PUB. 126

SAILING DIRECTIONS (ENROUTE)

★

PACIFIC ISLANDS

★

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Preface

Pub. 126, Sailing Directions (Enroute) for Pacific Islands, Tenth Edition, 2013, is issued for use in conjunction with Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia. Companion volumes are Pubs. 125 and 127.

Digital Nautical Charts 6, 12, and 13 provide electronic chart coverage for the area covered by this publication.

This publication has been corrected to 5 January 2013, including Notice to Mariners No. 1 of 2013.

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.

Charts.—Reference to charts made throughout this publication refer to both the paper chart and the Digital Nautical Chart (DNC).

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.—Users should refer corrections, additions, and comments to NGA's Maritime Operations Desk, as follows:

1. Toll free: 1-800-362-6289
2. Commercial: 571-557-5455
3. DSN: 547-5455
4. DNC web site: http://dnc.nga.mil/NGAPortal/DNC.portal
5. Maritime Domain web site: http://msi.nga.mil/NGAPortal/MSI.portal
6. E-mail: navsafety@nga.mil
7. Mailing address: Maritime Safety Office
   National Geospatial-Intelligence Agency
   Mail Stop N64-SH
   7500 Geoint Drive
   Springfield VA 22150-7500

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 Data Update (PDU) from the NGA Maritime Domain web site.

NGA Maritime Domain Website
http://msi.nga.mil/NGAPortal/MSI.portal

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.

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 Division website.

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.

Canadian Sailing Directions.

Various port handbooks.

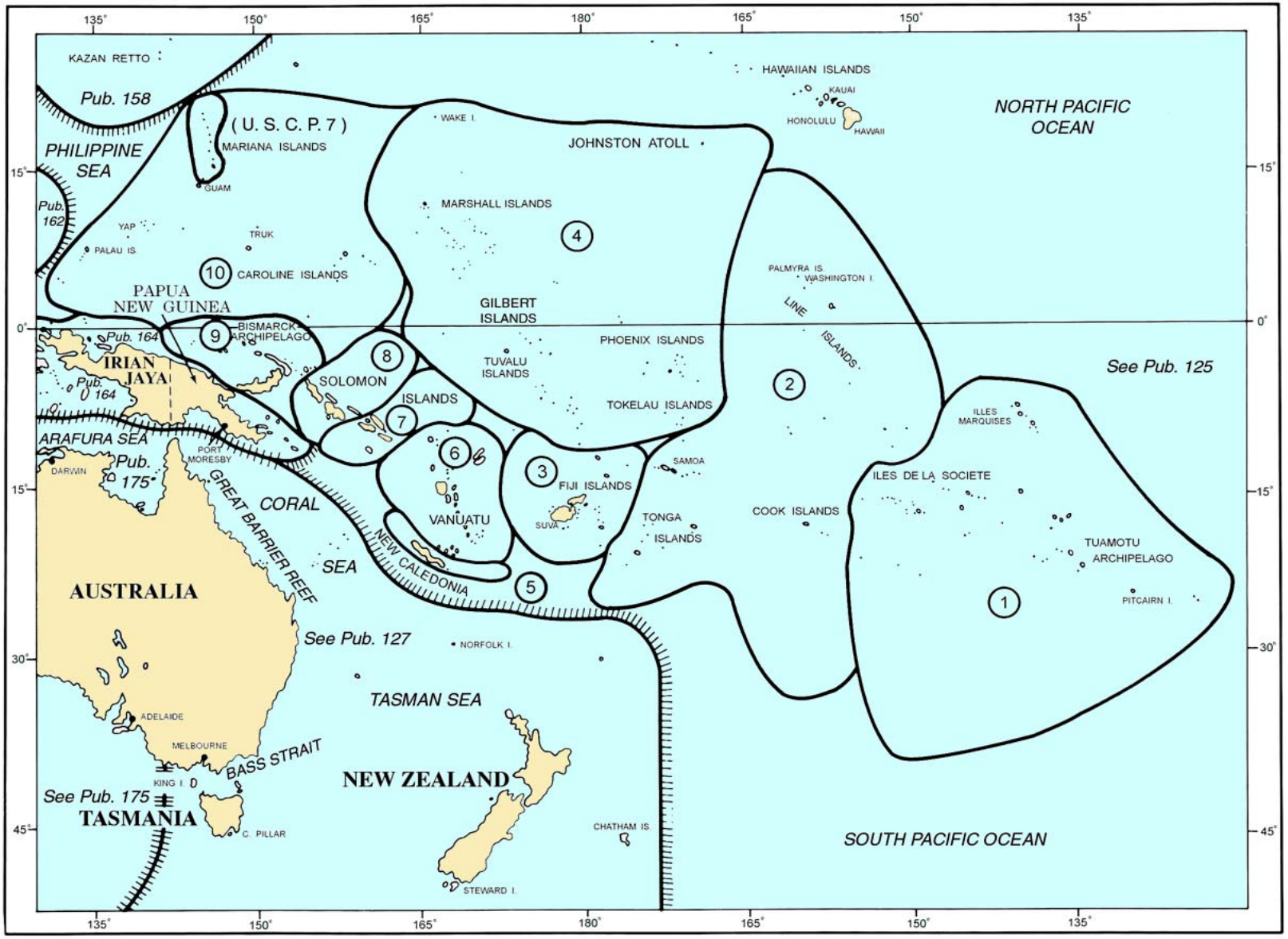
Reports from United States Naval and merchant vessels and various shipping companies.

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

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

Internet Web sites, as follows:

1. Port Authority of Guam
   http://www.netpci.com/~pag4
2. South Pacific Online
   http://www.sponline.com



SECTOR LIMITS — PUB. **126**

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

Abbreviations

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	SBM	Single Buoy Mooring
NAVSAT	Navigation Satellite	SPM	Single Point Mooring
ODAS	Ocean Data Acquisition System	TSS	Traffic Separation Scheme
CBM	Conventional Buoy Mooring System	VTC	Vessel Traffic Center
MBM	Multi-Buoy Mooring System	VTS	Vessel Traffic Service

Miscellaneous

AIS	Automatic Identification System	MMSI	Maritime Mobile Service Identity Code
COLREGS	Collision Regulations	No./Nos.	Number/Numbers
IALA	International Association of Lighthouse Authorities	PA	Position approximate
		PD	Position doubtful

The following abbreviations may be used in the text:

IHO	International Hydrographic Organization	Pub.	Publication
IMO	International Maritime Organization	SOLAS	International Convention for Safety of Life at Sea
loa	length overall	St./Ste.	Saint/Sainte

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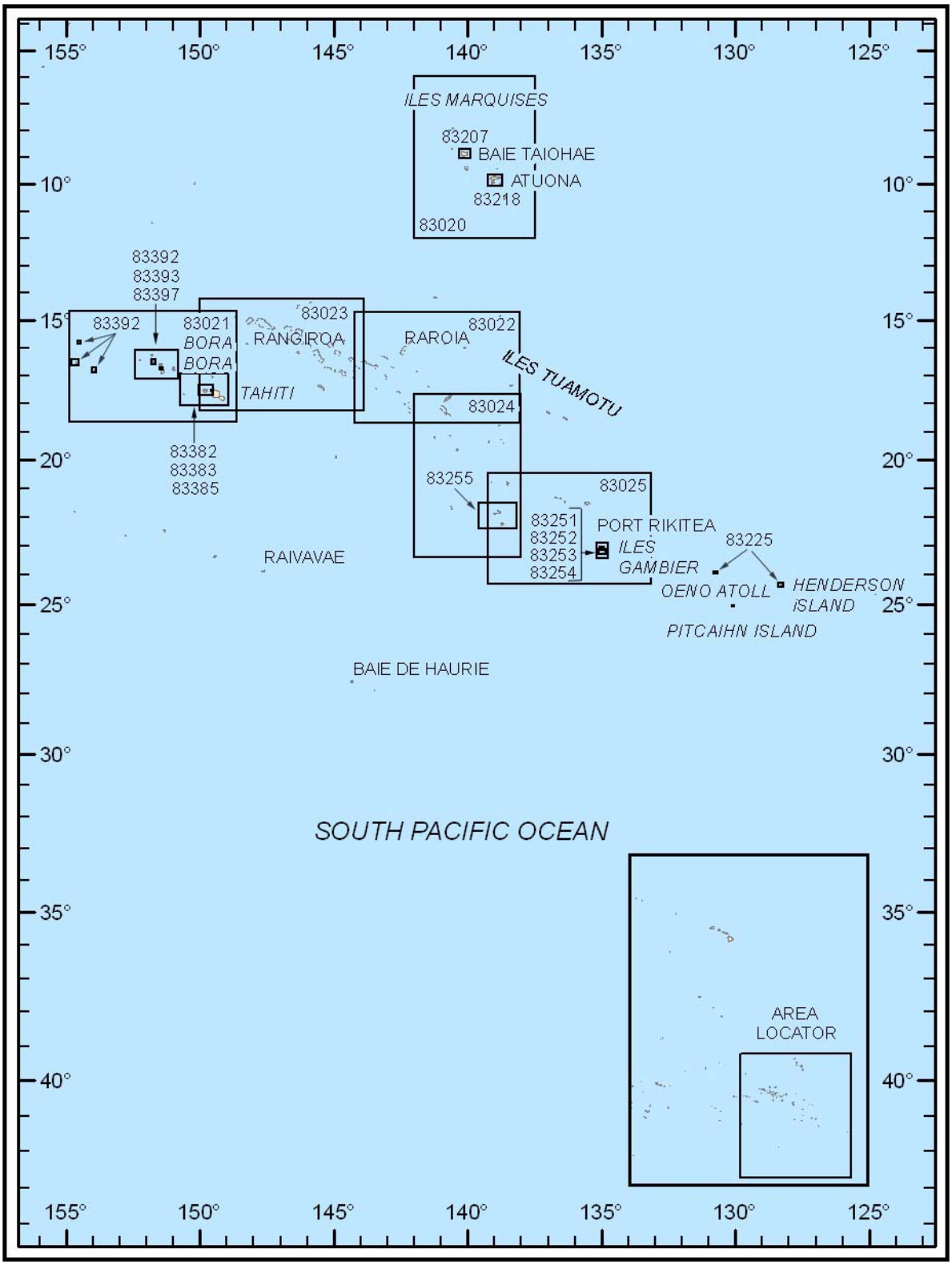

Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **1** — CHART INFORMATION

SECTOR 1

ILES TUAMOTU, ILES MARQUISES, ILES DE LA SOCIETE, AND ILES TUBUAI (INCLUDING OFF-LYING ISLANDS AND REEFS)

Plan.—This sector describes the islands, reefs, and dangers in a general area bound by 5°00'S and 42°00'S and between 120°00'W and 155°00'W. The island groups are described from NE to SW, with the islands within the group being described in a N-S direction.

General Remarks

1.1 The islands described within this sector are the territories of **French Polynesia** (20°S and 140°W) and **Pitcairn Island** (25°S and 130°W), a dependency of the United Kingdom.

French Polynesia, an overseas territory of France, extends between 7°S and 28°S, and 134°W and 155°W. The territory covers four chains of archipelagoes, with a collective land area of 1,522 square miles. Papeete, on the island of Tahiti, is the administrative capital controlled by a governor of four archipelagoes, as follows:

1. Iles Marquises (Marquises Island) (9°00'S., 140°00'W.).
2. Iles Tuamotu (18°00'S., 141°00'W.).
3. Iles de la Societe (Society Islands) (17°00'S., 150°00'W.).
4. Iles Tubuai (23°00'S., 150°00'W.).

Most E and W trans-Pacific routes and the international date line crossings by vessels on passages between groups of islands traverse the extensive area covered by this publication. These routes pass through or close to Papeete or Honolulu and are focal points for the South Pacific Ocean and the North Pacific Ocean. Other routes cross the ocean without passing through intermediate ports.

Generally, the passages between islands in a group or between groups of islands can be direct as safe navigation allows, since the track chosen is depended on location and distance. Most islands are located in the trade wind belts and within the limits of the Equatorial Currents. Favorable conditions are met by westbound vessels, except when a route follows in the Equatorial Countercurrent belt.

Fishing vessels, mostly Japanese, may be encountered anywhere in the Pacific Ocean. When engaged, fishing lines may extend to a length of 15 miles and reaching depths of 12 to 25m. Floats are attached to the lines, each at 0.1 or 0.2 mile span throughout the length. It is considered safe for all but deep-draft vessels to pass across midway between the floats.

In the vicinity of islands of French Polynesia, temporary fish havens exist. They are marked by orange lighted buoys with radar reflectors, and vessels should keep a minimum distance of 100m away from the area. Fish havens are artificial reefs constructed to attract fish.

Fish Aggregating Devices (FADS) are floating objects of varied shapes and forms to attract fish and may be encountered throughout a wide area anywhere from the Hawaiian coastal waters to the S of French Polynesian waters. FADS are normally moored in deep water and their positions may not be charted. Occasionally, FADS are marked with orange floats, flashing light, and radar reflectors. Concentration of fishing vessels also may be found in the vicinity. FADS are subject to break adrift from their moorings.

Lines of Oyster Cultivation Cages have been set aside on a number of the atolls in this sector. These lines consist of rope affixed to the surface of the buoy bases, which sometimes makes them difficult to see. Because the location of the lines can vary from month to month, reporting their precise location on charts is difficult.

Numerous aeronautical radiobeacons transmit from the islands of French Polynesia and may be useful to marine navigation. However, they are subject to caution since most transmit from low-lying islands and atolls of Tuamotu, while others transmit from high islands of SW Tuamotu and Iles Tubuai. There are no marine radiobeacons in the French Polynesia.

In French Polynesian waters, many of the navigable channels between the barrier reef and the coast are marked by the IALA Maritime Buoyage (Region A) System, or by the Special System as described below; however, local systems may also be in use along remote islands.

The IALA system is used to mark channels from seaward through gaps in the barrier reefs and the main channels within the barrier reefs to essential harbors and anchorages.

The Special System is used to mark minor channels within the barrier reefs in cases where the direction of fairways cannot be determined without ambiguity. Beacons having the same colors and topmarks may be used in place of buoys in either system. These channels are marked, as follows:

1. On the landward side, the markings are red can or spar-shaped buoys, with a topmark of a red hemisphere with the round side pointed upward.
2. On the side of the barrier reef, the markings are green conical or spar-shaped buoys, with a topmark of a green cone pointing downward.

It was reported that positions of some fixed marks determined locally were not accurate. Beacons situated on shoals, below water dangers, and buoys are reported to be in poor condition and cannot be relied for their positions.

Near the SE end of Archipel Des Tuamotu certain atolls are occasionally used for nuclear tests. When such tests are in progress the French authorities would declare the site, and an area of about 100 miles radius within the site to be considered dangerous.

Entry to French Polynesia is permitted only through:

1. Papeete (Iles du Vent).
2. Hao (Archipel des Tuamotu).
3. Mururoa (Archipel des Tuamotu).

Entry through Hao and Mururoa is further restricted by the regulated areas mentioned above.

Centre de Sauvetage Maritime (CCSM), a center for coordinating rescue at sea, has been established in Tahiti. Participants may contact the center on VHF channel 10.

Iles de la Societe requires a report to the Captain of the Port, Papeete at least 3 days before arrival at the pilot station by all vessels carrying bulk hydrocarbon, vessels carrying dangerous cargoes, and by vessels over 120m in length. Such vessels are also required to keep a VHF watch within the territorial waters of the archipelago.

Winds—Weather.—Isle Marquises are in the heart of the trade belt, but there is much less steadiness of winds here than in the trade belt in N latitudes. E wind is the most prevalent, but over the E waters of the group there is an annual tendency for the trades to be deflected a little to the N or E, while in the W waters there is a tendency for a deflection to the S or E. The E to SE winds taken together are more pronounced, as a rule, from April to October, while the E to NE winds are more prevalent in the intervening months. Among the E islands the average velocity is about 11 knots; among the W islands the average velocity is about 9 knots. The highest velocity occurs in July and August, when the average throughout the group is 12 knots.

Gales are of rare occurrence but the few heaviest squalls, so far as scanty records indicate, occur in December.

Iles Tuamotu, while in the nominal heart of the Southeast Trade Wind belt, is strongly dominated by E winds. Over the E part of the group, E to ENE winds are most prevalent, while in the W part the majority are from E to ESE. The NE inclination is most prevalent from November to May, and the SE inclination, from June to October. Some 80 per cent of the annual winds are from directions between NE and SE.

Occasional barometric depressions cross Iles Tuamotu, sometimes resulting in squally weather and temporary reversal of the trades into winds from W quadrants. These are most likely to occur from January to March, but may occur earlier or later in the season. There is no known record of the actual frequency of tropical cyclones in these waters.

Iles de la Societe and Papeete enjoy a prevailing E wind. This holds true for each month of the year and the E part of the group, and for most months in the W part. Northeast winds predominate, or are equal to, those from the SE, in the E part, except in June and July; during these months the SE winds are about twice as frequent as those from the NE. In the W part of the group, the SE winds are more frequent than the NE except in March and November.

At Papeete, due to local conditions, the drift prevails from the NE, except in September, when it is superseded by both N and SW directions; and in June, when it is equaled by winds from E and SW. North winds are frequent from September to February, and SW winds from April to December. Land and sea breeze effects are said to be definitely indicated.

The average annual velocity at sea is 9 to 10 knots. The strongest winds average 11 to 12 knots in the winter months.

Tides—Currents.—The general direction of current flow throughout this sector is W. However, under certain conditions the flow of current, in some areas, is E.

Particular and constant attention must be paid to the current when navigating among the island groups. When near the islands the current is sometimes deflected and is always accelerated. Again, most of the islands are so low that it is often impossible to see them at night, and ships may be driven on the encircling reefs without any warning from soundings; their having in general deep water close-to.

In the Iles Marquises the current, propelled by the prevailing trade wind, is usually W, between WNW and WSW, with a velocity of 0.5 knot, sometimes increasing to 3 knots. If the wind dies or if there are changes to the currents to the W, the current slacks, and during persistent W winds its direction changes. After a week of W winds a current setting to the E with a velocity of 3 knots, was observed in the strait between Hiva Oa and Tahuata.

The currents in the vicinity of Pitcairn Island and Henderson Island, in the SE part of the sector, set to the W at 0.5 knot.

In the Iles Tuamotu the currents are quite irregular. During the settled weather and a steady trade, the set is usually less than 1 knot to the W; but when the wind is W, which is frequently the case between October and March, the current is reversed and sets to the E at 1 to 2 knots. The uncertainty, on these occasions, as to the direction in which the current may be running, requires great caution when navigating among this mass of islands.

Among the Isles de la Societe the W set of the current is fairly regular with a velocity of 0.5 to 1 knot.

East winds, being the most frequent, the general set in the current is W. Strong winds from the W are liable to influence the velocity and at times reverse the direction of the current.

Normally, tidal currents within the passes or channels ebb and flood at 5 knots. Often there is a difference between the currents, with the outgoing current being the stronger. Generally the duration of slack water is greater at HW, but both slacks, if they exist, may be short. There are also locations where the tidal current cannot be counted on to turn with HW and LW.

In those lagoons which have passes, the tidal current is generally felt for 6 hours in each direction. The range of the tide in the passes is about 0.6m.

The S and W sides of most of these atolls are low, so that when a S swell has been running for some days, it breaks and a great volume of water flows into the lagoon. This usually occurs between mid-June and mid-September, especially during the season of strong SE trade winds. On occasions, after the swell has been running out for some days, a current runs out continuously for several days even without a period of slack water. In addition, sure indications of a strong current, up to 12 knots, setting out through the pass are: the race being so strong that it can be seen from a considerable distance, and the wake of the current extending considerably seaward of the pass.

Regulations.—Navigation in the territorial waters of Iles Tuamotu-Gambier is authorized and subject to the rules of innocent passage for foreign ships in French territorial waters.

Iles Marquises

1.2 Iles Marquises, lying between 7°50'S and 10°35'S, and 138°25'W and 140°50'W, are composed of three fairly distinct groups that lie in a general SE-NW direction.

The SE group consists of **Futu Hiva** (Futu Iva) (10°30'S., 138°40'W.), Mohotani (Motane), Tahuata, Hiva Oa, and Fatu Huka.

The central group consists of **Ua Pou** (9°25'S., 140°05'W.), Ua Huka, and Nuka Hiva.

The NW group is formed by **Eiao** (8°00'S., 140°42'W.), Motu One, and Hatutta.

All of these islands have the same aspect, they are high with abrupt and steep cliffy sides with few good anchorages. The islands are of broken irregular form, and may be seen at a distance of 50 miles in clear weather.

The administrative authority for Iles Marquises resides at Baie Taiohae in Nuku Hiva. Landing is not permitted on any of these islands until practique has been obtained from the administrative authority.

1.3 Hatutu (7°55'S., 140°34'W.) is about 3.5 miles long in a NE-SW direction and about 1 mile wide. The island rises to a height of 407m and is almost entirely cliff-ringed. A conspicuous rock, 147m high, lies off the island's NE side. It does not offer any shelter, with the exception of a cove in its S part, which is able to accept the anchoring of small vessels as well as their landing. The island is uninhabited.

Motu One (Ile de Sable) (Sand Island) (7°52'S., 140°23'W.), ENE of Hatutu, is a coral shoal about 0.8 mile long. It is covered by a white sand dune, approximately 300m in length and 100m in width, with a maximum height of about 3m. Motu One rests on a base that extends about 2 miles to the N and 8 miles to the E, and on which it is impossible to anchor.

Breakers were reported about 470 miles NNE of Ile de Sable in position 0°08'S, 139°19'W. Breakers and discolored water have been reported 120 miles SW and 135 miles WSW, respectively, from the above position. A depth of 27m has been reported about 360 miles WNW of the position. Less water is reported (2007) in a position approximately 10 miles E.

1.4 Eiao (8°00'S., 140°42'W.) lies SW of Hatutu; it rises to a height of 576m. The S coast of the island is formed by a perpendicular cliff, but the NW and W coasts are indented by several small bays. Its SE point displays a noticeable rock in the shape of an obelisk. This island is uninhabited.

The channel separating Eiao from Hatutu should be navigated with caution. A 6.4m shoal lies in the E entrance, while a reef, which has been reported to break, lies in the middle of the passage. The current generally sets NW through the channel with some strength.

The passage between Eiao and Motu Iti, further S, reportedly contains depths of 20 to 60m, and will be described with Nuku Hiva. Banc Hinakura, with a depth of 38m, lies 13 miles WNW of Eiao. A depth of 35m was reported 12 miles SW of the S extremity of Eiao, while a depth of 27m lies about 11 miles further SSW.

One can anchor at the opening of Vaituha Bay on the NW coast, in 27m, sand and mud, keeping the SW point of the bay bearing 247° at 0.2 mile.

In Charner Bay, also to the NW of the island, there is good anchorage, in 30m, sand and gravel, but it is not well sheltered from the swell which is felt strongly there.

1.5 Nuku Hiva (8°52'S., 140°08'W.), the principal island of Iles Marquises, lies SSE of Eiao. The island is 14 miles long E-W and has a maximum width of 11 miles. It is mountainous and rises to a height of 1,224m in its NW part. The mountains are steep toward the sea; the peaks are often hidden by clouds, giving them the appearance of a table mountain when seen from a distance.

Numerous waterfalls can be seen on its N and S sides; the most remarkable falls from a height of 600m, 1.5 miles ENE of the S extremity of the island.

Tides—Currents.—Northward of the N coast of the island the current always sets strongly to the W, however, off the NE extremity the current sets onto the coast. Off the SE extremity of the island, it is somewhat variable, sometimes setting E, though it usually follows the direction of the trade wind. Off the S central part the current generally sets strongly W.

Caution.—A local magnetic deviation was reported (1907) on Nuku Hiva, in position 8°54'S, 140°05'W.

Cap Atupa Atua (8°49'S., 140°00'W.) is the NE extremity of the island. On the extremity of the point, and at two-thirds of its height, are two rocks, which when seen from certain directions appear like grotesque statues of a man and a woman. A remarkable rock lies about 1.3 miles further SW.

The coast between Cap Atupa Atua and Cap Tikapo, 8 miles S, is indented in its N part by Baie Hatuatua, which is exposed. The remainder of this coast is formed by almost perpendicular cliffs.

1.6 Cap Tikapo (Cap Martin) (8°57'S., 140°00'W.), the SE extremity of the island, is high and steep-to. Above its cliffs is a mass of rocks; seen from SE and S these rocks resemble a tower, but when seen from SW they incline toward the sea. A rock, 1m high, lies 0.3 mile S of the cape; it breaks in a heavy sea. Vessels should avoid attempting to pass between the rock and the cape as it has been reported to be encumbered with uncharted submerged rocks.

From Cap Tikapo, the coast trends WSW to **Pointe Chickakoff** (8°58'S., 140°10'W.), the SW extremity of the island. It is rocky and the bays on the coast, which provide shelter, are described from E to W.

Baie de Controleur, entered immediately W of Cap Tikapo, recedes 3.8 miles NNW. The head of the bay is divided by two high points into three inlets, each extending NW.

Anchorage.—Anchorage is available for small vessels in any of the inlets, the central one possessing a wharf which may be subject to a heavy surge. Larger vessels may find anchorage, in a depth of 26m, sand and mud, with the point dividing the central cove from the W cove bearing 234° and about 0.4 mile distant. Anchorage in any of the coves provides shelter in NE winds, but may be subject to a heavy swell at the outer berths. There is an anchorage for yachts about 1,200m W of Fort Collet and NNE of Banc de Corail.

The shoal remains of two ancient volcanoes, with depths of 46 and 49m, lie about 27 miles WSW of Nuku Hiva.

1.7 Baie Taiohae (Anna Maria Bay) (8°56'S., 140°05'W.) (World Port Index No. 56015), entered between Sentinelle de l'Est, 4.5 miles W of Cap Tikapo, and Sentinelle de l'Ouest, 0.8 mile farther W, affords the largest and safest anchorage in Iles Marquises. The residency of the French Government Administrator for Iles Marquises is situated on the E shore, 1.3 miles within the entrance. The general depths are from 50m in the entrance to 10m W of the residency. An obstruction has been reported to lie about 0.3 mile WSW of the residency.

Baie Taiohae

Depths—Limitations.—A pier, with depths of 5 to 7m alongside, is situated 0.4 mile S of Fort Collet; this pier is used by fishing vessels. In heavy surf, mooring at this pier is dangerous.

Aspect.—Approaching from the S, the bay may be identified by the high crescent of mountains around it, and by a large white cross of crystalline rock in the face of the perpendicular cliff on the E side of the entrance. The islets on each side of the entrance are difficult to identify from the W, but Pointe Arquee, close within the E entrance, is an excellent landmark. A red-roofed building, the ruins of a fort, and a monument are useful landmarks. Lights are shown from the ruins and the head of the bay.

Anchorage.—Anchorage is available, in depths of 13 to 20m, sand, about 0.3 mile off the light shown from the ruins, with the light bearing between 050° and 075°. An obstruction lies 0.3 mile W of the ruins of Fort Collet. Anchoring is prohibited within the bearing between 347.5° and 010.5° of the light sectors. Small craft anchor W of the light.

This anchorage has been reported to be sheltered from all but S winds, but from April to September a swell may be felt, and squalls from the NE or NW may be experienced.

The coast for about 3.5 miles W of Baie Taiohae is rocky and is broken by several small bays. The bottom near the coast is strewn with rocks; a large vessel should give it a good berth.

Baie des Tai Oa (Tai Oa), 3.5 miles W of Baie Taiohae, is entered between a black rocky point on the E, and a cliff with a jagged peak above it on the W. In a strong wind the sea breaks heavily on the E entrance point, and the entrance to the bay is always rough.

A point separates two creeks at the head of the bay. Anchorage, with little room to swing, may be taken, in 12m, with the point separating the two creeks bearing 300°, distant 0.2 mile. Should the vessel drag during a squall, it will be unable to bring up before being drawn onto the rocks.

1.8 The W coast of Nuku Hiva trends NNW from Pointe Chickakoff, 1.5 miles W of Baie des Tai Oa to **Pointe Hinahaapapa** (8°49'S., 140°13'W.), 11 miles distant. This side of the island is known as Henua Ataha or Desert Land; instead of being steep and abrupt, it slopes up gradually to the mountains. The control tower and the airport building are prominent in the vicinity of Pointe Hinahaapapa.

Baie Marquisienne, 3 miles NNW of Pointe Chickakoff, can be recognized by the red cliffs near its entrance. Vessels with a length of 85m or less may anchor temporarily, in a depth of 24m, with the S point of the bay bearing 157°, distant 0.2 mile.

Baie Haopu, 5.8 miles N of Baie Marquisienne, has an anchorage for vessels up to 85m, sheltered from E winds, in a depth of 24m; however, swell affects in the bay and landing is difficult. Vessels anchor midway between the S point of the bay and an isolated rock on the N shore. Care should be taken to avoid the rocky head, which uncovers, located about 90m SW of the isolated rock.

From Pointe Hinahaapapa, the coast trends in an E direction

for a distance of 13 miles terminating in Cap Atupa Atua. It is indented by several bays, but during the season of NE winds, which veer to the N, they do not afford shelter.

1.9 Baie Hakaenu (8°48'S., 140°10'W.) is located W of a steep wall of black rock; its entrance is difficult to distinguish. The bay is about 0.2 mile wide and about 0.4 mile deep. There is good shelter from E winds, but is accessible only to small vessels. The depth in the middle of the bay is about 14.6m, sand. Baie Hakaenu offers better holding ground with less swell effect. The N extremity of the island lies close E of Baie Hakaenu. Baie Vaekao (Vaekao-Hapapani) lies 1.5 miles SE of Baie Hakaehu. Baie Hakapa lies 1.8 miles farther ESE.

Baie Atiheu (8°50'S., 140°04'W.) is entered E of a comparatively-low bare point, 2 miles E of Baie Hakapa, and a bare point 0.8 mile NW, which may be recognized by a bluff of black rocks 75m high. The bluff is steep-to with a depth of 29m close to its base.

Anchorage.—Anchorage may be obtained, in depths of 20 to 26m, about 0.4 mile off a conspicuous church situated at the head of the bay, with the church bearing 171°. Violent squalls from the SE sometimes blow from the steep mountains in the inner part of the bay. With NE winds, the sea is sometimes heavy, and nearly always rough.

1.10 Baie d'Anaho (Baie Anaho) (8°49'S., 140°03'W.) is separated from Baie Hatiheu by a broad promontory about 0.8 mile wide, which rises to a height of 300m.

With winds from the SE to ENE, the sea in the bay is calm, but when backing to NE, the swell begins to be felt; ESE squalls blow over the narrow isthmus separating this bay from Baie Hatuatua, and the current in the bay sometimes sets strongly W.

The depth in the bay decreases gradually from about 46m in the entrance to 9.1m about 0.1 mile from the head.

The E shore of the bay is free of dangers, but the W side of the head of the bay is fringed with a coral reef, which dries in places; an inlet in the reef offers a landing place.

Anchorage.—Anchorage may be obtained in any part of the bay, but vessels usually anchor in a position about 0.3 mile S of Pointe de la Mesange (Pointe Mesange), on the W side of the bay, 1 mile within the W entrance, in 21m.

Baie d' Hataivea (Baie Hataivea), a large exposed bay, lies close E of Baie d'Anaho. Poiku, a flat-topped island, lies close N of its E entrance, and Rocher Motu Iti, a pointed rock, lies close NW of its W entrance point. Cap Atupa Atua lies 1.3 miles E of the bay.

1.11 Motu Iti (8°41'S., 140°37'W.) WNW of Nuku Hiva, consists of three islets. The largest rock is volcanic and rises to a height of 220m. With the exception of a little vegetation on its W side the rock is barren.

The other two are also barren and lie close E. Some rocks, which are awash, almost join these two islets, and submerged rocks extend E from the E islet.

The islets are surrounded by a bank of muddy sand and coral, with depths of 24m within a distance of 2 miles. There are depths of 11 to 15m near the W side of the largest island.

Banc Lawson (8°42'S., 140°46'W.) has a least depth of 14.3m charted 9.5 miles WSW of Hatu Iti.

Banc Clark (8°05'S., 139°38'W.), with a least reported depth of 9.3m, lies 50 miles NNE of the NE extremity of Nuka-Hiva. The bank is about 4 miles in extent. Two shoals, covered by 35 and 42m, respectively, lie 25 and 35 miles WNW of this shoal. It is advisable to avoid this area due to the suggestive presence of submerged reefs.

1.12 Ua Huka (Washington Island) (8°55'S., 139°33'W.) is dominated by a high chain of mountains that rise to a height of 884m; spurs and valleys radiate to its coasts.

There are several detached rocks off the N, W, and S coasts. There are depths of 40 to 46m, 0.5 to 2 miles offshore, all around the island.

The island, which is round in shape and slightly indented on its S side, has many bays and coves, but the principal anchorages are along the S coast.

Pointe Teho te Papa (8°57'S., 139°29'W.) is the SE extremity of the island and Pointe Tekeho, 5.3 miles W, is the S extremity. From the W, Pointe Tekeho appears to be detached from the island and resembles an islet.

Motu Haane, 155m high, shaped like a sugarloaf, and formed by dark violet-red rocks, lies 2.3 miles WNW of Pointe Teho te Papa.

Baie d'Hananai is entered close NNW of Motu Haane. Rocks, with depths of less than 1.8m, lie near the head of the bay. Large vessels may anchor about 0.1 mile W of Motu Haane, in a depth of 30m, sand, good holding ground. This anchorage is exposed, however, with a current which tends to swing the vessel across it. Better anchorage might be had E of Motu Haane, with its N point bearing 270°. Small vessels anchor in the center of the bay, about 0.3 mile off the bay's head, in a depth of 15m.

Motu Papa, 28m high, lies 0.1 mile offshore, 1.4 miles WSW of Motu Haane. The islet has reddish perpendicular sides, and a flat top inclined towards the mainland.

Baie de Vaipaee (Baie Invisible) is located 1 mile W of Motu Papa. It is a narrow bight that indents the coast about 0.5 mile in a NNW direction. The bay may be identified when directly off its entrance by the sandy beach at its head. At the entrance, where the depth is 31m, there is always a heavy choppy sea. Only small vessels can use this deep bay, as there is no room to swing. With winds from the N to E, the sea is calm inside, but with winds from the SSE the surf sets in and it becomes dangerous. On the W side of the bay is a large hill and a light shows from a beacon in the vicinity of Mata te hotu.

1.13 Pointe Tekeho (8°57'S., 139°35'W.) is a black cape, 107m high. When this point is seen from a distance, it appears as a wedge, inclined toward the beach.

Ile Teuaua lies 0.6 mile W of Pointe Tekeho and Ile Hemeni, 97m high, lies 0.1 mile W of Ile Teuaua. Motu Keo Keo lies close off the W side of Ile Hemeni.

Baie Chavei (8°57'S., 139°35'W.) is entered 1 mile NW of Pointe Tekeho. There is anchorage, in a depth of 20m, with the peak of Ile Hemeni bearing 190°, and Pointe Tekeho bearing 107°; the bottom is sand. This anchorage is sheltered with winds from the N through E to SE, and is protected from the swell by the islands. Less water is reported 2 miles NE of Roches Epiti (2007), other shoals may be unreported in the area.

Ua Pu (Ua Pou) (9°23'S., 140°05'W.), an island about 8 miles long N-S, with a width of 7 miles, rises to a height of 1,203m near its center. The tops of its mountains are more jagged than those of the other islands in this archipelago, and some of the summits resemble towers or spires when seen from the distance. In the SE part there is a remarkable table mountain, topped on each side by spire-like pinnacles.

A number of islets, some of them remarkable, lie within 0.5 mile of the coast.

On the W side of Ua Pou are numerous villages and several anchorages. It is generally calm, but squalls are occasionally experienced.

The whole E coast is exposed to wind and sea, and caution is necessary in its vicinity as a strong W current sets onto it.

1.14 Motu Mokoe (9°22'S., 140°01'W.) consists of two islets that lie about 0.5 mile off the NE extremity of the island. These two barren islets are separated by a narrow dangerous channel. Depths of 32 to 40m, sand, have been reported about 2 miles N of these islets.

Rocher Tapukava lies 0.2 mile SE of the S extremity of the island and **Motu Oa** (9°29'S., 140°03'W.), 112m high, lies 0.8 mile SSE of the same point. Rocker Tamuko and Rocher Papati, 86m high, lie 1.3 miles and 1.8 miles NE, respectively, of Rocher Tapukava.

Motu Takahe (9°28'S., 140°04'W.), 237m high and shaped like an obelisk, lies 1.8 miles NW of Motu Oa.

From Motu Mokoe, the E coast trends SSE to the island's S extremity, and is indented with numerous bays.

Baie de Hakahau (9°21'S., 140°06'W.) is about 1.8 miles WNW of Motu Mokoe. A breakwater extends about 180m WSW from a position 150m SSW of Pointe Mataiva, the E entrance point of the bay.

Anchorage.—Anchorage in the bay is partially sheltered from the prevailing winds. In good weather, a vessel may anchor in the entrance to the bay, with Point Mataiva bearing 120°, in a depth of 16m; the holding ground is good.

Caution.—It has been reported (1990) that, since the completion of the breakwater, Baie de Hakahau is subject to silting in its SE part and to scouring in its SW part.

1.15 From the N extremity of the island the W coast trends SW about 4.5 miles to **Pointe Punahukua** (9°23'S., 140°08'W.), its W extremity, then about 7.5 miles SE to the S extremity of the island. It is indented by several bays; some of them afford convenient anchorage.

Baie de Hakahetau (Haka Hetau) (9°21'S., 140°06'W.) can be recognized by the beach that borders the head of the bay, by the coconut palm plantations, and a chapel. Roches Rouges (Red Rocks), on the E entrance point, is conspicuous. Motu Koio, 90m S of Roches Rouges, and Motu Kivi, 8m high, located on the E side of the beach 0.3 mile S of Motu Koio, are good landmarks. To the E of Moto Kivi Islet, there is a boat dock 5m long. Large vessels may anchor off the bay with the church at Hakahetau bearing 345° distant 0.5 mile, in depths of 22 to 29m.

Baie de Vaiehu (Vaieo Bay) (9°23'S., 140°08'W.) is entered between Punahukua Point and Pain de Sucre (Sugar Loaf). Pain de Sucre, 143m high, dominates the S part of the bay, but is difficult to distinguish when approaching from the N. It is preferable to approach the bay from the SW and anchor when the NW side of the entrance bears 321° and Pain de Sucre bears 181°. The anchorage, in 20m, sand and mud, is protected from E winds.

From Pain de Sucre, the coast trends SSE to Baie Hakatao. Baie de Hakamaii, located about 1.5 miles SE of Pain de Sucre, may be recognized by a conspicuous island off its entrance and a conspicuous church within. The bay offers anchorage, in a depth of 20m, good holding ground, with the church bearing 240° and about 0.3 mile distant.

Baie Hakatao (9°27'S., 140°05'W.) may be identified by a village with a chapel, and a group of three white crosses, all standing on the bay's S side. Anchorage is available midway between the rocky entrance points, on holding ground reported to be good, but depths not stated. This anchorage is exposed to a heavy swell and winds from the SE.

The S group of Iles Marquises includes four islands; from N to S they are Hiva Oa, Tahuata, Motane, and Fatu Hiva. Ilot Fatu Huku lies N of Hiva Oa and Rocher Thomasset lies NE of Fatu Hiva.

1.16 Fatu Huku (9°27'S., 138°55'W.), E of Ua Pou, is 361m high. The coasts of the islet are abrupt cliffs and steep slopes. It is surrounded by a bank with depths of 9 to 12m. There are two heads, one with depths of 5.4m, 2 miles NNW, and the other with depths of 6.8m, 1.3 miles NE of the islet; the sea breaks on these heads. The shoals also extend 1.7 miles SE of the island where a depth of 8.3m is reported.

Hiva Oa (9°47'S., 138°58'W.), 22 miles long E-W and about 7 miles wide, is the largest and most populous of the Iles Marquises. The island is mountainous with the highest being Mont Temetiu (Mont Temeti), 1,213m high, on the W side.

The N coast of the island is indented by numerous bays. The principal ones, those with anchorages sheltered from SE winds, are, from E to W, Puamau, Hanatekua, Hanaiapa, and Hanamenu. There is a rock, awash, about 0.5 mile N of the N extremity of the island.

The S coast is bordered by abrupt cliffs for 14 miles from the E extremity and has no shelter. The W part of the S coast forms Baie des Traitres (Vipihai). In the N part of the bay are the principal villages Atuona and Baie Taahuku, a sheltered anchorage for small ships.

The coast to the W of Baie des Traitres is overhung by heights that rise more than 500m, with abrupt slopes that offer no shelter.

Cap Balguerie (Matafenua) (9°45'S., 138°48'W.), the E extremity of Hiva Oa, terminates a long, high, and rocky promontory. It is surrounded by several isolated rocks; the highest, Motu Ofio, is 20m, located off the SE side, and Motu Tabu (Motu Tapu), in the shape of a truncated cone, lies to the NW of the cape.

1.17 Baie Puamau (Perigot) (9°46'S., 138°52'W.) is surrounded by mountains. The bay is entered between Pointe de l'Obelisque (Pointe Tahanamoa), on the E, and Bastion Point (Pointe Mataai), about 0.7 mile NW.

Banc Boulard, with a depth of 4.6m, lies about 0.2 mile WNW of Pointe de l'Obelisque. Rochers Jacquemart, also known as Motu Ana Kei and Motu Ana Momo, lies 180m S of Banc Boulard; these two rocks lie close together and are diffi-

Baie Taahuku

cult to identify when approaching from the W.

A small concrete jetty is situated on the E side of the bay at about 0.5 mile SW of Pointe de l'Obelisque, often a heavy swell exists at the jetty.

The N coast of the island trends WNW from Bastion Point for a distance of 4.5 miles, then N about 3 miles to Pointe Mautau (Cap Matau), the N extremity of the island.

Anchorage.—Anchorage, in depths of 20 to 23m, sand, good holding ground, is available with the hill on Pointe de l'Obelisque, seen between Rochers Jacquemart bearing 355° and with Bastion Point in line with a point located about 0.8 mile NNE of it bearing 105°. There is always a swell, and with a fresh breeze from the NE to NW the sea becomes heavy in the bay; the current enters the bay and sets directly onto Pointe du Bastion.

1.18 Baie Anahi (9°44'S., 139°56'W.), 3.5 miles W of Bastian Point, affords good anchorage with winds between the SE and ENE. The depths gradually decrease from 26m in the entrance toward the head of the bay.

A rock, awash, lies about 0.9 mile N of **Pointe Mautau** (9°42'S., 138°59'W.).

Baie Hanatekua (Hana Tekua), 0.5 mile W of Pointe Mautau, affords anchorage to small craft, in a depth of 26m, sand, with the NE point bearing 250°. Anchorage may also be taken outside a line joining the two entrance points, in 29 to 38m, good holding ground.

Baie Hanaiapa (Hana Iapa) (9°43'S., 139°00'W.) is entered between Pointe du Dome and Pointe Jouan, 0.5 mile SW. It can be recognized by La Borne, 15m high, located 0.2 mile N of Pointe Jouan, and a waterfall 1 mile W of the bay. A number of unmarked reefs lie about 160m SW of La Borne.

Anchorage.—There is good anchorage in the middle of the bay, in 17m, sand, sheltered from E winds. On the E coast of the bay is a small quay. Surf conditions make access difficult.

Baie Hanamenu (Hana Menu) (9°46'S., 139°08'W.), which is entered between Pointe Gaussin and Pointe Bonnard, 0.6 mile WSW, is divided into two parts by Grosse Tour, a steep point of dark red rock, 224m high.

Anchorage.—The best anchorage is in the E bight, in 20m, with the N extremity of Grosse Tour bearing 290° and a grotto S of Pointe Gaussin bearing 040°. Violent SSE squalls are sometimes experienced at this anchorage, especially at night.

Pointe Kiukiu (Pointe Kiutiu) (9°47'S., 139°10'W.) is the W extremity of Hiva Oa. From Pointe Kiukiu, the coast trends SE for about 10 miles to **Pointe Teaehoa** (9°51'S., 139°01'W.); it is rugged, has steep cliffs, and is inhospitable.

Baie des Traitres, N of Pointe Teaehoa, is about 2 miles wide. The bay is open to the E, and its S part is exposed to the wind and sea.

Ilot Hanake, a rocky islet 37m high, lies about 0.2 mile offshore, 2 miles N of Pointe Teaehoa.

1.19 Atuona (9°49'S., 139°02'W.) (World Port Index No. 56010) stands at the head of a small bay about 0.4 mile N of Ilot Hanake. This is the seat of the Bishop of Iles Marquises and has a radio station.

Depths—Limitations.—There is a concrete jetty close to the mole.

Aspect.—A monument is situated about 0.5 mile NW of Pointe Feki; it may be obscured by coconut palms. The light standing on the point is prominent. The bell tower, triangular and topped with a cross, of the village of Taaoa W of the bay is a conspicuous landmark.

Anchorage.—Anchorage may be taken, in 28m, sand and coral, 0.3 mile off the light shown from Point Feki, with the light bearing 003°. For vessels remaining overnight it is preferable to anchor with the E extremity of Ilot Hanake bearing 270° and the light bearing 334°, in a depth of 35m.

Anchorage may also be taken in Baie Tahauku (Taahuku Bay), which is entered E of Pointe Feki, about 0.5 mile NNE of Ilot Hanake. The anchorage, in 10m, good holding ground, lies with the light on Pointe Feki bearing 253° and the head of the bay bearing 022°. Ships over 100m in length and drawing more than 7m should not use this anchorage. Two anchors should be used to minimize the vessel's swing.

At night, vessels should approach these anchorages by keeping in the white sector of Atuona Light bearing between 332.5° and 339.5°, then adjust course as required to the anchorage.

The current generally sets W along the S coast of Hiva Oa, but in Baie des Traitres it follows the trend of the coast and sets toward Pointe Teahoa (Flat Point), which is located 0.5 mile ENE of Ilot Anakee. After a rain its strength is considerably increased by the flow of the numerous streams which empty into the bay.

Canal du Bordelais (Haava), which separates Hiva Oa from Tahuata, S of it, is 2 miles wide, deep, and clear of dangers. There is always a strong wind and a high sea in this channel. The current generally sets W at 2 to 3 knots, but after W winds have prevailed for some time the current is reversed and sets E at about the same rate.

Tahuata (Tahu Ata) (9°57'S., 139°05'W.) is about 8 miles long N-S and about 5 miles wide. A narrow ridge of mountains that rises to a height of 472m extends the length of the island. Spurs descend from the mountains to the coast, separated by deep narrow valleys watered by streams.

The steep E coast of the island should be avoided; the only anchorages are on the W side.

Baie Hana-moe-noa, 2.3 miles SW of the N extremity of the

island, affords anchorage for small vessels, in 10m, sand and gravel, good holding ground.

1.20 Baie Vaitahu (9°56'S., 139°07'W.), about 1.8 miles SSW of Baie Hana-moe-noa, lies under the highest part of the island. A high, rocky hill stands above the S entrance point of the bay; the N entrance point rises more gradually. There are two beaches at the head of the bay and the village of Vaitahu may be seen; there is a chapel here with a red roof, while a red-roofed government office building surmounted by a flagstaff is also visible.

Anchorage.—Large vessels anchor, in a depth of 50m, sand, with the flagstaff bearing 106°, 0.4 mile distant. Smaller vessels anchor, in a depth of 20m, sand bottom, with the flagstaff bearing 103° and about 0.2 mile distant. When the trade wind is blowing, violent squalls sweep down the valleys at the head of the bay; as the bottom slopes steeply, there is always the danger of dragging.

Landing can be affected at the foot of the cliff N of the beach. A footpath leads from this landing to the village.

Baie Hapatoni lies about 2 miles S of Baie Vaitahu. A rock, resembling a tower, marks the entrance on the S side of the bay, and a chapel is visible at the bay's head.

Vessels should drop anchor in depths of at least 60m to allow for adequate swinging room. The holding ground is poor. There is a landing place on a beach N of the village and another in the SW part of the bay.

1.21 Cap Te Hope o Te Keho (Tehopeote Keho) (10°02'S., 139°07'W.) is the S extremity of the island. A rock, with a depth of 6.5m, lies 0.9 mile offshore, 3.3 miles NNE of Cap Te Hope o Te Keho.

Motane (Mohotani) (10°00'S., 138°50'W.) lies E of Tahuata. It is 520m high in its S part, becoming gradually lower toward its N end, which terminates in a rocky point.

Ilot Terihi lies off the SE extremity of the island; the jagged top of this high islet, with a needle rock standing on it, affords a good landmark.

The E coast of Motane is formed by cliffs intersected by ravines and landslides. Its S and SW coasts are bordered by high, vertical cliffs.

Anchorage.—Anchorage for small vessels may be taken in Baie de Puhioono, about 0.6 mile SW of the N extremity of the island.

1.22 Fatu Hiva (10°28'S., 138°39'W.), the S island of Iles Marquises, lies SSE of Motane. The island is 8 miles from N to S and 4 miles wide; it rises to a height of 960m in the S part.

The E side of the island is extremely rugged; steep ridges extend from the mountain ranges terminating in high precipices over the sea. On the N and S ends the land slopes more regularly toward the sea.

The most noticeable feature on the W coast is Pointe Tataaihoa, the SW extremity of the island, which is a rocky cliff, 213m high, overhanging the sea. Ships passing within 3 miles of the W coast are exposed to a heavy swell, and strong squalls may be experienced even though the prevailing weather is calm.

Baie Havana (Hana Vave) (10°27'S., 138°39'W.) is entered 2.5 miles SSE of Pointe Aimoua (Aimua), the NW extremity of the island. From the W the bay may be identified by a 125m high group of pinnacle shaped rocks. From the E, two groups of rocks located about 0.2 mile E of the SW corner of the bay's head; the rocks are 120m high. The bay is entered on a course of 103°, with the N pinnacle of the N group of conspicuous rocks in the bay's SW corner, mentioned above, and a conspicuous white tooth-shaped peak half way up the mountain slope to the E in alignment. Vessels anchor, in depths of 40 to 60m.

Caution.—Caution is advised as the holding ground is indifferent, and as the bottom slopes steeply seaward, vessels have been known to unexpectedly drag their anchors and drift out to sea. Violent squalls blow down the valley towards the anchorage.

1.23 Baie d'Omoa (10°30'S., 138°40'W.) is entered between Pointe Motahumu on the N and a black rocky bluff on the S.

To enter the bay, steer 095° for Pierre Bonhomme, a conspicuous slender pinnacle rock, and anchor when Pointe Motahumu bears 007° for small vessels, or 017° for large vessels. Depths at both positions are 20m and 30m, respectively, sand. The anchorage is poor and a heavy swell rolls into the bay. During W winds, the bay is untenable.

It was reported that tooth-shaped peak is not easily identifiable; however, anchorage can safely be approached by steering for the center of the bay.

A concrete jetty is situated at Pointe Motahumu; landing is usually difficult as heavy swells prevail.

Rocher Thomasset (10°21'S., 138°26'W.) lies ENE of the N extremity of Fatu Hiva and is 4m high; partially emerged from an underwater mount, covered by about 41m of water at about 500m from the rock. Caution is necessary when navigating in this vicinity at night.

A shoal, with a depth of 18.3m, was reported to lie 26 miles NE of Rocher Thomasset. The existence of this shoal has been confirmed.

Pitcairn Island and Adjacent Islands

1.24 Pitcairn Island, Henderson Island, Ducie Atoll, and Oeno Atoll are British possessions. They form the district of Pitcairn and are administered under the United Kingdom High Commissioner to New Zealand, as Governor, by a council consisting of a Chief Magistrate and four other officers. Though far apart, they form a separate group lying off the SE end of Iles Tuamotu, and about 1,170 miles SE of Fatu Hiva in Iles Marquises.

Ducie Atoll (Ducie Island) (24°40'S., 124°47'W.), is the E island of the group. A low islet covered with trees lies on the reef on the N and NE sides of the lagoon; several smaller islets, also covered with trees, lie on the reef on the S side of the lagoon. Breakers extend for 0.5 mile S from the atoll.

Henderson Island (24°22'S., 128°19'W.) is about 31m high, with a flat surface covered with trees and dense undergrowth, except for its S extremity. On all sides except the N it is bounded by perpendicular cliffs, about 15m high, and considerably undermined by the sea. The island is about 5 miles long in a N-S direction and 2.8 miles wide. A reef extends about 0.1 mile from the NW point.

Anchorage.—Anchorage for small vessels, in 27m, sand and coral, may be taken 0.5 mile SW of the NW extremity of the island. Larger vessels may anchor farther out, in 37 to 46m, but with NW winds, this anchorage becomes untenable.

There is a deep, but narrow, boat passage through the reef, 0.3 mile S of the anchorage.

1.25 Pitcairn Island (25°04'S., 130°05'W.), about 2 miles long in an ESE-WNW direction, rises to a height of about 337m. The shore consists of high and almost vertical cliffs, except in one or two places. The island is thickly covered to the summit with luxuriant vegetation and the cliffs are skirted at their base with thickly branching evergreens.

Pitcairn Island Landing

Adamstown is situated on the N side of the island and is connected with the landing place at Bounty Bay by a path.

The most convenient anchorage is off Bounty Bay, on the NE side of the island, in 23 to 31m, about 0.4 mile from shore; St. Paul's Point is in line with, or just open E of Adams Rock and Youngs Rock bearing 284°. The bottom is sand with rocky patches. The best anchorage with E winds of any strength is in 22m, 0.3 mile offshore, with Youngs Rock bearing 058° and Point Christian bearing 180°. The preferred communication with the shore is in the islanders' own boats.

There is a conspicuous peak about, 90m high, 0.2 mile SE of Bounty Bay. Radio masts standing on the ridge about 0.5 mile SW of Bounty Bay are useful navigation aids.

Currents in the vicinity of Pitcairn Island generally set to the W at about 0.5 knot, but frequently flow at greater rates.

Oeno Atoll (23°56'S., 130°44'W.) is a low and dangerous atoll; the shallow lagoon is completely surrounded by the coral reef. Near the center of the atoll there is a large island covered with trees; Sandy Island lies in the center of the N part of the reef. The N ends of both islets were being eroded, and the S end of Sandy Island and the E extremity of the center islet were extending. Two towers, each 24m high and about 1 mile apart, stand on the reef.

Iles Tuamotu

1.26 Iles Tuamotu (Archipel des Tuamotu), consisting of 78 islands, almost all of them atolls, extends for about 950 miles in a general SE direction from a position about 180 miles N of Ile Tahiti. It is divided into two groups for administrative purposes; Iles Gambier and their dependencies forming the E group, and Iles Tuamotu forming the W group.

Iles Gambier and their dependencies, with the exception of Tematagi, lie E of 140°00'W.

Iles Tuamotu, with the exception of Pukapuka, lie W of 140°00'W. The islands in the S central part of Archipel des Tuamotu include all those which lie S of 18°00'S, between 140°W and 146°W. They extend in the S center from **Temetagi** (21°40'S., 140°37'W.) to **Hao** (18°15'S., 140°55'W.) and **Marokau** (18°05'S., 142°20'W.). On the N of 18°S, from **Amanu** (17°49'S., 140°46'W.) to **Napuka** (14°08'S., 141°12'W.), and about 10 miles NW where Tepoto lies.

Navigation within the territorial waters of Fangataufa Atoll and Mururoa Atoll has been temporarily suspended. See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for details.

Iles Gambier (23°10'S., 134°57'W.) lie near the E end of Iles Tuamotu. The group consist of ten islands and numerous islets enclosed by or settled on a barrier reef.

1.27 Ile Mangareva (Iles Gambier) (23°07'S., 134°59'W.), the largest of four main islands, maintains a permanent population. The majority of the population surrounds the main port of Rikitea, on the E side of the island. There is another port at Totegegie, on the barrier reef, 5 miles NE. On the NE side of the barrier reef there are many low detached islets covered with green vegetation. Elsewhere, with the exception of Banc de Tokoruaat, its W extremity, the reef is submerged; the depths are generally shallow.

The islands lie within an extensive lagoon. Most are of volcanic formation and the larger islands are high, covered with high grass, reeds, and ferns. Some islets are in the lagoon, but most lie on the NE of the reef and they are wooded.

The barrier reef rises steeply from great depths on its seaward side, except for the gradual rise from the SE. The NE part of the barrier is almost awash. There are three passes through the reef, which are known as Passe de l'Ouest, Passe du Sud-Ouest, and Passe de Sud-Est. All the passes give access to anchorage in the outer part of the lagoon.

From a distance, the island may be identified by Mont Duff, 441m high, and rising to two wedge-shaped peaks at its SW end. From the NW, Mont Duff and Mont Mokoto appear as two pointed peaks close together.

Pilotage.—Pilotage is not compulsory, but is recommended for the channels and anchorages listed below. The pilot will meet vessels at the entrance to Passe de l'Ouest.

Caution.—As Passe du Sud-Ouest and Passe du Sud-Est are exposed to the prevailing sea, the swell may reduce the available depth of water over the bar. It has been reported that

the buoys and beacons marking the dangers and channels mentioned below are unreliable.

1.28 Passe de l'Ouest (23°06'S., 135°03'W.), which lies between Ile Mangareva and Ile Taravaiis, is obstructed by two bars. The outer bar, which has general depths of 5.2 to 10m, has a least charted depth of 6.7m on the recommended track. The inner bar, which is buoyed, shows depths of 4.4 to 10m, with a least depth of 4m just NE of the track line. Vessels are advised not to use the channel until late morning or early afternoon, when the sun makes it easy to spot the landmarks and shoals.

Pass du Sud-Ouest is entered by keeping Pointe Teonekura and Pointe Mataihu in line bearing about 037°, but local authorities report that the points are difficult to see from seaward and caution is advised. Continue on this range until the N end of **Ile Agakauitai** (23°09'S., 135°02'W.) is in range with the W extremity of Ile Taravai, about 270°. Alter course to port to avoid a shoal with a least depth of 3.5m, and join the recommended track shown on the chart.

Caution.—The track line shown on the chart passes close to or over, isolated shoal depths of 5 to 8.2m. Isolated depths of 5.6 to 10m lie within 91m of the turn point mentioned above. It is reported that navigation marks are unreliable, with buoys missing and beacons overgrown or missing.

1.29 Passe du Sud-Est is approached from seaward with the summit of Ile Kamaka ahead bearing 326°. When the W side of Ile Akamaru is in line with the W end of Ile Makapu, steer for them on a bearing of 014°. Then, steer various courses to avoid isolated shoal depths to the anchorage SE of Ile Aukena. This pass requires local knowledge.

An inner channel running from Passe de l'Ouest around the S side of Ile Mangareva to Port Rikitea is best seen on the chart. The channel is marked by various ranges, buoys, and beacons; and passes over a least charted depth of 7.7m as far as the anchorages off Mount Duff. The channel across the reef stretching between Ile Mangareva and Ile Aukena has a least charted depth of 5.1m.

Rikitea Harbor

Anchorage.—Sheltered anchorage is available to vessels with local knowledge in Baie de Taku, off the NW side of Ile Mangareva. The approach to the bay has a controlling depth of 7.3m.

Anchorage for vessels on the inner channel is available, in depths of 13 to 35m, with **Pointe Ganoa** (23°08'S., 135°00'W.) bearing 300°, **Pointe Teonekura** (23°08'S., 134°58'W.) bearing 045°, and Monte Duff bearing 004°. Caution is advised as an isolated depth of 8.1m lies about 90m ENE of this anchorage, and depths of 4.3m lie within 0.1 mile of the position. Anchorage may be taken in depths of 27m with **Monte Mokoto** (23°07'S., 134°59'W.) bearing 010°, 1 mile distant; depths of less than 10m lie about 0.2 mile NNW of the position. Vessels also anchor with the chapel charted on Pointe Teonekura bearing 296°, 0.9 mile distant. The depth here is about 66m, but an isolated depth of 7.5m lies about 0.1 mile WSW of it.

Anchorage for vessels approaching via Passe du Sud-Est may be had 1.5 miles SE of Ile Aukena's SW end, in depths of 25 to 50m.

1.30 Port Rikitea (23°07'S., 134°58'W.) (World Port Index No. 55960), a small basin on the SE side of Mangareva, surrounded by shoals and reefs, lies close to the N shore off the N part of the village. The channel across the reefs from the outer anchorage to the inner anchorage is marked by beacons and range beacons, but is intricate and should not be attempted without local knowledge.

Commercial Wharf, lying furthest S, is 28m wide, with 2.5 to 4m of water alongside. Legion Quay, lying 1 mile N, is cement and 11m wide; the quay is without mooring bits with hawsers passed to trees ashore.

A channel, with a depth cleared by wire drag to 8m, is laid from 1 mile E of Rikitea to Totegegie, 5 miles NE; an airfield is situated on Totegegie. A wharf at Totegegie is restricted to vessels with a maximum length of 50m and a draft of 4.5m. An aeronautical radiobeacon transmits during daytime only from Totegegie.

Anchorage.—Anchorage for vessels able to cross the reef extending from Ile Mangareva to Ile Aukena is available on the range line of two beacons shown from a position 0.15 mile N of the church at Rikitea, in line bearing 263°. Anchor in charted depths of 58m about 1 mile off the front range beacon. The bottom, sand and mud, has been reported to be good holding ground in E winds, but only fair in W winds. The inner anchorage is cramped.

Recif Bertero (22°02'S., 133°28'W.), whose existence is now considered doubtful, was reported in 1829. A shoal, covered by 18m of water, was reported (1978) by a British vessel 9 miles WSW of Recif Bertero. Soundings carried out in 2000 in this zone did not locate it; its existence is doubtful.

Recif de la Minerve (Ebrill) (22°40'S., 133°30'W.), which is reported to break heavily in a smooth sea, has a depth of 11m; a reef, awash, was reported to lie about 11 miles ENE of it.

Temoe (Timoe) (23°21'S., 134°29'W.) is 3.5 miles long and 2 miles wide. Its barrier reef has several islets planted with coconut palms.

Portland Reef (Bank) (23°40'S., 134°20'W.) has a least depth of 8.8m, sand and rock; the sea breaks heavily over the reef. A depth of 9m is located 3 miles W of the W extremity of Portland Reef.

1.31 Morane (23°09'S., 137°07'W.) is a low-lying atoll about 3 miles in diameter, with no entrance to the lagoon. In 1985, it was reported that several huts and radio masts were visible on the NW side of the atoll.

Maria (22°01'S., 136°11'W.) is a small atoll covered with brushwood; the lagoon is inaccessible from the sea.

Marutea Sud (21°30'S., 135°35'W.) consists of a cluster of islets on a barrier reef, which is almost awash or only about 1m high. Some of the islets are cultivated.

Groupe Acteon (Actaeon) (21°23'S., 136°30'W.) consists of four atolls, from E-W, named Matureivavao, Tenaruga, Vahanga, and Tenararo. The islands are uninhabited, but are visited occasionally to harvest copra. The group is part of Iles Gambier administration.

Tides—Currents.—The current in the vicinity of Groupe Acteon usually sets W, but its direction is always influenced by the wind. With light W winds it has been found to set ENE at 0.3 kt.

1.32 Matureivavao (21°29'S., 136°24'W.), the largest atoll of the group, is about 4 miles long in a NNW-SSE direction. It is high enough to be visible from a considerable distance, and gives the appearance of a sandy beach, backed by a line of dark green. Some buildings lie on the NW side of the atoll.

In bad weather, the seas sometimes sweep over the reef. There is no entrance to the lagoon.

Tenaruga (Tenarunga), 9 miles NNW of Matureivavo, is a low, wooded atoll, whose lagoon is not accessible from the sea.

Vahanga, a small atoll 5 miles W of Tenaruga, is covered with coconut trees. There is a landing place on the NW side of the atoll, near a white house, but there is no access to the lagoon.

Tenararo (21°18'S., 136°44'W.) the smallest of the group, has a landing place on the NW side of the atoll between the small boulders, which encumber the reef. There is no entrance to the lagoon.

1.33 Fangataufa (Fangatafoa) (22°15'S., 138°45'W.) is a small, low, narrow, barrier reef.

There is access to the lagoon through a pass lying 0.5 mile SW of the N point of the atoll; the channel has a width of about 60m and a dredged depth of 6.5m. A 12m long quay, in 2.5m of water, is situated in the NE part of the lagoon; another quay, 50m long in 5m of water, and landing ramps, were constructed in its E part.

Aspect.—The access channel is marked, on each side, by two beacons. There is a disused airfield, built to accommodate medium size transport aircraft, on the NE coast of the atoll.

Caution.—It is reported that the pass of Fangataufa is obstructed by a chain boom. This boom can be moved by agreement with the local military authority.

Fangataufa is classified as a Common Military Zone. The zone includes the lagoon areas enclosed by the atoll and by baselines linking the closet points emerging from the reef on both sides of the channel. Entry is prohibited without authorization.

1.34 Mururoa (Mururura) (21°50'S., 138°55'W.) is an atoll about 15 miles long in an ENE-WSW direction and about 8 miles wide. The NW side of the atoll is low and the reef on that side is covered. The reef projects about 0.2 mile from the atoll on the E side and 0.1 mile on the W side.

Depths—Limitations.—The inner channel, with a least depth of 10.2m and a width of 100m, leads into the lagoon. The fairway is marked by buoys and lighted beacons. Currents in the entrance channel are generally variable, but usually set along the channel axis at rates of less than 1 knot.

Several channels lead to various berths throughout the atoll. A pier, with depths of 11m alongside, exists here, with a spur pier extending SE of it. This extension is about 150m in length, with alongside depths of 3 to 7m.

Aspect.—Large blockhouses stand on the atoll's N and SW points. Towers, with a height of 15 to 80m, moveable derricks, and other structures are visible at several points around the atoll. An airstrip lies on the NE portion of the group.

A light, with a racon, is shown from the center of the lagoon

Pilotage.—Pilotage is available.

Anchorage.—Vessels anchor in the E part of the lagoon, in varying depths from 20 to 30m, moderate holding ground. Winds from NW can raise a heavy sea. There is a mooring buoy in the anchorage zone.

Directions.—The entrance to the lagoon is on NW side of the atoll. Ilot Giroflee lies on the S side of the entrance. The lagoon has an average depth of 37m; however, it is encumbered with dangerous coral patches.

The lagoon is entered with a lighted beacon (21°49.6'S., 138°52.8'W.) bearing 096.5°, situated at the center of the lagoon.

Caution.—It is reported that the pass of Mururoa, as well as the N and S approaches, are obstructed by a chain boom. This boom can be moved by agreement with the local military authority.

Mururoa is classified as a National Defense Protected Zone. The zone includes the lagoon areas enclosed by the atoll and by baselines linking the closet points emerging from the reef on both sides of the channel. Entry is prohibited without authorization.

1.35 Tematagi (Tematangi) (21°40'S., 140°37'W.) is the farthest W of the dependencies of Iles Gambier. The atoll is about 7 miles in extent. The sea breaks violently on some coral blocks on the NW side. The bridge of a sunken landing craft is easily seen on the NW point. Landing is fairly easy and safe a few hundred meters N of the SW point of the atoll; there is no pass into the lagoon.

A rocky spit, with a depth of 3m, extends about 1.5 miles SE from the SE extremity of the atoll.

Tureia (20°49'S., 138°32'W.) 7 miles long and 5.5 mile wide, is low and wooded except on the SE side; the lagoon is not accessible. Landing at the village on the N side is dangerous and requires the use of a surf boat.

Vanavana (20°47'S., 139°08'W.), a small atoll 1.5 miles in diameter, has thick and bushy vegetation growing on it. There is no entrance into the lagoon. The landing place, which can be reached only in a light swell, is at the W end of the atoll, close N of a gap in the coconut palms. A 4m high rock lying on the atoll may appear larger than its actual size due to a mirage effect.

Pinaki (19°24'S., 138°40'W.) is a small atoll, wooded with coconut palms; the land is not more than 2m high. Landing is possible near a village on the NW side. The atoll is populated only during the copra harvest.

Nukutavake is a small island, of coral formation, located about 8 miles NW of Pinaki. It is about 3 miles long in an E-W direction, and is wooded except at its E end. There is a radio station and an airstrip, 850m long, on the island.

In May, June, and July the population of this atoll moves to Vairaatea, and in August, to Pinaki to harvest copra.

1.36 Vairaatea (19°21'S., 139°13'W.) is comprised of islands joined by a barrier reef surrounding a lagoon.

The surf is heavy and landing is difficult; the usual place is near a shed with a flagstaff situated on the NW end of the atoll. There is a village on the atoll's NW.

Vahitahi (18°47'S., 138°50'W.) is an atoll located about 29 miles N of Nukutavake. The lagoon is not accessible from the sea. The shores of Vahitahi are steep-to except the S part, which should not be approached within 0.3 mile. A village lies on the atoll's W end. It may be approached via a channel dug into the coral, leading to a small harbor equipped with a jetty and a wharf. This atoll has an airstrip 810m long.

Akiaki (18°33'S., 139°13'W.), NW of Vahitahi, is a small island of coral formation. There is a landing on the NW side that is difficult.

1.37 Reao (18°31'S., 136°23'W.) is a narrow atoll, 12 miles long in a NW-SE direction, and about 2 miles wide. A large white building on the W extremity of the atoll is conspicuous when seen from the SW.

The best landing is at the NW point near the village. When landing is not possible there, boats can land close S of the large white building.

Pukarua, 32 miles WNW of Reao, is about 10 miles long SE-NW. The NW side of the atoll is wooded and its S side presents a series of wooded clusters.

The lagoon is inaccessible from the sea, but landing can be effected on the shore N of the NW extremity, or on the W coast opposite the village. The coast is dangerous and should not be approached at night.

Tatakoto (17°20'S., 138°25'W.) is a low atoll about 90 miles NW of Pukaruha that is wooded on the NW part. The lagoon is inaccessible from the sea, but a landing may be made near a copra shed adjacent to a village on the atoll's W side. The landing consists of a small harbor equipped with a wharf that can be reached via a 6m channel dug into the coral. Another landing point is located S of the village. The landing consists of a small harbor, with a 200m jetty and wharf, also reached by a dug channel.

1.38 Hao (18°15'S., 140°55'W.), an atoll about 31 miles long SE-NW and 8 miles wide, is located 145 miles WSW of Tatakoto. The reef has numerous islets, and vegetation grows on most of them, particularly on those on the E side. On the S and SW sides the reef is so low in places that the sea washes into the lagoon. Passe Kaki, the only entrance into the lagoon, lies on the N side of the atoll, with a former French military

base close E of it. An airstrip stretches between the base and Otepa, the principal village.

Tides—Currents.—The spring range is about 0.6m. A local tide table published by the French authorities is available.

The rate of flow entering Passe Kaki can reach 3 knots at HW, when the water level in the lagoon is low. The outflow can exceed 12 knots, 6 hours after HW, when the water level in the lagoon is high. A S swell may lead to a phenomenon of water piling up in the lagoon, with resulting large and sudden changes in water levels of up to 1.8m. A tidal race and overfalls may extend up to 0.8 mile seaward of the channel entrance.

To avoid a difficult passage through the reef, vessels should wait for the two periods of slack water associated with the flood current, which are short. Slacks usually occur about 4.5 hours and 2 hours before moonrise; and again 5 hours and 3 hours before moonset. When the tidal race slows or stops, the channel may be entered.

Caution should be observed, as the information given above is for average conditions only. Current rates and the times or presence of slack waters may differ from those the vessel may experience.

Depths—Limitations.—Passe Kaki has a least depth of 6.4m on the range line. From the pass to the former military base, the channel was reported to have a least charted depth of 11m. The channel to the anchorage off Otepa has a swept depth of 7.4m.

A berthing facility, with a least depth of 5.5m alongside, is available at the military base.

Aspect.—A group of hangars with an aircraft control tower lies about 2.3 miles E of Passe Kaki.

Passe Kaki and the inner channels are marked by lights, beacons, buoys, and range beacons. Additionally, Passe Kaki is marked by a lighted range in line bearing 168°.

Pilotage.—Pilotage is compulsory.

Anchorage.—Off Otepa, anchorage is available, in a depth of 24m, sand. Anchor where a red lighted beacon is standing on an offshore shoal located about 0.4 mile W of the town bearing 090°, 0.3 mile distant.

Vessels waiting for a berth at the former military base anchor, in depths of 19 to 50m, between 0.6 mile and 1 mile E of a red beacon situated near the middle of the airstrip.

Caution.—Passe Kaki and the inner channels of this atoll all require local knowledge. The buoys, beacons, and lights marking the channels are reported to be unreliable.

1.39 Amanu (17°49'S., 140°46'W.) is an atoll located 10 miles NNE of Hao; it is wooded on all sides. There are two passes on the W side of the atoll which lead into the lagoon; they are 4.5 and 5.5 miles N of the S extremity.

Depths—Limitations.—The S pass has a width of 45m between the 5m lines. A spit, with a depth of 0.6m on its outer end, extends 0.1 mile S from the N side of the inner end of the pass. The pass 1 mile further NE is deeper but narrower and is not recommended.

Aspect.—A village, with a church which is not overly visible, lies on the W side of the lagoon. A conspicuous white tower stands on the coast to the W of the village.

A wet dock with two quays, which are accessible only by small boats, is located on the lagoon side of the village.

Pilotage.—Pilotage is available and recommended as currents may reach 10 knots in the passes, causing violent eddies and overfalls.

Anchorage.—The usual anchorage is 0.25 mile SSE of the village, in about 20m, good holding bottom, but there is the risk of catching on the blocks of coral strewn throughout the area. When the wind if from the E strong rippling makes the anchorage uncomfortable. A mooring buoy in 2004 was in poor condition and no longer in use.

Paraoa (19°08'S., 140°41'W.) is wooded and its lagoon is inaccessible. The atoll is a dependency of Hao.

In passing to windward of the atoll, attention should be given to the current, which has been observed to set strongly toward it.

Ahunui is an uninhabited wooded atoll. The lagoon is inaccessible, but there is a landing place on the NW end of the atoll near some huts and a tank.

Manuhangi is a small atoll that lies 29 miles W of Paraoa. There is no entrance to the lagoon.

1.40 Negonego (18°45'S., 141°49'W.) is an atoll with clumps of trees on it, but its greater part is bare. A pass 1 mile E of the N extremity of the atoll leads into the lagoon. The pass into the lagoon was reported to be about 0.1 mile wide and had a depth of 2m; however, a coral patch, with a depth of 0.9m, is located in the middle of the passage. Vessels with local knowledge can anchor in the lagoon.

Iles du Duc de Gloucester (20°37'S., 143°17'W.) consists of three small atolls, similar in aspect, located about 136 miles SW of Negonego.

Nukutipipi, the E atoll of this group, is wooded on its E side; there is no entrance to the lagoon.

Anuanurunga lies 11 miles WNW of Nukutipipi. The reef on the W side is submerged, except for some coral heads.

Anuanuraro is located 14 miles NW of Atoll Anna Rug. The reef on the NW and SW sides extends seaward and is marked by heavy surf.

Hereheretue (19°54'S., 145°00'W.) lies about 82 miles WNW of the atoll of Anuanu Raro. There is no entrance to the lagoon, but there is a landing place a few hundred meters N of the W extremity of the atoll. Landing is dangerous with an E wind. The sea off the atoll is often heavy.

Fakahina (Fangahina) (16°00'S., 140°08'W.) is a wooded atoll that can be seen for a considerable distance. There is no navigable passage into the lagoon, but landing can be affected in front of the village at the SW extremity of the atoll.

Fangatau (Angatau), about 38 miles WNW of Fakahina, is a wooded atoll, with no passage to the lagoon. A village with a church and a school is situated on the W extremity of the atoll.

1.41 Pukapuka (14°48'S., 138°50'W.) is a wooded atoll; the lagoon is connected to the sea by nonnavigable cuts in the S side of the reef. The lagoon has also been reported to be drying up. A wharf at the village on the atoll's W end provides berthing at HW to small vessels with local knowledge.

Iles du Desappointement (Disappointment Island) are located about 150 miles WNW of Pukapuka; they consist of an atoll and an island about 10 miles apart.

Napuka, the farthest SE, is an atoll which encloses a lagoon that is not accessible from the sea. The E and W sides of the atoll are wooded, but the S side is bare.

A white church with a red belfry, which is prominent from the N, dominates a village situated near the W extremity of the atoll. The atoll has a functional airstrip.

Tepoto (14°03'S., 141°25'W.) about 10 miles NW of Napuka, is about 18.3m high to the top of the trees; it is the NW island of the Iles du Desappointement. Landing is practicable, with assistance of the natives, on the W side of the island.

Ravahere (18°15'S., 142°10'W.) and Marokau are two low atolls that lie near each other. Each of the atolls is about 10 miles long; they are separated by a narrow channel that can be used by large vessels.

There is no entrance to the lagoon on Ravahere, but there is a landing, which is dangerous, on the SE side of the atoll.

Marokau, the farthest N of these two atolls, is wooded along its N side. Two islets stand on the S end of the reef on its E side, and there is a passage into the lagoon between them that is practicable for small vessels with local knowledge, in good weather.

Caution.—It was reported that two rocky patches about 0.2 mile apart, with depths of 9.1 to 11m, were seen 8 miles E of Ravahere.

1.42 Reitoru (17°50'S., 143°06'W.), a low atoll, has no entrance into the lagoon.

Haraiki, 30 miles NW of Reitoru, is somewhat higher than the usual atoll. A conspicuous white masonry water tower is situated on the N side of the atoll.

Hikueru, about 23 miles ENE of Reitoru, is partially wooded on the N side, but the E and SE sides are bare; the atoll is dangerous to approach at night. A village is situated on the atoll's W side.The concrete wharf is reported unusable and in a state of disrepair.

Tekokota (Tekokoto), about 14 miles N of Hikueru, is a circular atoll about 1 mile in diameter. Its N half is about 1.8 to 3.1m above water, but the S part is almost entirely submerged except for a wooded islet.

Tauere (17°21'S., 141°29'W.), a dependency of Amanu, is wooded on its N and E sides. The best landing place is on the reef on the W side of the atoll opposite the village.

Rekareka (Tehuata), a small atoll, lies 38 miles NW of Tauere. Shoal water extends 0.5 mile seaward from its N, W, and S sides, and about 0.8 mile SE from its SE extremity; on the NE side the reef is not steep-to. The best landing is on the NW side near a village.

Marutea Nord (North Marutea) is a large atoll located 60 miles W of Tehuata.

Caution.—Caution is necessary in approaching this dangerous atoll. Its S and W sides are completely submerged and on the NE side there are only a few places where the reef is sufficiently above water to support a few small clumps of trees.

The best place for landing is on the last island on the NW side of the atoll, opposite a white masonry water tank.

Nihiru (16°43'S., 142°50'W.), an atoll about 17 miles NNE of Marutea, is wooded except at its S and SE extremities. The reef extends a considerable distance from the S and SE points of the atoll, and forms a distinct bight W of the latter point. There is no entrance into the lagoon, but there is a landing place in a bay on the W side of the atoll, opposite the village.

On meeting the N extremity of Nihiru, the current divides into two branches which rejoin off its SE extremity, where they form a strong eddy.

Between Nihiru and Marutea a current setting NE at 3 knots was observed. It has been reported that this current causes violent overfalls on the atoll's SE extremity.

1.43 Raroia (16°05'S., 142°25'W.), 30 miles NNE of Nihiru, is lightly wooded on its E side, but the N and W sides are covered with trees, especially in the vicinity of the pass and up to 3 miles S of it. A village, which is difficult to see from the offing, is situated on the W side of the lagoon, 2 miles S of the pass. The atoll was made famous as the site of the sinking of the raft "Kon Tiki" in 1947.

The lagoon is entered through the Ngarue Passage on the NW side of the island, which is divided into two channels by shoals. The North Channel lies N of a reef covered by 2.1m of water. It offers a depth of 6.2m, a width of 20m between the reef, and a shoal covered by 3.8m of water. The channel is marked by a lighted range bearing 090.7°. This passage can be used by vessels of less than 100m in length with local knowledge.

Small vessels can use the S channel, which is a little more than 90m wide and has a least depth of 1.5m.

The outgoing current may exceed a rate of 8 knots, while slack water may be of short duration.

Large vessels anchor in the lagoon, in a depth of 20m, sand and shells, about 500m E of the village, with Tekanapi reef bearing 270°, and Neketaotao reef bearing 000°. There are many coral heads and reefs in addition to pearl farming in the approach to the anchorage.

Some of the coral reefs within the lagoon are marked by beacons. In general, after a vessel has cleared the pass, steer SW to pass W of the beacons, approaching the fringing reef to about 90m. Maintain this distance from the reef until the church is about 0.5 mile distant, then steer SSE to the anchorage.

Caution.—The passes and lagoons of Raroia are reputed to shelter a number of sharks, some of which belong to dangerous species.

1.44 Takume (15°48'S., 142°12'W.), an atoll, lies 5 miles NE of Raroia. It is wooded, except on its SE side, where the reef is broken in places and partly submerged. A village lies on the S islet of the atoll.

A strong W current runs in the channel between Takume and Raroia, and during winds from between the NE and SE, a heavy sea is raised.

Taenga (16°21'S., 143°08'W.), 30 miles WSW of Raroia, is an atoll which is wooded on its N side and its E extremity, but its S part is largely awash. A 30m wide pass, close N of the village on the W side of the atoll, has a least depth of 1.5m and gives access to the lagoon. The centerline is marked by a range bearing 047°, the pass is divided into two branches; the one to the S, marked by a lighted buoy, leads to the village. The ebb current through the pass may reach 10 knots, however, the flood rarely exceeds 3 knots.

The village of Fenuaparea, on the S side of the passage has a landing wharf with 3.5m of water.

Makemo (16°32'S., 143°40'W.) is one of the most important and frequented atolls in Iles Tuamotu. The atoll is about 38 miles long in a NW and SE direction and is 4 to 9 miles wide. The N side is wooded, but the S side, generally above water

level, is bare, and is very dangerous to approach at night.

There are two passes into the lagoon of Makemo that were reported to be marked by beacons with radar reflectors. Passe Arikitamiro, on the N side, about 12 miles W of the E extremity, leads SSE into the lagoon. The village of Pouheva is situated on the W side of the pass. Passe Tapuhiria is located on the NW extremity of the atoll. The village of Ohava is situated NE of the pass.

Passe Arikitamiro is easily identified by the break in the trees and a light which stands on a white tower on the W side of the entrance. A white cement tank and a two storied school are also reported to be visible.

Tides—Currents.—The ebb current is said to run out of these passes at a rate of 8 to 9 knots when the winds are between the S and SE. Under all conditions the currents are always strong; slack water is of short duration. Vessels should guard against yawing in the passes due to the strong currents.

Depths—Limitations.—Passe Arikitamiro is about 0.1 mile wide with depths of 27m on the leading line (148°), reducing to approximately 14m farther SSE. Within the entrance it is divided into three channels by two coral shoals. The middle channel should be used by larger vessels.

A jetty 230m in length extends S from the shore to the S extremity of Pirautoe, an extending spur of the coastal reef. At the head of the jetty, on the W side, is a quay 40m in length with a depth alongside of 6m.

Passe Tapuhiria, on the W extremity of the island, has a width of about 90m and a depth of 7m; it should only be entered by vessels with local knowledge.

Anchorage.—Anchorage may be taken in the lagoon SW of Passe Arikitamiro, with **Pouheva Light** (16°37.2'S., 143°34.1'W.) bearing 030°, distant 0.6 mile, in a depth of 15m. Anchorage is available in the lagoon 0.8 mile E of Passe Tapuhira, in a depth of 23m.

1.45 Tuanake (16°39'S., 144°13'W.) is the largest and farthest N of the three small atolls lie close together from 12 to 24 miles SW of Makem; it is wooded and a boat passage leads from the S side into the lagoon.

Hiti, lies 4.5 miles SE of Tuanake; the lagoon is inaccessible.

Tepoto lies 10 miles SW of Hiti; it is thickly wooded, and a stone landmark stands near the E extremity.

A patch, with a depth of less than 1.8m, was reported to lie 2.2 miles SW of Tepoto. The existence of this patch is considered to be doubtful.

Motutunga (17°07'S., 144°22'W.), a low atoll, is located about 13 miles SSW of Tepoto. The S side is especially low, but on the N side there are a number of wooded islets on the reef. The atoll is about 7 miles in diameter and is only inhabited in certain seasons.

There is an inlet into the reef 1 mile ENE of the W extremity of the atoll, but it does not give access to the lagoon. The depth in the inlet was reported to be about 4.7m. There is a ruined landing stage about halfway in the inlet, where there is good shelter for small vessels. There are two masonry tanks on either side of the inlet. It is not possible to anchor around the atoll.

Tahanea (16°53'S., 144°47'W.) is about 25 miles long E-W and up to 9 miles wide. It is wooded along its N side, but is bare on its S and SE sides.

The lagoon is encumbered by coral heads, but there is deep water between them. Three passes lead into the lagoon from the NE side of the atoll. A green church is reported to be visible from the entrance of all three passes.

Passe Otaho, the farthest E of the three passes, is for small vessels with local knowledge.

Passe Teavatapu (Passe Manino), 1.5 miles W of Passe Otaho, is practicable for large vessels, but difficult for small craft. The pass is about 0.2 mile wide, with a depth of 13m; however, an 11m depth exists at the S end of the pass. There is a reef 0.6 mile S of the S extremity of the island that forms the W shore of Passe Teavatapu.

There is anchorage W of the island; good anchorage can also be obtained 1.5 miles E of the visible reef located 0.6 mile SSW of Passe Teavatapu.

Passe Motu Puapua, 1 mile NW of Passe Teavatapu, is dangerous.

1.46 Anaa (17°25'S., 145°29'W.) is heavily wooded. There are five villages on the atoll; Tukuhora, the principal village, is situated on the NE side. A quay approachable by reef whalers is constructed on the side of a cavity in the coral reef in front of the town. Approach is impossible in winds from the E because of breakers which are produced on the quay. A mooring buoy, whose use is reserved for schooners supplying the atoll, is anchored 150m off the quay. There is no passage into the lagoon.

The clouds above the atoll reflect the lagoon in the form of a pale green projection in certain weather conditions which can be seen at a great distance.

Faaite (16°45'S., 145°15'W.) is a partly-wooded atoll. The S reef is low and dangerous to approach at night. There are buildings and a flagstaff near the pass that are conspicuous.

There is a pass through the barrier reef into the lagoon that is entered from the NW extremity of the atoll. It extends SE from the entrance, which is about 50m wide, with a least depth of 3.5m. It has been reported that the buoyed fairway to the pier W of the flagstaff, has a depth of 7.5m. The pier has alongside depths of 3m.

Tides—Currents.—Currents in the pass ebb at a rate of 6 knots and flood at a rate of 4 knots; slack water is of short duration.

Anchorage.—Anchorage may be had outside the pass with the flagstaff bearing 066°, about 0.4 mile distant. Anchorage is possible within the pass, but the currents may prove difficult.

1.47 Fakarava (16°18'S., 145°35'W.) is about 31 miles long NW and SE and about 14 miles wide; it is almost rectangular in shape.

Aspect.—On the SW side of the atoll the reef is low-lying, and has some small islets on it; they stand about 1 mile from the outer edge of the reef. Only two or three of the islets can be seen simultaneously. The N and E coasts are wooded.

There are several landmarks in Rotoava that are visible from seaward, including an unfinished light structure which has been abandoned. A conspicuous gray tower stands 0.3 mile N of Rotoava. A marker lighthouse, 30m high, was erected 1.5 miles NE of Garuae Pass.

Anchorage.—Large vessels anchor, in depths of 20 to 25m, with the flagstaff bearing 055° and about 0.7 mile distant. Small vessels anchor about 0.4 mile W of the flagstaff. Both

anchorages offer good holding ground, sand and coral, with shelter from winds of WSW through N to SSE. Winds of the SSE to WSW may raise a heavy swell here.

Directions.—Two passes that may be used lead into the lagoon of Fakarava.

Passe Tumakohua is suitable for vessels drawing less than 2.7m and requires local knowledge. One can clear the passage by following a lighted range line on a bearing of 336.4°. The pass intersects the atoll on the SE.

Passe Garuae is entered 6 miles WSW of the N extremity of Fakarava. The pass is about 0.9 mile wide and has been swept to a depth of 10m over a width of 0.2 mile. Recife Pufana, marked by a lighted beacon, is located 0.9 mile ESE of the E entrance point of the pass.

Vessels can enter the pass on a course of 147°. When the lighted beacon on Recife Pufana bears less than 070°, steer with the flagstaff at Rotoava ahead bearing 067°. When about 2 miles from the village steer as necessary to the anchorage. The channel is marked by buoys and beacons, which have been reported to be unreliable.

The outgoing tidal current follows the axis of the pass and is sometimes strong. A line of breakers appears to extend across the entrance; however, a vessel with a speed of over 8 knots can enter at anytime.

1.48 Katiu (16°25'S., 144°21'W.) is a low atoll. Its entire NE side is wooded, the SW is barren.

Pakata Pass on the NE side of the atoll offers an entrance to the lagoon, but has a width of about 30m and a least depth of 3.3m. A set of range lights bearing 193.5° mark the pass. This pass is practicable only for small vessels with local knowledge.

The other pass lies close S of the W extremity of Katiu, it is small and practicable only for boats.

Raraka (16°10'S., 144°54'W.), 23 miles NW of Katiu is wooded on its N side, but the S side is bare, except at its S extremity. There is a pass into the lagoon which should only be used by vessels under 300 grt with local knowledge. The passage is about 45m wide with a depth of 5m, and is marked by a set of range beacons in line bearing 163.4°.

Anchorage.—Anchorage is available with a flagpole situated in the village on the N side of the atoll bearing 295°, about 0.3 mile distant, in a depth of 15m. The current sets out of this pass, sometimes attaining a velocity of 6 or 7 knots with an E wind.

Kauehi (15°54'S., 145°09'W.) is wooded except for about 4 miles on its S side. A remarkable islet, marked by a beacon, lies on the E side of the lagoon.

Passe Arikitamiro, on the SW side, gives access to the lagoon. The channel is about 200m wide and has a depth of 11m; the north side is marked by a lighted beacon. Local knowledge is necessary for safe passage.

Tides—Currents.—A strong tidal current sets through the pass; eddies caused by the outgoing current are encountered up to 0.3 mile outside the entrance. Overfalls are caused by tidal currents at the outer and inner ends of the pass, depending on direction of flow.

Anchorage.—Anchorage can be obtained about 0.6 mile WSW of the head of the wharf at the village, in a depth of 16m, sand and coral; there is swinging room of about 0.3 mile.

Directions.—Vessels enter Passe Arikitamiro on course 045°; once the transit of the pass is completed, steer 024° for the village situated on the NE side of the lagoon, about 8 miles distant. A coral patch marked by a beacon, 1.2 miles distant bearing 306° from the conspicuous islet, should be passed on its E side.

Taiaro (15°45'S., 144°38'W.) is about 14m high to the tops of the trees; there is no pass into the lagoon. The best landing place is on the W side near some native huts.

1.49 Aratika (15°27'S., 145°30'W.), an atoll about 8 miles in diameter, is wooded on the N side, with a low, dangerous reef everywhere else. It lies 22 miles to the NW of Kauehi. A prominent village is situated near the E extremity.

Two passes lead into the lagoon, but are only suitable for small boats; they are subject to currents of up to 6 knots. Tamaketa Pass on the W side, whose bed is covered by 2.4m of water, is the only usable one. It is not possible to anchor around the atoll. Fainukea Pass, to the E, is frequently subject to heavy rollers, which can make its use impracticable, particularly when there are strong E winds. This pass is narrow and winding, and should not be used without the assistance of an experienced local pilot. The pass provides access to the village of Paparara, which is readily visible from a distance. Mariners should use caution because of the presence of pearl farms which cover almost the entire atoll.

A private airfield with a small control tower is situated NW-SE on the atoll and is more than 600m long and made of crushed coral. There is an infirmary and telephone service.

Toau (15°55'S., 146°02'W.) is about 20 miles long in a SE-NW direction, and about 10 miles wide. The NW and NE sides are wooded, but the SE and SW sides are bare and dangerous.

There are two passes into the lagoon on the E side. Passe Otungi (Passe Otugi), about 3.5 miles N of the atoll's E extremity, is 350m wide and has a depth of 6m. The current in the pass is strong and causes eddies up to 2 miles outside the entrance. The best anchorage in the lagoon is about 1 mile S of the pass, about 0.2 mile W of a masonry tank, partially covered by vegetation, in a depth of 14m.

Passe Nepo (Passe Fakatahuna), 1 mile NW of Passe Otungi, is about 150m wide, but is only practicable for small vessels with local knowledge and should be entered at slack water.

Anse Amyot is a small inlet in the reef on the NW side of Toau that provides shelter for small vessels.

1.50 Niau (16°09'S., 146°22'W.) lies 17 miles SW of Toau. This circular island, 5 miles in diameter and 8m high, is covered with forest, and visible from a distance of 12 miles.

The population was 160 in 1996. The town of Tupani, to the NE of the island, is well visible from sea and has an open basin where craft can approach even in moderate wind from the E. Another landing point is located to the NW of the island, on a sandy beach in front of the abandoned town of Ofare.

Vessels can anchor, in E winds, in 25m, in front of the village and 100m from the reef.

There is a radio station at the town of Tupana.

The current in the vicinity of Niau is strong, sometimes setting W and E.

Kaukura, about 15 miles W of Toau, is 25 miles long in an ESE-WNW direction. The N side is wooded, but the S side only has two clumps of trees. Large blocks of coral, some 9m

high and visible 12 miles, are located on the S side of the atoll.

Passe Moturaa, near the middle of the N side of the atoll, will accommodate vessels with a draft of less than 1.5m. Motu Panao, on the NW side of the atoll, is practicable only for boats.

Tides—Currents.—The tidal currents in the pass and the boat passage are strong; they set E on the flood current and W on the ebb current.

1.51 Apataki (15°27'S., 146°20'W.) is wooded, except on its S side, where the reef is submerged and is dangerous to approach at night; in calm weather the S side is dangerous even by day, as there are no breakers and the current is always strong.

There are two passes into the lagoon of Apataki. Passe Pakaka lies 6 miles NW of the S extremity of the atoll; Passe Tehere is located on the NW extremity, 14 miles N of Passe Pakaka.

It was reported that beacons marked coral patches on either side of a straight line drawn between Passe Tehere and Passe Pakaka.

Tides—Currents.—Passe Pakaka has currents, in the outer part of the pass, that set simultaneously in opposite directions; the N side is the normal tidal current with a minimum rate of 4 knots. The current on the S side is a countercurrent, and both change their direction at HW and LW.

Inside the pass, the strength of the outgoing current is increased by the narrowing channel, and sometimes attains a rate of 5 or 6 knots; the incoming current may reach a rate of 3 knots. Slack water occurs about the time of the noon meridian passage.

Passe Tehere has ebb currents of 3 knots that set along the axis of the channel. The rate of the flood tide may vary from 2 to 5 knots. The pass is about 0.2 mile wide and deep, but shoal spits at either end reduce the width of the fairway to 130m. There is a depth of 5.8m over the bar.

Depths—Limitations.—A concrete wharf lies on the S side of the pass, about 0.2 mile NE of the seaward entrance. The wharf offers three berths, the deepest of which offers 1.5 to 3m of water alongside a 10m wide berthing stage which projects outward from the main wharf. The rest of the wharf has less water alongside.

Anchorage.—Once within the lagoon and clear of the fringing reef, a course of 070° will lead to an anchorage about 1.5 miles from the pass.

Anchorage is available, in a depth of 26m, coral. The charted channel leads about 55m N of a reef with a depth of 0.5m.

1.52 Arutua (15°18'S., 146°45'W.), 9 miles W of Apataki, is wooded on the N side, but the S part is bare and a large part of the reef is submerged. There is an airstrip at the N end of the atoll.

Passe Porofai, near the SE extremity, gives access to the lagoon for small vessels; however, it is difficult even with local knowledge.

Tikei (14°58'S., 144°33'W.) is a small island about 60 miles NE of Aratika. The only landing place is at a small village on the W extremity of the island, and it is difficult.

Iles du Roi Georges, consisting of two atolls, Takapoto and Takaroa, lie about 37 miles NW of Tikei.

Takapoto (14°39'S., 145°12'W.) is about 10 miles long in a NE-SW direction; it is wooded.

There is no entrance to the lagoon, but boats can land at Fakatopatere, a village close W of the atoll's S extremity. In good weather, small vessels make fast to a reef about 2 miles N of Fakatopatere. A disused light is visible on the W end of the atoll.

1.53 Takaroa (14°27'S., 144°57'W.) is wooded in clumps on all sides. This atoll is 15 miles long in a NE-SW direction and is up to 3.8 miles wide. There is a pass near the SW extremity that provides access to the lagoon. There are numerous pearl farms in the lagoon.

Passe Teauonae is about 1 mile long on an E-W axis.

Tides—Currents.—Currents in the pass have a rate of 5 or 6 knots, but with a heavy swell from between the S and SW; there is a continuous outgoing current which sometimes reaches a rate of 9 knots.

Depths—Limitations.—The pass is about 55m wide at its seaward end, and has a least depth of 12m charted in the center of the channel, but gets shallow as it approaches the narrow lagoon entrance. The channel shows a least charted depth of 3m, is reef fringed, and requires local knowledge E of the wharf. A wharf on the N side of the pass, at the village, has an alongside depth of 3 to 4m.

Aspect.—The church spire at the village of Teavaroa is prominent. Wrecks lie on the beach 2 and 4 miles NE of the pass. The northernmost wreck is an outstanding landmark when approaching from the NW side of the island. There is a weather station, an aviation runway 1,200m long and 30m wide, and a telephone on the island.

Pilotage.—Although there are no official pilots for Passe Teavaroa, fishermen with outboard motorboats will sometimes lead ships in.

Anchorage.—A good temporary anchorage can be taken outside the pass near the N reef, in 16 to 18m.

1.54 Manihi (14°25'S., 145°57'W.) is a wooded atoll 15 miles long in an ENE-WSW direction. A village stands on the E side of Passe Tairapa in the SW part of the atoll.

Tides—Currents.—Currents in the pass normally attain a maximum velocity of 7 knots.

Depths—Limitations.—Passe Tairapa, about 60m wide and marked by beacons, is safe and deep, except at its poorly defined inner end, where it shoals, leaving a navigable channel about 40m wide, with depths of 3m. The W side of the channel is deepest and local knowledge is recommended. The concrete quay, on the E side of the channel has alongside depths of 0.6m; however, depths off the wharf are reported to increase rapidly to about 4m. Several submerged rocks protrude from the face of the quay.

Ahe (14°30'S., 146°19'W.) is about 13 miles long, 5 miles wide, and is wooded. A village is situated on the SE side of the lagoon, accessible via a channel leading across the lagoon from it to a pass on the NW side of the atoll. The pass and channel require local knowledge. A conspicuous house painted violet or purple, and a house with a conspicuous white gable are reported to lie NW of the village. The pass into the lagoon is reportedly accessible by vessels with a draft of less than 4m, but depths of 1.8m are charted on the reef obstructing the inner end of this channel. Small vessels Med-moor to a long wharf

situated at the village; the wharf offers depths of 2 to 4m alongside. It has been reported that the tidal currents in the pass are strong, but are negotiable at slack water. In 2001, it was reported that pearl farms lie on the E shore of the lagoon.

Caution.—It was reported that a strong SW set is experienced when approaching Manihi and Ahe, increasing as the atolls draw nearer. Caution should be exercised by vessels planning an early morning ETA at these atolls, as several vessels attempting this have been lost on the reefs here when the current brought them to the atolls before daybreak, ahead of their ETAs.

1.55 Rangiroa (15°08'S., 147°35'W.) is the largest atoll in Iles Tuamotu. It is about 44 miles long in an ESE-WNW direction and about 17 miles wide; it is wooded throughout.

Tides—Currents.—In both the passes tidal currents attain rates of 3 to 6 knots, which cause strong rips or eddies known as "opape." During the flood, these eddies are found at the inner part of the pass; during the ebb they are found near the outer part. Small vessels with auxiliary engines should wait for slack water to transit these passes.

Depths—Limitations.—Passe Avatoru, about 0.2 mile wide, has a least charted depth of 14m on the range until the turn into the lagoon, then, shoal water makes it dangerous for vessels drawing more than 2.8m to proceed further in. A set of range lights, in line bearing 172°, marks the channel through the pass. A wharf, about 20m in length, with alongside depths of 9m, lies on the E side of the pass. A second wharf, with an alongside depth of 4.5m, lies on the lagoon side of the village, 0.2 mile ESE of the church.

Passe Tiputa has a least reported depth of 8.7m on the range line. A quay, about 40m in length, is available on the SE side of the pass. Pilings off the quay's face offer the deepest berth, with a length of 17m, and an alongside depth of 6m; elsewhere, the quay has depths of 2.9m.

There is another quay on the W side of Passe de Tiputa, situated at the SW extremity of Ile Reporepo. The quay is 23m in length with a depth of 3.7m at its head. A shoal, with a depth of 2.7m, lies about 45m NW of the quay. At its inner end, the pass is divided by a bare flat-topped islet that stands on a reef. This reef extends 0.3 mile S from the S extremity of the islet. The channel N of the islet is encumbered with reefs and is dangerous. An exposed wreck of a sailing vessel lies on the ledge to the NW entrance to the passage of Tiputa. The lagoon is safe, and vessels can proceed from Tiputa to Avatoru without difficulty, but the SE trades may raise a sea.

Aspect.—An airfield with a control tower is situated on the N side of the atoll, but the antenna of an aeronautical radiobeacon has been reported to be obscured by trees. Two villages on the S side of the atoll possess churches, while a conspicuous wreck is charted on the SW side of the atoll. The wreck has been reported to be no longer visible.

Two passes lead into the lagoon. Passe Avatoru enters the lagoon 7 miles E of the atolls N extremity; Passe Tiputa lies 5.5 miles farther E. The villages of Avatoru and Tiputa lie on the E side of each pass. A church is situated in each village, but they are not conspicuous from seaward. In 1989, it was reported that there is a lighthouse at Motu Maherehonae, the NW extremity of the atoll.

Anchorage.—Vessels can anchor in Passe Avatoru on the range line, in a depth of 30m, about 0.2 mile N of the island dividing the pass in two. The holding ground is good, but the anchorage should not be used in N winds. Anchorage is available off Tiputa, in a depth of 17m, with the church bearing 048°, 0.3 mile distant, but the holding ground is indifferent in E winds. Anchorage is prohibited in Passe Tiputa as submarine cables cross the channel.

Anchorages recommended by the local authority are, as follows:

1. Ohutu Wharf bearing 073°, distant 0.5 mile.
2. Ohutu Wharf bearing 088°, distant 1 mile.
3. Church tower at Tiputa bearing 002°, distant 0.4 mile.

Caution.—Extreme caution should be used when navigating in the vicinity of the S extremity of Rangiroa. A strong current, called the "ati ati," sets vessels toward the N. The reef is only awash in places and is difficult to see.

1.56 Tikehau (15°00'S., 148°10'W.) consists of a chain of wooded islets standing on a nearly circular reef.

Tides—Currents.—Passe Tuheiava, at the W extremity of the atoll, has strong outgoing tidal currents which makes entry difficult.

Depths—Limitations.—The fairway between the reefs is about 90m wide and has depths of 3.7 to 11m; it gives access to the lagoon for vessels with a draft of no more than 3.7m, with local knowledge.

At the E end of the village of Tuherahera there is a pier, with depths of 3 to 5m on the E side of its head.

The IALA system of buoyage is in use to mark the passes and interior channels of the island. The general direction is counterclockwise around the islands.

Mataiva (14°53'S., 148°40'W.), 21 miles WNW of Tikehau, is the farthest W of the Iles Tuamotu. It is about 5 miles long E-W, and 3 miles wide. A light with radar reflector is found on the SE part of the island, alongside the plateau.

Faratue Passage on the NW of the atoll, permits the passage of small vessels; the passage is approximately 0.5m deep and crossed by a bridge. There is a small jetty on the S side, seaward of the bridge. Fishing nets may be spread across the passage. On the S side of the passage is a highly visible parabolic antenna.

NW swells and strong ENE winds can make access to Faratue Passage difficult.

1.57 Makatea (15°50'S., 148°15'W.) is an island about 4 miles in extent in a NW-SE direction. The highest point of the island, 110m high, is near its N extremity. The island can be seen at 20 miles. Cliffs border the island and at the foot there is a narrow strip of low ground which is covered with coconut trees.

Tides—Currents.—Currents in the vicinity of Makatea set W, when the Southeast Trades blow steadily, at a rate of 0.5 to 2 knots, except at Moumu Bay on the E coast, where it follows the shore in a NW direction. Off Port Temao an indraft is felt. During W winds, the direction of the current is often completely reversed with a rate of 1 to 1.5 knots.

Aspect.—Port Temao on the W coast was the site of mining and loading operations for phosphates. In 1971, the phosphate workings were abandoned and the port installations were no longer maintained.

Iles de la Societe

1.58 Iles de La Societe are divided into two groups for administrative purposes and are known as Iles du Vent (Windward Islands) and Iles Sous le Vent (Leeward Islands). Iles du Vent is composed of Meetia, Tahiti, Moorea, Tetiaroa, and Maiao. Iles Sous le Vent consists of Huahine, Raiatea, Tahaa, Bora-Bora, Atoll Tupai, Maupiti, Atoll Maupihaa, Atoll Manuae, and Atoll Motu One.

All of these islands, except Tetiaroa and those at the W end of the group, consist of high volcanic mountains surrounded by coral barrier reefs.

Currents in the vicinity of Iles de la Societe have no constant set. Except in their coastal waters, the current follows the direction of the wind. Easterly winds are the most frequent; consequently, W currents predominate; its rate depends upon the strength of the wind.

Regulations.—A continuous watch on VHF channel 6 is required in the territorial waters of these islands.

Meetia (Mehetia) (17°52'S., 148°04'W.) is the farthest E of Iles de la Societe. The island is 435m high and has a diameter of 1 mile. The N side is remarkably steep, but on the S side the slope is more gradual.

There are two prominent rocks near the E extremity of the island; a reef, which has no passage through it, extends about 1.5 miles E of the rocks.

In clear weather, Meetia may be seen for 60 miles.

Caution.—Breakers have been reported about 1 mile off the island's SW point, but their existence is doubtful.

Tahiti

1.59 **Tahiti** (17°41'S., 149°22'W.) is the most important of Iles de la Societe; it is 33 miles long NW-SE and is 15 miles wide. The island is formed by two ranges of high mountainous land, which are connected by the low narrow Isthme de Taravao (Isthmus Taravao), rising to a considerable height in each part from a low, and generally narrow margin of coast. Of these two parts the NW and larger is called Tahiti, and the SE, Presqu'ile de Taiarapu (Taiarapu Peninsula). Mont Orohena in the N part is 2,240m high, and Roniu, 1,323m high, is on Presqu'ile de Taiarapu.

The mountains are frequently enveloped in clouds, so caution is necessary when making land at night. If coming from the N or E the light on Pointe Venus (Venus Point) should be sighted before closing the coast.

A barrier reef surrounds the island at a distance of 1 to 2 miles. Within this reef there are several good harbors, the principal ones are Papeete on the NW coast, and Port Phaeton on the SW side of Isthme de Taravao.

Winds—Weather.—The trade wind blows from the SE between May and September; between September and December it is more frequently from the E, and from January to April it is from between the NE and NW. The winds are modified by the high mountains of the island and by the action of land and sea breezes. Along the shore the prevailing wind is from the ENE to ESE.

If the wind is from the ESE it divides on striking Presqu'ile de Taiarapu; the S portion blows along the S coast of Tahiti as far as Pointe Maraa, when it turns from the coast and blows toward the S point of Moorea. The N portion blows along the N coast as far as Pointe Venus, where it becomes a E wind. There it leaves the coast and blows toward the N point of Moorea.

Between Pointes Maraa and Venus there are generally calms and local breezes which extend for a short distance into the channel between Tahiti and Moorea. The dividing line between the winds to seaward and the calm is very clearly marked.

Should the wind be from the E or ENE it strikes the N coast of Presqu'ile de Taiarapu, and the SW coast as far as Passe de Teputo becomes becalmed, while a breeze crossing the Isthme de Taravao blows from the E along the S coast of Tahiti as far as Pointe Maraa. There it turns away from the coast and leaves a calm between Pointe Maraa and Pointe Faaa.

In proportion, as the wind shifts to the E and ENE the line of demarcation between the breeze and calm, which begins at Pointe Venus, approaches the land again and blows along the coast to Pointe Fare Ute, where it turns toward the reef off Pointe Faaa, leaving the roadstead at Papeete calm.

At Papeete, land and sea breezes usually prevail, the former commencing about 2000 and lasting until 0700; the sea breeze generally sets in about 1100, blowing from NW, and subsides about 1700.

Tides—Currents.—Along the N coast of Tahiti the general set of the current is to the NW, and on the S coast to the SE. With W winds the current is often reversed. In good weather the velocity of the current is about 1 knot, but with strong winds it sometimes attains a velocity of 3 knots. Off Presqu'ile de Taiarapu, with N winds, the set of the current is SE.

1.60 **Pointe Venus** (Venus Point) (17°29'S., 149°29'W.) is the N extremity of the island. It is a long low point extending about 1 mile to the N from the foot of the mountains. The point is marked by a light.

A reef, awash, extends in an arc N, E, and W of the point, about 0.5 mile from the beach, and there are probably shoal heads a short distance seaward of the line of breakers.

From Pointe Venus the coast trends 8 miles SW to Pointe Tataa (Tatuu Point), which lies close S of Point Faaa, the NW extremity of the island. The fringing reef lies up to 0.9 mile off this coast and the 100m curve lies from 0.2 to 1 mile offshore.

Baie de Matavai (Matavai Bay), lying between Pointe Venus and Pointe Outuhaihai (Utuhaihai Point), 2.5 miles SW, recedes about 0.5 mile and is fronted by shoals; it is divided by Mont Tahara, a rocky hill bordered by cliffs.

Banc du Dolphin, with a depth of 3.9m, lies 0.4 mile SW of Pointe Venus. There is a channel about 0.1 mile wide, with a least depth of 6.6m, NE of the bank.

La Chaine du Toatea (Toatea Reef) are a chain of shoals which extend 1 mile SW from a position 0.2 mile SW of Banc du Dolphin. The depths over the shoals are irregular, and on some of the coral heads there is only 5m. Several narrow channels lead through the reefs. With a heavy swell from seaward there are breakers on these reefs as well as on Le Mahoti, a reef with a least depth of 1.6m located 0.3 mile W of Mont Tahara.

In Baie de Matavai, anchorage may be obtained anywhere, but the best anchorage is with the lighthouse on Pointe Venus bearing 043°, 0.4 mile distant, in a depth of 20m, sand.

From Pointe Outuhaihai to Pointe Fare Ute, about 2.8 miles WSW, the coast is low, the foot of the mountains receding some little distance inland.

1.61 Pointe Ariti (17°31'S., 149°33'W.) is located 1 mile W of Pointe Outuhaihai. The coast recedes about 0.3 mile between these two points and forms a bay that is obstructed by banks of coral which have winding channels between them.

Pointe Ariti is fronted by a drying coral reef which extends about 0.2 to 0.3 mile offshore.

Passe de Taunoa, 0.2 mile wide between the 20m lines, has a least charted depth of 25m. The pass, 0.5 mile WNW of Pointe Ariti, is entered on a range of two beacons in line bearing 174°. Within Taunoa Bay anchorage, in 25m, sand, can be taken E of the range, with Pointe Ariti bearing 078°, 0.3 mile distant. This anchorage is protected from E winds; with strong NW winds it becomes dangerous as a heavy swell rolls in through the pass.

Chenal Taunoa connects Taunoa with Port de Papeete. It is about 1.5 miles long and tortuous; though marked by beacons, both lit and unlit, it should only be used with local knowledge. Vessels drawing up to 5.8m can use the channel with safety, but must be able to pass under a fixed bridge with a vertical clearance of 4.4m at the W end of the channel. Approaching through this channel, on the NW side, there is a berth 0.1 mile off the bridge for gas tankers of up to 85m long, 13.8m wide, with a maximum draft of 6m. Useful navigation aids include a 24m high red radio tower standing close S of the rear leading light and a conspicuous church 0.5 miles SW of the light.

Port de Papeete (17°32'S., 149°35'W.)

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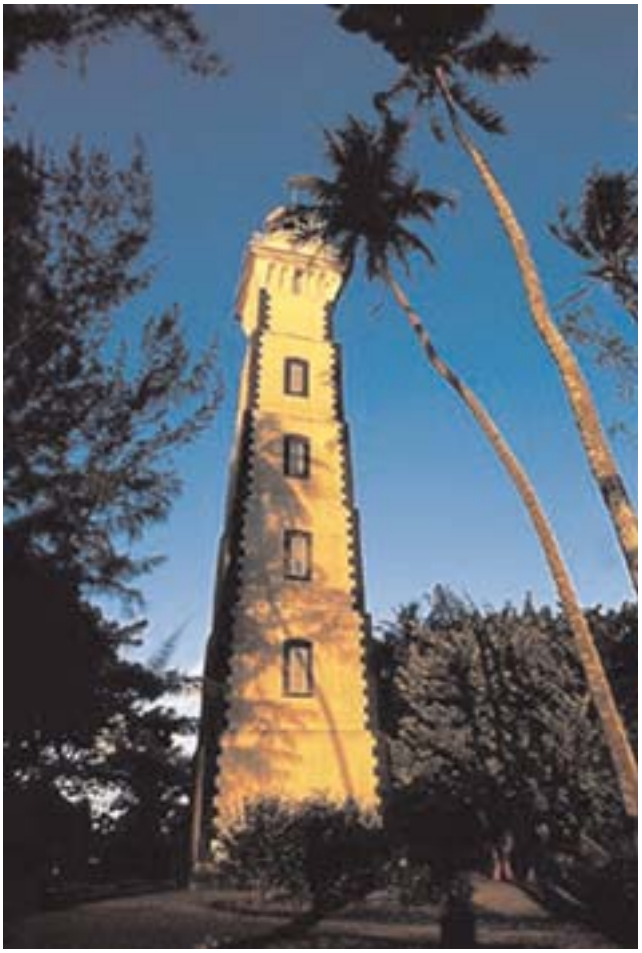
1.62 Port de Papeete, the most important and best-sheltered harbor in Tahiti, lies between the barrier reef and the coast on the NW side of the island. It consists of a small natural harbor and the town of Papeete.

Winds—Weather.—Rain squalls seen in the direction of Pointe Venus or a little S of it usually reach the harbor, but those collecting over Mont Aorai in the interior seldom descend to the harbor. The port is safe in all weather except typhoons. There are long periods of calm accompanied by rather high temperatures. November through March is usually considered to be the rainy season. At this time, strong gusts of wind from the N to NW are likely to occur.

Tides—Currents.—In this harbor, HW occurs twice each day, between 1200 and 1400, and between 0000 and 0200. This appears to be peculiar to this locality, and is apparently caused by the water thrown over the barrier reef by the sea breeze. The tidal rise is about 0.3m.

Off the entrance to Port de Papeete, the current generally sets W at about 1 knot.

The current running through the pass is dependent upon the volume of water contained within the barrier reef, which is independent of tidal rise and drop. The volume of water contained within is determined by the amount of rainfall on the hills behind the port, on the amount of water flowing from Chenal Taunoa or Chenal de Faaa, and the amount of water driven over the reef by the wind. The result is a constant set between the WNW and NW. During bad weather, particularly when the wind is between the WNW and NW and drives the sea over the reef, a W cross channel set with rates of 5 knots may be experienced. This current creates a heavy sea in the channel entrance, making it dangerous. Vessels should not attempt the pass at these times.



Courtesy of Dr. Giles

Pointe Venus

Depths—Limitations.—Passe de Papeete, 110m wide, has a swept depth of 10.9m on the range line, with general depths of 10 to 45m within the reef. Several shoal patches, some of which are buoyed, lie on the NE and SW sides of the harbor, which may best be seen on the appropriate chart.

Quai de Petrolier is positioned at the end of a 0.2 mile long causeway and lies about 0.3 mile SE of the channel entrance. This tanker terminal provides berthage for vessels up to 675m in length, with a draft of 10m. Quai au Long-Coeurs, 0.2 mile E of Quai de Petrolier, is about 450m in length, offering three berths to vessels loading coconut oil. The NE end of the wharf has an alongside depth of 11.4m, while the SE portion has a depth of 10.5m. Quai de Cabotage, about 0.3 mile NE of Quai au Long-Coeurs, offers a length of 290m and alongside depths of 6m to vessels discharging bulk grain or copra. Quai aux Petroliers, another tanker berth, situated 0.5 mile NE of Quai de Petrolier, offers depths of 10m to vessels up to 275m in length berthing alongside. Quai des Paquebots, the cruise ship wharf, lies 0.3 mile SE of Quai aux Petroliers and has a length of 250m, with an alongside depth of 9m.

Port de Papeete

Several small craft fishing and coastal berths are spread out around the harbor, with alongside depths of 0.5 to 3m. A naval installation, complete with floating drydock, lies in the NE portion of the harbor.

The maximum size vessel permitted to berth alongside is 250m long and drawing 10.3m. However, the longest vessel to berth is the liner Queen Elizabeth II, with a length of 294m; the deepest tanker drew 11.3m.

A vessel with a maximum length of 170m can anchor in Rade de Papeete.

Aspect.—The deep gorge of the River Faatetai is easily identified 5.5 miles SSE of the harbor. The gorge lies between **Mont Aorai** (17°36'S., 149°29'W.), 2,066m high, and Pic Mamanu, 912m high, which lies 3.5 miles S of the harbor and stands prominent between Mont Marau and the W coast of Tahiti.

Silver-painted oil storage tanks situated near **Pointe Fare Ute** (17°32.1'S., 149°34.3'W.) are a good landmark. A conspicuous radio tower painted red and white stands near Fare Ute.

Pilotage.—Pilotage is compulsory and must be arranged at least 24 hours in advance, confirming vessel's ETA 1 hour prior to arrival. The pilot boards about 2 miles NW of the harbor entrance. Pilot for the roadstead or for anchorages of Tahiti and Moorea must be requested 24 hours in advance at Papeete.

Regulations.—Restricted areas into which entry is prohibited have been established at both ends of Papeete Airport runway (17°33.5'S., 149°36.5'W.). Outer zones that enclose these areas have also been established in which the following regulations apply:

1. Navigation in Passe de Papeete is restricted for vessels with a height of more than 20m. In order to proceed through the pass, permission must be requested from the lookout station of the Papeete Autonomous Port.
2. By day, vessels with a height of more than 6m must seek prior permission from the lookout station of the Papeete Autonomous Port before navigating in Chenal de Faaa and in close proximity to the ends of the airport runway. By night, passage in this area is prohibited to all vessels.

Signals.—The post office and the pilot may be contacted on VHF channel 12. Vessels are required to maintain a listening watch on VHF channel 6 while within the waters of Iles de la Societe.

Anchorage.—Anchorage for vessels 170m in length or less is available in any portion of the harbor, at least 0.1 mile offshore, over a bottom of mud, sand, and shells.

Vessels awaiting practique usually anchor with the inner range lights in line and the front entrance range light structure

bearing 140°, in a depth of 31m. Vessels waiting for a berth anchor further E, in depths of 18 to 20m.

Directions.—From seaward, the fairway is marked by a set of range lights in line bearing 148.5° leading through Passe de Papeete. A second set leads through Rade de Papeete to the E side of the harbor in line bearing 087.5°. If proceeding to berth alongside or to a waiting anchorage, gradually steer E when the tanker terminal is on the port beam, situated about 0.4 mile SE of the entrance. The first set of range lights lead between Recif Soatai and another reef 0.3 mile NE to a quarantine anchorage.

Fresh ENE winds generally prevail during the day and cause drift, and the cross current in the channel causes set. A large vessel should enter at dawn when the trade wind is usually light.

Caution.—The current that sets out of Passe de Papeete attains a velocity of 4 to 5 knots, and at times varying in direction between the N and W. Local magnetic anomalies exist within the harbor.

1.63 From Passe de Papeete the barrier reef trends WSW about 2.8 miles, from 0.5 to 1 mile from shore, and then turns sharply to the S for 3 miles to Passe de Taapuna.

Pointe Punaauia (Punaavia) (17°38'S., 149°37'W.) is located 2 miles S of Passe de Taapuna. From this point, the W coast of Tahiti trends SSE 7 miles to Pointe Maraa, the SW extremity of the island. The coastal reef fronts this coast at a distance of 0.2 to 1 mile.

An airport has been constructed on the coastal reef parallel with the coast and extends from Pointe Nuutere, located 0.75 mile SW of Passe de Papeete, to Pointe Faaa. The airport's control tower and three radio masts, close E of the runway, are conspicuous; all the structures exhibit aircraft warning lights.

Chenal de Faaa, inside the barrier reef, connects Port de Papeete with Passe de Taapuna. The fairway has a least width of 45m and depths vary from 8 to 27m; however, there are several mid-channel shoals; local knowledge is necessary in making transit of this channel. The channel is occasionally used as a seaplane landing area. The airport is situated throughout the S stretch on the shore of Faaa.

Passe de Taapuna is dangerous and is not recommended. It is more than 90m wide between the reefs, but it is encumbered by shoals; one has a depth of 1.7m. Range lights, in line bearing 082.3°, mark the channel entrance. If compelled, use this pass in a calm sea and with sufficient speed to stem the outflow.

The current always sets out, especially when the sea is heavy upon the reef; at such times, the surf breaks upon the shoals in the pass, which then becomes a mass of breakers.

Vallee de la Punaruu, 1.8 miles S of Passe de Taapuna, is an immense gorge cutting the mountain from top to bottom. The mountains of the interior may be seen through this gorge.

Baie de Punaauia (Punaavia), close N of Pointe Punaauia, is a small bight in the barrier reef, about 0.7 mile wide. It is open, and the heavy SW swell rolling in on the gravel and sand beach of the bay nearly always renders landing both difficult and dangerous.

Baie de Punaauia connects Chenal de Faaa in the N and Passe de Taapuna in the S. The navigable channel through the lagoon is marked by beacons and lighted beacons (port and starboard hand). It is narrow and torturous in places, and has a least depth of 12m at the S end. The channel is accessible to large vessels, but local knowledge is essential. A prohibited zone on the W side of the channel (17°34.0'S., 149°37.6'W.) is marked by yellow beacons.

Paea is a village 4 miles S of Pointe Punaauia. Boats may pass inside the reef between the point and the village. Paea may be easily identified by Vallee Orofere (Orofere Valley), which appears to extend to the center of the island.

1.64 Pointe Maraa (17°44'S., 149°34'W.), the SW extremity of Tahiti, lies 3 miles S of Paea. The barrier reef lies 0.6 mile off the point. Pointe Maraa is low, wooded, and projects 0.1 mile from the foot of the mountains. It may easily be recognized from seaward by the sudden turn in the direction of the coast from the S to the E.

Passe de Maraa (Maraa Pass), S of Pointe Maraa, is about 0.1 mile wide and open to the SW. At the entrance the points of the reef on each side extend nearly 0.1 mile seaward of the breakers.

Tides—Currents.—The current in the pass nearly always sets W. In the winter season, when a heavy SW swell is common, the current attains a rate of 4 to 5 knots, and on meeting the sea, causes it to break across the entrance, making the pass impracticable. The pass should not be attempted without local knowledge.

Anchorage.—There is anchorage in Baie de Maraa, within the pass, in a depth of 20m, sand, with Pointe Maraa bearing 281°, distant 0.3 mile.

From Pointe Maraa the coast trends 6 miles ESE to Mahaiatea (Mahaitea Point). The appearance of the coast changes, and the mountain slopes are wooded down to their feet. About 2.5 miles E of Pointe Maraa the mountains recede, leaving a plain 0.5 mile broad and 5 miles long.

From Pointe Maraa the barrier reef extends 3.5 miles E, about 0.8 mile from the shore; inside the reef are a series of large basins strewn with coral patches, with deep water between them.

Passe de Topiro (Topiro Pass) and Avaiti (West Avaiti), 1.3 miles ESE and 3.5 miles ESE, respectively, of Passe de Maraa, are passes that are suitable for boats only in calm weather.

Baie Popoti (Popoti Bay) is formed by a break in the barrier reef close W of Mahaiatea. The entrance is restricted to about 0.3 mile by some banks extending NW from the reef on the E side. The depth inside does not exceed 20m, but it is too exposed to the SE swell to be a safe anchorage.

From Mahaiatea to Pointe Oneroa, 7.8 miles E, the coast is indented with several coves. The barrier reef lies up to 1.5 miles offshore, and is breached by several passes.

Passe Teavaraa, 0.5 mile SE of Mahaiatea, is wide but has only 2.4m of water; the sea almost always breaks across it. The pass is dangerous, but it can sometimes be used by small vessels with local knowledge.

1.65 Passe Aifa (17°47'S., 149°25'W.), 3 miles E of Passe Teavaraa, leads directly into Baie d'Aifa. The pass is about 0.2 mile wide, but the deep channel between a bar on the W side and a reef on the E side is only 45m wide. Passe Aifa is easy to navigate in good weather, but is dangerous when the S swell is heavy; in these conditions the outgoing current sets strongly onto the bar.

At each end of Baie d'Aifa are good anchorages, but local knowledge is necessary.

Passe Rautirare, 1.3 miles E of Passe Aifa, is a deep pass 270m wide, open to the S. Bassin de Papeuriri (Papeuriri Bay), within Passe Rautirare, is about 0.4 mile in diameter. The bay is free of dangers and the depth varies from 14 to 25m. Depths of less than 9m extend 130m from shore. Pururu is situated on the reef on the E side of the bay.

The coast opposite Pururu bends 0.5 mile N, and then trends irregularly E for 3 miles to Pointe Oneroa. The mountains, wooded to the base, are cut by a series of gorges, parallel with one another, from which several rivers flow.

Passe Temarauri, which leads to Port Papeari (Papeari Harbor), lies 2.5 miles E of Pururu. The pass is about 0.4 mile long and 130m wide. The E reef extends SSW in front of the pass and forms a bar which is generally unwise to cross. A small reef, awash, lies about 0.3 mile inside the entrance. When entering this pass, care must be exercised to guard against the current which sets on the W side.

Anchorage.—Port Papeari affords anchorage off the mouth of a small rivulet, in depths of 25 to 29m, mud, about 0.3 mile from shore.

Anchorage may be obtained anywhere in the bay; however, a vessel would not be sheltered from strong winds and a heavy sea from the S.

1.66 Port Phaeton (17°43'S., 149°19'W.) lies at the N end of an inlet NNE of Pointe Oneroa. The shores of the inlet are indented by several small bays which are blocked by coral.

On the W side, the mountains approach the shore and fall abruptly to the Isthme de Taravao, NE of the inlet. On the E side of the inlet the shore is low and wooded, and the land rises in gentle and uniform slopes to the high, rugged mountains in the central and S parts of Presqu'ile de Taiarapu (Taiarapu Peninsula). From Anse Mitirapa S, the hills approach the shore.

The entrance to Port Phaeton, located 1.5 miles E of Passe Temarauri, is divided into two channels by Recif Matuu.

Passe de Teputa (Teputa Pass), S of Recif Matuu, is more direct. It is deep and clear of dangers, but the pass narrows to 120m, and when clear of Recif Matuu, vessels are required to make a sharp turn; therefore, a vessel using this pass should have a smooth sea and the reefs should be visible.

Passe Matuu, W of Recif Matuu, is encumbered by reefs in its W part; the largest one lies in the center of the pass. Between this latter reef and Recif Matuu, the pass is deep and about 90m wide, but it has a sharp elbow and is not marked; it should only be used in case of absolute necessity.

Passe Tapuaeraha (17°47'S., 149°18'W.) is the only pass large vessels should use in the approach to Port Phaeton. The pass is marked by a lighted beacon, and lights in line bearing 057.2° lead into Bassin de Tapuaeraha (Tapuaeraha Harbor).

Passe Tapuaeraha is about 0.3 mile wide, but the navigable width is about 0.1 mile wide, with a least charted depth on the range line of 31m. Recif Roae has a charted depth of 29m on the range 0.3 mile within the entrance, and 8.7m charted 0.1 mile N of the range line, 0.1 mile within the entrance.

From Bassin de Tapuaeraha, the pass inside the reef leads NNW to Port Phaeton. Recif Toatara is located in the N part of the basin. It should be passed on its W side even though this channel is the narrower of the two. Basin de Tapuaeraha and most of the basin N to Port Phaeton afford good anchorage, in depths of 25m to 40m. At about 0.3 mile SE of Pointe Riri, on the coastal reef near Pointe Pautu, there are two bollards to which vessels of 200m long, drawing 12m, can moor stern-to.

1.67 Port Vairao (17°48'S., 149°17'W.), another basin within the barrier reef, lies between the S end of Bassin de Tapuaeraha and the N end of Pointe Matahiae, about 1 mile S. This basin is entered from the N through Bassin de Tapuaeraha. There are several reefs in Port Vairao, but not all of them are marked. Anchorage may be taken almost anywhere among the reefs, in depths of 27 to 32m, sand and mud. Large vessels have been reported to use this anchorage. Pilotage is available from Papeete if ordered in advance. A marine farm has been established in these waters. A dangerous wreck is reported (2011) to lie off Recif Toataire (17°48'S., 149°18'W.).

From Pointe Matahiae, the coast trends ESE to **Pointe Fareara** (17°52'S., 149°09'W.), the SE extremity of Presquile de Taiarapu. This part of the coast is dominated by high mountains, cut by deep gorges and valleys leading towards the center of the peninsula. In the vicinity of Pointe Fareara the mountains slope steeply to the sea, forming cliffs which the sea breaks heavily against.

The barrier reef from Pointe Matahiae to its termination, 0.8 mile W of Pointe Fareara, follows the trend of the coast, with its outer edge lying about 0.6 mile offshore; however, in places it lies 1 mile offshore. The barrier reef terminates abruptly, turning N to about 0.1 mile of the coast. East of this, a series of coral banks lies parallel to the coast at a distance of 1 mile offshore.

The basins inside the barrier reef along this coast afford anchorages to small vessels, but only those with local knowledge should attempt to navigate them.

1.68 Port du Beaumanoir (17°51'S., 149°13'W.) is a basin about 3 miles long and about 0.4 mile wide between the barrier reef and the shore. It has general depths of 14 to 46m, sand and mud. It is closed at its W end by a reef.

This large basin is entered by Passe Puotoe (Puuotohe), 6.5 miles SE of Passe Tapuaeraha, or by Passe Vaiau, 2.5 miles farther E.

Passe Puotoe is about 0.2 mile wide, but the fairway, which is 7m deep, is reduced to a width of about 45m by a shallow spit extending from the E reef. On the E side at the entrance there is an above-water reef, and on the W side is a least depth of 1.7m. The pass is only 90m long and opens out quickly after the breakers are passed. This pass is dangerous and should not be attempted during strong winds or heavy swell.

Passe Vaiau lies S of Mont Faretua, whose summit is 998m high. The pass is 0.1 mile wide, but a reef, awash, divides it into two channels. The E channel is only practicable for boats in good weather. The W channel is 90m wide, but has a small coral head near its inner end, with a depth of 5m.

Passe Vaiau should be approached with Mont Faretua bearing 008°. A vessel should steer for Mont Matarii (Matarii), 205m high and about 0.3 mile inland, on a bearing of 352°, keeping close W of the 5m patch described above. When within the pass, a WNW course will lead to Port du Beaumanoir, or

an E course will lead to Port de Vaiau. Local knowledge is necessary.

Passe Tutataroa, 1.5 miles E of Passe Vaiau, leads to Port de Vaiau. It is located between the shore and the barrier reef, and is 0.1 mile wide and 0.4 mile long in a W direction. It has been reported that a draft of 10m may be carried through the pass.

In the approach to Passe Tutataroa, the line of banks which project SE from the barrier reef are crossed; these banks are dangerous when the swell is strong.

Cote de Pari (Falaises Te Pari) is that part of the coast that extends from Passe Tutataroa to Pointe Fareara and then 2.8 miles NE to the Riviere Vaiote. This stretch of coast presents a different aspect from the remainder. It has no barrier reef, and the mountains rise steeply above a line of cliffs, which SE seas break against. This coast is dangerous and should be avoided.

Recif de Faratara, a chain of sunken reefs with depths of 5 to 20m, lie off Cote de Pari, with its outer edge 1 to 1.5 miles offshore. There is deep water between the reef and the coast, but it is encumbered with shoals which break in a heavy sea. When the swell from the SW is heavy and a sea is raised by E winds, there are tremendous breakers over the reef.

The barrier reef commences again off the Riviere Vaiote and extends N at 0.25 to 0.5 mile offshore. At the S end of the reef there are three wooded islands.

1.69 Passe d'Aiurua (17°49'S., 149°07'W.) is narrowed to about 90m by a spit extending S from the barrier reef. To enter this pass, steer for the sharp peak of an unnamed mountain located 1.3 miles inland, bearing 276°. This bearing clears the spit. A narrow unmarked channel leads from the pass into the lagoon to the S. It also connects with Passe de Vaionifa, about 3 miles N, by a deep channel inside the barrier reef.

Pointe Vaitoto is located about 2.5 miles N of Passe d'Aiurua. A river which descends through a deep and cliffy gorge discharges here through a delta with four mouths. Passe de Vaionifa, which should only be used by vessels with local knowledge, is located 0.5 mile NE of Pointe Vaitoto.

Pointe Tautira (17°44'S., 149°09'W.) is a low wooded tongue which projects 0.8 mile N from the general coastline, located 3 miles NNW of Pointe Vaitoto. This point is formed by the deposits of a river.

The barrier reef rounds Pointe Tautira at a distance of 0.2 mile and breaks off abruptly W of the point.

From Pointe Tautira, the coast trends W 5 miles to **Pointe Tiitau** (17°44'S., 149°14'W.). The general direction is straight, but two low wooded points, project about 0.3 mile seaward. The mountains behind the coast are steep and cliffy. The only break in the mountains is a valley which opens between the two points.

The barrier reef forms again about 0.5 mile W of Pointe Tautira, forming with the point, Baie de Tautira (Tautira Bay). The barrier, interrupted by passes, continues W, about 0.5 mile offshore.

Baie de Tautira opens to the N, affording protection from winds NE through E and S to WNW, but is dangerous with those from the N to NW. The best anchorage is about 0.2 mile from shore, in 15m, sand, with the extremity of Point Tautira bearing 045°.

Port de Pihaa, a deep basin within the barrier reef, extends from Pointe Mataiva at the W end of Baie de Tautira to Pointe Pihaa, 1.5 miles WNW. It is entered from the E end from Baie de Tautira. A 4m patch lies in the fairway of the approach, 135m outside the entrance. The entrance from the W end is about 45m wide between the fringing reefs N of Pointe Pihaa. Neither entrance should be attempted without local knowledge.

Anchorage in the W part of Port de Pihaa is good. Anchor between 0.3 and 0.6 mile ESE of Pointe Piha, in depths of 29 to 35m, sand and mud.

Passe de Taharoa, a break in the barrier reef about 0.2 mile wide, is located close W of Port de Pihaa. It leads into Baie de Taharoa, which lies between Pointe Pihaa and Pointe Vaiturutu, about 1 mile WNW. Banc Toataa, just within the entrance, has a least depth of 1.6m.

To enter, a vessel should steer for a waterfall located in a valley 0.5 mile S of Pointe Pihaa, bearing 162°. This course leads E of Banc Toataa. Only vessels with local knowledge should enter this pass.

1.70 Port de Pueu (17°43'S., 149°13'W.), a small basin, lies within the barrier reef, W of Pointe Vaiturutu. It may be entered at its E end from Baie de Taharoa, through a channel marked by beacons, or from the W by an inner channel leading from Passe de Tiitau. Neither of these entrances should be attempted without local knowledge.

Port de Pueu is only 0.3 mile in extent, but affords anchorage, in 31 to 42m, sand and mud.

Passe de Tiitau, is the channel between the W end of the barrier and **Banc Toapu** (17°43'S., 149°14'W.); the pass is about 0.2 mile wide.

From Pointe Tiitau the coast trends W for about 3 miles to Isthme de Taravao and from there it turns N to Passe de la Boudeuse (Boudeuse Pass), 7 miles distant.

The mountains, which are high and steep behind Port de Pueu, descend gradually toward the isthmus. The seaward side of the mountains are, in general, perpendicular cliffs.

On the highest point of the isthmus, and visible from the sea to the E, stands Fort de Taravao.

Northward of the isthmus, the densely wooded mountains form the coastline, broken only by numerous ravines and valleys.

From Banc Toapu, the greater part of the barrier reef is submerged, but forms a long chain of shoals trending W to Passe de Papeiri, about 3 miles distant. The width of the reef is not more than 0.1 mile, and the depth varies from 1 to 10m, though in some places the coral is awash.

1.71 Baie de Taravao (17°43'S., 149°16'W.), within the barrier reef, is more than 3 miles long and 1 mile wide. The bay is entered from the E by Passe de Tiitau. It may also be entered through Passe de Motu Nono, Passe de Taravao, and Passe de Papeiri. The general depths in the bay are 34 to 50m; it shoals near the shore, and has a mud bottom.

A wooded islet, Motu Nono, lies inside the barrier reef. It is surrounded by a shoal extending 0.1 mile from its beach. An isolated patch, with a depth of 2m, lies 0.4 mile E of the islet, and two isolated patches lie WNW of the islet, one 4m depth at 0.2 mile distant, and another 5m depth lies 0.85 mile distant.

Passe de Motu Nono, a depression in the line of reefs with depths of 7 to 10m, may be entered by small vessels with the center of Motu Nono bearing 203°. When clear of the line of

breakers, alter course to clear Motu Nono and its fringing shoal.

Passe de Taravao may be entered where the depth is 8.6m on the reef by steering for Fort de Taravao on course 245°; to clear a 4m depth, alter course S after crossing the line of breakers.

Passe de Papeiri, 0.5 mile NW of Passe de Taravao, is about 0.2 mile wide, with a least depth of 11m. Range lights lead through the pass.

None of these passes should be entered without local knowledge.

From Passe de Papeiri the barrier reef, which is awash, extends N about 1.3 miles to Passe de Vaihi, at a distance of about 0.4 mile offshore; the deep basin formed inside the reef is known as Port de Vaitoare. **Recif Paratahi** (17°40'S., 149°17'W.) is about 0.3 mile long N-S, and about 0.2 mile wide.

Port de Vaitoare affords good anchorage throughout, in 35 to 50m, mud, good holding ground. A good berth is about 0.2 mile offshore, opposite the village of Vaitoare.

Port de Vaitoare may be entered from the S through Passe de Papeiri, or from the N through Passe de Vaihi, or Passe de Faone. Passe de Vaihi is deep, but is only 90m wide between the spits extending from the reefs on either side.

Passe de Faone lies N of Recif Paratahi and is about 0.5 mile wide. Within its entrance the pass is divided into two channels by a projection of the coastal reef extending about 0.15 mile E of Pointe Poihahi (Teruafaroa); the N channel leads into Mouillage de Faone and the S into Port de Vaitoare. There is an isolated depth of 5.9m in the N part of Passe de Faone, and an isolated 1m depth about 0.16 mile offshore E of the church at Faone. The best anchorage in Mouillage de Faone is in 26m, with the church in Faone bearing 215°, distant 0.3 mile.

The coast between **Faone** (17°40'S., 149°18'W.) and Hitiaa, 4 miles to the N, is steep, broken by numerous valleys, and in some places towers over the sea.

The barrier reef on this coast trends N for about 0.8 mile until off the village of Otuofair, the reef recommences off the village Faatautia, 1.3 miles N, and continues to Hitiaa.

Porte de Temato, located inside the barrier reef between Faatautia and Hitiaa, is a deep channel about 2 miles long and 0.2 mile wide, gradually narrowing near the N end. Anchorage can be obtained in the middle of the port, in 40m, mud.

From Hitiaa, the coast trends NNW for about 1 mile to Pointe Mataorio, which is low and wooded. Baie de Taipahia is formed N of Pointe Mataorio, and from this bay the coast curves NW about 1 mile to Pointe Putaiamo.

The barrier reef NW of Hitiaa is broken by a pass about 0.4 mile wide. An islet is located on the barrier reef on the N side of the pass, another islet is located on the end of the reef, 0.4 mile N. The barrier reef submerges for 0.5 mile, forming a shallow pass, then comes to the surface and continues NNW for about 1 mile to abreast Pointe Putaiamo.

1.72 Passe de la Boudeuse (17°36'S., 149°17'W.) is narrowed by a shoal extending about 0.2 mile from the islet on its N side. There is a rock, with a depth of less than 2m in the middle of the pass, and Mouillage de Bougainville, inside the barrier reef N of the pass, is encumbered with numerous isolated shoals. This pass and anchorage should not be used without local knowledge as a swell rolls unobstructed through the pass. This anchorage is unsafe in winds between the S and E.

Baie de Taipahia affords anchorage, in a depth of 30m, sand, with the islet Motu Puuru, 0.5 mile NE of Pointe Mataorio, bearing 050° and that point bearing 148°.

Mouillage de l'Ilot Nansouty lies between the coast and the barrier reef N of Motu Puuru.

Anchorage.—Anchorage may be obtained 0.5 mile S of **Ilot de Nansouty** (17°34'S., 149°17'W.), in depths of 35 to 46m, sand and mud. The anchorage may be approached from Baie de Taipahia or from the NNW from Passe de Mahaena. There are two shoal spots, with depths of 3.2 to 3.6m, which should be avoided when approaching the anchorage from the N, and a reef, with a least depth of 2.3m, which should be avoided when approaching from the S.

1.73 Passe de Mahaena, about 1.3 miles NNW of Motu Puuru, is 0.5 mile wide; it lies E of the entrance to Vallee de Mahaena. The pass is deep, but should only be entered by vessels with local knowledge.

From Passe de Mahaena the coast trends WNW 11 miles to Pointe Venus. The mountains are close to the coast and the important Vallee de Onoheha is easily identified by Le Matotea, a mountain at its head 2 miles inland.

Along this coast the barrier reef is submerged and forms a series of dangerous shoals with general depths of about 5.5m, sand, which extend from 1 to 1.5 miles from the shore.

Between the shoals and the shore there are large open basins that vary in depth from 37 to 42m in the E to 18.3 to 22m in the W part.

Several wide passes give access to these basins, and in good weather, small vessels can pass over the shoals when sure of the marks. These passes should not be attempted except under the most favorable weather conditions, and then only with local knowledge.

Banc de l'Artemise (Artemise Shoals) extends 2 miles in a NW direction from Passe de Mahaena and then turns sharply W for 2 miles to **Passe d'Onohea** (17°31'S., 149°21'W.).

Passe d'Onohea, about 0.4 mile wide, has more than 61m in mid-channel in the entrance between the shoals.

Passe de Faarumai, about 1 mile W of Passe d'Onohea, is 0.2 mile wide. Recif Pupuura, inside the entrance 0.3 mile offshore, has a least depth of 6m.

Passe de Papenoo, 2 miles NW of Passe de Faarumai, is about 0.3 mile wide and about 1.4 miles offshore.

1.74 Motu Aau (17°29'S., 149°28'W.), a small, wooded islet, is located 0.9 mile ESE of Pointe Venus; a reef extends 0.2 mile NW of the islet. A basin is formed between the islet and the fringing reef extending E from Pointe Venus; it is untenable and dangerous with winds from between the NE and NW.

The channel between the two islands is 7.5 miles wide between the barrier reefs; it is deep and clear of dangers.

When there is a fresh E breeze N of Tahiti, it is generally calm in this channel, but the currents and eddies are variable and uncertain.

When there is a meeting of E and W winds in this channel, a heavy sea is raised, appearing like a line of breakers. When this condition occurs the E extremity of Moorea becomes more dangerous, which under any circumstance should be given a

wide berth.

The NW coast of Tahiti should not be closely approached, especially at night, as a portion of the W current striking Moorea is deflected and sets directly onto the barrier reef off that part of Tahiti.

A vessel entering this channel at night from the SW should make the light on Pointe Venus, after passing the S extremity of Moorea before standing to the E.

Moorea

1.75 Moorea (17°32'S., 149°50'W.) has a broken outline and numerous peaks; Mont Tohiea, 1,207m high, is located in the S central part of the island. There are numerous mountains throughout the island between 610m and 914m high, but the most remarkable is Muaputa, 830m high, located 2 miles NNE of Mont Tohiea. It has a hole through its summit which may be seen through on a SE bearing. The island is thickly wooded, but some of the peaks are bare.

The island, which is triangular-shaped, is about 8 miles long on each side. It is surrounded by a barrier reef which has several passes through it. Baie de Cook and Baie d'Opunohu, 2 miles W of Baie de Cook, are on the N side of the island.

The island is administered by a French Agent, who usually resides at Afareaitu, situated near the middle of the E coast.

Caution.—A marine space management plan has been established for the waters around Moorea from the shore to the 70m depth contour. The plan is intended to protect ecosystems and the environment. It regulates navigation of vessels, anchoring, fishing, diving, leisure activities, mineral extraction and plant gathering.

The plan includes protected marine areas as well as special fishing and mooring zones which are marked by buoys.

Anchoring is prohibited within the marked channels, except in emergency and also within a 50m area on either side of submarine cables and pipelines.

1.76 Pointe Faaupo (17°29'S., 149°45'W.), a low wooded point, is the E extremity of Moorea. From this point the coast trends NW 1.8 miles to Pointe Aroa, another low point, where it turns WSW 2.5 miles to Pointe Paveau, the E entrance point to Baie de Cook.

The barrier reef fringes the coast between Pointe Faaupo and Pointe Aroa, and then extends to 1.25 miles off Pointe Paveau. The 500m curve lies 0.9 mile off Pointe Faaupo and 2 miles off the coast between Pointes Aroa and Paveau.

Baie de Cook (Paopao Bay) (17°29'S., 149°49'W.) is entered between Pointe Paveau and Pointe Pihaena, 0.6 mile WSW; the bay extends 1.3 miles S. The fringing reef extends up to 160m off the E side and 0.1 mile off Pointe Pihaena. The bay has depths of 32m decreasing gradually to the 10m curve, which lies 135m from the head of the bay.

Depths—Limitations.—There is a T-shaped pier with a least depth of 4.5m alongside. A light shows on the coastal reef, close N of the pier.

Passe Avaroa, the entrance to Baie de Cook, is entered 0.7 mile NW of Pointe Paveau. The pass is about 0.1 mile between the 20m curves; it has a least charted depth of 26m. The pass is marked by a lighted range.

Anchorage.—Anchorage is available, in a depth of 32m, mud, on the intersection of two ranges shown from the W shore of the bay. It should be noted that strong winds blow down from the mountains.

1.77 Papetoai (17°29'S., 149°51'W.) is a small town on the W bank of Baie d'Opunohu, located about 2 miles W of Baie de Cook. The bay is enclosed by precipitous mountains; however, an extensive valley lies at the head of the bay.

Depths—Limitations.—The bay is entered through Passe Tareu, which is nearly 270m wide and has a depth of 69m in the middle, but shallow water borders the reefs on either side. The depths in the bay decrease gradually to 20m, 0.3 mile from its head.

Anchorage.—Anchorage is available, in a depth of 43m, on the intersection of two sets of range beacons. The first, which marks Passe Tareu, are in line bearing 157°, while the second pair are in line bearing 246.5°.

From Papetoai, the coast trends 2.5 miles W to **Pointe Tehau** (17°29'S., 149°54'W.); the barrier reef lies about 0.8 mile offshore. Two islets lie inside the barrier reef NW of Pointe Tehau.

From Pointe Tehau the coast trends in a SE direction 8.5 miles to **Pointe Parao** (17°35'S., 149°49'W.), the S extremity of the island. The barrier reef lies about 0.8 mile offshore along this coast, and the 500m curve lies 1.3 to 1.8 miles off.

Passe Matauvau gives access to an anchorage capable of handling a ship, but all of the reef passes require local knowledge.

1.78 Passe Matauvau (17°34'S., 149°52'W.), about 0.9 mile SSE of Passe Avamotu, is 0.2 mile wide and has a depth of 6.5m. Shoal water extends about 0.2 mile SW from the reef on the N side of the pass and the sea nearly always rolls heavily onto this shallow area. The current running out of the pass sets toward it.

Passe Matauvau may be approached with Mont Mouaroa bearing 046°, taking care not to confuse it with the two peaks 0.5 mile S of it. Steer through the pass keeping 90m W of the reef on the E side; when within the pass steer 067°. Port Haapiti is about 0.4 mile in diameter, with general depths of 14 to 30m over sand. Take care to avoid a 0.5m patch at the E end of the anchorage. This anchorage affords little protection from a W sea.

Passe Avarapa, 2.5 miles SE of Passe Matauvau, leads N through the barrier reef to Baie de Vairapa. A depth of 3.5m is charted in the middle of entrance to the pass. The pass is 0.2 mile wide, and the general depth is 5.8m. Baie de Vairapa is deep, but the shelter is not good and there are several unmarked shoals.

From Pointe Paroa the coast trends 1 mile E to **Pointe Nuupere** (17°35'S., 149°48'W.), and then turns NNE 6.5 miles to Pointe Faaupo. This coast is indented by several small bays backed by high, rugged mountains.

The barrier reef lies about 0.8 mile offshore to Pointe Nuupere, then it follows the coast about 0.5 mile off to Pointe Faaupo, where it joins the shore.

Passe Teruaupu, 1.3 miles NNE of Pointe Nuupere, is about 275m wide, but the navigable channel is only 92m wide. It should not be entered without local knowledge.

The pass leads into Baie de Haumi; there are channels,

marked by beacons, that extend both N and S from the bay.

Passe Tupapaurau, 1.3 miles NNE of Passe Teruaupu, has a least depth of 4m in the deepest part. Small schooners and boats can use the pass in good weather, but in bad weather the sea breaks heavily across it.

Baie Putoa (Baie Afareaitu), entered through Passe Tupapaurau or from the S through the pass from Baie de Haumi, affords safe anchorage, in depths of 30 to 49m, mud.

Passe Vaiare (17°31'S., 149°46'W.), 2.3 miles N of Passe Tupapaurau, is 180m wide; it is deep, clear of danger, and safe in all weather. The reef on the N side of the pass is awash in places, and a small bare islet is located on the reef on the S side. Range lights, in line bearing 272°, mark the pass.

Baie de Vaiare (Baie de Teavero) is a deep, sheltered basin. A village, with a wharf having an alongside depth of 3.3m, lies about 0.8 mile NNW of Passe Valiare. Anchorage is available within the bay, in depths of 20 to 40m, mud. Anchorage is prohibited between the range beacons.

1.79 Tetiaroa (17°03'S., 149°34'W.) is an atoll which consists of a number of small, low islets covered with coconut palms. There is no passage into the lagoon, but small boats can pass over the reef. A hotel is located on the atoll. A light is shown from the S extremity of the atoll.

Maiao (Tupuai Manu) (17°39'S., 150°38'W.), when seen from a distance, resembles a ship under sail, but on closer approach it is easily identified by two hills, which nearly divide the island. One of the hills is 154m high. A narrow fringing reef surrounds the island, except on its SW side where the reef extends seaward for 0.75 mile. There is a boat passage through the reef on the NW and S sides of the island.

Depths—Limitations.—The NW channel, oriented at 135° and dredged to 2.5m, is 120m long and 30m wide. Its entrance is marked by two lighted beacons. The open basin, 60m long and 40m wide, has a landing wharf that is 24m long. The swell from the SW to the NW can unfurl in the channel and create violent undertow in the open basin.

It was reported (1999) that the depth in the channel and along the landing wharf are not more than 1.5m. No anchorage is available around the island.

1.80 Huahine (16°45'S., 151°00'W.) is the farthest E of Iles Sous le Vent. The island is about 8 miles long N-S, and 5 miles wide; a narrow channel, with a least depth of 0.3m, divides the island in two parts.

Depths—Limitations.—Passe Farerea, in the middle of the E side of the island, leads to Baie de Maroe. The pass is narrow but deep, but with E winds it is dangerous. A current has been reported to set S across the entrance with N winds.

Two white range lights standing at the foot of a remarkable cliff, and a white house at an elevation of 30m, all of which are in line bearing 262.5°, mark the channel entrance. The rear beacon has been reported to be impossible to see until on the alignment for vessels approaching from the N.

Baie de Maroe is a deep and extensive basin extending WSW for about 2 miles from the inner end of Passe Farerea.

The bay is sheltered except from the E; squalls from the mountain sometimes occur suddenly.

Aspect.—The mountains in the N part of the island attain a height of 669m, and a height of 462m in the S part. With SE winds the land is generally covered with clouds and hidden by rain squalls, especially during the night when it is imprudent to make an approach. In thick weather the N point is the best landfall.

The barrier reef lies up to 0.9 mile off the SW side; in some places it is awash and in others it is sunken. From the NE side to the NW side it is a fringing reef.

Anchorage.—Anchorage is available in the W part of the bay, in depths of 30 to 35m, mud and sand, good holding ground.

Caution.—The remains of an old beacon, with a depth of 1.9m and considered an obstruction to navigation, lie about 120m WSW of Tetoaihurei Point.

Passe Tiare, 1.5 miles N of Passe Farerea, leads W then SW into Baie Faie. The pass is deep, but narrow, and should only be used by vessels with local knowledge.

Oyster cultivation cages can be found inside the bays and lagoons of Huahine.

1.81 Fare (16°42'S., 151°01'W.) is situated about 0.5 mile SE of Pointe Teffaao, on the NW side of the island. The port is protected by a coastal reef which extends about 0.3 mile offshore SW of Pointe Teffaao, and the barrier reef which lies 0.7 mile offshore, WSW of the village of Fare.

Depths—Limitations.—There are three berths available from E to W, as follows:

1. A quay, 61m long, with alongside depths of 8 to 9m.
2. A quay, 82m long, with alongside depths of 5 to 8m.
3. A quay, 29m long, with a depth alongside of 1.5m.

Due to the strong current alongside the quays, it is recommended to use an anchor when berthing.

A ro-ro berth is situated close WNW of the mouth of the Faahia River.

The port of Fare is entered from the NW through Passe Avamoa, which has a width of about 0.1 mile between the coastal reef on the N and the barrier reef on the S. There is a least depth of at least 10m on the range line. There are two lights, in line bearing 126.5°, situated 0.3 mile SSE of Fare. This range will lead through Passe Avamoa to the anchorage 0.1 to 0.2 mile offshore W of Fare. Vessels should moor head and stern in the direction of the pass, in 18.3 to 29m, mud.

Caution.—Caution is advised as the range lights may be obscured when only slightly off the range line.

1.82 Passe Avapehi (Passe Avapeihi) (16°43.6'S., 151°02.9'W.), about 1 mile SSW of Passe Avamoa, is about 0.2 mile wide between the barrier reefs and has a least charted depth of 17m; the passage leads to Baie Haavai. Two beacons on shore, in range 094.5°, lead through Passe Avapehi to Baie Have.

To proceed to Fare from Passe Avapehi, steer a course of 025° for the flagstaff which stands on the wharf.

A deep intricate channel is formed inside the barrier reef from Passe Avapehi, SSE 3 miles to Port Bourayne. This channel and the channel inside the barrier reef which leads farther SE to Baie Teapaa and Baie Haapu, 0.75 and 1.5 miles, respectively, from Port Bourayne, should only be used by vessels with local knowledge.

1.83 Haavai Bay (16°44'S., 151°02'W.) is well sheltered, but with depths too deep for the anchoring of small vessel. An anchor buoy for the mooring of crossing vessels is anchored at the opening of the bay; it cannot be used without special authorization and in addition, mooring is prohibited there at night. Anchorage for large vessels can be taken in the N part of Port Bourayne, in depths of 25 to 30m, mud.

1.84 Raiatea (16°50'S., 151°24'W.) and Tahaa, close NW, are two islands enclosed within the same barrier reef, located about 20 miles W of Huahine. Raiatea, the largest is about twice the size of Tahaa. Together, the islands extend 23 miles in a N-S direction and are about 9 miles wide in places.

The barrier reef is about 2 miles offshore and encloses the channel that lies between the two islands. There are eight passes through the reef to Raiatea and two passes through the reef to Tahaa.

Oyster cultivation cages can be found inside the bays and lagoons of Tahaa and Raiatea.

Tides—Currents.—A SE current with a rate of 2 knots has been experienced during an established NW wind about 10 miles W of the islands. Generally, the set is NW at less than 1 knot. Currents within the passes are generally weak, with the ebb being the stronger; however, the sea state outside the reef greatly affects the rate and set of these currents.

With winds from the SSE, a long and heavy swell is experienced off the island's SW side.

1.85 Raiatea (16°50'S., 151°24'W.) has a range of mountains which extends N-S. Near the center and at about 5 miles from the S end of the island, the highest peak of Mont Tefauaiti rises to a height of 1,017m. Numerous spurs extend to the coast, and the coastline is indented by many bays. Mont Tapioi, with a flat top, stands out at a height of 294m in the N part of the island.

Passe Teavapiti (16°45'S., 151°25'W.) is a break in the barrier reef approximately 3 miles SE of Pointe Motutapu, the N extremity of the island. Taoru, an island, divides the pass into two parts; the N pass is the principal pass used. Ofetaro, which is covered with brush and some coconut palms, is situated on the barrier reef 0.2 mile N of Taoru.

Passe Teavapiti is about 135m wide; there is a least charted depth of 12m on the range. Lights in line bearing 269° lead through the pass.

When the barrier reef has been cleared, about 275m NW of Taoru, lights situated off Uturoa, in line bearing 315°, lead inside the barrier reef to a point E of Pointe Tonoi; then follow the track as charted, or continue on course 315° to the wharf.

1.86 Uturoa (16°44'S., 151°27'W.) (World Port Index No. 55800), at the NE extremity of Raiatea, a natural coastal harbor, is the residence of the administrator.

Tides—Currents.—The tidal current within the barrier reef is strong in places; the general set is NW, but this may be affected by the prevailing wind and by the direction of the swell in the vicinity of the island. Off the wharf the flow is generally weak.

Depths—Limitations.—There is a wharf, 460m SE of the hospital, that will accommodate a vessel with a draft of 7m. A small craft pier extends about 50m SE of the wharf, while a second pier extends E from the shore close SE of the hospital.

Aspect.—The temple, a white building with a belfry, is situated in the NW part of Uturoa; the police station stands 275m SE of the temple. A hospital consisting of a yellow conspicuous building is situated 0.1 mile SE of the police station.

Pilotage.—A pilot can be made available from Papeete, if required.

Anchorage.—Anchoring vessels leave the range when about 0.8 mile SSE of the hospital, steering for a beacon on the reef N of Uturoa, bearing 327°. Four anchorage berths are available off the town, in depths of 31 to 39m, sand and coral, and are situated with the front range light on the following bearings and distances:

a. 215°—410m.
b. 241°—275m.
c. 285°—595m.
d. 309°—640m.

The 215° and 241° anchorages are the recommended berths, as the holding ground is good. The other two are subject to a strong NW set. Swinging room at all the berths is cramped.

Caution.—Caution is advised, as there is a depth of 15m on the 327° track, about 0.2 mile E of the front range light.

1.87 From **Point du Roi Tamatoa** (16°44'S., 151°27'W.), 90m N of the hospital in Uturoa, the coast trends 1.3 miles WNW to Pointe Motutapu, the N extremity of the island, then about 2.8 miles SW to **Pointe Mirimiri** (16°46'S., 151°29'W.). A 1.6m shoal lies 0.3 mile N of Pointe du Roi Tamatoa, and a 4.4m shoal is located 0.5 mile NNW of the same point. Reefs extend 0.4 mile N of Pointe Motutapu, and Grand Banc Central, separated from this reef by a channel 205m wide, extends 0.9 mile farther N.

A pass leads from the NE of Pointe Motutapa N within the barrier reef, E of Grand Banc Central, to the anchorage and the channel E of Tahaa. The pass is easy to navigate by vessels with local knowledge. In the absence of any beacons, the passage should not be attempted unless the reefs on either side are clearly distinguishable.

An aircraft landing strip, situated in an E and W direction, is situated close S of Pointe Motutapu.

An inner passage leads SW from Pointe Motutapu to Pointe Mirimiri. Vessels from the W whose destination is Uturoa may use this passage, but local knowledge is necessary or the services of a pilot are recommended. This inner passage is entered from Passe Rautoanui.

1.88 Passe Rautoanui (16°46'S., 151°30'W.) is a break in the coastal reef 0.5 mile W of Pointe Mirimiri. Generally, there is a SW set in the pass, caused by the prevailing E winds here.

The pass can be easily identified by the islets Tahunaoe and Torea, reported to be awash (2010), which lie on the N and S sides, respectively, of the pass.

A range light is situated on Pointe Mirimiri, and the front range light is situated 145m W. These lights, in line bearing 083.5°, lead through the pass.

A confined anchorage, in 30m, mud, can be taken in Baie Pufua, close S of Pointe Mirimiri.

From Pointe Mirimiri the coast trends in a S direction about 9.8 miles to **Pointe Tahoata** (16°55'S., 151°26'W.), the S

extremity of the island. This coast is irregularly shaped and is indented by numerous bays.

The barrier reef, which lies up to 1.25 miles offshore, is breached in three places by passes.

Passe Tiano (Passe Tetuatiare) (16°50'S., 151°29'W.) is located 4 miles S of Passe Rautoanui. This pass is both dangerous and difficult, and is not recommended.

1.89 Passe Toamaro (16°51'S., 151°29'W.), about 1.8 miles S of Passe Tiano, is about 145m wide between the reefs and has a least charted depth of 8.5m. Toamaro, a small, wooded island, is on the inner part of the N side of the pass, and there is an islet on the inner part of the S side of the pass.

This pass leads to a safe anchorage inside the reefs and also to Baie Vaiaeho, to the N of the pass. Care should be exercised in the vicinity of the 5.2m patch, 0.2 mile E of the S extremity of Toamaro, and the isolated reefs which lie 275m N and 180m S, respectively, from the 5.2m patch.

A deep, intricate channel, available only to small craft with local knowledge, leads S inside the barrier reef from Passe Toamaro to Passe Punaeroa.

Passe Punaeroa (16°54'S., 151°28'W.), 2.5 miles S of Passe Toamaro, is about 300m wide, with a least depth of 7m, leading to a deep roadstead. Anchorage may be obtained as convenient, avoiding isolated shoals.

A deep, narrow channel trends SE to Pointe Tahoata, within the barrier reef; in places it is nearly blocked by the coastal reef.

From Pointe Tahoata, the coast trends NE to Pointe Puutarape, about 7 miles distant, then NW 7.5 miles to Passe Teavapiti.

Passe Nao Nao (16°55'S., 151°24'W.), located 1.8 miles E of Pointe Tahoata, is a pass across the barrier reef close E of the islet Nao Nao. The pass is 90m wide and has a narrow bar with a depth of 4.8m, on which the sea breaks heavily in bad weather. The pass can only be used by small vessels with local knowledge in good weather.

Oatara (16°51'S., 151°19'W.), a small island on the barrier reef, lies 6.5 miles NE from Passe Nao Nao. This islet lies 1 mile E of Pointe Puutarape, the E extremity of Raiatea.

Passe Teava Moa (Passe Teavamoa), about 1 mile NW, is a deep narrow pass. A depth of 27m is charted close E of the entrance, and 9m is charted in the pass on the S side, close off the barrier reef. This pass leads to Baie Hotopuu, SW of the pass, and Baie de Toahiva (Baie Opoa), 1 mile W of the pass.

Baie de Toahiva affords good anchorage in the middle of the entrance, in 33m, mud, 180m S of a rock, awash.

Passe Iriru (16°47'S., 151°22'W.), 3.3 miles NW of Passe Teava Moa, leads SW through the barrier reef to Baie Faaroa. It is easily recognized as it lies between two islets, Iriru on the S and Tipaemau on the N. The pass is deep and about 135m wide between the edge of the barrier reefs. A drying reef is located 0.6 mile SW of Iriru.

A course of 217° will lead through Passe Iriru. When abeam Iriru's SW end, steer no less than 230° to clear the drying reef mentioned above. Baie Faaroa, entered about 1 mile SW of Iriru, offers anchorage in SW portion, in depths of 15 to 30m, mud. Anchorage is prohibited near submarine cables which cross the bay's entrance.

There is a pass inside the barrier reef S to Passe Teava Moa and N 3.5 miles to Passe Teavapiti. These passes should only be used by vessels with local knowledge.

1.90 Tahaa (16°38'S., 151°29'W.) (World Port Index No. 55780) is nearly round; Mont Vaihaato rises to a height of 590m near the center. Two passes lead through the barrier reef off Tahaa, one on the SW side and the other on the SE side, into the lagoon surrounding the island. There are a number of islets on the barrier reef on the N side; many of them are wooded. The barrier reef is nearly awash in places, and in others, has depths of 3.1 to 3.7m.

Vaitoare (Village de Tahaa), the principal village on the island, is situated in the SE part; it may be recognized by a temple.

Passe Toahotu (16°39'S., 151°24'W.), 4 miles NE of the S extremity of Tahaa, may be identified by the islets of Toahotu and Mahaea, which stand on the S and N side, respectively, of the channel.

The pass is about 0.1 mile wide between the barrier reef and is deep and clear of dangers; however, a shoal with a depth of 5.2m lies 410m NW of Toahotu.

Passe Toahotu should be entered on a mid-channel course of 293°, and when the N extremity of Toahotu bears 180°, course should be changed to 260° to pass S of the 6m shoal.

A pass inside the barrier reef leads SSW to Vaitoare. There is anchorage, in 37m, mud, 0.2 mile offshore, SE of the village.

From Vaitoare, the inner channel follows the coast WSW to abreast **Pointe Toamaro** (16°41'S., 151°28'W.), the S extremity of the island, then trends NW about 3 miles to Pointe Tiamahana, the S entrance point of Baie Hurepiti.

The inside pass from the N extremity of Raiatea leads E of Grand Banc Central to the anchorage of Vaitoare.

1.91 Passe Paipai (16°40'S., 151°31'W.), on the SW side of the island, provides access to Baie Hurepiti; it also gives access to the inner channel which encircles the island. There is a quay for coasters on the S shore of **Baie Tapuamu** (16°37'S., 151°33'W.); the quay has a depth of 6m alongside.

The pass is deep, having a least charted depth of 32m, between the reefs, either side which are awash. South winds cause a heavy swell in this pass.

Range lights standing on Pointe Pari (Pointe Tepari) lead through the pass.

Currents in the pass are reported to be strong.

Baie Hurepiti, entered between Pointe Pari and Pointe Tiamahana, 0.5 mile SSE, affords anchorage, in depths of 25 to 30m, sand, good holding ground. Anchorage is prohibited between the village of Tapuamu and Tautau islet due to the presence of undersea electrical cables.

Caution.—Mariners should note the presence of marine farms, best seen on the chart, which lie off the NW shore of the bay.

There is an inside passage from Passe Paipai NW, then NE to the N extremity of Tahaa. East of the N extremity of the island the passage is obstructed by a group of reefs and becomes intricate. From these reefs the passage SE to Passe Toahutu appears to be clear. This passage should only be used by vessels with local knowledge.

Bora-Bora

1.92 Bora-Bora (16°30'S., 151°45'W.) is composed of several islands enclosing a central lagoon, the whole being enclosed by coral reefs. The largest island of the group is Bora-Bora. A light is shown from Teturiroa, at SW extremity of the reef.

Aspect.—Bora-Bora is distinguished by the double-peaked Mont Pahia; the highest peak to the SE is 661m high. **Mont Otemanu** (16°30'S., 151°44'W.), close E of Mont Pahia, is the highest peak on the island, rising to a height of 727m. The E side of the island has a barren appearance. In general, this island group is more craggy than other islands of Iles de la Societe. A radio mast stands on the island's SW end.

The barrier reef is covered with islands, except on the S and SW side. This portion of the reef is awash in places, and in others, depths up to 3.1m exist.

Pilotage.—Pilotage is available and should be ordered from Papeete. Vessels are usually met 2 miles off the pass entrance.

Vessels should send their ETA to the Captain of the Port, Papeete at least 15 days in advance, confirming 3 days prior to arrival. The islands are governed by the administrator at Uturoa in Raitea, who delegates his authority to a police superintendent residing in Vaitape, the principal village.

1.93 Passe Teavanui (16°30'S., 151°47'W.) the only passage through the barrier reef, is off the W side of the island. It is straight, free from danger, and has a least charted depth of 8.0m in the fairway; the edges of the reef are clearly visible.

The pass is marked by buoys and a beacon. The daymark (white square) situated 0.2 mile SE of Pointe Pahua is reported as conspicuous. A range leads through the pass. Within the barrier reef, course may be set on two leading lighted beacons bearing 112°, and that will lead through the pass. Port entry limits ship size to an overall length 220m and a width of 30m, with a maximum draft of 9m.

Bora Bora

A buoyed channel, not charted, has been established (2004) W and S of Toopua Island.

The prevailing wind blows out of Passe Teavanui, but with strong NW winds, the sea breaks across the entrance, rendering it difficult to distinguish the channel. This condition may last from 2 to 15 days; it is most unfavorable during January, February, and March.

1.94 Vaitape (16°30'S., 151°45'W.) (World Port Index No. 55770), situated on the W coast of Bora-Bora, may be recognized by the church with a red steeple situated 0.3 mile WNW of the light marking Passe Teavanui. A pier able to accommodate vessels up to 500 grt is available here, with depths of about 4.5m alongside; larger vessels Med-moor to this pier. A marina protected by rocks is situated at the N part of the pier. Because of the presence of coral heads around the landing wharf and weak mooring points, this post becomes dangerous when the wind picks up.

Anchorage.—Anchorage is available in Baie de Povai, in depths of 22 to 33m. The anchorage off Vaitape, in a depth of 33m, lies with the church bearing 067°, 0.4 mile distant.

Baie Faanui, N of Passe Teavanui, offers anchorage, in a depth of 25m, sand and mud, on the bay's W side. A wharf about 130m in length lies on the S side of the bay, about 1.3 miles NNW of the church at Vaitape. In 1985, a report stated the wharf was in good repair, with alongside depths of 7.3m.

Anchorage is prohibited within 280m of the submerged water pipeline laid between Pointe Faripiti and Ilot Teveiroa; anchorage is also prohibited in the submerged pipeline area, best seen on the chart, between the main island of Bora-Bora and Motu Tape (16°30'S., 151°42'W.).

There is a prohibited anchorage area extending from Motu Mute S to Bora-Bora. Anchorage is also prohibited in the vicinity of the pipeline which extends ENE about 0.4 mile to Teveiroa, an island off the N entrance point of Baie Faanui. There is an aircraft landing strip and jetty on Motu Mute, an island on the N extremity of the barrier reef.

1.95 Atoll Tupai (Ile Motu-Itu) (16°16'S., 151°50'W.) consists of a group of low, wooded islets, about 9m high, connected by a coral reef. It is 4.5 miles long N-S and 3 miles wide.

The area surrounding the atoll is said to be free from danger; however, its position and charted outline are not definite.

Small boats may enter the lagoon through a break in the reef located 1 mile S of the E extremity of the atoll.

One can land at the NW point of the island facing a hangar, passing by a narrow indentation in the reef which gives access to a partially-destroyed quay.

Maupiti (16°27'S., 152°15'W.) is a small mountainous island, 380m high. The peak provides an excellent navigational aid and is easily identified. Should the peak be obscured, it is possible to use the S end of the island as it is steep-to and defined.

The barrier reef extends for a distance of about 2 miles off the S side and about 1 mile off the other sides. The S part of the barrier reef, except for a few islets, is mostly awash, but the N part of the reef is above water and has some wooded islands on it.

The entrance to the lagoon is on the S side of the island. In bad weather the sea breaks across the entrance, and in good weather rollers are common. A strong current always sets out to the entrance. The pass is narrow and tortuous, and is only

available to small vessels with local knowledge during good weather.

Atoll Maupihaa (Mopelia) (16°49'S., 153°57'W.) is roughly circular and about 5 miles in diameter.

The reef surrounds an extensive lagoon. The E side of the reef is occupied by a long, narrow band of dry land with numerous coconut trees. On the N and W sides there are a number of islets; many of them are covered with brushwood or trees. The reef on the S side is uncovered; some breakers indicate the presence of a danger.

A pass located about 1 mile SW of the N extremity of the atoll leads SE through the reef. The pass, about 27m wide between the reefs on either side, has depths of 9m at its outer end. The fairway at its inner end is encumbered by coral heads and by a shoal, with depths of less then 1.8m, which divides it into two channels. The N channel is practicable for small boats, and then for those with local knowledge only. The S channel has a least depth of 4m and also requires local knowledge.

Oyster cultivation cages can be found inside the lagoon at Maupihaa.

Courtesy of Polynesie Passion

Maupiti Channel from N

1.96 Atoll Manuae (Fenua Ura) (16°32'S., 154°41'W.) is the farthest W of Iles de la Societe. The reef encircling the lagoon is about 7 miles long NNW-SSE and about 5 to 6 miles wide. There is a group of low, and consequently dangerous, islets on the reef. The E side of the atoll is said to be green with trees, but the W side is reported to be coral which breaks heavily for about 5 miles. The lagoon is only accessible to craft by a pass located at about 0.4 mile to the WSW of the N point. A cavity in the barrier reef also allows whalers on the E coast close to the town; craft must be pulled up on the reef flat. This landing as well as the crossing of the pass can only be planned in calm weather. At night or in thick weather, vessels should avoid approaching this atoll.

Atoll Motu One (Bellingshausen Island) (15°50'S., 154°31'W.) consists of four low coral islands covered with coconut trees and other vegetation on a reef of triangular form about 3 miles in extent. The reef is steep-to and has a number of rocks on it. There is no passage into the lagoon.

Iles Tubuai (Iles Australes)

1.97 Iles Tubuai lie between 21°45'S and 23°55'S, and 147°32'W and 154°50'W. This is a scattered group consisting of five islands surrounded by fringing coral reefs which are generally steep-to. The French Government agent for Ile Tubuai, Raivavae, and Rapa, resides at Ile Tubuai; the islands of Rurutu and Rimatara are administered by a similar official stationed at Rurutu. These agents are under the orders of L'Administrateur des Colonies, whose headquarters are at Papeete.

Iles Tubuai are volcanic in origin; they are high, except for Iles Marie, which forms an atoll. All the islands surrounded by reefs are usually steep-to. The sheltered lagoons are accessible only to small vessels, and navigation marks in Iles Tabuai are not reliable.

1.98 Rapa (27°36'S., 144°20'W.) is an irregular, circular form about 4.5 miles in diameter. There are several deep indentations in the shore; the largest is Baie de Haurei on the E coast.

Winds—Weather.—The prevailing winds from October to April are from the E, but about once in three weeks, during December, January, and February, W winds occur for a short period. From May to the middle of September, W winds with heavy showers prevail, blowing down the valleys into Baie de Haurei; the strongest W winds are felt in July and August. From native reports, typhoons are sometimes experienced. Gales of cyclonic character, though not common, occur at all times of the year.

The climate is generally temperate but moist; rains are frequent. The island is often covered with clouds and fog when the weather is clear a few miles out to sea.

Aspect.—Ahurei (Haurei), a village, is situated on the S shore of the bay, 1 mile WSW of Pointe Maomao. The aspect of the island is remarkable; where the steep sides of its high, jagged peaks reach the coast, they become great cliffs falling almost vertically to the sea. The island rises to a height of 650m in its W part.

The mountains on the E side of the island are generally either bare or with a growth of stunted trees. On the W side, they are covered with a rich vegetation, and most noticeably with forests of large tree ferns.

The shore is bold and has no off-lying dangers beyond 0.5 mile, except in the approaches to Baie de Haurei, where spits and shoals extend nearly 1 mile seaward.

A shoal covered by 30m of water (locally called Maaki Shoal) is located 20 miles ENE of Rapa Island.

1.99 Baie de Haurei (27°37'S., 144°20'W.), open to the E, is entered between Pointe Tekogoteemu and Pointe Maomao, 0.6 mile SSW. It is protected from the prevailing E winds, and from the heavy sea, by the shoals in the approach. The land surrounding the bay rises rapidly from the shore. The white dome of a weather station is visible on the S side of the bay.

Depths—Limitations.—The entrance is narrow and tortuous, and has a least depth of 5.8m. Three sets of range beacons mark the channel, which is only 90m wide and should not be attempted with any type of cross wind. Shoals, with a least depth of 1.2m, are prevalent along the edge of the channel. Shoal water extends 0.4 mile S of Pointe Tekogoteemu, and

0.5 mile E of Pointe Maomao.

Pilotage.—A pilot is recommended for vessels without local knowledge. The pilot may be requested in advance by radio through Tahiti. Local pilots may be available, but it should be kept in mind that he will have little experience in handling vessels other than local craft. It is strongly recommended that before the channel is attempted, a preliminary reconnaissance be carried out to verify the beacons, and mark the edges of the shoals to be avoided, when altering course from one alignment to the next.

Anchorage.—Anchorage outside the shoals is available, in depths of 11m, with Pointe Maomao bearing 279°, 1 mile distant. Within the bay, large vessels anchor when a stone temple with a gray roof situated on the S side of the bay bears 213°, in depths of 10 to 15m, indifferent holding ground. With E winds, the anchorage inside the bay is protected, but with W winds, violent squalls may blow down from the high land. Vessels over 100m in length should not remain anchored overnight.

1.100 Iles Marotiri (Ilots de Bass) (27°54'S., 143°30'W.) are a group of three islands and seven rocks. The group, which lies within an area of 2 miles, are rugged and practically inaccessible. The S and highest island rises to a height of 122m. The islands on the S and W sides of the group have growths of grass and small bushes. Rocky ledges extend up to 1 mile seaward of the group.

Neilson Reef (27°00'S., 146°00'W.) is a crescent-shaped reef on which the sea breaks. It has a least depth of 2.9m on its NE end. The reef is about 3 miles long in a N-S direction, and about 4 miles wide in an E-W direction.

Wachusett Reef (Wachusett Shoal) (32°18'S., 151°10'W.) was reported to have depths of 9 to 11m.

Breakers have been reported to lie 100 miles SE and 100 miles SW, respectively, from Wachusett Reef.

Earnest Legouve Reef (35°12'S., 150°40'W.) was searched for in 1982 and 1983, but was not found.

Sophie Christianson Shoal (41°26'S., 148°26'W.) was reported as a patch of discolored water with a depth of 9.1m; it has also been reported to break.

Volcan Macdonald (29°00'S., 140°15'W.), a submarine volcano, was reported in 1981.

Maria Theresa Reef, which was reported to lie in position 37°00'S, 151°13'W, was unsuccessfully searched for in 1957. In 1983, the position of the reef was recalculated at position 36°50'S, 136°39'W, and searched for, but not found. In any event, caution should be exercised in the vicinity of both positions.

1.101 Raivavae (23°50'S., 147°40'W.) is the farthest E of Iles Tubai. The island is formed by rugged hills, mostly covered with trees, which in most cases slope gently toward the sea; it rises to a height of 437m.

Raivavae is about 4.5 miles long in an ENE-WSW direction and about 1.8 miles wide, and is completely surrounded by a barrier reef, most of which is awash. In the NW part of the reef there is a break which provides an entrance through the reef. On the S side of the island, a rocky bank, with a depth of 20m, extends about 1.5 miles offshore.

Passe Mahanatoa (23°50'S., 147°40'W.) runs through the barrier reef, which is 1 mile NNE of Pointe Matoaitanata. The fairway is led through a channel 35m wide marked by buoys over a least depth of 4.7m. At the inner end of the pass there are depths of 4.3m. Entry into the pass is led by the beacons in line bearing 167°15'. After clearing the beacons marking Roches Totoro at the inner end of the reef, alter course to starboard until white leading beacons are in line bearing on 261°. Keep on this course until Pointe Matoaitanata's rocky extremity bears 130°, then alter course to port to 207° passing W of Beacon No. 12, 0.3 mile SW of Pointe Matoaitana, then adjust course to 201° to the anchorage in Baie de Rairua. Baie de Rairua offers the best anchorage in all of the Iles Tubuai. The bay is sheltered against winds from the E. One can anchor, in 11 to 12m, mud, excellent holding ground.

A wharf, with a shed and a radio mast on it, is 40m long and has 4m of water alongside. It can accommodate small coastal vessels. A dolphin to the SW of its W end facilitates mooring. A slipway is situated at its E end.

Vessels without local knowledge wishing to enter should obtain a pilot, who can be summoned by displaying a large French ensign at the masthead; local inhabitants offer their services, but little confidence should be placed in them.

A sharp lookout from the masthead is necessary when entering to avoid the numerous shoal heads.

Passe Teavarua lies about 0.5 mile E of Passe Mahanatoa should not be used since the beacons are removed. A vessel too deep in draft for the entrance can anchor outside the reef, off the NW and SE coasts of the island. The tidal currents of the N end of the island set to the E on the flood and to the W on the ebb, and are strong enough to swing a ship in a stiff breeze.

The village of Vaiuru lies on the S coast of Raivavae. An aviation runway lies on a stretch of level ground to the SW of Vaiuru.

Caution.—Discolored water has been reported to lie 5 miles NE of the island.

1.102 President Thiers Seamount (President Thiers Bank) (24°40'S., 145°55'W.) has a least charted depth of 19m. The seamount is about 6 miles long and lies in a NNW and SSE direction, with discolored water extending some distance from it.

Ile Tubuai (Tubuai) (23°22'S., 149°26'W.) is about 5 miles long E-W and about 3 miles wide. Mont Taita, 422m high, the highest point, is located in the E part of the island, and Hanareho, 325m high, rises in the SW part. These two peaks are joined by low land, and when seen from the N or S, the island appears as two separate islands. There are a number of other peaks which are of considerable elevation.

A barrier reef, partly submerged, surrounds the island; there is an opening on the NW side, about 1.5 miles wide. Two passes lead through this gap, the E of which has a least depth of 4m. Range beacons, in line, lead through the pass.

Pilotage is available and essential for the lagoon. Arrangements for pilotage may be made via radio. The pilot boards off the pass.

The village of Mataura, which may be reached by vessels drawing less than 3.7m, lies on the N shore of the island.

Deep-draft vessels may anchor outside the barrier reef, on the range line marking the E channel mentioned above, in a

depth of 15m, broken coral, poor holding ground. This anchorage is reportedly usable only in offshore winds.

Anchorage is also possible 1 mile NNW of the wharf at Mataura Harbor by vessels with drafts of less than 3.7m in 6m of water, sand bottom and mediocre holding ground. It was reported (2002) that the wharf had been destroyed.

Mont Bouchard (25°31.0'S., 150°30'W.), a submerged seamount with a least depth of 197m, lies approximately 130 miles S of Tubuai.

1.103 Rurutu (22°29'S., 151°20'W.) is volcanic in appearance; however, the low-lying parts of the island is wooded. There is no barrier surrounding this island, which is about 5.5 miles long N-S; the width of the island averages 2 miles. Baie de Moreai is on the NE and Baie D'Vaera on the SW coast and the reef fringing the coast around the island is 0.1 to 0.2 mile thick. On the NW part of the island, Mount Taatioe (22°27.8'S., 151°22.2'W.) rises to a height of 389m.

The village of Moerai is situated on the NE coast facing Port de Moerai (22°27.0'S., 151°20.5'W.).

The village of Hauti, 2 miles SSE of Moerai has a red roof temple that can be clearly seen. Two windmills stand on the heights to the W of the village.

The village of Avera is situated on the SW coast at the head of Avera Bay which is backed by high vertical cliffs. A red-roofed temple is conspicuous.

Because of the steep incline of the bottom and its exposure to the swell from the W, it is not advised to anchor in Avera Bay even though it is sheltered from E winds.

In the approaches from N, the aeronautical radiobeacon at the airstrip, in position 22°26.1'S, 151°22.2'W, appears first over the horizon.

There is an anchorage in Baie Moerai, off the village, in a depth of 35m, with the belfry of the temple bearing 237° and the flagstaff bearing 158°. It has been reported (2002) that the temple is masked by vegetation and is difficult to see.

The port is entered through a 25m wide channel only suitable for boats up to 50 tons with a draft of 3.5m in good weather and with the absence of a SE swell. The entrance to the port is in alignment with two lighted beacons, painted red and white stripes, 0.1 mile apart on bearing 255.8° situated 0.1 mile N of the temple. The port has a quay in a SW direction and boats with 2.6m draft usually berth port side-to.

The access to the port becomes impossible when there is a strong sea or swell, causing a strong backwash.

Moses Reef (22°47'S., 151°13'W.), position doubtful, lies 17 miles SSE of Rurutu; it has a least known depth of 2.7m.

1.104 Rimatara (22°39'S., 152°48'W.), a densely-wooded small island about 2 miles in diameter and 83m high at the summit of Uahu, lies about 80 miles WSW of Rurutu. On the N side, a 460m wide coral reef fringes close to the island; a 650m wide coral reef fringes the S side.

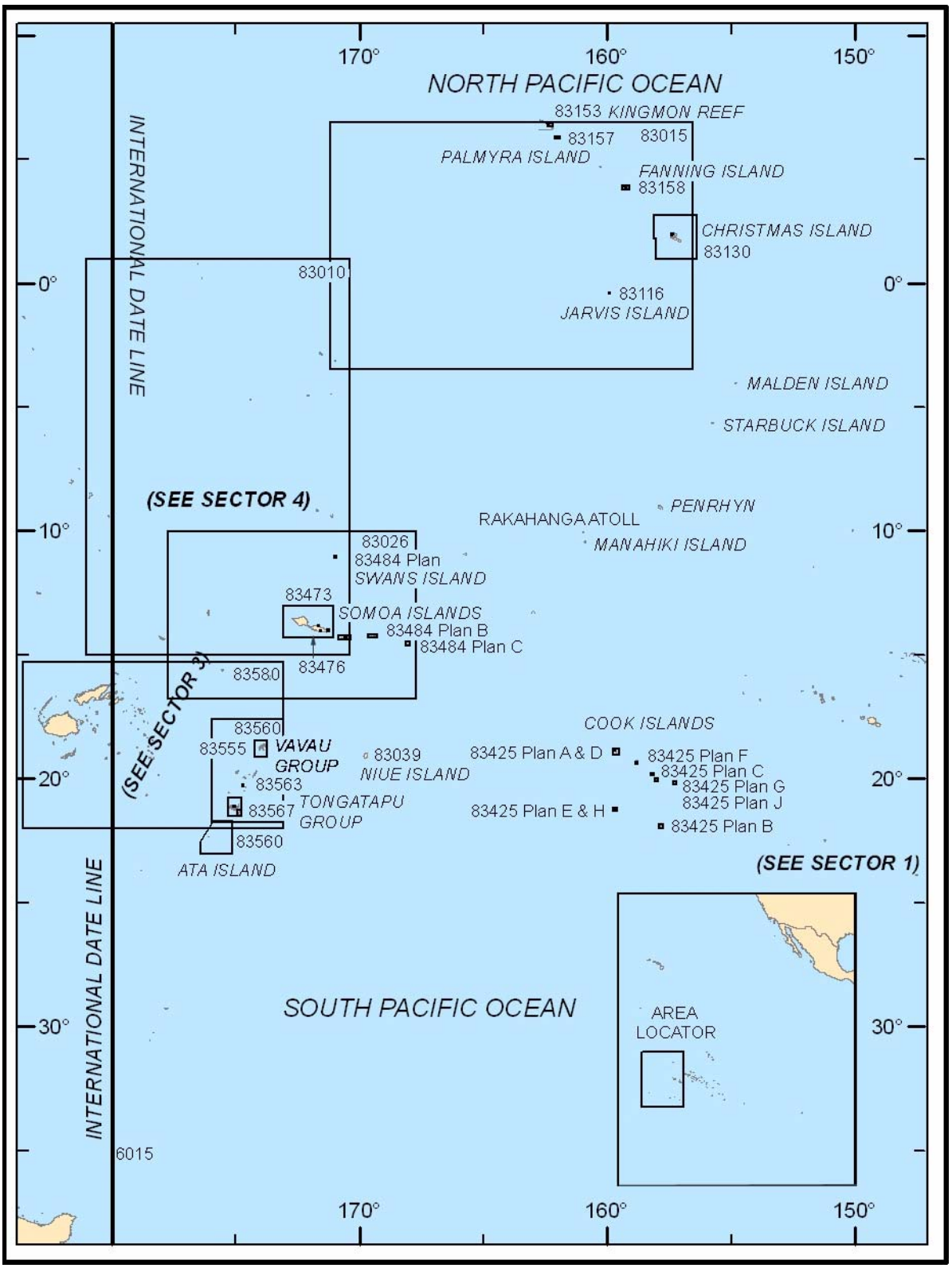
There are three small passes on the N, NE, and the NW side of the island. Passage through them by small boats and landing is possible, but only in good weather.

Passe Oatahuna (22°38.2'S., 152°47.5'W.), the westernmost of the three passages, is mainly used as it gives access to a jetty at HW. A house, 50m away from the jetty, is conspicuous.

Amura (22°38.8'S., 152°47.4'W.) is the largest of the three villages on the island, where a cemetery is distinctly noticeable. **Anapoto** (22°38.7'S., 152°49'W.) is a village on the NW side, where a temple partly covered by trees is usually identified by canoes drawn upon the beach, is a landmark. In good weather, vessels anchor on the lee side of the island, sand and coral, 0.3 to 0.4 mile WNW of the temple, in 30 to 40m.

Vessels usually anchor off Amaru, in a depth of 30m, with **Point Teruahu** (22°38.4'S., 152°47.4'W.), a round shape on the NE side of the island, bearing 330° and 0.2 mile NE of the cemetery. Boats approach the island in fine weather; landing may only be possible on the lee sides.

Ile Maria (21°50'S., 154°42'W.) is a group of four small islands surrounded by a triangular-shaped coral reef whose sides are about 2 miles in extent. The reef surrounding the islands appears to have no opening, and within the reef the water is shallow.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **2** — CHART INFORMATION

SECTOR 2

THE LINE ISLANDS, THE COOK ISLANDS, THE SAMOA ISLANDS, AND THE TONGA ISLANDS (INCLUDING OFF-LYING ISLANDS AND REEFS)

Plan.—In this sector the islands are described from Palmyra in the N; S to Flint, about 1,050 miles SSE; then WSW to Samoa, about 1,080 miles distant; then ESE and S to the Southern Cook Islands and the Tonga Islands. Off-lying dangers are described with the appropriate island or group of islands.

General Remarks

2.1 Large-scale coverage for U.S. territory located within this sector is provided by the National Ocean Service (NOS). Regulations pertaining to navigation within U.S. territorial waters may be found in U.S. Coast Pilot 7**,** while additional regulations will be cited in the text along with the navigational feature they affect.

Tides—Currents.—The current S of 6°00'S, and between 100°00'W and 175°00'W, is variable and only a small portion of currents have rates between 1 and 2 knots; most, but not all, are in some W direction. The predominance of the W currents decreases with increases in latitude, with a corresponding greater variability of current.

Particular and constant attention must be paid to the currents when navigating among the island groups, since the general current flowing in the region may sometimes be deflected near the islands and is always accelerated, particularly in the narrow passages. The effect of the obstruction is greater in proportion to the area and the complexity of the group. In addition, some of the islands are so low that it is often impossible to see them at night, and vessels may be driven onto their encircling reefs without any warning being obtainable from soundings, since these reefs usually rise abruptly from great depths.

The currents in the barrier reefs and atoll openings are usually strong, and cannot be counted upon to turn with HW and LW, where a barrier reef lies close to the coast, a heavy swell will throw so much water over the reef that the escape of this water causes a constant outgoing current in the opening, and sometimes across the fairway. These facts should be kept in mind before navigating in such localities.

As the Pacific South Equatorial Current and the Pacific Equatorial Countercurrent meet in the waters covered by this sector, heavy and local rippling may be experienced N of 40°00'S, especially E of 170°00'W.

The Line Islands and the Line Group.—The Line Islands consists of the Line Groups; each group of the three runs E to W almost parallel to one another as a scattered chain of low and flat coral islands or atolls, from Flint Island to Palmyra Atoll, which lies about 1,200 miles NW. The three groups are the Southern Line Group, the Central Line Group, and the Northern Line Group.

The Southern Line Group is formed by **Flint Island** (11°26'S., 151°48'W.), **Vostok Island** (10°06'S., 152°25'W.), and **Caroline Island** (9°57'S., 150°13'W.). Three other islands that geographically mold into this line group are Phoenix Island, Enderbury Island, and Canton Island.

The Central Line Group consists of the islands of Starbuck and Malden; both islands lie in the South Equatorial Current belt where there is a dominant W set in their vicinity. Between the islands, the rate is generally 1 knot with an E set; however, it increases at times to 2.5 knots near the coast.

Since currents along these islands are not reliable, approaches from the E require extreme caution do to the nature and extent of fringing offshore reefs and the strong tide rips in the vicinity.

The Northern Line Group consists of Kiritimati Atoll (Christmas Island), Teraina Island, and the island of Tabuaeran, including the adjacent Jarvis Island and Palmyra Atoll.

The Line Islands are described beginning in paragraph 2.2.

The Cook Islands.—The Cook Islands are a self-governing state in association with New Zealand under the British Crown. These islands lie scattered between 8°S and 23°S, and 156°W and 167°W in two groups, known as the Northern Cook Islands and the Southern Cook Islands (Lower Cook Islands). The islands have a total land area of 93 square miles.

The Northern Cook Islands are described beginning in paragraph 2.14. The Southern Cook Islands (Lower Cook Islands) are described beginning in paragraph 2.40.

The Samoa Islands.—Western Samoa (Independent State of Western Samoa) consists of large islands of Savaii and Upolu, between 13°20'S and 14°05'S, and 171°20'W and 172°50'W. The two islands cover a land area of 1,104 square miles.

American Samoa (Territory of American Samoa) includes the six islands of the Samoa group lying E of 171°W. **Swain Island** (11°04'S., 171°05'W.), a dependency of American Samoa, lies about 200 miles N of Tutuila, the principal island. The total land area of American Samoa is about 77 square miles.

A ferry runs between Western Samoa and American Samoa.

The Samoa Islands are described beginning in paragraph 2.20.

The Tonga Islands.—The Tonga Islands (Friendly Islands), with a total land area of 277 square miles lie between 18°01'S and 21°28'S, and 173°54'W and 175°25'W. The islands are widely scattered and occur mostly in groups. The groups consist of 170 islands (36 inhabited) and islets, all separated under three major classifications known as the **Tongatapee Group** (21°12'S., 175°10'W.), the **Ha'apai Group** (19°45'S., 174°30'W.), and the **Vava'u Group** (18°40'S., 174°00'W.); they extend about 200 miles in a NNE-SSW direction.

The off-lying islands of **Niuatoputapu** (15°57'S., 173°45'W.) and **Niua Fo'ou** (15°36'S., 175°38'W.) are included in the Kingdom of Tonga. Tonga is an independent state and a member state of the British Commonwealth.

The Tonga Islands are described beginning in paragraph 2.47.

The Line Islands

2.2 The **Line Islands** (1°52'N., 157°22'W.) consists of the scattered islands and atolls lying near the Equator and the meridian of 160°00'W. Two members of the group, Jarvis Island and Palmyra Atoll, are private property; they are unincorporated territory of the United States. The remainder belong to Kiribati.

This group should be considered dangerous to navigation as the islands are low, flat, and surrounded by strong variable currents. These currents are described below.

The N section of this group lies in or near the boundary of the Equatorial Countercurrent. Correspondingly, Kingman Reef experiences an E set, while the sets around Palmyra Atoll are strong and variable. The rest of the group lies within the W setting South Equatorial Current.

When within 200 miles of Kiritimati, the current was reported to have rates of 2.5 to 3 knots.

In the vicinity of Malden Island and Starbuck Island, the general set is W; however, E sets have also been experienced. Some of these E sets have exceeded rates of 1 knot.

2.3 **Palmyra Atoll** (Palmyra Island) (5°53'N., 162°05'W.) is an atoll which consists of many small islets lying on a barrier reef which encloses three distinct lagoons. The reef surrounding Palmyra Atoll is 5 miles long E-W, and 2 miles at its widest part. Shoal water extends 1.8 miles E from the SE extremity of the reef and the same distance from the NW and SW extremities.

The islets are low, about 1.8m high, and covered with coconut and other trees reaching heights of 30m and visible 12 to 15 miles.

Palmyra Atoll from ENE

Winds—Weather.—Palmyra Atoll has unfavorable weather and is the only island in its latitude where fresh W winds occur. A tropical front hovers in the vicinity of the island and is caused by the meeting of the Northeast Trades and the Southeast Trades.

Northeast Trades prevail, with an average velocity of 10 to 12 knots. There are frequent squalls of short duration and occasional winds up to 22 knots, but typhoons are infrequent.

Rainfall is heavy and humidity high, ranging from 2,540 to 4,572mm annually. Rain occurs almost daily; heavy squalls come up suddenly from the SW, but there are no severe storms.

Tides—Currents.—The tidal rise at Palmyra Atoll is about 0.6m at MHHW and 0.0m at MLW.

Strong and variable currents may be expected in the vicinity of the atoll. Caution is advised if approaching the atoll from the SW as dangerous tide rips have been reported to lie 5 miles SW from the atoll.

A current sets NW across the entrance channel and is particularly strong SW of Sand Island.

Depths—Limitations.—A dredged channel, which leads through the SW side of the island, is the only entrance. It was reported that the channel had a depth of 5.5m its entire length (2006). The depths within the lagoon vary from 3 to 53m. A pier was reported in poor condition, with depths of 5.9 to 7.1m alongside, in the W lagoon. The reefs and shoals within the lagoon are shown on the chart.

Aspect.—A group of four radio towers stands as a good landmark on the SW part of the atoll.

Regulations.—See U.S. Coast Pilot 7 for regulations pertaining to navigation in U.S. waters. Palmyra Atoll was purchased by the Nature Conservancy in 2000.

Anchorage.—The island should be approached from the W and anchor on the bank, in 22m, sand and coral, with the NW extremity of the island bearing 071°, 2.5 miles distant, or farther in, in 14.6m, sand and coral, with the point on the same bearing 2 miles distant. It is not advisable to attempt to anchor between sunset and sunrise. In 1988, a 2 knot current setting S was observed during a NW fresh at the anchorage.

Caution.—An explosive dumping area is situated with its center about 15 miles WSW of Palmyra Atoll.

2.4 **Kingman Reef** (6°25'N., 162°26'W.) is located about 33 miles NNW of Palmyra Atoll. The reef, a U.S. possession, is a Defensive Sea Area and Airspace Reservation and is closed to the public. The airspace entry control has been suspended, but is subject to immediate reinstatement without notice.

The reef is triangular in shape with its apex to the N. The reef is about 9 miles long E-W and 5 miles N-S. A small islet, 0.9m high, lies on the E side of the reef. The reef dries on its NE, E, and SE edges; the remainder of the atoll is contained within a ridge with depths of 18.3m. However, there are breaks in the reef, one on the N side and one on the S side, with more water. Outside the ridge the bottom slopes steeply to over 183m.

The reef has been reported to be difficult to identify, both visually and by radar. The reef has been sighted at 7 miles.

Kingman Reef is within the belt traversed by the Equatorial Countercurrent, which in this vicinity sets E at a rate of 1.3 to 1.8knots.

Caution.—A shoal, the existence of which is doubtful, is charted in position 6°50'N, 169°36'W.

2.5 **Teraina Island** (Washington) (4°43'N., 160°24'W.) lies about 120 miles SE of Palmyra Atoll. It is administered as

part of the Republic of Kiribati.

The island is about 3m high and is covered with a luxuriant growth of coconut and other trees. It is reported to be visible at 14 miles.

The fringing reef extends about 0.5 mile off the E part of the island and for some distance off the N side. At the W end, two tongues of reef extend from 0.3 to 0.4 mile offshore.

Off the W side of the island, a bank, deepening gradually, has depths of 18.3 to 26m, 2.3 miles offshore. It is reported that a wide swath of unsurveyed coral columns, with heads as shallow as 4m, lie in deep water to the W of the island.

Tides—Currents.—As Teraina Island lies near the S edge the Equatorial Countercurrent, great variations in the strength and direction of the offshore currents may be expected. For this reason, every opportunity should be taken to fix the position of the ship when in this vicinity.

Anchorage.—Anchorage is available on the bank off the island's W sides, in general depths of 13 to 31m. Caution is advised, however, as this area is often affected by heavy swell; working cargo here has been described as the most difficult and dangerous in the Pacific Ocean. Care must be taken to find a sandy bottom before letting go, as there are many deep holes in which anchors have been lost.

Anchorage is good when the Northeast Trades are light, but has been found very uncomfortable on occasions when they are strong enough to raise a sea and the countercurrent is setting strongly E, swinging a vessel across the sea. Such conditions are reported to be frequent from September to December.

Recommended berths are 1 and 1.4 miles offshore, in depths of 9 to 11m, with the island's westernmost point bearing 095° and 120°, respectively.

2.6 Tabuaeran (Fanning Atoll) (3°52'N., 159°20'W.) is administered as a part of the Republic of Kiribati. The District Commissioner for Tabuaeran is resident at Kiritimati Atoll.

The islands of the atoll are thickly covered with coconut trees, 18.3 to 27m high, visible at a distance of about 15 miles.

The barrier reef is not more than 0.6 to 1.2m high, except on the N and E sides, which are about 3m high. The reef is steep-to; on the N and NW side of the atoll the 200m line lies about 0.5 mile offshore.

Winds—Weather.—The prevailing winds are from E to the ENE. Average velocities are about 10 knots, with occasional gusts up to 40 knots. Gale force winds average less than 1 day per year. Rainfall averages 190mm. The dry season extends from August to November. There is no fog.

Tides—Currents.—The currents in the vicinity of Teraina are strong and variable; when in the vicinity every opportunity should be taken to fix the vessel's position.

2.7 English Harbor (3°51'N., 159°22'W.) (World Port Index No. 56039) is located within the barrier reef near the center of the SW side of the island; it is a natural harbor. A settlement is situated on the S side of the entrance.

Tides—Currents.—There is little tide in English Harbor, but normally the flood current runs until 10 minutes after HW and the ebb current runs until 20 minutes after LW. Slack water lasts only about 10 to 15 minutes. The flood current runs at a rate of 4.5 to 5 knots, and the ebb at a rate of 4 knots. Both currents are affected by the force and direction of the wind. On the ebb tide, rips and overfalls extending from the spit on the N side to near the middle of the channel might be dangerous to small craft.

Tabuaeran—Lagoon entrance

Depths—Limitations.—The navigable channel, with a least depth of 5.8m, is reduced to a width of less than 46m by the reef extending a short distance off Weston Point, the S entrance point, and the drying patches extending halfway across the pass from Danger Point, the N entrance point.

Aspect.—A conspicuous flagstaff stands on Weston Point. A light is shown on request from a stone monument standing about 45m ENE of the point. Take care not to confuse the light with an uncharted chimney close SW of it. The monument was reported obscured (1985) from seaward. A radar-conspicuous wreck stands about 1.3 miles NW of the harbor entrance. BA NP62 12th ed. 2011

Pilotage.—Pilotage for the harbor is necessary and is available from the settlement on the E side of Weston Point.

Anchorage.—Anchorage may be taken with the crane on Cartwright Point bearing 085°, and a white pier in alignment with a palm tree painted white, both of which are situated 0.3 mile S of Weston Point, bearing 138°. Small vessels usually anchor E of Terania Light, but shoaling and a tug moored in the vicinity make for uncertain depths and swinging room. Both bow anchors, and a stream anchor should be used here as English Harbor is exposed to squally NE and E winds.

Vessels may anchor in Whaler Anchorage, 3.8 miles NNW of English Harbor, in 27m, with the beacons in line 121°, about 0.3 mile offshore. Vessels are cautioned not to anchor S of the alignment, as it marks the N limit of a cable area best seen on the chart. It was reported that the beacons may have disappeared or become overgrown.

Caution.—Shoaling has been reported in English Harbor.

2.8 Kiritimati Atoll (Christmas Island) (1°52'N., 157°22'W.) is about 27 miles long SE-NW and is 16 miles wide in the N part. A neck extending from near the center of the atoll toward the SE is about 4 miles wide; this part is low lying scrub land, with trees adjacent to the coast. The island is about 12m high in the NW part, where there are growths of

scrubby trees and coconut palms visible for a distance of 12 miles.

There are several indentations in the coast. The Bay of Wrecks, the largest, is on the E coast and Vaskess Bay is located on the SW coast.

Bridges Point Light is a good landmark, as are radio masts situated 0.2 mile N and 4 miles NNE of it. A tank farm lies N of the light, while a large sled lies 7 miles E of the light.

Kiritimati Atoll has been declared a nature reserve. Permission to land on the small islands S of London must be obtained from the warden.

Winds—Weather.—The general tendency of the winds from November to May is NE and from June to October, SE, with an occasional squall from the N or S. North, NW, and W winds occur occasionally between March and June.

Rainfall at Kiritimati Atoll varies greatly from year to year. The weather is generally excellent for navigation.

Tides—Currents.—The spring range here is about 0.7m.

Offshore, the majority of the sets reported are between the NW and SW, with a large portion of the rates exceeding 1 knot. A rate of 2.5 knots has also been reported. E sets appear to be infrequent from June to November, but may occur at other times, particularly from March to May.

A strong NW current along the atoll's N coast forms tide rips N of the atoll's NW extremity. A very strong W current sets onto the island's SE end.

During passages between Kiritimati Atoll and Tabuaeran Atoll, a vessel reported currents to be variable, but not exceeding 1 knot.

Anchorage.—There is good anchorage, in 33m, coarse sand, with Bridges Point Light structure bearing 110°, 0.5 mile distant. Anchorage can be found anywhere W or NW of Bridges Point; however, anchorage SW of the light should be avoided as abandoned moorings lie about 0.5 mile SW of it.

Caution.—Fish Aggregating Devices (FADS) have been moored about 2.8 miles W and 3 miles NW of North West Point.

The fringing reef in the vicinity of South West Point was reported to be extending W.

2.9 London (1°59'N., 157°28'W.) is situated on the N side of the lagoon entrance, 3.8 miles SSE of the NW extremity of the atoll. The atoll is administered as a commercial plantation by the Government of Kiribati, through a District Commissioner, who is normally in residence here.

Tides—Currents.—The current sets strongly into and out of the lagoon, and may reach velocities of 4 to 5 knots, but does not affect the use of the port facilities. From November to March, NW swells are frequent and at times cause lines of breakers across the lagoon entrance making passage by small boats hazardous and sometimes impossible. W swells and fresh E winds cause the most dangerous conditions. During flood tides with strong E winds, waves up to 1.2m high are produced.

Depths—Limitations.—Vessels proceeding to London Wharf should use Cook Island Passage, which has a least charted depth of 5.0m.

The lagoon is shallow and studded with coral patches which makes navigation difficult even for boats.

2.10 Jarvis Island (0°23'S., 160°01'W.), an island of sand and coral formation, is located about 202 miles SW of Kiritimati Atoll. The island is 1.8 miles long in a E and W direction and about 1 mile wide; it rises to a height of 6.1m.

A narrow fringing reef, which dries in places and has breakers along the S shore, encircles the island. There are two breaks in the reef on the W side. A shoal, with a least known depth of 4.6m, extends about 0.6 mile from the E side of the island. The depths drop rapidly outside the shoal area.

Jarvis Island is a U.S. possession and a National Wildlife Refuge. It is under the jurisdiction of the U.S. Fish and Wildlife Service.

The higher ground surface lies on the W end of the island. Although low lying shrubs cover on most part of the island, it was observed without appreciable size of vegetation.

Caution.—Jarvis Island has been reported to lie 1 mile NE (1991), 1.6 miles E (1992), and 1.3 miles ENE (1996) of its charted position.

2.11 Malden Island (4°03'S., 155°00'W.) is triangular-shaped, of coral formation, and located 375 miles SE of Jarvis Island. The island is a wildlife sanctuary under the control of the Government of Kiribati.

The island is about 5 miles long and 4 miles wide at its E end, with the apex to the W. It is about 9m high, and visible for about 15 miles.

Malden Island is steep-to, with reefs extending from all its extremities for distances of 0.2 to 0.3 mile.

The settlement was situated on the N side of SW point and the ruins still remain.

Tides—Currents.—Between Malden Island and Starbuck Island, currents with rates of 1 knot are usual, but may reach 2 to 2.5 knots. Between September and November, the highest rates occur, sometimes exceeding 3 knots. The usual direction of the set is W, but E sets have been experienced rarely exceeding 1 knot.

Anchorage.—Anchorage is available, in a depth of 28m, off the W side, about 0.2 mile WNW of a tripod beacon, which is close SE of the landing place.

Caution.—Caution is advised as no implicit reliance can be placed on current rates and direction. Great care should be taken when navigating in this area.

2.12 Starbuck Island (5°37'S., 155°54'W.), a coral island, lies about 105 miles SSW of Malden Island. It is about 4.6m high and has a few shrubs on its NW part, making it visible from aloft at a distance of 11 miles.

A fringing reef, a large part of it awash, surrounds the island; it extends about 0.2 to 0.3 mile offshore, except off the E end, where it extends for 0.7 mile. A wreck is reported stranded near the NW extremity of the island.

The approach to Starbuck Island, especially from the E, should be made with great caution due to the currents in the vicinity of the island. The fact that the reef extending E is awash, makes the strong W current dangerous.

Filippo Reef (5°31'S., 151°47'W.) has been reported to be about 1 mile long in a NW-SE direction, and less in width. From the appearance of the breakers on the reef, it has about 0.6 to 0.9m of water.

Breakers were reported (1926) to have been seen about 30 miles SW of Filippo Reef; a line of breakers about 68m in length were reported (1944) about 80 miles SE of Filippo Reef.

This area lies outside of US chart coverage (2002).

Caution.—Vessels are advised to make due allowances for the strength, velocity, and erratic directions of the current in the vicinity of Filippo Reef; it may set vessels up to 50 miles off course in a 24-hour period.

2.13 Caroline Island (9°57'S., 150°13'W.) is an atoll consisting of a number of small, low, islets 4.6 to 6.1m high. The barrier reef is about 5.5 miles long in a N-S direction and about 1.4 miles wide at its S or widest end. The S end of the S island is reported to extend 1 mile S and then extends further SW and SE; it should not be approached at night. Broken water is reported to extend nearly 2 miles S of the island.

There is a boat passage through the reef near the SW point of the atoll that is narrow and tortuous.

Vostok Island (10°06'S., 152°25'W.), a densely-wooded island with trees, which rise to a height of 24m is roughly triangular in shape, and is about 0.4 mile long in a N-S direction. A sunken reef extends about 0.3 mile N from the N extremity of the island, and about 0.2 mile from the SW extremity, and 0.3 mile from the SE extremity.

The offshore current sets W at a rate not exceeding 3 knots. Close inshore, on the E side of the island, the current sets N. The eddies on the lee side of the island are changeable, depending on the velocity of the main current.

A sounding of 55m was obtained (1927) about 0.5 mile NW of the N extremity of the island.

In 1985, it was reported that the island lies 4.8 miles ENE of its charted position.

Flint Island (11°26'S., 151°48'W.), a coral island, lies about 90 miles S of Vostok Island. It is about 2.5 miles long in a NNW-SSE direction and about 0.5 mile wide. The island is densely-wooded with trees which rise to a height of 15.2m.

The island is surrounded by a steep, fringing reef which dries at LW and extends about 0.6 mile from the N end of the island, breaking for about 0.2 mile from the shore and terminating in a strong tide rip. The reef extends about 0.4 mile from the S end of the island, breaking for 0.1 from the shore. Both reefs have heavy breakers in a low swell and the reef extent is easily identified by lighter colored water.

A current sets W past the N and S reefs at up to 0.5 knot.

There is a boat channel through the reef with a least depth of 2.5m reported (1974) near the settlement on the NW side of the island.

The Northern Cook Islands

2.14 The Cook Islands consist of two groups, known as the Northern Cook Islands and the Southern Cook Islands (Lower Cook Islands).

The Northern Cook Islands consist of Penrhyn Atoll, Rakahanga Atoll, Manihiki Atoll, Suwarrow Atoll, Nassau Island, and Danger Island. They are described in this order from E to W.

Winds—Weather.—Typhoons may be experienced from November to March. Generally, these storms come from W, but have been said to develop near Penrhyn Atoll.

Tides—Currents.—Generally, currents set W, with the predominance of W sets increasing toward the Equator. Current rates usually do not exceed 1 knot.

Regulations.—Vessels arriving in the Cook Islands are required to call at Avaitu, Aratunga, or Penrhyn Atoll before proceeding to any other possession of that nation, unless in distress or given the specific approval of the Cook Islands Government.

Vessels arriving from an area infected with rhinoceros beetles must remain at least 1 mile offshore from 15 minutes before sunset until 15 minutes after sunrise. When an island is encircled by a reef, the 1 mile measurement will be taken from the seaward edge of the reef.

2.15 Penrhyn Atoll (9°00'S., 158°00'W.) lies about 330 miles WNW of Vostok Island and is the largest and northernmost of the Northern Cook Islands.

Numerous low islets, some of them several miles in length, stand on the reef surrounding the lagoon; they are covered with coconut palms which reach an elevation of about 15.2m.

The atoll is about 12.5 miles long in a SE-NW direction and is about 8 miles wide. North-West Bank, with a charted depth of 6.7m, extends about 1.5 miles NW from the NW extremity of the atoll.

Winds—Weather.—The winds at Penrhyn Atoll are usually E, with occasional N and NW winds between December and March. Typhoons are said to form in the vicinity of the atoll, but winds of typhoon force are unknown here.

Tides—Currents.—The three passes through the barrier reef into the lagoon are Northeast Pass, Northwest Pass, and West Pass (Taruia Pass); West Pass is the recommended pass. However, the tidal current can be strong running either direction, in or out of the pass.

The currents in the pass ordinarily run at a rate of about 3 to 4 knots, but at times have run at a rate of 8 knots. Both flood and ebb currents run for about 5 hours 30 minutes, except in cases of a heavy sea on the reef, when the current always sets out. The period of slack water is about 40 minutes at LW, shorter at HW. Heavy tide rips may be encountered at the entrance to the pass.

Aspect.—West Pass is easily identified from the SW by the conspicuous islets on either side. The islet on the S side of the pass on which the observation spot is situated is conspicuous when within a distance of 5 miles. The pass is located about 2.5 miles S of the NW extremity of the atoll.

Pilotage.—Pilotage has been reported to be compulsory for West Pass, and that a powered vessel with the proper draft may be handled at any stage of the tide. The pilot reportedly boards off the entrance to the pass.

Anchorage.—Outer anchorage is available on a bank SW of Taruia Pass, where the depths increase gradually to 18.3m then drop steep abruptly from the reef. This anchorage is suitable with an E wind to allow a vessel to swing away from the reef.

Anchorage may also be obtained on **NW Bank** (8°57'S., 158°04'W.), in depths of 13 to 17m; however, it is exposed and lesser depths may exist than charted.

Good anchorage allowing swinging room is available off Omoka, in a depth of about 18m.

Caution.—The depths listed for the passes and lagoons of this atoll are derived from old sketch surveys. The passes should be entered only at slack water, under favorable light conditions, and with local knowledge. A vessel 93m in length, with a draft of 4.6m possessing local knowledge, has been re-

ported to have negotiated West Pass and the channel to Omoka.

Flying Venus Reef lies about 3 miles NE of the NE extremity of Penrhyn Atoll. The reef has a least charted depth of 3.7m, but there is probably less water.

2.16 Omoka (9°01'S., 158°04'W.)is situated on the S side of West Pass within the lagoon. The Resident Agent lives here. A channel leads from the fairway of West Pass to Omoka; it will accommodate a vessel with a draft up to 4.3m. There is a stone wharf here suitable for vessels up to 46m in length with a depth of 4.3m alongside.

A tower, 9m high, stands 0.3 mile S of Omoka, while a satellite dish stands 1.3 miles SE of Omoka.

2.17 Rakahanga Atoll (10°00'S., 161°06'W.) lies 186 miles WSW of Penrhyn Atoll. It is roughly quadrilateral in shape, about 2.5 miles long in a N-S direction and about 1.5 miles wide at its N end. The atoll is about 18m high to the top of the trees. A light is shown on request from the island's SW end.

The fringing coastal reef extends from the SW extremity of the atoll to a distance of 0.2 to 0.3 mile offshore.

There is a settlement in the SW part of the atoll. Landing may usually be affected through a passage in the reef, W of the settlement. A strong tidal current runs and landing conditions are much effected by the surf.

There is anchorage off the NW extremity of the atoll, in 14m, about 0.1 mile from the fringing reef.

A local magnetic anomaly was reported (1921) off Rakahanga.

Wairuna Shoal (5°12'S., 162°18'W.), which may not exist, was reported (1915) as a dangerous breaking reef. This position is about 300 miles NNW of Rakahanga Atoll.

Manihiki Atoll (10°23'S., 161°01'W.) is located 21 miles SSE of Rakahanga Atoll. It is roughly triangular in shape, with its apex to the N. It is 6 miles in length NW and SE by 5 miles wide. There are several low islets on the continuous reef, densely covered with coconut trees. The tops of the trees reach a height of 21m. An aviation runway lies close to the town at the N extremity of the island.

The principal village is on the W side of the atoll. Landing can usually be affected at this village.

A depth of 27m lies about 5 miles W of the N extremity of the atoll.

2.18 Suwarrow Atoll (13°16'S., 163°06'W.) consists of several wooded islets lying on a barrier reef which encloses a lagoon. Anchorage Island on the NE side and High Island on the W side of the island are covered with coconut trees from 18 to 25m high; they are easily recognized.

The barrier reef shows a little above HW. It is dangerous to approach the reef on its S or SE side unless the weather is clear. The N side projects to a sharp point; on the E side of it, there are some islets covered with brush.

Northeast Reef lies about 0.5 mile E of Anchorage Island and forms the E side of the entrance. East Reef lies 0.3 mile E of the S extremity of Anchorage Island, and South Reef lies about 0.2 mile SSW of East Reef. South and East Reefs can be distinctly seen from 3 miles.

The coast in the vicinity of the passage is said to be dangerous to approach at night due to irregularities in the line of the barrier reef.

The lagoon entrance is just E of Anchorage Island. A vessel, with a draft of 4.6m, can use the channel between Anchorage Island and South Reef, but caution and local knowledge is necessary. Currents in the lagoon entrance are irregular. Rates on the flood reach 0.5 to 1 knot, while the ebb flows at rates of 2 to 3 knots. At the anchorage within the lagoon, the ebb current starts about 1 hour 30 minutes before HW.

Anchorage.—Anchorage, unsafe in N weather, may be taken inside the lagoon, 0.2 mile off the W side of Anchorage Island, in a depth of 33m.

2.19 Nassau Island (11°31'S., 165°25'W.) lies about 165 miles NW of Suwarrow Atoll; it is 21m high to the top of the coconut palms. The island is surrounded by a steep-to fringing reef, which is about 90 to 130m wide on the E, S, and W sides, but comes in close to the beach on the N side.

The prevailing winds from April to September are the SE trades. At other times, winds may vary from the NE to W.

2.20 The **Danger Islands** (10°55'S., 165°50'W.) lie about 42 miles NNW of Nassau Island. They consist of Pukapuka, the farthest N; Motu Ko, 3 miles S of Pukapuka; Motu Katawa, 1.5 miles NW of Motu Ko; and several smaller islets and sand cays. A sand cay lies at the W end of a reef, 3 miles W of Motu Katawa. The islands, islets, and sand cays lie on or within the barrier reef, which surrounds a shallow lagoon.

The barrier reef is unbroken and there is no access to the lagoon for other than small boats. On its W side the barrier reef is always awash; its S side is awash at LW, and its E side is partly awash and partly dry sand. The sea breaks over the sunken reef which extends W from Motu Katava.

Pukapuka is densely wooded with coconut and other trees; some reach a height of 24m. The island is bordered on its N and W sides by wide, flat reefs, and the surf beats heavily on the narrower reef on the weather side. Three villages are situated on the S side of the island near the lagoon; a large church and a school are situated in one of the villages. The Resident Agent lives on Pukapuka.

Motu Ko, at the SE end of barrier reef, is flat and sparsely wooded; the tops of the trees rise to a height of 30m. An aviation runway is situated on the S side of Motu Ko.

Motu Katawa is densely wooded in its W part. The trees on the W side rise to a height of 38m, and the coconut palms on the E side rise to 24m.

The current sets strongly onto the E side of the Danger Islands.

The current across the reef extending W from the islands is dangerous. It runs S during the ebb and N during the flood, attaining a rate of 3 to 5 knots. This reef is said to break in deep water even on a calm day.

Tema Reef (11°05'S., 165°38'W.) lies about 14 miles SE of the Danger Islands. The reef was reported to lie 2 miles S of its charted position. The reef is about 0.3 mile in diameter and breaks heavily, but no rocks show above water. On a good day, with the wind less than force 4, the reef has been sighted at 8 or 9 miles.

Breakers have been reported (1986) to lie about 140 miles SSW of Tema Reef, and may best be seen on the chart.

The Samoa Islands

2.21 The **Samoa Islands** (Navigator Islands) (13°25'S. to 14°30'S.; 168°00'W. to 173°00'W.) consists of two groups, which are commonly referred to as American Samoa and Western Samoa.

The islands comprising American Samoa are Tutuila Island, Aunuu Island, Ofu Island, Olosega Island, Tau Island, and Rose Atoll. Western Samoa comprises the islands of Upolu Island and Savai'i Island.

Winds—Weather.—The prevailing winds, or so-called trade winds, come from a direction more nearly E, blowing between ESE and NNE. They are fairly constant through the dry season, but during the wet season they are fitful, and are frequently broken by periods of calm.

The islands lie within the typhoon area of the W Pacific. Typhoons occur from January to March, and occasionally up to the middle of April.

The year divides itself distinctly, but not sharply into a dry season, May to November, and a wet season, November to April. The wettest month, January, has a range of 127 to 1,651mm. The annual rainfall has also varied this much.

The climate varies little from year to year, because of the great area of water surrounding the group. December is the hottest month, with an average excess of only about 2° over the mean temperature for July, the coldest month.

Regulations.—See U.S. Coast Pilot 7 for general regulations concerning navigation in United States waters. Specific regulations will be given with the description of the area they affect.

Caution.—Caution should be exercised in the vicinity of American Samoa, as several Fish Aggregating Devices have been moored at off-lying deep-water locations around Tutuila, and other positions around the group. These devices may drift off position, and/or concentrations of fishing vessels may be found in their vicinity.

The devices are comprised of aluminum catamaran floats painted orange and white. Each device carries white daymark, fitted with the letter designation of the device, and a flashing white light. The devices offer good radar returns.

2.22 **Rose Atoll** (14°33'S., 168°09'W.), the farthest E of the Samoa Islands, is nearly square in shape; its sides are about 1.5 miles in length. Sand Island, inside the reef on the N extremity, is merely a sand spot.

A large clump of trees, 20m high, stands on Rose Atoll.

There is a boat channel into the lagoon, close W of the N extremity of the reef.

Tides—Currents.—Tidal currents off Rose Atoll are reported to set NE and SW, with the SW or ebb current being the stronger.

Regulations.—Rose Atoll is a National Wildlife Refuge managed by the Department of Interior. Entry is strictly prohibited without prior approval.

The **Manua Islands** (14°13'S., 169°33'W.) consists of three islands which extend over an area of about 17 miles in an ESE-WNW direction. The group is clear of dangers as far as known.

Tau Island (14°15'S., 169°28'W.) is the farthest E of the three islands which comprise the Manua Islands. The island is about 5.8 miles long E-W, is dome-shaped, and rises to a height of 966m. It is covered with vegetation.

Maafee Islet is located close offshore, about 0.3 mile S of the W extremity of the island.

Tides—Currents.—The tidal currents at the Faleasau anchorage flows SW on the ebb at 1 to 2 knots, and the flood flows NW at 1 to 2 knots. At the Luma anchorage, the ebb flows S and the flood N at a similar rate.

Anchorage.—Faleasau (Faleasao), on the NW side of the island, affords sheltered anchorage, in 27m, during the trade winds, but a vessel should be prepared to weigh anchor with any change. Anchorage may be obtained, in 24m, coral, with Fitiuta Point, the NE extremity of the island, bearing 080°, distant 0.4 mile. Fair anchorage can also be obtained at Luma village on the W side of the island opposite a conspicuous white church.

Caution.—A shoal, with a depth of 40m, lies about 1.3 miles, bearing 279°, from the W extremity of Tau Island. It lies in an area that has experienced submarine volcanic action. Volcanic activity was reported (2001) approximately 36 miles SE of Tau Island in position 14°34.5'S 168°55.5'W.

2.23 **Olosega Island** (14°11'S., 169°37'W.), 6 miles NW of Tau Island, rises nearly perpendicularly on its W side to a height of 639m. The coral reef surrounding the island consists of two regular shelves, one beyond the other.

There is fair anchorage, except during the trade winds, in 33m, coral, S of the W extremity of Olosega, and in 27m, sand, NE of the same extremity.

Ofu Island (14°11'S., 169°39'W.) is separated from Olosega Island by Asaga Strait, which is about 0.2 mile wide. Ofu is nearly 3 miles long in an E-W direction, and about 1.5 miles at its widest point. The island rises to 494m in its SE part. Two islets lie off the W side of the island. The coastal reef extends about 0.2 mile from Ofu Island to these islets.

A light is shown from the island's W end. A stranded wreck lies on the reef close NW of the light.

Depths—Limitations.—Significant improvements have been made to Ofu Harbor. The newly-built harbor is protected by a breakwater and has an excellent pier face, approximately 30m in length, for small craft. The alongside depth and turning basin has a reported controlling depth of 4.9m. A boat ramp exists for launching and recovering small craft.

A 47m bank lies about 23 miles WNW of Ofu Island; a 62m bank lies about 28 miles SW of the island.

Tutuila Island

2.24 **Tutuila Island** (14°19'S., 170°42'W.) is about 17 miles long in an ENE-WSW direction, 5 miles wide, and rises to a height of 653m. A wooded mountain ridge extends nearly the entire length of the island and is of extremely rugged aspect, especially in the E. The N coast is bold and precipitous.

The 180m curve lies from 0.1 to 2.3 miles off the S coast of Tutuila, about 4.3 miles off the W extremity, and from 1.3 to 2.5 miles off the N coast. There are several shoal areas, especially off the S coast, which may best be seen on the chart.

Tides—Currents.—Currents near the coast set SSW, particularly with NE winds. Rates of 4 knots have been observed. Between Tutuila and Upolo, a NW current with a rate of less

Ofu Island

than 0.5 knot has been found to exist. A current setting SW from Cape Taputapu is said to produce overfalls.

The S coast of the island extends from Cape Matatula, the E extremity of the island, in a WSW direction about 14 miles to Steps Point, the S extremity, and then about 5.8 miles NW to Cape Taputapu, the islands W extremity.

From **Cape Matatula** (14°15'S., 170°34'W.) to Matuli Point, 1.5 miles S, the coast is fronted by a reef which extends about 0.1 mile offshore.

Aunuu Island (14°17'S., 170°33'W.) lies 0.7 mile SSE of Matuli Point. The island has two peaks, the highest is 84m, and there is a village at its W end. A light is shown from the island's NE shore.

Caution.—A cable area extends across the channel between Aunuu Island and Tutuila Island, and is best seen on the chart. Vessels should avoid anchoring in the vicinity.

2.25 Nafanua Bank, with a least charted depth of 6.4m, extends 1.5 miles in a SW direction from Aunuu Island.

When making Pago Pago Harbor from the N, vessels usually pass N of Aunuu Island.

From Matuli Point, the coast trends 2.3 miles SW to Cape Fogausa. A rock, with a depth of 3.1m, lies about 0.4 mile SSE of the cape.

Fagaitua Bay lies between Cape Fogausa and Lions Head, 1.7 miles W. There is a 3.7m patch near the middle of the bay. The chart should be consulted for other depths.

Breakers Point (14°18'S., 170°40'W.), 2 miles W of Lions Head, is the E entrance point to Pago Pago Harbor.

Discolored water has been reported (1989) to exist within 1 mile of position 14°22.2'S, 170°40.7'W.

Taema Bank, with charted depths of 7.3m, lies across the entrance to Pago Pago Harbor, about 1.5 miles S of Breakers Point. The bank is about 2.3 miles long in an ENE-WSW direction.

Narragansett Passage lies between Taema Bank and Nafanua Bank to the E. There are several banks in the vicinity of the passage whose positions may best be seen on the chart. The pass is not recommended due to the age of survey.

Pago Pago Harbor (14°17'S., 170°40'W.)

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2.26 Pago Pago, a natural harbor located on the S shore of Tutuila, is entered between Breakers Point and Niuloa Point, about 0.8 mile WSW.

Pago Pago, on the NW side of the harbor is the largest village on the island and is the seat of the government. It is the only port of entry for American Samoa. The village of Utulei is situated close SE of the government administration buildings, and the village of Fagatogo is situated close W of the same buildings.

Winds—Weather.—The climate of the Samoa Group is mild. Although not far from the Equator, it is pleasant, even at sea level. The year divides itself into a dry season, May to October, and a wet season, November to April, with a wide variation in rainfall from year to year.

The prevailing winds, or so-called trade winds, come from an E direction, blowing between the ESE and NNE. These winds are fairly constant through the dry season, but during the wet season, are weaker, being broken by frequent calms.

Tides—Currents.—The mean tidal range is 0.7m, while the spring range is 0.9m.

Depths—Limitations.—The shores of the harbor are fringed by reefs, which on the W side of the entrance extend up to 0.3 mile offshore and the same distance inside the E entrance. In most parts the reefs are steep-to and their edges are marked by surf.

The depths in the harbor are from 31 to 69m. An 18.3m depth is charted outside the 30m curve, about 0.2 mile SW of Breakers Point. A dangerous submerged wreck is situated about 0.1 mile E of the patch.

Station Wharf (Main Wharf), on the S side of the inner harbor, is 122m long and has depths of 9.8 to 11m alongside, but in 1987, a vessel reported a least depth of 9.1m alongside.

A deep draft container wharf, 305m long, is situated between Station Wharf and Fuel Pier.

Fuel Pier 122m in length, has depths of 10.3m alongside.

Station Wharf and Fuel Pier have been reported (1992) to be in poor condition.

Customs Pier has a depth off 3.1m at the SW end and 6.1m at the NE end.

The facilities on the N shore of the inner harbor are reserved for the fishing fleet serving the canneries. Each of the two wharves are 107m long, being extended to 122m in 1992. The depths alongside are at least 7m.

An aerial cable, with a clearance of 46m, spans the inner harbor.

Pago Pago, American Samoa

Aspect.—When making the port, easily-identified landmarks include Aunuu Island; Steps Point, the S extremity of the island; the sharp peak of Matafao, 653m high, 1.3 miles S of Pago Pago; the flat, dome shape of North Pioa Mountain, 524m high, on the E side of the harbor; and Fatu Rock, 31m high, located 0.2 mile S of Niuloa Point. Tauga Rock, about 1 mile E of Breakers Point, is 27m high and prominent. The lighted range which is best seen on the chart is located next to a white church with a red roof. These range marks are hard to distinguish in bright sunlight.

Pilotage.—Pilotage is not compulsory, but is advisable; a pilot is available day or night. Pilotage fees are charged whether or not a pilot is used. It is recommended that large vessels request a pilot if docking in inclement weather. A radio request for a pilot should be made 24 hours prior to the ETA. The pilot prefers to embark close to the dock, but in good weather will embark off Fatu Rock.

Entrance at night is not encouraged; however, if previous arrangements are made and weather permits, a pilot will embark during hours of darkness.

Port officials board inbound ships alongside the dock.

Regulations.—See U.S. Coast Pilot 7 for regulations pertaining to navigation in U.S. waters.

Required notifications to the Officer in Charge, Marine Inspection and/or the Captain of the Port, Honolulu, may be made in American Samoa to:

U. S. Coast Guard Liaison Office, American Samoa
P.O. Box 249
Pago Pago, American Samoa

Signals.—Pago Pago Harbor Control and the harbormaster may be contacted on VHF channel 16. Pago Pago Harbor Control also monitors 2182 kHz.

Anchorage.—There is good anchorage in the inner harbor, in 11 to 46m, mud and sand. The best anchorage for large vessels is in midstream off the main dock. Vessels of 1,000 grt and up should not anchor in less than 29m, as the harbor becomes narrow and there is no room to swing.

Directions.—Vessels approaching from the E should pass about 1.5 miles E and 1 mile SE of Aunuu Island. Then a course of 256° should be steered until Breakers Point Light bears about 025°. Then alter course to the N to pass W of Taema Bank. When clear of the bank, steer a NE course to intersect the entrance range. Then steer 342° and enter the harbor on the range. This range line passes E of Whale Rock, which has a depth of 3.7m.

Caution.—Vessels from the W or S, and deep-draft vessels, should keep outside the 200m curve until reaching position 14°21'S, 170°41.5'W. From this position steer 026° to clear the W end of Taema Bank, then proceed as directed above.

2.27 From Pago Pago Harbor, the shore trends SW 6.8 miles to **Steps Point** (14°23'S., 170°46'W.); about midway on this stretch of shore, near the airport, the reef extends about 0.3 mile offshore. The sea breaks continuously on this reef.

An area W of Stepps Point, including Fagatele Bay, has been declared a National Marine Sanctuary. See the Code of Federal Regulations, Title 15, Part 941, as well as U.S. Coast Pilot 7 for further details.

The shore from Steps Point to Papualoa Point, about 2 miles NW, is formed partly by perpendicular rocks and partly by blocks of lava, which extend some distance seaward and upon which the sea breaks.

Leone Bay is entered between Papualoa Point and Fagaone Point, about 2.5 miles NW, and is open to the SSW. There is anchorage W of the village of Leone, in 29 to 37m, but it is dangerous when winds are from the S or SSW.

2.28 Cape Taputapu (14°19'S., 170°51'W.), the W extremity of Tutuila, lies 1.5 miles WNW of Fagaone Point. It is a mass of high, steep rocks, fronted by some rocky islets. Taputapu Island lies on the reef close SW of Cape Taputapu. The following banks, with the indicated least depths, lie in the approach to Cape Taputapu:

a. 26m—3.3 miles SE.
b. 20m—2.3 miles SSE.
c. 27m—3.8 miles SW.
d. 33m—3.5 miles W.

The N coast of Tutuila is described from the E to W.

From Cape Matatula to Pola Island, 6.5 miles W, the coast is indented by numerous bays. The coast then trends WSW 11 miles to Cape Taputapu. This coast is also indented with bays.

Aoa Bay (14°15'S., 170°35'W.), entered about 1.5 miles WSW of Cape Matatula, affords anchorage, in 31m, midway between the entrance points.

Masefau Bay, entered W of Tiapea Point, 1.5 miles W of Aoa Bay, affords anchorage, in 31m. The surrounding reefs and Nuusetoga Island, off the W entrance point, narrow the anchorage.

Afono Bay, 1.5 miles W of Nuusetoga Island, is said to provide good anchorage, in 26m, coral, except in N winds.

Pola Island (14°14'S., 170°40'W.), 1.5 miles NW of Afono Bay, is located off the N extremity of Tutuila. Cockscomb Point, the N extremity of Pola Island is formed by a ridge of rocks, which are high, indented, and steep.

A depth of 24m is charted just over 1 mile ENE of Cockscomb Point; a 27m depth is charted about 1.5 miles W of the same point.

Fagasa Bay lies about 4 miles SW from the N extremity of Tutuila. Anchorage, protected from the trades, may be taken, in 24m, between the E and W points of the bay.

Between Fagasa Bay and Aoloau Bay, 3 miles WSW, there are two small bays backed by mountains.

Aoloau Bay affords good anchorage, in 27m, midway between the heads, but vessels should be prepared to leave on short notice when the winds shift to the N. Aoloau Bay is small and surrounded by high mountains.

A 22m depth is charted 1.5 miles NNW of Aoloau Bay. Similar depths are charted to a distance of 4.8 miles W of the 22m depth above.

Poloa Bay (14°19'S., 170°50'W.), 4 miles SW of Aoloau Bay, affords good anchorage during E winds, in 31m, midway between the entrance points. Vessels should be prepared to leave on short notice when the wind shifts to the W.

In this bay there is a 1 to 4 knot current that runs in a SW direction. Cape Taputapu is located close SW of Poloa Bay.

Upolu Island

2.29 Upolu Island (13°54'S., 171°44'W.), in Western Samoa, lies about 38 miles WNW of Tutuila Island. The island is about 39 miles long in an E-W direction and 13 miles wide. A range of mountains consisting of a series of extinct volcanoes traverse the length of the island, lying nearer the S coast and sloping more steeply on the S side than on the N. The E part is more mountainous. The island rises to a height of 1,100m in Mount Fito, near the center of the island.

The shores of the island are fringed with a coral reef, which in places is intersected by channels, forming convenient harbors.

Apia, on the N coast, is the principal town on the island, and the official port of entry for Western Samoa.

Cape Tapaga (Point) (14°01'S., 171°23'W.), the SE extremity of the island, is reef-fringed. This reef curves N around the small islands of Namua and Fanuatapu, located 1.5 miles and 2.8 miles NE, respectively, from Cape Tapaga. The reef extends offshore to the W side of Fanuatapu, 1.5 miles distant.

Depths of 4.9m are charted 1.5 miles and 1.6 miles NE of Cape Tapaga, and a depth of 1.2m is charted 1.8 miles NE of the cape.

Samusu Point (13°59'S., 171°26'W.), 3.8 miles N of Cape Tapaga, is precipitous. A patch, with a depth of 11.9m, lies 1.5 miles E of the point.

Uafato Bay, about 5 miles NW of Samusu Point, affords anchorage to vessels with local knowledge on its W side, in a depth of about 29m. Care should be taken to avoid a coral spur extending NE from the head of the bay.

A bank, with a depth of 14.6m, lies 2.5 miles NNE of the W entrance point of Uafato Bay.

Fagaloa Bay (13°55'S., 171°32'W.), 2.5 miles NW of Uafato Bay, is 1 mile wide at its entrance and recedes 2.5 miles in a SW direction. The bay is fringed with reefs; those on the S side extend up to 0.3 offshore, and have shoals which lie off the reefs. The reefs on the N shore extend up to 0.2 mile offshore.

The SE trade winds prevailing in Fagaloa Bay from April to October draws into the bay as a NE wind. The W winds generally felt at the anchorage as coming from WSW to SSW.

There are general depths in the bay from 18 to 70m. The 20m curve lies about 0.5 mile from the head of the bay.

Anchorage.—Anchorage may be taken, in 27m, 0.7 mile from the head of the bay. A 14.6m patch lies close S of the anchorage.

Fagaloa Bay may be approached from the N and when Spitzer Mountain, about 12 miles from the E end of the island, bears 244°, stand in on that bearing.

A waterfall on the S side of the bay is conspicuous and Fao Peak on the N side is unmistakable.

From Fagaloa Bay the coast continues NW 3.5 miles to Mantantu Point, then W 2 miles to Saluafata Harbor.

A reef extends up to 0.8 mile seaward between Mantantu Point and Saluafata Harbor.

2.30 Saluafata Harbor (13°52'S., 171°37'W.), a natural harbor, is protected from the swell by coral reefs. The W side of the bay is encumbered by reefs which partly dry and extend 0.7 mile offshore. Casino Islet lies on this reef, 0.4 mile offshore; this islet is sometimes covered, even 2 hours before HW, and frequently shifts its position. Saluafata Bank, with a least depth of 3.7m, lies about 0.8 mile N of the E entrance point. With a NE swell the sea breaks on this bank.

Ariadne Point is located on the SE side of Saluafata Harbor; a conspicuous beacon marks the point.

Pilotage.—Pilotage is compulsory, the harbormaster at Apia Harbor acts as the pilot.

Anchorage.—Anchorage, in a depth of 14m, sand, can be taken with Ariadne Point bearing 170° at 0.4 mile distant. The anchorage may be approached with the beacon on Ariadne Point in line with a rear beacon, and the summit of Leading Peak bearing 175°. This range leads close to the reef on the W side of the harbor.

2.31 Vailele Bay (13°50'S., 171°43'W.), about 5 miles W of Saluafata Harbor, is divided into two parts by a detached reef which dries in places. In the W part of the bay is the settlement of Letogo.

A shoal, with a least depth of 2.7m, lies 0.2 mile NW of the N end of the detached reef above. The anchorage NE of Letogo is approached between the reef and the shoal on a course of 239°. Vessels anchor, in 11 to 12m, about 0.3 mile offshore.

Nuu (13°48'S., 171°39'W.), with a depth of 18m, lies 5 miles NE of Letogo. Depths of 20 and 22m are charted 1.3 and 2.5 miles NW and WNW, respectively, from Nuu.

Matautu Point (13°49'S., 171°45'W.), 3 miles NW of Letogo, is the E entrance point to Apia Harbor.

Muaavasa, a bank with a depth of 13m, lies 2 miles NE of Matautu Point; the bank breaks occasionally. Toatuga, with a least depth of 12m, lies on the entrance range line 3.5 miles NNE of Matautu Point.

East Reef extends 0.4 mile N from Matautu Point, and West Reef lies on the W side of Apia Harbor and extends 0.6 mile E, and nearly 1 mile N from the Mulinuu Peninsula. The peninsula projects 1 mile NW from Apia.

Apia Harbor (13°49'S., 171°46'W.)

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2.32 Apia Harbor is an inlet in the coastal reef entered between East Reef and West Reef; it is open to the North. Apia is the capital and principal town in Western Samoa; it is a port of entry.

Winds—Weather.—During the months of May to October, at irregular intervals, there is a day of short squalls and rain instead of the steady trade winds. The squalls may be of force 6 or 7 for a short period, but are not dangerous. The typhoon season is November to March.

Tides—Currents.—The mean tidal rise here is 0.8m, while the spring rise is 1m.

The current across the harbor entrance, about 0.3 mile off the reef, is variable and frequently sets against the wind and tide. It is predominantly W and attains rates of 4 to 5 knots during the rainy season. In this season, November to February, the rivers which discharge into the harbor frequently cause 2 knots W set at the anchorage.

A vessel entering the harbor in February reported that a 1m swell in the harbor entrance was the dominating concern.

Depths—Limitations.—Depths on the range line vary from 49m at the seaward end, to 16m just NE of the tanker berth.

Within the harbor, depths range from 4.8 to 12.8m, but a reef fringes the entire harbor and may best be seen on the appropriate chart.

Main Wharf is 184m long, with a depth of 9m alongside; the Inner Berth, on the inside face of the wharf, is 80m long, with a depth of 4.5m alongside. Caution is advised when using this inner berth, as a coral rock with a depth of 1.2m lies about 68m SE of the wharf's SE end. The maximum allowable draft at the main wharf at Apia is 9m.

An inter-island ferry terminal, with alongside depths of 3 to 4m, is situated close E of main wharf. Wooden dolphins have been set out at this berth to keep vessels off the harbor bulkhead.

An offshore oil berth, connected to a submarine pipeline and centered within a Prohibited Anchorage Area, lies in a charted depth of 12.1m on the W side of the harbor. This multi-point mooring will accommodate tankers of up to 32,000 dwt, with a maximum draft of 12.8m.

Catholic Cathedral, Apia Harbor

Aspect.—A conspicuous object when approaching Apia is the small tide gauge on West Reef. The twin towers of the catholic cathedral, and the single tower of the church are conspicuous. Two groups of oil tanks stand on the Mulinuu Peninsula. Caution should be exercised as it has been reported that the tide gauge is missing.

Pilotage.—Pilotage is compulsory; the pilot boards about 2 miles outside the harbor on the range line. The port is open at night for arrivals or departures, but arrivals are preferred in either early morning or late afternoon, as the trade wind is less fresh then.

Regulations.—Vessels should send their ETA to the local authorities at least 48 hours in advance, confirming 24 hours prior to arrival. Practique should be requested at least 12 hours before arrival.

Between November and April, vessels may not immobilize their main engines without the harbormaster's permission, and should be ready to sail with 2 hour's notice.

Signals.—Apia Harbor Control and the pilot may be contacted by VHF.

Anchorage.—Ships awaiting a berth can anchor about 1 mile N of East Reef, in 46 to 49m, coral, poor holding ground. Vessels may also anchor, in 37m, N of the harbor entrance, on or near the range lines.

Anchoring is prohibited in the vicinity of the tanker terminal.

Directions.—Entry to the harbor may be made with the approach range in line bearing 194°.

Caution.—A dense white smoke from local cooking fires may obscure the marks in the approaches to the port. This smoke may be encountered particularly on Sunday.

Between November and April, especially with a N or NW swell, a heavy surge may be felt at Main Wharf, strong enough to force a vessel to leave her berth.

2.33 From Apia to **Cape Faleula** (13°47'S., 171°50'W.), 4.3 miles NW, the coast is low and fronted by reefs. The reef extends 1.5 miles seaward from Cape Faleula, the N extremity of the island. A bank, with a depth of 5.8m, is located 2 miles NW of the light which stands NNW of Cape Faleula.

From Cape Faleula to Cape Fatuosofia, 15 miles WSW, the coast is low and covered with vegetation. The coastal barrier reef extends from 0.5 to 1.5 miles offshore.

There is anchorage in an exposed position off the village of Mulifanua, 3 miles NE of Cape Fatuosofia.

An inbound vessel should fix its position offshore and head for Mulifanua on course 148°. When the range lights become visible, continue on the range, bearing 148°, and anchor, in 29m, about 0.8 mile from the front beacon. A depth of 11.6m is charted on the range line NW of the anchorage.

Manono (13°51'S., 172°06'W.) is an island lying nearly 2 miles WNW of Cape Fatuosofia. The reef which surrounds Manono is connected to Upolu; the reef extends 0.6 mile W of Manono, and an islet, 37m high, is located near the W edge of this reef.

From Cape Tapaga, the S coast of Upolu extends W 19.5 miles to Cape Nuutoi, then continues about 21 miles WNW to Cape Fatuosofia.

Tides—Currents.—The currents off the S coast of Upolu set E.

Hertha (13°53'S., 171°16'W.), a bank with a depth of 27m, lies about 14 miles NE of Cape Tapaga.

Nuutele (14°02'S., 171°22'W.) and Nu'ulua, two islets joined by a reef, lie 1.3miles and 2 miles SE, respectively, of Cape Tapaga.

A rock, with a depth of 4.9m, lies 0.4 mile W of the NW extremity of Nuutele, but its position is doubtful. Large vessels should avoid the passage between Nuutele and Upolu.

Lepa, a village about 3.8 miles W of Cape Tapaga, is marked by a long, low, white church with a bright red roof.

2.34 Falealili Harbor (14°01'S., 171°41'W.), entered about 12 miles W of Lepa, is sheltered from N winds only. Nusafee, an islet, lies on the reef 1 mile WSW of the E entrance point. The reef extends 0.8 mile offshore, with indentations in it.

This harbor is too small and deep to allow sufficient chain to be veered in a heavy gale.

Safata Harbor, about 9 miles WNW of Falealili Harbor, is a reef harbor with depths of about 11 to 26m. The entrance is difficult to make out from a distance.

In the entrance and in the central part of the bay are four reefs, three of them on the center line of the bay. The outermost

of the detached reefs has a depth of 4.9m, and the sea breaks on it in heavy weather; there is a depth of 0.9m on the middle reef which also breaks, and the inner reef dries. The channel on either side of the reef is about 0.2 mile wide. The E part of the harbor offers better shelter.

From Safata Harbor, the coast trends 3.5 miles W to **Round Point** (14°00'S., 171°55'W.), and then 4.5 miles NW to Lefaga Bay. The coast along this area is fringed by a reef.

Cape Mulitapu'ili (13°57'S., 171°59'W.), the W entrance point of Lefaga Bay, is a high bluff.

From Cape Mulitapu'ili to Samatau, a large village 5 miles NW, the coast is fringed by a reef which extends 0.5 mile offshore, then to the S side of Manono where the fringing reef extends about 1.5 miles offshore.

2.35 Apolima (13°49'S., 172°09'W.), an islet, 165m high, lies about 1.8 miles NW of Manono Island. A rock, 12.2m high, lies 0.4 mile N of the islet.

Apolima Strait separates Apolima from the SE extremity of Savai'i Island, about 4 miles WNW. Depths of 14.9m and 16.1m are charted 2.3 miles WNW and 3.5 miles NNW, respectively, from Apolima.

The strait is easy to navigate, but vessels which have passed through from the S have reported a strong current setting E towards Apolima, and N of the islet a strong countercurrent setting W.

Caution.—Caution should be exercised when approaching the strait from the S, as depths of 34 to 62m are charted in an area 9 miles SW, 11 miles S, and 12 miles SE of Apolima.

Ferry traffic may be encountered in the strait at any time. These vessels are reported to be poorly lit and not readily discernible by radar.

Savai'i Island

2.36 Savai'i Island (13°37'S., 172°29'W.), the largest and farthest W of the Samoa Group, is about 40 miles long and 20 miles wide. It differs from the other islands in appearance; the shores are low and the ascent to the center is gradual. The island rises to a height of 1,858m near the center which is constantly enveloped in clouds.

Tafua Savai'i (13°47'S., 172°15'W.), 1.5 miles NW of the SE extremity of the island, is 171m high. It makes a good mark for making Apolima Strait. It begins to show above the horizon about the same time as Apolima Islet, and appears as an island. From the NE, Tafua Savai'i may be mistaken for Apolima and the latter for Manono, which does not appear until much closer.

Palauli Bay, 3.5 miles WNW of Tafua Savai'i is a semi-circular bay almost entirely barred by a reef. Vessels may anchor in the bay during NE winds, in 44m, sand, with Tafua Savai'i bearing 099°, about 0.4 mile off the reef fronting the E shore. A rock lying W of the anchorage is marked by breakers.

The S side of the island is rocky; as there are no fringing reefs, a heavy surf beats directly upon it. There are few places where landing can be affected.

Cape Asuisui (13°47'S., 172°32'W.), the SW extremity of the island, lies 15 miles W of Palauli Bay.

From Cape Asuisui the coast trends NW about 6 miles to Salailua Bay, which may be identified by the fringing reef which is the first fringing reef seen after passing Palauli Bay.

There is anchorage in the middle of Salailua Bay, in a depth of 44m. The anchorage is protected from SSE winds; the holding ground is good.

A depth of 6.4m is charted 0.5 mile offshore, about 2 miles NW of Salailua Bay.

A withe house in the center and another at the S end identify Falelima, a village standing 10 miles NW of Salailua Bay. Landing can be affected in favorable weather, at HW, between the rocks which project off the coast.

2.37 Cape Mulinuu (13°30'S., 172°48'W.), the W extremity of Savai'i Island, terminates in a low, rocky spit. A white church near this point is a conspicuous landmark.

From a position about 3.8 miles N of the SE extremity of Savai'i Island to **Cape Tuasivi** (13°40'S., 172°10'W.), the E extremity, about 5 miles farther N, there is a barrier reef which extends up to 1.8 miles offshore.

South of the reef is the village of Salelologa, where shelter may be obtained by small vessels with local knowledge in fair weather. Lights, in line bearing 312°, lead into the entrance.

The barrier reef continues for a distance of about 6 miles NNW of Cape Tuasivi. There are several boat passages through the reef. Between the reef and the coast there are numerous mangroves and large trees, which at HW give the appearance of a flooded island.

From the above reef for a distance of about 10 miles the coast is steep-to, apparently without any reef fronting it.

Tides—Currents.—See the Apolima Strait description in paragraph 2.35 for information on currents off the E side of Savai'i Island. Off the island's N coast, a W set is felt, but it is basically confined to deep water.

2.38 Matautu Bay (13°26'S., 172°22'W.), 17.5 miles NNW of Cape Tuasivi, lies close W of the N extremity of Savai'i Island. The bay is a slight indentation in the coast whose W entrance point consists of a perpendicular cliff, 50m high.

Anchorage.—An anchorage with good shelter in the trade wind season, but exposed at all seasons, may be taken by vessels with local knowledge, in 14 to 26m, sand, between the reefs.

Safune Bay, 3.5 miles W of Matautu Bay, is nearly filled with reefs, but it provides anchorage, in 24m, during SE winds. There is usually a swell at the anchorage.

Asau Bay (13°30'S., 172°38'W.), entered about 13 miles W of Safune Bay, is completely fronted by a reef of sand and mud.

Tides—Currents.—Off the entrance, the tidal current sets in an E direction from 4 hours before to 1 hour after HW at Asua, and in a W direction from 3 hours after to 6 hours before HW reaches a maximum rate of almost 0.8 knot at springs.

In the dredged channel, there is a continuous NW flow, reaching a maximum rate of 1.5 knots during a falling tide, with a minimum rate on the rising tide.

There are heavy tide rips in the channel 0.2 mile NW of the seaward end of the airstrip.

Depths—Limitations.—The approach channel through the reef to Asau Bay is 54m wide, while the center 37m has been dredged to 6.7m. Due to sea and swell conditions, an underkeel clearance of 1.5m is recommended. The best conditions for entering are at first light and LW. There is a wharf with a least depth of 8.5m close S of Utuloa on the E shore of the bay.

Three sets of range beacons mark the channel edges and center; all three sets stand in line bearing 139°.

Anchorage.—Anchorage may be obtained, in 31m, 0.2 mile N of the entrance, but may be untenable when the wind backs to the NE.

Close W of Asau Bay, separated from it by Cape Mauga, lies Sataua Bay, which has a sandy shore and a reef. Anchorage may be obtained by vessels with local knowledge, in 27 to 37m, in the middle of the bay where there is good shelter from the trade winds.

Caution.—Caution is advised as silting has been reported on the W side of the approach channel off the airstrip.

2.39 Cape Vailaoa (13°29'S., 172°47'W.), fronted by a coastal reef, is located 6 miles WNW of Sataua Bay.

Falealupo Road, entered SW of Cape Vailaoa, affords good protection against E winds in an anchorage, with depths of 20 to 49m, coral and sand.

Cape Mulinuu, the W extremity of Savai'i Island, lies at the S end of Falealupo Road.

Swains Island (11°03'S., 171°05'W.), lying about 160 miles NNE of Savai'i Island, is somewhat circular in shape and has a diameter of about 1.5 miles. The land is from 3 to 4.6m high, and the trees are from 21 to 30m high.

A platform reef about 0.1 mile wide, which surrounds the island, uncovers at LW; the reef is steep.

The island is administered by the Government of American Samoa.

There is anchorage for small vessels N of the village of Taulaga, which is situated on the W coast of the island. Deep-draft vessels are advised to remain at least 0.4 mile offshore as depths shoal rapidly; a vessel anchoring 0.2 mile off the village reported anchoring in 55m.

The Southern Cook Islands (Lower Cook Islands)

2.40 The Southern Cook Islands (Lower Cook Islands) lie between 19° to 22°S and 157° to 160°W. They consist of Mangaia, Rarotonga, Mauke, Mitiaro, Atiu, Takutea, Manuae, Te-Au-o-Tu, and Aitutaki.

The Southern Cook Islands are administered for the New Zealand government by a Resident Commissioner at Avarua in Rarotonga. Each island has a Resident Agent, who is assisted by the island council.

Winds—Weather.—The climate of the Southern Cook Islands is generally warm and humid. The trades usually blow from the ESE. Typhoons may be experienced from November to April, and usually come from the direction of the Samoa Islands.

Tides—Currents.—In the vicinity of this group, the current will generally be found setting to the W with a velocity of about 0.5 knot, but it is influenced by the force and direction of the wind.

2.41 Mangaia (21°55'S., 157°55'W.), the farthest S of the Southern Cook Islands, lies about 730 miles SE of Rose Island in the Samoa Islands. The island rises to a height of 169m near the center. A fringing reef, about 0.6m high, surrounds the island and extends about 46 to 366m offshore. A huge barrier cliff, formed of coral and covered with vegetation, makes a complete circuit of the shore.

Oneroa, a village on the W side of the island, is conspicuous. The Resident Agent lives on the island. A prominent white church and radio masts are situated within the settlement. A light, shown occasionally, is exhibited near the town. In good weather, anchorage for small vessels is available off a village 0.8 mile N of the main village, but the vessel's engines must be kept ready for immediate departure. A small wharf used by lighters lies adjacent to the anchorage; however, the channel to the wharf requires local knowledge.

Rarotonga

2.42 Rarotonga (21°14'S., 159°46'W.) lies about 110 miles WNW of Mangaia and is the seat of government for the Cook Islands. The New Zealand High Commissioner resides at Avarua, where the offices of the administration are situated.

The island is about 6 miles long E-W, and about 4 miles wide. The island is volcanic in nature, the mountains rising to sharp peaks covered with vegetation. The highest peak is Mount Te Atukura, 638m high.

The fringing reef surrounding the island is steep-to, extending for 0.3 mile on the S side and 0.5 mile on the SE side.

Avarua Harbo**r**, on the N side of Rarotonga, is S of the passage which leads through the barrier reef to the town of Avarua. This harbor has not been used since a hurricane in1987.

Avatiu Harbor, located 0.5 mile W of Avarua Harbor, lies outside the barrier reef.

Winds—Weather.—The Southeast Trades dominate the area. At Rarotong,a 25 per cent of the winds are E and SE. Next in frequency, at 9 per cent, are S winds. These S winds are most frequent from May to September. North and NE winds blow most often from December to February. Calms in the Rarotonga area occur about 13 per cent of the time.

Tides—Currents.—The spring range of tide is 0.6m. The tidal currents in the approach to Avatiu harbor normally sets to the W. Reports have stated that a W set, with rates of 1 to 3 knots, may be encountered in the harbor entrance. It has also been observed that N winds send a swell into the harbor causing rips and cross channel sets in the entrance.

Aspect.—When approaching Rarotonga from the W, red obstruction lights mark antennas and other obstructions within the vicinity of an airstrip situated on the island's NW side, as well as an aeronautical beacon shown from the same general location. These lights should not be confused with the lights of Avarua and Avatiu. The obstruction lights and aeronautical beacon are shown only when an aircraft is expected.

The large fuel tanks W of the harbor, and white cylindrical tanks on the E side, are the most conspicuous marks seen when approaching Avatiu.

Anchorage.—Anchorage, in 40m, can be obtained about 650m NNE of Avarua Harbour East Breakwater head.

Caution.—A local magnetic anomaly has been reported (1922) to lie at the position 21°11'S, 159°45'W.

The local authorities should be contacted for the latest information on depths and aids to navigation before anchoring or attempting to berth here.

Courtesy of Don Silk, Harbormaster.

Avatiu Harbor

Avarua Harbor is no longer used by commercial vessels and the leading lights have been discontinued.

2.43 Avatiu (21°12'S., 159°47'W.) (World Port Index No. 55740) is open to shipping with a draft of 6m or less, but vessels should keep in mind the cautions listed below. Range lights, in line bearing 193°, lead from seaward to the harbor basin which will accept a vessel up to 90m in length. Two wharves are available; the outer berth (NE wharf) has a length of 135m, with depths of 4 to 6m alongside while the inner berth (SE wharf) has a length of 128m a with a depth of 4.8m alongside. The S wharf is 98m in length and permanently occupied by small fishing vessels. The W wharf is 45m long, with a depth of 2m alongside.

The police boat of the Cooks Islands is stationed at the SW wharf. Vessels using the NE wharf must tie up with the bow towards the exit.

A dock accessible to small vessels has been built in the W part of the port. It has a wharf with 4m of water alongside where ships can tie up by the stern and a landing stage set aside for debarking passengers from ships that anchor.

Conspicuous tanks are charted on the NE side of the harbor.

Pilotage.—Pilotage is available and recommended for Avatiu Harbor. Vessels should send requests for pilotage through Rarotonga Radio 24 hours in advance to the Harbormaster, Rarotonga. Vessels are requested to call the Harbormaster on VHF channel 16 when in range. The pilot boards 0.8 mile N of Avatiu Harbor entrance.

Signals.—Rarotonga Radio maintains a 24-hour watch on 2182 kHz. The Harbormaster can be contacted on VHF channel 16 during normal hours, or can be contacted through Rarotonga Radio outside normal hours.

Anchorage.—The anchorage for liners is off Avarua, as indicated on the chart, about 0.35 mile to the NE of the entrance, in a depth of 36m.

Vessels unable to enter either harbor usually anchor, in depths of 36m, at the intersection of two sets of range lights, best seen on the chart. The holding ground is soft coral, and reported to be bad, although safe in winds between the E and SW. The anchorage is unsuitable with N winds or swell. Caution is advised, as the ranges have been reported to be difficult to distinguish. In calm weather, the ship's chain may snag on the coral.

Caution.—Avatiu is exposed to N winds. When such a wind generates a sea, a confused sea rolls over the reefs making them unsafe, and entry difficult.

A pinnacle rock, with an estimated depth of 5.9m, was reported to lie at approximate position 20°38'S, 161°02'W.

2.44 Mauke (20°09'S., 157°23'W.), 148 miles ENE of Rarotonga, is the farthest E of the Lower Cook Islands. It is low and wooded, somewhat circular in shape, and has a diameter of 2.3 miles. A reef fringes the island, but does not extend more than 0.3 mile.

There is no anchorage, but local boats will come out in good weather. The principal landing place is at Taunganui, on the NW side of the island. The island has an airstrip.

Mitiaro (19°50'S., 157°41'W.) lies about 24 miles NW of Mauke. It is a small island surrounded by a barrier reef; there are apparently no dangers outside the reef, and there is no anchorage.

Atiu (20°02'S., 158°07'W.) lies about 21 miles WSW of Mitiaro. The island is thickly wooded and rises to a height of 120m near the center. The coast is encircled with a coral cliff. A bold rocky cliff about 9m high, intersected by sandy bays, forms the N side of the island.

The fringing reef surrounding the island extends no more than 0.5 mile from the coast; depths of 220m are found 0.2 mile seaward of the reef, and there are no apparent off-lying dangers. With an E wind, a current sets strongly onto the island's N side.

There are a number of landings on the island, but local knowledge is necessary for all.

The island's center is so thickly settled that the separate villages can be regarded as one. Taunganui, on the W coast, is the residence of the Resident Agent. The landing here cannot be used in NW winds and a S swell.

A lighter harbor contained within a concrete jetty lies on the island's W side. This harbor requires local knowledge and is available to small craft less than 9m in length. The harbor is reportedly hazardous to enter.

There is an aviation runway at the N extremity of the island.

2.45 Takutea (19°49'S., 158°18'W.), located 12 miles NW of Atiu, is a small island with a white, coral sand beach protected by a fringing reef. The tops of the trees are about 24m high and are visible from Atiu.

A reef, occasionally marked by heavy breakers, extends 1.8 miles SE from the island. A shoal, with depths of 7.3 to 12.8m, extends about 0.3 mile W from the W extremity. Tide rips exist N of this shoal.

Manuae Atoll (Hervey Islands) (19°21'S., 158°56'W.) consists of Te-Au-o-Tu, a small island on the E side of a lagoon, and Manuae, a small island on the W side of a lagoon.

A coral reef surrounds the atoll and there is no passage through the reef. There is no safe anchorage, but with offshore or light winds, temporary anchorage can be found off the NW side of Manuae, in 16 to 22m, about 0.1 mile off the reef.

Aitutaki (18°54'S., 159°46'W.), the farthest NW of the Lower Cook Islands, lies about 51 miles WNW of Manuae Atoll. The island, about 4 miles long in a N-S direction, is located at the N end of a reef which is a fringing reef on its N extremity, but becomes a barrier reef farther S. A number of small islets, from 6 to 18m high and covered with trees, stand on the barrier reef; also, some low cays on the E side of the reef break heavily.

Aitutaki

Aitutaki rises to a height of 119m in the N part. A light is situated on this peak.

There are some conspicuous rocks, 11.6m high, off a point on the W coast about 2 miles SSW of the N extremity of the island. A house with a conspicuous silver-grey roof stands near the coast, about 0.4 mile SSE of the conspicuous rocks, and 0.6 mile SSW of the house there is a church with a conspicuous red roof.

Motikitiu, a small islet, is located near the SE extremity of the barrier reef 4 miles SE of Aitutaki; Maina, a small islet, is located near the W extremity of the reef, 5.5 miles WNW of Motikitiu.

2.46 Arutunga (18°53'S., 159°47'W.) is a reef port with a boat passage through the reef which has a depth of 1.8m at HW. In 1972, a depth of 1.5m could be carried to the pier. Strong currents occur in the boat passage, for which pilotage is recommended. Range lights, in line bearing 145.5°, are shown from the port.

The Resident Agent is stationed at Aratunga.

A vessel can anchor off the boat passage, in 33m, coral sand, about 0.8 mile NW of the root of the pier.

In 1988, it was reported that the anchorage area was small, difficult to locate, and very close to shoal water. Also, the anchorage appeared to be unsafe with a W wind.

Palmerston Atoll (18°04'S., 163°10'W.) lies about 200 miles WNW of Aitutaki. They belong to the Northern Cook Islands and are administered from Rarotonga.

The atoll consists of six sandy islets on a coral reef and encloses a lagoon. The islets are covered with coconut palms, with the exception of some low cays on the NE part of the reef.

The inhabitants state that heavy gales occur every year, usually in January and February, blowing from the NE and E, and lasting 24 to 36 hours, the wind remaining in that quarter.

During good weather, anchorage can be obtained, in 10 to 30m, coral, about 0.2 mile from the reef, on a prolongation of the W point of the reef extending from the W islet. It is imprac-

Courtesy of Ewan Smith

Palmerston Atoll

tical for large vessels to anchor. The atoll is dangerous to approach at night.

The Tonga Islands

2.47 The Tonga Islands are a widely scattered group of islands lying between 18°01'S and 21°28'S, and 173°54'W and 175°25'W. They consist of over 100 islands and islets, which are divided into three main groups, namely Tongatapu, Ha'apai, and Vava'u. Between Tongatapu and Ha'apai are the subsidiary groups of Nomuka, Otu Tolu, and Lulunga (Kotu).

Volcanic activity occurs occasionally in areas N and S of the Tonga Islands, which may best be seen on the chart.

Winds—Weather.—In early winter the trade wind blows mainly from the ESE becoming SE in July. In the N at Vava'u, strong winds blow mainly from between the ESE and SSE, and are said to last about 3 days; they are generally accompanied by rain squalls. In summer, strong winds occasionally blow from the NW with thick rainy weather, but the wind does not usually remain in this quarter longer than 12 hours. It is reported that a swell from the SW, raised by gales in high S latitudes, cause a heavy surf on the S coasts of the islands.

Tides—Currents.—The currents in the shallower waters of this area and near the island coasts are greatly influenced by the winds and tend to follow the line of the coasts.

Caution.—A local magnetic anomaly has been reported to exist at position 20°42'S, 175°01'W.

Generally, a line of shallow and shoal depths extends SSW from the Tonga Islands for about 500 miles to the Kermadec Group, continuing SSW towards New Zealand. The Kermadec Group and the dangers SW of them are described in Pub. 127, Sailing Directions (Enroute) East Coast of Australia and New Zealand and may be seen on the appropriate chart.

Volcanic activity has been reported (1979) in position 25°52'S, 176°14'W; in 1986, in position 24°58'S, 175°52'W; and, in 2006, in position 18°48'S, 174°38'W.

2.48 The **Minerva Reefs** (23°46'S., 179°02'W.), lying from 250 to 275 miles SW of Tongatapu Group, appear to stand on a submarine plateau from 549 to 1,097m below the surface of the sea, which extends about 28 miles in a NNE and SSW direction. The two reefs are 18 miles apart and are located toward the extremities of the plateau.

South Minerva Reef (23°56'S., 179°08'W.), consisting of two united atolls about 4.8 miles long in an ENE and opposite direction, has large detached blocks of coral lying on the W reef, which dries 0.9m.

A bight on the N side of the junction of the two atolls is about 0.8 mile wide. Here, about 0.3 mile N of the reef, there are depths of 18 to 37m, where vessels can find protected anchorage during the SE trades. A tower stands close to the junction of the two reefs.

North Minerva Reef (23°38'S., 178°55'W.), nearly circular in shape, has a diameter of about 3 miles. The reef, which dries about 0.6m or 0.9m, was reported to give a good radar echo. An opening about 0.2 mile wide, and which has tidal currents running through it at rates of 3 knots, leads into the coral-free lagoon. Anchorage may be had, in a depth of 27m, sand, near the center of the lagoon.

Pelorus Reef (22°51'S., 176°26'W.), about 144 miles NE of North Minerva Reef, has a charted depth of 26m. It would be prudent to avoid the vicinity of this reef.

For the many shoal areas and reported discolored water areas S of the Tonga Islands refer to the chart.

Ata (22°20'S., 176°12'W.), 32 miles NNE of Pelorus Reef, is distinguished by two lofty peaks of about equal height, the N of which is about 290m high. The island, about 1.5 miles long, is wooded. A rock, about 91m high, lies close off the S point of the island, and some white rocks, 122m high, lie close off the NW point.

Gleaner Reef (22°43'S., 173°54'W.), which was struck by a vessel drawing about 5m, lies about 128 miles ESE of Ata, but the position is doubtful.

An obstruction was reported (1946) in position 21°54'S, 174°01'W, about 49 miles NNW of Gleaner Reef.

Depths of 168m and less have been reported to lie between Ata and Tongatapu, and may best be seen on the chart. Vessels are urged to use the appropriate caution in this area.

Eua Island (21°22'S., 174°56'W.), the farthest S of the Tonga Islands, lies about 10 miles SE of Tongatapu. The island is 10.5 miles long in a N-S direction and nearly 4 miles wide; it rises to a height of 311m near its S end.

Kalau, an islet 37m high, lies 2.5 miles WSW of the of the S extremity of Eua.

When approaching Tongatapu from the S, Eua provides a good landfall; however, caution should be exercised if approaching from this direction.

English Road, on the NW side of Eua Island, affords anchorage, in 46m, about 0.3 mile offshore, off the village of Ohonua. This anchorage is unsafe in W winds.

2.49 **Tongatapu** (21°10'S., 175°12'W.), the principal island of the Tonga group, is triangular in shape and is about 18 miles long, 9 miles wide, and mostly level. The ground is undulating in places and rises from sea level on the N coast to an elevation of about 61m in the SE part of the island.

Caution.—Uncharted reefs have been reported to lie up to 4 miles off the island's S side.

Attention is drawn to the presence of old mine zones around Tongatapu.

Niu Aunofo (21°04'S., 175°20'W.), the NW extremity of Tongatapu, is a low, wooded rocky cliff.

Duff Reef, 2.5 miles W of the light on Niu Aunofo, is a small steep-to reef on which the sea always breaks heavily.

The coast for 2.5 miles SW of Niu Aunofo is rocky, with long white patches of sand, and is fringed by a narrow reef which is steep-to.

For 12 miles SE, there is a considerable number of blowholes which extend between the higher ground and the coastline. The coast is mostly low rocky cliffs, with patches of white sand in places.

From this point to Houma Toloa (Homa Toloa), the S extremity of the island, the coast changes and rises until at that point the cliffs of coral rock are more than 61m high. A barrier reef, or series of reefs, extend along the entire S side of the island, 3 to 4 miles S from it.

From Houma Toloa to **Mui Hopohoponga** (21°09'S., 175°02'W.), the E extremity of the island, about 9 miles NNE, the coast consists of low, broken rocky cliffs and sand patches.

The fringing reef which surrounds Houma Toloa continues for some distance to the N. A similar reef extends around Mui Hopohoponga.

From Mui Hopohoponga the coast trends 16.5 miles WNW to Niu Aunofo. It is broken and low, the highest point being Popua, a hill with an elevation of 33m to the tops of the trees, located on the coast 7.5 miles W of Mui Hopohoponga.

Coral reefs extend 9 miles offshore, and other dangers lie within 13 miles of the coast; there are some islets on these reefs in the approaches to Nuku'alofa.

Eua Iki lies about 3 miles ENE of Mui Hopohoponga. Reefs, which break, extend about 0.8 mile in a SSE direction from the island; no vessel should attempt to pass the E or S sides nearer than 1.5 miles.

The extensive reef 3 miles NNE of Mui Hopohoponga always breaks.

There are three channels leading to Nuku'alofa, from E to W, are Piha Passage, Ava Lahi, and Egeria Channel. Piha Passage can ordinarily be used in an emergency, but is not recommended. Egeria Channel is not recommended.

Hakau Mama'o (21°00'S., 175°13'W.) is a coral reef lying about 7 miles NE of Niu Aunofo. It seldom dries, but the breakers on it are always visible.

Monro Rock is a small, coral head, with a depth of 7.3m, located about 1.5 miles NE of the light structure on Hakau Mama'o. A shoal, with a least depth of 8.5m, lies 1 mile NNW of Monro Rock.

Atata is a wooded island, 36m high to the tops of the trees, about 4 miles ENE of Niu Aunofo; it lies at the NE end of an extensive reef.

Malinoa, a low sandy islet 15.5m high, lies 7 miles E of Atata. Telemachus Reef, with a least depth of 3.7m, lies 2 miles NW of Malinoa; the sea breaks on the reef.

Nuku'alofa (21°08'S., 175°12'W.)

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2.50 Nuku'alofa, the principal town of the Tonga Islands, is the residence of the Ruler and the Government; it is a port of entry. This is a natural coastal harbor protected by reefs, but open to N winds. The alongside berths may become untenable for small vessels, forcing them to anchor out.

Winds—Weather.—Nearly 60 per cent of the winds are from the SE to E. During May to August, when SE winds are in their ascendancy, the E wind components are in considerable part replaced by S, SW, and NW winds. About 24 per cent of the annual winds are from the NE and S, about equally divided between the two directions. The December wind speed is 10 knots; from May to July the wind speed is about 7 knots.

From May to November, the strongest winds are generally experienced from the SSE to ESE, usually accompanied by rain from these quarters, lasting up to 3 days. When the wind shifts to the NE, good weather may be expected for a time.

After September, strong NW winds with thick dirty weather and heavy rains may occasionally be expected, but the wind does not appear to remain longer than 12 hours in that quarter, and will probably shift to the S and clear up.

From December to April, the winds are generally E, but sudden and violent W and NW squalls are common. An average year brings about 3 days of gales.

Typhoons may be experienced from December to March.

Tides—Currents.—The spring range at Nuku'alofa is 1.2m. In Ava Lahi, the principal approach, a W set will usually be encountered, the force and direction varying with the prevailing E winds. The strength of this current is greater N of Malinoa, and decreases farther S.

In Piha Passage, the tidal currents set E and W, with slack water occurring about 2 hours 30 minutes after HW or LW at Nuku'alofa. Within the narrows slack water usually occurs about 3 hours after HW or LW, but the wind has a considerable affect on this. Currents through this area have been reported as irregular, with maximum rates of about 4 knots.

At Queen Salote Wharf, the surface current flows to the W; however, at a depth of 5.5m a countercurrent tends to the E.

Depths—Limitations.—Two major passages lead to the harbor area at Nuku'alofa. Ava Lahi Passage to the N was swept (1942) to a depth of 12m, and is indicated in green on the chart. Ava Lahi is larger and deeper than Piha Passage to the E. A maximum draft of 10.3m can be accommodated in the harbor. Ava Lahi Passage has a series of ranges to guide vessels when entering the harbor.

Vuna Wharf consist of a T-shaped jetty and extends to the edge of the fringing reef in front of the Government buildings. The berth is 60m in length, and will accept a vessel with a draft of 6.7m. Two wrecks covered by 5.7m and 13.2m of water lie, respectively, 92m and 185m to the SE of the extremity of Vuna Wharf.

Queen Salote Wharf, 1 mile E of the Vuna Wharf, consists of four numbered berths. Berth No. 1 is about 90m in length, with a depth of 11.6m alongside; this berth works containers and general cargoes. Berth No. 2 is 110m long, with a depth of 10m alongside, and can handle container, tanker, ro-ro, and general cargoes. Berth No. 3 is 100m long, with a depth of 7m

alongside and handles local trade. Berth No. 4 is 60m in length.

Dredged boat harbors lie on either side of Queen Salote Wharf and are best seen on the chart.

Aspect.—The flagstaff at the root of the pier is reported to be prominent from the entrance of Ava Lahi. The palace and royal chapel are wooden structures situated near the foreshore. Conspicuous radio masts and tanks are situated 0.5 mile and 1.4 miles ESE, respectively, of the root of the town jetty. A radio mast high is situated 0.8 mile ESE of the tanks.

Pilotage.—Pilotage is compulsory for merchant vessels and should be ordered at least 24 hours in advance. Vessels may also request advice on the best time to transit the entrance channels. Pilots will board vessels using Ava Lahi, about 2.5 miles NE of Hakau Mama'o (outer boarding location) or in position 21°03.5'S, 175°12.9'W (inner boarding location). Vessels less than 137m in length drawing less than 5.5m board the pilot for Piha Passage 2.8 miles E of the Narrows.

Regulations.—A major part of Nuku'alofa harbor and a large part of Ava Lahi Passage are prohibited to anchorage and fishing. The area is delimited by a line joining the following positions:

21°07.3'S, 175°12.6'W
21°06.0'S, 175°12.6'W
21°04.3'S, 175°14.1'W
21°01.3'S, 175°11.5'W
21°01.5'S, 175°10.9'W
21°03.6'S, 175°12.6'W
21°05.0'S, 175°12.6'W
21°07.6'S, 175°10.2'W
21°08.2'S, 175°10.2'W
21°08.2'S, 175°10.8'W
21°08.2'S, 175°11.0'W
Excluding Monnu
21°07.7'S, 175°11.0'W
21°07.9'S, 175°11.4'W
21°07.6'S, 175°11.5'W
21°07.4'S, 175°11.5'W
21°07.4'S, 175°11.3'W
21°07.5'S, 175°11.1'W
Excluding Ualanga 'Uta
21°07.0'S, 175°11.8'W
21°07.0'S, 175°12.1'W
21°06.8'S, 175°12.1'W
21°06.8'S, 175°11.8'W

Signals.—The pilot station may be contacted on 2182 kHz or VHF channel 12 or 16. The pilot vessel may be contacted 1 hour before arrival.

Anchorage.—Anchorage may be taken in areas recommended by the harbormaster. The anchorage is clear of dangers, except for three reefs, which dry from 0.3 to 0.6m. They lie 0.5 mile NE, 0.9 mile NNW, and 1.8 miles N of the root of the pier. Large vessels may anchor, in 27m, SE of the reef Ualanga Uta, about 0.6 mile N of the pier head.

During the typhoon season, more shelter and better holding ground will be found in the bight NE of Queen Salote Wharf pier head.

Caution.—A wreck, with a depth of 11.6m, lies about 0.5 mile SW of Paugaimotu Islet; a special spherical buoy is moored close to it. A wreck covered by 10.4m of water is situated at 0.3 mile to the SW of the same islet.

It is reported (1990) that many of the buoys in the Ava Lahi Passage are out of position and that many of the lights are weak and unreliable. Mainers are advised not to attempt passage after dark without local knowledge.

Mariners are cautioned to the presence of shoals just W of the pilot boarding area for Ava Lahi Passage. Shoals exist over a considerable area to the NE of Tongatapu.

1.

A 9.1m shoal, and a shoal with a depth of 12.8m, lie about 17.5 miles and 3.5 miles NNE, respectively, of Malinoa Light.

Dido Shoal (20°55'S., 175°00'W.), about 13 miles N of Mui Hopohoponga, has a least charted depth of 7.3m; it breaks in moderate weather.

Hyane Shoal, a small coral patch with a least depth of 7.3m, lies about 5 miles WSW of Dido Shoal. A similar shoal lies 1.5 miles W of Hyane Shoal.

Caution should be exercised when navigating in this area.

A submarine volcano, which is occasionally active, is located 17 miles NW of Niu Aunofo. A depth of 13.7m was obtained over the volcano in 1943, but due to volcanic activity that resumed in 1999, less water may now exist.

2.51 Hunga Ha'apai (20°33'S., 175°25'W.) and Hunga Tonga are two islands which lie about 31 miles N of the W extremity of Tongatapu.

Hunga Ha'apai rises to a height of 128m in its N part and 104m in the S. A ridge runs the entire length of the island, falling in high cliffs to the sea on the E side.

Hunga Tonga, about 1 mile NE of Hunga Ha'apai, has steep cliffs; above the cliffs the ground rises to a wooded ridge that runs the length of the island.

A reef that breaks lies 2 miles SE of Hunga Ha'apai. In this vicinity a submarine volcano was reported which last erupted in March 2009.

Tides—Currents.—When navigating in this part of the group, vessels should make allowance for the strong W current.

Fonua'ou (20°19'S., 175°25'W.) is of volcanic origin and at times smoke has been seen rising from it. The island has changed shape many times and has at times disappeared. Volcanic activity has been reported in 1993.

Shoals are reported to lie 33 miles W of Fonua'ou.

The islands in the S part of the Nomuka Group lie 38 miles NNE of the light on Malinoa. The group lies on an extensive bank, which has charted depths of 3.7 to 174m and many drying rocks.

Kelefesia (20°31'S., 174°44'W.), the farthest S of the group, is 37m high and wooded. Foul ground extends 4 miles SE of the island, and the rock 5 miles farther SE is marked by heavy breakers. There are other dangers E and NE which may best be seen on the chart.

Kefikana Rock, 4m high, white and conspicuous when the sun is shining on it, lies 3 miles WNW of Kelefesia.

Tonumea, an island 42m high and densely wooded, lies on a reef 2.5 miles NNW of Kelefesia. The sea breaks on some foul ground which lies 0.8 mile NNW of the island.

2.52 Nomuka Island (20°15'S., 174°48'W.), about 11 miles NNW of Tonumea, is the principal island of the group. It is triangular in shape, with each side about 2 miles in extent; it

encloses a saltwater lagoon. West of the lagoon there is an elevated ridge with a peak, 51m high, at the N end and a peak, 49m high, at the S end. A fringing reef encircles the island and extends 0.3 mile offshore in places, but there are breaks in the reef where boats can approach.

Nomuka Iki, about 1 mile S of Nomuka, is separated from it by a channel that has a least navigable width of 0.3 mile. The island rises to a height of 45m in the S part. The island is surrounded by a coral reef which extends 1.3 miles ESE from the S extremity, forming a dangerous point. There are reefs and shallows off the S and W sides of the island which break, but they have not been completely examined.

Muifuiva, a small islet, lies 0.5 mile NW of the N extremity of Nomuka Iki. Lua Vaila, with a depth of 3.7m, lies in the middle of the channel 0.8 mile E of Muifuiva. A light is shown from the islet.

Nomuka Harbor lies between Nomuka on the N and Nomuka Iki on the S; it is open NW, but is protected in other directions by these two islands and adjoining reefs.

Anchorage.—Anchorage may be taken, in 24m, coral sand, with the NW extremity of Nomuka Iki bearing 244°, 0.4 mile distant.

In the NW approach to the anchorage there are depths of 7.3m, 9.1m, and 8.2m, located 0.6 mile NE, 0.4 mile NNW, and 0.5 mile NNW, respectively, from the light on Muifuiva.

2.53 Mango Island (20°20'S., 174°43'W.), an island 5 miles SE of Nomuka, is fringed by a reef which extends 0.8 mile SE. There is a wooded hill at its NW and SE ends, each about 43m high. A village with a church is situated on the N coast of the island. Anchorage for small vessels may be taken, in 22m, sand and coral, with the tangents of Mango bearing 126° and 196°.

Mango Iki, about 1 mile W of Mango, is 21m high to the tops of the trees, and is fringed by a reef which breaks.

The passage between Mango Iki and Mango is bad, especially during S winds.

Nukufaiau (20°18'S., 174°42'W.), about 2 miles NNE of Mango, is encompassed by a reef which extends 0.2 mile offshore. A coral patch, with a depth of 6.4m, lies 2 miles WNW of the islet, and a patch, with a depth of 5.5m, lies 0.8 mile NNE of the islet.

Luafitu (20°20'S., 174°38'W.), a reef that covers 3.7m, is located 4.5 miles ESE of Mango. Rocks and shoal water are charted ENE and ESE of this danger.

Nukutula (20°15'S., 174°41'W.) is a wooded sand cay, 5.5m high, standing on a reef 2.5 miles N of Nukufaiau.

Fonoifua, an island about 3.5 miles ESE of Nukutula, is 28m high to the top of the trees on the S side, and rises to a cliff 20m high on the N side.

Tano'a, an islet about 0.8 mile S of Fonoifua, has a good boat harbor in the reef N of it.

2.54 The Otu Tolu Group is composed of four islands which stand on the same sunken reef about 15 miles ESE of Nomuka. They are low, wooded, and even-topped islands.

Fetokopunga (20°18'S., 174°32'W.), the farthest N of the group, lies 5 miles ESE of Fonoifua; it is 17m high and has no distinguishing feature. **Telekivavau** (20°19'S., 174°31'W.), 0.8 mile farther SSE, is 22m high. **Telekiha'apai** (20°21'S., 174°31'W.)(Lalona), the next islet, about 1.5 miles farther S, is 20m high, and **Telekitinga** (20°24'S., 174°32'W.), 2.3 miles farther S, is 16m high.

Tides—Currents.—The currents, especially in the vicinity of the reefs, are uncertain in strength and are variable in direction. After strong E winds they set strongly to the W causing rips and blind rollers in places.

Caution.—The area enclosed between the reefs S of Otu Tolu, Nomuka, and the islands to the S, is thickly studded with reefs and shoals, and it is unsuitable for navigation except under favorable conditions of light. The reefs are steep-to and not easily seen, even from the masthead. There are passages that can be used, but great caution should be exercised.

A shoal has been reported to lie about 27 miles E of Telekitinga in about position 20°22'S, 174°03'W.

2.55 Hakaufisi (20°09'S., 174°55'W.) is a reef lying about 7.5 miles NW of Nomuka; it is steep-to, dries in places, and the sea always breaks on it. A stranded wreck is charted on the reef.

The Ha'apai Group is composed of numerous coral islands lying NNE of the Nomuka Group, and separated from that group by a deep channel about 3 miles wide. The islands are scattered over an area 40 miles in length in a NNE-SSW direction, and 22 miles in width; for the most part they lie on an irregularly shaped bank with depths less than 200m. Many of the islands and reefs rise abruptly from deep water, with depths of more than 400m around them.

Most of the islands of the group present similar features; from a distance they appear low and flat-topped and on a nearer approach, a white sandy beach is seen encircling a densely-wooded island entirely surrounded by a reef.

The SE part of the group is faced on the E side by a barrier reef.

Anchorage.—The best anchorages of this group are off the W side of Lifuka. Elsewhere, anchorages are few, especially in the N part of the group.

2.56 The Lulunga Group (Kotu Group), a subsidiary of the main Ha'apai Group, comprises a cluster of small, low islands in the SW part of it.

On the S side of the Lulunga Group, the W extension of the barrier reef is broken up in patches. Some of the patches break heavily and others have blind rollers which break occasionally. The only pass through this part of the reef that a vessel should attempt is Ava Fonuaika, lying immediately W of Fonuaika Islet. Large vessels should use the passage between Tungua and Doyland Reef, as it is wider and the tidal current is not as strong.

Fonuaika Islet (20°07'S., 174°42'W.), the farthest S of the Lulunga Group, lies about 9 miles NNE of Nomuka. It is a small, wooded islet 20m high to the tops of the trees. It is fringed by a steep-to reef which breaks heavily. A line of detached reefs extend E from the islet to the S extremity of the barrier about 15 miles distant.

A detached reef, on which the sea breaks, lies 1.5 miles W of Fonuaika. Murray Patches consist of three detached shoals 3.3 miles WSW of the islet; the NW patch has depths of less than 1.8m.

Tokulu, a sand cay 1.5m high, about 5 miles W of Fonuaika,

lies on a detached reef whose S side is steep-to. It is the farthest SW of the Lulunga Group. A light is shown from the cay.

Wickam Reef lies 1.5 miles WNW of Fonuaika. A shoal, with a depth of less than 1.8m, lies close SE of the reef. Ava Fonuaika passes to the E of this shoal.

Ward Rock is a coral patch, with a depth of less than 1.8m, lying nearly 2 miles N of Fonuaika; it is steep-to.

2.57 O'ua Island (20°02'S., 174°41'W.), 4.3 miles N of Fonuaika, is densely wooded and about 43m high to the tops of the trees. It is surrounded by an extensive reef. A reef, which dries 1.5m, extends about 1 mile WSW from the island; a sand cay and two islets are located on this extension. Detached reefs lie about 1 mile W of these islets, and Nukulai Island is separated from these reefs by a deep channel 0.4 mile wide. A light is situated on Nukulai Island.

Lekeleka Islet (20°04'S., 174°37'W.) lies close within the E extremity of an extensive reef, 4 miles ESE of O'ua Island. Between Lekeleka Islet and the barrier reef E and SE there are a number of reefs, the positions of which may best be seen on the chart. A reef 3 miles N of Lekeleka Islet is awash. There are several reefs charted in this area.

A reef, which breaks, is located 3.3 miles NNE of O'ua Island; it can always be distinguished.

Tungua Islet (20°01'S., 175°46'W.), 4 miles WNW of O'ua Island, lies on the N end of a reef which extends 1.3 miles SE from it. A small, rocky islet, marked by a light, lies about 1 mile NW of Tungua Islet.

Doyland Reef, awash, lies about midway between the NW end of Wickham Reef and the SE extremity of the reef projecting SE from Tungua Islet. The channel N of Doyland Reef is about 0.5 mile wide. There is a reef, awash, about 0.6 mile E of Doyland Reef.

Kito is a small, wooded islet lying 1.3 miles NW of Tungua Islet. A small reef, awash, lies 1.5 miles E of Kito. Other dangers are charted ENE and SE of Kito, and a depth of 9.1m is charted 1.8 miles W of the islet.

Foua (20°00'S., 174°44'W.) is a small, rocky islet 9m high located just over 1 mile NE of Tungua Islet; a light is shown on the islet.

2.58 Kotu Island (19°57'S., 174°48'W.), the farthest W of Lulunga Group, lies 4 miles NNW of Tungua Islet. The island is densely wooded and is 37m high to the tops of the trees. The S end of the island is faced by reddish cliffs, 15m high, but the N end is low with a sandy shore.

Kotu Island is located on a reef which extends 2 miles SE of the island. An extensive reef and foul ground extends nearly 3.3 miles ENE from the island; between the E end of this reef and the W side of the reef fronting Ha'afeva Island, there is a deep channel about 0.6 mile wide.

A reef, the westernmost danger in the group, lies 1 mile W of Kotu Island; it is about 3 miles long in a N-S direction.

Putuputua, the farthest N of the Lulunga Group, a sand cay about 3.7m high, stands on a reef 3 miles NE of Kotu Island.

Ha'afeva Island (19°57'S., 174°43'W.), 4.5 miles E of Kotu Island, is the principal island of the group. It is fringed by a narrow reef, but on the SE side where the village is, a boat channel leads to the beach. A barrier reef fronts the NW, N, and NE sides. The SE portion of this reef is from 0.5 to 1.5 miles from the island, the intervening space forming a small bay in which there are depths of 38 to 51m. An islet is located on the reef, 0.8 mile ESE of the E extremity of Ha'afeva Island, and a wooded islet lies 0.8 mile SE of the S extremity. A rock, 3.7m high, lies in the approach to the anchorage, 0.3 mile NE of the wooded islet.

Vessels with local knowledge may anchor off the village, in 49m, sand and coral, with the S tangent of Ha'afeva Island bearing 269° and the NE tangent bearing 356°.

2.59 Limu Islet (20°01'S., 174°27'W.), a small, wooded cay with trees 12m high, lies on the barrier reef in the SE part of the Ha'apai Group, 9 miles ENE of Lekeleka Islet.

Ava Matamatavika is a channel through the barrier reef, 3 miles NW of Limu Islet. It is about 0.6 mile wide and has depths of 48 to 60m in the center.

There are three narrow, wooded islets from 12 to 15m high on the barrier reef on the N side of Ava Matamatavika. **Uanukuhihifu** (19°58'S., 174°30'W.) is the farthest SW of these three, and **Tofonga** (19°57'S., 174°28'W.) is the farthest NE.

A shoal, which consists of a narrow ridge with a least depth of 1.8m, lies about 2 miles SW of Uanukuhihifu. This shoal is formed by a bank 2.5 miles long, extending in a WNW and opposite direction. A small reef, awash, lies about midway between this shoal and the barrier reef.

Ladd Reef, a small coral patch with depths of 0.6 to 0.9m, lies 2 miles NNW of Uanukuhihifu; a similar patch exists 0.5 mile SE of Ladd Reef.

A bank of irregular soundings, all over 37m, lies NW of Ladd Reef. The bank is marked by tide rips and overfalls during the strength of the tide, giving the appearance of shoal water.

There is an anchorage, in 33m, sand and coral, with the W extremity of Uanukuhihifu bearing 212°, distant 1.1 miles, and the N extremity of Tofonga bearing 094°.

Tides—Currents.—The tidal currents set through with a velocity of 4 to 5 knots flood to the E, and about 3 knots ebb to the W. During the E current with an E wind, there are heavy tide rips and overfalls dangerous to boats, but by keeping close to the reef on the S side they may be avoided. It is not advisable for vessels to use the passage except at the time of slack water.

2.60 Uiha Island (19°54'S., 174°24'W.), 3.5 miles NE of Tofonga, is 2.5 miles long N-S.

Tatafa Islet, 27m high, lies off the NW extremity of Uiha Island.

Ava Auhangamea, the channel separating Tatafa Islet on the S from Uoleva on the N, is 0.4 mile wide between the reefs on either side. Two shoals, with depths of 5.5 to 8.2m, lie nearly in the middle of the channel.

Tides—Currents.—The tidal currents in Ava Auhangamea run at the rate of 3 to 4 knots on the E current, which does not begin to make until 2 or 3 hours before HW. When there is an E wind, heavy tide rips and overfalls extend across the passage, making it dangerous for boats.

Uoleva (19°51'S., 174°24'W.) is covered with trees which attain a height of 30m. It is the S island of a chain of islands, connected by reef, extending in a NNE direction for 14.5

miles. Off the NW coast of the island there are patches of reef, with foul ground between them and the shore, at a distance of 0.8 mile.

Hakau Faha, 2 miles NW of Uoleva, is a reef awash, which always breaks. Nearly 1 mile WNW of Hakau Faha there are two patches having depths of 4.6 and 5.5m. Many coral heads have been reported to lie E of Hakau Faha.

2.61 Lifuka Island (19°48'S., 174°21'W.), 0.7 mile NE of Uoleva, is the principal and farthest SW of the three largest islands of the group.

The seaward coast toward the N and S ends of the island is cliffy, but the remainder is low and covered with trees.

On the W side of Lifuka Island, there are numerous reefs and shoals within the 37m line. Beacons have been erected on some of the reefs, some of which may have been destroyed.

Depths—Limitations.—The reefs in the vicinity of the anchorages and in the approaches are so numerous that only those bordering the entrance channels are described.

A reef, which has a sandbar that dries 1.2m, lies just over 2 miles NW of the N end of Lifuka Island. Shoal water extends nearly 0.1 mile E of the reef, and shoal patches extend 0.5 mile W of the reef.

The shore reef extends 1.3 miles SW from the N extremity of Lifuka Island; the edge is usually indicated by breakers.

Mariner Patch, a detached coral head with a depth of 4.6m, lies 0.1 mile off the W part of the above reef and is marked by a buoy.

Lua Sii, marked by a buoy, is a coral patch with a depth of 2.1m WNW of Mariner Patch. It is not always seen in passing. There are two rocky patches W of Lua Sii which sometimes break.

Lua Matavai, with a depth of 2.7m, lies about 0.4 mile SSW of Mariner Patch and is marked by a buoy.

Hakau Mateialona, which dries, lies 0.6 mile WNW of Lua Matavai. Sunken reefs extend 0.1 mile SE from it and a patch, with a depth of 5m, lies 0.3 mile NW of it.

Navigators should be aware that the buoys referred to above may not be in place. Therefore, be prepared to navigate visually, bearing in mind that the reefs in this area are difficult to make out at high water.

2.62 Hakau Tuaniu (19°47'S., 174°23'W.), which dries 0.3m, lies 0.5 mile SW of Hakau Mateialona. A coral head, with a depth of 4.1m, lies 0.1 mile S of the reef. Lua Tula, with a depth of less than 1.8m, lies 0.4 mile S of Hakau Tuaniu. Lee Patch, with a charted depth of 3.7m, lies 1 mile SW of Lua Tula.

Lua Vika, with a depth of less than 1.8m, lies about 0.6 mile ESE of Hakau Tuaniu.

Hakau Fusipala, which dries, lies about 0.3 mile SSW of Lua Matavai.

Buchanan Reef (19°47'S., 174°22'W.) is a small reef, awash, about 0.4 mile S of Hakau Fusipala. To the N and E of it, foul ground and reefs too numerous to mention form part of the inner line of reefs fronting the anchorage off Pangai. This line of reefs is prolonged to the S by two large reefs, with a pass between them, for a distance of 1.3 miles.

Hakau Sela, a small drying reef, lies 0.5 mile SE of Buchanan Reef. In 1991, it was reported that a dangerous wreck, with a depth of 0.6m, lies 0.1 mile N of Hakau Sela. Rachel Patch, with a depth of 3.2m, lies 0.15 mile E of Hakau Sela. Hakau Vonu, about 0.5 mile S of Rachel Patch and about 0.3 mile offshore, is awash.

David Patch, with a charted depth of 3.2m, lies 0.15 mile N of Hakau Sela; a patch, with a depth of 4.6m, lies 0.2 mile SW of David Patch.

Pilotage.—Local pilots are not available, but may be obtained at Nuku'alofa by prior arrangement.

Anchorage.—Anchorages are available off the W side of Lifuka, and are described below, along with the channels leading to them. The reefs and channels are marked by lights, beacons, and buoys, but such aids should not be relied upon. Additionally, there is a lack of landmarks in the area to assist in fixing a vessel's position. It may be necessary to navigate strictly by eye from aloft. On a calm day at HW the reefs are frequently impossible to see. Vessels are urged to exercise the appropriate caution.

Faka'amunei Anchorage offers a convenient anchorage outside the reefs lying off Pangai and is used by vessels arriving too late to transit the channel S of the anchorage in safety. Deep-draft anchorage is available among the reefs, but only vessels with a draft of 5m or less may reach the inner anchorages.

Faka'amunei Anchorage lies off the NW side of Lifuka Island, but is not safe in W winds. Anchor, in depths of 29m, sand, with the N end of the island bearing 090° and about 1.1 miles distant. A W set has been experienced in the vicinity of Faka'amumei Anchorage.

Within the reefs, the only safe anchorage for deep-draft vessels is available in the vicinity of Lua Vika. Vessels are afforded anchorage, in a depth of 25m, sand and coral, about 0.4 mile S of the reef or, in a depth of 20m, 0.3 mile WSW of the reef.

Anchorage for vessels off Pangai is available, in a depth of 8m, with a conspicuous flagstaff bearing 124°, 0.5 mile distant. Caution is advised as this anchorage affords little shelter from winds or bad weather from the W.

Directions.—To approach the anchorages near Lua Vika from the N, sail as safely as navigation permits to the general vicinity of Faka'amunei Anchorage. After fixing the vessel's position, steer to pass about 90m W of the buoy marking Mariner Patch. After passing between Mariner Patch and Lua Sii, steer to pass W of Lua Matavai, then steer a mid-channel course between Hakau Fusipala and Lua Vika, then anchor as desired.

To reach the deep-draft anchorages from the W, steer an E course towards Lua Vika, passing N of Lua Tula and S of the dangers lying about 0.3 mile NNE of it.

The channels from the deep-draft anchorage to the inner anchorage require local knowledge.

2.63 Pangai (19°48'S., 174°21'W.) (World Port Index No. 55600), the principal town on Lifuka Island, is situated near the middle of the W shore of the island. The Governor resides here. Several public buildings, churches, and missions are situated in the town. A pier, 55m long with a least depth of 4.8m at its head, extends N from the town.

Foa Island (19°45'S., 174°18'W.) lies on the barrier reef with its SW extremity 0.4 mile NE of Lifuka Island. It is a low, densely wooded island about 4 miles long. The SE side is bordered by low cliffs, and the NW coast consists of sandy beaches and rocky points. The coastal reef on the latter side is broken

and there are several off-lying patches.

Nukunamu is a low, wooded islet, 15.2m high, lying close NE of the N extremity of Foa Island.

Ha'ano Island (19°40'S., 174°17'W.), the farthest N of the group, lies 0.8 mile N of Nukunamu. It is covered with trees which have an elevation of 30m.

A barrier reef, which breaks heavily, follows the trend of the E coastline of the chain of islands N from Uoleva, separated from them by a narrow channel; from the N end of Ha'ano Island, it extends 0.6 mile farther N. On the W side of the islands it becomes a fringing reef with a broken and irregular edge for the greater part of its length.

On approaching from the NW, Ha'ano Island, Foa Island, and Lifuka Island appear as one low line of land broken by gaps. If making for the anchorages off Lifuka Island, steer for the second gap from the N.

Fotuha'a Island (19°48'S., 174°44'W.), 9 miles NNE of Kotu, on the W side of the group, is about 61m high to the tops of the trees. Cliffs, 24 to 27m high, form the coastline throughout; landing is only possible in good weather.

Fatumanongi, a small, flat rock 3m high, lies 2.3 miles N of Fotuha'a. A spit, with a depth of 5.5m, extends 0.2 mile N from the rock.

Tofua (19°45'S., 175°04'W.), 16.5 miles NW of Kotu, is an active volcano. The island appears flat-topped and rises to a height of 506m, rising steeply from the coast except on the NW side, where the slope is more gradual.

Kao (19°40'S., 175°02'W.), a dormant island volcano, lies 2 miles NNE of Tofua and is separated from it by a deep, clear channel. It rises in the center to a peak, 1,030m high, which appears as an almost perfect cone from every direction.

The coast of the island is rocky and cliffy in many places and is steep-to all around.

Caution.—Volcanic activity has been reported (1993) on Tofua.

A rock, 0.9m high, lies 1.3 miles N of Kao. Depths of 26 to 27m lie 0.3 mile NW of the rock.

2.64 **Niniva** (19°46'S., 174°38'W.), an islet, 26m high, lies close within the SW extremity of an extensive coral reef enclosing a lagoon, about 5.5 miles NE of Fotuha'a Island.

Hakau Iki, a detached coral reef, awash, lies 0.6 mile WNW of the W extremity of Hakau Homaulu, the reef on which Niniva is located.

Hakau Lahi is an extensive reef enclosing a lagoon, separated from the NE side of Hakau Homaulu by a deep channel about 1 mile wide. Meama, an islet 32m high, is located close within the NW extremity of the reef, and a wooded islet, 18.3m high, lies close within the SE extremity. Detached shoals, with depths of 2.7 to 5.5m, lie 0.5 to 1 mile S of the S extremity of Hakau Lahi.

Balfour Patch (19°42'S., 174°34'W.), with a least depth of 10.1m, coral, and steep-to, lies 3.3 miles N of Meama.

Smith Shoal, with a least depth of 3.7m, and steep-to, lies 6 miles ESE of Meama.

Hakau Eihiho is a small reef lying 2 miles SSE of Niniva. Two detached reefs, with depths of 5.5m and 4.6m, lie 0.4 mile and 0.7 mile S, respectively, of the reef.

2.65 **Lofanga Island** (19°50'S., 174°33'W.), a low, flat-topped, and wooded island bordered by cliffs, lies 2.5 miles SE of Hakau Eihiho. The principal village is on its S side. A reef projects 0.3 mile to the W of the island, and a small detached coral head, with a depth of 3.7m, lies 0.5 mile off the W end of the island. Another small, coral patch, with a depth of 2.7m, lies 0.4 mile N of the island.

The channel between Lofanga Island and Hakau'ata, which lies in the middle of a reef 1.5 miles SE, is obstructed by a cluster of rocks, awash, nearly in the center of the passage.

Anchorage.—Anchorage can be taken by small vessels, in 20m, sand and coral, with the right tangent of the island bearing 062° and the left tangent bearing 277°.

Hakau Fakaosi Toume is a reef on a detached bank which dries 1.2m, 4.8 miles ENE of Smith Shoal and about 2.3 miles WNW of the W extremity of Foa.

Esk Shoals, 3.5 miles NE of Smith Shoals, consists of several coral patches with depths of 3 to 5.5m. Crawshaw Shoals, with depths of 4.6m and 5.5m, lie on a coral bank which is steep-to, 4 miles E of Esk Shoals. Lualafalafa, with depths of 7.3m and 9.1m, coral and steep-to, lies 2.5 miles N of Crawshaw Shoals.

Luahoko, 3.5 miles W of Lualafalafa, is a small islet covered with trees 14m high. It is surrounded by a reef which extends 0.3 mile from the N side.

Ofolanga Island (19°36'S., 174°27'W.), the N island of the Ha'apai Group, lies 9 miles NW of Ha'ano Island. It is low and covered with trees which are 24 to 27m above the sea. The island is surrounded by a barrier reef which is 0.8 to 1 mile off all sides except the S, where it nearly joins the fringing reef. The edge of the barrier reef is steep-to and free of off-lying dangers, except off the SE corner where a shoal patch, with a depth of 7.3m, lies 0.12 mile from the reef.

Anchorage.—Anchorage may be taken near an indentation in the barrier reef, in 24m, sand, with SW extremity of the island bearing 001° and the SE extremity bearing 070°; the reef will be 0.2 mile distant.

2.66 Mo'unga'one Island lies 2.3 miles SW of Ofolanga Island, with a deep channel between them. The island is flat-topped, the trees reaching a height of 30m; it has a rocky, cliffy coastline with no fringing reef except on its SE, where there is a sandy beach fringed by a reef which extends about 0.1 mile from the shore.

Bethune Bank, with a least charted depth of 12.8m, lies 5 miles NE of Ha'ano Island. There are three extensive banks within 5 miles N of Bethune Bank, which may best be seen on the chart.

Falcon Bank (19°19'S., 174°07'W.), 22 miles NNE of Ha'ano Island, has a depth of 12.8m; less water may exist on it.

Disney Reef, 2 miles NE of Falcon Bank, has a depth of 4.6m; it breaks when there is a swell. Both Falcon Bank and Disney Reef are steep-to.

Akkumanes Bank (19°14'S., 174°06'W.) is separated from the bank upon which Disney Reef stands by a deep channel 1.5 miles wide. It extends 14 miles in a N direction. The depths along the SE edge of the reef are 22 to 26m. On the E, at flood current, there are tide rips and overfalls on the shallower part of the bank.

2.67 **Hakaufusi** (19°01'S., 174°01'W.) is a sand cay, 1.5m

high, encircled by a reef located 17 miles N of Disney Reef. There is foul ground, on which the sea usually breaks, at a distance of over 0.5 mile off the N and E sides.

Campion Breakers, 3 miles SW of Hakaufusi, always breaks; shoal water extends 2 miles W of the breakers.

Tides—Currents.—Between Ha'apai and Vava'u, observations show during Southeast Trades that at springs the E current begins to make about 1 hour 30 minutes before HW by the shore and runs until about 4 hours after HW. The direction varies from ESE to NNE attaining its maximum velocity of 1.3 to 1.8 knots when setting NE, gradually changing its direction N. The W current begins to make 4 to 5 hours after HW, its direction ranging from NW to SW with a rate of 1.5 to 2 knots.

The tidal currents are liable to considerable variation both in velocity and direction, and also in the time for turning, and the foregoing can only be taken as a general guide. Sometimes the E current does not begin until nearly HW, but it seldom runs for a period longer than 4 hours after HW.

2.68 Metis Shoal (19°11'S., 174°52'W.), about 42 miles WNW of Falcon Bank, is a small shoal with a depth of about 3.6m, which occasionally breaks. Numerous reports of volcanic activity has been reported in the vicinity of this shoal. An islet, formed by volcanic activity, has been reported (1995) in the vicinity of the shoal. This island is reported to be 240m in diameter and up to 80m high (1995).

Home Reef, which breaks, lies about 13 miles NNE of Metis Shoal; it has a depth of about 1.8m. Volcanic activity has been reported about 3.3 miles SE of Home Reef. Home Reef itself was last reported active in 2006.

Late Island (18°48'S., 174°39'W.), located about 12 miles NNE of Home Reef, is about 518m high and about 3 miles in diameter. The hills slope gradually from the sea to the symmetrically shaped peak. It has been reported to be visible 50 miles in clear weather. Reported active in 1971, the first eruption since 1856.

There are no off-lying dangers, and the coast, which is cliffy, appears to be steep-to within a very short distance.

There is a shelf running off the N side of the island, where a vessel may anchor, in 27m, sand and stone, with the peak bearing 173° about 0.4 mile from the shore.

A reef was reported about 42 miles W of Late Island in position 18°46'S, 175°24'W; it has shoal water on its N and NE sides.

Vava'u, the largest island of the Vava'u Group, is located 60 miles NNE of Ha'ano. The group consists of the large island and several smaller islets encompassing an area about 18 miles long in a NNE-SSW direction. The N side of Vava'u is high and steep-to, but S of the island there are many reefs and low islets. The depths are considerable throughout the group; the anchorages are few and indifferent.

When approaching the group from the SW, Fatumanga, about 10 miles SW of Vava'u, will be seen in the foreground and about 5 miles farther NNE, Fofoa, Kalau and Hunga, appearing as one island will be seen, terminating to the W in a bluff headland with a second bluff showing a short distance E. Vava'u will be seen, also terminating to the W in a bluff headland. In the SW part of Vava'u, the defined table-topped hill Mo'ungalafa shows higher than the more distant land behind. Farther to the E the land becomes fainter and lower as it recedes in the distance.

Lalalolomei Bank, with a least charted depth of 12.8m, lies 5 miles NNW of Hakaufusi.

Maninita (18°51'S., 174°00'W.), the farthest SE of the islands, is 17m high and lies 6 miles NNE of Lalalolomei Bank. Taula, a similar islet, lies 1 mile NW of it. Lua Loli, a coral reef, lies about 0.3 mile N of Taula, and extends about 0.5 mile in a NW direction.

2.69 Fua'amotu Island (18°48'S., 174°01'W.), a wooded island, 41m high, surrounded by a reef, lies 3.8 miles NNW of Maninita. Lua Ui Vaha is a small, wooded islet surrounded by a reef located 1.8 miles WSW of Fua'amotu. Kaihifahifa, a small islet 15m high, is located in the center of a reef 1 mile SSE of Fua'amotu.

Foul ground with reefs which break and two small islets, Luatafito and Fonuafuu, located on it, extends 5 miles NNE from Maninita.

Lua Hiapo and Lua a Fulehu are two small wooded islets lying 4.3 miles and 5.3 miles WNW, respectively, of Maninita. Each is encircled by a reef. Unmarked shoals and reefs lie in the vicinity of these two islets.

Richards Patches lie about 2.3 miles SSW of Lua a Fulehu; they have a least charted depth of 9.1m. Finau Patches are two coral shoals, with a depth of 9.1m, lying about 2 miles NNW of Richards Patches.

Fatumanga (18°47'S., 174°10'W.), a barren flat-topped island, 26m high, is located 3.3 miles NW of Finau Patches. A shoal extends 0.5 mile S of the islet; a rock on the shoal breaks. This islet may be passed on either side, with due consideration to the shoal.

Luo Atofuaa, a coral patch with a depth of 3.7m, which nearly always breaks, lies 2.3 miles E of Fatumanga.

Fonua'one'one, 23m high, lies 0.8 mile E of Luo Atofuaa.

Fotuaikamoana, a coral patch with a depth of 12.8m, and Fotuaikamamaha, a similar patch with a depth of 9.1m, lie 1.3 miles and 2 miles NNE, respectively, of Fatumanga.

Mu'omu'a, an islet 41m high, is located 1.5 miles E of Fotuaikamamaha. An islet, 18m high, is located 0.4 mile S of Mu'omu'a.

Ovaka (18°45'S., 174°06'W.), an island that rises to a height of 58m in its W extremity, lies about 0.7 mile NNE of Mu'omu'a. A reef, which is not passable, extends 3.5 miles E. Two small islets lie on this reef, and Euakafa, 82m high, is the highest and most conspicuous islet of the S group. It lies on the E extremity of the reef.

Lua Ui, a small islet surrounded by a fringing reef, lies 1.3 miles SSE of Euakafa. An isolated coral reef lies about 1 mile WSW of Lua Ui.

Vaka'eitu (18°43'S., 174°06'W.) is a wooded, 61m high, L-shaped island lying 0.8 mile N of Ovaka. The island extends 0.8 mile N from its S extremity and about 1 mile E. Langitau, a small islet, lies on a reef that joins the SE extremity of Vaka'eitu.

Anchorage.—Anchorage may be taken N of Ovaka, in 53m, sand and coral, with the E extremity of Ovaka bearing 156° and the NW extremity bearing 249°, 0.3 mile offshore.

Nuapapu, lying close N of Vaka'eitu, is connected to it by a reef. The island extends 2.5 miles NE and then 1.8 miles SSE; at no place is it more than 0.3 mile wide.

Nuapapu, with Vaka'eitu, forms the E shore of Ava Pulepulekai.

Kitu, a narrow flat-topped wooded islet with precipitous sides, lies close off N extremity of Nuapapu.

Kapa, a wooded islet which rises to a height of 105m, lies 1.5 miles E of Nuapapu. There are several high flat-topped islands with precipitous sides lying between these two islands.

2.70 Foelifuka (18°43'S., 174°09'W.) is an islet, 38m high, lying 1.8 miles W of the W extremity of Vaka'eitu. Close E of Foelifuka is Foefoa, a wooded islet, with a light shown on it. The area N to the two islands Fofoa and Hunga, 0.5 mile distant, is encumbered with reefs and foul ground. The narrow openings to the basin that separate Hunga and Fofoa are blocked by a reef resulting in the two island being practically one.

Tefitomaka, a rock 1.2m high, stands on a shoal area 0.8 mile SSW of Foelifuka. The soundings between the rock and islet are irregular, and vessels should not pass between them.

Fofoa, 0.5 mile N of Foelifuka, terminates at its W extremity in a prominent bluff, 63m high. Kalau, which also terminates at its S end in a high bluff, almost joins the N extremity of Fofoa.

Hunga, separated from Kalau on its SW extremity by a narrow reef-filled pass and the island's S extremity, lies close E of the E extremity of Fofoa.

Fofoa, Hunga, and the islets S form the W shore of Ava Pulepulekai.

The E extremity of Hunga is separated from the SW extremity of Vava'u by Faihava, a deep channel about 1.5 miles wide.

2.71 Vava'u (18°37'S., 173°59'W.) is nearly 9.5 miles long E and W, about 6 miles wide; its S shoreline is irregular in shape. The NW, N, and NE coasts of the island are bordered by high cliffs covered with vegetation; in some places there are white streaks. There are numerous islands and shoals off the S side of the island.

From **Nukumalolo** (18°38'S., 173°55'W.), the SE extremity of the island, a chain of islands extends 4 miles S. They are connected to the main island and to each other by reef; their E sides are cliffy and steep-to. Another chain of islands parallels this group 1.5 miles W.

From Nukumalolo to Maninita Islet, about 14 miles, the E side of the group is bound by a succession of reefs. Shallow depths, which break heavily if there is any swell, exist between the patches of reef along the whole of this distance. There is no channel for a vessel to navigate.

The whole area E of Kapa is unapproachable, the area being surrounded by reefs with no navigable channel.

Ava Pulepulekai, the channel between Hunga and Nuapapu, is deep and clear of dangers. The shore on both sides of the channel is deep and steep-to. This channel is the approach to Neiafu from the S and W.

Faihava is the NW channel of approach to Neiafu; it is deep and clear of dangers.

Luafatu, 34m high, lies about 1 mile W of Fata, the SW extremity of Vava'u.

Utungake (18°40'S., 174°01'W.), 1.8 miles E of Fata, is an island that rises to 88m in its S part. This island lies on the SE side of the approach channel to Neiafu. It is connected to Kapa by a reef, which extends in a SW direction from its S extremity. Mala, a small islet 41m high, lies on the reef about midway between the two islands.

Anchorage.—Anchorage may be taken in the bight formed between Utungake, Kapa, and the reef, in 54m, coral, with the SW extremity of Mala bearing 141° and the W extremity of Utungake bearing 016°.

Teleki, a point on the N side of the channel 0.5 mile N of Utungake, rises to a height of 55m.

Talau, a promontory 1 mile ENE of Teleki, rises to a conspicuous flat-topped summit, 131m high.

Pangaimotu lies with its N extremity 0.4 mile SE of Talau. A shoal spit, with a depth of 5.5m at its extremity, extends 0.15 mile NE from the N extremity of the island. Galloway Rock, about 0.2 mile NW of the N extremity of Pangaimotu, with a depth of 4.6m, lies on a rocky ridge which stretches across the channel.

2.72 Neiafu (18°39'S., 173°59'W.) (World Port Index No. 55610) is situated about 0.8 mile E of Talau on Vava'u. The Governor of the group resides here; the Government offices are close to the wharf.

Depths—Limitations.—The Halaevalu Wharf, which is 60m long, has a depth of 7m on its W side and 9.1m on its E side; an extension has been completed which can accommodate vessels with a maximum draft of 7.9m.

A small boat jetty lies just SE of the wharf with the Bounty Bar at its root and a ferry ramp lies just NW of the wharf.

Pilotage.—Pilotage is not compulsory. Vessels are not permitted to enter at night. The pilot will board inbound vessels in Faiahiva Channel. Arrangements are made through the harbormaster at Nuku'alofa.

Anchorage.—Anchorage may be taken in Neiafu Harbor, in 33m, sand and coral, with the Church bearing 100° and the W end of the wharf bearing 021°.

A vessel has reported anchoring 0.4 mile N of Lotuma, in a depth of 49m, over a bottom of sand and coral.

Caution.—It was reported (2011) that currents exceeding 6 knots have been experienced in Faihava Passage.

2.73 Kilikili, a point on Vava'u about 0.2 mile NNW of Pangaimotu, shows two beacons in range 065.5°, which lead to the harbor entrance S of Galloway Rock. There is a least depth of 9.6m on the range line. Another set of range beacons, in alignment astern bearing 291°, leads through a segment of the harbor channel only 90m wide. A third set of range beacons, in alignment bearing 104°, leads to the wharf. The rear beacon of this last pier has been reported to be hard to distinguish from a church standing about 0.2 mile SE of the wharf. A light is shown from the end of the wharf.

Vessels departing the harbor should do so early in the morning, as the beacons shown from Kilikili, which mark the critical part of the channel, would be astern and obscured by the sun at other times.

Toku Island (18°09'S., 174°11'W.), 27 miles NNW of Vava'u, is flat-topped and wooded. It is encircled by a fringing reef which projects 0.3 mile from it in a N direction. A rock, awash, which breaks heavily, lies 11.4 miles WSW of the island. The Tongan Government has prohibited the settlement of the island, as the volcano is liable to eruption.

Fonualei (18°01'S., 174°19'W.), 11 miles NW of Toku, rises

to a sharp defined summit 195m high which falls abruptly to the sea on the S side.

There is a narrow fringing reef on the NE, S, and W sides. Off the NW side of the island it has been reported that a shelf with depths of 37m extends about 0.3 mile from shore. There are no dangers charted outside the fringing reef.

Caution.—Volcanic actively was reported (2001) 25 miles NW of the Vava'u Group, centered on position 18°19.1'S, 174°21.1'W.

2.74 Niua Fo'ou (15°36'S., 175°38'W.), about 200 miles NNW of Vava'u, is a Tongan possession. This volcanic island is 260m high at its E end. There appears to be no safe anchorage for large vessels here; however, small vessels may anchor, in 12 to 18m, off the village on the W side, 0.1 mile from shore, with the remains of the church bearing 124°.

Niuatoputapu (16°00'S., 173°47'W.), 107 miles ESE of Niuafo'ou, is part of the Kingdom of Tonga. There is a ridge of hills near the center of the island, 107m high. The principal village, Hihifo, is situated on the NW side of the island. The Government Agent or Chief Magistrate lives here.

A barrier reef enclosing a lagoon full of shallow patches lies 0.7 mile off the NW side of Niuatoputapu. The other sides of the island are fringed by a narrow steep-to reef. A dangerous reef which breaks heavily, and with depths of less than 1.8m, lies about 2 miles NW of the island, and a dangerous coral reef extends about 1 mile from the SW extremity of the island.

An islet, 6m high, stands on the seaward edge of the barrier reef off the NW side of Niuatoputapu, and a wooded islet, 21m high, lies close to the W side of the island off Hihifo.

When approaching from the SE, vessels should give the island a berth of at least 1 mile to avoid the shoals extending from it.

Anchorage.—Anchorage may be taken, in 18m, 0.5 mile NW of the islet, 6m high, off the NW side of Niuatoputapu.

Caution.—Durham Shoal (16°05'S., 173°50'W.), with 8m of water over it, lies about 9 miles SSW of Niuatoputapu.

It has been reported (1994) that Niuatoputapu lies 2 miles W of its charted position.

Tafahi (15°51'S., 173°44'W.), 7 miles NNE of Niuatoputapu, a possession of Tonga, is a conical-shaped wooded islet, rising to a height of 610m. The island is reported to give a good radar return up to 24 miles.

Caution.—It has been reported (1991) that Tafahi lies 2 miles W of its charted position.

Curacoa Reef (15°30'S., 173°37'W.), 24 miles NNE of Tafahi, has been reported to consist of two parts about 90m apart lying in a NW-SE direction. The sea breaks heavily in the vicinity of the reef.

Curacoa Shoal, with a depth of 15.3m, lies 11 miles SSE of Curacoa Reef.

Caution.—Volcanic activity was reported in an area 5 miles SSW of Curacoa Reef.

2.75 Niue Island (19°02'S., 169°52'W.), about 230 miles E of Vava'u of the Tonga Islands, is about 12 miles long N-S and 10 miles wide. Its thickly-wooded hills rise to a height of 73m. The island is self governed.

A steep fringing reef surrounds the island, and there are no charted off-lying dangers.

Winds—Weather.—The prevailing wind is from the ESE. Winds of high velocity occur during the summer months, but seldom result in severe typhoons.

December to March is the wettest season and the hottest, although the rainfall is generally distributed throughout the year.

Regulations.—Vessels coming to Niue from any area infected with rhinoceros beetles must remain at least 1 mile offshore from 15 minutes before sunset until 15 minutes after sunrise.

2.76 Alofi (19°02'S., 169°56'W.) (World Port Index No. 55695) is situated at the head of Alofi Bay, on the W coast of Niue. It is one of the five principal villages on the island. There are lights, in line bearing 123°, which lead to the anchorage in Alofi Bay; the cargo is worked here.

Anchorage.—There is good anchorage in the bay, in a depth of 55m, coral, about 0.2 mile from the fringing reef, with a lighted beacon bearing 123°, and Alo-fi North beacon on the N side bearing 046°. It has been reported that local vessels up to 1,700 grt moor on the range line, bow to seaward, and stern lines to the shore. This anchorage is not tenable in strong W winds.

Antiope Reef (18°15'S., 168°24'W.) is a circular plateau approximately 400m in diameter. A depth of 9.5m lies over the reef. It has been reported that the reef breaks.

Harans Reef (21°33'S., 168°55'W.), discovered and charted in 1842, breaks furiously.

A report of a reef (1965), the position of which is doubtful, lies in position 21°43'S, 167°45'W.

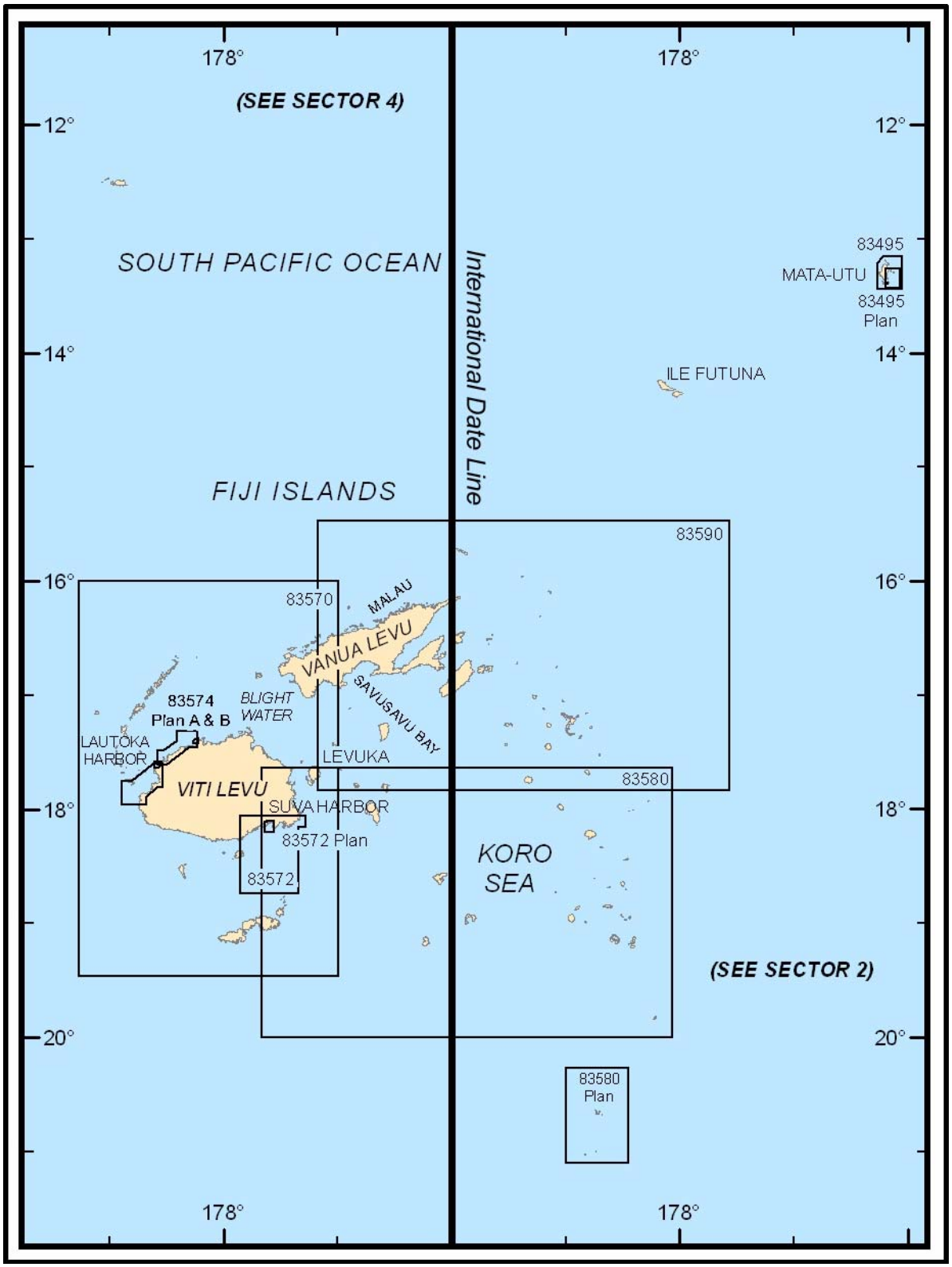
Beveridge Reef (20°00'S., 167°48'W.) encloses a lagoon; the reef is awash at LW and breaks continually.

A pass into the lagoon, from the SW side, is about 0.2 mile wide; over a width of 90m it carries a depth of 5m. There are several coral heads in the passage, and it was reported that it would be unwise for vessels with a draft of over 3.7m to use it.

Anchorage.—A vessel has reported anchoring, in a depth of 3m, on the E and S sides of the outer lagoon, where the water was light green in color. The bottom was sand, holding ground reported as excellent. The anchorage was uncomfortable near HW with strong winds.

Caution.—A stranded wreck lies at the SE end of the barrier reef.

Antiope reef is reported (1984) to lie 1 mile SW of its charted position. Beveridge reef has been reported to lie 4 miles SW and also reported to lie 5 miles E of its charted position. The reef has also been reported (1993) to lie 3 miles NE of its charted position.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **3** — CHART INFORMATION

SECTOR 3

THE FIJI ISLANDS AND THE LAU GROUP (INCLUDING ISLANDS AND REEFS NORTH OF THE FIJI ISLANDS)

Plan.—This sector describes the principal islands; Viti Levu; Vanua Levu; and the off-lying islets, reefs, and dangers associated with each island. The outlying islands, reefs, and dangers lying E and N of the principal islands are also described.

When discussing an island, or group of islands, they are generally described in a clockwise direction.

General Remarks

3.1 The Fiji Islands are a Commonwealth Nation, while Iles Wallis and Futuna are a territory of France. Rotuma Island is a dependency of the Fiji Islands.

Tides—Currents.—In the vicinity of the Fiji Islands, currents in any direction may be experienced, but there is some preponderance of W currents over E currents, particularly in the months from September to November. Most of the currents in any direction do not exceed 1 knot.

Fiji Meteorological Service
http://www.met.gov.fj

In Kandavu Passage, with strong E and SE winds, the current sets W at the rate of 1 knot, but after W winds there is a decided E set.

The tidal currents are by no means regular in force or direction, being in the latter respect greatly influenced by the wind. The tidal currents usually set S and N between the reefs and islands, with the former current being the stronger.

In Nanuku Passage and Somosomo Strait, in the NE part of the group, the general direction of the currents is S and N. Off the S coast of Viti Levu, they set SE and NW. Among the Lau Group, they set SSE and NNW, but are irregular. Between Oneata and Mothe, the current has been observed to set S and N; the proximity of the reefs deflects it to NE and SW, respectively.

Among the Lau Group, in the good weather season from April to November, a vessel making surveys experienced little or no current, except in the lagoon passages, where it was distinctly tidal. This current was found near the reefs, where it did not appear either regular or to exceed the rate of 0.5 knot. During the months from December to April, an E set has been experienced.

After a period of strong NW winds, such as occurs between November and April, a strong SE set is experienced in the Koro Sea and around Nanuku Passage. This strong set has resulted in two vessels being stranded S of Nanuku Passage; several others have narrowly avoided stranding due to the strength of this set. Regular traders in the area allowed for the set but underestimated its rate and have narrowly avoided stranding.

Near Yandua, on the W coast of Vanua Levu, the current at times has been observed to set SW. The strongest tidal current found in the group is in Somosomo Strait, where it has a rate of 3 knots after the full and change of the moon. In some lagoon passages the tidal currents attains a rate of 2 knots during springs; notwithstanding that the entrances are chiefly on the NW sides of the islands; both the flood and ebb appear to be of equal strength.

Caution.—Volcanic activity has been reported to occur at various locations throughout the region, and may best be seen on the chart.

Floating fields of pumice have been reported between Tonga and Fiji, in the Koro Sea to the W of the Lau Group, and N of Vanuantu between position 13°00'S, 160°30'E and position 14°00'S, 167°30'E. This hazard to ship's intakes may continue for some time, depending on how long the volcanic activity continues, and the extent to which pumice is washed up on beaches, and is refloated by high tides.

Beacons around the coasts of the Fiji Islands are frequently destroyed or damaged by heavy weather. When this occurs, it may be some time before the aids are repaired or replaced. Also, it may not be possible to rebuild the aid in its exact charted position. Mariners are advised to use caution.

The Fiji Islands

3.2 The **Fiji Islands** (17°00'S., 179°00'E.), located about 1,350 miles N of New Zealand, are a group of 332 islands, of which 110 are inhabited. The Fiji Islands are an independent state and a member of the British Commonwealth. The group lies between 16°00'S and 21°00'S, and 177°00'E and 178°00'W.

In general, the islands are subdivided into four distinct groups, as follows:

1. Viti Levu and the islands in its vicinity.
2. Vanua Levu, lying NE of Viti Levu.
3. The Lau Group.
4. The Southern Group, containing the off-lying islands from both Viti Levu and the Lau Group.

Rotuma Island (12°30'S., 177°05'E.) is politically part of the dominion.

Suva, the capital of the State, is situated on the S coast of Viti Levu, the largest and highest island of the group.

The islands consist partly of coral atolls, with or without openings into the central lagoon, and partly of volcanic elevations surrounded by fringing coral reefs.

The Lau Group is located 70 to 130 miles E of Viti Levu.

Vanua Levu lies NW of the Lau Group and NE of Viti Levu. The large open sea enclosed by these groups of islands is known as the Koro Sea.

Kandavu Island

3.3 Kandavu Island (19°00'S., 178°15'E.), the farthest S of the principal island of the Fiji Islands group, is usually the first land sighted by vessels coming from the SW. The island is mountainous and **Nambukelevu** (Ndelainambukelevu) (Mount Washington) (19°07'S., 177°59'E.), its highest and most conspicuous peak, rises to a height of 805m nearly 2 miles within its W extremity.

At Namalata Isthmus, 12 miles ENE of the island's W extremity, the island is low and only 0.5 mile wide, while at the Ndaku Isthmus, about 8 miles farther NE, it is less than 0.8 mile wide.

Caution.—Aerial reconnaissance has indicated that uncharted coral heads exist in the area around Kandavu and Great Astrolabe Reef. As depths are uncertain over these heads, vessels are urged to avoid the area by as wide a margin as is practicable.

3.4 Mbiloniyanggona (Mount Challenger) (18°59'S., 178°21'E.), 635m high, has a defined peak. It rises about 3 miles SSE of the N extremity of the island.

Coral reefs, broken in many places where fresh water streams flow out, fringe the island; in some places they take the form of a barrier reef with navigable depths inside.

From the E extremity of Kandavu Island, a number of islets and rocks, fringed by coral reef, extends N about 19 miles. Great Astrolabe Reef lies on the E side of these islets. North of Great Astrolabe Reef, and separated from it by a deep channel, is North Astrolabe Reef.

Uthuna Naingoro (19°00'S., 178°29'E.) is the E extremity of the island. Between this point and Korolevu Bay, 3.5 miles SW, the coast has two deep indentations and several small rocky islets.

Naingoro Pass, a break in the barrier reef, is located about 1 mile SE of Uthuna Naingoro. The pass is about 0.5 mile long and 146m wide, and should only be used in daylight and the best weather. In bad weather, the sea breaks across the entrance. This passage affords a means of reaching Ono Channel.

Korolevu Bay (19°02'S., 178°25'E.) is entered through Korolevu Passage, a break in the barrier reef 4.5 miles SSW of Uthuna Naingoro. An islet, 21m high, lies on the inner side of the barrier reef about 0.9 mile NNE of the entrance of Korolevu Passage. An islet, 7.6m high, lies 1.3 miles SW of the above islet.

There is a W current past the entrance with strong trade winds, and the sea breaks heavily on the outer edges of the reef.

Anchorage.—Anchorage may be taken by vessels with local knowledge, in a depth of 22m, mud, N of a coral reef which is awash, about 0.8 mile SSW of the village of Korolevu.

3.5 Ngaralevu Point (Ucinaqarelevu Point) (19°04'S., 178°19'E.) lies 6.5 miles WSW of Korolevu Passage. The barrier reef joins the shore in several places between the passage and the point and forms a dangerous spur 3 miles WSW of the passage. Heavy breakers are formed on this spur, even in light winds. Breakers also form on the reef S of Ngaralevu Point.

Soso Passage, a break in the barrier reef, lies 2.3 miles W of Ngaralevu Point. This passage, about 0.2 mile wide, leads into Soso Bay. There is a passage inside the barrier reef SW to Ngaloa Harbor.

Soso Bay (19°02'S., 178°17'E.) is a continuation E of Ngaloa Harbor. The village of Soso is situated in the NE part of the bay.

Nakorotu, a black conical hill 377m high, rises NW of Soso Bay.

The Ndaku Isthmus is located at the head of Soso Bay. The mountain range here dips to about 61m and the island is only about 0.7 mile across.

Ngaloa Harbor is entered between Esk Reef on the N and Pearl Reef on the S. This entrance lies 4.5 miles SW of Soso Passage.

Ngaloa Island divides the W side of the harbor into two parts known as the Outer Anchorage and North Bay. An island, 50m high, lies 1.3 miles NNE of the NE extremity of Ngaloa Island.

Anchorage.—Anchorage may be taken in Outer Anchorage, in 29 to 37m, mud. Anchorage is also available in North Bay, in 16.5m, mud, with 0.2 mile swinging room.

Sea Reef, which uncovers in places, extends 4.5 miles E from the mainland on the S side of Ngaloa Harbor; the reef is steep-to.

Yauravu Bay is entered through a channel 0.1 mile wide, located 8 miles WSW from the E extremity of Sea Reef. The bay affords anchorage, in 26 to 29m, mud, to vessels with local knowledge.

Matanuku Island (19°10'S., 178°06'E.) lies on the coastal reef 1.3 miles SW of the entrance to Yauravu Bay; it is 174m high and is covered with grass. A conspicuous wreck lies about 0.5 mile E of the island. The coral reef extends 0.8 mile SW from its S side, and the reef is steep-to. There are five islets on the coastal reef between Matanuku Island and Yauravu Bay.

Koro Erangi, a peninsula 159m high, has the appearance of an island. The coast between Matanuku Island and Koro Erangi, 4.5 miles W, is fronted by a coastal reef which has two boat passages through it. The coastal reef extends 1.5 miles SW from the peninsula, and the sea breaks with violence even in light winds.

3.6 Thikombia Point (19°09'S., 177°58'E.), 2 miles WNW of Koro Erangi, is a precipitous, dark, rocky headland, 128m high; from the distance, it appears like an island.

A coral shoal, with a depth of 3.7m, lies 0.3 mile S of the point. In light winds the sea breaks heavily on the reef.

Ndavinggele Bay, encumbered with numerous coral heads, lies between Thikombia Point and Koro Erangi. A stranded wreck lies on one of the reefs.

The coast trends 1.3 miles NW from Thikombia Point to Uthuna Mbukelevu, then N 1.8 miles to Cape Washington.

The coastal reef extends 0.4 mile SW from Uthuna Mbukelevu and NNW to Denham Island, 0.5 mile distant.

Denham Island, a low, coral island about 3m high, lies about 0.3 mile offshore and is connected to the mainland by a coral reef.

Cape Washington (19°07'S., 177°57'E.), the extremity of a spur extending 1.5 miles W of Nambukelevu, takes the form of a rocky bluff more than 30m high; it is fringed by a narrow coral ledge. A light is shown from the cape.

Talaulia Bay, entered between Cape Washington and a point 4.5 miles NE, affords anchorage, in 18m, off the village Ndangai.

Dawson Reef (19°04'S., 178°02'E.), a detached reef, awash, lies 1.3 miles N of the E entrance of Talaulia Bay. A coastal

reef extends 2 miles NNE from the same point and is separated from Dawson Reef by a channel 0.3 mile wide, which is encumbered with dangers.

Tavuki Bay is entered between a reef which extends 1 mile N from the shore and the John Wesley Bluffs, 2 miles E. Hope Reef, which breaks and is marked by a beacon, lies 1 mile NNE of the reef above.

The John Wesley Bluffs are a line of reddish bluffs about 152m high, and are prominent from the N.

Namalata Reefs extend 4.8 miles N from the John Wesley Bluffs and lie parallel to the shore at a distant of 2.3 miles.

The Namalata Isthmus is located at the head of a small bay, close SE of the John Wesley Bluffs.

Asses Ears, 488m high, is a double peak which rises 3.5 miles NNE of the Namalata Isthmus.

3.7 Uthuna Moindule (18°59'S., 178°10'E.) is located 4.8 miles N of the Namalata Isthmus. From this point, the coast trends 8.5 miles ENE to Yale Point and is fringed by coral reefs.

Rooper Reef lies 1.3 miles offshore NE of Uthuna Moindule; Ham Reef lies 0.5 mile offshore, 3.3 miles ENE of Rooper Reef.

Mount Chalmers, 418m high, 2.5 miles ESE of Uthuna Moindule, rises 1 mile inland.

Yale Bay (Tombani Yale) (18°56'S., 178°20'E.) lies E of the coral reef which extends 0.5 mile NE from Yale Point. Anchorage may be taken in the bay, in 21m, coral and mud.

On the W shore of Nakasaleka Bay, 2.3 miles ESE of Yale Bay, there is large white patch on the cliffs, conspicuous from the E when the sun shines on it.

Kasaleka Reef, a detached reef, lies close offshore on the E side of Nakasaleka Bay. A beacon marks the reef.

Kavala Bay (18°57'S., 178°26'E.), located 2.8 miles SE of Nakasaleka Bay, forms a harbor about 1.3 miles long and 0.5 mile wide, where anchorage can be obtained, in depths of 22 to 29m. The E entrance point of the bay is marked by a beacon.

Uthuna Naingoro, the E extremity of Kandavu Island, lies 4.5 miles SE of Kavala Bay. Two conspicuous hills are seen on this coast. One, a conical hill 353m high, rises 1 mile SE of the E entrance of Kavala Bay. The other, Burnt Hill, 287m high, rises 1 mile farther SE.

Great Astrolabe Reef

3.8 Great Astrolabe Reef (18°50'N., 178°30'E.) takes a N direction from Naingoro Pass, off the E extremity of Kandavu Island, for a distance of 21 miles, then turns sharply SSW for 12 miles.

About midway on its E side the reef forms an elbow, where the sea breaks heavily in all weather. North of this elbow the sea breaks lightly upon the reef and it is dangerous to approach, especially at night.

The W side of Great Astrolabe Reef is broken. Between the N extremity of the reef and Ono Island, a distance of about 12 miles, there are four passages which vessels may enter the waters enclosed within the reef. From N to S the passes are Usborne Passage, Herald Pass, Alacrity Passage, and an unnamed pass between Alacrity Rocks and Ono Island.

Caution.—Aerial reconnaissance in the area of Kandavu Island and Great Astrolabe Reef have indicated the presence of uncharted coral heads. Vessels are urged to use caution and navigate the area under the most favorable light conditions, as the depths over these heads is uncertain.

Volcanic activity was reported (2001) E of Great Astrolabe Reef in position 18°46'S,179°11'E.

3.9 Alacrity Rocks (18°53'S., 178°26'E.) is a dangerous cluster of rocks at the termination of the W side of Great Astrolabe Reef. The principal patch, upon which the sea breaks at LW, is 1 mile NW of the W extremity of Ono Island.

Astrolabe Lagoon comprises a large area of smooth water within the limits of Great Astrolabe Reef, including the islands N of Ono. The lagoon is navigable on a bright day if a good lookout is maintained at the masthead.

In 1990, a depth of 7.3m was reported to lie in mid-channel, close N of the Ono Island beacon. Another depth of 2m was reported to lie about 2.3 miles NNE of the same beacon.

Ono Island (18°54'S., 178°29'E.), the largest of the islands in the lagoon, is separated from Kandavu Island by Ono Channel, which is about 2 miles wide at this point. The island rises to a height of 344m, and there is a sharp peak 338m high near the center of the island, nearly 1 mile farther NE. A coral reef surrounds the island and is separated from the E side of Great Astrolabe Reef by a passage 45m wide.

Vuro Island, connected to the NE side of Ono Island by a coral reef, is 82m high.

Yambu Island is a small island located 1.3 miles NW of Vuro Island; Mbuliya Island, 140m high, lies 1.3 miles E of Yambu Island.

Yaukuvelailai Island, 64m high, lies 1 mile N of Mbuliya Island; a rocky shoal extends 0.8 mile S of this island. A coral reef joins this island to Yaukuve, an island 122m high, located 0.3 mile N.

Nggasimbale Island (Qasibale Island) (18°48'S., 178°29'E.), 18.3m high, lies 1.5 miles W of Yaukuve. Namara Island, Yanuyanu-I-loma Island, and Yanuyanu-I-Sau Island lie on the same reef and are located 0.5 mile, 1 mile, and 1.3 miles N, respectively, of Nggasimbale Island.

Ndravuni Island, 1.5 miles N of Yaukuve, rises to a height of 107m in its S part. Off the NW part of the island there is anchorage, in 7m, sand, protected from the prevailing SE wind. Vessels should use the appropriate caution when attempting to use these anchorages; local knowledge is recommended.

Vanuakula Island, 76m high, lies 1.5 miles NW of Ndravuni Island.

3.10 Diamond Rock (18°46'S., 178°28'E.), a rock with a depth of 1.8m, lies 2.3 miles W of Ndravuni Island, just within the entrance to Herald Pass.

Ono Channel (18°57'S., 178°28'E.), within Naingoro Pass and separating Kandavu Island and Ono Island, has a number of coral heads and dangerous submerged rocks; passage should not be attempted except with the sun in a favorable position for seeing reefs.

Kavala Bay is recommended to enter from the W through Ono Channel. Pass between the coast and the cluster of coral patches to the W of Swanston Rocks on a course of 130°. When the bay entrance opens, veer S and steer between the channel beacons into the bay.

Mayo Rock (18°55'S., 178°26'E.) lies 1 mile off the SW coast of Ono Island. At the NW end of the channel lies Swanston Rocks, with its two coral heads, lying 1.3 miles S of Mayo Rock. Rocks lie within 0.8 mile E and S of Swanston Rocks' S head, while another group of rocks, marked by a beacon, lie between Swanston Rocks and the coast to the WSW.

North Astrolabe Reef (18°39'S., 178°32'E.) is separated from the N side of Great Astrolabe Reef by D'urville Channel, a deep-water passage about 1 mile wide. The reef encloses a lagoon where anchorage may be taken, in 22m, sand and coral. There are two passages through the reef. Renard Passage, at the N extremity of the reef, is for small vessels in good weather. Beagle Passage is located about 0.7 mile WSW of Renard Passage. A beacon marks the reef on the E side of the passage.

Solo, a rock 3m high, is located near the center of the lagoon and is marked by a light.

Caution.—The sea seldom breaks on the W side of North Astrolabe Reef and lightly on the N and E side. Due to this condition, the reef is difficult to distinguish at night.

3.11 Kandavu Passage is a broad deep channel between Kandavu Island, on its S side, and Vatulele, Thakau Lekaleka, Mbengga, and the barrier reef, on its N side.

Vatulele (18°32'S., 177°39'E.) is a low, wooded island lying 36 miles NNW of Cape Washington; it rises to a height of 35m in its N part. The island slopes gently to the E coast from the steep bluffs on the W, and the encircling reef encloses a spacious lagoon. A light is shown from the NW side of the island.

The island presents a perfectly even and regular outline, but is difficult to make out in thick weather or at night. A coral reef, 0.15 to 0.3 mile wide, and which dries 0.9m, fringes the W coast, but the N and E coasts are protected by a barrier reef.

There are three islets located on the N part of the barrier reef, and there are two passages into the lagoon in the vicinity of the islets.

By careful conning from the masthead, vessels of not more than 3m draft can enter the lagoon through either passage.

Tides—Currents.—In the N part of Vatulele Lagoon, and along the reef on the W side of the island, the flood current sets SSE while the ebb current sets NNW.

Thakau Lekaleka (18°36'S., 177°48'E.) is a reef, awash, 8 miles E of the S extremity of Vatulele. It is steep-to and usually breaks heavily. A conspicuous wreck lies on the N side of the reef.

3.12 **Mbengga Island** (18°23'S., 178°08'E.) lies within a barrier reef about 20 miles NE of Thakau Lekaleka. The island, about 436m high, lies on the E side of the lagoon. A light is shown from the E side of the island. There are two deep indentations on the island, one on the NE side and the other on the SW side.

Other islands in the lagoon are Stuart Island (Ugaga Island), 1.3 miles SW of Mbengga; Yanutha Island, 5.5 miles W of Mbengga; and Bird Island, on the E side of a reef 1.8 miles N of Yanutha.

Mbengga Lagoon (Beqa Lagoon) is about 15 miles long, NE-SW, 9 miles wide, and is nearly surrounded by barrier reefs. The lagoon is separated from Viti Levu by Mbengga Passage, which is described in paragraph 3.14.

Caution.—Although the lagoon has been surveyed, portions of the survey have been reported to be unreliable. Vessels should exercise caution when navigating the lagoon, as less water or other dangers may exist in addition to what is shown on the chart.

3.13 Mbengga Barrier Reef, the main part of the reefs surrounding the lagoon, has an unbroken length of 20 miles extending from a position about 1.8 miles E of Mbengga Island for a distance of 15 miles in a SW direction, then turning sharply NNW for 5 miles. The prominent elbow formed lies about 12.5 miles SW of the highest peak of Mbengga Island.

The reef is from 0.5 to 1.3 miles across, and throughout most of its length is marked by breakers. At the elbow it dries at LW, and the sea breaks heavily upon it.

Yanutha Reefs lie on the NW side of the lagoon and are a continuation of Mbengga Barrier Reef. Frigate Passage, 1.8 miles wide, separates the two reefs. The passage has two coral patches in it, and is available for vessels, according to draft, entering Mbengga Lagoon.

Thakau Nisithi (18°21'S., 177°59'E.) is a coral reef which lies about 1.5 miles NE of Yanutha Reefs; Bird Islet, a small sand cay, is located on the reef. Nisithi Rocks are a continuation NE of Thakau Nisithi.

Caesar Rocks, about 2.5 miles NE of Bird Islet, are two coral heads with a depth of 1.8m; the sea seldom breaks on the rocks.

3.14 **Pearl Rock** (18°20'S., 178°05'E.), 3.5 miles ESE of Caesar Rocks, consists of coral and has a depth of 5.5m at LW. The opening between Caesar Rocks and Pearl Rock is shown to have considerable foul ground, alternating with deep soundings.

Pratt Reefs, 1.5 miles ENE of Pearl Rock, are a group of coral reefs. A beacon, equipped with a radar reflector, is situated on the W extremity of the reef.

Nearly midway between Pearl Rock and Pratt Reefs are two rocks, with depths of less than 1.8m, and a reef, which dries.

Nanuku Passage, between Pratt Reefs and Nanuku Reefs, is foul.

Nanuku Island (18°20'S., 178°09'E.), a sand cay with trees 12.2m high, is located near the NW end of Nanuku Reefs, 1.8 miles SE of Pratt Reefs.

Nanuku Reefs extend in a SE direction to the N extremity of Mbengga Barrier Reef; they afford protection to Mbengga Island from the E swell.

Sulphur Passage (Bala Passage), 1.8 miles SE of Nanuku Island, is generally used by vessels from the NE to enter Mbengga Lagoon. It is about 0.2 mile wide, but is constricted by a spur extending S from the N side of the pass.

Cutter Passage (Davetamuamua Passage), between Nanuku Reef and Mbengga Reef, is narrow.

Anchorage is available at many places within the lagoon, but local knowledge is required.

Caution.—Caution should be exercised when approaching the barrier reef and other reefs surrounding Mbengga Island, especially at night.

Mbengga Passage separates Mbengga Barrier Reefs and the isolated reefs N of Mbengga Island from Viti Levu. The pas-

sage is deep, with a least width of 0.8 mile between the 200m curve, and is about 11 miles long. After heavy rainfall, the rivers of Viti Levu discharge into Mbengga Passage and cause discoloration of the water, which gives the misleading appearance of shoals.

Viti Levu

3.15 Viti Levu (17°48'N., 178°00'E.) is the largest, highest, and principal island of the Fiji Islands group. It is mountainous, with several peaks attaining a height over 1,067m. The principal peaks are Mount Tomanivi, 1,323m high, in the N central part of the island; the Korombasambasanga Range, with a peak 1,207m high, 18 miles NW of Suva; Korombo, with a sharp summit 1,075m high, lying about 19 miles ENE of the W extremity of the island; and Korovanitu, 1,195m high, rising 13.5 miles N of Korombo.

The principal rivers are the Rewa River, which rises on the E slope of Mount Tomanivi and flows into the sea close E of Suva, and the Singatoka River, which rises on the W slope of the same mountain and flows into the sea on the SW coast of the island. The Navua River flows into the sea 15 miles WSW of Suva.

From **Kamba Point** (18°00'S., 178°42'E.), the E extremity of Viti Levu, the coast trends WSW 18 miles to Suva. This part of the coast is low, with a mud and coral bank extending up to 3.8 miles offshore in places. Reefs, which are steep-to, lie at the outer edge of this bank.

Between Suva Harbor and Korolevu Bay, 40 miles W, the coast trends WSW to **Vatumbari Point** (18°16'S., 177°54'E.), the S extremity of the island, then WNW. This area is mountainous and densely wooded. The highest mountain peaks are in the vicinity of Suva.

There are several detached reefs off this part of the coast. These reefs extend up to 1.8 miles offshore.

From Korolevu Bay, the coast continues WNW to Vatuloa Point, about 23 miles distant, then NNW 11 miles to Uverite Point, the W extremity of Viti Levu. The mountains in the SW part of the islands are relatively low near the coast, rising to higher peaks inland.

The coastal reef fronts the coast, except where the waters from the several rivers have broken through. The reef extends up to 2.3 miles off the SW part and is steep-to along its entire length.

3.16 Kiuva (18°03'S., 178°41'E.), a low point, lies 3.5 miles SSW of Kamba Point. A bank of mud and coral extends 4.8 miles E of a position about midway between these two points.

The Nasilai River discharges into a small bay 2 miles S of Kiuva Point. There is anchorage, in 14m, sand, about 0.7 mile SW of Navuni Vatu, a mushroom-shaped rock about 1.5m above water, on the S reef at the entrance.

Nasilai Reef extends 4 miles from shore, 4 miles SW of Kiuva. A light is situated on the SW extremity of the reef. An isolated 6.4m shoal lies 0.7 mile ESE of the light. A stranded wreck is charted about 0.3 mile SE of the light.

Rewa Roads is an open anchorage at the Nasoata mouth of the Rewa River, 9 miles SW of Navuni Vatu. The roads offer anchorage for small vessels, but should be considered too exposed when the trade winds are established, or during the typhoon season. When selecting a protected position for anchoring, it should be borne in mind that the reefs are difficult to see, especially after rain, due to the muddy water from the river.

Belcher Rocks (18°12'S., 178°32'E.) are a group of sunken coral heads at the W extremity of Rewa Roads. The sea nearly always breaks over the rocks.

The delta of the Rewa River is low and flat without any distinguishing features to mark its locality. The principal mouth is within Rewa Roads.

Makuluva Islet Light (18°11'S., 178°31'E.) stands on the S tip of the islet. A depth of 4m was reported (1990) to lie about 2.4 miles, bearing 081°, from the light. Nukulau Island lies on the W extremity of a reef, 0.7 mile N of Makuluva.

Port Nukulau (18°10'S., 178°31'E.) lies NW of Nukulau Island and may be entered either by Nukulau Passage from seaward or from Rewa Roads by a passage that leads between Makuluva Islet and Nukulau Island.

Nukulau Passage is about 0.1 mile wide and lies between the islands of Makuluva Islet and Nukulau Island on the E, and an extensive sand and coral reef on the W side.

Anchorage.—Anchorage can be obtained in Port Nukulau, in 14m, sand and mud, but care should be taken to keep E of the prohibited anchoring area which nearly encompasses the bay.

Nukumbutho Passage, about 2.5 miles W of Nukulau Passage, narrows to a width of 0.1 mile inside; the passage is deep. Lauthala Harbor is entered through Nukumbutho Passage.

Caution.—Seaplanes may be encountered landing, or taking off, in daylight hours in the vicinity of the breakwater on the W shore of the harbor.

Anchoring is prohibited, due to the existence of submarine cables in an area indicated on the chart, which embraces practically all of the harbor.

Suva Harbor (18°08'S., 178°25'E.)

World Port Index No. 55540

3.17 Suva Harbor, entered about 5 miles NW of Nukumbutho Passage, is a natural deep-water port and is the largest and most important commercial port in the Fiji Islands.

The port is under the jurisdiction of the Fiji Islands Government; the controlling officer is the harbormaster, whose office is situated near King's Wharf in the town of Suva, which is situated on the E shore of the harbor.

Suva Harbor

http://www.fijiports.com.fj

Winds—Weather.—The port is protected from the prevailing E wind. In the summer, the winds are from the NE; in the winter, the winds are from the SE.

Tides—Currents.—The near spring range here is 1.2m. Tidal currents are negligible; however, a vessel reported encountering a strong E set just outside the reef on the approach to the harbor entrance in the month of April.

Depths—Limitations.—The entrance channel is 0.8 mile

long and has a least width of about 0.3 mile; there is a least depth of 38m charted on the entrance range.

Princes Wharf, with a dredged depth of 4m, is used by small coastal vessels, and is the S facility here. King's Wharf offers two berths, with alongside depths of 11m. Container, ro-ro, and tank vessels berth here.

Suva Harbor

Walu Bay, N of King's Wharf, contains wharves as far as the bridge. The largest berth available is 183m in length, with a dredged depth of 9m alongside. A naval base lies N of Walu Bay.

A gas terminal with dredged depths of 11m consists of two mooring buoys situated off Cliffy Point, about 0.7 mile NW of King's Wharf.

Aspect.—On making the S coast of Viti Levu from the S and SE, the most conspicuous landmarks are Rama, 442m high, located 5.8 miles W of the rear range light; Nakorombamba, 429m high, located 1.3 miles WNW of the same light; and Nakombalevu, 464m high, located 2 miles NNE of the light.

In the harbor area, the hospital about 0.5 mile E of King's Wharf is conspicuous, as is the clock tower situated 0.6 mile S of the same wharf, although it has been reported (1998) that recent construction obscures the clock tower.

A house close N of the front range light is conspicuous when smoke obscures the light.

Pilotage.—Pilotage is compulsory. Pilots embark off the harbor entrance, about 3 miles S of Old Light Tower.

The pilot vessel is white overall, with the word "Pilot" painted in black on each side of the deck house.

Vessels are required to send their ETA at the pilot station 24 hours before arrival and to confirm the time 12 hours before arrival. The harbormaster's office and the pilot boat operate on VHF channels 16 and 12

Practique should be requested at least 72 hours prior to arrival. Additionally, vessels arriving from an area infested with rhinoceros beetles are subject to additional quarantine regulations, for which the local authorities should be consulted.

Signals.—Visual storm signals consists of the following:

1. Preliminary Typhoon Warning—yellow pendant.
2. Final Typhoon Warning—black pendant.
3. Three red lights in a vertical line will be displayed when a typhoon warning is in effect.

Visual storm signals are displayed at the following:

1. Harbormaster's Office
2. Government Offices
3. Hospital
4. Cable Office
5. General Post Office

Anchorage.—The inner harbor is capable of accommodating several vessels and affords an excellent typhoon anchorage.

The principal anchorage, in 17m, mud, lies about 0.5 mile NW of the N extremity of King's Wharf. The anchorage designated Medical Examination" is charted S of the above anchorage.

Directios.—Range lights, in line bearing 010.25°, lead from seaward to the main harbor area. Caution is necessary as it has been reported (2001) the vertical separation of the two range markers makes them difficult to find; the forward range marker sits close to the water while the after range marker is fairly high on the mountain. It is also reported (2011) that the leading lights may be obscured by smoke.

The reefs and shoal areas are marked by lights and buoys, which may best be seen on the chart. Range lights, in line bearing 102.5°, lead into Walu Bay.

A measured distance of 1,855m, indicated by two sets of range beacons, is charted off the port, but vessels using this measured distance should exercise the appropriate caution as the course passes close off the reef at either end, off the wharf, and through the anchorage.

Vessels wishing to dock at King's Wharf should do so prior to 0900, before the E winds become established.

Namuka Harbor, a small harbor 3 miles W of Suva Harbor, is entered through **Namuka Passage** (18°10'S., 178°20'E.), which is deep.

Nanggara Passage, Vatuloa Passage, and Tongoro Passage lie 3 miles, 6.5 miles, and 10 miles SW, respectively, off Namuka Passage.

3.18 Naitonitoni Anchorage (18°14'S., 178°11'E.) is a convenient anchorage within Tongoro Passage. The passage is about 0.9 mile wide between the reefs. Sand Bank, which is conspicuous, is located near the NW extremity of the E reef. The best anchorage is in a bight formed by the W entrance reef and the shoal water extending from the coast, about 1.5 miles WNW of Sand Bank; there is a depth of 11m.

Mariners using the anchorage should exercise caution due to the incomplete nature of the survey.

Pilotage for the anchorage is not compulsory, but can be obtained at Suva.

Naitata Flats extend 1.3 miles offshore, 2.5 miles W of Tongoro Passage. Rovondrau Reefs lie 1 mile W of the above flats, and its SW extremity lies 1.8 miles offshore. These dangers lie to the NE of Mbengga Passage.

Rovondrau Bay is formed NW of Rovondrau Reefs.

Between the W end of Rovondrau Reefs and the E end of Serua Reef, 5.5 miles W, there is a line of detached reefs and coral patches. The largest of these are Combe Reef, Lake Reef, and Shark Reef which lie 1.5 miles, 3.5 miles, and 4.5 miles W, respectively, from Rovondrau Reefs.

3.19 Serua Reef (18°17'S., 177°58'E.) is separated from the shore reef by a narrow channel.

Serua Harbor is entered between Serua Reef and a reef about 0.3 mile W.

A conspicuous radio tower stands on the summit of Nambouwalu, close NW of Serua Harbor.

Vunaniu Bay, 4.3 miles WNW of Serua Harbor, affords good anchorage to vessels with local knowledge, in 12m, mud and sand. The W reef extends S more than 0.5 mile from the mouth; there is consequently a confused sea immediately outside the passage.

Korolevu Bay lies 8.5 miles WNW of Vunaniu Bay.

The Singatoka River flows into the sea 12 miles WNW of Korolevu Bay. The fringing reef ends abruptly at the E entrance to the river. For 2.5 miles W of the entrance there is no protecting coral fringe, and the S swell breaks on the beach at times with great violence, throwing up quantities of sand which is formed by the wind into hillocks 6 to 58m high.

3.20 Thuvu Harbor (18°08'S., 177°25'E.), 6.3 miles WNW of the Singatoka River, affords anchorage, in 9m, sand. Its entrance is 0.27 mile wide between the coastal reefs, and is open S. A heavy swell often sets into the bay although the wind may be blowing from the E.

Korolevu (Cannibal Hill) is a defined peak, 401m high, located 5.5 miles NE of Thuvu Harbor. Mbutoni, 273m high, is a triangular-shaped peak between Kovolevu and the coast. A conspicuous tower, 20m high and mounted by a 12m mast, stands on Korolevu.

Kamba Island, a low, wooded, coral island 12 to 18m high, located on the W side of Thuvu Harbor, is connected to the mainland at LWS tides.

The coast between Kamba Island and Natandola Harbor, about 6 miles WNW, is fringed by a reef which extends from 0.2 to 1 mile from shore. This reef can be crossed by boats at HW.

Natandola Harbor is formed by a break in the coastal reef. The swell sets in although the prevailing wind is ESE.

Anchorage.—Anchorage may be taken, in 7 to 9m, sand, close off Navo Island.

3.21 Likuri Harbor (18°03'S., 177°17'E.) is entered 3.5 miles NNW of Natandola Harbor. The harbor is formed by the Tuvu River forcing its way through the reef. It is sheltered from all winds.

Likuri Island, on the barrier reef, 1 mile within the entrance, is low and sandy, and covered with coconut trees.

Tides—Currents.—Tidal currents in Likuri Harbor run strong, in and out, but the ebb is the greater current.

Anchorage.—Anchorage may be taken, in 14m, sand, with East Point, the NE extremity of Likuri Island, bearing about 118°, 0.4 mile distant.

Uverite Point (17°58'S., 177°15'E.), 5.8 miles NNW of Likuri Harbor, is low, but rises to Kavukavu, 300m high, 3 miles E. The rear range light for Navula Passage is the principal light for making this part of the coast.

Uverite Point and **Navula Point** (17°53'S., 177°16'E.), 4.5 miles N, are the entrance points of Momi Bay.

Navula Passage, entered about 3.3 miles NW of Uverite Point, leads through the barrier reef to Momi Bay. Lights, situated on shore, lead through the passage. The light situated on the N side of the passage should not be mistaken for the range lights. This passage is the principal entrance to Nandi Waters and is the only passage leading through the barrier reef on the W side of Viti Levu; it can also be entered at night.

Pilotage.—Pilotage for Vunda Point Tanker Terminal (paragraph 3.24), Lautoka Harbor (paragraph 3.25), or Vatia Wharf (paragraph 3.32) is available, and should be requested at least 48 hours prior to arrival. The pilot boards from a blue hulled boat with a white superstructure, about 1 mile seaward of the passage.

In rough weather, the pilot will embark abreast the beacon situated on the E end of the reef on the S side of Navula Passage.

When no pilot boat is sighted, a vessel should proceed through the passage and anchor in Momi Bay, N of the range line.

It is advisable to arrive off the entrance just before sunrise or else about 2 hours after, as the beacons are difficult to distinguish against the sun. The light structures on the N side of the passage can generally be seen which assists a vessel in its approach.

The pilot vessel may be contacted on VHF channels 12 and 16. Normally, pilots are available from 0800 to 1600, Monday through Friday, and on Saturday from 0800 to 1200. Pilots may be obtained outside these hours by prior arrangement.

Caution.—Strong tide rips have been observed in Navula Passage, especially at HW and LW. It has been reported that even with moderate weather a set to the NW has been experienced by vessels approaching Navula Passage. The reefs on the N side of the passage have been reported to be extending to the S.

Vessels wishing to take the inshore route to Vatia Wharf are restricted to a draft of 8.8m; however, lesser depths have been found on and adjacent to the track N of Lautoka.

The barrier reef which lies off the NW side of Viti Levu extends about 29 miles NW of Navula Passage to Tartar Reef.

Navula Reef forms the N side of Navula Passage. In 1986, it was reported that a shoal depth of 3.1m extends 0.3 mile SSW from Navula Reef Light.

3.22 Tavarua Island (17°51'S., 177°12'E.), sandy and fringed by coral reef, lies 1.5 miles N of Navula Reef.

Namotu Island lies about 1.3 miles NW of Tavarua Island. It is sandy, fringed by a coral reef, and is easily identified by its coconut palms.

Malolo Passage leads between Tavarua Island and Namotu Island; the passage is about 0.5 mile wide and is dangerous for deep-draft vessels. Foul ground extends 1 mile NE from each island and a 5.1m patch lies 1.5 miles NE from Tavarua Island.

Wilkes Passage is a narrow channel between Namotu Island and Ro Ro (Malolo) Barrier Reef. Wilkes Passage is dangerous for deep-draft vessels.

Malolo Barrier Reef, awash at LW, extends 8.5 miles NW from a position 0.6 mile NW of Namotu Island. There are two prominent horns in the middle of the seaward side which break heavily. The NW extremity of the reef also breaks heavily.

Mamanutha Reefs, extending 17 miles NNW of Malolo Barrier Reef, are broken and intersected by a number of passages. The SE reef is awash, as is the S end of the next reef N of it, but the remainder are sunken dangers with depths of 1.8 to 9.1m. The edges of the reefs are not defined, and they break

only in heavy weather.

Tartar Reef (17°31'S., 176°56'E.), the farthest NW of the group, is composed of coral, and has depths of only about 1m.

A shoal, whose position is doubtful, with a depth of 4.5m, lies about 3 miles W of the N end of Tartar Reef.

West of a line joining Tartar Reef and Viwa Reef, about 17 miles N, the depths are great, but depths of 16.5 to 31m, coral, have been found near this line.

From Navula Point, the coast trends NNE about 9.5 miles to a point which marks the S entrance to Tomba Ko Nandi. The Nandi River discharges through its S mouth 8 miles NNE of Navula Point and a point 3 miles farther NE.

Between an airport charted 5.3 miles SSE of Vuna Point and the town of Nadi, numerous hotels may be seen. A light is shown from the airport.

3.23 Turtle Rock (17°48'S., 177°19'E.), with a depth of 6.9m, coral, lies 6 miles NNE of the light situated off Navula Point. A shoal, with a least depth of 6.9m, lies 2.3 miles W of Turtle Rock. Cody Shoal, with a depth of 5.1m, and Curacoa Rock, with a depth of 2.1m, lie 1.5 miles NNW and 1.8 miles NNW, respectively, from Turtle Rock.

Nandi Waters (17°41'S., 177°15'E.) is the area W of Tomba Ko Nandi. Within an area 8 miles WNW of Vunda Point are several islets, with numerous shoals and drying reefs in their vicinity. The position of these dangers may best be seen on the chart.

Biunadoa Reef (Catlow Reef) (17°40'S., 177°20'E.), with a depth of less than 1.8m, lies nearly 3 miles WNW of Vunda Point; it is the farthest E of the dangers in Nandi Waters.

Tomba Ko Nandi is 5 miles long N-S and recedes 4 miles. The barrier reef and off-lying islands afford partial protection to the bay.

Yakuilau Island, about 0.5 mile NW of the S entrance point of Tomba Ko Nandi, is a low coral island fringed by a reef. A rock awash was reported (2004) to lie approximately 0.3 miles NNE of Yakuilau Island. Tanks are situated on Vunda Point, the N entrance point of the bay.

Tides—Currents.—Tidal currents in the channel extending from Navula Passage to Tomba Ko Nandi are reported to run at a rate of 2 knots in a SW direction 3 hours before HW to 3 hours after HW, and in a NE direction from 3 hours after HW to 3 hours before HW.

The channel from Navula Passage to Tomba Ko Nandi was wire dragged to a depth of 12.5m in 1942; its position may best be seen on the chart.

Anchorage.—There is good anchorage between the Navula and Malolo Passages and the Nandi River delta, in depths of 18 to 37m, mud. A vessel anchored in Tomba Ko Nandi during the bad weather season, from November to April, should be prepared for storms.

3.24 Vunda Point Tanker Terminal (17°41'S., 177°23'E.) lies 0.5 mile S of Vunda Point, which is low and sandy. There are four mooring buoys and a spar buoy with a submarine pipeline leading N to the shore. Tankers up to 24,000 dwt can moor at this terminal with a least depth of 12.5m.

Vunda Point Gas Terminal lies 0.15 mile S of the same point, having two mooring buoys and a manifold platform.

Naikorokoro Point (17°38'S., 177°23'E.), 2.8 miles N of Vunda Point, is from 12 to 18m high, thickly wooded, and has a small fringing reef. For a considerable distance inland the country is low and covered with grass.

Tivoa Islet and Pascoe Cay stand on a group of reefs 2 miles NW of Naikorokoro Point.

Pinder Reefs (17°36'S., 177°25'E.), which dry, lie 2.3 miles NNE of Naikorokoro Point on the NW side of the recommended track. Thovuli, an extensive reef which dries 0.6 to 0.9m, lies with its SE extremity 1.5 miles NE of the lighted beacon on Pinder Reefs.

Lautoka Harbor (17°36'S., 177°26'E.)

World Port Index No. 55530

3.25 Lautoka Harbor is a port of entry and the second-largest in the Fiji Islands. The harbor lies inside Vio Island, about 3.3 miles NE of Naikorokoro Point, on the NW coast of Viti Levu.

Vio Island lies on a reef separated from the main island by a channel with a least navigable width of 146m and a least depth in the fairway of 9.4m. Lautoka Harbor handles the bulk of the Fiji Island's sugar and timber exports.

Winds—Weather.—The prevailing direction of the wind is SW; in the dry season land and sea breezes occur.

Tides—Currents.—It is reported that the spring tides rise 1.5m and the neaps 1.2m. The maximum velocity of the currents is usually 1 knot, but they can reach velocities of 6 knots when affected by the wind. The currents always flow NW.

Depths—Limitations.—The fairway between Viti Levu and the W side of Vio Island has a least charted depth of 9.4m, a navigable width of 142m, and contains the berths of Lautoka Harbor. Approaching the harbor from the N, caution is advised as depths of 8.9m and 8.7m have been found in the fairway, which has been dredged to a depth of 10.1m.

A multi-point offshore berth is available S of Vunda Point to vessels handling LPG and oil. An offshore oil berth is S of Vio Island in depths of 5.5m. The Fiji Sugar Corporation Wharf, about 0.3 mile NNE of the LPG wharf, has depths of 8.7 to 10.1m. Queens Wharf, just NNE of the Fiji Sugar Corporation Wharf, offers three berths, with alongside depths ranging from 3.6 to 10.1m.

Kings Wharf, located 2.7 miles S of the Queens Wharf, is an open basin used by fishing vessels and inter-island trading vessels.

The FSC Wharf, located directly S of the Queens Wharf, is a dolphin wharf with a depth of 10m alongside.

The maximum size vessel to enter the port was the 44,800 grt, with a length of 250m and a draft of 10.4m.

Aspect.—A radio mast showing obstruction lights is positioned about 1.3 miles SE of Queens Wharf, while a second radio tower is positioned about 0.5 mile ESE of the wharf. Seven chimneys standing within the town are conspicuous.

Pilotage.—Pilotage is compulsory and should be requested at least 48 hours in advance. The pilot boards 25 miles S of Lautoka in Navula Passage. See the Navula Passage description in paragraph 3.21 for details.

Signals.—The wharf manager and the pilot may be contacted on VHF channels 12 and 16.

Courtesy of Maritime & Port Authority Fiji

Lautoka Harbor—Fiji Sugar Corporation Wharf

Storm signals are displayed from the post office and harbormaster's office. A Preliminary Typhoon Warning is indicated by a yellow pennant, while a Final Typhoon Warning is signaled by a black pennant.

Anchorage.—Anchorage is available off the N entrance to the port, in depths of 13 to 19m, mud, between Mbekana Island and the coast SE. The quarantine anchorage is centered about 1.1 miles W of Vio Island, and offers depths of 22 to 24m, over a charted bottom of mud.

Caution.—Seaplanes may be encountered landing, taking off, or taxing during daylight hours in the area between Mbekana Island, located 0.5 mile N of Vio Island, and the mainland of Viti Levu.

A least depth of 8.8m exists at a distance between 0.1 and 0.2 mile NNW of Queen's Wharf. Vessels are cautioned against undetected shoal patches.

3.26 The **Malolo Islands** (17°45'S., 177°10'E.), 8 miles NNW of Navula Point, consists of Malolo, Malolo Lailai, Nggalito, Mathiu, Wadingi, and Vatumbulou. Malolo Island, the largest island in the group, has a conspicuous peak in the center 229m high; it is light colored and covered with grass.

The Mamanutha Group is divided into two groups known as the Mamanutha-i-Thake Group and the Mamanutha-i-Ra Group, or the windward and leeward Mamanuthas.

This group of islands extend from **Mana Island** (17°41'S., 177°07'E.), located 15 miles NW of Navula Point, to **Eori Island** (17°26'S., 177°04'E.), 14 miles N.

Monu Island, 5.3 miles NNW of Mana Island, has a remarkable thumb peak to the W of and nearly as high as its 223m summit.

Navandra Island (17°27'S., 177°04'E.), 8 miles N of Monu Island, has a defined summit 128m high. Navandra stands upon a reef with another island and a rock.

The islands and dangers of the Mamanutha Group are best seen on the chart.

Vomo Island (17°30'S., 177°16'E.), located 12 miles NW of Lautoka Harbor, is flat-topped and 116m high. The island is covered with grass and is surrounded by a coral reef. Vomolailai Island sits on the coral reef close off the NW extremity of Vomo.

White Rock, a small islet 6.5 miles NW of Vomo, is 12.2m high.

3.27 The **Yasawa Group** (17°00'S., 177°22'E.) extends NE about 50 miles from a position about 7.5 miles NE of Navandra Island.

Kuata Island (17°22'S., 177°09'E.), the farthest S of the Yasawa Group, is 174m high.

Wayasewa Island is separated from the N side of Kuata Island by a channel 0.3 mile wide. There is a remarkable thumb-shaped peak, 354m high, on the S side of the island.

Waya Island (17°18'S., 177°08'E.) is connected at its SE extremity to the N point of Wayasewa by a sand bank. The island has several sharp peaks; the highest, toward the NE end of the island, rises to 571m. A rugged, defined mountain 506m high and perpendicular on its W face, overlooks the SW cape. The SW cape is terminated by a wedge-shaped hill, 82m high.

White Rock, which has already been described in paragraph 3.26, lies close off this island.

Yalombi Bay (Alacrity Bay), on the S side of Waya Island, is protected except from the S, from which direction a considerable swell rolls into the bay at times.

There are extensive reefs, which break, on the W side of Waya Island between 0.8 and 1.8 miles from the coast. A deep-water passage runs between the reefs and the shore. Two coral patches, each with a depth of 4.6m, lie in the S approach to the passage midway between the SW point of the island and the reef.

Anchorage.—Anchorage may be taken in the bay, in a depth of 26m, sand and mud, off the village.

Nalauwaki Bay (Watering Bay), on the N side of Waya Island, is 2 miles wide and recedes 1 mile. Two coral heads, with depths of 3.7 and 4.6m, lie just outside the entrance. Anchorage may be obtained by vessels with local knowledge, in 36m, mud, with the entrance point bearing 302° and with the rock off the NE extremity of the island just obscured.

Nalauwaki Bay—The Rhino

3.28 **Viwa Island** (17°09'S., 176°55'E.) is the farthest W of the Fiji Islands group; the island is about 18m high. The island lies 13 miles NW of Waya Island. It is fringed by a reef which extends about 5 miles S. A rock, 3m high, lies within about 1.5 miles off the extremity of the reef where the sea breaks heavily.

Caution.—It was reported in 1904 and again in 1932 that the island and reef were charted inaccurately, and should be given a wide berth.

East of 177°E, between the parallels of Viwa Island and Monu Island, are a number of shoals on which the sea occasionally breaks.

3.29 **Naviti Island** (17°07'S., 177°15'E.) lies about 7 miles NNE of Waya Island. A cluster of small islands lie off the S extremity of the island. Naviti, 388m high, is the largest of the Yasawa Group. Soso Bay, at the S end of the island, is sheltered from all but S winds. There are extensive reefs off the E and W coasts of the island.

Yanggeta Island lies about 2 miles NNE of Naviti Island; the passage is clear except for a reef on the N side which breaks continually. A line of reefs lie off the E coast, and there are several patches W of the island.

Matathawa Levu lies 0.5 mile N of Yanggeta and is joined to it at LW by extensive sand flats. The island rises at the S end to 299m.

Nathula Island (16°53'S., 177°25'E.) lies 2 miles NE of Matathawa Levu and rises to a height of 257m at its N end. There are extensive reefs on the S and W side of the island, and there are extensive sand banks with coral patches on the E side.

Yasawa (16°46'S., 177°31'E.) is separated from Nathula Island by a passage about 0.5 mile wide. The passage is dangerous for other than small vessels with local knowledge and should not be attempted except in suitable conditions of sun and visibility.

3.30 **Yawasirara Bay** (16°43'S., 177°34'E.) is reported to provide a suitable anchorage, for cruise liners up to 21,600 grt, at the NW end of Yasawa Island. The approach to the bay should be made from the NW, with Cololevu, the highest hill in the NW end of the island, bearing 148°. Adjust course ESE towards Labatia Point to pass approximately midway between the dangers extending 1.5 miles NW from Naloto Point and 1 mile SW from **Muanakuasi Point** (16°42.0'S., 177°34.2'E.). Several shoals, with a least known depth of 13.4m, lie close to this track.

Small craft, in suitable weather conditions, can approach to within 0.1 mile of the shore close S of the village. Tidal currents in the bay are weak. Communication on VHF can be established with Lautoka.

A peak near the S end of Yasawa Island rises to a height of 296m. Dangerous reefs extend about 5 miles NNE from the island.

Dua Lei Ranima (Ethel Reefs), located from 5 to 9 miles W of the Yasawa Group, are comprised of two separate reefs which dry. Porpoise Shoal lies about 2 miles WSW of the W extremity of Ethel Reefs.

The area between Yawasa Island and Tivolei Reef, 5 miles SE, has not been closely examined, but contains isolated and dangerous shoals.

Tides—Currents.—Tidal currents in the vicinity of Ethel Reefs are reported to set SE at 2 knots on the flood.

Round Island Passage is formed between the reefs N of Yawasa; Yawasa and Tivolei Reef on the W and S sides; and on the E by the line of reefs off Yalewa Kalou and Pascoe Reefs. The passage is about 4 miles wide between the 200m curve W

of Yalewa Kalou.

Current flow caused by the Southeast Trades pass through Bligh Water in a NW direction at a rate from 0.5 to 1.5 knots. It leaves through Round Island Passage where it turns W over the reef extending NNE from Yasawa.

Anchorage.—Suitable anchorage is reported to lie approximately 1 mile SW of Yawasirara village, in a depth of 27m, on a sand and coral bed. Good anchorage may be taken in the bay on the SW side of Yawasa Island, with Saunimolilevu Point bearing 280°, about 0.8 mile distant; the charted depth is 7.6m.

Caution.—Depths less than those charted may exist in Round Island Passage. Vessels approaching the passage should fix their position as quickly as possible and avoid the shoal area N of Yasawa Island.

3.31 Yalewa Kalou (16°40'S., 177°45'E.) is about 152m high, has steep cliff sides, and a summit covered with grass and stunted bushes.

A shoal, with a depth of 6.4m, lies about 1 mile WSW of the island.

The bank extending N from Yalewa Kalou is studded with dangerous breaking reefs on its W edge. Eight miles N of the island, this bank joins the Great Sea Reef.

Pascoe Reefs, with depths of less than 1.8m, extend SE and then E for about 40 miles from a position 6 miles SSW of Yalewa Kalou; these reefs have not been examined.

Tivolei Reef, which dries, extends about 12.5 miles S from a position 11 miles SSW of Yalewa Kalou.

Bligh Water is the sea area N of Viti Levu. It is bound on the N by Pascoe Reefs and on the S by the reefs off the N coast of Viti Levu.

From Lautoka Harbor, the coast trends in a NE direction about 7.5 miles to **Nathilau Point (Nacilau Point)** (17°30'S., 177°31'E.), a defined headland; the intervening coast is indented by two bays.

Mbekana Island lies 0.8 mile N of Lautoka Harbor, on the E side of the recommended track. Reefs extend about 0.3 mile off the W and N side of the island.

Yawalau, an island 9m high, lies 0.5 mile offshore, 2.4 miles NNE of Mbekana Island. The recommended track passes between this island and Naivaka Point, about 0.7 mile S. A detached reef, 0.5 mile NE of Naivaka Point narrows the fairway to 0.3 mile.

Nukunimanu (17°30'S., 177°30'E.), about 1 mile W of Nathilau Point, is a narrow ridge of coral grit about 1m high that lies on a steep-to reef, which is awash. The recommended track lies E of Nukunimanu.

Ngana Point (17°27'S., 177°37'E.) is a low point of mud and sand located 6 miles NE of Nathilau Point. This point is the W entrance point of the Mba River.

Malevu is a drying reef which extends 2 miles NE from a position 1.5 miles NNE of Nathilau Point. An islet, 6m high, lies on the SW end of the reef.

Large detached reefs lie 1.8 miles W and 1 mile NW, respectively, from the W extremity of Malevu. The recommended track passes between Malevu and these two reefs. Vessels should pass close to these reefs and near Thakau Na Sasi, the extensive reef 0.8 mile N of Malevu.

Caution.—Surveys indicate that lesser depths than charted exist on and near the recommended track.

3.32 The Mba River flows into the sea E of Ngana Point and forms a delta about 8 miles in extent.

Mba Roads (17°25'S., 177°41'E.) is off the entrance to the river. After heavy rainfall, discolored water from the river spreads many miles along and through the reef passages. Good anchorage can be obtained, according to draft, over soft mud.

Caution.—Caution is advised as uncharted reefs exist in the vicinity of the anchorage.

Kelly Reef (17°27'S., 177°34'E.), which dries, lies 1.8 miles W of Ngana Point. Hood Reef, 1 mile NE of Kelly Reef, is awash at LWS.

Yarawa Reef lies with its S extremity 4.5 miles NNE of Ngana Point. Two detached reefs lie about 0.3 and 0.6 mile S, respectively, of Yarawa Reef.

Mba Passage is entered between Yarawa Reef and Tavutha Reef, 2 miles E. This passage which gives access between Mba Roads and Bligh Water should only be used by small craft with local knowledge, and then only in good conditions of sun and visibility.

Yavena Passage, 0.6 mile wide, is deep and clear, and gives safe access between Mba Roads and Bligh Water. This passage leads between the NW extremity of Tavutha Reef and a reef on the N. The S side of the passage is marked by two conspicuous rocks 1.5m high, which appear as a single rock from most aspects. A beacon is situated on the SE extremity of the reef on the N side.

Good anchorage, in about 30m, grey mud, is available in the bight E of Yavena Passage.

Eastward of the delta of the Mba River, the coast takes a NE direction for 5 miles, where it forms a headland terminating in **Vatia Point** (17°22'S., 177°50'E.).

Vatia Wharf, at the head of which lies the Empressa Goldmine Berth, is a T-headed wharf which lies about 3.5 miles SW of Vatia Point. The pier extends about 247m offshore; the head of the pier is about 30m long. In 1989, a depth of 9.1m was reported alongside the wharf.

Vessels should approach the pier from the SW with the range beacons in line bearing 059°.

Pilotage.—Pilotage is required for the fairway to this berth. See the Navula Passage, in paragraph 3.21, for details.

Vatia Headland is high, rugged, and partly wooded, with a saddle hill, 267m high; higher hills rise farther inland.

The bight between Vatia Point and **Nathilau Point** (17°22'S., 178°01'E.), 11 miles E, is encumbered with reefs.

Sali Sali, an extensive reef which dries on its outer edges, lies 0.2 mile ENE of Tavutha Reef. Manava Cay is situated on the W side of Sali Sali.

3.33 Davy Rock (17°22'S., 177°50'E.), a small coral patch which dries 1m, lies on the S side of the fairway, 1.3 miles NE of Vatia Point.

Manava Passage, between Tavutha and Sali Sali, is only 0.3 mile wide, but a depth of 24m can be carried through it on the recommended track.

Ve Ndrala Reef, E of Sali Sali, is steep-to on its S edge and dries 0.5m at LW. The passage between the two reefs is dangerous.

Olatha Reef lies on the S side of the recommended track, with its NW extremity 1 mile E of Davy Rock.

Thakau Moi, 1 mile N of Nathilau Point, lies close E of Ve Ndrala. There is a cay, awash at HW, on its W end.

Nukurauvula Passage lies between Ve Ndrala and Thakou Moi. A depth of 10.9m is charted in the N entrance about 0.3 mile NW of the rocks on the NW extremity of Thakau Moi. The sand bank on the W end of Thakau Moi is a mark for the channel in calm weather; the sea seldom breaks on the reef.

Occasional small tide rips occur in the S part of the passage when the tide is against the wind.

Nukurauvula Passage is the best in this area and is marked by beacons on either side.

From Nathilau Point the coast preserves the same characteristics for 10 miles to **Volivoli Point** (17°19'S., 178°11'E.), the N extremity of Viti Levu.

Mathuata, 122m high, about 1 mile NE of Nathilau Point, is connected to the main island, 0.8 mile S, by a reef that is awash at LW. There is anchorage W of the island, in 24 to 29m, mud.

Tovu lies on a reef 1 mile ENE of Mathuata; it is 61m high and is covered with grass and trees.

3.34 **Malake** (17°19'S., 178°09'E.), 4 miles ENE of Tovu, is 220m high, covered with grass and casuarina trees, and is surrounded by a fringing reef.

The passage between Malake and Thakau Vatu Latha, immediately to the N, is clear of dangers and is marked by beacons.

Malake Passage, through the barrier reef NW of Malake, is constricted by a coral patch and a cluster of sunken rocks lying in its N entrance. This passage is not recommended.

Anchorage.—Good anchorage will be found, in 22m, mud, close S of the W extremity of the island.

Charybdis Reef (17°11'S., 178°02'E.) lies in Bligh Water about 5 miles N of the barrier reef. The reef is just awash and encloses a lagoon about 5 miles in diameter. Deep water lies to the W of the reef.

The tidal currents in the area N of Charybdis Reef set strongly and are irregular in direction. Tide rips occur over parts of the reef.

3.35 **Nananu-i-Ra** (17°17'S., 178°13'E.), an island 73m high, lies 2.5 miles NE of Volivoli Point, and Nananu-i-Thake lies SE of Nananu-i-Ra and on the same reef. The recommended track passes between these islands and the main island.

Depths—Limitations.—Nananu Passage, an opening through the reefs about 2 miles N of Nananu-i-Ra, is marked by beacons, in line bearing 169°. The coral heads on the E side of the passage are easily seen, but the coral heads on the W side cannot be seen until they are abeam.

Ellington Wharf (17°20'S., 178°14'E.) is situated on the S side of the recommended track, 0.6 mile SSE of the W extremity of Nananu-i-Thake. A depth of 5.2m is charted along the face of the 44m T-head wharf. Patches, with depths of 7.7m and 8.7m, lie 0.3 mile and 0.35 mile ENE, respectively, of the head of the wharf. In 1982, it was reported that the berth was disused and the wharf was falling into disrepair.

Anchorage.—Anchorage may be taken in the bight formed between the two islands and the reef, in a depth of 16m, blue mud, good holding ground.

Caution.—A shoal, with a depth of 6.3m, lies 1 mile E of Ellington Wharf. The recommended track leads N of this shoal, then between a chain of reefs and Thakau Levu on the NE side. A shoal extends 0.15 mile SE of Nananu-i-Thake's SW end and has depths of 5.5 to 8.4m.

3.36 Navolau Passage lies S of Thakau Levu; the pass is about 0.2 mile wide between two reefs. A spit, with a depth of 8.1m, extends 130m E from the NE corner of the reef on the W side of the passage.

Viti Levu Bay (17°25'S., 178°16'E.) is about 2 miles wide and recedes 3 miles. There are some shoals lying off the shore reef on the NW side of the bay and an isolated shoal near the middle of the bay. The depth in the center of the bay is 22m, shoaling gradually to the head. A remarkable thumb-shaped hill, about 197m high, is located on the W shore of the bay.

Caution.—Uncharted dangers exist within the bay.

3.37 From Viti Levu Bay the coast trends 4 miles SE to **Nggaralase Point** (17°27'S., 178°20'E.) and is free from dangers in the fairway.

Nggaralase Point is a conspicuous dark headland, 123m high. The coast to the SE, between Nggaralase Point and Tanavuso Point, about 10 miles SE, is broken up into several small bays and inlets.

Tandruku Island, 10.7m high, is located on the fringing reef off a low, rocky point, 2.5 miles SSE of Nggaralase Point.

The inshore route between Nggaralase Point and Tanavuso Point requires local knowledge. It has been reported the beacons marking the passage cannot be relied on.

Tanavuso Point (17°34'S., 178°29'E.) is the extremity of a spur; the shore reef extends 0.4 mile in a N direction from the point. Vessels should give the point a wide berth.

There is good anchorage on the W side of Tanavuso Point in 16m, just W of a small shoal lying off the shore reef.

3.38 Between the Nananu Islands and Tanavuso Point, the barrier reefs consist of two irregular lines of coral reefs and sunken rocks. Mariners should keep to the inshore passage.

Dangerous rocks lie about 2.3 miles NNE and 2 miles NE, respectively, of Tanavuso Point.

Vatu-i-Ra, NE of the barrier reef, extends S from a position 14.5 miles ENE of Ellington Wharf to a position 4.5 miles NE of Tanavuso Point.

Vatu-i-Ra Islet (17°19'S., 178°28'E.), 30m high, lies near the N end of the lagoon formed by the vast collection of small reefs that comprise Vatu-i-Ra.

Vatu-i-Ra Channel is a deep channel, with a least width of 3 miles, that separates Vatu-i-Ra from Vanua Levu barrier reef to the NE. This channel has not been surveyed recently, but the center of the channel has been used regularly by deep-draft vessels.

The narrow part of the channel has drying reefs on each side which are marked by lighted beacons.

A current caused by the Southeast Trades enters Vatu-i-Ra Channel and flows through Bligh Water in a NW direction. The rate attained is from 0.5 to 1.5 knots.

Thakau Ndavui, about 3 miles E of the S extremity of Vatu-i-Ra, is a circular reef 1 mile in diameter.

Moon Reef (17°32'S., 178°32'E.), nearly 1 mile in diameter, is separated from the S end of Vatu-i-Ra by a channel about 0.4 mile wide.

The SE extremity of the barrier reef lies about 1 mile SW of Moon Reef and is marked by a beacon.

Between Tanavuso Point and **Tailevu Point** (17°39'S., 178°36'E.), 9 miles SE, the coast is sandy, with coral and mud flats extending 0.2 to 0.3 mile off it.

Tova Peak, 647m high, stands 1.5 miles S of Tanavuso Point. It is fang-shaped when viewed from the E or W, but sharp from the N; it slopes down gradually to the coast.

Tailevu Point is low and sandy. A group of buildings are situated on the rising ground behind the point.

The water off this section of the coast is encumbered with numerous rocks and shoal patches whose positions are best seen on the chart.

3.39 Price Patches (17°33'S., 178°35'E.), with a least depth of 2.4m, lies 4 miles offshore about 2 miles SE of Moon Reef. Star Reefs, with a depth of 0.6m; Cox Reef, with a depth of 0.9m; and Elsie Reefs, which dries in places, lie 1.5 miles SE, 3.5 miles SSE, and 4.5 miles SE, respectively, from Price Patches.

Nggoma Island, located 0.4 mile NE of Tailevu Point, is 41m high. The islet is fringed by a reef which extends 0.2 mile off the NW end. A reef lies 1.3 miles N of Nggoma, and a detached reef lies about 0.3 mile E of the island.

Knott Reef, which dries, lies on the NW edge of an extensive reef, 1.5 miles NE of the recommended track.

Naingani (17°35'S., 178°42'E.), 6.3 miles NE of Tailevu Point, has a defined summit, 184m high, at its NE side. Reefs extend 5 miles SW and 3 miles NW from Naingani.

The coast between Tailevu Point and **Verata Point** (17°51'S., 178°39'E.), 12.5 miles S, is fringed with mangroves and coral reefs, and mud flats extend off it.

The water between this coast and Ovalau Island is thickly strewn with coral reefs and sunken rocks. Navigation is dangerous among these hazards; a good masthead lookout and the sun in a favorable position will be the best guides.

From Verata Point to Kamba Point, 10 miles SSE, the coast recedes about 3 miles and forms a bay that is filled with shore reefs and numerous isolated reefs and dangers.

Moturiki Island (17°45'S., 178°45'E.) lies 8 miles offshore, 8.5 miles SE of Tailevu Point. The island extends 5 miles SSE from its N extremity.

Mbua Waters is the name given to the water area inside the barrier reef S of Moturiki Island to Kamba Point.

Viwa Island, 49m high, lies 0.6 mile offshore, 5.3 miles S of Verata Point. Large vessels may navigate in Mbua Waters as far S as abreast of Viwa Waters, but the vessel should be conned from aloft with the sun astern.

Caution.—In Mbua Waters, sunken coral reefs are numerous and soundings give no warning when approaching these dangers. It is probable that there may be patches of coral that are not charted; great vigilance is necessary when navigating among them.

3.40 Tomberua Passage, about 2.5 miles E of Kamba Point, leads through the barrier reef to the S extremity of Mbua Waters. It is available to vessels of 3.4m draft.

Moturiki Channel, 1 mile S of Moturiki Island, is about 0.5 mile wide between the reefs which fringe the islands of Thangalai on the N and Leleuvia on the S side of the channel, respectively.

The barrier reef extends 11.5 miles S from the S entrance point of Moturiki Channel to Tomberua Passage.

Mambualau Islet (17°58'S., 178°47'E.), 27m high to the tops of the trees and conspicuous, stands on the E edge of the barrier reef, 2.5 miles N of Tomberua Passage. It is a valuable mark for making the coast in this area.

3.41 Ovalau (17°41'S., 178°49'E.) lies 9 miles E of Tailevu Point and about 1 mile N of Moturiki Island. The island rises to a height of 626m and is rugged throughout. The island lies close within the barrier reef which extends 4.5 miles NE from its N extremity, and 3 miles SSE from its S extremity.

Between Ovalau and Naingani, 5 miles NW, the seabed presents an irregular contour, and there are numerous dangers and shoals. The area is filled with reefs which may best be seen on the chart.

The sunken barrier reef between these two islands is broken by a gap 1 mile wide, about 3 miles NW of Ovalau.

Na Tumbari Entrance, between Lekaleka Reef, awash, on the N, and Mbalavu Reef, awash at half tide, on the S, is the principal entrance to Levuka Harbor. The channel is about 0.2 mile wide between the 9.1m lines, and has a least depth of 35m charted between the reefs on the range line. Lights, in line bearing 263°, lead through Na Tumbari. The front light is a neon light in the form of a cross on the face of the church; the rear light is a vertical neon strip about 0.1 mile W of the front light.

Waitovu Entrance, about 1.3 miles N of Na Tumbari Entrance, is formed between the N end of Lekaleka Reef and Mbuli Mbuli Reef, 0.6 mile farther N. Mbuli Mbuli is awash at LW. This entrance is 0.4 mile wide, with an average depth of 12.8m, but there is a rock, with a depth of 5.5m, in mid-channel.

Levuka (17°41'S., 178°50'E.)

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3.42 Levuka is a small, natural harbor located on the E side of Ovalau; it is protected by the barrier reefs which lie about 0.5 mile East. Heavy seas pass over these reefs, which dry.

Tides—Currents.—The neap and spring tidal rise here is about 1.2m.

Depths—Limitations.—Kings Wharf lies S of the entrance range and offers two berths, with alongside depths of 6.7 to 7.9m. Three sunken piles, with a least depth of 5m, lie within 30m of the NE corner of the wharf.

Vessels up to 30,000 dwt, with a maximum length of 171m and a maximum draft of 7.6m, can be accommodated.

Aspect.—The mountains W of Levuka are rugged, steep, and densely wooded, rising to a height of 375m within 0.7 mile of the coast. There are two prominent war memorials; one, 10m high, stands on shore 0.15 mile NW of Kings Wharf, while the other, of stone, 11m high, is situated 0.4 mile farther N. A church, which has a square clock tower, is also prominent. An oil tank, 0.4 mile SSE of the S war memorial, is conspicuous.

Pilotage.—Pilotage is compulsory. Vessels send their ETA at least 48 hours in advance to the Port Master, Suva. The pilot boards about 1 miles ENE of the Na Tumburi Entrance.

Levuka Harbor

Tankers are only berthed between sunrise and sunset; there are no restrictions on unberthing.

Signals.—Storm signals are shown at the Custom House during the typhoon season. The signals, which are displayed until conditions improve, are, as follows:

1. Preliminary Typhoon Warning—Yellow pennant.
2. Final Typhoon Warning—Black pennant.

Anchorage.—General anchorage is available E of the wharf, in depths of 27 to 36m, sand, good holding ground. The swinging room here is cramped; therefore, vessels are not recommended to remain anchored overnight.

Vessels over 75m long, awaiting free pratique, anchor at the quarantine area, 0.6 mile NNE of Kings Wharf, in 27m, sand.

Caution.—A patch, with a depth of 13.4m, lies 55m N of the range line, 0.45 mile ENE of the front range light. A depth of 6.4m is charted about 0.2 mile ENE of the same light. A reef, which dries 0.9m and is marked by beacons, lies 0.3 mile NE of the front range light.

Islands East of Viti Levu

3.43 **Ngau** (18°00'S., 179°20'E.), 30 miles E of Kamba Point, is about 11 miles long in a N-S direction. Ndelaitho rises to a height of 715m about 3.8 miles S from its N extremity. Lion Peak, 320m high, is located 2.5 miles NNW of the S extremity of the island.

Singuma Harbor (17°57'S., 179°16'E.) is formed by an indentation on the N coast of Ngau Island. A pair of leading lights mark the entry to the anchorage, in line bearing 138°, and are lit on request only. Local knowledge is required to enter the harbor and limited to vessels up to 42m in length.

The island is fronted on the W by a barrier reef which extends up to 3.5 miles offshore. Its E side is fronted by a fringing reef.

Yathiwa Island is located on the barrier reef, about 1 mile S of the island.

There are three passes through the barrier reef on the NW side of the island.

In Thumbaithsa Passage, the S channel, there is a least depth of 3.7m on the range line, with the W extremity of the island, Single Tree Point, in line bearing 136° with Yathiwa Island.

In the center channel, there is a least depth of 12.8m on the range with Lion Peak bearing 115°. This channel is about 0.1 mile wide between a 7.3m patch on the S side, which is clearly visible, and a 4.1m patch on the N side, which is not so distinct.

Wakathiva Passage, the farthest N, is deep in the fairway and about 0.1 mile wide between a 3.7m patch on the S side and a 5.5m patch on the N. Lion Peak, bearing 132°. It leads through the middle of the channel.

Anchorage.—Good anchorage can be taken, in a depth of 31m, 1.5 miles NNW of the W extremity of the island and, in 37m, 1 mile SSW of the above anchorage.

3.44 Mambulitha Reef, 5 miles S of Yathiwa Island, is awash and generally breaks heavy. Soundings give no warning of the proximity of this danger.

Nairai (17°48'S., 179°24'E.), a volcanic island, lies 9 miles NE of Ngau. It is surrounded by barrier reefs which extend 5 miles off the W coast and 4 miles off the N and S extremities.

Caution.—Nairai Island was reported (1970) to lie about 0.5 mile ESE of the charted position. Navigate only in conditions when reefs can be most clearly seen; dangerous coral pinnacles exist in the vicinity of the island.

3.45 Nayatha Entrance, an opening in the SW barrier reef, leads to an anchorage off Tovulailai, which is near the middle of the W side of the island. The entrance may be made with Green Mound in line bearing 055° with a peak. When a point about 0.7 mile NW of Green Mound is in line bearing 010° with a summit about 1 mile N of it, steer that bearing to the anchorage off the village. There are numerous dangers within the barrier reef.

Naleve Entrance, 0.8 mile S of Nayatha Entrance, may be entered with lights in line bearing 040°. A good lookout is necessary for coral patches.

Natovi, 0.8 mile S of Nairai, is remarkable for its magnetic anomaly.

Mbatiki Island, 186m high, lies 12 miles W of Nairai. It is almost completely surrounded by reefs extending 0.5 mile from shore. A strong S set may be encountered in this area.

Caution.—Thakau Momo (17°39'S., 179°15'E.), an atoll, is located about 10 miles NW of Nairai; it is marked on its W side by a light equipped with a radar reflector. This reef, which dries 0.9m and seldom breaks, is one of the most dangerous in Fiji Islands waters.

3.46 **Wakaya** (17°37'S., 179°01'E.), an island 181m high, lies 9 miles NNW of Mbatiki Island. The W side of the island is fringed by a reef, and the remaining part is surrounded by a barrier reef enclosing a lagoon, which extends about 3.5 miles N and SE from the NW and S extremities of the island, respectively, and 3 miles off the E side. At the N extremity the barrier reef joins the reef extending S from Makongai Island.

The lagoon is deep except for a 7.3m patch, 1.8 miles E of the summit of Wakaya, and shoals near the NW and SE ends, which may best be seen on the chart.

North of Wakaya, on the NW side of the lagoon, there is a

pass, Ndaveta ni Kaindraiimba, which is deep in the fairway and 0.3 mile wide. A sunken rock, which must be rounded, is on the S side of the fairway about 0.2 mile inside the entrance. There are other dangers 1 mile E of the entrance.

Ndaveta ni Kavu, 0.8 mile NW of the N extremity of the island, may be used by vessels with local knowledge.

An opening on the NE side of the lagoon can be entered by keeping the N and NW extremity of Wakaya in line bearing 249°.

Anchorage.—Anchorage may be taken in the bight on the N end of the island, in 16 to 26m, sand and coral.

Makongai Island (17°27'S., 178°59'E.) lies 7.5 miles N of Wakaya; it has two peaks in the center about the same height, 267m. A quarantine station lies on the island.

Makondronga, an island, lies within the barrier reef, 0.5 mile NW of Makongai.

A barrier reef surrounds Makongai, enclosing a large lagoon on the W side which has depths of 11 to 38m. The reef is broken in the NW sector.

The lagoon may be entered through Ndaveta Yawalevu Passage on the W side. To enter, bring the S extremity of the island to bear 112°, or a set of range beacons shown from the island's W side in line bearing 101°.

The best anchorage is in Dalithe Bay, on the NW side of the island, in 18 to 26m, sand and coral.

Vatu Vula is an isolated coral shoal, S of the above entrance.

Makongai Channel (17°27'S., 178°55'E.), a frequented passage between Vatu Vula and the barrier reef of Vatu-i-Thake, is 2 miles wide.

Caution.—An area 0.8 mile wide 1.3 miles WNW of Vatu Vula always breaks. Vessels generally pass about 0.5 mile from Vatu Vula.

Care should be taken to give a wide berth to the NE horn of the barrier reef of Ovalau; it is difficult to see at night.

3.47 Koro (17°19'S., 179°24'E.), an island of volcanic origin, lies 22.5 miles ENE of Makongai. Muanivanua Point, the S extremity of the island, is dominated by a hill, 355m high.

Coral reefs, mostly of the fringing nature, surround the island, except for a distance of 4 miles on the SW coast. The reef extends 0.8 mile S of Muanivanua Point and 2 miles N of Nola Point, the NW extremity of the island.

Tulane Harbor (Ndere Bay), entered 1 mile SSE of Nola Point, is protected from all directions except from the NW. Vessels, with local knowledge, may anchor, in 26m, sand and coral. A sand cay, 0.9m high, stands on the W extremity of the reef which forms the S side of the bay.

Smoothwater Reef is the name of the reefs N of Nola Point; Vatulele Reefs lie 1.5 miles E. Vatumatau Bay lies between the reefs and provides anchorage, in 17 to 27m, for vessels with local knowledge. A line of sunken rocks lie in the entrance to the bay.

A line of reefs extends 1 mile N from the NE extremity of Koro. Good anchorage may be obtained by vessels with local knowledge W of this reef.

Nanggaindamu Harbor, located 5.5 miles S of the NE extremity of Koro, provides anchorage to vessels with local knowledge. There are several coral heads in the harbor which are not easily seen, as muddy water is discharged into the harbor from streams.

The harbor may be entered by North Passage, a long winding passage, 14.6m deep, or by South Passage, 18.3 to 49m deep. Dangerous spits extend off either horn of the entrance, and from inside the S horn a line of sunken rocks extend 0.3 mile in a NW direction.

Anchorage.—Anchorage can be taken 0.3 to 0.5 mile SE of the village, in 7 to 14m, or, in 22 to 37m, under the lee of the detached reef which forms the E protection of the harbor.

Vanua Levu

3.48 Vanua Levu (16°35'S., 179°20'E.), which lies with its S extremity about 36 miles NE of the N extremity of Viti Levu, is of similar formation to that island. The highest peak is Nasorolevu, 1,032m high, about 54 miles ENE of its W extremity. The coast is more indented than that of Viti Levu; the extreme E portion is nearly separated from the remaining part by Natewa Bay, with only a narrow isthmus connecting them.

The S coast of the island has a general WSW direction between Navukana Promontory and Solevu Point, 72 miles distant. This coast is indented by two bays. The principal port in the island is contained in Savusavu Bay.

In addition to Nasorolevu there are several remarkable peaks from 610 to 914m high.

The lofty island of Taveuni, off the SE extremity of Vanua Levu, is seen from along the coast only in clear weather. In strong trade winds, clouds cover its summit.

From the SE extremity of Navukana Promontory, the coast trends in a W direction to Urambuta Point, about 21 miles distant. It is indented by several bays and is fringed by reefs, with openings to the bays.

3.49 Viani Bay (16°45'S., 179°53'E.) may be entered by Viani Pass, a break 1 mile wide in the outer reef; however, there is a coral bank, with a depth 3.7m, in the center. There is good anchorage, in 24m, sand and mud, in the NE corner of the bay.

Mbenau Islet, 15m high to the tops of the trees, lies inside the barrier reef, 2 miles WSW of Viani Bay. About 0.1 mile NE of the islet there is a conspicuous black, rocky point.

The coast from Mbenau Islet to Urambuta Point forms a bay in which there are two harbors. The fringing reef extends from 0.5 to 2 miles from shore.

Waikava Harbor (16°44'S., 179°48'E.), 5 miles NW of Mbenau Islet, is 0.8 mile wide E-W. On the W side of the harbor there is a small coral island. A coral reef extends 0.2 mile E of the island, and at the village, the spit of coral, mud and sand, extends 0.15 mile offshore.

The channel into Waikava Harbor has a depth of 49m between the inner horns.

Anchorage.—Anchorage may be taken, in 11 to 16m, mud, with the center of the islet bearing 235°, distant 0.3 to 0.4 mile.

3.50 Fawn Harbor, 4.5 miles W of Waikava Harbor, is entered through a passage in the fringing reef that is 160m wide and has a depth of 37m between the inner horns. Good anchorage may be obtained, in 10 to 22m, mud, within the harbor.

Urambuta Point (16°48'S., 179°34'E.) is a low, rocky point covered with trees. The fringing reef extends 0.3 mile from shore.

The coast from Urambuta Point trends in a W direction 16.5 miles to Lesiatheva Point, the E entrance point to Savusavu Bay. The fringing reef lies up to 0.9 mile off this coast.

Point Reef (16°50'S., 179°16'E.) extends 1.5 miles SW from Lesiatheva Point. A light is situated on the extremity of the reef.

Savusavu, a conical peak 353m high, located 6.5 miles NE of Lesiatheva Point, is the most prominent landmark along this coast.

3.51 Lesiatheva Point (16°49'S., 179°17'E.) stands out in relief and distinctly marks the entrance to the bay.

Naviavia Island, 18.3m high to the top of the trees, is located on Point Reef, 0.5 mile S of Lesiatheva Point.

Savusavu Bay is entered between Lesiatheva Point and Kumbulau Point, 13.5 miles SW; the bay recedes 7.5 miles. The E part of the bay is protected by the promontory running NE from Lesiatheva Point, and the W part is protected by the barrier reef. The E part of the bay is clear of dangers.

Point Passage, the principal entrance to Savusavu Bay, is located between Point Reef and **Sybil Rocks** (16°49'S., 179°15'E.), 1.5 miles NW. Sybil Rocks are not marked by breakers, and do not show clearly after rains because of the muddy discoloration of the water.

Nakama Creek flows into the bay on the E side, 5 miles within Point Passage. Nawi Island, on the N shore of the creek, is 39m high.

3.52 Waikama (Savusavu) (Nakama) (16°46'S., 179°20'E.) (World Port Index No. 55560), on the S bank of Nakama Creek, handles vessels loading copra. A wharf, 38m in length and with alongside depths of 5.8m, will handle vessels up to 110m in length.

Pilotage.—When heading for Savusavu, pilotage is required. The request must be made at least 48 hours in advance via the Suva station. The pilot boards about 1.3 miles to the W of Point Reef Light.

Anchorage.—Vessels may anchor off Nakama, in 44m, with the summit of Nawi Island bearing 082°, 0.35 mile distant.

Nyavu Passage, 10 miles W of Lesiatheva Point, is about 0.5 mile wide and deep. A ledge of rocks extend nearly 0.1 mile off the outer horn of the E reef. Beacons, in line bearing 330.5°, lead through the passage. Once through the passage there are several dangerous patches, which may best be seen on the chart.

A bauxite plant lies on the bank of a river near the inner end of Nyavu Passage. Anchorage has been reported to be available 1.3 miles SE of the river's mouth, in a depth of 27m, grey mud.

Kumbulau Passage, about 2 miles SW of Nyavu Passage, extends NE and SW. The passage is reported dangerous and full of uncharted coral heads. Local knowledge is required.

From **Kumbulau Point** (16°54'S., 179°04'E.), the coast trends SW about 4 miles to Nasonisoni Island. A barrier reef lies parallel to this coast, ending about 2 miles ESE of the island.

Nasonisoni Passage, between Nasonisoni Island and a detached reef S, is about 1.5 miles long and 0.15 mile wide in the narrowest part. A vessel in transit should keep close to the S side, which is steep-to. This passage should only be used during good light conditions when the reefs can be seen. Tide rips extend up to 2 miles SE of the passage's E end.

3.53 Namena Barrier Reef (17°05'S., 179°03'E.) extends SSE 13 miles from the detached reef on the S side of Nasonisoni Passage, then turns sharply to the NW and forms a lagoon 2 to 3 miles wide. North Save-a-tack Passage enters the lagoon on the E side, 6 miles NNW of its S extremity, while South Save-a-tack Passages enters the lagoon 4.5 miles NW of its S extremity. Namena (Namenalala) Island, 98m high, rises in the lagoon, 1 mile E of the latter passage.

The reef continues for another 12 miles WSW, then about 21 miles SSE to Makongai Channel. There are heavy tide rips off the SE extremity of the reef.

Vatu-i-Thake (17°23'S., 178°46'E.), an island 32m high, is located inside the barrier reef, 6.5 miles NW of its SE extremity.

From Vatu-i-Thake, the reef continues in a NW direction for 20 miles, but it begins to lose its barrier characteristics and becomes fragmentary. Farther N the barrier form completely disappears, and the reefs become scattered and disconnected. On the seaward side the reef is steep-to, except as regards the latter portion, where more shoal soundings exist.

Nandi Passage and the Vuya Passages, located 9 miles SSW and 16.5 miles SW, respectively, from Nasonisoni Island, are available for large vessels. There are other passes through the barrier reef, but the majority are suitable only for small craft. The current sets strongly through these passages at times, and there are generally tide rips in them.

Caution.—The N portion of Namena Barrier Reef as far W as the Vuya Passages is comparatively free from dangers. The S portion is studded with reefs and sunken reefs that are charted, but it is possible that uncharted dangers exist; therefore, care should be exercised and a vigilant masthead lookout is necessary when navigating among them.

3.54 Wainunu Bay (16°56'S., 178°53'E.) indents the coast of Vanua Levu from Nasonisoni Island to Solevu Point, 14 miles WSW; the bay is defined.

The Wainunu River discharges into the bay 5 miles NW of Nasonisoni Island, its entrance is obstructed by coral and mud flats. Thaningge, a large horseshoe-shaped reef which dries, lies near the center line of the bay 3 miles S of the mouth of the river. Several reefs and patches lie between Thaningge and the river.

Between the Wainunu River and Nasawana Bay, 6 miles SW, the fringing reef extends more than 1 mile offshore. There are numerous dangerous shoals outside the fringing reef.

Nandi Bay (16°58'S., 178°48'E.), 2.5 miles SW of Nasawana Bay, exposed to the S and E, is subject to strong winds and heavy seas.

Leading Peak, 5 miles NW of Nandi Bay, and Nandi Bluff, in line bearing 308.5°, lead through Nandi Passage to the anchorage off Nandi Bay. Nolè, a reef rising from deep water and drying 1.2m, lies 3.5 miles SE of Nandi Bay and close S of the above track. Anchorage can be taken near the entrance to Nandi Bay in depths of 9 to 11.8m, but care should be exercised in

this area due to rocks and shoal patches.

Solevu Point lies 2.5 miles SSW of Nandi Bluff.

The Vuya Passages are located about 5 miles S of Solevu Point. There are several passes through the barrier reef in this vicinity, but only the S one is recommended. The S side of the recommended passage is marked by a concrete beacon, 10m high. This passage will accommodate vessels drawing 9m.

3.55 Cocoanut Point (17°00'S., 178°41'E.) lies 4.8 miles WNW of Solevu Point; it is low, with coconut trees on it. A reef extends 0.8 mile offshore between these two points, forming a breakwater to any E swell. A reef with a beacon on it is located 1.8 miles S of the above reef. Other isolated rocks and reefs are located in this area, their position may best be seen on the chart.

Lekumbi Point (16°52'S., 178°34'E.), which terminates in a sandy beach, lies 10 miles NW of Cocoanut Point. The coast between the two points is fringed by a reef which extends up to 0.5 mile offshore. Several reefs, above and below-water, lie within 1.5 miles of this coast.

Thakau Levu, an extensive isolated reef, lies 0.9 mile W of Lekumbi Point.

Mbua Bay is formed between Lekumbi Point and Naithombothombo Point, 4.5 miles NW. The bay is encumbered with reefs, Mbavu Reef, the largest of them lies 1.3 miles NW of Lekumbi Point. The bay offers sheltered anchorage, with the E portion having the best, in depths of 12 to 16m, mud.

3.56 Yandua Island (16°49'S., 178°18'E.) lies 10 miles W of Naithombothombo Point. The island is 194m high and is sparsely wooded. A light is shown from the island.

Anchorage.—Anchorage may be taken off the entrance to Cukuvou Harbor (Strahan Harbor), in 31m, sand and coral, about 0.2 mile off the reef with the summit bearing 100°. This anchorage is sheltered from the trade winds, but is subject to a heavy swell when wind and tide are running against each other.

Yendua Tambu Island, encircled by reefs, lies close off the SW side of Yandua Island; this island is 91m high.

South Reefs lie 0.8 mile S of Yandua; an isolated reef lies close E.

Pascoe Reefs, previously described in paragraph 3.31, extend W from Yandua Island.

Sail Rock (16°40'S., 178°18'E.), 18m high, lies 7.5 miles N of Yandua Island. There are many other dangers in the area N and NW of Yandua Island.

Thakau Mono, 1.5 miles E of Yandua Island, is an extension of South Reefs. A barrier reef extends in a general SE direction to within 3 miles of Cocoanut Point, then extends S joining the barrier reef.

Yandua Passage, 5.3 miles W of Naithombothombo Point, leads from Bligh Water to join the inshore channel round the W and N sides of Vanua Levu. The passage is marked by buoys equipped with radar reflectors. The center of the fairway has been wire dragged to a depth of 9.1m over a 0.3 mile width.

Naithombothombo Point (16°50'S., 178°30'E.) is low and rocky, and from it the coast turns abruptly N and becomes broken up into numerous rocky points with sandy beaches between them.

Seseleka, 421m high, rises 3.3 miles NNE of Naithombothombo Point.

From **Mbaulailai** (16°45'S., 178°29'E.), a small bay 5 miles N of Naithombothombo Point, there is an inside passage to Ndrua Ndrua, a distance of about 75 miles. The track is marked by beacons.

Rukuruku Bay is located 4 miles NE of Mbaulailai; the reefs on either side of the S approach are marked by beacons. Rukuruku Bay provides hurricane anchorage in depths to 22m mud, with ample swinging room.

3.57 Sleepy Point (16°39'S., 178°32'E.), the NW extremity of Vanua Levu, is sandy and has a village situated on it.

Good anchorage may be obtained, in 26 to 27m, mud, off Sleepy Point.

Two peaks, 502m and 469m high, are located 2.3 and 2.8 miles ENE, respectively, from Sleepy Point; they are both rocky and partly wooded, with their sides are covered by grass.

Monkey Face Pass, 1.3 miles NW of Sleepy Point, is about 0.5 mile broad that leads from seaward through the reefs.

Yangganga Island, 4.5 miles NE of Sleepy Point, is rocky and barren; the summit consists of several sharp peaks, the greatest height of 270m is near its W extremity.

The area between the coast and Yangganga has three large reefs which are all steep-to. The track is S of them.

3.58 Wairangia Point (16°39'S., 178°37'E.), 3 miles SSE of Yangganga Island, is the W entrance point of Ngaloa Bay. Ngaloa Bay forms a deep bight with depths of about 5.5 to 8m. Shallow water extends about 1 mile off the shore of this bay, and there are several sunken patches farther out. The shoals here are not easily seen as the water is cloudy.

There are several islands and rocks in a general NE direction from Wairangia Point. These dangers may be passed on either side. The N route is preferred.

From a position on shore, 8 miles E of Wairangia Point, to a position near the village of Nambekavu, 10 miles NE, mud flats extend offshore for considerable distances.

Oandrau Island (16°34'S., 178°47'E.), small and sandy, lies 10 miles NE of Wairangia Point. Nukuira, Nandongo, and Vatuki are islands located on the off-lying coral reefs, 2.3 miles W, 2 miles N, and 6 miles NE, respectively, from Oandrau Island. Nakuthi, a small island surrounded by reefs, lies close N of the recommended track, 6 miles NE of Oandrau Island.

Anchorage.—There is anchorage, in a depth of 14m, mud, good holding ground, 1 mile ESE of the S extremity of Nukuira.

3.59 Raviravi Point (16°28'S., 178°57'E.), 6 miles ENE of Nakuthi, is backed by a hill, 234m high; the hills in this area are topped with rugged black stones. Tuna Islet lies on the shore reef about 230m N of Raviravi Point. The recommended track passes close N of the islet.

For detached reefs and rocks near the recommended track, it is best to refer to the chart.

From Raviravi Point, the coast turns E and is backed by sparsely-wooded ranges from 305 to 610m high.

Mathuata-i-Wai (16°25'S., 179°04'E.) lies about 0.9 mile offshore, 6.8 miles ENE of Raviravi Point. This island is sur-

rounded by a fringing reef. The recommended track lies S of the island.

Kia Island (16°14'S., 179°06'E.), 10.5 miles N of Mathuata-i-Wai, is 226m high. It lies in a pronounced bight in the Great Sea Reef and forms a most conspicuous landmark. Three small islets lie close off its E side.

Great Sea Reef is the name given to the reef which extends E from a position about 8 miles NE of **Yalewa Kalou** (16°40'S., 177°45'E.). From the W extremity the reef, it extends ENE about 85 miles to Kai Island; it then extends E for another 50 miles, gradually approaching the shores of Vanua Levu, and finally merging into the barrier reef surrounding the island. This great reef forms a natural breakwater against the sea raised by N winds to the passage between Viti Levu and Vanua Levu and to a lesser degree to the N coasts of those islands.

The main passage around Great Sea Reef is Round Island Passage, leading into Bligh Water or Vatu-i-Ra Channel, all of which have been previously described in paragraph 3.30, paragraph 3.31, and paragraph 3.38, respectively.

3.60 Raviravi Passage (16°19'S., 178°56'E.) is used by local vessels bound from Fiji to Rotuma Island. The passage has a least depth of 25m and a least width of 0.3 mile.

This passage requires local knowledge and should only be used in daylight, under favorable light conditions. The seaward entrance should only be approached at LW, as the entrance is not easy to make out. Tidal currents in the passage are strong.

There is a passage through the Great Sea Reef, 3 miles SW of Kia Island. A reef, which nearly dries at LW, lies in the middle of the passage. A coral head, with a depth of 3.7m, lies 0.5 mile E of the reef, and numerous other coral heads are reported in the vicinity. This passage is not recommended for deep-draft vessels. This passage was formerly mined; anchoring, trawling, and other bottom activities are not recommended.

Nathula Point (16°26'S., 179°07'E.), a low point on the coast 2.5 miles E of Mathuata-i-Wai, is mangrove covered. Two small detached reefs, awash at LW, lie 0.4 mile N of it.

Nanduri, a town on the coast 2 miles E of Nathula Point, has a good anchorage 0.4 mile N of its beach, in 9m, mud.

Nangano Island (16°24'S., 179°10'E.), located on the N side of the recommended track 3 miles NE of Nathula Point, is 20.7m high. Thakari lies 0.5 mile S of Nangano Island, on the S side of fairway. Ulsori Peak, a conspicuous rocky hill 348m high, rises 2.3 miles SE of Thakari.

Thukini Island, 1.5 miles E of Nangano Island, stands on a reef over 2 miles long. A track which leads NW to the passage through Great Sea Reef passes between these two islands.

Caution.—Much of the NW track through the Great Sea Reef is unsurveyed. Care is to be taken when navigating this route.

Mali Island (16°21'S., 179°21'E.), about 3 miles long, 1 mile wide, and 169m high, lies 6.8 miles ENE of Thukini Island. Vorovoro Island, 77m high, is joined to its W end by a coral reef which is awash at LW.

3.61 Malau (16°21'S., 179°22'E.) (World Port Index No. 55556) is situated on shore, 0.6 mile S of Mali Island. This is the site of the Fiji Sugar Corporation bulk sugar terminal. The jetty projects 200m from shore and has a depth of about 11m at its head. Three dolphins, connected to each other by walkways, form the head of the jetty; a loading tower, which is conspicuous, stands on the center dolphin. A wooden jetty, which was in disrepair in 1980, lies close SW of the jetty.

Tugs, fuel, and fresh water are not available. There is a hospital in Malau. An airport, with daily service to Suva, is close by the village.

A mooring about 0.1 mile farther W is connected by a floating pipeline with oil tanks on shore. A timber mill is situated about 0.5 mile farther SW.

Vessels using the bulk sugar terminal are loaded to a draft not exceeding 11m and are restricted to HW departures.

Pilotage.—Pilotage is compulsory. Pilots are arranged via the vessel's agent in Suva with a 48 hour notice given to the Suva harbormaster. Pilot boards approximately 2 miles N of Mali Pass. Arrivals and departures are restricted to daylight hours.

Anchorage.—Anchorage is available about 0.5 mile W of the sugar terminal, in a depth of 16m, good holding ground and protected from the trades. Vessels drawing over 6m should drop a second anchor to limit their swing.

Caution.—There are many dangers in this area and care should be taken when navigating these waters.

3.62 Lambasa (16°26'S., 179°23'E.), the administrative center of Fiji's N district, is situated on the banks of the Lambasa River, entered about 3 miles SSW of Mali Island. The town is reachable by vessels drawing not more than 2.3m at near HWS.

Mali Pass is a wide, deep passage through the reefs NW of Mali Island. In mid-channel, the soundings vary from 36 to 80m; the reefs on each side are steep-to. During springs, the tidal currents sets with considerable force. This passage is subject to heavy ground swells. This passage was formerly mined; anchoring, trawling, and other bottom activities are not recommended.

Initially, the passage is entered from seaward on a mid-channel course of 165°; then steer for the W end of Vorvo Island, bearing 145°, leads into the inner passage. Caution is advised, as once the barrier reefs are cleared, the track splits to avoid a shoal, with a least depth of 1.2m, located about 1.5 miles SW of Vorvo Island's W end. Mali Pass should not be used if the reefs cannot be seen.

Corbett Rock, located about midway between the barrier reef and the N part of Mali Island, is small and has a depth of 1.5m.

Roberts Point (16°19'S., 179°24'E.) lies 2 miles E of Mali Island.

Sausau Peak, 404m high, located 2 miles inland, about 3.5 miles E of Roberts Point, is a conspicuous grassy hill.

Sausau Island, located on the barrier reef 3.5 miles NE of Roberts Point, is 37m high. The island is a small rocky mound covered with grass and sparsely wooded.

Tivi Island, about 1.5 miles E of Sausau Island, is 105m high, rugged, and rocky. The recommended track passes between these two islands.

Vatundamu Point (16°14'S., 179°32'E.), 4 miles NE of Tivi Island, is a rocky, wooded promontory rising to an elevation of 216m, about 1.5 miles inland. A conspicuous rock, 12.2m high,

0.3 mile N of Vatundamu Point, is connected to it by a sunken reef.

Thorp Shoals, a number of patches with depths of less than 1.8 to 9.1m, lie 1.5 miles W of Vatundamu Point on the S side of the recommended track.

Sausau Passage is entered about 5 miles NNW of Vatundamu Point. This passage through the barrier reef is wide and deep, but is not recommended as the channel was last surveyed in the 1890s, and there are many coral heads or obstructions which lie within the fairway. This passage was formerly mined; bottom activities including anchoring and trawling should not be undertaken in this area.

Pasco Bank, with a least depth of 4.6m, lies on the SE side of Sausau Passage. Tidal currents set across this bank, and foul ground extends N and E of the bank.

3.63 **Tutu** (16°14'S., 179°34'E.), an island 193m high, is connected to the mainland by a reef about 1.3 miles E of Vatundamu Point. It has the appearance of a peninsula.

Kavewa, an island 71m high, covered with scrub and trees, lies 1.8 miles N of Tutu.

A conspicuous rock, 16.8m high, lies on the reef 0.5 mile NW of Kavewa.

Ndrua Ndrua (16°12'S., 179°37'E.) lies 1.5 miles E of Kayewa. It has a table-topped summit, 134m high. A conspicuous rock, 31m high, lies about 0.4 mile N of the island.

Tilangitha Harbor lies 8 miles E of Ndrua Ndrua Island. It may be entered from the N via Tilangitha Pass, which forms part of the harbor. Deep-draft vessels can anchor in the harbor, in 27 to 37m, mud, with about 0.4 mile of swinging room. The pass is not marked and vessels should only make passage in good conditions of wind and light.

Tilangitha Island, located on the SE end of Tilangitha Pass, is 26m high.

Caution.—From Ndrua Ndrua Island E, there is no inshore navigation to Tilangitha Harbor, except for boats.

3.64 Nukundamu Pass is entered about 5 miles E of Tilangitha Pass and is about 135m wide with depths of more than 37m in the fairway. This pass, about 1 mile long, leads to Mbekana Harbor, where there is good anchorage, in 27m, mud clear of the rock swept to 11.3m.

The passages through the reefs E of Nukundamu Pass are only available for boats with local knowledge.

The NE extremity of Vanua Levu is a narrow, marked peninsula, about 13 miles long. The many clearly-defined hills gradually diminish in height toward the NE. It is fronted on both sides by coral reefs which project 3 miles NE of Undu Point, terminating in a sharp point named Napotu. The seaward side of the reef is steep-to with depths of more than 183m within 0.5 mile of its outer edge.

Undu Point (16°08'S., 179°58'W.), the extreme NE point of Vanua Levu, is dominated by a saddle-shaped formation, 382 and 472m high.

3.65 **Thikombia Island** (15°46'S., 179°56'W.) is narrow and wooded, with three conspicuous peaks; the highest, in the NW part, is 192m high. The NW coast is bold and rocky, but the E point is low and sandy. The island lies 22 miles N of Undu Point.

Littlebreak Spit is a ledge of sunken coral reefs and detached patches extending 2.5 miles SE from the E extremity of the island; there is seldom any break on this reef.

From Undu Point, the coast trends in a SW direction to Natewa Bay and is generally rocky, interspersed with small sandy bays. It is fringed by a drying reef which extends from 0.5 to 1 mile offshore; the reef is steep-to.

Natewa Bay, about 20 miles SW of Undu Point, is entered between **Tawake** (16°15'S., 179°51'E.) and **Kumbulau Point** (16°28'S., 179°55'E.), the N extremity of the Natewa Peninsula.

The bay has general depths of over 183m to within 9 miles of its head. The NW coast, which has numerous detached reefs, has a shelving bottom while the SE coast is steep-to. The SE side of the bay is formed by the Natewa Peninsula, a triangular-shaped promontory whose apex is SE.

Tides—Currents.—Within the bay, the height of tide is influenced by the prevailing wind, and may vary as much as 0.5m from the values predicted for the area. During periods of strong E winds, a small surge has been observed here.

Tidal currents in the center of the bay are negligible. Weak and unpredictable local sets may be experienced in the vicinity of the reefs, but rates of more than 0.5 knot have not been experienced.

From Kumbulau Point, the E coast of the Natewa Peninsula extends SSW 13 miles, then SE for a distance of 8 miles to the E termination of Navukana Promontory.

A barrier reef extends from 1 to 2.8 miles off Kumbulau Point and the remainder of the coast is fronted by coral reefs, and backed by densely-wooded mountains, which rise to a height of 835m.

3.66 **Rambi** (16°30'S., 179°58'W.), separated from Kumbulau Point by Georgia Channel, rises to a height of 463m in its S part.

Dawson Bay, located on the E side of the island, 2.8 miles SW of its N extremity, is the deepest indentation on the island.

Anchorage.—There is good anchorage at the head of the bay, in 20 to 27m, mud. Katharine Bay, located on the S side of Rambi Island, has good anchorage protected from all winds. Anchorage can also be found in Albert and Virginia Coves in depths of 22 to 29m, local knowledge is required for all anchorages.

Georgia Channel is about 3 miles wide, but a large reef projecting from shore 4 miles SSE of Kumbulau Point, and the coral bank with a least depth of 3.7m extending WNW from the S extremity of Rambi, reduce the width to about 0.3 mile.

Caution.—This channel requires local knowledge, as S of Rambi the reefs are numerous and seldom break. Strong tide rips and sets may be experienced in the vicinity of the reefs at the S end of the channel.

Vessels proceeding between Natewa Bay and Sonosono Strait should round the N end of Texas Reef and enter Rambi Channel.

3.67 **Kioa Island** (16°39'S., 179°55'E.), 5 miles SSE of Rambi, lies 0.6 mile off Navukana Promontory. It is wooded and 303m high near its S end.

Kioa Reefs lie about 1.5 miles SE of Kioa Island. They are a line of sunken dangers which seldom break. West of the reefs

there are many dangerous coral heads.

Texas Reef and Florida Reefs extend S from a position 6.5 miles NNE of the N extremity of Rambi for a distance of 18 miles.

The Florida Passages, E of Dawson Bay, separate Texas Reef and Florida Reefs; the opening is divided by a narrow ridge of sunken coral.

The S Florida Passage is the easier approach to Dawson Bay. Both N and S passages have sunken rocks 0.5 mile inside them, which with ordinary precaution are easily avoided. Navigation within the lagoon is safe if there is good light and a masthead lookout kept.

Rambi Channel, which is deep in the fairway, lies between the above reefs and Budd Reef, about 5.5 miles E. The sea seldom breaks on Florida Reefs or Budd Reef, therefore, that great caution is necessary when passing through the channel, especially by vessels without local knowledge.

The Ringgold Isles

3.68 The **Ringgold Isles** (16°19'S., 179°28'W.) are a scattered group of atolls and islets occupying an extensive area within a distance of 50 miles E of Undu Point. The group includes Vetauua Islet in the N to Nanuku Levu Islet at the S end.

Tides—Currents.—Tidal currents through the Ringgold Islands generally set N-NE and S-SE, with the S to SE set being the stronger, seldom exceeding 1 knot.

Thakau Matathuthu (16°10'S., 179°41'E.) extends 6 miles SE from a position 15 miles E of Undu Point. The lagoon within the reef may be entered about 2 miles S of its NW extremity, and is marked by a rock awash at LW, about 0.5 mile from the S side of the entrance. The sea usually breaks, but it cannot always be relied upon. Good anchorage can be found in the lagoon, in 29m, sand, on a flat bottom.

The tidal currents off the lagoon entrance set with some strength across the axis of the channel; the SE current is the stronger.

Cocks Shoal, 1 mile SW of the entrance to the lagoon, has a least charted depth of 3.6m. It is usually marked by a strong tide rip and should be given a wide berth.

Thakau Vuthovutho, 3 miles NE of Thakau Matathuthu, is separated from that reef by Scatterbreak Channel. There is a lagoon which may be entered on its W side.

3.69 **Nggelelevu** (16°05'S., 179°10'W.), a small islet, is located on the E end of a lagoon, 20 miles E of Thakau Vuthovutho. The island has a light situated on its E side.

Nggele Levu Lagoon, enclosed within the reef which extends 12.5 miles W of Nggelelevu, has good anchorage in all parts, in depths of 7 to 29m, sand. A shoal, with a least depth of 2.7m, has been reported to lie 2.8 miles WSW of the light on Nggelelevu.

There are three passages into the lagoon from its W side. Rendell Passage, the farthest S, is the easiest to find. This passage is at the W end of the continuously-breaking reef which forms the S side of the atoll. A sand cay, awash at HW, lies 0.5 mile E of the passage. From the passage, the S extremity of Nggelelevu bears 080°.

The flood tide sets out of Rendell Passage at a velocity of 0.3 to 0.8 knot; the ebb is not as strong.

Vetauua Island, fringed by a coral reef which extends from 0.1 to 0.3 mile offshore, lies 16 miles WNW of Nggelelevu.

Nukusemanu Reefs (16°17'S., 179°28'W.), 9 miles SSW of Rendell Passage, and Nanuku Reef, 28 miles S, are the N and S parts of a sunken reef.

In the lagoon enclosed by these reefs there are several coral patches on which the sea breaks heavily in strong E winds. On the submerged banks which form the boundaries of the lagoon, there are many tide rips and the sea breaks on them in places.

Nukusemanu Island, located on the reefs 12.5 miles S of Rendell Passage, is 18m high to the top of the trees. There is a passage into the lagoon NW of the island.

Heemskercq Reefs, sometimes awash, occupy the middle of the E side of the lagoon.

Nanuku Reef, steep-to, forks to the N 5 miles from its S point; the E branch is submerged, and in light winds only breaks occasionally. The W branch maintains its sunken character and joins Nukusemanu Reef.

Nanuku Levu (16°43'S., 179°28'W.), a small islet 21m high to the tops of the trees, lies about 1 mile N of the S extremity of Nanuku Reef.

Adolphus Reef, about 4 miles in diameter, lies 3.5 miles NE of Nukusemanu Island; the sea breaks heavily on the SE part of the reef and on the NW horn.

3.70 **Nukumbasanga Island** (16°18'S., 179°16'W.) lies on the E side of a small reef 3 miles E of Adolphus Reef.

On the W side of the lagoon formed by Nukusemanu and Nanuku Reefs, there are two isolated reefs; Pitman Reef, awash at LW, lies 9 miles SW of Nukusemanu Island, and Miller Reef, about 10 miles SSE of Pitman Reef, breaks heavily in strong S winds.

Ringgold Channel, between Nukusemanu and Budd Reef, is 8 miles wide and apparently clear, except for the two reefs described above.

Budd Reef (16°31'S., 179°37'W.), about 6 miles wide and 11 miles long, NE-SW, encircles six islands. The reef lies 7.8 miles E of Rambi, and is separated from it by Rambi Channel. As the reef is partly submerged, the sea breaks on it in certain places.

Thombia Island, 1.3 miles S of the N extremity of Budd Reef, is the highest and farthest N of the islands in the lagoon. The island is 180m high and forms a conspicuous landmark for those navigating among the reefs N and E.

The other islands enclosed within Budd Reef may be seen on the chart.

3.71 **Gangway Rocks** (16°38'S., 179°49'W.), 4 miles NNE of Tavenuni, has two rocks that are awash at LW. Some of the rocks have depths of about 1.8m. The sea breaks here occasionally, but is never heavy. An isolated 7.3m patch lies about 0.6 mile N of the rocks.

Taveuni (16°50'S., 179°59'W.), about 4 miles E of Navukana Promontory, is 23 miles long, NE-SW, and is 5 to 8 miles broad and rises to a height of 1,241m. The island is usually covered with clouds during SE winds. A radio mast is situated on a peak near the center of the island.

Naselesele Point, the N extremity of the island, has several

small islets extending NNE from it.

Anchorage.—Anchorage is available 1 mile WSW of the point, in a depth of 30m, sand.

Mate Rock, with a depth of 5.5m; Breaknot Rocks, with depths of 1.8 to 5.5m; and Champion Rocks, with a depth of 3.7m, lie 2.5 miles N, 2.3 miles NNW, and 3.5 miles W, respectively, from Naselesele Point.

Koro Levie (16°46'S., 179°59'W.), a small islet 46m high, lies about 0.8 mile offshore, 8.8 miles SSW of Naselesele Point, on the E side of Somosomo Strait. It is a useful landmark for the strait, and can be seen on any but dark nights. Reefs, awash in places at LW, surround the islet.

Phillips Rock, with a depth of 3.7m, is a small coral bank 0.9 mile N of Koro Levie which never breaks.

Anchorage.—Anchorage may be taken off the village of Somosomo, 7 miles SSW of Naselesele Point, in 49m, with the S tangent of Koro Levie bearing 255.5°, distant about 1.5 miles.

3.72 Vuna Point (16°57'S., 179°53'E.) is the W extremity of Taveuni; it lies 13 miles S of Somosomo.

Vuna Reef, enclosing a lagoon, projects 2 miles W from Vuna Point. A light is situated on the W edge of the reef.

Somosomo Strait, separating Tavenuni from Vanua Levu, is 4 miles wide. In the narrowest part, islets, rocks, and reefs extend from both shores reducing the navigable width of the channel to 1.3 miles. The depths in the channel are over 183m. The reefs on either side of the strait are of irregular formation and seldom break. There are strong tide rips on the sunken banks on the W side and should be avoided. Vessels without radar should not attempt to pass through the strait at night.

In the narrows the flood sets SW and the ebb NE. The tidal current turns 2 hours after and 4 hours before HW; the speed varies 1 to 3 knots according to the wind and the age of the moon.

Directions.—Radar navigation is particularly useful in the narrows, as the reefs bordering the channel cannot be seen easily. Koro Levie, a beacon 0.3 mile NNE of it, and a beacon 0.7 mile W of the islet are reported to be radar conspicuous and handy.

A mid-channel course of about 204° should be steered through the narrows, keeping in mind the strong tidal currents here. Caution should be exercised if navigating by radar alone, as strong tide rips are created in the narrows when the tide opposes the wind. These rips might be interpreted as echoes from a reef.

3.73 South Cape (17°01'S., 179°55'E.), 4 miles SE of Vuna Point, is the S extremity of Taveuni. It is the termination of a spur from a conspicuous hill, 298m high, about 1.5 miles N.

Lavena Point, 14.5 miles NE of South Cape, is low but conspicuous, and is the only important promontory on the E coast. A coral reef extends 0.5 mile E of the point. Mbouma Rock, a 7.3m coral bank, lies 2.3 miles NE of the point.

Veitalathangi Point (16°47'S., 179°50'W.), the N entrance point to Vurevure Bay, is a low promontory of sand covered with trees. A coral spit extends 1 mile E from the point. Thurston Rock, a 3.7m coral head, and Uto Mbutho, which breaks, lie 2.3 miles SSW and 1 mile S, respectively, from Veitalathangi Point.

Vurevure Bay can accommodate a vessel up to 300 grt. Anchorage may be taken, in 20m, black sand. A spit of coral reef projects from the shore into the middle of the bay.

From Veitalathangi Point, a distance of 6.8 miles, the general direction of the coast is NNW; a coral reef fringes the coast.

Several rocks lie N of the extremity of Veitalathangi.

Viumbani Island, a conical island 131m high, lies on the fringing reef 5.3 miles NNW of Veitalathangi.

Tasman Strait, separating Taveuni from Nggamea, has been wire dragged to a depth of 11m; however, a 3m patch lies in the strait 0.5 mile E of Veitalathangi Point. There are many detached reefs off the E side of Taveuni; one of them projects E from Veitalathangi and narrows the channel to 0.8 mile. Vessels in transit should keep near the Nggamea shore.

A series of unmarked reefs extend in a SW direction for 2.5 miles from a point about 3 miles ESE of Viumbani Island.

The Nggamea barrier reef continues to the Tavenui shore in sunken patches, obstructing the S entrance to the strait, where the coral banks are comparatively shallow. Uto Mbutho is passed on the port hand when entering Tasman Strait from the S.

The flood current in the strait sets to the S and the ebb current sets to the N, both at a rate of 1 to 2 knots.

Caution.—Discolored water in Tasman Strait, caused by sand in suspension, makes the shoals difficult to identify.

3.74 Nggamea (16°45'S., 179°45'W.), 1.3 miles E of Taveuni, is densely wooded and has many bays. There are several peaks on the island of nearly the same height, with one rising to 311m, the highest.

Lauthala Island, close E of Nggamea, is densely wooded and has several peaks of about the same altitude; the highest is 268m. The two islands are surrounded by a barrier reef.

Matangi Island, 134m high, lies close N of the N extremity of Nggamea on the barrier reef; Motualevu Reef lies close NE of the Lauthala barrier reef.

Motua Lailai (16°43'S., 179°34'W.), an isolated oval-shaped reef about 1 mile in diameter, lies 2.5 miles E of Motualevu Reef.

Nanuku Passage, the principal channel among the islands in the NE sector of the Fiji Islands group, is 16 miles wide between Nanuku Reef and Wailangilala (Welangilala). It is clear of dangers and deep. When coming from the N, it is recommended to make Wailangilala, which is safe to approach and which is marked by a light.

The Lau Group

3.75 Wailangilala (Welangilala) (16°45'S., 179°07'W.), 21m high to the tops of the trees, appears as two islands when viewed from the NW or SE. The island lies in the NE end of a coral lagoon which extends 3 miles S. The lagoon entrance, which is 0.15 mile wide, lies on the W side of the atoll. Although the channel has a least depth of 12m, less water may exist, especially on the N side of the fairway. Vessels may anchor in the lagoon, in depths of 38 to 42m.

Duff Reef, 8 miles E of Wailangilala, is about 6 miles long and has a sand cay, 1.2m high, on its SE end. The cay may be seen at a distance in bright weather.

Naitamba Island (17°01'S., 179°17'W.), 186m high, lies 18 miles SSW of Wailangilala. The peak is flat-topped and conspicuous. A barrier reef surrounds the island.

Yathata Island (17°15'S., 179°32'W.), 18 miles SW of Naitamba, is remarkable for its resemblance to a cap when seen from a distance. The island is surrounded by a coral reef of fringing character.

Kaimbu Island, close E of Yathata Island, is connected to it by a reef. The island rises to a height of 46m.

Nukutolu are three islets located from 4 to 6 miles WSW of Yathata Island. A light is shown from the farthest W of these islets.

3.76 Vatu Vara (17°26'S., 179°32'W.), 9 miles S of Yathata Island, is a bold picturesque densely-wooded island, with a flat summit 314m high, which falls in steep cliffs on all sides. It is surrounded by a fringing reef, except at the S point where the surf breaks against the cliff.

Vatu Vara

Malima is the name given two small islets located in a lagoon 6.8 miles SSE of Naitamba Island.

The Kimbombo Islets are three small islets located in a lagoon 8 miles ENE of Malima. Bell Reef, which breaks heavily on the E side, is separated from the reef encircling Kimbombo by a deep channel 0.8 mile wide.

Williamson Reef and Dibbles Reef lies 3.8 miles NNW and 4.5 miles NE, respectively, from the N islet of Kimbombo. Dibbles Reef has heavy breakers on its E side.

Lookout Reef (16°57'S., 178°48'W.), 10 miles E of Dibbles Reef, is a round coral reef awash at LW. Shallow water surrounds it for a distance of 0.2 to 0.4 mile, breaking heavily in even light winds. A depth of 6m was reported (2005) to lie 2 miles SE of the reef.

Lewis Bank, with a depth of 11m; Jeffreys Bank, with a depth of 16.5m; and Alacrity Bank, with a depth of 18.3m, lie 1 mile NW, 5.5 miles NNE, and 8 miles ENE, respectively, of Lookout Reef.

An isolated depth of 22m (Charted as 33m) was reported (2005) to lie 13 miles NE of Jeffreys Bank. A 24m patch lies 3 miles ESE of Jeffreys Bank.

The **Exploring Isles** (17°15'S., 178°55'W.) are a group of islands surrounded by a barrier reef located about 4 miles S of the Kimbombo Islets. These islets and the associated reefs extend about 31 miles in a ENE-WSW direction. Trigger Rock, with a depth of 7.3m, lies about midway between the Kimbombo Islets and the Exploring Islets.

3.77 Vanua Mbalavu Island (17°14'S., 178°57'W.), in the W part of the lagoon, is the largest island of the group and rises to a height of 283m.

The principal passages into the lagoon are Tongan Passage, on the SE side of the barrier reef; American Passage on the E side, 12 miles E of Vanua Mbalavu Island; and Nggilanggila Passage (Nggilannaila Passage), at the NW corner of the lagoon.

Tongan Passage is frequently used for entering the lagoon. It is about 0.8 mile wide and has a coral patch, awash at LW, in the center. Heavy breakers form on the reefs on either side of the entrance. The currents in the passage are irregular.

The passage into the lagoon should not be attempted without local knowledge, as the beacons are not to be relied upon.

Caution.—Unless the light is favorable and the lookout vigilant, the navigation of the lagoon is hazardous. It is seldom safe to steer to the W after 1400.

3.78 American Passage is 0.8 mile broad, the depth in the center is over 183m, and it is easily navigated. The S end of **Ava Island** (17°22'S., 178°53'W.), bearing 264°, leads through the passage.

Nggilanggila Passage, at the NW extremity of the reef, is useful for entering the lagoon.

The leading marks were reported to be visible up to 5 miles seaward in 1984. Local knowledge is recommended for this passage.

The tidal currents run strongly through the channel.

3.79 Blackswan Point lies on the NW end of Vanua Mbalavu Island, about 2.3 miles within Nggilanggila Passage. A vessel more than 75m in length should not attempt the passage N of this point without a pilot.

Andavathi Passage, entered 5 miles W of the peak on Vanua Mbalavu Island, is frequently used by interisland vessels. The SE extremity of the reef on the N side of the passage and the NE extremity of the reef on the S side are marked by beacons.

Namalata Island (17°20'S., 178°58'W.), 128m high, is joined to the SE end of Vanua Mbalavu by a drying reef. Susui Island, 131m high, is separated from the SE end of Namalata by a narrow passage, which dries 0.6m.

Munia Island, 4 miles ESE of Susui Island, is 290m high. This island lies on the W side of Tongan Passage.

Nuku Thikombia Reef, 4 miles E of American Passage, protects it, to some extent, from the SE swell. Dilio Shoal, unnamed 18m shoal on chart, lies 4.5 miles ENE of Nuku Thikombia Reef.

The Sovu Islets, located within the lagoon 6 miles WNW of American Passage, is a group of three islands. The islet farthest W has a defined peak, 70m high. Sovu Passages, which lead through the barrier reef, are located NW of Sovu Islets.

3.80 Nggilanggila (Nggilannaila) (17°10'S., 179°03'W.), 155m high, lies within the barrier reef close off the NW extremity of Vanua Mbalavu. An oblong basin enclosed between

these two islands is almost entirely landlocked with a deep-water entrance about 0.3 mile wide. The anchorage is clear of dangers, except at the S end of the bay where there are small rocks which rise sheer from 9.1 to 18.3m of water. The shores of the bay are steep-to.

Kanathea Island (17°16'S., 179°10'W.), 7.5 miles W of Vanua Mbalavu, has some conspicuous peaks; the highest one is 268m high. The island is surrounded by a reef which extends 1 mile from the N side and on the E side opens into a barrier reef which extends NNE 6 miles.

Boehm Rock, a coral patch awash at LW, lies about 2 miles NE of Kanathea.

Morse Reef, 1.5 miles SE of Kanathea, has a depth of 1.8m, and breaks heavy even in moderate weather.

Mango Island, 8.5 miles S of Kanathea, 204m high, is surrounded by a reef.

Frost Reef (17°25'S., 179°19'W.), which dries at LWS, lies 7 miles W of Mango Island. A rock, 0.6m high, lies near its N end.

3.81 Katafanga (17°31'S., 178°44'W.), an island 55m high, lies 10 miles SE of Exploring Isles, and is surrounded by a barrier reef which extends 2.5 miles from its E side. The reef breaks heavy off the NE and SE sides.

Malevuvu Reef, 4.5 miles N of Katafanga, is an atoll 2.8 miles long and 1.5 miles wide.

Vekai Island, 9.1m high, is a coral rock covered with scrub located 5.5 miles WSW of Katafanga. The barrier reef extends 1.5 miles W from the rock and forms a lagoon.

Tuvutha Island, 5.5 miles S of Vekai, has precipitous hills near the shore. A conspicuous peak, 244m high, stands near the NW extremity of the island.

A coral barrier reef, 0.2 to 0.3 mile in width, circles the island.

Thakau Tambu (17°40'S., 178°33'W.), 14 miles E of Tuvutha, encloses a lagoon with depths of 20m.

Tavunuku-i-Wai, a small reef with a lagoon in the center, lies 2.5 miles SSW of Tuvutha, and Tavunuku-i-Vanua, with a sand cay 1.2m high located on it, lies 1.5 miles farther SSE.

Yaroua Island, about 21m high to the tops of the trees, lies 8.5 miles SE of Tuvutha, and Thakau Nokeva, which dries at LW, lies 2 miles farther SE.

Thakau Lasemarawa, 2.8 miles S of Yaroua, encloses a lagoon and is about 1.5 miles in diameter.

Thithia Island (Cicia) (17°45'S., 179°20'W.), about 25 miles WSW of Tuvutha Island, is surrounded by a fringing reef which dries at LW. The island rises to a height of 165m and is 4 miles in diameter. It is of volcanic origin. An aviation runway is situated on the island.

Small vessels can anchor, in an indentation in the reef, in 26m of water, off the village of Tarakua, which is situated on the NW coast of the island. A 137° range line, consisting of two beacons, leads to the anchorage.

Thakau Nawa, a small reef enclosing a lagoon, lies 2.5 miles WSW of Thithia.

3.82 Nayau Island (17°58'S., 179°03'W.), dark colored and densely wooded, lies 21 miles SSW of Tuvutha. The island is reef fringed except on the NW side, where the summit rim overhangs the sea. The island appears to be table-topped from all directions, with the summit between 162 to 177m high. Maafu Rock, a coral head with a depth of 8.2m at LW, lies 7 miles NE of Nayau.

Cicia Wharf

Vanua Vatu (18°22'S., 179°17'W.), 24 miles SSW of Nayau Island, is encircled by a coral barrier which joins the shore in several places, and encloses a lagoon. The summit is 94m high at the highest point, which overlooks the SE coast.

Lakemba Island (18°13'S., 178°48'W.) lies 16 miles SE of Nayau. The summit of the island is a double peak, which rises to heights of 210m and 219m. The island is fringed by a coral reef which extends 1 mile offshore in places; on the N side the reef dries 0.9m, but on the S side, boats can pass at half tide. The sea breaks heavily on the S point of this reef. A lagoon enclosed by a barrier reef lies with its NE extremity about 6 miles from the island. Steamer Passage, which may be found by bringing the N extremity of the island to bear 297°, is encumbered with rocks.

Vessels with local knowledge may obtain anchorage in the lagoon, in 24m, sand and coral, entering by Steamer Passage and conning the vessel from aloft in a favorable light. Vessels with local knowledge may anchor off the village of Wainiyabea, on the W side of the island, in 18.3m, sand. This berth is tenable in winds from the NNE to SSE.

An aviation runway is situated 2 miles to the NW of Tubou, the main town situated on the SW coast.

3.83 The **Aiwa Islands** (18°20'S., 178°41'W.), 6 miles SSE of Lakemba, are 64m and 61m high, respectively. A barrier reef surrounds these islands and extends 4 miles E and 3.5 miles NW from them. The sea breaks heavily on the E, S, and W extremities of the reef.

Mbukatatanoa Reefs lie about 11 miles E of Lakemba, and enclose two extensive lagoons separated by a deep, narrow channel. The greater part is a barrier reef, but the middle is broken up by detached reefs and groups of sunken rocks. The sea breaks heavily on the SE extremity of the reefs. There are some detached reefs lying between Lakemba Reef and the W side of Mbukatatanoa Reefs.

Reid Reef, about 4.5 miles NE of Mbukatatanoa Reefs, is an

atoll enclosing a lagoon in which there are three islets.

Malan Bank, with a least depth of 14.6m, sand and coral, lies 1.5 miles SE of Reid Reef. There are tide rips around the bank and in the channel between Reid Bank and Mbukatatanoa Reefs.

Lakemba Passage, located between Thakau Lasemarawa and Thakau Nokeva on the W, and Reid Reef and Mbukatatanoa Reefs on the E, is used by some vessels proceeding between Papeete and Suva. The passage is not recommended except in good weather with extreme visibility, as it is difficult to make land fall when approaching the passage from the E.

3.84 Oneata Island (18°27'S., 178°29'W.), about 13 miles ESE of Aiwa Island, lies in the S part of a lagoon that is enclosed by a reef about 10 miles long E-W. The island rises to a height of 49m.

Loa, an islet 43m high, lies 0.7 mile E of Oneata and is connected to it with a sunken reef.

There four entrances to the lagoon are Transit Passage, on the W extremity of the reef; Schooner Passage, 1 mile farther N; Middle Passage, about 1.3 miles SW of the N extremity of the reef; and Broken Passage, on the N side of the reef, about 4.5 miles SE of its N extremity.

Middle Passage is 0.3 mile wide with a depth of 24m, sand and coral, in the middle, and is considered the best entrance. The passage may be found by bringing Loa to bear 123°. A coral head, with a depth of 0.6m, is located on this bearing 0.2 mile inside the middle of the passage; it may be passed on either hand. There is another coral head about 0.2 mile SW of this one, but there is sufficient depth and ample room to pass between the two.

Anchorage.—Anchorage may be obtained, in a depth of 26m, off the NW end of Oneata.

3.85 Mothe Island (18°39'S., 178°31'W.), 11 miles S of Oneata, is 2.3 miles in diameter with one conspicuous peak, 180m high. The island is surrounded by a barrier reef which extends 7 miles SSE.

Anchorage.—Anchorage can be obtained outside the reef on the NW side of Mothe, in 22m, sand, protected from the E through S to SW.

There are three defined reefs N and NE of Mothe. Thakau Lekaleka, Thakau Motu, and Thakau Vau lie 4.5 miles N, 3.8 miles NE, and 10 miles NE, respectively, from Mothe.

An isolated depth of 17.7m lies 2.8 miles NNE of Thakau Lekaleka.

Komo Island (18°41'S., 178°37'W.), 6 miles W of Mothe Island, has a summit 82m high, marked by a clump of coconut trees. An islet, 21m high, lies off the W end of the island and is connected to it by a sunken reef. A coral reef, which surrounds the island, joins the shore on the E side, but N it forms a barrier enclosing a lagoon. The lagoon has moderate depths and a scarcity of coral heads.

Anchorage.—Good anchorage may be obtained by vessels with local knowledge near the island, in 9 to 18m, sand and shells.

West Passage, on the NW side of the lagoon, is 500m wide and may be found by bringing the summit of Komo to bear 133°. The rocks on the NE side of this passage are sunken and the sea seldom breaks on them.

East Passage, on the NE side of the lagoon, is 290m wide, but there are two sunken rocks in it, the S one near mid-channel, leaving a channel 128m wide with a depth of 16.5m, sand and coral, between it and the barrier reef on its E side. This rock is awash and can be easily detected in bright weather. This passage may be found by bringing the summit of Komo to bear 167°.

Thakau Vuite is separated from Komo barrier by a passage 1.5 miles wide. A sand cay, 0.6m high, is located near its NE end, and is conspicuous in bright weather.

Olorua Island is a small, but steep island with three humps on the summit, located 7 miles NW of Komo. The island is surrounded by a reef which breaks on its S extremity, about 1.5 miles S of its highest peak.

3.86 Tavunasithi Island (18°43'S., 179°07'W.), 20 miles SW of Olurua, is small, wooded, and 61m high. The island is encompassed by a fringing coral reef.

Vuanggava Island, surrounded by a coral reef, lies 13 miles SE of Tuvunasithi. This island is 3 miles long, 1 mile wide, and 59m high at its SW extremity and 48m at its NE extremity; a small salt water lake linked underground to the sea, is located at the center of the island.

Kambara Island, 3 miles SSW of Vuanggava Island, is about 4.5 miles long N-S, and 3 miles wide. On the NW side there is a conspicuous hill in the shape of a truncated cone, 143m high. The island is surrounded by a coral reef which almost disappears N of this hill.

Marambo Island (18°59'S., 178°50'W.), about 7 miles E of the S extremity of Kambara, is about 52m high and is surrounded by a fringing reef which extends 0.5 mile from the island on the SW side.

Namuka-i-Lau, 12 miles NE of Marambo, is a dark, wooded island with a badly defined summit, 79m high, overlooking the N coast. A form of barrier reef nearly surrounds the island. At the NE and SW points of the island the reef touches the shore, but on the NW side it is broken and recedes from shore and forms a harbor for small vessels, reachable by those drawing 4m or less with local knowledge.

Wilkes Reef, 2.8 miles N of the E end of Namuka-i-Lau, dries at LW. There is a shoal, with a depth of 3.7m, 0.2 mile S of the reef.

Yangasa Cluster, 4 miles SE of Namuka-i-Lau, consists of four islands within a lagoon, which is formed by a barrier reef 22 miles in circumference.

On the W part of the barrier reef there are several rocks visible.

Yangasa Levu (18°56'S., 178°28'W.), the largest island of the cluster, is table-topped and 119m high. This island lies in the E part of the lagoon. The other islands may best be seen on the chart.

3.87 Thakau Levu (18°52'S., 178°22'W.), a coral reef 3 miles NNE of Yangasu Levu, is open on the W end and has a prominent horn forming the E end, which always breaks heavily. On the SW prong there is a sand cay, 0.6m high, which is conspicuous in bright weather.

Thakau Thikondua, 3 miles E of the N end of Yangasa Levu, is a small, round, flat reef.

Naiabo Island, of coral composition and 12m high, lies 5.5 miles E of Yangasa Levu. The barrier reef which surrounds the

island encloses a shallow lagoon.

Thakau Reivareiva and Thakau Nasokesoke are two small flat coral reefs that lie 1.5 and 4 miles S, respectively, of Naiabo Island. These reefs are steep-to and dry in places at LW.

Fulanga Island (19°08'S., 178°35'W.), 8 miles SSW of the Yangasa Cluster, is 79m high. The island, together with the reef to the N, encloses a basin which is thickly studded with rocks on its E and W side varying in heights from 6 to 15m. The outer edge of the island is surrounded by a coral reef of a fringing character.

Ongea Levu and Ongea Ndriki, including a barrier reef, lie 4 miles E of Fulanga. The reef dries at LW, and has a passage on the W side. A conspicuous wreck is stranded on the reef SW of the islands.

Ongea Levu, the largest of the two islands, lies near the center of the lagoon. It is densely wooded and 82m high. Numerous detached rocks lie off its S shore.

Ongea Ndriki lies in the S extremity of the lagoon. Its summit is ill-defined and about 91m high. Several detached rocks fringe the N shore.

Ongea Lagoon has fair anchorage, in 7 to 20m, sand and coral.

The lagoon may be entered through Barracouta Passage on the W side of the reef. It is 228m wide and has 24m in mid-channel.

The reefs on the sides of the passage dry at LW. A coral head, which must be left to starboard when entering, has a depth of 1.8m. This coral head lies 230m E of the S inner horn.

The entrance may be found by steering for the N detached rock N of Ongea Ndriki bearing 106°, but the vessel should be conned from aloft in a favorable light.

Tides—Currents.—The tidal current in the passage has been estimated to run through Barracouta Passage at a rate of 3 knots at half tide.

Thakau Teteika, 0.5 mile E of the N end of Ongea Barrier, has a rock showing 0.6m above HW off its NW edge.

Nuku Songe (19°13'S., 178°21'W.) lies 3.8 miles E of the SE coast of Ongea Ndriki. A sand cay, 0.6m high, lies near the N extremity and a rock, 0.9m high, lies on the SW edge of Nuku Songe.

Vatoa (19°50'S., 178°13'W.) lies 38 miles SSE of Ongea Ndriki. It is densely wooded, rising gradually to 44m in its N part. A reef extends 1 mile from its N and S ends. A light is shown from the N end of the island.

Vuata Vatoa is a detached reef lying 3 miles SSW of Vatoa. Shoal water was reported to extend 5 miles off the SW part of the reef.

Tides—Currents.—A current setting in a NE direction at a rate of more than 1.5 knots was reported on one occasion between Vuata Vatoa and a position 100 miles SE.

Caution.—A reef, with a depth of 3.7m, was reported to lie about 40 miles ENE of Vatoa.

3.88 Oni-i-Lau (20°41'S., 178°47'W.) is a cluster of three volcanic and three coral islands surrounded by a reef, oval in shape, and covering an area about 6 miles NE and SW, and about 4 miles wide. These islands lie about 52 miles SSW of Vatoa. At the NW part of the largest island is the highest peak of the group, which has an elevation of 113m.

The SW elbow of the reef is marked by breakers. The NE extremity and the line of the NW and SE sides are indicated by islets lying on the outer edge of the reef.

Vuato Ono, a reef awash, and on which the sea always breaks, lies 5 miles SW of Ono-i-Lau.

Tuvana-i-Tholo (21°00'S., 178°43'W.) and Tuvana-i-Ra, 5 miles WSW, 20 miles S of Ono-i-Lau, are the farthest S of the Fiji Islands group. They are two densely-wooded sand cays surrounded by inaccessible reefs, which break heavily and can always be seen during the day. If they are not seen before nightfall the area should be given a wide berth. The islands have been reported (1997) to lie 2 miles SW of their charted positions.

A bank, with a least depth of 179m, was reported to exist in position 21°35'S, 178°55'W, about 32 miles SSW of Tuvana-i-Ra.

Moala Island (18°35'S., 179°53'E.) lies 45 miles WSW of Vanua Vatu. The island is about 7 miles long N-S and 5 miles wide; it is deeply indented on the E side. The island rises to a height of 468m in the NW part; a double peak 2 miles N of the S extremity rises to a height of 383m.

The barrier reef projects 3 miles off the N and S extremity of the island and 1.7 miles off its W point.

Caution.—Volcanic activity was reported (2002) to lie SW of Moala Island in position 18°46.5'S, 179°10.8'E.

3.89 Herald Roadstead, close N of the NE extremity of the island, affords anchorage, in 37m, coral bottom. The anchorages off the village of Naroi and in Herald Roadstead are approached from the N; bearing 189° are a set of leading lighted beacons standing on the foreshore, 0.8 mile WNW of NE Point. A dangerous rock lies 0.4 mile NE of the anchorage, about 1 mile N of NE Point. The above approach to the anchorage will lead between two patches having a depth of 2.7m, about 1.5 miles N of the anchorage. The anchorage is reached when a cluster of black rocks off the NE extremity of the island bears 258°.

A better anchorage is reported to exist off a village W of the black rocks, in a depth of 31m. Range lights, in line bearing 183°, situated near a conspicuous school building and shown by request, lead to the anchorage.

A T-shaped jetty projects NW from the W end of Naroi village, with depths of 4 to 5m alongside the outer face. A beacon marks a dangerous rock lying about 0.3 mile WNW of the jetty.

In the approach to Herald Roadstead the flood current sets S and the ebb N with a velocity of 1 knot.

The barrier reef NE of Herald Roadstead always breaks and uncovers at half tide.

A small bank, with depth of 18.3m, lies about 20 miles N of Moala.

3.90 Navatu (18°39'S., 179°33'W.) lies 31 miles E of the S extremity of Moala Island. It is a coral reef, which dries about 0.6m on its outer side, and encloses a lagoon.

Totoya Island (18°58'S., 179°52'W.), 21 miles SSE of Moala Island, almost encircles a lagoon, with a deep opening, about 2 miles across on the S side.

The island is surrounded by the barrier reef; the outer edges

may be distinguished in many places by breakers. Off the NW and SW sides of the island, the reef lies up to 1.8 miles offshore, and off the E side about 1.3 miles, leaving deep areas between.

Herald Sound lies between the SW side of the island and the barrier reef, and is entered at its N end.

In the extreme E part of Herald Sound, there is a narrow channel which leads into the lagoon. The channel is about 90m wide and 46m deep, but the tidal currents attain rates of 3 to 4 knots in it.

The channel to Herald Sound can be found by bringing the 353m peak on the SE side of the island to bear 103° when it appears in the gap of the intervening ridge of land. The sea breaking on the horns of the reef will indicate the fairway.

Anchorage can be taken in Herald Sound, in 46m. It is also possible to anchor in the lagoon.

3.91 Matuku Island (19°09'S., 179°45'E.) lies 21 miles SW of Totoya Island. The highest peak on the island is 385m, and a peak 1.3 miles farther SSE is 369m high. The fringing reef, awash at LW, projects off the N and SE points of the island to a distance of 1 mile, but not more than half that distance from the other parts.

Anchorage.—Good anchorage can be found in Matuku Harbor, in 33m, on the W side of the island, with the 369m peak bearing 095°. The passage is about 0.1 mile wide and is easily seen from the masthead. The 369m peak bearing 092° leads though the reef entrance.

3.92 Zephyr Shoal (15°52'S., 176°40'W.) lies 190 miles ENE of Undu Point, the NE extremity of Vanua Levu. The shoal is extensive, with reported depths of 16.5 to 20.1m. Less depths may exist in the vicinity, and vessels should approach with caution.

Rochambeau Bank, with a least depth of 24m, lies about 45 miles NNE of Zephyr Shoal.

Foss Reef, with a least depth of 8.2m, was reported to lie 47 miles NE of Rochambeau Bank.

Wallis and Futuna Islands

3.93 Wallis and Futuna Islands are French Overseas Territories. **Iles de Horne** (14°17'S., 178°05'W.) is formed by two islands; Ile Futuna and Ile Alofi. The islands are under the jurisdiction of the French Governor at Iles Wallis.

Ile Futuna (14°16'S., 178°08'W.) attains a height of 524m at its highest peak. The NW coast appears bold and precipitous; on the S side a number of coconut trees are seen on a low projecting point. The NW and SW coasts are fringed by a reef on which the sea breaks heavily.

Depths—Limitations.—Only the SW approaches to these islands have modern surveys. The accuracy of which may be questionable due to seismic activity.

Aspect.—Ile Futuna's natural harbor, Anse de Sigave, is located on the SW side of the island. The church at the head of the bay; a satellite antenna 0.4 mile ESE of this church; Les Lions, two large rocks lying close offshore on the E side of the bay; and a cascade at the head of the bay, which is often dry, are conspicuous. A set of white columns, in line bearing 028°, leads into the anchorage.

Ile Alofi, separated from Ile Futuna by Chenal Sain, about 1 mile wide, rises to a height of 366m. A ridge of rocks extends about 0.3 mile N from the E extremity of the island. A reef extends about 0.5 mile seaward from the NW coast.

Banc de la Meurthe, with a depth of 29m, lies 0.6 mile E of the E end of Ile Alofi.

Anchorage.—During the Southeast Trades and in good weather, the only circumstances under which anchorage is practicable, vessels may anchor, in depths of 50 to 70m, with the two columns in line, and the statue bearing 087°.

There is anchorage in Chenal Sain, NNW of the village, with the N extremity of Ile Alofi bearing 080°, and the W extremity bearing 247°. There is a depth of 35m in the anchorage, which is protected from the prevailing wind and sea.

A berth is available alongside a T-headed pier extending from the E side of the bay. The pier will reportedly handle vessels up to 500 grt, but is hampered by heavy swell.

Caution.—It has been reported (1993) that depths up to 1m less than charted may exist S of the island, due to earth tremors.

3.94 Iles Wallis (13°18"S., 176°10"W.), about 127 miles ENE of Iles de Horne, are a group of islands, islets, and reefs surrounded by a barrier reef which forms a lagoon. The lagoon provides a good shelter.

Ile Uvea, about 8 miles long N-S and 3 to 4 miles wide, is the principal island in Iles Wallis. Mont Lulu-Fakahega, near the center of the island, is 145m high and covered with vegetation.

Most of the islets that surround Ile Uvea are on the barrier reef. The most characteristic are Ilot Nukufoto, on the N point of the barrier reef, 60m high and dark colored; Ilot Fungalei, to the E of Mata Utu, 60m high, with a saddle summit; and Ile Faioa, to the SE of Ile Uvea on the barrier reef, covered with coconut palms. Hihifo airport aero radiobeacon lies in position 13°14.5'S, 176°11.9'W.

Ile Nukuaeta (13°22'S., 176°11'W.), within Passe Honikulu, is 98m high, rugged, and prominent.

Ilot Fenua Fu, on the reef to the E of the pass, about 775m S of the white rock, is a good landmark for vessels approaching from the S.

Ilot Nukutaakimua, on a reef 1.3 miles NNE of Ilot Fenua Fu, resembles a sailboat and is a good mark for navigating in the bay.

Caution.—The barrier reef off the W coast of Uvea uncovers partially, and after a period of good weather does not break. At night, in calm weather, it will not be seen when approaching the island.

Fish havens, marked by black buoys, have been established in the adjacent waters S of the Wallis Islands.

3.95 Passe Honikulu (13°23'S., 176°11'W.), close W of Ile Fenua Fu, leads into Baie de Mua and is the only channel used by vessels proceeding to the anchorage inside the barrier reef. The pass shows charted depths of 12.6m, and reportedly will handle vessels up to 9,000 grt.

Tides—Currents.—The mean tidal rise is 1.1m, while the spring rise is 1.4m.

On a spring tide, HWS occurs between 1.5 hours and 2 hours

before HW, while LWS occurs 30 to 45 minutes after HW.

During neap tides, HWS occurs between 1 hour and 10 minutes before HW, to 30 minutes before HW, while LWS occurs between 15 and 30 minutes after HW. At spring tides, the ebb current reaches 4 knots and the flood current 3 knots. At neaps, the ebb flows at 3 knots, while the flood reaches 2 knots. During and after periods of bad weather, the current patterns are altered by the surf and storm swell thrown over the barrier reef. Current rates of 6 knots may be experienced, and the duration of the ebb current will be increased.

The ebb current is known to set onto the NE point of the reef forming the W side of the pass, creating strong tide rips.

Depths—Limitations.—Baie de Mua, an area within the barrier reef E of Passe Honikulu, shows general charted depths of 24 to 46m. Mouillage de Mua, an enclosed anchorage separated from Baie de Mua by several reefs, is difficult to reach and requires local knowledge. Baie de Mata-utu has depths of 7.3 to 42m, but is studded with reefs and coral heads. The bay is reached from Baie de Mua by Passe Faioa, a narrow but deep channel. Tidal currents within the pass reach rates of 3 to 4 knots.

Gahi is a small village on the NW side of Mouillage de Matalaa.

3.96 Mata-utu (13°17'S., 176°08'W.) (World Port Index No. 55650), the capital of the island group, is situated 3.3 miles N of Gahi. A pier extends from the village, at the outer end of which lies a berth 45m in length, with an alongside depth of 6.2m. Vessels berth either starboard side-to or stern-to.

Depths—Limitations.—Halao is a lighter complex situated on the W side of Ile Uveai and is reached by a channel S of Nukuatea, marked by beacons. A set of beacons, in line bearing 051.75°, leads to a wharf capable of handling tankers up to 85m in length with drafts of 6.2m. A concrete slipway for flat-bottomed lighters is also available.

Anchorage.—In Baie de Mua, anchorage is available, in a depth of 40m, sand, with the white rock mentioned below bearing 270° and about 1.3 miles distant.

Matalaa anchorage is the best anchorage available here, having depths of 18 to 22m over a good holding ground of sand and coral, as well as being sheltered by reefs. The village of Gahi is reachable by boat from this anchorage in all but very bad weather.

Mata-utu anchorage is hampered by reefs and shoals best seen on the chart. Three berths with restricted swinging room are available, as follows:

1. In a depth of 34m, sand and coral, with the church at Mata-utu bearing 340°, 1.6 miles distant.
2. In a depth of 22m, with the church bearing 316°, 1.4 miles distant.
3. In a depth of 12m, good holding ground, with the church bearing 295°, 0.9 mile distant.

Directions.—Keeping in mind the tidal currents, Passe Honikulu should be attempted at LWS, with the sun high and astern. Preferably the vessel should arrive off the channel entrance at least 1 hour prior to slack water to identify the range marks and gauge the currents.

A white light, 7m high, stands atop a grey, stone wall on Ile Uvea, in line with a beacon, red light, located on the fringing reef close SE of Ile Nukuatea bearing 032.3°. Once within the reefs, the channel through Baie de Mua and Passe Faiou is marked by beacons and buoys. One leg of the passage through Baie de Mata-utu is marked by the church in Mata-utu bearing 340.5° leading between beacons 15 and 20.

Caution.—Coral heads or reefs, not all of which are marked, fringe the passage through the bays and anchorages. Mariners should exercise the appropriate caution when navigating within the barrier reef.

3.97 Lalla Rookh Seamount (12°56'S., 175°40'W.), 32 miles NE of Ile Uvea, has a general depth of 16 to 29m, sand and coral bottom. From the edge the soundings drop steeply to depths of 367 to 549m.

The current in the vicinity of the seamount was found to set between WNW and SSE from 0.5 to 1.3 knots.

Home Seamount (12°54'S., 175°37'W.) lies 1 mile ENE of Lalla Rookh. It is a small coral knoll with a least depth of 18m and general depths of 22 to 29m, coral and sand bottom.

The 2,000m curve encircles the two seamounts at distances varying from 1.5 to 3 miles.

Pasco Reef (13°04'S., 174°23'W.), 90 miles E of Iles Wallis, has a least depth of 14m on its S edge and is steep-to. The current over the reef has been observed to set between the NW to SW at a rate of 0.5 to 1.3 knots.

Siafiafi Seamount (12°14'S., 175°30'W.), 72 miles NNE of Ile Uvea, was reported to have a depth of 29m, where the bottom was plainly visible.

A number of depths from 18.3 to 33m are charted about 15 miles W of Siafiafi Seamount; their position may best be seen on the chart.

Field Seamount (12°19'S., 174°48'W.) lies 38 miles ESE of Siafiafi Seamount. The depths vary from 24 to 27m; it is steep-to. A 21m patch lies 27 miles SE of Field Seamount.

3.98 Taviuni Reef (12°05'S., 174°35'W.), 14 miles NE of Field Seamount, has a least known depth of 16.5m. It is steep-to; the 2,000m curve lies 2 miles all around the reef.

Waterwitch Seamount (12°30'S., 176°45'W.), located about 48 miles NW of Ile Uvea, has a least charted depth of 20m. A bank, with depths of 48m, lies about 15 miles N of Waterwitch Seamount.

Isabella Reef (12°25'S., 177°26'W.), with a depth of 18.3m, lies 35 miles WNW of Waterwitch Seamount; **Combe Seamount** (12°31'S., 177°40'W.) lies 6 miles SW of Isabella. There is a depth of 26m over Combe Seamount.

In the area of the three above-mentioned depths, a slight current setting NW was experienced. With a fresh trade wind this set was increased and there was a troublesome sea in the area.

Depths of 7.6 to 18.3m are charted from 8 miles N of Isabella Reef to 11 miles NW; their positions may best be seen on the chart.

Adolph Seamount (11°54'S., 178°10'W.), with a charted depth of 29m, lies 52 miles NW of Isabella Reef. It rises steeply from depths 549 to 732m.

Tuscarora Seamount (11°50'S., 178°15'W.) lies 3 miles NW of Adolph Seamount. On the SW edge of the bank, there is a depth of 26m; the entire bank is steep-to.

Robbie Bank (11°04'S., 176°53'W.), 84 miles NE of Adolph Seamount, is nearly circular in shape with a diameter of 8 miles. It is composed of sand and coral, with a least charted

depth of 12.8m in its W part.

A 14.6m depth was reported to lie 3 miles W of the S extremity of Robbie Bank.

3.99 Bayonnaise Seamount (12°06'S., 179°45'W.) lies 85 miles W of Adolph Seamount. A depth of 10.1m lies over this bank.

Between Bayonnaise Seamount and a position 90 miles SSE, several isolated depths are charted that range from 22 to 108m; their positions may best be seen on the chart.

A similar number of soundings extend 30 miles NW and 35 miles N of Bayonnaise; these depths vary from 18.3 to 33m.

Balmoral Reef (15°40'S., 175°52'E.), 147 miles NW of Viti Levu, is 2.5 miles in length and 1.8 miles wide, with a least depth of 7.3m near its E edge. A shoal, with a depth of 9.1m, was reported to lie 24 miles SSW of Balmoral Reef.

Caution.—Balmoral Reef has been reported (1991) to lie 5 miles NE of its charted position. Discolored water was observed (1999) about 12 miles to the ENE of this same charted position.

3.100 Rotuma Island (12°30'S., 177°06'E.) is now administered by the Dominion of the Fiji Islands. A District Officer resides at the Government Station, which includes a radio station and a small hospital.

Seen from a distance of about 10 miles, the island appears undulating, hilly, and densely wooded. Mount Suelhof, 256m high, rises near the center; Satarua Peak, 166m high, lies near the E end of the island.

A low isthmus lies 2 miles from the W end of the island. On the N coast of this isthmus, Solroroa, 218m high, a cliff with a red sandstone face, forms the NW extremity of Foviung Efau. About 0.8 mile SW of Soloroa is Solmea, another prominent, conical, wooded hill, 165m high.

Winds—Weather.—The Southeast Trades predominant throughout the year, though typhoons have occurred during the months from November to April.

During the month of September, the wind blows almost constantly from between ENE and ESE, moderate to fresh breezes. During three days, it attained the force of a fresh gale.

The climate is damp.

Tides—Currents.—The spring range here is 1.4m, while the neap tidal range is 1m.

Solkope, with a summit 128m high, close off the SE coast, cannot be distinguished as an island from seaward. The island lies on the edge of the coastal reef. A mudbank extends 0.6 mile offshore, 0.8 mile SE of Solkope.

Solnahu, a flat-topped islet 50m high, lies on the coastal reef about 1 mile W of Solkope. Amnoseng Point is located on the S side of the island, 3.5 miles W of Solnahu.

Limarai Rock, a small coral patch with a depth of 5.5m, is located about 1 mile offshore, SW of the SW extremity of Rotuma. The fringing reef extends over 0.3 mile off the same point.

3.101 Whale Bank (12°32'S., 176°52'E.), with a least depth of 26m, lies 6.5 miles WSW of Limarai Rock.

From the SW extremity of the island, the coast trends in a N direction 1 mile to **Halafa** (12°30'S., 177°01'E.), the NW extremity of the island. The entire coast is fringed by a reef. Cliffs 9.1m high front the N half of this coast.

Uea (12°28'S., 176°59'E.), a conical island, 262m high, lies 1.8 miles NNW of Halafa. It is the farthest NE of a chain of rocks which extends 3.5 miles SW.

Hofhaviyunglola is the name of two rocks, 0.6m high, lying close together, 0.8 mile WSW of Uea.

Hatana, a small rocky islet, 18.3m high, lies 1.8 miles SW of Uea; a small islet lies off its N end. These two islets are surrounded by a fringing reef and foul ground, with blind rollers, and extends 600m SW.

Hofliua (12°30'S., 176°56'E.) is a small, bare, rocky, and cliffy islet, 58m high, located 3.5 miles SW of Uea. It is the farthest SW of the chain of islets, and has a remarkable, perpendicular cleft across it, which the sea passes through.

Caution.—No dangers have been detected in the channels between these rocks and islets, but as the bottom is rocky and uneven, and a heavy sea runs over it, it is not advisable to pass between the islets of the group.

Mariners without local knowledge, approaching Rotuma from the W, might possibly mistake Uea for Soloroa, the high, wooded bluff on the W side of Rotuma.

In 1989, a danger area with a 10-mile radius of shoal depths centered at position 11°56'S, 172°08'E, was reported.

3.102 From Halafa, the coast extends 1.5 miles E to **Foviung Efau** (12°30'S., 177°02'E.). The bay is marked on its W side by Soloroa. A church which is conspicuous stands on the SW side of the bay, 1 mile S of Soloroa. The government station is situated on the E side of the bay. The head of the bay is occupied by a reef.

Anchorage.—The best anchorage in Foviung Efau. in 29m, lies with the government station bearing 155°, 0.9 mile distant.

From Foviung Efau, the coast trends 4.5 miles E to Oinafa Bay. The coast is fringed by a reef which extends up to 0.3 mile off the N extremity. The reef dries 0.6m on the N coast.

Oinafa Bay affords anchorage, in 8m, sand, with the S extremity of Uea in line with the N extremity of Rotuma.

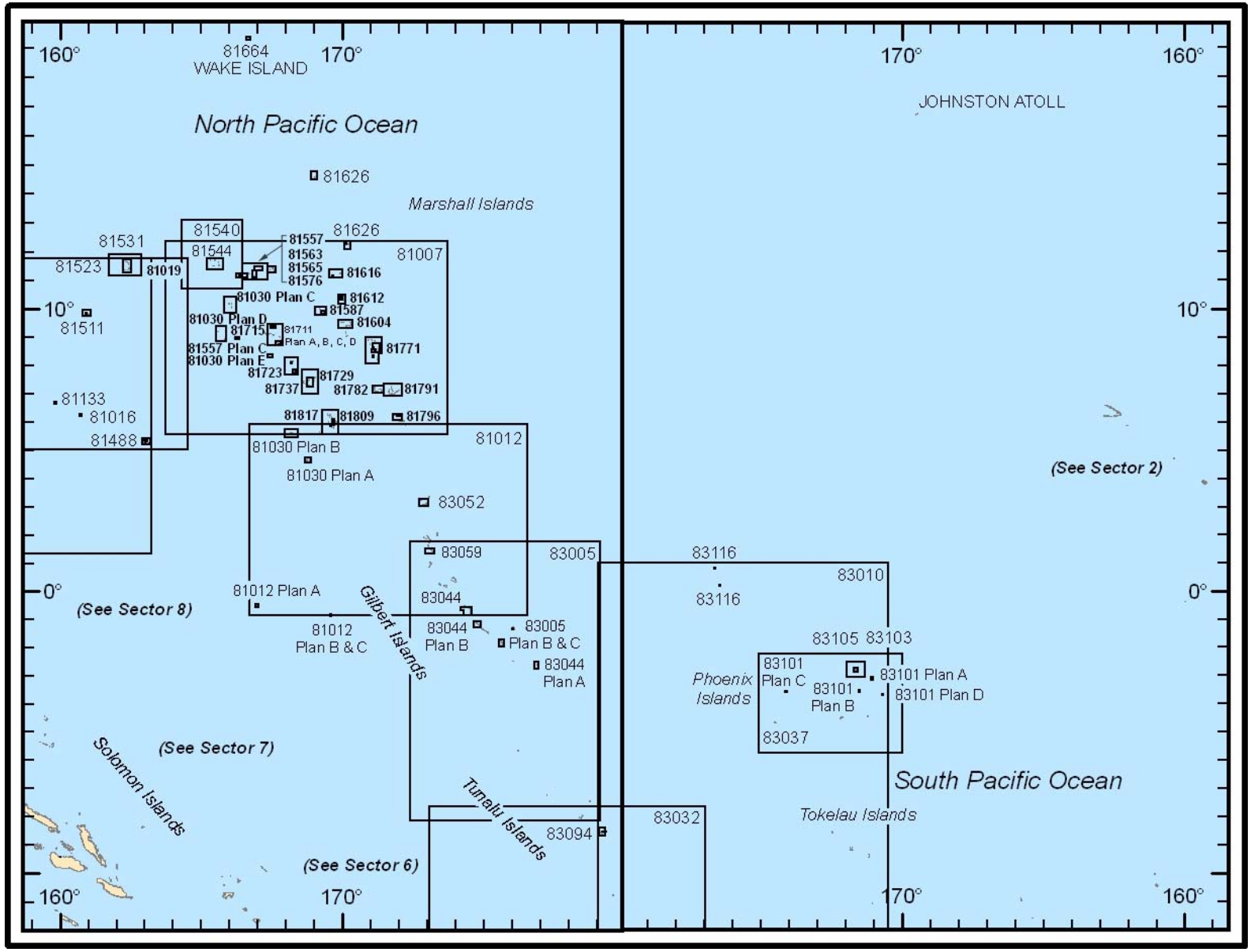
The anchorage is protected from E winds, but is exposed to a nasty sea which sets around the islands to the NE, and causes ships to roll incessantly.

Haua Tui, about 0.5 mile off the NE coast, is a wooded islet, 58m high, having a steep cliff on its N face. An islet close S of Haua Tui is joined to that islet and Rotuma by a fringing reef. The islets and reef form the E boundary of Oinafa Bay.

The E coast of Rotuma trends 2.3 miles SSE to its SE extremity.

Afnaha (12°31'S., 177°09'E.), an islet 44m high, lies on the fringing reef, 0.6 mile off the SE extremity. Two rocks and a small islet lie on the reef NW of Afnaha.

Caution.—Tide rips occur E of Afnaha.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **4** — CHART INFORMATION

SECTOR 4

THE KIRIBATI ISLANDS TO THE MARSHALL ISLANDS (INCLUDING THE TOKELU ISLANDS, TUVALU, AND OFF-LYING ISLANDS AND REEFS)

Plan.—This sector describes five island groups, some individual islands, and two island atolls, with each group set apart under a separate heading. The descriptive sequence is from Johnston Atoll in the North Pacific Ocean to about 1,200 miles S to the Kiribati Islands in the South Pacific Ocean, between 2°50'S and 4°40'S, and 170°43'W and 174°31'W. Further S to the Tokelau Islands, between 8°32'S and 9°26'S, and 171°11'W and 172°32'W, then about 457 miles W to the Tuvalu (Ellice Islands), between 5°00'S and 11°00'S, and 176°E and 180°. Between 2°45'S and 3°30'N, and 172°30'E and 177°15'E lies the Gilbert Island group. Further NNW is the Marshall Island group between 4°34'N and 14°32'N, and 162°20'E and 172°07'E in the North Pacific Ocean. Wake Island lies further N in 19°16'N, 166°40'E.

General Remarks

4.1 The Gilbert Island group lying between 2°40'S and 3°20'N, and 172°40'E and 177°00'E are the possessions of the Republic of Kiribati. The Tuvalu group (Ellice Islands) comprise the nation of Tuvalu. The Marshall Islands make up the Republic of the Marshall Islands.

Large-scale chart coverage for U.S. territory located within this sector is provided by the National Ocean Service. Regulations pertaining to navigation within U.S. territorial waters may be found in the U.S. Coast Pilots, while additional regulations will be cited in the text along with the navigational feature they affect.

Reagan Test Site—Warning Area.—Intermittent hazardous missile operations are conducted within an area with a radius of 200 miles, centered at position 8°43'N, 167°43'E. See the Kwajalein Atoll description in paragraph 4.68 for details.

4.2 **Johnston Atoll** (16°45'N., 169°31'W.) (World Port Index No. 56325), a possession of the United States, consists of four islets that lie on a reef about 9 miles long in a NE-SW direction. Johnston Island, the largest island, lies about 2 miles inside the SW end of the reef. **Sand Island** (16°45'N., 169°31'W.) and Hikina Island lie about 0.5 and 1 mile NE, respectively, of Johnston Island; Akau Island is about 1 mile N of Sand Island.

The Johnston Atoll Chemical Agent Disposal System (JACADS) facilities were completely demolished and removed from the island in 2004. Most other facilities on the island have likewise been removed. Pacific Air Forces officially closed the airfield on June 15, 2004.

Johnston Atoll is a Naval Defense Sea Area and Airspace Reservation. The island is closed to the general public and to unauthorized traffic and shall not be navigated within 3 miles of the atoll's perimeter. Johnston Atoll is administered from Washington, DC by Pacific Air Forces, Hickmans AFB, and the Fish and Wildlife Service of the US Department of the Interior as part of the National Wildlife Refuge system.

Winds—Weather.—Winds average 10 to 15 knots in summer and 15 to 25 knots in winter. They are from the E to NE about 90 per cent of the time. The occasional Hawaiian Island storms are characterized by stormy S or SW winds and heavy rains.

Johnston Atoll after demolition (2004)

Brief showers occur frequently, but protracted bad weather is rare. Visibility is good, usually over 12 miles.

Tides—Currents.—In the main entrance channel there is usually a flow to the N during the flood and a flow to the S during the ebb, at a rate of 1 to 2 knots. The HW interval is 3 hours 15 minutes. The mean range of the tide is 0.6m.

When there is a heavy swell on the barrier reef, there may be a strong E set at the junction of the main entrance channel and basin, especially with the ebb tidal current.

Depths—Limitations.—A barrier reef extends in an arc from about 2 miles W to about 7 miles NE of the islands. Depths outside the reef drop off to 200m about 0.4 mile off. With heavy breakers on the reef, a 0.6m to 0.9m surge exists in the lagoon. A line drawn from the NE, extending S to SW, inside the 11m (6 fathom) curve, delineates a foul area with a very irregular bottom. The 200m curve lies 4 miles S of the center of Johnston Atoll, however, there are 10.4m shoals lying as close as 0.3 mile inside the curve and to the SE of the atoll.

Anchorage.—Vessels drawing more than 8.5m anchor in the channel approach area S of the channel entrance.

Directions.—Vessels bound for Johnston Island ship channel should approach the channel from the S, passing through position 16°41'N, 169°31'W.

Caution.—Navigation aids were removed by the U.S. Coast Guard in 2009; charted channel and harbor depths will become doubtful over time due to the lack of maintenance. All cultural

features were removed from the islands by late 2005 and can no longer be relied upon for navigation.

4.3 Rional Reef (17°16'N., 177°16'E.), **Rene Reef** (16°44'N., 179°00'E.), and **Schjetman Reef** (16°08'N., 178°56'W.) were searched for in 1923 and were not found within a radius of 20 miles of their assigned positions. Schjetman Reef and the unnamed reef lying 40 miles ENE were searched for in 1963, but were not located.

On July 24, 1945, sonar ranging gear gave distinct echoes of a suspected shoal or reef at position 16°25'N, 178°22'W.

A vessel reported (1944) sighting a suspected shoal in position 14°30'N, 179°02'W. The discolored water covered an area 9 by 23m, and was estimated to be from 9.1 to 14.6m in depth.

A shoal, the existence of which is doubtful, is shown on the chart at position 13°33'N, 170°24'W. In 1946, a vessel reported finding no indication of shoaling in this position.

Shoals, the existence of which is doubtful, are shown on the chart at position 10°00'N, 179°40'W and position 10°00'N, 179°30'E. Several old reports assign the following positions to dangers in this locality:

a. 10°00'N, 180°00'.
b. 10°00'N, 179°21'W.
c. 10°00'N, 179°21'E.
d. 10°00'N, 179°30'E.
e. 10°00'N, 179°15'E.

Wilder Shoal (8°17'N., 173°25'W.) is reported to be about 30m in diameter, with an approximate depth over the shoal of about 5.5m.

The Kiribati Islands (Phoenix Islands)

4.4 The Kiribiti Islands (Phoenix Islands) are a group comprised of Canton Island, Enderbury Island, Phoenix Island, Birnie Island, Orona Atoll (Hull Island), Manra Atoll (Syney Island), McKean Island, and Nikumaroro Atoll (Gardner Island). The Kiribati Islands, including Canton Island and Enderbury Island, became independent on July 12, 1979 to form part of the Republic of Kiribati.

The group lies about 1,230 miles S of Johnston Atoll. The islands on atolls are low and of coral formation, surrounded by fringing reefs which in most cases are steep-to. With the exception of the atolls, the islands are almost devoid of vegetation, and navigation in their vicinity at night is dangerous due to the difficulty of distinguishing them.

Rawaki Island (Phoenix Island) (3°43'S., 170°43'W.) is a treeless, triangular, coral atoll surrounded, except for the middle third of the W or longest side, by a wide platform reef. The reef bares at LW. Depths of less than 9.1m are found within 0.25 mile of the SE and NE sides. Shoals, which break heavily, extend about 0.4 mile off the NW and E ends of the island. The land rim is about 4.9m high, 30m inshore from the reef. The first rise is covered with loose coral fragments washed in from the sea. The uninhabited island is a wildlife sanctuary Under the control of Kiribati. Phoenix Island has been reported to give good radar returns up to 11 miles.

Winds—Weather.—Winds are always E. Usually, they vary from ENE to ESE, with the latter predominating.

Tides—Currents.—The current sets strongly past the N and S points of the island, converging on the W side. Close in to the shore on the W side of the island, the flood sets N and the ebb sets S. Offshore, the set is W about 0.5 knot, varying in strength and direction with the surface currents set up by the prevailing wind.

4.5 Enderbury Island (3°08'S., 171°05'W.) is a coral island consisting of a rim averaging 3.9m high, with a sunken central plain about 1.2m above sea level. The island is steep-to, with a very short reef which makes landing difficult because of the strong sweep of the undertow on the shelving shore. The shelf extends only about 68.5m and drops off rapidly except at the N and SE corners.

Winds—Weather.—The winds vary from the NE to SE. There are frequent, but usually brief rain squalls and they cannot be depended on as the sole water supply.

Tides—Currents.—Immediately W of the island, the current sets to the S with a strength of about 1 knot. In very strong flood tides this set may be reversed. Clear of the island, to the N or S, the average set is about 0.8 knot in a 255° direction.

Aspect.—A mast, marked by red obstruction lights, exists about 0.8 mile S of the N extremity. The most conspicuous objects on the island are several palms at the N end; a large guano heap, about 6.1m high on the W side; and the buildings of the settlement at the S part of the island.

Anchorage.—During the season of the Southeast Trades, there is opportunity to anchor on the spit off the NE point, in depths of 45 to 55m, coral and sand. The anchorage should be approached slowly from the WNW with constant use of the depth sounder, as the spit is very narrow and may be overrun easily.

The observed set of the current at this anchorage is to the NW, which keeps the stern away from the shore.

Anchorage here is not recommended when the Northeast Trades are blowing.

Directions.—The landing place is on the W side of the island, just N of the settlement. Ships may approach the island to within less than 0.8 mile at this point. Landing may be affected by a surfboat through a channel in the reef leading in on a range of two beacons, in line bearing 092°. Great care must be used in landing as the reef is short and steep, and the channel is narrow with rapid shoaling toward the landing. The best landing conditions prevail at HW and with a strong E wind, which flattens the swell that usually sets in from the S.

4.6 Canton Island (Kanton) (2°50'S., 171°43'W.) (World Port Index No. 56025) is located about 35 miles WNW of the NW extremity of Enderbury Island. It is a coral atoll, enclosing a large lagoon studded with coral heads, and crossed by numerous barrier reefs. The land rim is unbroken except for two openings on the W side. The surf breaks on the N extremity; off the S extremity, heavy tide rips extend about 0.5 mile from the weather side of the island.

Canton provides a good stopping point for small vessels on trans-Pacific voyages or waiting out a hurricane. There is no local phone system, but the island has HF radio capability and monitors 6215 kHz sporadically. There is little to no resupply capability on the island and visiting vessels should plan to be self-sufficient for the duration of their stay. It should be noted

Enderbury Island

that some of the fish species in the lagoon tested positive for ciguatera.

Winds—Weather.—The prevailing winds 90 per cent of the year are E, ranging from ENE to ESE, with an average velocity of 12 to 15 knots and moderate seas. High winds, 25 to 30 knots, and rough seas are infrequently experienced during the months of April, May, and June. During heavy weather, vessels have been held up from entering or leaving the harbor for periods of 2 to 3 days, occasionally extending to 5 days.

There are no noticeable seasons throughout the year. Temperatures range from a night low of 24°C to a daytime high of 35°C.

Tides—Currents.—Close to the W shore the flood sets 325°. In the lagoon entrance, the current runs 6 to 8 knots at the strength of the flood and the ebb. The current has been observed to run as high as 11 knots at the ebb, with a strong E wind blowing. Ebb currents produce a marked rip when mixing with ocean currents up to 1 mile or more off the entrance channel.

The tidal range is approximately 1.2m. However, with only two small openings to the sea for the entire atoll, strong currents are experienced throughout the tide cycle except for brief periods of slack water that last 20-30 minutes depending on local weather conditions. Slack water at low tide occurs approximately 1 hour after the predicted time of low water. In 2010 it was noted the time from when the current slows to 2 kts to the time of slack water at low tide is approx 30 minutes. Close to W shore, the current sets in approximately a 180° direction. Once inside the lagoon, the currents are rotary and run parallel to the pier face. A tidal current of up to 3 knots was experienced at the pier.

The ocean current near the island sets about 255° at about 0.8 knot, but is much stronger at the NW and SE points of the island. A vessel lying off the W shore may expect to be set off at the average rate. Local weather conditions make both tide and current predictions inaccurate, and vessels entering the harbor should contact local authorities for information regarding conditions at time of entering.

Depths—Limitations.—The channel N of Spam Island is reported (1997) to have a least depth of 9.1m. Depths of 4.5m were reported immediately outside the channel. Shoaling, which was visible in daylight, was occurring on the Spam Island side of the passage. The channel S of Spam Island was reported to be able to accommodate vessels with a draft of 2m.

A wharf, 100m in length, lies just inside the lagoon N of the N channel. The depth alongside the wharf was reported to be 9m. The face was reported to be in good shape, but the bollards were in poor condition. It is recommended that vessels berth starboard side-to. A tide measuring station is located at the S end of the wharf. The wreck charted just S of the wharf was searched for in 1997 and could not be located.

A boat ramp, 28m in width, is located just N of the pier. It is made of concrete and was reported to be in good condition.

There is a small boat basin N of the boat ramp protected by a breakwater on each side and has a least depth of 2m.

Piers and jetties charted along the lagoon on the SW side of the atoll, S of Spam Island, are reported (1997) to be ruins.

Anchorage.—There is fair anchorage on the coral shelf just off the lagoon entrance for vessels drawing less than 7m, in charted depths of 13 to 25m, white coral sand, good holding ground. Care must be taken to ensure the vessel anchors on the shelf, as the depth increases abruptly to depths over 30m a short distance seaward. At this anchorage the ship will swing from 040° to 160°, but will not swing into the beach while the trade winds are blowing. West winds are practically unknown at this island.

There are several favorable anchorages for small vessels inside the lagoon. However, vessels anchoring inside the lagoon should ensure their anchor is large enough to provide good holding to the sand bottom when tidal currents and E'ly trade winds are at their maximum.

Local opinion, supported by that of masters who have visited the island, is that there is no good anchorage for a vessel too large to enter the harbor.

Directions.— A vessel visiting in 2010 reported that the International 1924 datum used for electronic chart (GB 1451)-

Canton Lagoon and NGA paper chart 83105 could not be directly converted to WGS 84 datum. Erosion has significantly changed the contours of the land areas depicted on the chart. There are no pilotage requirements (or pilots available) for Canton. Plotting by visual or radar bearings is extremely difficult in this waterway, compounding the datum issues with the chart. The only charted item useful for navigation is reported to be the old lighthouse tower S of Spam Island at 02°49.00'S 171°43.01'W. The gas and water tanks S of the lighthouse tower no longer exist. Other charted objects cannot be seen due to tree growth. Beacons surround the seaplane landing area. Radar returns may be inaccurate for piloting due to large amounts of erosion on the N side of Spam Island. Shoals are visually evident during a daytime transit. This channel should not be navigated at night. For vessels transiting outbound from the lagoon, the stern of the charted wreck at the entrance to the lagoon serves as a good head bearing.

Caution.—The strong current, strong wind, and small space in which to maneuver a fairly large vessel make entry hazardous. A speed of 5 to 8 knots should be maintained to stem an ebbing tide in the channel, and to navigate the turn at the lagoon end of the channel. The current in this channel runs as high as 10 knots on both flood and ebb, and the periods of slack water are almost negligible. The channel is on the lee side of the island, and a strong wind may prolong the period of ebb and shorten the period of flood tides. Vessels should plan to enter during daytime at HWS and leave at LWS in order to ensure that they will be stemming the current. Also, a boat should be sent close inshore to sound the passage, observe the tidal currents, and to report when conditions are suitable for the vessel to proceed.

An explosives dumping area lies SW of Canton Island, between 3°09'S and 3°28'S, and between 171°53'W and 172°13'W.

An uncharted wreck was reported (2010) in position 02°48.3'S, 171°42.8'W.

Numerous recreational vessels visit Canton and anchor in the lagoon. Large vessels visiting Canton should send a small boat to verify that no small vessels are anchored in the lagoon, impeding approach to the pier.

4.7 Birnie Island (3°35'S., 171°31'W.) lies about 43 miles S of the S extremity of Canton Island. The island is 3.6m high on the rim, sloping gradually to sea level at a shallow brackish pond located about 90m inland from the E side of the island. Birnie Island is a bird sanctuary.

A flat fringing reef, drying at LW and extending as far as 0.1 mile offshore, surrounds the island. A shoal, which breaks in heavy weather, extends 0.7 mile S from the S point of the island. A stone monument, 03°35.05'S 171°30.79'W, on the E side of the island, about midway of the length, is visible 6 miles to seaward and is a radar target for the same distance.

Tides—Currents.—Close into the W shore the current sets N. Farther off, the set is W and is usually at a rate of about 0.5 knot, with the strength and direction varying with the surface currents set up by the prevailing wind.

Anchorage.—Anchorage is possible about 0.3 mile off the NW point, in 16.5m, with E winds. Anchorage is also available in 16.5m with the stone monument bearing 40° off the W side of the island. The S spit is considered too dangerous for anchorage, as it drops off from a depth of 3.7m to 54.9m within 90m.

4.8 Manra Atoll (Sydney Island) (4°27'S., 171°15'W.) is a triangular atoll located about 54 miles SSE of Birnie Island. The land rim of the atoll is about 4.6m high, and is covered with brush and trees entirely enclosing a circular lagoon. The island has been reported to give good radar returns up to 7 miles.

Winds—Weather.—The winds at Manra Atoll are almost always E, those of the SE quadrant predominates.

Tides—Currents.—Off the island, the set is W at a rate of 0.5 to 1.5 knots, varying in strength and direction with the prevailing wind. Close inshore it conforms to the shoreline, diverging at the E extremity and converging at the W extremity.

Aspect.—With a NW wind blowing or at LW, it is better to land on the S side just E of the island. At this point, there is a fissure in the reef wide enough for a boat to enter if properly handled. The passages were reported improved by blasting.

Anchorage.—There is anchorage off the W side of the island, in about 16.5m, about 0.1 mile off the reef sheltered from the prevailing winds. From November to April, NW winds may be expected replacing the prevailing E winds.

4.9 Orona Atoll (Hull Island) (4°30'S., 172°10'W.) is a coral atoll surrounded by a flat fringing reef, which dries in patches and is about 270m wide. The shelf drops off quickly except at the E extremity, where there is a least depth of 110m, 0.4 mile offshore. At all other points, the 200m curve is within 0.3 mile of the atoll.

The land rim of the atoll is about 0.3 mile wide and encloses a large and relatively clear lagoon. On the SE side of the atoll there are some passes from the lagoon to the outer reef which are fairly deep at HW, but there is no communicating channel through the reef. It was reported that the passes in the reef were improved by blasting.

At the W end of the atoll there are coconut palms from 12 to 18m high; the remainder of the atoll is covered with palm trees and brush, 6 to 12m high. There is a village in ruins on the W part of the atoll.

The lagoon has depths up to 14.6m and 16.5m in places, but it is foul, with numerous shoal coral heads. The larger and shallower heads have been marked with buoyed gasoline drums.

Tides—Currents.—Close into the shore, the current sets W along the atoll with an average velocity of 1 knot. Offshore, the set is W about 0.5 knot, varying with the surface currents set up by the wind. The tidal current in the blasted channel through the reef in the NE part of the atoll is very strong, ranging up to 5 knots.

The E channel, the widest and deepest, carries about 0.9m of water at the spring tides. A channel has been blasted through the W extremity of the reef.

Anchorage.—There is anchorage for small vessels in E winds only, in a depth of about 18.3m, about 0.1 mile off the W extremity of the reef. It is recommended that vessels with a draft of more than 6.1m lie off the W end of the atoll.

4.10 Nikumaroro Atoll (Gardner Island) (4°40'S., 174°31'W.) is a wooded wedge-shaped atoll lying about 137 miles W of Orona Atoll (Hull Island). The atoll is surrounded

by a fringing reef, which dries at LW, extending about 0.2 mile offshore. The NW and SE extremities of the reef appears to be extending. Depths off the atoll, which is steep-to except at its NW and SE extremities, average 366m, 0.3 mile from the reef. Nikumaroro Atoll (Gardner Island) encloses a lagoon into which there is no navigable passage. With the exception of two breaks, a large one on the W side and a narrow one on the S side, the land rim of the atoll entirely surrounds the lagoon.

Nikumaroro Atoll

The lagoon is encumbered with coral heads, but seaplanes have landed successfully.

A conspicuous stranded wreck lies close W of the N extremity of the atoll. The wreck was reportedly breaking up.

Tides—Currents.—Off the atoll the set is W, and varies in direction and strength with the prevailing wind. Close inshore, the current follows the trend of the land to the W.

There is a deserted village on the W side of the atoll, about 1 mile S of the N extremity, off which anchorage may be obtained by small vessels, very close inshore. Two small beacons N of the village indicate the approach.

Directions.—The best landing place, marked by a white pyramidal concrete structure, is about 0.3 mile S of the village. A boat channel has been cut through the reef in a 054° direction and in line with the concrete beacon. Landing should be attempted just after HW when there is less surf than on a rising tide. With a SE wind, landing can be effected in the lee of the wreck at any stage of the tide. The reef is extremely slippery and wide, and the landing is not recommended if any equipment is to be landed or brought off.

4.11 McKean Island (3°36'S., 174°08'W.) is a treeless coral island, nearly 0.5 mile round in shape, set on a heart-shaped reef. Breakers extend about 0.3 mile from the N end and 0.2 mile from the S end of the island. The most conspicuous object on the island is the ruin of a large building on the W side, with a coral slab, 2.1m high. Scattered about are the ruins of several structures, obviously part of the old guano works. The island is a wildlife sanctuary.

Winds—Weather.—The winds are nearly always E, varying from NE to ESE, with the former predominating.

Tides—Currents.—The current sets strongly past the N and S points, converging on the W side of the island. Close in to the shore on the W side, the flood sets N and the ebb S. Offshore, the set is W with an average velocity of 0.5 knot, but varying in strength and direction with the prevailing wind.

Carondelet Reef (5°34'S., 173°51'W.) lies about 118 miles SSW of McKean Island, with a minimum depth of 3.7m. The reef does not bare at any stage of the tide and breaks only in moderate or rough weather. Depths just off the reef are from 9.1 to 18.3m and increase rapidly when beyond a distance of 0.5 mile.

Islands and Dangers North of the Kiribiti Islands

4.12 A vessel reported (1954) sighting a reef about 1 mile long in an E-W direction at position 0°56'S, 174°51'W. The reef was clearly visible, and the water in the general area was discolored.

Winslow Reef (1°36'S., 174°57'W.), about 38 miles S of the above-mentioned reef, is about 1 mile long in a E-W direction and 0.5 mile wide in a N-S direction with the shallow area toward the W. A minimum depth of 11m has been indicated. The NW and SE edges of the reef come out into points. The sides of the reef drop off steeply on all sides.

The existence of a possible uncharted reef was reported in 1983. The approximate position is 2°21'S, 175°19'E. This position is approximately 47 miles SSW of Winslow Reef.

A W set was reported in the vicinity of Winslow Reef.

An uncharted reef was reported lying about 30 miles SE of Winslow Reef in position 1°51'S, 174°34'W.

Baker Island (0°12'N., 176°28'W.), about 275 miles NNW of McKean Island, is nearly flat, but rises to an elevation of 6.1m at its SW extremity. At this point there is a steep, sandy beach which extends some distance N; elsewhere, the island is fringed by a coral reef. On the N and E sides of the island an extensive shoal, with depths of less than 7.3m in places, extends about 0.8 mile. The surf breaks heavily on the E side and the SW extremity of the island. The W side of the island is to leeward under prevailing wind conditions.

Winds from the E predominate throughout the year. From December to May, the prevailing winds are sometimes interrupted by W winds and bad weather.

Regulations.—Baker Island is a National Wildlife Refuge under the administrative responsibility of the U.S. Fish and Wildlife Service. The refuge extends outward to the 3-mile limit. Entry into the refuge without a permit is prohibited except in an emergency. Permits must be obtained from the Refuge Manager, Hawaiian/Pacific Islands National Wildlife Refuge Complex, U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, P.O. Box 50167, Honolulu, HI 96850.

There is no sheltered anchorage. Vessels lie off the island and discharge to landing craft. The fringing coral reef surrounding Baker Island makes landing difficult. The S point of the island can be used for landing when winds are from NE.

Caution.—Tangent bearings of the island are unreliable. The radio towers at the E side of the island have been removed.

4.13 Howland Island (0°48'N., 176°38'W.), about 38 miles NNW of Baker Island, is a low flat island devoid of vegetation other than a few stunted trees. It is ringed by a relatively flat coral reef almost completely exposed at LW extending out to about 0.1 mile, except on the W side where the reef averages about 73m in width. Outside of this reef is a coral shelf extending about 0.3 to 0.5 mile on the N, E, and S sides, and about 0.1 mile on the W side. The depths on this shelf vary between 5.5 to 21.9m.

A broad, sandy, and in some places, gravelly beach slopes upward at a slight angle on the W side of the island. On the windward, or E side, there is practically no beach and the island rises abruptly from the reef to an average height of 3.7m, with the highest point about 5.5m in the N part. Amelia Earhart Daybeacon is situated near the center of the W side of the island.

NASA Image (2004)

Howland Island

Winds—Weather.—Winds from the E predominate year round. From December to May, the prevailing winds are sometimes interrupted by W winds and bad weather.

Regulations.—Howland Island is a National Wildlife Refuge under administrative responsibility of the U.S. Fish and Wildlife Service. The refuge extends outward to the 3-mile limit. Entry into the refuge without a permit is prohibited except in an emergency. Permits must be obtained from the Refuge Manager, Hawaiian/Pacific Islands National Wildlife Refuge Complex, U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, P.O. Box 50167, Honolulu, HI 96850.

Anchorage.—A vessel anchored (1966) about 0.4 mile from the N end of the island, in 22.8m, with the E tangent of the island bearing 144°, the W tangent bearing 185°, and the day beacon bearing 167.5°. A vessel anchored (1967) about 0.3 mile NNE of the N end of the island, in 11.9m, with the E tangent of the island bearing 153°, the W tangent bearing 213°, and the day beacon bearing 176°, distant 1 mile.

The Tokelau Islands

4.14 The Tokelau Islands, comprises three atolls, namely Atafu Island and Nukunonu Atoll (Nukunono Atoll), to the NW, with deep channels between, and Fakaofo, to the SE; they lie about 241 miles S of the Phoenix Island group. A W set at a rate of about 1 knot has been experienced in the vicinity of the group in the months of June and September.

Caution.—Fish Aggregating Devices have been moored 0.4 to 0.5 mile W of the atolls. Vessels should exercise caution when within the vicinity.

Atafu Island (8°32'S., 172°30'W.) is an atoll consisting of a number of islets lying on a triangular-shaped reef which encloses a lagoon. The reefs surrounding the atoll are mostly steep-to. The islets are covered with coconut, pandanus, and low trees. A conspicuous clump of casuarina trees is located on the S islet of the atoll. Masts, 21m high, stand on the S side of Atafu Island, the NW island of the atoll. There is a passage, S of the island, into the lagoon that lighters can use.

Landing can be effected at the S end of the NW islet. It is difficult to land except within 2 hours of HW.

Caution.—In 1977, a shoal was reported 133 miles ENE of Atafu in position 7°47'S, 170°23'W.

4.15 Nukunonu Atoll (Nukunono Atoll) (9°11'S., 171°52'W.), consisting of several islands, lies about 45 miles SE from the SE extremity of Atafu Island. The N part of the atoll is a bare reef, awash, upon which the sea breaks heavily. A church with a steeple is located in the center of the village near the S end of Nukunonu island. A large metal roofed meeting hall is located adjacent to the beach just S of the church. of Nukunonu Atoll is conspicuous from the W; near the W extremity is a noticeable clump of bushes, 2.4 to 3m high. A red and white mast stands on an island SE of Nukunonu Atoll. A doctor is located on Motusaga island which is connected to Nukunonu island by a bridge 50m in length and visible from sea.

During offshore winds, fair anchorage can be obtained on the shelf of the reef, in 27.4m, coral bottom, on the W side of the atoll, about 0.6 mile S of the N extremity of Nukunonu Atoll. A mooring buoy is located off the village in approximately 30m of water. If requested, local authorities will come out in a skiff and bring people ashore. The island Police or Customs can be contacted on 9080 kHz.

Landing is dangerous, but canoes can land abreast at the village on Nukunonu, or about 2 miles N, according to the direction of the wind. A boat channel, with a reported depth of 1.2m, lies off the church and is protected by boulder breakwaters. This channel, which leads to a landing on a sandy beach, breaks heavily during SSE winds.

Caution.—Caution is advised, as the boat passage was damaged in a storm in 1987. The passage is littered with rubble, and is no longer marked by boulders.

4.16 Fakaofo (9°23'S., 171°15'W.), about 35 miles ESE of Nukunonu, consists of 61 islets lying on reefs which encircle a lagoon. The reefs which form the sides of the atoll are awash at LW, but bare in places with coral rocks and boulders emerging from the water. The surf is heavy on the NE or weather side, but moderate on the W side. The lagoon contains a few coral heads and reefs. The larger islets are covered with coconut palms, native trees, and undergrowth.

Fonua Fala (Fenua Fala) (9°23'S., 171°17'W.) is the W islet of the atoll. Lighters can enter the lagoon abreast Fakaofo village, about 1 mile SE of Fonua Fala, but the passage through

the reef is hazardous. There is a small hospital on Fakaofo islet and an emergency seaplane landing area in the lagoon NE of the islet.

Tuvalu (Ellice Islands)

4.17 Tuvalu, formerly the Ellice Island group, became an independent state in 1978. It became part of the Republic of Kiribati in 1979. This group of islands lies between 5° and 10°S, and 176°E and 180°, extending about 360 miles in a NW-SE direction. It consists of nine atolls or clusters of islands, which are low and flat. The tops of the coconut trees are from 18 to 24m high.

Tides—Currents.—The N part of the group experiences a W set, as it lies within the South Equatorial Current. Currents in the S part of the group are variable.

Niulakita Island (Sophia Island) (10°47'S., 179°28'E.), the S island of the group, is a little higher than most of the group and thickly covered with trees. The island is surrounded by a fringing reef, and a bank, with a depth of 25.6m, extends about 1 mile off its shores. Depths of 14.6m extend about 0.5 mile from the shores of the island. Outside of 1 mile from the island, the depths increase rapidly.

Anchorage.—There is anchorage off the SW side of the island, in 12.8m, in a position defined by the left tangent of the island bearing 048°, and the right tangent bearing 077°. There is a good anchorage off the NW side of the island, in depths of 13 to 21m, sand, about 0.5 mile from shore, with the E end of the island bearing 112° and the W end bearing 156°. A reef extends about 0.2 mile from the W extremity of the island.

Landing on the island is difficult in other than canoes. The landing place on the SW side of the island cannot be used in SE weather.

Caution.—Mariners without local knowledge should keep to the W of the island, as shoal water has been reported to extend up to 13 miles ESE of the island's E end. A bank, position doubtful, with a least depth of 25.5m, has been reported to lie 9 miles NE of the island.

4.18 **Nukulailai** (Nukulaelae) (9°22'S., 179°51'E.) comprises several islets located on a coral reef which surrounds a shallow lagoon.

It was reported (1993) that a 20m shoal lies 43 miles S of the atoll in position 10°09.5'N, 179°41.8'W.

Fangawa Island, lying on the W extremity of the reef, is 26m high and wooded. There is a mission station on this island.

Tides—Currents.—The flood current sets SSW and the ebb current sets N at the anchorage.

Anchorage.—There is precarious anchorage W of Fangawa Island, in 12.8m, 0.2 mile from the main reef. The bank on which to anchor is best found by eye from aloft, being easily seen with a good light. A vessel, 87m in length, has reported anchoring, in depths of 34 to 36m, with the N tangent of Fangawa Island bearing 047° and the S tangent bearing 110°. This position was found to be satisfactory in moderate to fresh E to SE winds.

Landing from boats is a very hazardous operation, except in calm weather with local knowledge, as even native canoes frequently capsize. There are two boat passages through the main reef. The passage off the W side of Fangawa Island is satisfactory during moderate to fresh E weather. During SE weather, a landing place off Matala, about 1 mile NNE of Fangawa Island, is preferable.

4.19 **Funafuti Atoll** (8°31'S., 179°08'E.) (World Port Index No. 55617), about 60 miles NW of Nukulailai, consists of a group of 30 islands and islets lying on reefs which encircle a lagoon. The lagoon contains numerous dangerous shoals and coral patches, several of which break heavily in the swell, which sets in through the various passages. The lagoon is encumbered by numerous banks and coral clusters not generally visible if covered by more than 6m of water. Its W part is especially foul and is full of small coral patches rising steeply with deep water all around. In the deepest parts, there are depths up to 48m, sand and coral.

Winds—Weather.—The prevailing winds are E, with a N component from November to April and a S component from May to October. East to SW winds are steadier, but E to NE winds are slightly more frequent winds. Average winds are from 10 to 13 knots. The strongest gales occur in the season from November to April. Waterspouts are frequently seen in the area. The wet season is from December to March. September and October are the driest months. Squalls occur occasionally in the afternoons, but are of short duration.

Tides—Currents.—The spring rise within the lagoon is 1.8m, while the neap rise is 1.3m.

Currents within 7 or 8 miles of the atoll generally set W, but off the atoll's NE side the currents take a more N set. The current does not exceed rates of 0.75 knot, and is seldom more than 0.5 knot.

Tidal currents in the center of the lagoon are weak and irregular. Observations on currents were that in general, the tidal current flows along the axis of the channels. Maximum flood velocity of about 2 knots and maximum ebb velocity of about 1.6 knots may be expected.

Tidal currents in Te Ava I De Lape have an average maximum spring rate of 1.2 knots on the flood and 1.5 knots on the ebb. With NE winds, however, rates in the middle of the pass attain rates of 4 knots, with the ebb being the stronger. During SE winds, currents are less. In Te Puapua the flood sets W, the ebb SE, at rates of about 1 knot. The maximum current in Te Ava Fuagea is found to be 1.5 knots, this maximum coming at the springs on the ebb halfway between HW and LW. The current was usually under 1 knot. The current was not at anytime sufficient to interfere with navigation.

Funafuti Wharf

Depths—Limitations.—The largest vessel to have been handled was reported to be of 11,500 grt. Of the passes through the reefs, Te Ava I De Lape is the favored entrance, but has a depth of 5.8m (1985) on the bar. Te Ava Fuagea has a depth of 18.3m, but has a width of about 0.1 mile. From the pass to the wharf, the charted track has a least depth of 12.3m. Te Puapua has a least depth of 12.7m. The wharf, situated on the lagoon side of Funafuti islands, is L-shaped and offers two berths. The outer face has a length of about 50m and alongside depths of 8m. The inner face has a length of 40m and an alongside depth of 5.5m. A second L-shaped wharf, 100m in length with an alongside depth of 7.4m, lies close S of the above wharf. An offshore multi-point mooring is situated off an oil tank just N of the wharf, but no information on depths at this berth are presently available.

Aspect.—Funafuti Island, the largest of the group, is located on the reef and is the only one of the group with a permanent population. The whole island is densely covered with coconut palms and presents a very uniform appearance when seen from a distance.

The tanks, and a wreck situated 0.2 mile WNW of the wharfs, are conspicuous. A church with a metal roof lies 1 mile SSE of the wharf. Several radio masts are charted on the seaward side of the island.

Funafuti Church

Pilotage.—Pilotage, which is available 24 hours a day, is not compulsory. Vessels should contact Funafuti Coast Radio Station, via radiotelephone, 48 hours and 24 hours prior to arrival with an ETA. The pilot will board the vessel from a small boat at Te Ava Pua Pua passage (8°35'S., 179°08'E.).

Anchorage.—Outside the barrier reef, anchorage is available on the lee side of the atoll. A vessel, 143m in length, with a draft of 7.6m, has reported anchoring, in a depth of 13m, between Fuafatu and Te Akau Fuafatu. The vessel reported the holding ground as good, and had also reported experiencing NE winds, force 3 to 6.

Anchorage may be taken on a bank located about 1.3 miles NNW of Tepuka, with the W end of the island bearing 153°, also with Te Afualiku and Paava in line bearing 071°. This berth offers convenient anchorage in E and SE winds.

Within the lagoon, anchorage is available NW, W, and SW of the village, but several reefs and shoals, some of which break, lie within 0.5 mile of the beach. Shelter here is reported to be moderately good, but vessels should use caution and a good scope of cable, as there are frequent heavy winds and rain squalls. A ground swell has also been reported here.

Caution.—Caution should be exercised when navigating within the vicinity of the passes, and within the lagoon due to the age of the survey. Uncharted shoals may exist off the recommended track, especially in the W portion of the lagoon. The aids to navigation marking the shoals within the lagoon have been reported to be unreliable or not in place.

4.20 Fatato Islet and **Funangongo Islet** (8°33'S., 179°10'E.), with a few coconut palms, lie on the reef which extends about 3 miles continuously SW from the SW extremity of Funafuti Island, at distances of about 0.6 mile and 1.8 miles, respectively, from that point.

Funamanu Islet, about 0.5 mile SW of Funangongo Islet, is covered with coconut palms and is marked close S of its W extremity by a beacon. A rocky spit, which does not always show well, extends about 0.2 mile SW from the W extremity of the islet.

Falefatu Island (8°35'S., 179°08'E.) is a narrow wooded island lying about 1 mile SW of Funamanu Islet. Reefs and shoals, with depths of less than 5.5m, extend nearly 0.3 mile off the NE and SW ends, and off the SE side of the island.

Mateika (8°36'S., 179°07'E.), the N extremity of which lies about 1.3 miles SW of Falefatu Island, is the northernmost of a chain of islets extending S to the S extremity of the atoll. These islets are all wooded with coconut palms and show a very uniform outline. Motungie is the S islet of the group. Avalau is a small islet about 0.3 mile W of Motungie.

From **Avalau** (8°38'S., 179°05'E.) the reef, with several small wooden islets located on it, extends for about 2.3 miles in a N direction to **Tefala** (8°36'S., 179°05'E.). Tefala, a small islet on the reef forming the W side of the atoll, lies 1.75 miles W of the N extremity of Mateika. From Tefala, the reef extends NNW for 1.25 miles to Fuagea Islet, and then for 1.5 miles to Te Ava Fuagea passage.

Te Ava Fuagea (8°33'S., 179°04'E.) is a deep passage which was previously described in paragraph 4.19.

Te Ava Fuagea passes between reefs, awash at extreme LW, while the reef bordering the N edge of the pass has boulders on it.

From seaward, and with local knowledge, proceed as safe navigation permits keeping a good lookout for reefs and the current. The pass has a least width of about 0.1 mile, and a least depth of 18m, while the track across the lagoon has a least reported depth of 12.3m.

4.21 **Fuafatu** (8°31'S., 179°03'E.), the W islet of the atoll, is located 5.5 miles N of Tefala and lies near the outer edge of the reef which projects W at this point.

Te Akau Fuafatu is a 5.5m coral patch lying 1 mile W of Fuafatu. It rises from a bank of sand and coral, with depths of 11 to 12.8m, which projects about 1 mile W from the reef. This bank drops very steeply down to the 200m curve. With any swell, the shoal breaks heavily and the bank on which it stands

breaks occasionally. Fualopa and **Tepuka** (8°28'S., 179°06'E.) are two wooded islets lying 1.75 and 3 miles NE of Fuafatu. Te Afualiku is an islet about 1.8 miles N of Tepuka.

Pava Islet and **Fualifeke Islet** (8°26'S., 179°08'E.), about 1.3 and 1.5 miles ENE, respectively, of Te Afualiku Islet, are both wooded and nearly joined at LW by a sandy spit. The reef on which they lie partly dries, and extends about 0.5 mile WSW from Pava Islet.

Vessels, with a draft greater than 3m, wishing to navigate Te Paupau, should exercise extreme caution, as shoals with depths of less than 5m lie within 0.15 mile of the fairway. Banks, which were reported in 1972 to be extending, restrict the pass through the reef to a width of 0.1 mile. The fairway has a least reported depth of 12.7m, but passes over charted depths of 12.3m, 0.5 mile SW of the beacon on Funamanu.

When approaching the pass from seaward, the entrance should be identified visually, as the beacon on Funamanu is not conspicuous; also, the islands between Funamanu and Funafutiare are not radar conspicuous. The beacon used as a steering mark (iron rail) should not be confused with a similar beacon situated about 0.5 mile SSE of it. This second beacon marks **Te Ulu Bungu** (8°33'N., 178°08'E.).

Te Ava I De Lape has a width of about 0.3 mile, a least depth of 5.8m, and is the most straightforward entrance for the lagoon. The channel passes between banks, with depths of less than 5m, which extend from coral reefs projecting from Te Afualeku, Pava, and Fualifekele.

From seaward, steer with the E end of the trees on Funangongo ahead bearing about 159.5°. When about 1.5 miles SSE of the pass, steer for the SE radio mast on Funafuti bearing 130°.

Caution.—The local authorities should be consulted for the latest information on depths, dangers, recommended tracks, and instructions before attempting to enter any of the channels mentioned above. The passes and lagoon require local knowledge.

4.22 Nukufetau Atoll (8°00'S., 178°20'E.) comprises a group of islets located on a reef about 48 miles NW of Funafuti Atoll. The atoll is roughly rectangular in shape, and contains some 30 islands and islets rising from a narrow coral reef. At LW, much of the reef is dry or barely awash. It is possible to walk between many of the islands and far out into the lagoon at LW. This group of islets forms a part of Tuvalu. All vessels discharge cargo to lighters. A wreck lies stranded on the reef, close W of the atoll's S island.

On **Savave Island** (8°02'S., 178°18'E.), one of a group of islands at the SW corner of the atoll, is a native village, the white buildings and flagstaff of which are visible from the sea. At the SE corner of the atoll is Motolalo Island, the largest of the chain.

The barrier reef on the NW side is broken by two passes, Teafua and Deafatule Pass. Teafua, entered about 1.8 miles NE of Savage Island, is used by vessels with local knowledge.

Tides—Currents.—A set, depending upon the state of the tide and the conditions of the weather, will generally be noted by vessels when approaching the seaward entrance of Teafua Pass. This set appears strongest on the ebb tide, when it usually sets S. A slight set to N may be expected inside the lagoon near the inner entrance of the pass. The current in the pass follows the general axis of the channel, and flows at rates of 1 to 3 knots. Caution is advised as at the turn of the tide, tide rips form, rendering the pass dangerous.

Anchorage.—The lagoon affords good anchorage in many places, but the channel leading to the anchorages NE of Savage Island is intricate.

Directions.—Teafua Pass (8°00'S., 178°20'E.) has been swept to a depth of 4.9m. It lies between the reefs which surround Sand Islet and **Entrance Islet** (7°59'S., 178°20'E.), lying about 1.3 and 2.5 miles NNE, respectively, of Savave Island. The pass is unmarked, but a white beacon on **Vasamotu Islet** (8°02'S., 178°23'E.), on the E side of the lagoon, bearing 120°, leads through the center of the channel; in 1984, the beacon was reported to be missing. This beacon is useful, as the shoal water on either side of the bearing indicated is not very obvious.

Caution.—Vessels approaching Nuku Fetau should be careful to keep seaward of the shoal area extending about 1 mile WSW from the SW end of the atoll. The approach to Teafua Pass should be made from a position at least 1.3 miles seaward of the entrance. Local knowledge is required in passing through the channel.

4.23 Vaitupu Island (7°28'S., 178°41'E.), 32 miles NNE of Nuku Fetau, is densely wooded and surrounded by a fringing reef. The island has lagoons, the larger located in the SE part. There are two entrances to the larger lagoon, one of which is practicable for boats at HW. The larger lagoon is surrounded by a belt of coconut trees, 18m high. Landing is difficult and is best effected in native canoes.

The principal village of the island is situated near its S end, to the SW of the large lagoon. A church at the village is conspicuous between NE and ESE bearings.

There is a passage through the reef abreast this village. The seaward end of the passage is in line bearing 060° with the church. This passage can be used by ship's boats at HW only and in a flat calm.

Anchorage.—In 1961, a vessel found anchorage with the church bearing 100°, distance about 0.4 mile. In 1984, a vessel reported being unable to find anchorage off the island's W side.

4.24 Nui Atoll (7°13'S., 177°10'E.), lying about 90 miles W of Vaitupu, is in the form of a crescent, with an island 18m high at each end. A chain of 14 islets extends between the islands along the E portion of the reef.

The S island, which is inhabited, is approachable by a boat channel into the lagoon. The channel, which is impassable by canoes at LW, is entered with a flagstaff on the S island bearing 077°. In 1979, the channel was reported to have been widened, while in 1984, the flagstaff was missing.

The W side of the atoll is steep-to and offers no anchorage. In 1984, a small vessel reported anchoring off the N lip of the N island.

Niutao (6°06'S., 177°16'E.), 68 miles N of Nui, is about 1.3 miles across, nearly round, and densely covered with coconut trees. A narrow fringing reef extends all the way around the island, on which a heavy surf breaks, rendering landing difficult except for canoes. There is no passage into the lagoon. A village is situated on the SW side of the island.

NASA Image (2001)

Nui Atoll

Tides—Currents.—A vessel has experienced a strong S set between Nuku Fetau and this island.

Anchorage.—Anchorage can be found, in a depth of 31.1m, off the W end of the island, about 90m from the reef. There is a similar anchorage off the E end of the island for use in W winds.

The best landing place is close N of the W extremity of the island.

4.25 Nanumanga (6°18'S., 176°21'E.) is a low coral island surrounded by a narrow fringing reef with an unusually precipitous face to seaward. The island is wooded with coconut palms about 24m high.

Reefs extend nearly 0.4 mile from the N and S points of the island, which is about 1.5 miles long and 0.8 mile wide. The surf breaks heavily over the reefs.

There is a village on the W side and native missionaries are established. A flagstaff and a church stand on the W side.

There is no anchorage or lagoon and landing is difficult.

Caution.—A shoal patch, with a least depth of 11.3m, is located about 2.5 miles NNE of the N extremity of Nanumanga. The patch provides a useful anchorage for visiting ships, but there is no shelter and the swell tends to be more pronounced.

4.26 Nanumea (5°39'S., 176°08'E.), 37 miles NNW of Nanumanga and the N atoll of the Tuvalu group, consists of a coral reef, with two principal islets, Lakina and Nanumea, about 0.5 mile within its W and SE extremities, respectively, with a lagoon between them. There is no channel for deep-draft vessels into the lagoon. A small boat channel, available to boats at HW, leads W of the W arm of Nanumea into the lagoon. There is a village on the W side of Nanumea with a conspicuous red-roofed church bearing between 020° and 120°, off which extends a broad fringing reef which rises as a wall of coral from the depths of the ocean. The sea breaks furiously on this reef, but at intervals the surf subsides to the extent that boats may land. Reefs extend off the SE point of Nanumea. It has been reported that a pier, 82m in length, extends from the village, and that two other piers exist in the lagoon.

Nanumanga Church, Nanumanga Island

Vessels approach Nanumea from the W and lie off this islet, discharging cargo into landing craft. The bend in the atoll affords a slight lee off the NW arm of Nanumea. Large landing craft beach and unload on the reef; they should come in 3 hours before LW and can remain until 3 hours after LW. Engines should be kept running to keep the stern from swinging.

Anchorage.—A vessel anchored off the NW point of Lakina on a submerged coral patch, about 0.3 mile off the dry fringe reef, in 12m. The anchor was dropped 0.5 mile from the NW tangent of Lakina, with the tree line bearing 145°.

Caution.—Vessels passing N or S of Nanumea should give it a wide berth. The fringing coral reef is extremely hard and will break the back of any ship swept across it. The coral fingers extending from the reef also present a hazard.

The Gilbert Islands

4.27 The Gilbert Islands lie N of the Tuvalu group and extend from 2°45'S to 3°30'N, and between 172°30'E and 177°00'E. Some of these islands are incorrectly placed on the chart, particularly as to longitude. Those islands of the Gilbert group that lie N of the Equator are known as the North Gilbert Islands; those S of the Equator are known as the South Gilbert Islands.

The E side of these islands are steep-to and may be passed at

0.5 to 1 mile off. The W side are fronted by sunken reefs, spits, and coral patches which in some cases extend many miles off. It is advisable to pass E of the islands, but care must be taken not to be set too close inshore by the prevailing E wind and the South Equatorial Current, which generally sets W. Vessels are urged to contact the Marine Superintendent at Beito, Tarawa for the latest navigational information on buoys, beacons, etc., before entering or approaching.

Tides—Currents.—The islands in this group are almost always influenced by the South Equatorial Current, which sets to the W at rates of 1.5 to 2 knots. Persistent W winds, which may occur from December to April, or a S shift of the South Equatorial Countercurrent may cause an E set.

Caution.—Fish Aggregating Devices (FADS) have been placed within the waters of the Gilbert Islands in the following approximate positions:

a. 3°08.1'N, 172°41.2'E.
b. 1°23.2'N, 173°10.6'E.
c. 1°10.0'N, 173°01.0'E.

FADS are usually moored in deep water locations; they may be lit or unlit, and concentration of fishing vessels may be encountered in the vicinity. FADS are not an aid to navigation nor are they maintained as such; they are subject to break loose from their mooring grounds.

In 1983, breakers and discolored water reported in position 3°53'S, 174°02'E and position 2°21'S, 175°19'E.

4.28 Arorae (2°39'S., 176°50'E.), the SE island of the Gilbert Islands, lies about 185 miles NNE of Nanumea, in the Tuvalu group; it is densely wooded and about 15m high to the tops of the trees.

A reef, which always breaks heavily, extends 0.3 mile S from the island. A coral and sand reef, with depths of 3.6 to 7.3m, extends about 2 miles from the NW point of the island. On the latter reef, which is dangerous, a heavy ground swell usually runs and occasionally breaks heavily at more than 1 mile offshore.

There is a concrete church on the island, but it is obscured by trees from the N and S. The island is best approached from the W, steering for the flagstaff which shows above the trees at the government station; the flagstaff was reported (1996) obscured by trees.

Anchorage.—The best anchorage is on the W side of the island, immediately in front of the church. It has no swinging room and is practicable only when there are N and S winds.

A vessel found an anchorage (1949), in 23.8m, with the flagstaff bearing 001° and the N of four coconut palms, painted white, on the foreshore, bearing 67.5°.

Directions.—Landing is accomplished from canoes at the beach in an area, to the W of the flagpole, where all projecting coral heads have been cleared for a distance of about 0.2 mile. The reef extends out for about 0.2 mile in the area.

4.29 Tamana (2°29'S., 175°59'E.), located about 50 miles W of Arorae, is densely covered with coconut trees and is fringed by a coastal reef about 0.2 mile wide. There are no navigational marks on the island, except for a conspicuous white church and a flagstaff about 90m SE of it. The church is situated about midway along the SW side of the island, close to the beach. An administration building stands close S of the church.

There are no anchorages off the island, except for small vessels with local knowledge.

There are depths of over 200m about 0.1 mile from the breakers, except at the N and S extremities of the island, where the slope of the seabed is less steep.

A boat channel, suitable only for canoes or surfboats, has been blasted through the reef opposite the flagstaff. The channel, which is about 4.8m wide, is approached with the flagstaff bearing 041°.

Caution.—Off-lying banks, with depths of 92 to 366m, lies in approximate position 3°01'30"S, 175°41'12"E, about 35 miles SW of Tamana. In 1983, a vessel reported breakers in approximate position 3°53.0'S, 174°02.5'E and approximate position 2°21'S, 175°19'E.

4.30 Onotoa (1°51'S., 175°35'E.) lies about 41 miles NW of Tamana and has a shallow lagoon bordered by a broken reef on the W side. The lagoon is studded with numerous coral heads. At LW, it is possible to walk all the way around the islands in the lagoon. There are two boat channels leading through the reef. The N channel S of **Temuah Island** (1°47'S., 175°29'E.) leads to the jetty on the W side of Tanyah Island, the N island. It has been reported that the N channel is hazardous. The S channel, N of the SW island, leads to the lagoon and the village on the S island. The tidal rise is about 1.8m. There is a conspicuous stone beacon with a white top on Temuah Island, at the NW extremity of the atoll.

Anchorage.—The principal anchorage is off the N boat passage, about 1 mile S of Temuah Island, in depths of 11 to 12.8m, with Temuah Beacon bearing 000° and the S extremity of Tanyah Island bearing 107°.

Large vessels can anchor about 0.3 mile W of the latter anchorage, in 18 to 21m, where there is plenty of swinging room.

Landing can be effected at the coral rock jetty on Tanyah Island at all tides.

4.31 Beru (1°20'S., 176°00'E.), about 37 miles NE of Onotoa, is surrounded by a reef and has a small lagoon on its W side. Coconut palms cover Beru. Near the center of the island, the reef extends about 2.5 miles W. It extends about 0.3 mile from the SE point and always breaks. Beyond the edge of the reef is a spit extending 0.5 mile E, with depths of 7.3 to 21.9m.

There is a boat channel through the reef abreast the NW point of the island. A boat passage lies about 0.5 mile N of the SW corner of the barrier reef. The reef off the NW end of the island has a depth of about 1.8m at HW, when it can be crossed by boats.

Anchorage.—There is anchorage, in 14.6m, coral, close to the reef abreast a trading station at the southernmost village. It can be used only in good weather with winds between the N and E.

Espiegle Anchorage is abreast the mission buildings off the W side of the atoll. Anchorage is available, in depths of 10.9 to 51m, with the NW extremity of the island bearing 342°, and the SW extremity bearing 114°.

Directions.—The best landing is about 4 miles from the S extremity of the island, on the central inner reef, opposite a church and the trading station.

4.32 Nikunau (1°23'S., 176°26'E.), located about 23 miles E of Beru, is of coral formation and surrounded by a reef. The seaward edge of the reef drops away rapidly into deep depths. There are breakers all around Nikunau. A shoal, with a depth of 6.7m about 0.5 mile from shore, extends from its S point. A narrow spit, with depths of less than 16.4m, extends SE for about 1.5 miles from the SE end of the island. A spit, with a depth of 6.7m at its seaward extremity, extends about 0.5 mile W from the NW end of the island. The island is 1.8 to 2.4m high and thickly covered with coconut and pandanus trees. All the villages are on the W coast.

Anchorage.—There are no suitable anchorages for large vessels. In 1959, a vessel anchored off Rungata village (near the center), just over 0.1 mile clear of the reef, in a depth of 69.5m. From the anchorage the flagstaff bore 107°, the white Mission building bore 061°, and the spire of the Roman Catholic church bore 021°. The anchorage is unsafe in a W wind.

Nikunau Church and Village House

Directions.—There is a landing at Rungata through a boat passage which has been blasted through the reef. The passage is located opposite a point on the shore just N of the prominent white Mission building. Landing may also be affected over the reef on a stretch of sandy beach fronting a large native building in a cleared space about 1.5 miles N of the S point of the island.

4.33 Tabiteuea (1°21'S., 174°54'E.), the largest atoll of the Kiribati Islands, lies about 31 miles NW of Onotoa and is about 32 miles long. It consists of a chain of islets, lying in a NW-SE direction, thinly covered with trees. At the S end of the atoll is a lagoon, enclosed on its N and E sides by islets, and on its S side by a drying reef. The W side of the lagoon is also closed by a barrier reef extending out about 5 miles. The lagoon depths are from 3.7 to 9.1m.

There is a ship passage into the S lagoon. West Passage, about 13.5 miles, bearing 254° from the N extremity of **Buariki** (1°28'S., 175°04'E.), should not be attempted by a vessel drawing over 3m. Local knowledge is necessary for the use of this passage.

Eanikai (1°10'S., 174°43'E.), the N island of the atoll, has several mission stations and villages. A beacon, 18m high, and a flagstaff are useful landmarks on the island.

Nautilus Shoal (1°34'S., 174°55'E.) is reported to lie 7 miles WSW of the SE extremity of Buariki, the E island of the atoll. Depths of the shoal are from 9.1 to 21.9m, and are reported to be connected to the reef by foul ground.

A dark brown rock, called The Breaker, lies in about position 1°29'S, 174°51'E. This rock is awash at LW and almost always breaks. Two drying coral patches lie about 0.2 mile E and 0.3 mile ESE of this rock.

Shoal water and breakers were sighted by a ship (1966) at a position about 12 miles S of Tabiteuea.

Nautilus Shoal and its adjacent foul ground should be given a berth of at least 15 miles and no attempt should be made to approach the anchorage unless the sun is high enough and far enough astern to navigate through the coral by eye. Continuous sounding is necessary.

Strong tide rips off the NW side of the atoll appear as surf from a distance.

Anchorage.—There is anchorage, in 14.6m, sand and coral, off the boat passage which lies 2 miles W of **Umai Ataei** (1°33'S., 175°00'E.), the S islet, with the islet bearing 085°. A vessel anchored, in 29.3m, with the beacon SW of Utiroa village bearing 052°. This anchorage appeared to be good, but there were several light-colored patches in the vicinity.

Peacock Anchorage, which lies outside the shore reef, is a bank of coral and sand upon which there is anchorage, in depths of 9.1 to 21.9m. It is W of Eanikai, the N island. Great care must be taken in anchoring here, as the water shoals rapidly from depths of 45.7m. This anchorage is obstructed by reefs and coral heads. Landing from Peacock Anchorage in moderate weather is fair.

4.34 Nonouti (0°40'S., 174°21'E.) lies about 24 miles NW of the N end of Tabiteuea. The islets of which it is composed are nearly continuous on the N and E sides, being connected by coral reefs. The atoll is partially covered with trees. A reef extends 1.5 miles W of the N point of the atoll and then S for about 9 miles to Archer Entrance.

An intricate passage, which leads from Archer Entrance through the lagoon, is available, reportedly to vessels up to 55m in length, with drafts of 4.5m, but requires extensive local knowledge.

Tides—Currents.—Outside the lagoon, the tidal currents follow the trend of the reef, the flood setting N and the ebb S, at velocities of 1.5 to 2.5 knots. The currents turn about 1 hour after HW and LW.

Aspect.—A conspicuous church, with metal-roofed buildings close N and S of it, stands at **Umantewena** (0°44'S., 174°28'E.), while prominent churches stand in villages 1 mile and 3.5 miles N of Umantewena. **Numatong** (0°36'S., 174°13'E.), an island standing on the NW reef, is conspicuous from a vessel off the W reef. When approaching Archer Entrance from the N, vessels should give Numatong a berth of at least 5 miles to clear the spit extending W from it.

There is a good landing at Kairaoa, about 0.4 mile SSE of Temaraia.

Anchorage.—Outside the lagoon, anchorage is available in Archer Entrance, with a beacon (0°40.9'S., 174°20.9'E.) bearing 075°, 4 miles distant. Southwest Anchorage has depths of 31m E of **Autaken Reef** (0°44'S., 174°23'E.). Vessels anchor with the mission at Umantewena a little over 3 miles distant,

bearing 020°. Close NW of the anchorage there are two boat passages into the atoll, the N one being preferred.

Anchorage within the lagoon requires local knowledge.

Caution.—Autaken Reef, on the SW side of the atoll, is nearly awash, steep-to, and always shows well. **Autaken Spit** (0°47'S., 174°20'E.) extends about 2 miles in a SW direction from Autaken Reef. It is light in color, very shoal, and easily distinguished.

From the spit, the sunken reef extends NNW for about 6 miles to Archer Entrance. On this reef are numerous small pinnacle coral heads known locally as "horse's heads," which are difficult to see and make it necessary to avoid this part of the reef.

4.35 Aranuka (0°08'N., 173°37'E.), S point, lies about 56 miles NW of the N extremity of Nonouti. It consists of two wooded islets lying on a reef enclosing a shallow lagoon. The islets appear to be connected in a continuous string by low, sandy beaches, with a boat passage on the SW side of the atoll.

A reef and dangerous ground extend about 4 miles WNW from the W extremity of the W islet, and for a distance of up to 2 miles off the N side of the atoll.

Anchorage.—Anchorage is reported on the reef extending out to the W and N, but there is considerable swell. There is also anchorage, in depths of 14.6 to 18.3m, coral, from 0.1 to 0.3 mile from the reef close S of the boat passage on the SW side.

Caution.—The boat passage is available in moderate weather from half-flood to half-ebb tide. There are several obstructions in it and the currents are strong, rendering the passage dangerous. Several areas of this lagoon are unsurveyed.

4.36 Kuria (0°13'N., 173°24'E.), an island about 6.8 miles WNW of Aranuka Atoll, is divided into two parts near the middle, the N of which is known as Oneaka. The island is densely wooded and covered with palm trees, 21m high. A fringing reef surrounds the island. An unsurveyed spit, on which the sea usually breaks, extends about 5 miles NNW from the N extremity of Oneaka. Depths of 9 to 17m are located 1 mile and 1.3 miles E, respectively, from the E extremity of Kuria.

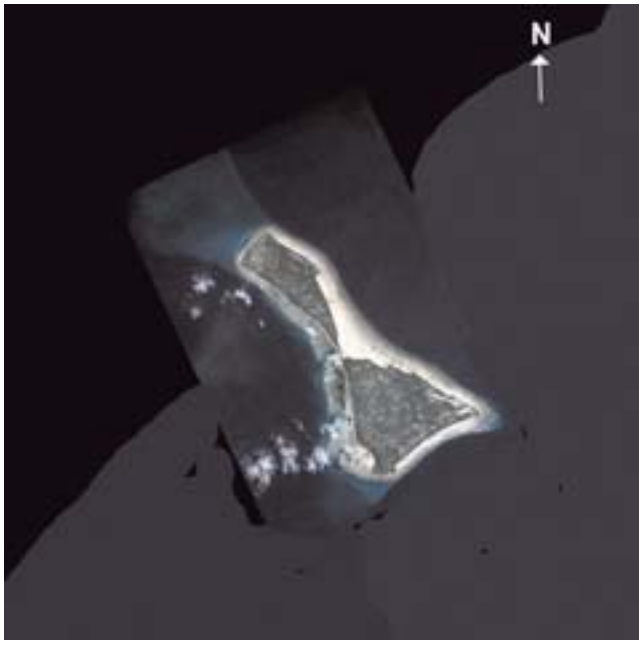
Tides—Currents.—In June, the current was observed to set W with a velocity of 2 knots. Near the coast the tidal current changes with the tide.

Anchorage.—There is an anchorage off the W side of Kuria, in a depth of 24m, on the edge of a shelf.

Caution.—Mariners are cautioned to give the SE extremity of Kuria a wide berth, as this area is unsurveyed and contains shoal water. A large reef extends to the E from about the midpoint of the island.

The boat passage over the reef cannot be used within 1 hour of LW.

4.37 Abemama Atoll (Hopper Atoll) (0°21'N., 173°51'E.) lies about 23 miles ENE of Kuria, with an almost continuous chain of islands on the N and E sides of the lagoon. There are no off-lying dangers reported anywhere near Abemama Atoll, and vessels may circumnavigate it in safety by keeping about 1 mile off the breakers. There are depths of 200m close to the edge of the reef surrounding the atoll, making outside anchorage dangerous. There are two passes into the lagoon; the **Western Passage** (0°24'N., 173°47'E.) and South Passage. Vessels are urged to contact the Marine Superintendent at Tarawa for the latest information on the depths and aids to navigation marking the channels of this atoll.



NASA Image

Kuria

Tides—Currents.—In the lagoon passes, the current is tidal. In Western Passage, which is shallow, the tidal current runs about 2.5 knots at springs. A considerable ground swell runs occasionally at the entrance to this channel. Through South Passage, which is narrower and deeper, the current may often obtain a rate of 4 knots during springs. A strong tidal current is reported setting approximately along the axis of that portion of the channel lying SW of Henson Rocks. Tide rips are noticeable and, at ebb tide, often give the appearance of reefs.

A report states that the general set at Abemama is 260°, with a drift of 1.6 knots. The current divides at the SE part of the atoll, and follows the reef N and S. The current 0.9 mile off the reef was observed to be 0.3 knot, setting parallel to the reef on the E beach. Along the N beach the drift was 2 knots. Eddy currents exist off the NW beach, the set being S with a velocity of 1.5 knots. Here again, because of the tidal effect of the lagoon, the currents have rips and are not predictable.

Aspect.—Bike Island (Entrance Island) (0°22'N., 173°52'E.) is located about midway along the SW side of the atoll. The remains of a wreck lies on its SE side. Foul ground extends for over 0.35 mile off the NW side, and 0.8 mile off the N end of the island. Part of this foul ground consists of a sand spit which is defined and shows up almost white. At LW, the spit is awash at its extreme end.

Henson Rocks, a group of rocky shoal patches with depths of 3.4m, lie on the N side of the main channel, about 0.9 mile NNE of the N end of Bike Island. These rocks are sometimes difficult to distinguish, especially at ebb tides, when the water is much discolored. Caution is necessary in navigating the channel due to adjacent shoals and strong currents.

Anchorage.—Vessels should anchor in the entrance to these passages midway between the reefs in depths of about 9.1m. Western Passage is more favorable as the currents are not so strong. Anchorage may also be taken in good weather just to the W of the N end of the atoll.

A large number of vessels, necessarily limited in size by the depths of the entrance channels, can obtain sheltered anchorage in the lagoon. The holding ground is said to be excellent, consisting of fine coral sand with almost a clay-like consistency.

Directions.—Western Passage, with a least depth of 3.4m in the center and entered about 2.5 miles N of **Abatiku Island** (0°24'N., 173°46'E.), gives access to difficult waters. It should not be used by vessels drawing over 3.6m, and then only with local knowledge. The entrance, which is about 0.5 mile wide, can be picked up from seaward as a gap in the line of breakers. The S side of the channel is bounded by a foul area of coral heads and boulders. Vessels drawing more than 3.4m should keep to the N side of the passage, where a least depth of 4.2m can be carried. Keep the barrel buoy, moored about 3 miles NE of the E tip of Abatiku Island, on a suitable bearing ahead to stay in the N side of the passage. Unless the position of the buoy has been recently checked, vessels drawing from 3.6 to 4.6m are advised not to enter the passage except near HWS. Inside the entrance, the channel leads in a general NE direction to the finger pier, and is marked by buoys and beacons.

South Passage is entered on the SW side of the atoll NW of Bike Island. The channel is about 0.3 mile wide at its outer end, but narrows and becomes tortuous inside. A sandspit on the S side and shoals on the lagoon side of the entrance narrows the channel to less than 0.1 mile.

A set of range beacons, in alignment bearing 042° mark part of the passage through the entrance.

4.38 **Maiana** (1°00'N., 173°01'E.) is an atoll of quadrilateral shape, 9 miles long in a NE-SW direction, and 6 miles wide. The E side of the atoll forms one continuous island; the W side is formed by a reef, awash, the position and extent of which, especially W, has not been accurately determined. There are many dangers in the lagoon which is shallow and has not been surveyed.

A boat passage, which dries 0.3m, leads through the reef near the N extremity of the atoll to the island of **Tebikerei** (1°00'N., 173°01'E.), on which there is a village. The passage is marked by "perches" standing in piles of stones which cover at HW. A shoal, with a depth of 3.7m, lies about 0.5 mile WNW of the entrance to this boat passage.

The deepest boat passage with reported depths of 1.8 to 5.5m, lies about 7 miles SW of the N extremity of the island. This passage, marked by perches, is used by small craft going to the government station on the SE side of the lagoon. There is a pier here; a flagstaff stands close E.

Tides—Currents.—There is a strong indraft on the NE side of the atoll. The island, Maiana, is almost always influenced by the South Equatorial Current, with a W set at a rate of 1.5 to 2 knots. Persistent W winds which can occur between December and April may cause E sets.

Anchorage.—Anchorage may be obtained on the edge of the shelf, in a depth of about 23.8m, about 0.2 mile W of the 3.7m shoal off the entrance of the N boat passage. Anchorage may also be obtained on the edge of the shelf, in a depth of 7.3m, about 2 miles NW of the boat channel situated about 7 miles SW of the N extremity of the island.

Caution.—The W sides of the atoll are dangerous and must be approached with caution as the sea seldom breaks over the reef, and the discoloration of the water is not always discernible.

Tarawa Atoll (1°30'N., 173°00'E.)

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4.39 Tarawa Atoll is located about 18 miles N of Maiana, and consists of a chain of long narrow islets located on a right triangular shaped reef. The E and longest side and the S side have islets along their whole length. The W side of the atoll is submerged, with depths of 3.7 to 18.3m over the reef, except for about 6 miles from the N extremity of the apex, where it is above water. There are no off-lying dangers reported near Tarawa. However, vessels should give the extremities of the atoll a wide berth. The islands are partially wooded with groves of coconut trees, except for Betio and Bairiki at the S extremity of the atoll, which are covered with dense undergrowth. Masthead navigation is necessary when navigating around the atolls. It has been reported that when in the vicinity of Tarawa and approaching land at night, a lookout at deck level normally sights land before those stationed at higher levels.

Tarawa is the port of entry for the Republic of Kitibari and the administrative center. The port and commercial center is at Betio Island and the government offices on Bairiki Island, 2 miles E. The harbormaster's office is situated below the radio tower in Betio.

Winds—Weather.—The Southeast Trade season extends from March to November. It is characterized by more or less steady trade winds blowing from ESE and little rainfall. There is no actual doldrum period and no definite time of calms and squalls, although calms and cat's paws do occur quite often in June and July.

The average wind force during the day is about 12 knots, but occasionally a good fresh trade will blow up to 30 knots. After sunset the wind will fall to 3 to 6 knots, freshening again in the morning about 3 hours after sunrise. Occasionally, a fresh breeze or squall will be experienced in the morning or evening.

The westerly season extends from November to March, or more precisely, westerlies very seldom occur before the beginning of November or after the end of March. It is not certain that a westerly will occur in any one year during these months, but there have been exceptional cases in which westerlies have lasted throughout the entire year. In these exceptional cases, gales do not occur, winds are light, and the atmosphere is sultry. Such an unusual year might be encountered once in every decade.

There is some variation in the trades between the N and S Gilberts. In the N group, consisting of Apiang, the N part of Tarawa, Marakei, Butaritari Atoll (Makin Atoll), and Little Makin, the islands come under the influence of the Northeast Trades at certain times of the year. Apparently the border line of the trades is along this belt. In the S group the trades blow ESE, while in the N group from the E to just a little SE. In the westerly season, winds in the N group will blow ENE, with an

occasional NE squall.

The westerly gales usually give 24 to 36 hours notice of their approach. The first indication is a bank of high cirrus working up slowly from the W. This is followed by a coppery haze in the afternoon, and a swell from the W. When these phenomena are observed it is fairly definite that a westerly gale will hit the island group within 36 hours.

The gale itself is heralded by a low bank of dark, nimbus clouds approaching on the W horizon, usually in the form of a horseshoe. The gale comes up fairly fast, and breaks with thunder, lightning, heavy rain, and a rush of wind. The gale may attain a rate of 50 miles per hour, and in localized instances in excess of 60 miles per hour. A very violent gale may last only 5 or 6 hours, but usually it is 3 days before the wind subsides. The wind then starts chopping from the SW and NW. The sky breaks, the wind and swell subside, and within 24 hours normal conditions return.

The "line island" squall, which is also encountered in these waters, is not to be confused with the westerly gale. These squalls may occur in any season and generally strike toward sunset. Their approach is often heralded by a cloud banking up among the trade wind clouds to windward. This cloud then spreads and forms a dark horseshoe bend on the horizon. Heavy rain and a very strong gust of wind follows with a force of about 50 miles per hour at the heart of the squall. The squall may last for an hour, or perhaps an hour and a half, but it has no lasting effect, and good weather soon follows.

The climate in the Gilbert Islands is warm to hot, and drier in the S part of the group than in the N. Except on calm days, which are somewhat oppressive, the heat is tempered by the trade winds. The nights are cool and pleasant.

Tides—Currents.—The mean tidal rise is 1.3m, while the spring rise is 1.9m.

The maximum tidal current observed in the entrance channel was 1.2 knots, setting 282° on ebb tide. The maximum velocity observed on flood tide was 0.8 knots, setting 120°. The current may be slightly greater during maximum spring tides or unfavorable weather outside. It has been reported that tidal currents in the entrance channel have been known to flow athwart the fairway.

The SE extremity of Tarawa should be given a wide berth, as a strong current splits off this point, one part flowing W and the other N.

The currents along the E approach to Tarawa have a set to the NW of about 2.5 knots. To the N and S of the atoll this set increases from 3 to 3.5 knots. On the W side it drops back to 2.5 knots and is unpredictable.

Following westerly gales the currents may reverse and flow to the E for 2 or 3 days before returning to their normal path.

Between Tarawa and Abaiang Atoll, about 6 miles N, an E countercurrent occasionally runs, the average rate being 1 knot. It may be experienced at any time of the year. During June and July, the countercurrent is sometimes felt as far S as Nonouti.

Depths—Limitations.—Vessels with a depth of 7.3m can enter the lagoon at any stage of the tide, while drafts of 9.1m may enter at HW. Cargo is normally worked by lighter.

Betio Harbor is formed by two moles and has a depth of 1.8m at LW.

Tank vessels, with drafts up to 4m, normally anchor off the E mole, Med-moor, and discharge to floating hoses.

Betio Harbor—Wharf area

A jetty projects 150m NNE from the head of E mole. A wharf, operating four berthing faces 50 to 70m long, has a least depth of 5m alongside.

Aspect.—The NE side of the atoll is over 19 miles long and contains numerous other long, narrow islands lying on the reef. The W side of Tarawa Atoll consists mainly of submerged reefs lying near the N end, and Betio Island, about 16 miles S. The main passage into the lagoon is entered on this side, about 3.3 miles N of Betio Island. Tarawa Lagoon is extensive in area, but it contains numerous shoals and coral heads in its N and E parts. The lagoon is moderately sheltered, except from the W and NW. Between Betio Island and the SE extremity of the atoll, about 13 miles E, there are several long, narrow islands lying on the coral reef. This reef mostly dries at LWS.

The water in Tarawa Lagoon always carries small particles of coral in suspension, which greatly cuts down underwater visibility. Shoals and coral heads in depths that would in most lagoons permit their being seen with ease are invisible here.

Four radio masts stand on the W end of Betio Island, while another pair stand 5 miles ESE of the first group. Lights are shown from several locations within the lagoon.

Pilotage.—Pilotage is compulsory and is available in daylight only. Pilots should be ordered at least 48 hours in advance, confirming 24 hours prior to arrival. The boarding ground is about 1 mile W of Entrance Buoy No. 1 (1°24'N., 172°55'E.). The IALA Maritime Buoyage System (Region A) had been adopted in 1985 for Betio Lagoon.

In 1989, it was reported several buoys and beacons in the approaches were missing or temporarily replaced by drums or other marks.

Signals.—The local authorities may be contacted via radiotelephone, while the pilot may be reached on VHF channels 02 and 16. The port radio station in Betio has limited communication ability, operating only on 6215.5 kHz and on VHF channel 16.

Anchorage.—Beyond the reef, W of Betio, there is reported to be a good anchorage. Vessels over 9.1m draft should anchor, in 27 to 36.6m, outside the reef near the entrance channel.

In 1987, a good anchorage was reported, by a vessel drawing

5.6m, to lie 2.3miles E of Betio harbor entrance, in depths of over 11m.

Vessels may anchor almost anywhere along the lee side of the atoll, but it is advisable to bring it up soon after striking soundings, as in places, especially S of the main passage and toward the N end of the atoll, the bottom shoals quickly and becomes foul.

The principal anchorage is off Betio Island, where a vessel drawing up to 9.1m can anchor 0.65 mile, bearing 029° from Betio boat harbor light. A cable area in which anchorage is prohibited extends off the docks at Betio.

Directions.—Vessels should approach Tarawa Atoll from at least 2 miles to seaward of the entrance buoys, then head 109° for Bikeman Island beacon and pass through the entrance. To avoid passing shoals in the vicinity of Buoy No. 1 and Buoy No. 2, a vessel should keep to the port side of the track, about 0.1 mile. When Buoy No. 3 is abeam to starboard, course should be altered to bring Bairiki Island beacon in line bearing 150° with the beacon marking Vinstra Shoal. Vessels should then follow the track depicted on the chart.

Caution.—Vinstra Shoal, with a depth of about 2m and marked by a beacon, lies about 2.2 miles NNE of the W extremity of Betio Island.

4.40 Abaiang Atoll lies about 6 miles N of Tarawa. The land along its E side is continuous and wooded. On the NW side of the atoll there are several islands. **Ribona Island** (1°58'N., 172°52'E.) is the N margin of the atoll, with **Nanikirata Island** (1°54'N., 172°47'E.) being at the W extremity, both are situated on a drying reef on which are several sand banks. Between the latter island and **Bolton Point** (1°43'N., 172°59'E.), the SW point of the atoll, the W side of the atoll is formed by a broken drying reef on which there are several islets. There are several boat passages on the SW side of the atoll.

Bingham Channel (1°45'N., 172°58'E.), the main ship channel, lies about 2.3 miles NW of Bolton Point. The entrance is about 0.3 mile wide, with a least depth of 2.7m about 0.7 mile within the entrance (2011). There are overfalls on both sides of the entrance. Within the lagoon, which is only partly surveyed, there are numerous shoals and drying reefs. There is a depth of 3.6m in the channel inside the lagoon. Beacons mark the channel to the anchorages off the villages.

Anchorage.—There are no safe anchorages for large vessels off Abaiang Atoll. Inside the lagoon, anchorage may be obtained, in a depth of 6.4m, about 0.5 mile SW of **Taburao** (1°49'N., 173°01'E.) flagstaff. Small coasters and copra vessels anchor off all the main villages. Landing can best be made at HW, when small boats can beach.

Navigation within the lagoon is not recommended before 0800 or after 1600, or when the sky is overcast, since the reefs are not then clearly visible.

4.41 **Marakei** (2°01'N., 173°17'E.), in two parts, is an atoll located about 17 miles NE of Abaiang, and contains a deep lagoon which is entirely landlocked at LW. From seaward, the island has the appearance of being land only. The island is 1.8 to 3m high and is densely covered with coconut palms about 24m high. There are two passages which give access to the lagoon at HW. One is on the E side of the atoll, and the other on the W, with gaps in the trees being the only indication. The E side is foul and is not used, but the W side, about 1 mile N of the SW point, can be used only by boats and is crossed by a bridge.

There are several villages on the island, the main one being Rawanawi on the W side, about 0.8 mile S of the N extremity. A white church here is conspicuous, with a flagstaff standing about 0.3 mile S of it. The shore reef at the N end of the island extends NW for about 0.5 mile. The reef breaks on the S and E sides.

Tides—Currents.—Along the W side of the island the flood current sets N and the ebb sets S.

Anchorage.—The principal anchorage is off the village of Rawanawi, in 18m, with the church steeple bearing 119° and the N end of the island bearing 051°. From November to March, the anchorages at Marakei are not tenable due to N swells.

4.42 **Butaritari Atoll** (Makin Atoll) (3°10'N., 172°50'E.) lies about 64 miles N of Abaiang Atoll. The major facilities are situated on Butaritari Island, at the SW part of the lagoon. There are two trading stations at Butaritari Island; at the SW station are the remains of On Chongs Wharf and about 0.5 mile NE is Kings Wharf. About 0.4 mile NE of Kings Wharf are the ruins of a church, 0.1 mile N of which is a short, stone pier, and about 0.6 mile NE of the latter are the remains of a government pier. All supplies are brought ashore by barge. There are beaches used by landing craft.

Winds—Weather.—As the atoll lies between the NE and SE trades, the winds are more variable than in the S groups of islands. Generally, the wind is from the ENE, force 4. Occasionally, strong NE winds of force 5 to 6 are experienced. They are usually accompanied by short, fierce squalls, with rain. Calms and sultry conditions occur in June or July. Occasionally, thunderstorms may occur at any time of the year. The westerlies are, as in the rest of the group, gales up to force 7 lasting from 3 to 7 days.

Tides—Currents.—The mean tidal range is 1.3m, while the spring rise is 1.8m.

The W equatorial Current usually sets to the W and WSW in force, but occasionally, a countercurrent to the E is experienced. However, this is not a seasonal change and cannot be predicted. The rate in both cases is normally 20 to 40 miles per day. Westerly gales produce a surface drift to the E which usually lasts for 1 to 2 days after the blow has passed.

At Butaritari Atoll, observations indicate a general set of 315°, with a drift of 1.8 knots. The current divides at Tabukintetau, the E end of Butaritari Island, setting W along the contours of the reef with a velocity of 2 knots and NNE along the E large island. When the current setting W along the S side of Butaritari again joins the general set, it produces tide rips S of Ukiangang Point, the S point of Butaritari Island.

East of Butaritari Atoll, the set is N, with a drift of 2 knots. West of Butaritari the currents are quite unpredictable. Tide rips are pronounced. The tides setting in and out of the passes through the W reef apparently cause the irregularity of the currents in this vicinity. About 20 miles W of Butaritari the current is back to a normal set of 315°, with a drift of 1.8 knots.

Strong currents are experienced in **South Channel** (3°03'N.,

172°45'E.) on springs, and moderate current on neaps. The current sets roughly with the channel, but crosscurrents may be expected, particularly at ebb tide, when the set is across the channel to W and NW.

Depths—Limitations.—The only danger to navigation reported in the vicinity of Butaritari Atoll is the fringing reef. A submerged reef, with depths of 2.8 to over 30m, extends nearly 0.5 mile W from Flink Point, the NW point of Butaritari Island. Reefs also extend about 1.3 miles N from Bikati Island, the NW island of the atoll. There is also some danger along the N barrier reef, as the reef edge breakers do not always show up well.

Aspect.—The SE side of the atoll is almost continuous, with a break 0.3 mile wide near the village **Tabukintetau** (3°03'N., 172°54'E.). There is a depth of 1.2m at HW in the opening. The N side of the atoll is composed almost entirely of a reef which dries for most of its length. There is a boat passage through it, which can be used only between half tide and HW. The W side of the atoll lying on the main reef is broken by three ship passages and several boat passages.

Anchorage.—A sunken reef W of Flink Point, located about 2.8 miles NW of Ukiangang Point, provides good anchorage, in depths of 4 to 21m, coral and sand. Approach this anchorage with the N end of Flink Point bearing 104°. The anchorage is untenable in W winds, which build up a heavy ground swell.

The lagoon of Butaritari Atoll is a large area with general depths, except for scattered shoals, of 18.3 to 36.6m. The SW part of the atoll is the main anchorage. This anchorage has a swept depth of 12m.

Directions.—The barrier reef on the W side of Butaritari Atoll is crossed by three ship channels, called North Channel, Central Channel, and South Channel. Vessels should use South Channel only.

South Channel is entered between the N end of the reef extending about 1.3 miles N from Flink Point, and Ramanaba, a detached drying coral reef about 0.4 mile farther North. The channel trends for about 2 miles in a general NE direction to the main anchorage area off Butaritari Island. Before entering the lagoon, vessels are advised to contact the Marine Superintendent at Tarawa and obtain the latest information on navigational aids in the area.

Caution.—Undetected coral heads may exist outside of the wire-dragged areas.

The boat passage S of **Oteariki** (3°10'N., 172°42'E.) and the passage N of **Kotabu Island** (3°05'N., 172°45'E.) have been mined and may still be dangerous.

4.43 Little Makin (3°23'N., 172°58'E.) is the N island of the Gilbert group. This island and the two islands S of it, **Kuup** (Kiebu) (3°14'N., 172°57'E.) and Onne, lie on a reef which is separated from Butaritari Island by a passage about 1.3 miles wide. The W part of Little Makin forms a bight, the head of which is a village, and a government station and flagstaff.

Tides—Currents.—The currents through the passage and in the bight on the W side of the island are strong and irregular.

Anchorage.—Anchorage is not safe at Little Makin at any time.

Banaba (Ocean Island) (0°53'S., 169°32'E.) lies about 302 miles, bearing 219° from Butaritari Atoll (Makin Atoll). The island is surrounded by a fringing reef, which dries and extends out 91m from the shore. Its center, about 81m high and nearly flat, descends in jagged fashion to the coast.

Cliffs from 4 to 9m high surround the island, except for a portion of Home Bay on the SW side of the island. The ETA of a vessel should be sent when within radio range of the island. Practique may be requested by cable when within 24 hours of arrival.

Winds—Weather.—East winds are predominant year round. Very occasionally, strong W winds blow with squalls of great force and heavy rains at Home Bay. Usually this weather does not last for more than 2 or 3 days, but in exceptional circumstances it may last for a week or 10 days. In the event of such weather, vessels must put to sea.

Tides—Currents.—The current usually sets fairly strongly W, but from December to March it frequently sets E. It is possible that during the W current an eddy may be set up in Home Bay causing the flow close inshore to set E. In Home Bay a NW current with a velocity of about 2 knots was experienced. A vessel endured a current setting W with a velocity of 1 to 2 knots in the vicinity of Banaba (Ocean Island).

4.44 Home Bay (0°54'S., 169°33'E.), on the SW portion of the island, was the site of a phosphate loading facility, but the facility has been out of commission since 1979. There is no harbor and the port facilities are situated on the open coast, which is protected only from winds from the NE quadrant. Some protection is provided for lighters and launches by a small boat harbor blasted out of the reef near the S end of Home Bay. The boat harbor is protected by breakwaters. There is no anchorage within the bay, but several mooring buoys are situated there. These provide berths for vessels up to 200m in length, and three berths for vessels up to 91m in length.

Pilotage.—Pilotage is compulsory. The pilot will board the ship from 1 to 2 miles SW of Home Bay during daylight hours. The pilot and harbormaster may be contacted on VHF channel 16. The pilot ladder should be rigged on the port side, and the main engines must be on standby at all times.

Directions.—Range beacons, in line bearing 343°, are shown at Home Bay. Vessels approaching the bay from the S or SE are warned to keep to the W of the range line.

Caution.—Strong currents up to 4 knots running either E or W may be encountered off Sydney Point. A depth of 9.1m lies 2.5 miles S from the S extremity of **Sydney Point** (0°54'S., 169°33'E.). Vessels should not approach the island within 2 miles after dark.

4.45 Nauru (0°32'S., 166°55'E.) (World Port Index No. 56500) is visible for about 18 miles and is of coral formation.

Winds—Weather.—The prevailing wind is between NE and ENE and is rarely stronger than force 4 to 5. In light winds, it is usually stronger near the shore, especially at night. Nauru does not appear to be visited by typhoons, but SW storms occasionally occur. The island has a wet season from November through February. When the wind is from the W, cargo handling is impossible. If the vessel experiences an onshore wind greater than a light breeze, it should be ready to put to sea.

Tides—Currents.—As a rule, the current sets W, but E currents have been encountered. Its rate has been reported to be as much as 3 to 4 knots. A 2 knot current, setting N or S, has been

experienced close to the W side of the island. Sailing vessels getting to leeward have great difficulty in making the island.

Depths—Limitations.—There is no harbor except for boats, and the port facilities are situated on an open coast, which is protected only from E winds. Two cantilever phosphate loading berths extend from the W side of the island. Ships secure head and stern-to buoys laid offshore, and are then warped in to buoys moored close to a reef. North of the two piers, a small basin has been blasted out for the use of cargo boats and launches. A depth of 457.2m was found near one of the buoys, about 0.1 mile off the N cantilever.

Arijejen Phosphate Port, Nauru Island

Vessels up to 40,000 dwt, with a maximum length of 192m and a maximum beam of 28.3m, can be accommodated.

Aspect.—From an approaching vessel, it is seen as two round hummocks some distance apart. The island is surrounded by a fringing reef which extends about 0.1 mile from the shore and is steep-to. The island can be approached to a distance of 0.3 mile, as the reef is easily distinguished.

The SW aspect of the island is radar conspicuous; the airport runway, 1.25 miles long, traverses the SW edge of the island and was reported (1985) as radar conspicuous at 18 miles.

Pilotage.—Pilotage is compulsory and should be ordered well in advance. The boarding ground is about 0.5 mile W of the berth. The pilot boards the vessel with a mooring gang and mooring tackle. No ship's mooring are used. The pilot and mooring gang remain onboard during loading. The weather is extremely unpredictable and the vessel may be required to sail at very short notice.

Regulations.—Vessels should send their ETA to the local authorities at least 48 hours in advance, confirming 12 hours before arrival and when within 20 miles of the port. Practique should be requested at least 24 hours prior to arrival. Special instructions and port regulations are published in a letter available on arrival, or from the phosphate company's office in Melbourne, Australia.

Vessels should have their engines in an operational condition while alongside the loaders.

Signals.—The local authorities may be contacted via radiotelegraph, radiotelephone, and VHF.

Quarantine messages should be sent to the Quarantine Officer, Nauru, 24 hours and 12 hours prior to arrival. The message should include the vessel's last port of call and date of departure, the number of crew and passengers aboard, and whether any infectious diseases are present aboard.

The Marshall Islands

4.46 The Marshall Islands are a group of low, coral atolls scattered in two irregular, roughly parallel chains that extend in a NW-SE direction. Besides the 2 main chains there are 6 outlying atolls, so that the whole group consists of about 34 separate groups of low, coral islands lying on circular reefs, most of which surround a lagoon. In general, the E or weather sides rise steeply and those on the lee side slope gradually. Most of the larger islands can be seen from 10 miles. The islets are mostly very low, and although a few of them attain a height of more than 7.6m, the remainder are from 1.5 to 6m high. The dull-green tops of the coconut palms show first above the horizon.

The United States entered into a Compact of Free Association with the Republic of the Marshall Islands on October 21, 1986.

Tides—Currents.—The Marshall Islands are divided by the effects of the North Equatorial Current and the Equatorial Countercurrent into the North Marshall Islands and the South Marshall Islands, with the approximate boundary at 8°30' N.

Currents, varying from 0.5 knot to 1.5 knots, set E in the S part of the groups and W in the N part of the group. When there is a N shift of the N limit of the countercurrent, and especially if a steady W wind is blowing, the currents in the N part of the group may set temporarily to the E.

During strong NE winds, the W current is strongest between Likiep Atoll and Wotje Atoll in the Ratak Chain. On the other hand, the E current is strongest between Mili Atoll and Ebon Atoll. In general, the Equatorial Countercurrent is little felt.

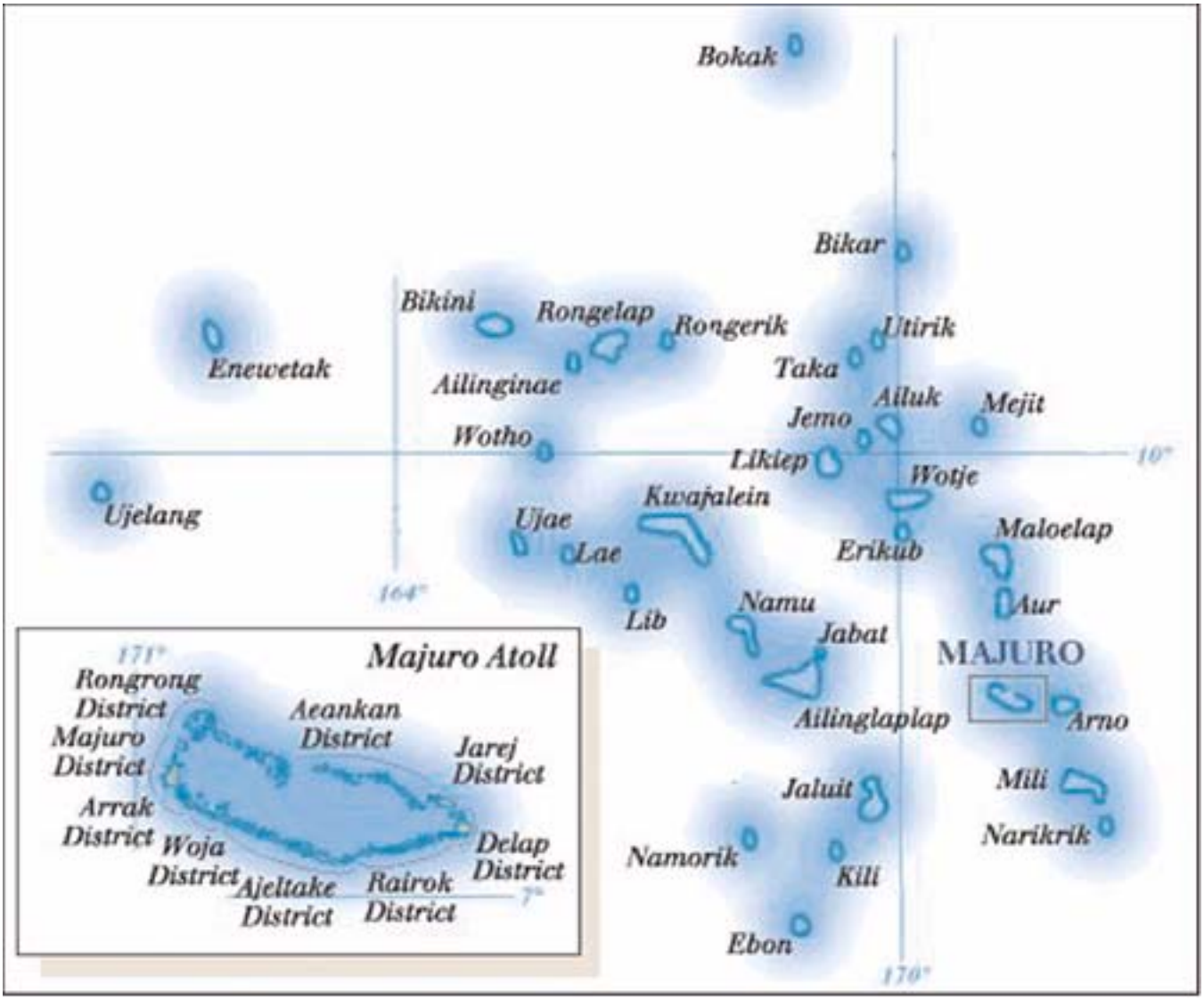
Caution.—Intermittent hazardous missile operations are conducted within an area with a radius of 200 miles, centered at position 8°43'N, 167°43'E. Additionally, entry into certain islands of the Kwajalein Atoll is controlled. See the Kwajalein Atoll description in paragraph 4.68 for details.

The Ratak Chain

4.47 The Ratak Chain (Sunrise Chain), the E group, consists of Mili Atoll, Knox Atoll, Arno Atoll, Majuro Atoll, Aur Atoll, Maloelap Atoll, Erikub Atoll, Wotje Atoll, Likiep Atoll, Ailuk Atoll, Taka Atoll, Utirk Atoll, Bikar Atoll, and Taong Atoll. Mejit Atoll and Jemo Atoll are two detached coral islets in this group. There are no major ports, but some of the lagoons provide anchorage for all classes of ships. Minor ports are situated at Mili Atoll, Majuro Atoll, Maloelap Atoll, and Likiep Atoll.

Winds—Weather.—In Likiep Atoll, NE winds prevail from November to April and often have a force of 3 or 4. Around May or June these winds gradually decrease in strength, and from July to October, when the sea is smoothest, light NE to SE wind with occasional S winds will be experienced. West winds are rare throughout the year; they often indicate approaching storms.

There is little annual change in temperature, though in July and August it is comparatively high, with a maximum average



The Marshall Islands

of 31°C. It is difficult to make a definite division between the dry and wet seasons, as some rain falls at all times of the year.

Taongi Atoll lies within the Northeast Trades which blow steadily with moderate to fresh velocities. The dry season (November through June) corresponds to the maximum development of the NE trades, and is characterized by long periods of fair weather. Rainfall totally 50 to 75mm can be expected during each of these months, falling mostly as brief showers.

The wet season (July to November) often has considerable periods of fair weather. Since the mean position of the doldrums is S of Taongi Atoll, the atoll does not experience the change from NE to SE winds that occurs in the more S atolls. However, the fresh NE winds of the dry season may weaken and turn E during this period. There is an estimated 1,030mm of rainfall annually.

Tides—Currents.—It was reported that a vessel, approaching Majuro Atoll from Ailinglapalap Atoll to the W, experienced a strong set to the N and West. According to a native, who has lived on Majuro Atoll for 30 years, the currents off the N and S sides set to the W, and at the E and W end they set to the S. These currents have a velocity of 1 knot.

Between Aur Atoll and Maloelap Atoll, a strong NW current was reported. In July and August this current was reported as setting in an opposite direction. In 1943, heavy rips, setting W, were experienced in this area. Heavy seas are sometimes met with between these atolls.

In 1944, a NW current with a rate of about 0.8 knot was experienced between Ailuk Atoll and Mejit Island. In 1963, strong W currents were experienced between this atoll and Wotje Atoll.

A W current, with a rate of 0.5 knot, was experienced off the W side of Taongi Atoll in November, with an E wind.

4.48 **Mili Atoll** (6°08'N., 172°07'E.) is the southernmost of the Ratak Chain. Numerous islets lie along the barrier reef, most are from 1.5 to 4m and are covered with coconut palms and other trees.

Mili (6°05'N., 171°44'E.), the center of activity for Mili Atoll, is situated at the SW end of that atoll. A church, a trading station, and the residence of a native chief are situated on the island.

Tides—Currents.—The tidal currents in the various passages turn at about the time of HW and LW. In Tokowa Channel, the tidal currents set in the direction of the channel and attain a maximum rate of 3 knots at flood and 2.5 knots at ebb. The tidal currents in Reiher Pass attain a rate of 2.5 knots and set onto the reefs, making navigation difficult. In Acharan Passage the currents set directly through the channel at a rate of about 2 knots.

Depths—Limitations.—The seaward side of the atoll is steep-to. The W of two shoal banks, which has depths of 9.1 to 36.5m, extends 0.75 mile off the barrier reef between Acharan Passage and Reiher Pass, about 3 miles W. The other shoal bank, with depths of 10.9 to 14.6m, extends nearly 2 miles NE from the NE end of the atoll.

The W part of the lagoon is comparatively free from dangers, but its N and E parts are encumbered with sunken dangers. These are hard to identify, except under favorable conditions of light.

Anchorage.—Mili Atoll offers good protection to all classes of vessels in its spacious lagoon. Anchorage may be obtained by vessels with local knowledge about 0.9 mile NE of Mili, with good holding ground. It is the best anchorage on this side of the lagoon, but during NE winds there are heavy seas, and rocks extend about 0.5 mile offshore; it is not recommended at that time of the year, as landing is then very difficult. Large areas in the NW and W parts of the lagoon have been swept to 15.8m.

Port Rhin (Takaiwa Anchorage), which is sheltered from E seas by the reef, extends SE from Tokowa Island, and has depths of about 27.4m, good holding ground.

Anchorage can be taken, in 11 to 25.6m, SE of Burrh Island.

Directions.—Tokowa Channel (Takaiwa Channel), entered between **Tokowa Island** (6°14'N., 171°48'E.) and Burrh Island, is reported to be the best. The channel is about 0.2 mile wide between the reefs, has charted depths of 10 to 34.7m, and has been swept to a depth of 15.8m within the limits shown on the chart.

A detached reef, that uncovers, lies about 0.8 mile SSE of the SW end of Burrh Island. The main part of Tokowa Channel leads between this reef and the edge of the reef that extends about 0.8 mile SE from Takowa Island.

Reiher Pass, entered 10.5 miles E of the NW extremity of the atoll, is encumbered with dangers and has a winding fairway. It has been swept to a depth of 13.4m.

Acharan Passage (6°14'N., 171°57'E.) is about 0.5 mile wide between the reefs fringing Narappu Island and Acharan Island. A channel about 135m wide has been swept to a depth of 9.1m.

4.49 Bue Passage, about 1.5 miles SE of Acharan Passage, is about 0.5 mile wide between the reef on either side, but only 0.1 mile between the 18.3m curve. Numerous reefs and shoals lie within the lagoon, abreast the pass.

Ennanlik Channel, about 1.3 miles ESE of Bue Passage, is about 0.8 mile wide between the reef on either side, and is deep in the fairway. This channel should only be attempted by small vessels with local knowledge under favorable conditions of light.

Northeast Passage, at the NE extremity of the atoll, is fronted by a line of dangerous reefs, and is difficult to enter except for small vessels with local knowledge.

Knox Atoll (Knox Islands) (5°55'N., 172°09'E.) lies about 2.3 miles SSE of the SE extremity of Mili Atoll, being separated by Klee Pass, in which there are reported to be depths of 4.9 to 9.1m. Knox Atoll is about 4 miles long and 0.8 mile wide. It is surrounded by a rough coral shelf. The islands are visited by natives of Mili Atoll for the harvesting of copra.

4.50 Keats Bank, located about 79 miles E of Knox Atoll, was reported to have a least depth of 14.6m. When first discovered, it was reported to lie farther to the E and to have a least depth of 8.7m. Vessels should navigate with caution in this area, as other dangers may exist.

Arno Atoll (7°05'N., 171°40'E.), about 43 miles N of Mili The islets on the barrier reef are from 1.8 to 2.4m high, and have trees 6 to 21m high. A light is shown from Arno Island, at the W end of the atoll.

Winds—Weather.—Heavy swells set in on the E side of the atoll during strong NE winds.

Tides—Currents.—A strong tidal current sets across the fairway of Dodo Passage at the E side of the lagoon. The maximum rate is about 2 knots. The tidal currents turn about 1 hour after HW and LW.

Depths—Limitations.—Depths of 18.3 to 45.7m are found in the main lagoon. Areas just within the main entrances have been swept to 14.9m within the limits shown on the chart. There are numerous coral heads in the lagoon, especially on the E and S sides.

Anchorage.—Anchorage can be taken in the swept area, W or S of Dodo Island, but is not safe during NE winds.

Directions.—Dodo Passage (7°07'N., 171°42'E.) is considered to be the best channel into the lagoon. It is located on the NE side, about 11 miles S of the N extremity

Tagelib Passage, about 1.3 miles SSE of Dodo Passage, is divided into two channels by Enirik (Enirikku Island). On **Tagelib Island** (7°05'N., 171°43'E.), on the E side of the passage, the trees are 25m high, and are higher than on any of the islands in the vicinity, so that it is easily identified. The N channel is narrow and encumbered by reefs. The E channel is suitable only for small vessels.

Caution.—A depth of 13m was reported (1978) 49 miles E of Arno Atoll. In 1977, breakers were reported 20 miles N of the E extremity of Arno Atoll in position 7°29'N, 171°58'E. It was reported (1977) a shoal with a least depth of 7m lies in approximate position 7°05'N, 172°44'E.

4.51 **Majuro Atoll** (7°08'N., 171°11'E.) (World Port Index No. 56400), a vast natural harbor, lies about 10 miles W of Arno Atoll, being separated by Fordyce Channel. The channel is deep and is reported to be clear of dangers. The atoll consists of more than 50 coral islands, most of which are about 1.5m high. It is a first port of entry. Majuro, the largest island of the

Majuro Port

group, stretches along the S side of the atoll for a distance of 14 miles. The island is 4.9m high in its W part. At the E end of the atoll are the important islands of Djarrit, Uliga, and Delap. Most of the facilities and the principal settlements on the atoll are centered on the three islands, which are joined by a causeway.

Tides—Currents.—The spring rise of tide is 1.8m, while the neap range is 1.2m.

A current, which does not exceed 0.5 knot, sets consistently W in the lagoon. In Calalin Channel, the main entrance of the lagoon, the rate for both flood and ebb is about 1 knot. The currents turn at about the time of HW and LW.

The tidal currents and the prevailing E trade winds cause a strong SW set across Calalin Channel at times. Just within the entrance, the maximum flood occurs 4 hours after LW. It sets in a SSW direction at a rate of 0.5 knot. The maximum ebb occurs 3 hours after HW; it sets WNW at a rate of 0.5 knot.

Depths—Limitations.—The W part of the lagoon is studded with coral heads. The E part has a few scattered dangers, but has general depths of 23.8 to 54.9m. Except for these dangers, the W part of the lagoon has been wire-dragged to a depth of 14.9m.

All international commercial vessels use the **New Commercial Dock** (7°05.6'N., 171°12.6'E.), on the S side of the lagoon at Delap. The dock is about 300m in length with depths alongside between 16.7m and 18.3m and has been constructed to the W of the islands airstrip. Petroleum products can be transferred here.

All domestic passenger and cargo vessels use a smaller dock at Uliga for all their activities, located about 2.7 miles to the N. This berth is 60m in length and has a depth of 9m alongside.

The international and domestic tuna fishing fleet uses the Fisheries Dock, located at the E end of the main commercial dock. This dock has a 40m and a 20m berth, both with 15m of depth alongside.

A permanent underwater pipeline and mooring, transfers bulk fuel to a small shoreside facility.

Vessels are urged to contact the local authorities for the latest information on the facility, as reports differ on the depth of water available here.

Aspect.—A ship approaching the W part of the atoll reported that Majuro Island was identifiable by radar from 18 miles.

Domestic Dock at Uliga

The atoll, appearing as three small humps, was sighted visually from a distance of 12 miles. Prominent features include a radio tower, a satellite dish antenna, and a tank farm near the wharf.

A tower, marked by a light, stands at Uliga, 1.25 miles N of Dalap.

Pilotage.—Pilotage is compulsory. Vessels should send their ETA 24 hours in advance on 2182 kHz, 2724 kHz, or 5205 kHz. The pilot boards in Calalin Channel. Entry is not recommended at night.

Anchorage.—There are numerous submerged dangers in the W half of the lagoon, and there is no anchorage there except for small vessels with local knowledge. Anchorage may be obtained in the E half, where the bottom is mostly of soft rock. Djarrit Anchorage, considered to be the best, is situated in the NE corner of the lagoon. Depths of 27.4 to 47.5m are found in this anchorage, which is sheltered from winds between N and E. Numerous anchorage sites are available within the lagoon immediately off the wharf.

Directions.—Calalin Channel, about midway on the N side of the atoll, is about 1.5 miles wide between the reefs extend-

ing from Eroj Islet on the W and **Calalin Island** (7°09'N., 171°13'E.) on the East. The W channel is marked by lighted beacons which were reported (1992) not in their charted positions, but all continue to mark dangers. No. 4 Beacon was reported missing.

There is a ridge in the middle with a least depth of 5.5m over its NW end and 1.2m at its SE end. The channel on the SW side of this ridge is about 0.2 mile wide and deep in the fairway, but there is a drying reef and several shoals, with depths from 1.8 to 5.5m, on its W side. The E channel is only suitable for small vessels. A small islet, located close off the E end of Calalin Island and covered with palm trees, serves as a good landmark.

4.52 Aur Atoll (8°15'N., 171°05'E.) lies about 55 miles N of Majuro Atoll. It is diamond-shaped and has most of the islands, which are wooded, on its E side. Tabal, 2.4m high, is located on the NE extremity of the atoll; Aur, also 2.4m high, is at the S extremity.

Depths range from 18.3 to 82.3m within the lagoon. There are a great number of coral heads, some of which uncover, in the lagoon.

Tides—Currents.—Between Aur Atoll and Maloelap Atoll, a strong NW set is usually experienced, but reports have stated that the current sets in the opposite direction in July and August. Tide rips have been reported here, and heavy seas are sometimes experienced, but no dangers have been discovered.

Depths—Limitations.—There are two main channels leading into the lagoon. **West Opening** (8°19'N., 171°03'E.) is about 0.3 mile wide and has depths of 16.5 to 49m. Inside the opening there are reefs and some drying rocks, necessitating sharp alterations of course to avoid them.

Three narrow passages lead through the reef to the S of West Opening. Depths of 11.9 and 14.6m are found in these passages.

South Opening is only 90m wide in the fairway and has depths of 9.1m.

Anchorage.—Anchorage can be taken, in 40.2m, sandy bottom, about 0.5 mile off the lagoon side of Tabal. Vessels can anchor with the extremities of the island bearing 011° and 127°. Shelter from N to SE winds is afforded here.

4.53 Maloelap Atoll (8°43'N., 171°03'E.) consists of numerous islands which are covered with a thick growth of coconut palms and other trees.

Taroa (8°43'N., 171°14'E.), the principal island, is located on the E extremity of the atoll. A settlement and main wharf exists at Taroa; there are several small piers extending into the lagoon.

Tides—Currents.—The tidal currents in the entrance channels turn at about the time of HW and LW. The maximum rate in **South Opening** (8°32'N., 171°07'E.) is 1.25 knots during the flood and 1.5 knots during the ebb. The maximum rate in **Dollap Channel** (Torappu Channel) (8°52'N., 170°52'E.) is 1.5 knots. During a heavy swell, a steady outward set may occur in **Enijun Channel** (8°36'N., 171°03'E.). There are weak currents in the lagoon.

Depths—Limitations.—Vessels can navigate the lagoon under favorable conditions of light, as the waters are usually clear. Depths vary from about 27.4 to over 73.1m, and several areas have been swept to depths indicated on the chart. Numerous dangers are found in the vicinity of the swept channel leading from Enijun Channel to the anchorage off Taroa. Other scattered dangers are found throughout the lagoon.

Anchorage.—Anchorage can be taken, in 11 to 27.4m, sand and shells, good holding ground, off the W set side of Taroa. This anchorage affords good shelter during the NE trades, but is unsafe during strong W winds. Small vessels with local knowledge can anchor E of Kaven Island. There are shoals, with depths of 2.7 to 9.4m, close E of the island. The holding ground is poor and the anchorage is exposed to NE winds.

Directions.—All channels leading into the lagoon are on the W side of the atoll.

South Opening (8°32'N., 171°07'E.), an opening in the barrier reef, provides a fairway with a minimum width of about 265m between the 18.3m curves, and has general depths in excess of 36.6m. Immediately inside the barrier reef the main channel trends E, S of a reef which uncovers about 1.5m. A secondary channel trends sharply NW from just inside the barrier reef, W of the aforementioned drying reef, and it has a least depth of 8.2m. South Opening and the main channel have been swept to a depth of 14.9m; the secondary channel has been swept to a depth of 8m.

Enijun Channel is divided into two channels by **Enijun Island** (8°36'N., 171°03'E.) and its surrounding reef. A 6.9m shoal lies in the middle of the SE channel, but on either side of this danger are deep passages over 270m wide. Numerous shoal patches lie in the lagoon within the entrance.

The NW channel is nearly 0.3 mile wide and has depths of 14.6 to 27.4m in its middle part. The channel has been swept as indicated on the chart. Several deep but narrow passages lead through the barrier reef between Enijun Channel and Kaven Island, about 21.5 miles NW. They are suitable only for small vessels with local knowledge.

4.54 Erikub Atoll has many small islets all covered with trees, and lies about 45 miles WNW of Maloelap Atoll. **Erikub** (9°01'N., 170°03'E.), on the SW side of the atoll, is the principal islet.

The lagoon should only be entered by small vessels with local knowledge, and then under only the most favorable conditions of weather and light. There are three passages on the W side, the N of which is about 210m wide, is the best. In this passage there are depths of 16.5 to 36.6m, and a channel 118m wide has been swept to a depth of 9.1m.

Anchorage.—Erikub Atoll can be used by small vessels with local knowledge as an emergency anchorage. There is no protection from the winds in the anchorage area. An anchorage area, wire-dragged to 9.1m over an area about 0.5 by 0.8 mile in extent, lies just within NW channel. The bottom is of coral sand, good holding ground. Anchorage in good holding ground has been reported about 0.8 mile E of the S end of **Loj Island** (9°09'N., 169°57'E.).

4.55 Wotje Atoll (9°28'N., 170°02'E.) lies about 5 miles N of Erikub Atoll. The highest and principal island is Wotje, at the E end of the atoll. It is thickly vegetated. Two boat piers extend out from the W side of the island. The S is suitable only for vessels with drafts of 0.6 to 0.9m. Several shoals extend outward off the head of the pier, and approaches should be

made with caution. The second pier is about 0.3 mile N of the other, with a maximum alongside depth of 3m.

The other islands in the atoll are somewhat smaller, relatively low, and sandy. Most population and activities are now centered at Ormed Island, at the NE end of the atoll. **Kojjouj** (Kechautsu) (9°21'N., 169°55'E.), the SW extremity of the atoll, and **Bird Island** (9°31'N., 170°01'E.), in the middle of the N side, can be easily identified. **Goat Island** (9°32'N., 169°53'E.), located on the NW side of the atoll, is reported to be radar prominent from a distance of 18 miles.

Tides—Currents.—The maximum rates of the tidal currents in **Shishmarev** (Schischmarev) **Strait** (9°23'N., 170°06'E.) are 1.75 knots at flood and 1 knot at ebb. The tides turn about 1 hour after HW and LW. Local authorities report that the current always sets W across the channel at a rate of 0.5 knot to 2 knots.

In Meichen Channel, about 1.8 miles W, the flood current attains a rate of 1.25 knots and the ebb a rate of 0.75 knot. The tides usually turn shortly after the times of HW and LW, but the time of change cannot always be depended upon. A heavy swell causes water to flow over the reef resulting in a constant flow out of the opening and at times across the fairways. A constant W set occurs in the lagoon, but its rate does not exceed 0.5 knot.

Depths—Limitations.—The main entrances are deep and clear of dangers in the fairway. The entire lagoon is navigable between the shoals. Large areas in the E and W parts, including a wide navigable channel connecting them, have been swept to depths of 14 to 16m, while other areas have been swept to lesser depths, all of which can best be seen on the chart. These dangers can readily be seen by a bridge lookout under favorable conditions of light.

Anchorage.—Wotje Atoll affords anchorage for a large number of vessels. Shelter can be found from E winds at least 0.5 mile off the sandy beach fronting the W side of Wotje Island. The bottom consists of sand and broken coral growths. Navigators are cautioned that the reefs off the W side of the island are irregular; drying rocks lie up to 0.3 mile offshore.

Vessels can anchor in convenient depths S of Ormed Island or S of **Nibwung** (Niibunka) (9°32'N., 169°58'E.).

Christmas Harbor, at the NW corner of the lagoon, has depths of more than 11.9m, sheltered from NE and NW winds.

Directions.—Shishmarev Strait (Schischmarev Strait) is considered to be the best entrance, but is difficult to identify from the offing. It is clear of dangers, except for the reefs on either side. It has a least charted depth of 27.4m and has been swept to 16m over a least width of 0.4 mile. Vessels should favor the E side of the channel as the shoal area close off the W edge of Bikeichi Island is clearly visible when the sun is high, whereas the shoals on the Wedge of the channel are more difficult.

Shishmarev Strait is hard to identify from a distance of more than 3 miles. The group of islands, which stands on the reef, located SW of **Toton Island** (9°24'N., 170°06'E.), appear as one large island, particularly at LW. **Eluk** (Erukku) **Island** (9°24'N., 170°08'E.), dome-shaped and about 25m high, and Bwokwlewij Island (Bokureutchi Island), barren of foliage and 9.2m high, are the best landmarks in the approach.

Vessels entering the strait should favor the E side of the channel, as the reefs are more readily identifiable. The reefs fringing the N side of Toton Island are also easy to identify because of discoloration and surf.

Having cleared the passage, vessels can steer a course of 065° for the anchorage W of Wotje Island. The best landmarks for bearings on this course are Eluk Island and Wotje Island.

4.56 Meichen Channel, about 2 miles W of Shishmarve Strait, is fairly wide and deep at the entrance and swept to a depth of 18m over a width of about 0.5 mile. Meichen Island, fringed by a drying reef, divides the inner part of the fairway into two channels. The channel E of the island is swept to a depth of 18m over a width of about 0.3 mile. The channel W of the island is swept to a depth of 15m over a width of 0.3 mile.

Lagediak Strait (9°24'N., 170°09'E.), entered about 1.8 miles E of Shishmarev Strait, is very narrow and has a depth of 7.3m. It is navigable only by small vessels under the most favorable conditions.

Rurick Strait, at the W end of the atoll, is deep, but narrow. The fairway has been swept to 15m over a least width of 0.2 mile.

Likiep Atoll, lying about 34 miles WNW of Wotje Atoll, is composed of numerous islets, most of which lie on the windward side of the barrier reef. These islets are not more than 1.8m high and are covered with coconut palms. **Likiep Island** (9°49'N., 169°19'E.), reported to be a good radar contact at a distance of 17 miles, lies at the E extremity of the atoll. A village and mission station are established on the island.

South Pass, on the S side of the atoll, is the best entrance into the lagoon. Entered between **Agony Island** (9°50'N., 169°14'E.) and Etoile Island, the pass is about 0.2 mile wide and has charted depths of 16 to 54.9m. The entrance is swept to 13.4m over a least width of 270m. South Pass is clearly defined; the fringing reefs and the coral heads are plainly visible under favorable conditions of light.

Entrance Island, surrounded by reefs and a coral bank, with a depth of 1.5m, lies close within the entrance. It divides the inner end of the pass into three channels, each swept to a depth of 13.4m within the limits shown on the chart. The E channel, narrow and deep, leads to the anchorage off Likiep Island. The W channel, between the shoals N of Etoile Island and the 1.5m coral bank, has a swept width of 0.15 mile. The middle channel, which is very narrow, lies between Entrance Island and the 1.5m coral bank. Shoal patches lie N of the swept area of the channel.

Northwest Passage has a least charted depth of 16.5m in mid-channel, and is swept to a depth of 15.9m over a least width of about 160m, with shoal heads swept to lesser depths, as indicated on the chart.

Tides—Currents.—The tidal currents in South Pass attain a rate of 2.5 knots at flood and a rate of 1.5 knots at ebb. They turn at about the time of HW and LW. At neap tides, the tidal currents may set inward continuously at a rate not exceeding 1.75 knots.

The tidal currents in Northwest Passage attain a rate of 2 knots at flood and 2.75 knots at ebb. The tidal currents in the lagoon do not attain a rate of over 0.5 knot.

Depths—Limitations.—The lagoon is cluttered with coral heads and detached shoal patches. Swept areas of 11 to 15.9m, with shoal heads swept to lesser depths, are shown on the chart.

Anchorage.—Large vessels can anchor in the swept area N and NE of Entrance Island. The approach can be made by passing W of Entrance Island. The dangers in this area are plainly visible under favorable conditions of light. Vessels with local knowledge can anchor, in 18.3m, good holding ground, among the reefs N of Likiep Island. A good lookout must be maintained in order to avoid the coral heads in the anchorage area. Many reefs and coral heads lie N and E of the swept area.

Small vessels with local knowledge have found excellent anchorage, in 15.5m, within 0.15 mile SW of the flagstaff on Likiep Island. Such vessels can anchor off the reef fringing the SW side of **Lado Island** (9°50'N., 169°19'E.).

It is reported that good anchorage can be taken over a bottom of coral and sand in the swept area of the NW part of the lagoon. There are numerous coral heads in this area.

4.57 Jemo Island (10°05'N., 169°32'E.), about 20 miles NE of Likiep Atoll, is about 0.8 mile in extent and densely covered by trees. Steep-to reefs, on which the seas break heavily, surround the island and extend about 3 miles ENE from it. A depth of 34.7m lies 13 miles ENE of Jemo Island.

Ailuk Atoll (10°20'N., 169°56'E.), about 42 miles NE of Likiep, consists of numerous islets, some 6.1m high and most of which lie on the E side of the atoll. There is an islet on each of the W and SW extremities. Ailuk Island, the SE extremity of the atoll, is the center of population and activities. There is a stone pier on the NW shore of the island and also a church. Ailuk Island is reportedly visible on radar from distances of up to 20 miles.

Tides—Currents.—Strong tidal currents are reported in the entrances of the atoll. Both flood and ebb currents attain a rate of 1.75 knots at springs. The tide turns at about the time of HW and LW.

Depths—Limitations.—The lagoon is studded with reefs, coral heads, and pinnacle rocks. It should be navigated by vessels having local knowledge and then under only the most favorable conditions.

Anchorage.—The anchorage areas are poorly sheltered and their approaches are studded with shoals and coral heads. Winds of force 4 are not uncommon.

Small vessels with local knowledge can anchor, in 29.3m, about 0.5 mile NW of the lagoon side of Ailuk Island.

Directions.—The three main entrances are located on the W side of the atoll. **Erappu Channel** (10°20'N., 169°55'E.), about 4 miles NNE of the W extremity, is the best passage into the lagoon. It is about 0.1 mile wide and, although the depths are considerable, the fairway is tortuous, being divided into several branches by shoals and sunken rocks.

4.58 Marok Channel, about 1.5 miles N, is narrow but straight and deep. Eneneman Channel, about 2 miles farther N, is deep and has some shoal reefs in its inner part.

Mejit Island (10°17'N., 170°53'E.), about 52 miles E of Ailuk Atoll, is nearly 1.75 miles long and fringed by a very steep-to unbroken reef. The N half of the island is flat and the S half is undulating. The entire island is covered with palms and breadfruit trees. A shallow inlet on the W side divides the island into two parts. Landing may be affected abreast the trader's station at the S end on the W side of the island.

4.59 Taka Atoll (11°09'N., 169°38'E.) lies 40 miles NNW of Ailuk Atoll. It has six small islets on its barrier reef. They are uninhabited and are wooded. Taka Passage, on the SW side of the atoll, is about 90m wide and has a least depth of 8.2m. Dangers lie within the entrance and throughout the lagoon. The pass should only be used by small vessels with local knowledge under the most favorable of conditions. Anchorage is not recommended.

Utirik Atoll lies about 4 miles E of the NE extremity of Taka Atoll. **Aon Island** (11°13'N., 169°46'E.) is the SW extremity of the atoll and is covered with coconut palms. Utirik Island, the E extremity of the atoll, is the site of a village and center of all activities. Shoal reefs extend a considerable distance off and many reefs front the lagoon side of Utirik Island. A long sandspit extends W from the island. The lagoon is studded with dangers. Uncharted reefs may exist, and the charted position of some of the dangers may be inaccurate. The atoll was reported to be a good radar target up to 14 miles distance from the E and South.

Depths—Limitations.—A least depth of 5.2m is reported in Utirik Passage, near the W extremity of the atoll. Many coral heads, with depths of 4.1 to 5.5m, lie in or near the fairway.

Directions.—Utirik Passage is difficult to navigate as the reefs near it are hard to identify and there are no good landmarks in the area. Small vessels with local knowledge should only attempt to enter the passage under the most favorable of conditions. The transit should be made at half tide. Such vessels should proceed at slow speed as the reefs are not identifiable until close aboard; due allowance must be made for the effects of winds and currents. Navigation in the lagoon is difficult.

4.60 Bikar Atoll (12°14'N., 170°06'E.) lies about 55 miles NNE of Utirik Atoll. There are numerous islets, covered with trees, nearly all of which lie on the reef on the E side of the atoll. Light scrub bushes are found on the outer fringe of the islets, thickening to heavy undergrowth towards the middle. Numerous birds and turtles are found on the islets. **Jabwelo Island** (Jaboerukku Island) (12°15'N., 170°08'E.) was visible 12 miles from NW. The island was picked up by radar at about the same time.

Bikar Passage is suitable only for small craft, as its inner end is shallow and strong currents run through it. The lagoon is, for the most part, shallow and studded with reefs.

Caution.—The barrier reef extends up to 0.5 mile further seaward on its NE side than charted.

A group of reefs or shoals, with depths of 12.8 to 40.2m, are reported to lie in position 13°12'N, 168°55'E.

Taongi Atoll (14°38'N., 168°58'E.) the N islet of the Marshall Islands, is located about 150 miles NNW of Bikar Atoll. All of the islets, which are low, sandy, and densely covered with bushy scrub trees up to 7.6m high, stand on the SE side of the atoll. The outer reef is continuous except for a boat passage on the W side of the atoll. There are no inhabitants, and the islets are rarely visited. It serves as a haven for sea birds.

With E winds the sea breaks over the reef on the E side of the atoll and into the lagoon. From about 4 hours before to 4 hours after LW, the ebb tidal current is reported to attain a rate of 10 knots through the boat passage on the leeward side of the

reef. There is a SW set along the leeward side of the reef.

The boat passage can only be used at slack water, and then under only the most favorable conditions. The lagoon is shallow and presents a mucky appearance.

The Ralik Chain

4.61 The Ralik Chain (Sunset Chain) consists of 15 atolls and the three small coral islets of Kili Island, Jabwot Island, and Lib Island. The chain consists of Ebon Atoll, Namorik Atoll, Jaluit Atoll, Ailinglapalap Atoll, Namu Atoll, Kwajalein Atoll, Lae Atoll, Ujae Atoll, Wotho Atoll, Rongerik Atoll, Rongelap Atoll, Ailinginae Atoll, Bikini Atoll, Enewetak Atoll, and Ujelang Atoll. There are no major ports, but some of the lagoons provide anchorage for all classes of ships. Kwajalein Island is the site of the most important port in this group. Minor ports are situated at Jaluit Atoll and Enewetak Atoll.

Winds—Weather.—East winds prevail in the vicinity of Jaluit Atoll. Winds 65 to 85 per cent of the time in the vicinity of the atoll blow between NE and E during the months of November through August. In November the wind gradually backs to N and becomes NE in January. It reaches its maximum strength in December. Beginning in March the wind gradually diminishes in strength and changes to an E direction. Mild SE winds prevail from June to October. This is the period of calms and least precipitation. At this time, the wind may sometimes shift to the S and W. Storms often follow winds from the latter direction. Typhoons are rare.

Temperatures range from 25° to 31°C. Precipitation is comparatively heavy from November to January.

In the vicinity of Ailinglapalap Atoll, NE winds blow continuously from November to April with force 3 or 4. They gradually decrease in strength in May and June, and change to E. South winds often occur during this period. From July to October, the winds are weak and the sea is usually calm. West winds are rare. A N wind is considered to be a forerunner of stormy weather. Precipitation is heavy in June and July.

The winds in the Kwajalein area blow mainly from the E to NE. Winds from the SE sometimes blow during the rainy season. Observations have shown the prevailing winds to be ENE, averaging 8 to 20 knots about 70 per cent of the time, with a maximum velocity of 30 knots.

During the dry season (December through March), the Northeast Trades blow steadily with moderate to fresh velocities. There are extensive periods of good weather.

In the time of the rainy season (April through November), the winds are weaker and more variable. Gales are infrequent, but occur for brief periods during the rainy season. Heavy squalls and cloudiness occur. Temperatures are as follows: maximum high 33°C or 34°C; average mean 27°C or 28°C; and low 22°C or 23°C.

The mean annual rainfall is about 2,030mm. Rainfall gradually increases through the spring and summer to over 250mm per month during September through November.

There is a conspicuous diurnal variation in rainfall. The rain falls mostly at night, with a maximum in the early morning, usually decreasing rapidly after sunrise. There is a small secondary increase in the late afternoon, with a secondary minimum near midnight.

Thunderstorms are most frequent during the autumn rains, when they occur 4 to 5 per cent of the time. Typhoons, although uncommon, are not unknown.

In the vicinity of Enewetak Atoll, NE winds are strong from October to March. They shift to the E gradually and from the latter part of March to June blow from that direction. In June or July the winds blow from a S direction. Squalls increase in June, and occur most often in June or July. During this period, the sea is often smooth and the temperature reaches a maximum. West winds are rare throughout the year.

Rainfall averages 1,420mm annually. July to November are usually the rainy months. The dry season occurs from December through May. At Ujelang Atoll, the months of January, February, and March are comparatively dry, and a marked increase in rain attends the months between June and November, when the trades are least active. This definite division into a dry and wet season is less pronounced over the S islands.

The mean temperature is about 28°C, with the maximum seldom rising above 30°C. The minimum is about 25°C or 26°C. The humidity is high.

Tides—Currents.—See also the "Tides—Currents" topic under the Marshall Islands heading in paragraph 4.46. The current is reported to set E in the vicinity of Namu Atoll. A strong W current was reported off the W side of Lib Island. In 1958, the current in the vicinity of Bikini Atoll was reported to set W to WNW at a rate of 0.5 to 2 knots. A W current with a rate of 0.75 knot was experienced 5 miles SW of Ujelang Island. A NE current, with a rate of 0.75 knot, was reported (1963) off the S side of Ailinglapalap Atoll.

4.62 **Ebon Atoll** (4°38'N., 168°42'E.) is the southernmost of the Ralik Chain of the Marshall Islands. Islets stand on all but the N side of the reef. **Ebon Island** (4°34'N., 168°42'E.) is the principal island of the atoll. Ebon Channel, on the SW side of the atoll, is the only passage into the lagoon. It is narrow, tortuous, and only suitable for small vessels with local knowledge at slack water. A jetty extends about 30m from the S side of Meidj Island on the W side of **Ebon Channel** (4°36'N., 168°41'E.), and there is a long pier near the village on Ebon Island. The coral reef off Meidj Island extends parallel with the channel and is hard to identify. The lagoon is mostly deep and clear. The coral formations on the lagoon side of the channel can usually be identified.

Tides—Currents.—The flood attains a maximum rate of 3 knots and the ebb a maximum rate of 5 knots. The ebb tidal current from the W channel tends to turn the head of a vessel entering E. The tidal current from the next channel sets across the fairway, and striking the reef N of Juridi Island is deflected NW. Thus, it strikes an inbound vessel on the starboard bow, making it difficult to keep clear of the reefs on the W side. The incoming tidal current affects a vessel in the opposite direction, except that there is no countercurrent NW off Juridi Island.

Anchorage.—Anchorage can be taken, in 25.6m, off the trader's store, near the W end of Ebon Island. This anchorage is exposed to NE winds.

Directions.—Ebon Channel is suitable for small vessels with local knowledge under the most favorable conditions of light and weather. Vessels entering the lagoon should steer in, with the middle of the entrance bearing about 020°, keeping in mid-channel until abeam the S end of Juridi Island. Then, if the ebb tidal current is running, the Meidj Island side of the chan-

nel should be favored until abeam the point of reef opposite the N end of Juridi Island. The course then should be altered sharply round the reef into the channel, steering about 076°, which is the general direction into the lagoon.

After clearing the reef, vessels should keep N when passing the branches, as the tidal current setting out strikes the vessel with considerable force. Vessels should then pass N of the small detached point of the inner extremity of the reef.

4.63 Namorik Atoll (5°35'N., 168°07'E.), about 63 miles NW of Ebon Atoll, consists of two wooded islands on the reef enclosing the lagoon. A coral islet stands between them on the reef, with numerous black boulders. The very shallow lagoon is cut off from the sea by the drying coral reef. Boats can cross the reef with difficulty, at HW on the W side of the atoll. There is a trader's store on the W side of Namorik Islet, on the S side of the atoll.

Landing near the W side of Namorik Islet can be effected about 90m S of the store. There is no shelter during NE winds, and it is dangerous with strong SW winds when there is a heavy sea. There is a fringing reef which extends about 135m in the vicinity of the landing place. There is depth of about 1.2m and there are rocks in places. Two stranded wrecks lie about 90m off the S shore along the reef line.

Kili Island (5°38'N., 169°07'E.), 58 miles E of Namorik Atoll, is about 1 mile in length and surrounded by coral reefs. It is also densely covered with trees. A reef, having a depth of 18.3m, extends 0.5 mile SW from the SW end of the island. There is usually too heavy a sea to anchor on it.

4.64 Jaluit Atoll (6°05'N., 169°37'E.), about 83 miles NNE of Ebon Atoll, forms a large natural harbor. The atoll appears as one long, low island covered with coconut palms when approaching from the S. One of the important islands is Jaluit, a long narrow island on the SE side of the atoll.

Jabor (5°55'N., 169°39'E.) is a minor port on Jaluit Atoll, but serves as a trading center for the Marshall Islands. Cargo is handled at the anchorage. Lighters are available. A light is shown from a water tower on the N end of Jaluit Island. A small bunker fuel facility is located at Jaluit Atoll.

Tides—Currents.—The tidal currents are strong near the entrances, and change at about HW and LW. In the lagoon, they have no definite direction and are influenced by wind. They rarely attain a rate of more than 1 knot.

The tidal currents are strong in Southeast Pass and set in a N direction across the entrance of the channel. When the flood current is strongest, a countercurrent sets along the inner edges of the reefs and islands. In the S inner channel of the Southeast Pass, the flood attains a rate of 3 knots and the ebb a rate of 2.5 knots.

The tidal currents are strong in Northeast Pass. They attain a rate of 2.75 knots on the flood and a rate of 2.5 knots on the ebb.

The tidal currents attain a rate of 2.75 knots on the flood and 2.25 knots on the ebb in the channel NW of Northeast Pass. The tidal currents attain a rate of 2.75 knots on the flood and 2.75 knots on the ebb in the entrance of the channel E of Northeast Pass.

The tidal currents in Southwest Pass attain a rate of 2.25 knots on the flood and 3 knots on the ebb.

Depths—Limitations.—Caution is advised when navigating the passes or the lagoon, due to the age of the survey. The passes into the lagoon and the lagoon itself have adequate depths for all classes of vessels. The N and W parts of the lagoon contain numerous coral heads. Wide channels swept as indicated on the chart leads from Northeast Pass, and the passes close E and W to Imieji Anchorage and **Jaluit Anchorage** (5°55'N., 169°38'E.). Swept channels also lead from Southeast Pass and Southwest Pass to these anchorages.

Many dangers are found in the swept areas of the anchorages and in their approaches. Numerous dangers lie in the N approach to **Ship Channel** (5°56'N., 169°39'E.).

The SE side of the atoll is rather steep-to and there is usually a heavy surf. The SW side of the atoll, between **South Point** (5°47'N., 169°37'E.) and Pinglap Island, a little over 13.5 miles NW, has wide beaches and very little surf. North of Pinglap Island, the reef is covered with about 1.5m of water at HW.

Breakers, about 1.2m high, are reported in position 6°19'N, 169°06'E, a little over 19 miles W of **Bogenaga Island** (6°17'N., 169°25'E.), near the N extremity of the atoll.

Directions.—Several passes lead into the lagoon, Southeast Pass, Northeast Pass and two adjacent passes. Southeast and Northeast Passes are the most used by large vessels.

Southeast Pass, the main entrance of Jaluit Anchorage, is about 0.4 mile wide between the reefs on either side. The pass has been swept to a depth of 14.9m in the fairway. Within the lagoon, the pass divides around the reef enclosing Kabbenbock Island into three channels.

The S channel of the inner channels leads between the reefs fringing Jaluit Point and those fringing Kabbenbock Island. Abreast Jaluit Point, the channel is narrowed to a width of less than 0.1 mile, with depths of 14.6 to 29.3m in the fairway. Then the channel, which has been swept to a depth of 13.4m, leads to Jaluit Anchorage.

Ship Channel extends in a N direction between the reefs fringing Kabbenbock Island and those fringing Enybor Island. The fairway has been swept to a depth of 12.8m over a width of 135m. A large sand bank divides the inner part into two passages, both of which are navigable. The E passage is best as it has been swept.

Northeast Pass, about 7 miles NW of the E extremity of the atoll, has been swept to a depth of 14.9m over a least width of about 135m.

A pass, situated a little less than 1 mile NW, has a swept depth of 14.9m over a least width of about 0.2 mile. It leads between the reef fringing Imrodj Island and that fringing Medyado Island. Within the entrance, a narrow channel leads SW between numerous detached coral reefs into the lagoon, and a wider channel leads in a NW direction along the lagoon side of the atoll reef.

A pass, swept to a depth of 14.9m over a width of nearly 0.3 mile, leads between the reef fringing **Kinadyeng Island** (6°06'N., 169°38'E.) and the reef to the E. Within the pass it divides into three narrow channels, which then leads between numerous reefs into the lagoon.

Southwest Pass, swept to a depth of 14.9m over a least width of 135m. is suitable only for small vessels with local knowledge. The pass is tortuous, and to be used under only the most favorable conditions. Such small vessels use this pass during

periods of NE winds.

Most of the buoys cannot be relied upon as they are either missing or off station.

Northeast Pass is unmarked, except for the cement foundation of a destroyed beacon on the W side of the channel and a black beacon with a rectangular topmark on the SE side of the channel. The former is visible at LW.

Anchorage.—Winds from the N and W quadrants cause choppy seas in the lagoon, but good anchorages over sand and coral is available for all classes of vessels. Good anchorages are reported throughout the E part of the lagoon and within all of the main passes. The areas close within these entrances are not suitable for anchorage, as they are exposed to wind and sea and have strong tidal currents.

Jaluit Anchorage affords shelter from winds between NE and SE, and is suitable for all classes of vessels.

4.65 Imieji Anchorage (6°00'N., 169°40'E.) has been swept to 14.9m, with shoal spots swept to lesser depths, as indicated on the chart. Some of the numerous dangers in the approaches to this anchorage are buoyed, but they cannot be relied upon. Small vessels with local knowledge should only attempt to reach this anchorage, and then under the most favorable of conditions.

Directions.—Vessels bound for Jaluit Anchorage or for Jabor should enter the lagoon by Southeast Pass unless permission has been obtained to enter by one of the other passes. The reef on the N side of the channel is readily identifiable, but the reef on the S side of the pass is somewhat more difficult to distinguish.

Vessels entering, in order to avoid making too sharp a turn in the channel, should favor the N side of the entrance by steering for the S extremity of Kabbenbock Island on a course of about 270°. This course leads about 0.1 mile S of the reef fringing Enybor Island. Then the course should be gradually altered, so as to pass in mid-channel through the S channel and to the anchorage.

Ailinglapalap Atoll

4.66 Ailinglapalap Atoll (7°25'N., 168°46'E.) lies about 67 miles NNW of Jaluit Atoll and is a series of low islands strung out along the atoll reef. The numerous islands are not more than 1.5 to8m high, but most of them are covered with tall coconut palms appearing black in color. They can be made out from a distance of 10 miles. Ailinglapalap Atoll was reported (1963) to lie from 1 to 2 miles S of its charted position.

Tides—Currents.—In South Pass, the flood current attains a maximum rate of 2 knots and the ebb a maximum rate of 2.5 knots. The currents turn about 1 hour after HW and LW.

In **East Pass** (7°18'N., 168°51'E.), the flood attains a rate of 1.5 knots and the ebb a rate of 1.75 knots. In **Mezetchoku Passage** (7°29'N., 168°44'E.), the flood attains a rate of 2 knots and the ebb a rate of 2.25 knots. In **Begangu Passage** (7°30'N., 168°40'E.), about 2.5 miles W of Mezetchoku Passage, the flood attains a rate of 0.75 knot and the ebb a rate of 1.5 to 1.75 knots.

Depths—Limitations.—The main passes and the lagoon are fairly deep, except for scattered shoals and coral heads. An irregular-shaped area connecting South Pass and East Pass with Berangu Passage and Mezetchoku Passage has been swept to 14.9m, with shoal spots swept to lesser depths. Shoals are readily seen under favorable conditions of light.

There are eight passes leading into the lagoon, one on the S side, three on the E side, and four on the N side. South Pass, East Pass, Berangu Passage, and Mezetchoku Passage have been swept. The remainder are only suitable for small vessels with local knowledge.

South Pass is about 0.1 mile wide and curving. It has been swept to a depth of 14.9m within the limits shown on the chart. It is reported that the pass is not suitable for large vessels due to its narrowness and strong currents.

East Pass has depths of 5.5m, and is about 0.5 mile wide. It has been swept to 5.2m over a least width of about 0.3 mile. A swell sets into the pass during NE winds.

Berangu Passage is about 0.3 mile wide and has been swept to a depth of 14.9m. On entering the lagoon, vessels using this pass must steer SE to avoid the reefs.

Mezetchoku Passage is very deep and has been swept to a depth of 14.9m over a least width of about 0.1 mile. Shoals lie close to the channel limits.

Anchorage.—Large vessels can anchor, as convenient, within the lagoon, in 29.2 to 54.9m, clear of the scattered shoals. The best anchorage is on the W side of Ailinglaplap Island next E of **Bigatyelang Island** (7°17'N., 168°43'E.), but even here the holding ground is coral the tidal currents are strong. The bottom slopes steeply about 0.1 mile outside this anchorage. The anchorage is sheltered from N and E winds.

Jabwot Island (7°45'N., 168°59'E.), lying about 9 miles N of the N extremity of Ailinglapalap Atoll, is about 0.8 mile in length, and is fringed with reefs. A 1968 report states that the fringing reef appears to drop off sharply within several hundred meters from 150 to 200m of the beach. A reef extends approximately 1 mile off the NW point of the island.

4.67 Namu Atoll (7°58'N., 168°08'E.) lies about 25 miles NW of Ailinglapalap Atoll and consists of over 50 small islets, most of which lie on the E side. Kaginen Island, located on the NE side of Namu Atoll, appears as three distinct islets when approaching from the N. Coconut palms and breadfruit trees grow on most of the islets. There is a trading station on **Namu Island** (8°12'N., 167°58'E.), at the N extremity of the island.

Anil Channel (7°48'N., 168°12'E.) is narrow and divided into two channels, the S of which is only 90m wide. The channel should be used only by small vessels with local knowledge, under favorable conditions of light.

Bock Channel (8°03'N., 168°07'E.), about 135m wide and deep in the fairway, leads into the lagoon from the northernmost entrance of the W side of the lagoon. The entrance channel is divided into two channels by a ridge of reefs. Bock Islet, 2.4m high, stands on the N side of the entrance. The approach to the channel should be made on a course of about 086°. The channel should only be entered under the most favorable conditions of light. When within the entrance, vessels should alter the course to port and navigate (by sight) through the NW channel.

Anchorage.—Anchorage can be taken by vessels with local knowledge inside the lagoon off **Leuen Island** (7°45'N., 168°14'E.), in 27.4m, coral. There is little swell at this anchorage, but it is exposed to NE winds. The best anchorage is off

the house near the NW end of the island.

Caution.—Great caution should be observed when passing to leeward of the atoll because of a SE current. Breakers are rarely seen on the reefs on the lee side of the atoll, between the months of May and September.

There are scattered shoals in the lagoon. These can only be identified under favorable conditions of light.

Lib Island (8°19'N., 167°24'E.), 34 miles WNW of Namu Atoll, is about 0.8 mile in length and fringed by a steep-to reef which extends from 0.1 to 0.2 mile offshore. The edge of the reef is steep-to, and landing may be effected on its W side on a calm day at HW. Lib Island is reported to be a good radar contact at distances of up to 19 miles and may be visually identified at 13 miles.

Kwajalein Atoll

4.68 Kwajalein Atoll (9°04'N., 167°19'E.), about 33 miles NNW of Namu Atoll, consists of more than 90 islets and islands mostly covered with coconut palms from 17 to 29m high. They lie along the atoll reef which surround a lagoon that has an area of approximately 839 square miles. The reef is submerged for long stretches, especially on the SW side of the atoll. The S islands are covered with a dense growth of coconut palms and small vegetation. The islands to the N are mostly wooded.

Certain islands of Kwajalein Atoll are under military jurisdiction and require special authorization for entry.

Image courtesy of Capt. Richard Coxey

Kwajalein Airfield from ENE

Reagan Test Site—Warning Area.—The waters within a circular area with a radius of 200 miles, centered at position 8°43'N, 167°43'E, are so designated. Intermittent hazardous missile operations will be conducted within the area 24 hours, on a permanent basis.

Normally, operations in the Reagan Test Site are covered by HYDROPAC messages.

Regulations.—Full particulars dealing with entry applications to the Reagan Test Site are contained within Title 32, Code of Federal Regulations, Part 525. These regulations apply to all persons, ships, and aircraft wishing entry to the Reagan Test Site. The entry authorizations issued under the authority of these regulations do not apply to entry to any other areas of the Marshall Islands. In addition to the controls covered by this regulation, movement within the Test Site, the territorial sea of, and airspace over it, is subject to the local control of the Commander, Reagan Test Site.

Reagan Test Site is defined as all those defense sites in the Kwajalein Atoll, Marshall Islands, including airspace and adjacent territorial waters, to which the United States Government has exclusive rights and entry control by agreement with the Republic of the Marshall Islands.

Entry requirements are, as follows:

1. Ships or other marine vessels in the following categories, except those which have been denied entry or have had a prior entry authorization revoked, may enter the Reagan Test Site territorial waters upon request to and approval of the Commander, Reagan Test Site:
   a. U.S. private ships which are:
      (i) Under charter to the Military Sealift Command, or
      (ii) Employed exclusively in support of and in connection with a Department of Defense construction, maintenance, or repair contract on Kwajalein.
   b. Trust Territory of the Pacific Islands/RMI ships which have been approved by the resident representative on Kwajalein.
   c. Any ship in distress.
   d. U.S. public ships which are providing a service to the Kwajalein Atoll in accordance with their agency responsibilities
2. All other ships or marine vessels must obtain an entry authorization from the National Range Commander before entering the Kwajalein Atoll territorial sea. The entry authorization application should reach the National Range Commander at least 14 days prior to the desired entry date and should include the following information:
   a. Name of ship.
   b. Place of registry and registry number.
   c. Name, nationality, and address of operator.
   d. Name, nationality, and address of owner.
   e. Gross tonnage of ship.
   f. Nationality and numbers of officers and crew (include crew list when practicable).
   g. Number of passengers (include list when practicable).
   h. Last port of call prior to entry into area for which clearance is requested.
   i. Purpose of visit.
   j. Proposed date of entry and estimated duration of stay.
   k. Whether ship is equipped with firearms or photographic equipment.
   l. Whether crew or passengers have in their possession firearms or cameras.
3. Entry authorizations may be granted for either single or multiple entries.
4. Captains of ships and/or marine vessels planning to enter Reagan Test Site shall not knowingly permit excluded persons to board their vessels.
5. U.S. public ships which are authorized to enter de-

fense areas by the controlling Defense Department agency may enter the Kwajalein Atoll territorial sea without the specific approval of either the National Range Commander or the Commander, KMR, provided that the Commander, KMR, is notified as far in advance of the impending entry as is consistent with the security requirements pertaining to such movement.

The Commander, Ballistic Missile Defense Systems Command, is the National Range Commander.

1. Address: National Range Commander, Reagan Test Site, Ballistic Missile Defense Systems Command, ATTN: BDMSC-R, P.O. Box 1500, Huntsville, Alabama 35807.
2. Electrical address: CDRBMDSCOM HUNTSVILLE AL//BMDSC-R//.

The Commander of the Reagan Test Site is situated at Kwajalein Island, Republic of the Marshall Islands.

1. Address: Commander, Reagan Test Site, P.O. Box 26, APO AP 96555.
2. Electrical address: CDRKMR MI//BMDSC-RK//.

Photo courtesy of D. Sweeney

Kwajalein—Echo Pier

Signals.—Twenty-four hours prior to operations "Range Command Center" will broadcast a voice warning on 2716 kHz. Range operations also are usually covered by HYDROPAC messages.

Kwajalein (8°43'N., 167°44'E.)

World Port Index No. 56370

4.69 Kwajalein, the principal island of the atoll, lies at the SE end of the atoll and is 26m high to the tree tops. Numerous oil and water tanks, an airfield, and other installations are situated on the island.

Kwajalein Island observes M time zone and E hemisphere date. This puts the island 22 hours ahead of Hawaii.

Tides—Currents.—The mean range of tide is 1m, while the maximum range is 2m.

A W current with a rate of 1.5 knots sets along the S side of Ebadon Island, the W extremity of the atoll. The currents throughout the lagoon set SW at a rate of 2 to 3 knots. They do not reverse on changing tide. The currents are strongest at half ebb. The currents off the W side of the atoll are reported to be variable.

During periods of strong NE winds (October through June)

and at half ebb, a 3-knot current has been observed setting through South Pass, about 5 miles NW of Kwajalein Island. At the same time, a current setting NW at a rate of 2 to 3 knots sets along the lagoon side of Ennyiabegan Island, about 1.3 miles NW of South Pass, toward Gea Pass.

The ebb current in **Gea Pass** (8°49'N., 167°35'E.), a little less than 1 mile NW of Ennyiabegan Island, attains a maximum rate of 2.25 knots at spring tides and sets in a WSW direction.

There is usually a SW-NW set in Milu Pass (Mellu Pass), about 4.5 miles SW of the N extremity of the atoll, at a maximum rate of 2 knots. The flood attains a rate of 1.5 knots and the ebb a rate of 2 knots.

The directions of the tidal currents in North Pass, about 2.3 miles NE of Milu Pass, are variable. The estimated rate of the current is about 3 knots.

Depths—Limitations.—General depths of 29.3 to 54.9m are found throughout the lagoon, except near the atoll reef. As a rule, greater depths are found in the S part of the lagoon. There are a number of small reefs and coral heads scattered throughout the lagoon; some of these are marked by buoys. These dangers are visible under favorable conditions of light. Many passages within the lagoon have been wire-dragged, as indicated on the charts.

The main cargo complex is an L-shaped structure. The long side runs E and West. The N face is designated Foxtrot Pier. This pier is 274m long with the furthest 150m from shore used for berthing. The depths in this area range from 7.6 to 11.5m.

The side facing the lagoon runs at a bearing of 020° and is designated Echo Pier. This pier is 97.5m long and has dolphins to accommodate vessels up to 192m. Depths along Echo Pier range from 10.4 to 11.5m.

Alpha Pier, Bravo Pier, Charlie Pier, and Delta Pier have depths of 4.5 to 6.1m, and are generally not used for visiting vessels.

A T-headed petroleum berth is situated S of Echo Pier and has an alongside depth of 9.1m.

A fuel pier is situated on the SE side of the island of Roi-Namur, depth of 8.5m alongside was reported (1963). Several small craft piers are situated on several of the islands around the atoll, some of which are in a state of disrepair.

Large vessels enter the lagoon by way of Gea Pass. It is buoyed and nearly 0.2 mile wide between the 18.3m curves. It has depths of over 36.6m in the fairway. The channel has been swept to a depth of 14m over a least width of about 270m.

South Pass has been wire-dragged to a depth of 5m. Its entrance is marked by buoys. Heavy seas are found in the channel during S winds.

Photo courtesy of NOAA Ship Ka'imimoana

Kwajalein—Fuel Pier

Milu Pass (Mellu Pass) (9°21'N., 167°25'E.), the N entrance for larger vessels, is about 0.4 mile wide between the 9.2m curves. It is easy to identify because of the break in the heavy surf on the reef. The pass has been wire dragged to 14m over a least width of about 0.4 mile. Sand Islet, located about 1 mile SSW of Milu Island (Mellu Island), is a shifting sandbar surrounded by a shoal with depths of less than 18.3m.

North Pass, about 2 miles NE of Milu Pass, is used only by small vessels.

Enewetak Passage, located 16 miles N of Kwajalein Island, is entered between Kwadack Island and Meck Island. Enewetak Island lies on the W end of the passage. There is a channel, swept to 7m, between Enewetak Island and Kwadack Island, but the area is encumbered with shoals with depths of 4 to 4.9m, and there are no navigational aids.

Bigej Channel, about 8 miles North Kwajalein Island, is a wide and generally shallow channel dragged to a depth of 6m, and marked by buoys. Depths of 9.2m in the center of the channel were reported in 1983, and shoals are readily observed under favorable light conditions.

Aspect.—Numerous uncharted structures exist on Kwajalein Atoll, making identification of the charted features difficult.

The Kwajalein Harbor Control Tower is situated near the main pier on Kwajalein. A red and white calibration tower, 48m high, stands near the W end of the island, with another tower 19.5m high, about 0.5 mile E of it. One wooden pole, which support radio antennas, stands near the N end of the island. An aviation light is situated on the water tower (8°43.8'N., 167°44.4'E.) at the center of the island. The DCCB warehouse is the most obvious structure on the W side of the island. This is a 36m high concrete structure. It has a triangular face to the N and rectangular face on the S and West.

Ebeye Island has a microwave tower (8°46.5'N., 167°44.4'E.) on the S end. This tower is difficult to see in daylight.

Landmarks in the **Roi-Namur** (9°24'N., 167°28'E.) area are unreliable. On the E side of the atoll, obstruction lights are shown from the various islands.

An aero light is shown from the middle of Roi-Namur at the N extremity of the atoll, 43 miles NNW of Kwajalein Island; this light is of exceptional visibility and has been mistaken for the aeronautical light on Kwajalein Island.

Pilotage.—Pilots are available. Pilotage is not compulsory for vessels proceeding to an anchorage in the lagoon. It is, however, recommended. Pilotage is compulsory for vessels berthing alongside.

Vessels approaching Gea Pass from the SE should board the pilot in the vicinity of South Pass. The pilot will board vessels approaching from other directions from a position off Gea Pass. Full power is required for docking and undocking. Ships are berthed only during daylight hours.

Regulations.—Vessels are urged to contact the local authorities for information on regulations pertaining to navigation in the area on 2716 kHz and VHF channels 12 and 16.

Berthing is arranged through the harbormaster. All ship movements within the lagoon are controlled by Kwajalein Harbor Control on Kwajalein Island.

Signals.—Notice of ETA must be given 24 hours in advance and any change of more than 1 hour must be made at least 6 hours prior to arrival. Kwajalein Harbor Control may be contacted on VHF channel 12.

Kwajalein—Roi-Namur Airfield from NNW

Anchorage.—Kwajalein Atoll affords good anchorage to a large number of vessels of all classes, in 27.4 to 54.9m, coral and sand.

Anchorage Alpha, centered in position 8°45.09'N, 167° 43.08'E, is designated for vessels less than 122m in length. Anchorage Bravo, centered in position 8°46.05'N, 167°42.60'E, is designated for vessels greater than 122m in length.

Kwajalein Anchorage extends from about 1.5 to 9 miles off the lagoon side of Kwajalein Island. The entire area, with the exception of a few scattered shoal spots, has been wire-dragged to 14m. It provides one of the best anchorage areas in the Marshall Islands.

Roi-Namur Anchorage, in the N part of the lagoon, has many anchorage berths. Most of the area has been wire-dragged to 14m, although small sections near the N and NE reefs have been dragged to lesser depths. These anchorages are exposed to S winds. Anchorage at Roi-Namur should be done only under the guidance of Kwajalein Harbor Control.

Directions.—When wind velocities exceed a rate of 35 knots, inbound vessels should be alert for instructions, as they may be directed to an anchorage rather than to an alongside berth. During the typhoon season (July to December), vessels should contact the weather station prior to departure.

Vessels approaching Gea Pass from the S should make certain that the pass is open and that Lighted Buoy No. 6 is clearly identifiable. A course of 074°, with that buoy ahead, leads midway between Lighted Buoy No. 2 and Buoy No. 3. The currents in this area are usually S, but N currents have been experienced. Therefore, sufficient way should be kept so as to avoid being set onto either the S shore or upon the coral heads N of the channel. When the post on the NW point to Gea Island bears about 200°, course should be altered to 090° following the recommended track on the chart. When the stern of the wreck off Ennylabegan Island is abeam to starboard, alter course to 123°. When the vessel is abeam of Buoy No. 1, alter course to 135°. Alter course to keep Round House near the center of Kwajalein Island ahead at 135°.

Vessels entering the lagoon through South Pass should steer a course of 063°, passing about midway between the entrance buoys. When the NW tangent of Enubuj Island bears 147°, the course should be altered to 096°, being careful to avoid the charted shoal patches. When the Round House near the center of Kwajalein Island bears 135°, alter course to that bearing.

Vessels should approach Milu Pass on a course of about 170°. When Milu Island bears about ENE, follow the recommended track on the chart.

Take care to avoid the shoals, wrecks, cable areas, and other hazards when navigating within the lagoon, which are best seen on the chart.

Caution.—Due to the existence of wrecks and cables, vessels are cautioned against anchoring within the lagoon without first contacting local authorities.

During the season of the trade winds (June to October), a surge develops alongside the main piers on Kwajalein Island. Cargo operations are sometimes hindered and mooring lines are sometimes parted.

4.70 Lae Atoll (8°56'N., 166°14'E.) lies about 40 miles WSW of the W extremity of Kwajalein Atoll. The Lae Atoll has 10 or more islets, most of which are on the E side of the reef enclosing the lagoon. Lae Island, at the SE extremity of

the atoll, is 2.4m high and the center of activities for the island group. A light, privately maintained, is shown on Lae Island.

Tides—Currents.—Strong currents set in and out of the entrance. There is a little or no current in the lagoon.

Aspect.—The only entrance is on the W side of the atoll, and is shoal and narrow. It should only be attempted by small vessels with local knowledge under only the most favorable conditions. The entrance is hard to identify, except when the sun is overhead. The reef on the N side of the entrance is hard to identify; the S side is generally marked by breakers. Vessels should enter by keeping about 45m off the breakers on the S side of the channel.

Anchorage.—Sheltered anchorage and good holding ground can be taken by small vessels with local knowledge in the lagoon. Anchorage has been taken about 0.3 mile N of the W end of Lae Island.

Caution.—Numerous scattered dangers lie in the lagoon, and in the area between the entrance and the anchorage off Lae Island. These dangers are identifiable under favorable conditions of light.

The lagoon has not been closely examined and uncharted dangers may exist. It was reported (1979) that islands exist where none are charted. Most of the islands were of different shape and length than they appear on the chart.

4.71 Ujae Atoll (9°04'N., 165°39'E.) lies about 27 miles W of Lae Atoll. It consists of islets which are covered with coconut palms. Ujae Island, located at the S extremity of the atoll, is the principal islet.

Bock Channel (9°02'N., 165°36'E.) is suitable only for small vessels with local knowledge, and then only under the most favorable of conditions.

Tides—Currents.—Tidal currents in Bock Channel are strong and unpredictable. A vessel entering 1 hour before LW experienced a 3 knot S set.

Anchorage.—Anchorage in the lagoon is not recommended as the bottom is very irregular.

4.72 Wotho Atoll (10°06'N., 165°58'E.) lies about 56 miles NNE of Ujae Atoll and consists of a number of islets on the reef enclosing the lagoon, all of which are covered with trees. **Wotho Island** (10°10'N., 166°00'E.) lies at the NE extremity of the lagoon and is the principal island.

Aspect.—Small vessels, with local knowledge, can enter the lagoon through Ombelim Channel and Medyeron Channel, on the W side of the atoll. It may be attempted only during the most favorable conditions. The least depth reported in these channels was 9.1m and 18.3m, respectively. The lagoon is studded with dangers.

Anchorage.—Anchorage is reported about 0.3 mile SW of the village on Wotho Island. Anchorage can also be taken off the SE side of **Medyeron Island** (10°11'N., 165°55'E.) and in the area N of **Begin Island** (10°07'N., 165°56'E.). These anchorages cannot be considered safe as dangers lie in their immediate vicinity and in their approaches.

Caution.—It was reported (1979) that Wotho Atoll was of a different shape than it appears on the chart. Island shapes may not be accurate and not all are charted.

4.73 Rongerik Atoll (11°21'N., 167°25'E.), located about 104 miles NE of Wotho Atoll, is comprised of about ten islands. The only islands which are wooded with coconut palms are Rongerik Atoll and Enewetak Atoll, located on the NE and SE extremities of the atoll, respectively. The other islands are lightly wooded. There are numerous coral heads within the lagoon.

Because of the effects of numerous nuclear experiments, radioactivity on Rongerik Atoll is considered to be at a higher level than that to which human beings should be exposed. Mariners are advised to keep clear of this area.

Eniwetak Pass (11°17'N., 167°28'E.), which is about 0.2 mile wide, appears to have depths of 18.3 to 25.6m. The channel has been swept to 12.5m within the limits shown on the chart. The dangers bordering on and within the channel are plainly visible under favorable conditions of light.

Bock Pass, on the W side of the atoll, is divided into several unmarked channels by detached shoals and reefs. The middle channel, which has a least depth of 21.9m, is preferred. There are patches, with depths of 5.5 to 7.3m, near the fairway. The pass is hard to identify from offshore.

Jedibberdib Pass, at the N side of the atoll, is shallow and suitable only for small vessels with local knowledge. The pass is to be used under only the most favorable conditions. It has been swept to a depth of 3.6m. A heavy swell rolls in during strong NE winds.

Anchorage.—Small vessels, with local knowledge, can anchor, in 27.4m, sand, about 0.3 mile off the lagoon side of Eniwetak Pass. Care must be taken to avoid the reefs, which are hard to identify due to their dark brown color.

Caution.—The S end of the atoll is difficult to identify, except under the most favorable conditions, as there are no islands or sand cays. The reef fringing the seaward side of **Bock Island** (11°23'N., 167°22'E.) bares at LW to a distance of 0.25 mile offshore. Navigation within the lagoon is dangerous, except under favorable conditions of light.

4.74 Rongelap Atoll (11°18'N., 166°51'E.), lying about 18 miles W of Rongerik Atoll, consists of a number of small sandy islets, most of which lie on the E side of the atoll. Rongelap Island, Eniaetok Island, and Burok Island (Burokku Island) are covered with coconut palms; the rest of the islets are very sparsely wooded. A church and a small village has been built on Rongelap Island. Native crafts are obtainable.

There are nine entrances into the lagoon, three on the E side, four on the S side, one on the W side, and a small boat passage on the N side. South Pass, Kaeroga Pass, Northeast Pass, and Enybarbar Pass (Enibarubaru Passage) are considered to be the best and most important. The approaches to these passes are clear and can be readily identified under favorable conditions of light.

Tides—Currents.—The tidal currents in South Pass attain a rate of 1 knot on the flood and 1.35 knots on the ebb. They appear to turn at about the time of HW and LW. In 1979, an extremely strong W set was reported while entering the South Pass to Rongelap Atoll lagoon during ebb tide. With a ship's speed of 10 knots, a heading 014° to the right of track was necessary to maintain course.

Strong currents are reported in **Bikien Pass** (Pigen Pass) (11°10'N., 166°45'E.) and other narrow passes. Most of the wa-

ter enters through the E passes and flows out through **West Pass** (11°21'N., 166°38'E.) and Kaeroga Pass. It was reported that there were strong flood currents in West Pass and Kaeroga Pass.

Depths—Limitations.—Numerous sunken rocks lie in the lagoon. An area, swept to 14.9m and having shoal spots swept to lesser depths, exists along the E part of the lagoon. It was reported that the NE part of the lagoon was strewn with reefs. It was further reported that the W portion of the lagoon appeared to be navigable, and to be free of coral heads, except for those lying quite close to the atoll reef.

Aspect.—South Pass is about 3.5 miles wide, but shoals divide the pass into several unmarked channels. The deepest channel has depths of 32.9 to 51.2m, and lies about 1.5 miles WNW of Rongelap Island. This channel has been swept to 14.9m. When the sun is high, the deep water portion of South Pass can be clearly distinguished from a position 1.5 miles to seaward. Between this channel and Rongelap Island, there are other channels which have been swept to various depths, within the limits shown on the chart.

Kaeroga Pass, about 9 miles WNW of the W extremity of Rongelap Island, is reported to be deep and clear. The channel, which shows clearly in contrast to the reefs on either side, is about 0.8 mile wide and has a reported depth of 27.4m. Numerous coral obstructions were reported (1963) to lie up to 1 mile N of Eniran Island (Enigan Island). The lagoon area within the entrance is reported to be clear of shoals, but no soundings are shown on the chart.

Northeast Pass, about 6 miles NE of **Eniaetok Island** (11°17'N., 166°54'E.), is about 0.5 mile wide. It has a least depth of 18.3m in the fairway, and has been swept to 14.9m over a width of 0.2 mile. Large vessels may use it. Vessels wishing to enter should steer for Erririppu, the E of two low islets on the atoll reef opposite the pass, on a course of about 335°.

Enybarbar Pass (Enibarubaru Pass), reported to be suitable for large vessels, has been swept in 1927 to a depth of 14.9m on the W side and 10.6m on the E side,. A shoal, with a least depth of 11.9m, lies in mid-channel.

Anchorage.—Vessels can anchor, as convenient, in the swept areas of the lagoon. Vessels can anchor in a position about 0.8 mile off the lagoon side of Rongelap Island. Anchorage can also be taken off the N side of Mellu Island, located on the E side of Northeast Pass.

4.75 Ailinginae Atoll (11°08'N., 166°25'E.) lies about 7.5 miles WSW of the SW extremity of Rongelap Atoll. The atoll bares at LW and consists of a number of tree and bush-covered islets, most of which lie on the S and E sides. Coconut palms, trees, and moderate undergrowth are found on the S islands, and sparse undergrowth is found on the E islands. The shores of the islands are rocky with a few sandy beaches. **Sifo Island** (11°08'N., 166°18'E.), on the SW corner of the atoll, was reported as being visible from S from a distance of 16 miles, both visually and by radar.

Aspect.—Mogiri Pass, on the S side of the atoll about 2 miles from its W extremity, is the main entrance into the lagoon. In 1963, an examination of Mogiri Pass showed a least depth of 7.3m in the fairway. The lagoon appeared to have depths of 10.7 to 18.3m, except in the E part where several sand bars were noted.

On the E side of Mogiri Island, at the E side of Mogiri Pass, is Eniibukku Pass. It is encumbered with rocks and should only be used by small vessels with local knowledge.

Anchorage can be taken about 0.3 mile N of Mogiri Island, where it is fairly calm. The wind, at times, causes a heavy sea.

4.76 Bikini Atoll (11°35'N., 165°23'E.) consists of over 20 islands and islets lying about 46 miles WNW of Ailinginae Atoll. **Bikini Island** (11°37'N., 165°33'E.), covered by a dense growth of coconut palms and having a few buildings on it, is the principal island of the group. Some coconut palms also grow thickly on Enyu Island, about 4.5 miles S of the S extremity of Bikini Island. Three piers, each about 69m long, are situated on the SW side of Enyu Island. Bikini Atoll, from 1946 to 1963, was used as an nuclear proving grounds. Bikini Island was designated a World Heritage Site in 2010 by UNESCO.

Depths—Limitations.—General depths of 36.6 to 54.9m are found in the lagoon. Scattered shoals exist and are more numerous near the islands than further out in the lagoon. This is particularly true off Bikini Island.

Aspect.—A wooded tripod tower stands on the S end of Bikini Island. A prominent peaked building, painted a light buff color, stands adjacent to a concrete bunker near the S end of Enyu Island. It was reported that a prominent concrete bunker stands on **Airukiraru Island** (11°30'N., 165°24'E.).

Enirik Pass (11°30'N., 165°22'E.), in the middle of the S side of the atoll, is reported to be the best entrance; there is a least depth of 53m in the fairway, which has been swept to a depth of 14.9m over a width of about 0.15 mile.

Enyu Channel is situated on the E part of the S extremity of the atoll. It is about 8 miles wide, but there are a number of shallow banks in all but its E part. East Channel, about 1 mile wide and swept to a depth of 11.9m, is the best of the Enyu Channels.

Rukoji Pass, about 3.3 miles WNW of Enirik Pass, is about 2 miles wide, but shoal areas in the E part considerably restrict navigation. Depths of 7.3 to 36.6m are found in the fairway. An area, about 0.1 mile wide, has been swept to a depth of 14.9m.

Anchorage.—Anchorage, protected from NE winds, can be taken, in 20.1m, sand, about 0.8 mile from the beach on the lagoon side of Bikini Island.

Caution.—Radiation levels are high enough that permanent habitation is not possible. Local crops, coconuts and bananas, and fish are to be considered unsafe for consumption. Diving in the lagoon and limited stays on Bikini Island are permissible.

4.77 Eniwetak Atoll, the NW outpost of the Marshall Islands, lies about 165 miles W of Bikini Atoll. The atoll consists of about 38 islands or islets strung along a circular reef, enclosing a lagoon, with a diameter of 20 miles. The highest land elevation is 4.2m, but some trees attain a height of 15.2m. Most of the islands are found on the E side of the atoll. The prohibited area surrounding Enewetak Atoll has been disestablished. Entry control to the area has been returned to the Republic of the

Marshall Island.

Eniwetak Island (Enewotok Island) (11°20'N., 162°20'E.) (World Port Index No. 56350) has a submerged pipeline berth for oil cargo, close off the NW extremity. There is one berth available which handles vessels on a three-point mooring, two mooring buoys forward and one aft. The POL handling facility is reported to be dangerously close to the reef and caution should be exercised.

General cargo vessels load and discharge at the lagoon anchorage. Small piers are situated on **Medren Island** (Parry Island) (11°24'N., 162°22'E.), Enewetak Island, and on some of the islands in the group. The pier on the NW side of Medren Island is reported (1968) to be decaying and unusable.

Although Enewetak Island is W of the 180° meridian, the Time Zone Description kept is +12, or as though it were E of the meridian.

A seaplane area is established off the atoll reef, between Enewetak Island and Medren Island (Parry Island).

Tides—Currents.—A W current, which follows the contour of the encircling reef at a rate of 1.5 to 2 knots, has been experienced along the outer rim of the atoll. The tidal range is about 0.8m.

Cactus Dome and Nuclear Crater, Runit, Eniweak Atoll

In South Channel, the flood set is W at a maximum rate of 1 knot about 1 hour 15 minutes after HW. The ebb sets SW at a maximum rate of 0.75 knot about 2 hours 30 minutes before LW. Slack water occurs 2 hours 45 minutes after HW, and 1 hour 30 minutes before LW.

In East Channel, the flood sets W at a maximum rate of 2 knots about 2 hours after LW. A maximum ebb of 1.25 knots, setting SE, occurs about 45 minutes before LW, and about 15 minutes after HW.

Depths—Limitations.—General depths of 20.1 to 54.9m are found in the lagoon. There are many coral heads scattered throughout, many of which are unmarked. The E half of the lagoon is swept to 13.7m, with shallower spots swept to lesser depths. Some of the most dangerous shoals are marked by buoys or beacons.

Aspect.—The two main passes into the lagoon are East Channel, on the SE side, and South Channel, on the S side. East Channel, the principal pass, lies between Japtan Islet (Muti Islet) and Medren Island (Parry Island). It is deep, about 0.7 mile wide, and has been swept to a depth of 13.7m over a width of 0.3 mile. At the inner end of the pass is Jedrol Islet (Bogen Islet), surrounded by a drying reef; between Jedrol and Japtan Islet there is a narrow channel leading NW from the main fairway. This narrow channel has been swept to a depth of 8.5m. There are no navigational aids for East Channel, and none of the dangers are marked.

South Channel, between Eniwetak Island and Ikuren Island (Igurin Island), is divided by shoals into two channels. The E channel (the main channel) has been swept to a depth of 13.7m over a width of 0.25 mile, and is centered 0.4 mile W of the W end of Eniwetak Island. The W channel, centered 3 miles W of Eniwetak Island, has been swept to a depth of 7.6m over a width of 1.5 miles. The entrances are not marked by navigational aids.

The S tip of Enewetak Island provides a sharp tangent for taking bearings.

Pilotage.—Eniwetak Port Control has been disestablished. No pilots are available. Vessels may contact local governmental authorities on Marshall Island Administrative frequencies.

Anchorage.—Eniwetak Atoll provides anchorage for all classes of vessels in the E part of the lagoon. Every vessel, having received permission to enter the lagoon, will be assigned anchorage by the Port Director. Anchorage is prohibited in East Channel and South Channel, due to the existence of submarine cables.

Directions.—Entry and departure from Eniwetak lagoon may be made only during daylight hours. A vessel entering by East Channel should do so on a course of 285°, to pass 0.4 mile S of the beacon on Japtan Islet (Muti Islet); when this beacon bears 041°, course should be altered to 263° into the lagoon.

A vessel entering by South Channel should do so on a course of about 350°, passing between 0.4 and 0.5 mile W of the W end of Enewetak Island, altering course as required.

Caution.—A magnetic disturbance of 1° has been reported in the vicinity of the atoll. A large Prohibited Anchorage Area is situated within the lagoon, and may best be seen on the appropriate chart.

4.78 Ujelang Atoll (9°50'N., 160°54'E.) lies about 118 miles SW of Eniwetak Atoll and has a number of sandy islets on its outer rim. A small jetty, flagstaff, and house are situated

near the middle of the N part of Ujelang Island, lying at the SE extremity of the atoll.

Tides—Currents.—A maximum current of 2 knots has been reported in the middle of **Wide Pass** (9°49'N., 160°53'E.), about 5 miles WNW of the W extremity of Ujelang Island. The average direction on the flood was NE, and SE on the ebb. A countercurrent has been observed near the reef line on the W side of the pass. A strong SW set was reported about 2 hours before LW.

Narrow Pass, over 1.25 miles NW of the W extremity of Ujelang Island, has strong tidal current within it.

Depths—Limitations.—Depths of about 21.9m to over 36.6m are found in the lagoon. The greater part of the lagoon has been swept to 9.8 to 11m, with some shoal spots swept to lesser depths.

The 1.8m shoal, located about 1.4 miles E of the inner end of Wide Pass, is dark brown in color and difficult to see even under the most favorable conditions of light.

Aspect.—There are two passages into the lagoon on its SW side. They are only available for small vessels with local knowledge, under favorable conditions of light.

Wide Pass is about 0.3 mile wide between the reefs on either side. The best water is one on the W side of the passage, close off the reef which fringes it. The channel is about 50m wide and has been wire-dragged to 4.3m. A least depth of 5.5m is reported in the channel, but vessels drawing 4.6m or more should only use the channel at HW.

Narrow Pass (9°47'N., 160°56'E.), about 3.8 miles SE of Wide Pass, is shoal, unmarked, and difficult to navigate. There is a confused sea and swell in the entrance during W winds.

Anchorage.—Vessels can anchor, in 29.3m, about 0.3 mile from the extremity of the reef in front of the house which stands near the middle of the N side of Ujelang Island.

Anchorage with good holding ground has been taken about 0.4 mile N of the flagstaff on Ujelang Island.

These anchorages are open to the Northeast Trades.

Caution.—Ujelang Atoll is reported to lie about 1 mile N of its charted position.

Wake Island

4.79 Wake Island lies about 304 miles NNW of Taongi Atoll, the N most of the Marshall Islands. It is a U.S. possession with an area of only 3 square miles, consisting of three islands about 6.4m high, which form all but the NW side of an atoll enclosing a shallow lagoon. The NW side of the lagoon has a barrier reef which is visible at low tides and prevents entry to the lagoon. The higher parts of the islands are covered with a fairly heavy growth of scrub bush. The entire island group is surrounded by a shallow reef interspersed with coral rocks. There is no natural fresh water.

Wake Island (19°17'N., 166°37'E.) (World Port Index No. 56330) can accommodate three LCMs, which may serve as tugs or as cargo lighters. Ships should radio their ETA 48 hours in advance. An unloading wharf is situated on the SW side of the basin. There is a boat landing at the head of the basin. Two mooring buoys are moored in about 30m off the entrance of the boat channel, which leads into the boat basin. Cargo is discharged at the moorings. Sea conditions often permit a vessel to lie to offshore and discharge dry cargo; this is reported to be the safest and best method for large vessels. Oil is discharged through a floating hose which is floated out on barrels and connected to a fuel jetty at the E entrance point of the boat channel.

Wake Island Channel

The restrictions imposed upon the entry into Wake Island Naval Defensive Sea Area have been suspended, except for the entry of foreign flag vessels and foreign nationals. The restrictions may be reimposed without notice at any time. Wake Island is an unincorporated territory of the U.S., administered from Washington, DC by the Department of the Interior; activities on the island are managed by the U.S. Army under a U.S. Air Force permit.

Winds—Weather.—East and NE winds prevail throughout the year, with average velocities of 10 to 13 knots. Gales occur on an average of 10 days per year. By reason of its position, the atoll is subject to typhoons and tropical storms. Thunderstorms occur very seldom.

At Wake Island, the influence of the higher latitude is noticeable, and the means vary between a low of 25°C in January and February and a high of 28°C in September. In August the mean maximum reaches 31°C. Extremes above 35°C are rare.

The annual average rainfall is only 936mm, showing a great decrease in precipitation from that occurring in the lower latitudes. The monthly totals range from a January average of 29mm in the dry season to 180mm in August.

Tides—Currents.—A SSW current of 0.5 to 1 knot has been observed in the vicinity of Wake Island. There are occasions when the currents are erratic, and onshore sets have been observed. Vessels should carefully note the set and the drift of the tidal currents before attempting to moor. The tidal currents in the vicinity of the mooring buoys have been observed to set parallel to the shore at a rate of about 0.8 knot. The tidal range is from 0.6 to 1.2m.

Depths—Limitations.—On the seaward side, between Wake Island and Wilkes Island, there is a channel leading to a boat basin at the W extremity of Wake Island. Access is limited to craft of LCM size and smaller.

Aspect.—A conspicuous concrete structure with storage tanks in the background is situated near the W end of Wake Island.

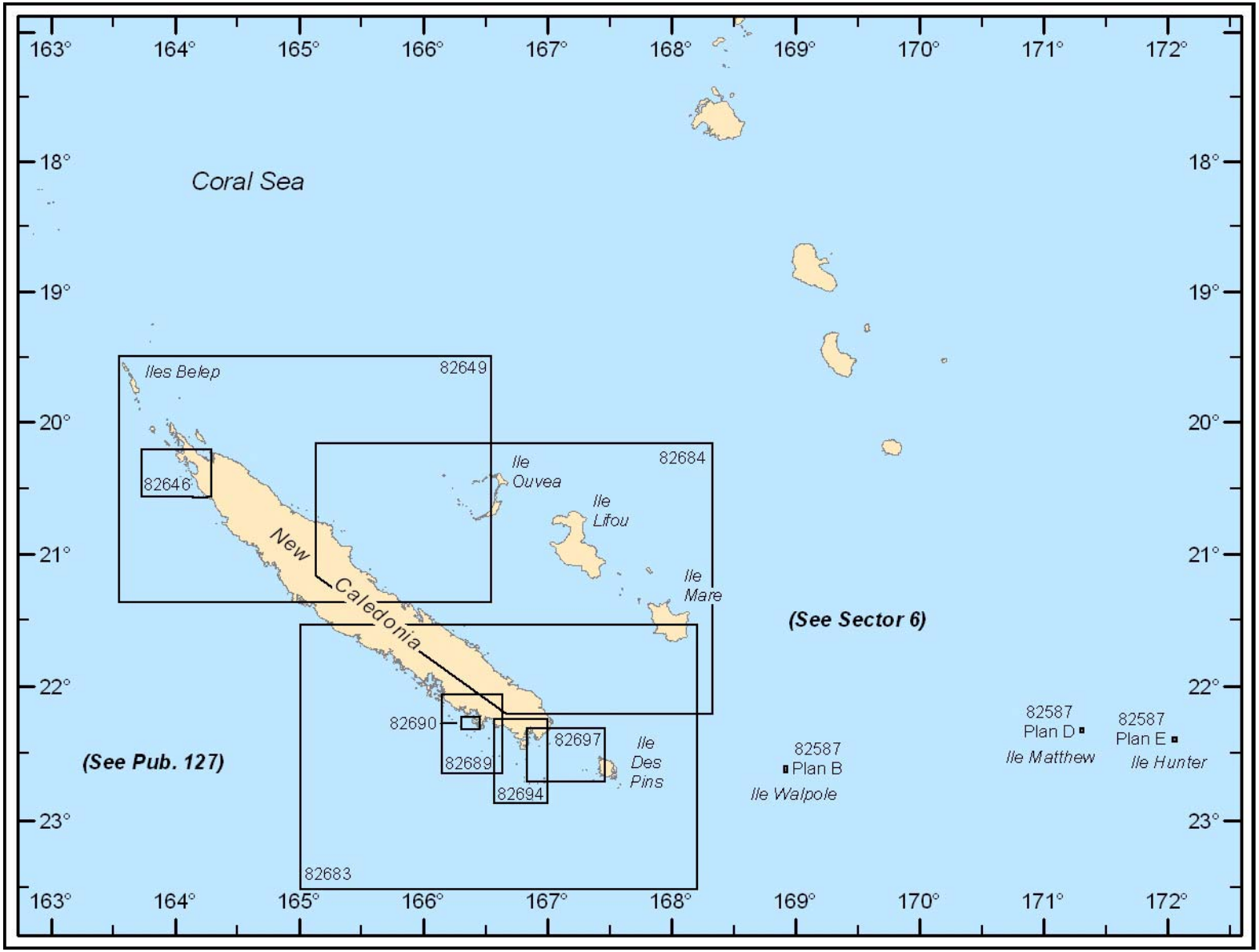
A prominent tower stands on Peale Island (possibly destroyed by Typhoon Loke in 2006). The bridge connecting Wake with Peale Island is in ruins due to Typhoon Loke (2006).

An aeronautical light (19°17'N., 166°39'E.) is shown from an abandoned control tower situated 0.6 mile NW of Peacock Point, the SE extremity of Wake Island.

It was reported that a ship obtained radar contact with Wake Island from a distance of 35 miles. The complete outline of the island was observed from a distance of 25 miles.

Anchorage.—The depths drop off sharply outside the atoll reef, making it unsuitable for anchorage. The lagoon itself is inaccessible. The mooring facility outside the boat basin is available to all vessels having permission to call at Wake Island, but is considered hazardous. The use of the anchor is not recommended when using these mooring buoys.

Caution.—Vessels should not attempt to secure at the mooring buoys in an onshore or S wind. If secured to one buoy when the wind shifts to blow onshore, slip the mooring and leave the area. Any vessel moored to only one buoy must have engines on standby. Vessels should be secured to the mooring buoys with the bow headed ESE. LCMs usually assist in mooring operations, with the best time being at either HW or LW slack.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **5** — CHART INFORMATION

SECTOR 5

NEW CALEDONIA (INCLUDING OFF-LYING ISLANDS AND REEFS)

Plan.—This sector describes the island of New Caledonia and several off-lying islands. The descriptive sequence is S to N on the extended sides of New Caledonia, with a ESE and NNW arrangement at the ends for the off-lying islands.

General Remarks

5.1 New Caledonia, also known as Nouvelle-Caledonie, is located about 750 miles NE of Brisbane, Australia. It is the principal island of the French Overseas Territory, and the fourth largest island in the South Pacific. The island is almost completely surrounded by a barrier reef, submerged in places, but nearly level with the sea, having many narrow passages through it. The distance of the reef from the main island varies; about 85 miles in the middle of the SW side the reef practically adjoins the shore; in other places it is from 1 to 15 miles off the intervening waters, being studded with reefs and shoals of coral and sand. There are several islands inside the line of the reefs, and on the seaward side there are various dangerous spots.

On neither side of the island do the reefs afford protection from winds blowing up or down the channels lying within the barrier reef and leading generally parallel to the coasts. These winds produce a choppy, disagreeable sea which rises quickly and quickly subsides. On the SW side of the island the inner channels are protected from a sea coming from the SW, as the barrier reef is on a level with the sea; on the NE side, where the barrier reef is largely submerged, there is little protection from a NE sea.

Outside the reefs the sea becomes steep and confused, particularly in the channel between New Caledonia and Iles Loyaute (Loyalty Islands). The general depth between the barrier reefs and the land varies from 37 to 91m. The bottom is nearly all hard rock or broken coral.

Although New Caledonia is a mountainous island and very broken in places, it has broad interior plateaus and coastal plains. The highest points of the mountain ranges are Mount Humboldt in the S, about 1,618m high, and Mount Panie in the N, about 1,628m. Parallel mountain ranges flank both coasts; the longest unbroken range is on the upper N and E side of the island. Much of the island is covered with broken, barren land much of it practically impassable. Torrential rains have resulted in massive erosion of the crumbling surface resulting in a surface that is cut and scarred in all directions.

The first impression of the navigator, who has been accustomed to the luxuriant vegetation of most Pacific islands, is that New Caledonia is bare and arid. The prevailing growth is a small, drab tree, the Niaouli, similar in appearance to the ubiquitous eucalyptus scrubs of Australia. The coconut palm grows on the coast, and many of the great valleys are filled with a luxuriant growth of the beautiful kauri pine.

Vessels navigating the inner channels should keep as far as possible to the weather side of the passage. Be at all times on guard against the effects of variable winds and strong tidal currents, and the resulting eddies and tide rips. It should be borne in mind that in the reef-encumbered waters of the inner channels the number of hidden dangers is great and the existence of undiscovered hazards is probable, necessitating the maintenance of a sharp lookout from the masthead.

Photos de Nouvelle-Caledonie

http://www.photos-nouvelle-caledonie.com/albums.php

Winds—Weather.—On average, about three severe hurricanes a year affect some part of New Caledonia, mostly between January and March. They are sometimes of such small dimensions that they do not affect the whole island. They are usually moving in some direction between SW and SE. Storms approaching the island from the NE are often deflected by the high land and move SE.

Squally W winds accompanied by rain may occur on the W coast in all seasons during weak trade winds, while the E coast which is sheltered, has a breeze from SE.

On the W coast, the winds are deflected by land and sea breezes near the shore, the land breeze being the more prominent. The effects of these breezes often does not extend beyond the barrier reefs. It is reported that when vessels leave Noumea with a NW wind, they sometimes find a W or SW wind outside the passage. When leaving with a wind between E and SE, it is frequently between SE and S outside.

On the E coast, land breezes are rare and never extend to the barrier reef. With a SSE wind blowing in the W coast a fresh wind from SW often blows offshore, especially at night on the N and E coast of the island. The trade winds from ESE are said to reach its maximum strength near the shore at about 1400, but in the offing and beyond the reefs its greatest is reached between 1800 and 1900. Close inshore it subsides at sunset.

Tides—Currents.—New Caledonia is nearly surrounded by a barrier reef at about sea level with narrow openings; its coasts and anchorages are affected only by the tidal current. Outside the barrier reef the main oceanic currents are encountered, but close to the reef these become unpredictable.

Within the barrier reef the tidal currents are moderately regular, though they are accelerated or retarded by a strong breeze. The flood current runs NW and the ebb SE. On the E coast, during strong SE winds, the ebb current runs out through the passes and the flood sets in.

During 50 per cent of the flood and 50 per cent of the ebb, the currents are setting in directions almost at right angles to each other at the entrances of Canal de la Havannah and Passe de la Sarcelle. The result is violent eddies and a heavy breaking sea across the entrance of each passage, rendering it difficult to steer a ship except at high speed. At springs, the currents run at the rate of 4 knots through each passage and 2 knots in the offing.

The S subtropical current, having a predominate W set and a S limit in this vicinity at about the 26th parallel, divides on nearing New Caledonia and Iles Loyaute (Loyalty Islands). One branch, called the Rossel Current, sets NW along the

whole E side of New Caledonia (outside the reefs), and its influence is most felt at a distance from the shore. After several days continuance of a fresh SE wind, the strength of this current is considerably increased. With the wind at N or NW, the force of the current is diminished, or a countercurrent is established between Iles Loyaute and New Caledonia, running SE, and some days elapse after the cessation of the N wind before the normal NW current reappears.

The other branch of the great current passes to the S of Ile des Pins (Kunie), turns to the W and the WSW, and is deflected to the S before reaching Australia. The W side of New Caledonia is somewhat protected causing weak eddies, which are variable both in force and direction, and are present dependent on the wind and the action of one of the currents which pass the island.

The velocity of the tidal currents in Canal de la Havannah and Passe de la Sarcelle is high, and the S subtropical current impinging on this area renders the currents in these passages the strongest and most irregular in the vicinity of New Caledonia.

The S branch of the S subtropical current, after passing S of Ile des Pins, is further deflected by the great S projection of the barrier reef, the S limit of which lies more than 35 miles S of the S extremity of New Caledonia.

Pilotage.—Pilotage is compulsory for the following vessels within the waters of New Caledonia.

1. All foreign vessels regardless of their length.
2. All French vessels more than 60m in length.

French warships are exempt, as well as pleasure craft less than 60m in length.

Masters of pleasure craft less than 60m in length are advised to consider engaging the services of a pilot if unfamiliar with the area.

Regulations.—Vessels arriving from an area infested by rhinoceros beetles are subject to quarantine inspection. The local authorities should be contacted in advance of arrival for details and requirements. Vessels carrying hydrocarbons are subject to special regulations. See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for details.

Trawling and dredging are prohibited in a 13,000 square mile restriction zone located SE of the S end of New Caledonia. This special protection zone is bounded by a line joining the following positions:

a. 23°15.0'S, 167°00.0'E.
b. 23°15.0'S, 169°00.0'E.
c. 25°30.0'S, 169°00.0'E.
d. 25°30.0'S, 167°00.0'E.

Caution.—Reports indicate that the set and drift of currents in the vicinity of the barrier reef surrounding New Caledonia are unpredictable. Extreme caution should be used in navigating these waters, particularly in an area defined by the following limits:

1. A line extended first in a 180° direction from the E side of Passe de Boulari (Bulari Pass) for a distance of 35 miles;
2. then to position 23°30'00"S, 167°00'00"E.
3. then to position 23°15'00"S, 167°30'00"E.
4. then to position 22°56'18"S, 167°45'00"E.
5. A line extending to the E side of Ile des Pins.

The area between these limits and the barrier reef is rendered extremely hazardous by unpredictable currents, and no vessel should enter it except in emergency.

The area between the barrier reef and the mainland has not been closely sounded; therefore, vessels should navigate with caution.

Rocky patches, covered by depths of about 7.3m, can be seen at a distance of 1 mile from an elevation of 24 to 30m; when close, the bottom can be seen in at least 18.3m. When there are passing clouds, the effect of light and shade on the water may be taken for the indication of a shoal, but the change of form and movement of a mere shade will soon become apparent. To have the sun ahead and at an altitude of less than 65° is one of the worst circumstances attending navigation within the reefs.

When navigating within the reefs without a trustworthy pilot or in unsettled weather, it will be prudent to make sure of reaching a convenient anchorage before nightfall or to stand out to sea.

Though many vessels have anchored between the barrier reef and the island without accident, it must be considered a dangerous thing to do, not only because of the risks normally inherent in taking anchorage on rocky bottom, but because of the likelihood of sudden changes in winds and weather.

Areas dangerous due to mines laid during the WWII are indicated in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Islands and Reefs East of Ile des Pins (Kunie)

5.2 Ceva-i-Ra Reef (Theva-i-Ra Reef) (21°44'S., 174°38'E.), called Conway Reef until 1976, extends about 1.6 miles in an E-W direction. This reef is under the jurisdiction of Fiji. The breakers on it are visible at a distance of 7 miles. On the middle of the reef is a sand cay, 1.8m high, 0.2 mile long, and 73m wide. A stranded wreck of a coaster lies 0.15 mile S of the center of the cay, and the wreck of a fishing vessel lies on the NE end of the reef.

Ile Hunter (Hunter Island) (22°24'S., 172°06'E.), a 296m high volcanic block, has grassy slopes dotted with trees. Although the island is not an active volcano, it emits jets of sulphurous vapor. No detached dangers have been discovered off Ile Hunter, and it appears to be steep-to; depths of 73m having been obtained 90m offshore and 915m, 1 mile off.

Tide rips extend for 2 miles from the NW side of the island, and in places produce foam, which in sunlight has a greenish hue and resembles shallow water. The prevailing wind and current are reported to be from the SE. It may be possible under favorable circumstances to land on the N or NW side under the lee of some rocks.

5.3 Ile Matthew (Matthew Island) (22°21'S., 171°21'E.) is small in extent and consists of two parts joined by a low isthmus. The E part rises to a cone, 142m high, and the W part has the greater elevation of about 177m. On the S slopes of the W part of the island is a defined crater, from which sulphurous fumes were observed.

The shores of the island are free from known dangers except to the N and the SE. There are shoals extending outward from these areas for several hundred meters. The area around Ile Matthew has been reported to be volcanically active. Light green patches caused by rust colored water upwelling and dispersing

have been observed in the vicinity of the island. An area of discolored water, which was reported to be volcanically active, was reported to lie 9 miles W of the island.

Strong currents set W off the NW and SW extremities of Ile Matthew. These unite about 0.5 mile from the W side of the island and form heavy tide rips, the foam from which is said to have the appearance of shoal water. The prevailing set in the general vicinity of the island is NW.

In 1990, a depth of 20m was reported to lie 2 miles ENE of Matthew Island. In 1999, an obstruction with a least depth of 5m was reported to lie 14 miles NW of Ile Matthew.

5.4 **Ile Walpole** (Walpole Island) (22°37'S., 168°57'E.) lies about 134 miles W of Ile Matthew. It is composed of coral, and presents the appearance of a narrow tableland, the vertical walls rising about 91m at the N end and about 100m at the S end. The summit of the island is barren, the E side drops down to a green terrace.

There are some sheds in ruins on the S extremity, and a wharf in ruins just N of the SW extremity of the island. Landing may be affected on the W side of the island only in calm weather or with the wind from an E direction. It is reported that landing is possible on the E side of the island in good weather. The anchorage on the SW side of the island is not safe, as the depths decrease rapidly on approaching the shore.

A N set of 0.5 knot has been observed off the E side of the island.

Caution.—Mariners are advised that the majority of islands and reefs in this area have been reported to lie elsewhere than charted.

A bank, with a depth of 18.3m or less, is reported to be about 38 miles SW of Ile Walpole. Vessels are advised to avoid this vicinity. Ellet Bank, with a depth of 25.6m, lies about 34 miles SE of Ile Walpole.

5.5 **Banc de L'Orne** (L'Orne Bank) (22°24'S., 168°56'E.), about 12 miles N of Ile Walpole, has depths of 10 to 24m, and a sand and gravel bottom. It appears to be quite extensive. Depths of 24 to 27m have been reported between the bank and Ile Walpole.

Durand Reef (22°02'S., 168°39'E.), located about 26 miles NW of Banc de L'Orne, is about 0.7 mile in diameter and has depths of less than 2.1m. This reef is particularly dangerous because it does not always break, and the soundings give no warning of its proximity. A depth of 384m has been obtained 0.5 mile W of it.

Reefs and Islands off the Southeast Side of New Caledonia

5.6 Extensive reefs, consisting of two separate horns, extend about 35 miles S and 40 miles SE of New Caledonia. Ile des Pins, the largest of the islands close off the coast of New Caledonia, lies near the SE extremity of the SE horn.

Approaching the S coast of New Caledonia requires particular care. The high ground is not always easy to identify, as the peaks are often hidden by mist or clouds. The shape and distance of the islands and islets in this vicinity are often misleading due to mirage.

Pilotage.—See paragraph 5.1 for further information.

Ile des Pins (Kunie) (22°38'S., 167°29'E.), located about 29 miles ESE of the S extremity of New Caledonia, is the principal island off the coast. It is surrounded by numerous reefs and islets, particularly along the S and W coasts. The shore of Ile des Pins is generally low, stony, and densely covered with brushes. The land gradually rises to a undulating, brownish red plateau, which attains its maximum elevation near the SW part of the island.

The E extremity of the island is almost free of reefs, but the N, W, and S sides are encumbered by broken and extensive reefs with deep anchorages within them. Navigation is intricate without the aid of a pilot.

Pic Nga (Nga Peak) (22°39'S., 167°27'E.), about 262m high, is conical and heavily wooded, rising on the S part of Ile des Pins. It is visible for about 30 miles in clear weather, and appears as a twin peak when seen from the SW. Ile des Pins is a good radar target at 22 miles; and the breakers can be picked up by radar at about 8 miles.

The island Koutomo lies off the SE side of Ile des Pins, from which it is separated by a shallow narrow passage.

Recif Nokanhoui (Nekanmue) (22°45'S., 167°36'E.) encloses a lagoon open to the SE. On the S and E extremities of the reef are Ile Ami and Ile Ana, two bare sand cays. In the vicinity of Recif Nokanhoui, the general current sets to the W and is rather strong.

Two wrecks were reported (2005) in close proximity to Nekanmue Atoll. This area should be avoided by deep draft vessels.

Torch Bank (22°52'S., 167°41'E.), located 17 miles, bearing 134° from Pic Nga on Ile des Pins, has a least depth of 31m.

Anchorage.—In general, the anchorages at Iles des Pins are safe during good weather, or during the prevailing E winds. During the bad season if the barometer is low, or if the winds veer to the W, it is not advisable to seek shelter at these anchorages. All of these anchorages require local knowledge. In any case, the channels and passes leading to these anchorages should be navigated with caution, as numerous coral heads standing up in deep-water may be found here, along with numerous unmarked reefs and shoals.

Passe Nokanhoui, between Recif Nofanhoui and Koutomo, is a little less than 0.8 mile wide between the reefs on either side, and has a least depth of 11m in the fairway. There are some detached patches, with depths of from 8.8 to 10m, about 2 miles E of the S extremity of Koutomo Island. This pass requires local knowledge.

5.7 **Ile Brosse** (Alcmene) (22°43'S., 167°28'E.), covered with trees, is located on the W extremity of a reef extending about 5 miles W from the S end of Koutomo. Mouillage Alcmene and Port de Vao are formed between this reef and the S side of Ile des Pins (Kunie).

Mouillage Alcmene and Port de Vao, the latter available only for small vessels, are not very secure except with winds from an E direction. They are open to the W or SW winds, which often are very violent and raise a heavy sea. Landing from these anchorages is often difficult, and the tidal currents are very strong.

Tides—Currents.—Tidal currents generally set through Passe Nokanhoui at a moderate rate. If there is a SW wind during flood current, which sets W, the sea becomes agitated.

When the SE wind is established, there is no swell, but the current then is very strong. For these reasons, the passage is not recommended for small vessels.

Baie de Kuto (22°40'S., 167°26'E.), just N of the **Kuto Peninsula** (22°40'S., 167°28'E.) is generally used by vessels visiting Ile des Pins. The holding ground is fairly good, but a swell penetrates into the bay and cause vessels to roll. Large vessels anchor outside the bay, but as close in as is possible to avoid the swell coming around the Kuto Peninsula. Depths of more than 9m may be found if the W extremity of the peninsula is kept bearing less than 200°. This anchorage, as well as the approaches to it, requires local knowledge.

Baie Ouameo, on the NW side of Ile des Pins (Kunie), affords anchorage according to draft, and is accessible from the N by two passages, one on either side of **Recif Tiare** (22°28'S., 167°23'E.).

The W passage is 1 mile wide, and with Pic Nga bearing 147°, will lead through it towards Recif Numae, about 2.8 miles S of the S extremity of Recif Tiare. The E passage is narrow, but free of dangers in the fairway. Pic Nga, in line with the W side of **Ile Moretiga** (22°32'S., 167°26'E.), bearing about 156°, will lead through it. The reefs in the vicinity of this passage can be easily distinguished.

The passes and the anchorage require local knowledge and may best be seen on the chart.

Mouillage de Gadji (Gadji Anchorage) is sheltered by a barrier of reefs, and may be entered from the NW or E. The NW approach is via Passe de Uapan (Passe de Gadji), N of the reefs and islets that separate the anchorage from the bay, with Pic Nga bearing 165°. When **Ile Gie** (22°30'S., 167°26'E.), the N of the wooded islands which extend NW from Ile des Pins, bears 270°, alter course to 117° and steer for the anchorage.

To enter by Passe de Oupe (Passe de Upe), the E entrance, steer with Pic Nga bearing 191°, slightly W of a small beach at **Oupe** (22°33'S., 167°31'E.) until clear of the E extremity of the reef forming the N side of the anchorage; then steer 256° and anchor, in depths of 29 to 35m, with moderately-good holding ground, about 0.5 mile offshore, about 1.3 miles E of the N extremity of Ile des Pins. The passes and the anchorages listed above require local knowledge.

Baie de Ougo (Ugo Bay) (22°34'S., 167°33'E.), on the NE side of Ile des Pins, is open to the N and affords temporary anchorage only to small vessels having local knowledge. To reach the entrance of the bay, steer a course of 210° for Pic Nga. When W of the reef which forms the E side of the bay, turn S and pass E of the N island in the bay. The anchorage is 0.15 mile E of this island. A 3.7m patch lies 0.2 mile N of the N island in the bay.

Passages Between Ile des Pins and New Caledonia

5.8 Passe de la Sarcelle (Sarcelle Passage) is the first passage of any importance through the reefs lying NW of Ile des Pins. This passage, which is about 12 miles from Ile des Pins, is wide and free from any known dangers. The passage may be recognized at 2 to 3 miles by **Rocher Ietendi** (Ietendi Rock) (22°26'S., 167°13'E.) about 3m high, located on and near the E end of Recif Nokueka (Nokoueka). The islets **Ile Ndie** (22°31'S., 167°14'E.), **Amere** (22°27'S., 167°06'E.), and **Kie** (22°23'S., 167°04'E.) make it possible to recognize the pass and fix position if Rocher Ietendi (Ietendi Rock) is not seen. A directional light is exhibited from a white metal tower on Ile Ndie.

Passe de la Sarcelle is traversed by strong tidal currents. There is a heavy sea when the wind is against the current.

Mouillage d'Amere (22°26'S., 167°09'E.), N of Recif Gunoma and Passe de la Sarcelle, affords temporary anchorage, but is deep and provides little shelter in bad weather.

This anchorage is located within a nature preserve and is bound by a Restricted Area best seen on the chart. Entry into this Restricted Area is prohibited without permission.

Banc Coetlogon (22°18'S., 167°07'E.), on the N side of the E entrance to Canal de la Havannah, about 12 miles NNW of Passe de la Sarcelle entrance, has a least depth of 9.1m. As there may be other undiscovered patches, a good lookout from aloft is necessary at all times. The clearness of the water in this locality allows the bottom to be seen at a sufficient distance to avoid shoal depths. Several charted shoal patches lie N of the reef, while a 12m patch lies SE of the reef.

Canal de la Havannah (22°20'S., 167°05'E.), about 3 miles SW of the S extremity of Banc Coetlogon, is the passage normally used by ships approaching from the SE, E, or NE, and bound for Noumea, about 40 miles W. The E entrance is about 1.3 miles wide between **Recif Komekame** (22°21'S., 167°04'E.) to the S and Banc du Vandegou, on the NW side of the fairway. The sea will break at times in the entrance when winds are counter to the currents, giving the impression that it is breaking on reefs. The channel has been swept to a depth of 11.6m. A string of shoals and dangers, including Bancs Kie and Banc Ionontea, extends parallel to, and to the S of the route. A local magnetic anomaly was reported to exist in Canal de la Havannah.

Tides—Currents.—The flood current sets SW, and the ebb NE; they have a velocity of 3 to 5 knots. The flood is established about 1 hour before LW, and the ebb about 1 hour before HW. About the time of the change of tide, there are violent eddies, and caution should be exercised.

Great care should be taken in approaching Canal de la Havannah. Strong and variable tidal currents may be encountered setting NW towards **Banc du Vandegou** (22°20'S., 167°03'E.) or SE towards Recif Komekame, where several wrecks have occurred. When there is a strong NE wind during ebb current, the sea is often very heavy in the entrance to Canal de la Havannah. It sometimes happens that the current eddies, extremely violent and constantly shifting, make the sea very rough and choppy, and give the reefs between New Caledonia and Ile des Pins an unbroken appearance. Small vessels and boats should then wait for the flood current before navigating the E part of Canal de la Havannah.

The flood current is stronger on the N side of Recif Ioro, and the ebb current is stronger on the S side.

Aspect.—A vessel coming from the SE will first sight Pic Nga, the summit of Ile des Pins; if coming from NE, it will sight the mountains of the E coast of New Caledonia. At a distance of 30 miles from the coast, the mountains have the following aspects beginning at the S:

1. A row of conical hills.
2. A long crest without identifying marks.
3. A cut in which there is Mont Gouemba (Mount Guemba) (22°11'S., 166°56'E.), a detached sharp peak,

4. At Cap Pouareti (22°06'S., 166°58'E.), a ridge which is covered by vegetation.

From seaward, Nogoungouet (Nogungueto) is a good mark. Nogoungouet, 258m high, is located on the SW side of Ile Ouen. Vessels should open a little S of Cap Ndoua on a bearing of 246° which then leads to a position from which the entrance range may be seen. Four structures, in line bearing 247°, three of which are lighted and serving as the entrance range for this channel, are situated on Cap Ndoua. The structures are difficult to identify in the afternoon.

5.9 **Cap Ndoua** (22°24'S., 166°55'E.), the S point of New Caledonia, is at the SW end of Canal de la Havannah. The cape, as well as the reef which fringes the N side of the passage, is steep-to. It is reddish in color, high, and prominent, thereby forming one of the useful marks for negotiating the passage. Vessels approaching Cap Ndoua from the E must be careful not to confuse it with Ile Ouen, in the background, into which it blends.

Recif Ioro (Ioro Reef) (22°23'S., 166°58'E.), awash at LW, lies about 1.5 miles ENE of Cap Ndoua and is easily distinguished. It is marked by a light on its NW extremity, and may be passed on either side.

A shoal, having a depth of 16m, lies about 2.2 miles NE of Recif Ioro Light. A shoal, with a depth of 3.7m, lies about 4.2 miles ENE of the same light.

Pilotage.—Pilotage is available for this channel. See the Noumea port description in paragraph 5.21 for further information.

Anchorage.—Anchorage should not be taken in Canal de la Havannah under any circumstances as it is impossible for the anchor to get sufficient grip in the hard, rocky bottom to hold a ship even during a calm. If for any reason a vessel finds it necessary to anchor while traversing Canal de la Havannah, it may do so in certain of the inlets along the S coast of New Caledonia. These anchorages are described with that stretch of coast.

New Caledonia—South Coast

5.10 Port de Goro, at the E entrance to Canal de la Havannah, is a long, narrow inlet immediately NNE of **Cap Reine Charlotte** (Cap Queen Charolotte) (22°21'S., 167°00'E.). Center Reef is an extensive reef across the mouth of Port de Goro, leaving two narrow access channels. Two low islands are located on the W end of the reef. A light, with a Racon, is shown on the NE side of Passe de Goro, a little over 2 miles ENE of Cap Reine Charlotte. The beacons in Port de Goro should not be relied upon. Local knowledge is necessary.

A local magnetic anomaly has been reported in the vicinity of Port de Goro.

A bank, near the center of Port de Goro, has a least depth of 0.9m, and there are other patches within the 9.1m curve surrounding it. About 1 mile N of this bank, the depths are shoal and the bottom rocky.

Cap des Cannibales (22°19'S., 167°01'E.) is a large point of land with wharves of a mining company situated about 0.5 mile N. The wharves were reported destroyed. A loading conveyor extends from a pier on the W shore at Port de Goro, to water deep enough to permit barges to load ore.

Tides—Currents.—Port de Goro is subject to continual tidal currents, but not as strong as those in the two entrances. One current enters through **Passe de Toemo** (22°21'S., 167°01'E.) and flows out partly through Passe de Goro and partly N along the coast; the other current sets in the reverse direction. Both currents set across the entrances to some extent.

Anchorage.—Anchorage is available here on the following ranges and distances from Cap des Cannibales, over a bottom of sand, or sand and soft mud:

a. 104°, 1,280m, in a depth of 20m.
b. 134°, 640m, in a depth of 40m.
c. 010°, 732m, in a depth of 18m.

Anchorage can be taken, in 12 to 16m, soft mud and sand, almost anywhere in the N part of the port N of the shoals in the center of the port. To reach this anchorage area, caution is advised so as to avoid a rocky spit, with a depth of less than 3.6m, which projects about 0.4 mile SE from a point on the coast located about 1 mile N of Cap des Cannibales. This anchorage area is protected from the most violent winds.

Caution.—Port de Goro may be entered by either Passe de Goro, E of Center Reef, or Passe de Toemo, W of the same reef. An allowance must be made for the tidal current, a careful lookout kept from aloft, and due regard given to the shelving sides of the reefs, especially in Passe de Goro. It is reported that Passe de Toemo is preferred because of its greater depth, and the reefs on either side are steep-to, with the tidal current setting more nearly along the axis of the channel.

5.11 Port de Koue, entered 1.5 miles W of Passe de Toemo, is accessible only to boats.

Port Boise, the entrance of which is about 1 mile SW of Port de Koue, is a landlocked harbor with good holding ground, but is open to the SE. A small pier, reported destroyed (1997), is situated on the NE side of the port. The port is entered on the alignment of two beacons bearing 301°, standing on the bay's W shore. The port entrance points are also beaconed. This anchorage requires local knowledge.

Baie du Prony (Prony Bay) (22°22'S., 166°52'E.), NW of Cap Ndoua, is a large irregular-shaped harbor divided by a promontory extending in a N-S direction into two parts. Each has several small bays along its shores. The width of the entrance between the extremity of the reef extending from Pointe Est, the E entrance point, and an islet, close SE of **Ile Montravel** (22°23'S., 166°51'E.) on the W side, is 1.75 miles. A light is shown on the S extremity of the reef extending a little over 0.5 mile SW of Pointe Est. A depth of 11.9m lies about 1 mile WSW of Pointe Est Light. The bay has considerable depths, but offers good shelter to any class of vessel. Navigation should be undertaken only in the daytime or on a very clear night. There any many species of poisonous fish within the bay.

Caution.—A nature reserve has been established in Baie du Prony marked by buoys. Access to this area is regulated.

5.12 **Ile Casey** (22°21'S., 166°51'E.) lies nearly midway between the SW extremity of the promontory extending S from the head of the bay and the mainland to the W. The island may be passed on either side and a draft of 8.8m can be carried in mid-channel.

A conspicuous installation for the loading of ore stands on

the E side of a short peninsula, about 0.8 mile NE of the village of **Prony** (22°20'S., 166°49'E.), on the W side of the bay. A small pier here will accept vessels up to 150m in length, with a maximum draft of 8.8m. When approaching this pier, take care to avoid a rock with a depth of 1.6m, which may be passed on either side.

Port de Prony, which lies on the E side of the bay, consists of two "L" shaped piers serving a nearby mine. The general cargo pier is 200m long with a depth alongside of 11m. The bulk berth is 210m long and a has a depth of 12m.

A rock that uncovers lies at the end of the two jetties.

Anchorage.—Anchorage within the bay, which requires local knowledge, may be had in several of the coves and inlets, as may best be seen on the chart.

5.13 Ile Ouen (22°24'S., 166°50'E.) lies with its NE extremity about 4.5 miles W of Cap Ndoua, and may be considered the W limit of Canal de la Havannah. The island is mostly barren, rugged, and hilly, with peaks varying in height from 151 to 325m. It may be identified by its dark color, contrasting with the mountains behind and N of it. The slopes of some small streams are covered with beautiful vegetation during the rainy season.

NASA Image

Ile Ouen

Baie Ouara, on the E side of Ile Ouen, is a small indentation fronted by **Recif Ma** (Ma Reef) (22°26'S., 166°51'E.). This bay can be entered by rounding either end of Recif Ma; the N entrance is better. There are structures and a jetty at the head of the bay.

Anchorage, in a depth of 20m, may be obtained in the middle of the bay. A conspicuous white church can be seen on the S coast of the bay.

Port Koute (Port Koube) and Anse Koumbe (Anse Kembe), which indents the coast S of Ouava quite deeply, have a common entrance 0.1 mile between the lateral reefs. Port Koute has a tide rip in strong E winds, but the sea always is calm in Anse Kembe.

Port Koutoure (22°28'S., 166°48'E.) is a basin sheltered by reefs off the island. The port is protected from N winds and from the sea in all directions. The entrance from the E, by the passage between **Recif Niagi** (Cinq Miles) (22°30'S., 166°48'E.) and the small reef to the E of it, is narrow, but deep. The exit by the W passage, **Passe Nokoue** (Noku Passage) (22°28'S., 166°46'E.), is difficult on account of the narrowness of the channel which is only 91.4m wide, and the sharp turn necessary to clear a patch of black rocks off the extremity of the island. The tidal currents are very strong, and vessels drawing more than 3m should not attempt it. Anchorage is available within a line joining the N entrance point of the E end of the bay and the W point of the bay.

Caution.—There are two prohibited anchorage areas in the vicinity of **Pointe Nokoue** (22°28'S., 166°47'E.). One lies NW and the other SE from the point, and their limits are marked by yellow buoys. Extreme care in the area is necessary not to interfere with aircraft landing or taking off.

5.14 Baie Tioae (Tioae Bay) (22°26'S., 166°46'E.) is an open anchorage of moderate depths. During strong winds from the NE through S, this bay affords good anchorage, in depths of 20 to 25m, good holding ground, opposite a small, sandy beach bordered by coconut trees at its S part. It is not advisable to go far into the bay, as the bottom may be composed of coral. If the wind should veer to the SW, vessels should return to Woodin Canal, about 1.8 miles N.

Ilots Tioae are two islets lying 0.8 mile W of the N entrance point of Baie Tioae.

Vessels can enter Baie Tioae by passing either W and S of Ilots Tioae, or between Ilots Tioae and the N entrance point of the bay. Vessels choosing the latter should keep on the Ilots Tioae side of the center of the passage, as a spit with a least depth of 3.7m extends about 0.3 mile SW from the bay's N shore.

Baie Ire (22°24'S., 166°48'E.), about 1.5 miles NE of Baie Tioae, offers good shelter from the heaviest gales. Each side of the bay is skirted by a strip of coral reef, narrow and steep-to. The inner part is fringed by a sandy beach, outside of which is a mudbank, which extends up to 0.2 mile offshore. Behind the sandy beach is an extensive level plain which is frequently inundated.

Anchorage may be taken in Baie Ire, in depths of about 23.8m, with the peak of Ia Pic, about 3.8 miles distant, bearing about 305°. Vessels will almost completely escape the effects of the current.

Baie Kouo (22°24'S., 166°49'E.), with a steep shore bordered by a narrow, very sheer reef, is located a little over 1 mile ENE of Baie Ire. Anchor off the bay, in 23m, mud, keeping more than 0.1 mile offshore. Tidal currents cause eddies which make a vessel swing continuously.

Woodin Canal (22°24'S., 166°49'E.), from 0.5 to 1 mile wide, separates Ile Ouen from New Caledonia. The fairway has depths of 14.6 to 46m; the shore on each side is steep-to and free from any known danger. The channel has been dredged to 12m.

5.15 Pointe des Pins (22°23'S., 166°50'E.) is the termination of the promontory which extends SE from New Caledonia. The point is covered with fir trees.

Pic Ia, 487m high, is located on the N side of Woodin Canal, about 5.5 miles W of Pointe des Pins. The peak is very conspicuous and is an important mark for entering Woodin Canal from the E.

http://www.photos-nouvelle-caledonie.com

View of Noumea from the top of Mount Dore

Tides—Currents.—In Woodin Canal, the flood current sets W, and the ebb E. Ordinarily, the current has a velocity of 3 to 4 knots, but with very high tides it has a velocity of 5 knots. Along the coast of Ile Ouen the current has less strength than in the middle of the passage or along the coast of New Caledonia. A countercurrent runs close off the N shore of Ile Ouen.

Anchorage.—On the N side of Woodin Canal, there is a large open bay with depths of 16.5 to 33m. Since the bay is exposed to SE winds, it would be preferable to anchor in Baie Ire on the N side of Ile Ouen.

In case of necessity, vessels could anchor in Woodin Canal. The bottom here is composed of soft coral.

Directions.—From a position with the rear structure of **Cap Ndoua** (22°24'S., 166°55'E.) range bearing 009°, distance about 1 mile, a course of 270° is made good for 2.3 miles until the light on the extremity of the reef extending from Pointe Est bears 000°, distant 1,006m. From this latter position a course of 290° is made good for almost 2 miles to where a white rock on the islet close SE of Ile Montravel bears 014°, distance 0.7 mile. The course is then altered to bring Ia Pic dead ahead bearing 285°, and maintained until the white rock on the W side of Point des Pins bears 072°, a run of about 2.3 miles. Alter course to 252°, keeping the white rock astern, and this course is maintained for about 3.3 miles, until the W extremity of Ilots Tioae bear 170°, then follow the recommended track shown on the chart.

The W entrance to the channel is marked by lights, in line bearing 088°.

West of Woodin Canal there are several bays along the coast, with high mountains extending along the shore, which curves S beyond Baie de Boulari, and forms the peninsula on which is Noumea.

5.16 Mont Dore (Mount d'Or) (22°16'S., 166°35'E.), located about midway between Woodin Canal and Noumea, attains a height of 774m. It is a good landmark.

Baie Uie (22°21'S., 166°44'E.), just N of Ia Pic, affords anchorage, in depths of 5.5 to 11m, good holding ground. A ves-

sel should not go too far into the bay, as the bottom is rocky and uneven in its NE port.

Baie Ngo, 1.5 miles WNW of Baie Uie, affords anchorage in depths of 5.5 to 11m, and is a sheltered port. There is a landing pier on the W shore.

Baie de Mouea (22°18'S., 166°38'E.) is located about 4 miles NW of Baie Ngo. Anchorage is available, in a depth of 13m, with the S extremity of Ile Nde (Ile Nole) bearing 247°, 2.3 miles distant.

Baie de Boulari (22°16'S., 166°32'E.) affords anchorage in one of the coves WNW of Mont Dore (Mount d'Or). Anchor also off the entrance to Anse du Charbon in the NE corner of Baie de Boulari, in 4 to 8m.

Baie de Magenta (22°17'S., 166°29'E.), about 3 miles WSW of Baie de Boulari, is encumbered on its NE side by islets and reefs. The SW portion of the bay is clear as far in as the Magenta landing wharf on the SW side near the head, except for a 3.6m patch about 0.5 mile E of the dock. A channel dredged to depths of 7 to 10m, with diminishing depths, leads into and abreast the dock.

There exists a hazardous zone, 300m long and 50m wide, around the extension to the airport runway. Surfing, surfboarding, and kite flying are prohibited along the beach inside this zone.

Baie de Sainte-Marie (Port Ngea) (22°18'S., 166°28'E.), situated about 2 miles SSW of Baie Ouen, has irregular depths of 5 to 14m. Anchorage may be obtained in Port Ngea. There are several shoals entering and within the port. A shoal with a least depth of 2.8m extends up to 0.5 mile SSW of **Ile Uere** (Ile Ouere) (22°19'S., 166°28'E.).

Ilot Porc-Epic (22°20'S., 166°34'E.) is the outermost of a group of islands on the E side of Baie de Boulari. It is rocky and the only one covered with fir trees. Anchorage may be taken either E or W of the islands.

Directions.—From the W end of Woodin Canal to Noumea, follow the recommended track on a course of 277°, change course to 297.5° when the Ilot Porc-Epic Light is in line with the old signal tower in Noumea on this bearing. At night, this course is within the white sector of the light on Ilot Porc-Epic. When Ilot Porc-Epic is about 0.3 mile distant, alter course to 270°, passing E and N of several shoals best seen on the chart. When the range lights shown from Ile Nou are in line bearing 347°, steer for them.

Passages South and West of Noumea

5.17 Several passes lead through the barrier reef S and W of Noumea. The main channels, which are marked, are Passe de Boulari and Passe de Dumbea.

Pilotage is compulsory for the following vessels within the waters of New Caledonia:

1. All foreign vessels regardless of their length.
2. All French vessels more than 60m in length.

French warships are exempt, as well as pleasure craft less than 60m in length.

Masters of pleasure craft less than 60m in length are advised to consider engaging the services of a pilot if unfamiliar with the area.

See the Noumea port description in paragraph 5.21 for details on pilotage.

With the exception of vessels drawing less than 8m, and carrying less than 8,000 tons of petroleum products, tank vessels must proceed to the Passe de Boulari pilot boarding ground to take a pilot. Vessels are required to remain at least 5 miles off the reef while awaiting the pilot vessel, or in the absence of reefs, 5 miles from the territorial waters of New Caledonia.

Tank vessels drawing less than 10m and transporting less than 20,000 tons of petroleum products are permitted to transit Passe de Boulari. Vessels drawing more than 10m, and carrying more than 20,000 tons of petroleum products, are restricted to the transit of Passe de Dunbea, in daylight only.

Passe de Kuare (22°47'S., 166°45'E.) is about 20 miles S of the S extremity of Ile Ouen. It lies between Neokouie and Neokumbi Reefs, and was the first practical passage about which anything was known. It has a depth of 20.5m. Passe de Uatio, 3.8 miles NW of Passe de Kuare, has a least charted depth of 34m. A shoal with a charted depth of 17.8m lies in the center of Passe de Uaito. Passe de Mato, 5 miles NW of Passe de Uatio, has depths of 22.5m. These passages may be used only by vessels with local knowledge.

Passes de Boulari, entering the barrier reef between Grand Recif Abore and Grand Recif Kue, is the main approach to Noumea from the S. The pass is divided into three entrance channels, described below in paragraph 5.18. All three channels are easy to navigate, but Passe du Nord is generally used the most, although it is the narrowest and shallowest of the three.

5.18 Passe du Nord (Northern Passage) (22°30'S., 166°26'E.) is 0.4 mile wide between Grand Recif Abore and Recif To, but the navigable width is reduced to 463m. Although this passage is the narrowest and shallowest of the passages, it is preferred by the pilots because it can be navigated by all classes of vessels during the usual SE winds.

A conspicuous stranded wreck lies on the W side of Grand Recif Abore, about 4.8 miles NW of the S extremity of the reef. It is reported to be an excellent visual and radar target.

Passe Centrale (Central Passage) (22°31'S., 166°26'E.) is about 0.9 mile between Recif To and Recif Le Sournois, 1 mile S. The fairway is deep, but its width has been reduced to about 0.6 mile by the banks on either side. The bottom can be seen in parts of the passage at a depth up to 23.8m. In transiting the passage, preference should be given the N side of the fairway.

Passe du Sud (22°32'S., 166°26'E.), 0.5 mile wide between Recif Le Sournois and Recif Toombo to the S, has depths of 24.9 to 43.8m.

Recif Toombo (22°33'S., 166°27'E.) is steep-to on its seaward side. Its N end prolongs itself a short distance under water, but this prolongation should not be a danger, as the bottom can be seen at depths of 12.8 to 14.6m. A stranded wreck lies on the NW side of the reef.

Tides—Currents.—In Passes de Boulari, the ebb current leaves with a considerable velocity; the flood enters with a more moderate velocity.

Aspect.—When a vessel is approaching from W, the high land in the vicinity of Noumea will generally be seen. **Mont Mou** (22°04'S., 166°21'E.), 1,211m high with its two horns about 13 miles NNW of Noumea, and **Mont Mone** (22°10'S., 166°31'E.), 1,079m high, 7.5 miles NE of Noumea are visible, depending on the weather. **Mont Dore** (22°16'S., 166°35'E.)

772m high, lies about 7.8 miles E of Noumea and is separated from Mont Mone by a remarkable valley. It sometimes happens that although the horizon may appear to be moderately clear, the higher land of Mont Mou and Mont Dore may not be seen until some time after the light on Ile Amedee (Passes de Boulari) is sighted.

Caution.—An explosives dumping ground, now disused, is located close off the S tip if Grand Recif Abore. This area, best seen on the chart, is safe for surface navigation, but not for bottom actives,

5.19 Ile Amedee (22°29'S., 166°28'E.), located 2 miles within Passe du Nord, is composed of sand and covered with small bushes. Range lights, in line bearing 050°, are shown from the island.

Courtesy of South Pacific Online http://www.sponline.com
Ile Amedee Light

Basse Amedee, with a shoal depth of 2.3m, lies about 0.5 mile WNW of Ile Amedee.

Recif Tabu, which is awash, lies about 1 mile WSW of Ile Amedee. A light is shown from the E side of Recif Tabu. A lighted buoy lies close N of the wreck on the W side of Recif Tabu.

About 1.5 miles N of Ile Amadee are Les Quatre Bancs de l'Ouest, which dry from 0.6 to 0.9m, and an extensive group of reefs and shoals. Basse Thisbe, with a depth of 2.7m, located a little over 1.8 miles NNW of Ile Amedee, is the most dangerous. Patches, with depths of 9.4 to 9.9m, lie close E of the recommended track, 2.8 miles NNW of Ile Amedee.

Recifs Snark (22°26'S., 166°25'E.), which dry from 0.6 to 0.9m, lie on the W side of the recommended track, about 3 miles NW of Ile Amedee.

Petits Bancs (22°26'S., 166°26'E.), which dries from 0.6 to 0.9m, lies within 0.5 mile N of Recifs Snark.

Basse Garnault (22°24'S., 166°25'E.), 5.5 miles NNW of Ile Amedee, lies about 1 mile W of the recommended track to Noumea. It has a depth of 1.8m.

Ilot Maitre (22°20'S., 166°25'E.), which is wooded, is located a little over 2.5 miles SW of the S extremity of the peninsula on which Noumea stands. Ilot Maitre lies on the NW side of a reef which dries 0.6m on its NE side, and does extend about 1 mile SE from the island.

An underwater drinking water pipeline and electric power cable runs between Ilot Maitre and Bagay Point.

Ile aux Canards, located about 1.8 miles NE of Ilot Maitre, is low and wooded. A reef surrounds the island for a distance of 0.2 mile.

5.20 Passes de Boulari to Noumea.—Vessels bound for Noumea by way of Passes de Boulari proceed on a 050° course with the range lights mentioned above ahead in line; then follow the recommended track shown on the chart. When clear of Recif Tabu and Basse Amedee, steer with Ile aux Canards in line with Pointe Baggay ahead bearing 356°. Change course to 347° when the range lights shown from Ile Nou are in line on that bearing.

Passe de Dumbea (22°22'S., 166°15'E.) is an opening in the barrier reef between Grand Recif Abore to the S and Recif Mbere to the N. It is about 0.8 mile wide and the fairway is deep. Both sides of the entrance are marked by a lighted buoy. A vessel approaching Passe de Dumbea from seaward can fix its position by several unmistakable landmarks as indicated on the chart.

Recif Laregnere, on which the sea always breaks, lies about 3 miles within and NE of Passe de Dumbea.

Ile Nge, 1.5 miles E of Recif Laregnere, is located on a reef 1.5 miles in length. Several drying patches are reported to lie between Ile Nge and Recif Laregnere.

Ilot Te Ndu, located on a reef 2 miles N of Recif Laregnere, is composed of sand and covered with trees.

Recif Senez (22°18'S., 166°20'E.) is awash, and the seas break only on it in NW or SW winds. It is not visible when looking into the sun.

Tides—Currents.—In Passe de Dumbea the current is very strong and sets constantly to the W. When the wind is against the current, strong eddies accompanied by overfalls are produced.

Directions.—The approach channel from seaward through the pass is marked, and may best be seen on the chart.

From seaward, Ile de Freycinet ahead bearing 044° marks the first leg of the recommended track. Take care to avoid the prohibited area centered 22°16'S, 166°19'E having a radius of 1,000m.

Passe de Uitoe (22°10'S., 166°06'E.) is 0.5 mile wide between the N extremity of Recif de l'Annibal and the SE extremity of Recif Tetembia, on which the sea breaks. The passage can be recognized by the breakers on either side. The principal landmark to be seen from the offing is **Mont Mou** (22°04'S., 166°21'E.), 1,219m high, sometimes enveloped in mist. Sommet Titema Peak, 360m high, is about 7 miles WSW of Mont Mou, and Karikate Peak, 234m high, is located about 2.5 miles WNW of Sommet Titema.

Cap Ka, the abrupt W end of **Ile Mathieu** (22°05'S., 166°06'E.), located 5 miles N of the passage, and the chain of wooded islets fronting Port Uitoe are also good landmarks.

Noumea (22°17'S., 166°26'E.)

World Port Index No. 57320

5.21 Noumea consists of Petite Rade, which fronts the town of Noumea and comprises the old harbor facilities, as well as Grande Rade, which has the new berthing complexes. The two harbors are separated by Ile Nou, and are joined by a small craft channel near their inner ends.

Winds—Weather

The Southeast Trades blow regularly from June to October. The winds are said to freshen with the sun, and reach a maximum around 1400 close to shore.

Tides—Currents

Information on currents and tidal currents in the reef passes and channels leading to Noumea are given in the respective channel descriptions.

The mean range of tide at Noumea is 0.5m, while the spring range is 1.3m.

In the roadstead, tidal currents are weak, setting N on the flood and S on the ebb. In Petite Passe, the flood sets ENE and the ebb WSW; currents are a bit more sensitive here.

Depths—Limitations

Petite Rade, approached from the SSE on the alignment of the Ile Nou range lights, is entered via Petite Passe, which has a least depth of 11m on the 055° range shown from Noumea. The commercial berths lie along the N side of the harbor, while the S side is comprised of a naval base, contained within a Prohibited Area, best seen on the chart. Quai des Longs Courriers, fronting the town, offers three berths. The largest berth offers a length of 200m, with alongside depths of 7 to 8.5m. Quai de Europe (FED), at the N end of the harbor, has facilities for passenger vessels. It can accommodate vessels up to 170m long having a maximum draft of 11.2m.

Grande Rade is approached by a recommended route, best seen on the chart. The N shore of this harbor is formed by Presqu'il Ducos, indented by several bays. Detached patches and spits extend from the N shore of the bay, and are best seen on the chart. The harbor's S shore is formed by Ile Nou. Banc des Japonais, with a least charted depth of 7.6m, lies up to 0.6 mile off Ile Nou's shore. Several other shoal patches and banks extend from the shore of the harbor, and may best be seen on the chart.

The approach from the harbor entrance to its head is marked by range lights, in line bearing 116°. The least depth shown on the range line is 10.1m.

Baie des Dames (22°14'S., 166°24'E.) offers two berths to vessels handling petroleum. A T-headed pier flanked by two dolphins offers berthing to vessels up to 100m in length and has alongside depths of 5.5m. A multi-point mooring, consisting of five mooring buoys, is situated at the bay entrance, and offers a berth to tankers with a maximum length of 200m and a maximum draft of 10.7m.

Baie Numbo (22°15'S., 166°25'E.), 0.5 mile SE of Baie des Dames, has a cement wharf situated on its E side and is utilized by vessels with a maximum length of 260m and a maximum draft of 9.7m.

Presqu'ile Doniambo, 1.5 miles SE of Baie Numbo, has a quay at the nickel smelting works. Tankers, up to 260m in length with a maximum draft of 9.7m, use the NW end of the quay; the center of the quay has ro-ro facilities with a depth of 8.4m alongside.

Anse du Tir, SE of Presqu'ile Doniambo, offers berthing with alongside depths of 5m to coastal vessels.

Grande Quai (Pointe Lambert Quay), immediately SSW of Anse du Tir, is 750m long and can accommodate vessels with drafts of 6.5 to 10.3m. The berth close E of Grande Quai is reserved for support vessels.

Aspect

An old lighthouse is situated on a 90m hill above the city. The cathedral, about 0.4 mile S, is a massive white structure with two towers, the SE of which is the front light of a 055° range, is conspicuous.

A passenger terminal building 0.6 mile WNW of the cathedral is conspicuous, as is a monument in the form of a cross of Lorraine, which stands on Mont Coffyn, 0.5 mile SSE of the cathedral.

A prominent satellite antenna exists on Ile Nou, and is a useful landmark.

Pilotage

Pilotage is compulsory for all foreign vessels and warships.

French warships are exempt from pilotage, as are pleasure craft less than 60m in length. Masters of pleasure craft less than 60m in length are advised to consider engaging the services of a pilot if unfamiliar with the area.

Pilotage for New Caledonia is centralized at Noumea. Vessels proceeding to Noumea should order the pilot at least 24 hours in advance.

Pilots and Port Contact Info	
Telephone	
Port Authority	687-255000
Harbormaster	687-255005
Pilots	687-273274
Facsimile	
Port Authority	687-275490
Harbormaster	687-283772
Pilots	687-277178
E-mail	
Port Authority	noumeaportnc@canl.nc
Harbormaster	noumeaportcap@canl.nc
Pilots	movement@pilotage-maritime.nc

The pilot will board vessels at various locations depending on the vessels's cargo, direction of approach and destination.

For vessels approaching Passe de Boulari, which is the W entrance to Noumea, the pilot will board 3 miles SW of Amedee Light. For tank vessels, the pilot will board 7 miles SW of Amedee Light.

The pilot may board tankers bound for Noumea 5 miles off Passe de Dumbea by prior arrangement, however, no guidelines have been published for ordering pilotage for tank vessels required to use Passe de Dumbea. Tankers, with 1,500 tons or more of black oil or with more than 20,000 tons of clean oil,

Courtesy of South Pacific Online, http://www.sponlinee.com

Noumea—Pointe Lambert Quay

must proceed to Passe de Dumbea with a pilot on board. Vessels are urged to send their request in advance of arrival. A designated pilot boarding area is located 1 mile seaward of the pass in position 22°23'S, 166°13'E.

Canal de Havannah is used as the E access to Noumea, Ile des Pines and E coast ports. If transiting Canal de Havannah in daylight, the pilot will board off **Gorro Light** (22°20'S., 167°02'W.); at night the pilot will board off **Port Boise** (22°22'S., 166°59'E.).

Pilot vessels here are black hulled with a white band, and are fitted with VHF radiotelephone.

Regulations

See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for regulations pertaining to vessels within the waters of New Caledonia.

Noumea is the first port of entry for New Caledonia. All trade, fishing, and pleasure craft are required to call here first. Vessels are obliged to send their ETA to the Harbormaster, Noumea, at least 24 hours prior to arrival. The pilot will gather the necessary information to grant free pratique, and the vessel will be boarded at the pier; otherwise, the vessel will not be permitted to berth.

Vessels arriving from areas infested with rhinoceros beetles are subject to special quarantine regulations; the local authorities should be consulted for details.

Tank vessels intending to navigate the waters of New Caledonia, or in distress and within 50 miles of New Caledonia, are governed by special regulations.

Tankers with more than 20,000 tons of petroleum product onboard or with a draft over 10m are required to use the Tanker Channel during daylight hours only.

A copy of the current harbor regulations may be obtained from the harbormaster's office on arrival.

Vessels carrying explosives or dangerous cargoes must inform the pilot, and await the decision of the harbormaster. Vessels are prohibited from using their whistles or sirens between the hours of 2220 and 0500.

A restricted area, best seen on the chat, lies within Petite Rade around Ilot Brun. Diving is prohibited in Anse Paddon from Nouville to Pointe Gregoire and in Baie Numbo. Both areas are best seen on the chart.

Signals

Noumea (FJP) offers full radio services 24 hours. The harbormaster's office and the pilot office may be contacted on 2182 kHz or VHF channel 16. The normal office hours for both the pilot and harbormaster are 0700 to 1100 and 1300 to 1700, but the pilot office may be contacted 24 hours on VHF

channel 16.

Storm signals are displayed from the old signal station mentioned above, and consist of the following:

1. Black ball—Port threatened by a storm with a mean wind speed possibly reaching 33 knots or over, with an E component.
2. Two black balls—Port area threatened by a storm with a mean wind speed reaching 33 knots or over, with a W component.

Anchorage

Mouillage de Ndie (22°15'N., 166°24'E.), on the N side of Presqu'ile Ducos, functions as the quarantine anchorage for the port. Anchorage may be had between **Ilede Freycinet** (22°14'S., 166°24'E.) and Ile Ndie, 0.8 mile NE of it, in depths of up to 16m, mud, clear of the foul ground 0.3 mile ENE of Ile Freycinet.

Outside the port, anchorage may be taken 1.5 miles N of Ile de Freycinet, in a depth of 8m, mud, sheltered from all but SSW winds. Winds from the S and SE raise a chop here. Anchorage is also available S of Ile Nou, in depths of 9 to 20m, bottom quality not stated.

If approaching Petite Rade at night, temporary anchorage may be had, in depths of 12.4m, bottom quality not stated, with the N end of Ilot Brun bearing 265°, 0.3 mile distant. Anchorage may be had anywhere within Petite Rade, in depths of 8 to 13m, good holding ground, except within the charted prohibited anchorage areas, but anchorage berths here are assigned by the harbormaster.

Anchorage in Grande Rade is better than that available in Petite Rade, and it also offers hurricane shelter. Caution is advised, however, as the NE portion of the harbor is encumbered with coral heads. The bottom is foul with obstructions on the S side of Banc des Japonais.

Directions

See the descriptions for Canal de la Havannah (paragraph 5.8), Passe de Boulari (paragraph 5.17), Passe de Dumbea (paragraph 5.20), and Woodin Canal (paragraph 5.14) for directions and information on the approaches to Noumea.

Noumea to Baie de Saint Vincent

5.22 Baie Maa (22°13'S., 166°20'E.), which indents the W side of the Maa Peninsula, affords anchorage sheltered against E winds. The bottom is sandy, but many coral heads exist, especially in the S part.

Port Laguerre, 2.5 miles NW of Baie Maa, is sheltered on its W side by Ilot Te Ndu, and is open to the S. The NE arm of the bay is shallow and receives two rivers.

Mont Koui (22°08'S., 166°18'E.) 441m high, in line with the W hill on the small peninsula just E of Port Laguerre, bearing about 354°, clears the shoal water extending WNW from the SW extremity of the Maa Peninsula.

Anchorage, protected from all but S winds, may be obtained ENE of the N end of Ilot Te Ndu, in 8m, soft mud.

5.23 Port de Uitoe (22°06'S., 166°09'E.) is situated upon the E side of Presqu'ile de Uitoe, a striking peninsula. Ile N'dukue and Ile Mathieu lies close SW of the peninsula. A reef projects 2.8 miles ESE from Ile N'dukue across the entrance of the port, upon which lie Ile Mbe, Ile Abu, and Ilot Moro.

Recif No, easily seen at LW, lies about 1.8 miles SE of Ilot Moro. Recif No is joined to Recif Mamaora, which projects about 0.6 mile SW from a point on the coast, about 1 mile E, by a shallow ridge. Recif Ti lies about 1 mile SW of Recif No.

The SW side of Ile Abu, in line with the V formed by Pointe Kauritio, the S end of Presqu'ile de Uitoe, and the N end of Ile N'dukue, bearing 308°, leads midway between Recif Ti and Recif No.

A patch, which dries, with a shoal having a depth of 3m close N, lies about 0.8 mile SW of Ilot Moro.

Vessels with local knowledge can obtain good anchorage in Port de Uitoe, as charted, in depths of 7 to 11m, good holding ground. This anchorage is approached from either the S or W, rounding Ilot Moro at a safe distance.

Recif du Prony, which dries 1.5m in its E part, lies 2.25 miles SSW of **Pointe Bovis** (22°14'S., 166°21'E.), the S end of the Maa Peninsula. An islet, 1.3m high, lies on the W part of Recif du Prony. Basse Kaui, with a depth of 0.6m, lies 2 miles SW of Pointe Bovis. A reef, whose position is approximate, lies about 0.5 mile S of Basse Kaui.

Ilot Ndue and Ilot Ie, with Recif Ndaru and Recif Numbea between, lie upon a reef about 5 miles WNW of Pointe Bovis. Ilot Tangue (Ilot Iange) lies about 1.8 miles NNE of Ilot Ndue; the channel between is narrowed by shoals projecting from either side.

Ilot Mbo and Ilot Mba are wooded islets lying on the SW side of the fairway between Port Noumea and Passe de Uitoe, about midway between Ilot Ndue and the barrier reef SW. In 1976, less water than charted was reported 2.3 miles NW of Ilot Mba.

Directions.—Vessels with local knowledge departing Noumea from Grande Rade, round Ile Nou and set a course for **Pointe Bovis** (22°14'S., 166°21'E.). When in the vicinity of Pointe Bovis, about 0.5 mile off, steer 302° for Cap Ka, passing through the fairway between Ilot Ndue and Ilot Tangue (lot Iange), and between Recif Ti and Recif No, up to the entrance of Port Uitoe. Approaching Recif Ti, the vessel should follow the leading line described above and, if continuing to Baie de Saint Vincent, should adhere to this line until Cap Ka and the S end of Ile N'dukue comes into line bearing 298°. This alignment leads between Ilot Moro and the 1.5m patch 0.75 mile SW; when the buoy marking the patch is abeam, change course abruptly WSW for 0.6 mile until the SW end of Ile Hugon is in line with the NE end of Ilot Ronhua, bearing 300°. This course leads to the entrance of Passe du Cap Ka between Cap Ka and Pointe Guillois, the SE end of **Ile Hugon** (22°03'S., 166°03'E.).

5.24 Passe de Uitoe (22°10'S., 166°06'E.) entrance is between the SE end of Recif Tetembia and the NW end of Recif de Annibal, is easily discernible, as the sea breaks over the reefs.

Aspect.—The main landmarks from the offing are Mont Mou, Piton Karikate, and Sommet Titema Peak, 360m high, 2.5 miles ESE of Piton Karikate, all described in paragraph

5.20. From the passage, Cap Ka, a chain of wooded islets S of Port de Uitoe, Ilot Mba, and Ilot Mboa, are all good marks.

A shoal, with a depth of 7.4m, marked by a buoy, lies about 0.5 mile ESE of the S end of Recif Tetembia. The sea during a SW swell has been seen to break on this shoal.

Directions.—Vessels approach the entrance of Passe de Uitoe with the E summit of Mont Mou in line with Sommet Titema, bearing 065°. Vessels should remain N of the center of the passage and avoid the above shoal. When the breakers on the S side are abeam, vessels should steer for the N summit of Ile Nou, bearing 107°. If bound for Noumea, remain on this bearing until between Pointe Bovis and Basse Kaui, where course can be changed as required. This track leads over the area in which less water than charted was reported in 1976, NW of Ilot Mba, and over a 11m patch 1 mile NNE of the same islet.

Baie de Saint Vincent to Baie de Bourail

5.25 Baie de Saint Vincent (Baie du Sud), entered between Cap Ka and Ile le Predour, almost 8 miles NW, is a broad bay fronted by many islands. The water within the bay is so muddy that shoals cannot be seen and vessels must rely on bearings and ranges to avoid them.

The shores of the bay are very irregular, forming several smaller bays which can only be used by small craft. There are large open areas in the S part of the bay with depths of 9 to 25m.

Aspect.—Ile Mathieu, Ile Hugon, Ile Ducos, and Ile le Predour are the most prominent islands of those that extend across the entrance of Baie de Saint Vincent.

Dent de Saint Vincent, 1,545m high, is a sharp peak lying about 14 miles NNE of Cap Ka. Mont Do, a rounded summit, 1,036m high, lies 12.5 miles N of Ile le Predour. The aeronautical light on Set N'dui, S of the Tontuta River, is visible from sea.

Caution.—The inner passage between Passe de Saint Vincent and Passe d'Ovarai has been surveyed, with changes to hydrography and recommended routes. Vessels should not attempt to enter this area without local knowledge.

5.26 Passe de Saint Vincent (22°02'S., 165°58'E.) represents an opening in the barrier reef lying about 11.5 miles NW of Passe de Uitoe. This passage can be identified in good weather by bearings of Dent de Saint Vincent and Mont Do. Ilot Tenia, which lies on the barrier reef, about 0.8 mile from the NW side of the passage, is wooded and is a good mark for identifying the passages location.

Canal Hugon, lying between Ile Ducos and Ile Hugon, has depths ranging from 0.3 to 9m. A reef, upon which the sea breaks, and a sand cay lie between Canal Hugon and Passe de Saint Vincent. A shoal, with a depth of 9m, lies about 2 miles W of the W end of Ile Hugon. Ile Ronhua lies upon a reef 0.6 mile off the SW side of Ile Hugon.

Canal Ducos, deep and 0.4 mile wide in the fairway, lies between Ile Ducos and Ile le Predour. A patch, with a depth of 5.5m, lies about 2 miles SW of Pointe Arch d'Alliance, the NW end of Ile Ducos. A 9m patch lies on the recommended track in the entrance to the passage about 2.5 miles SW of the same point. Vessels with local knowledge can obtain anchorage in Baie du Sud, which lies between Presqu'ile de Uitoe and Ile Hugon. The recommended berth, in a depth of 11m, sand and mud, lies about 0.5 mile N of the NE end of **Ile Mathieu** (22°05'S., 166°07'E.).

Baie Centrale lies E of Ile Hugon and Ile Ducos. Vessels with local knowledge can obtain anchorage here, in depths of 6 to 7m, about 1 mile SE of **Ile Geoffroy** (22°00'S., 166°07'E.).

Baie du Nord, lying in the NW part of Baie de Saint Vincent, is divided into a W arm, Baie Arembo, and a N arm, Baie de Deama. Vessels with local knowledge may obtain anchorage in Baie du Nord, as the bottom is soft mud, holding ground excellent. Anchorage may be found in the entrance to Baie Arembo, W of Recif Toyaghi.

Directions.—Vessels should not enter Passe de Saint Vincent without local knowledge. Vessels from the S approach Passe de Saint Vincent with Mont Do, bearing 112°, and enter with Dent de Saint Vincent in line with Pointe Arche d'Alliance, the NW end of Ile Ducos, bearing 054.5°, which leads in mid-channel to the entrance of Canal Ducos.

Vessels with local knowledge bound for Baie du Nord from the SE pass either S of the islands fronting Baie de Saint Vincent or pass inside the barrier reef entering Passe du Cap Ka. From Passe du Cap Ka, pass E of Ilots Trio. When the N and S islets of Ilots Trio are in line, astern, steer for the S hill on Ile Parseval, bearing about 007°, leading between two patches of discolored water lying about 1 mile N and 1 mile NNE, respectively, of the N Ilots Trio. This course leads between Recif Marceau and the E side of Ile Ducos. From a position N of Recif Marceau vessels should pass close along the NE shore of Ile Ducos so as to avoid the drying reef lying 0.2 mile N of the NE end of the island. When **Presqu'ile Beaupre** (21°57'S., 166°05'E.), lying on the E side of Baie de Deama, opens W of Ilot Devarenne, lying 0.75 mile WNW of the S end of Ile Parseval, vessels should change course N and head to pass very close W of Ilot des Morts to avoid Recif du Cher, with a depth of 2.1m, lying about 0.3 mile W of Ilot des Morts.

5.27 Baie de Pritzbuer (21°57'S., 165°57'E.), fronted by Ile Le Predour, Ile Puen, and Iles Testard, is the next indentation NW of Baie de Vincent. This bay may be approached from either N or S of **Ile Le Predour** (21°59'S., 166°00'E.). From the NW there is a channel between Iles Testard and Ile Quernel, with a least depth of 4.2m in the fairway.

A rock, with a depth of less than 1.8m, was reported to lie near the channel SW of Iles Testard, about 0.6 mile SW of the rock off the SE end of that island. A shoal, with a depth of 4.2m, lies 0.7 mile SW of the SE end of Iles Testard.

Vessels with local knowledge can obtain good shelter in Baie de Pritzbuer, which lies 1 mile NE from NW end of Ile Puen.

When entering the bay from the W, Pointe Moziman should be given a berth of about 0.3 mile to avoid the spit extending SE from Ile Testard.

Directions.—The route between Ilots Champignons and Passe de Saint Vincent is not recommended nor described due to the lack of hydrographic data in this area.

From Passe de Saint Vincent, vessels with local knowledge intending to head NW to Baie de Pritzbuer or to Passe d'Isle should, after rounding the reefs extending E from Ilot Tenia, keep the NE end of **Ile Isie** (21°54'S., 165°52'E.) in line with the W summit of Sommet Ouanvo, bearing about 316.5°. When Pointe Moziman, the NW end of Ile Puen, bears 090°, vessels should head for the summit of the SE of Iles Testard for

a distance of about 0.5 mile, to avoid the sunken rock lying 0.6 mile SW of the rock off the SE end of that island. When the rock off the SE end of Iles Testard is in line with Piton Kari, bearing about 043°, vessels should change course W and resume the 316.5° alignment, which leads between Iles Testard and Banc du Curieux. When the S summit of Ile Quernel bears 101°, vessels should change course W, and after passing between Recif du Milieu and the buoy moored off the NW end of Banc du Curieux, vessels should keep the S summit of Ile Quernel astern, bearing 101°, which leads close N of the buoy, then S of Ile Isie and the off-lying reef, and then to Passe d'Isie.

5.28 Passe d'Isie lies about 13.3 miles NW of Passe de Saint Vincent, and it is deep, 0.5 mile wide, and generally free of known dangers. The wreck of a vessel stranded on the coastal reef, about 1 mile S of Passe d'Isie, was reported prominent both visually and on radar.

Passe d'Ouarai, lying 3 miles NW of Passe d'Isie, is also deep and about 0.5 mile wide. When within this channel entrance, coral patches and sand, which comprise the bottom, will be plainly seen.

Mount Do is a good landmark from a considerable distance for either of the two above passages.

Sommet Ouanvo (21°51'S., 165°49'E.), on which there is a beacon, and the peninsula on which it stands, can be made out from the offing. This peak should not confused with Ile Libris, 3.25 miles NW, which it resembles.

Ile Isie (21°54'S., 165°51'E.), on which there are two rounded hills, lies about 4 miles NW of Iles Testard, and is conspicuous. The islets of Konduyo and N'digoro, both wooded and prominent, lie 4 miles and 7 miles WNW, respectively, of Ile Isie.

Meleo Cone, 101m high, 0.75 mile ESE of Sommet Ouanvo, is a conspicuous mark.

Directions.—Vessels with local knowledge heading for Passe d'Isie should steer for Mont Do, bearing 058°, which will lead to the entrance; however, before entering vessels should bring Meleo Cone to bear about 059.5° which leads through the entrance.

Vessels bound for Passe d'Ouarai should keep Mont Do in line with Mont Ouinne, 4.75 miles WSW, bearing 069°, which will lead to the entrance. To enter, keep the summit of Ile Lebris in line with Mont Me Fombiru, 5 miles NE, bearing about 043.5°.

5.29 Baie d'Ouarai (21°46'S., 165°43'E.), which lies at the NW end of the inner waters N of Passe d'Ouarai, is sheltered on the W by a reef projecting about 6 miles SSE from the shore.

Vessels with local knowledge can obtain anchorage, in depths of 7 to 14m, about 2 miles NNW of Ile Lebris. During bad weather, a small vessel might obtain a good berth, in depths of 5 to 7m, mud, N of **Ilot Teremba** (21°47'S., 165°44'E.). At this anchorage, SE winds are reported to cause a heavy short sea.

Directions.—Vessels with local knowledge, after having entered the barrier reef through Passe d'Ouarai, intending to enter Baie d'Ouarai should continue on the range, described above, passing between the beacon marking the edge of the reef extending from the S side of Ile Lebris and the S end of the 0.5m shoal on the W side of the fairway. From this position course may be shaped as required into the bay.

The shoals extending S from Ile Lebris may also be avoided by not allowing Ile Hugon to open NE of Ilot Konduyo until Ilot Gero, lying close off the NW point of Ile Lebris, is open W of that island. At this point, vessels should steer for Ilot Gero until abeam of the S end of Ile Lebris, when they should steer for the anchorage passing to the E of the buoy marking the W side of the fairway abreast Libris Island.

The shore NW of Baie d'Ouarai to Baie Moindu is fronted by a reef that extends up to 4 miles offshore in places. Two wrecks lie on the edge of the reef, about 4 miles and 5 miles WNW of Passe d'Ouarai. It was reported only one of these wrecks was visible.

5.30 Baie Moindu (21°44'S., 165°40'E.) is entered through Coupee Mara, a narrow opening in the reef about 6 miles NW of Passe d'Ouarai. Coupee Mara, which should only be used by vessels with extensive local knowledge, has depths of over 9.1m in the channel for a distance of about 2.5 miles from the entrance to the passage.

Small vessels with extensive local knowledge can obtain anchorage, in depths of 5 to 8m, mud, N of the narrowest part of the channel. This anchorage is in a position with the S end of **Ilot Kundogi** (21°48'N., 165°42'E.) lying on the reef nearly 4 miles ENE of the entrance to Coupee Mara, bearing about 128°, just open SW of the SW end of **Ile Mara** (21°47'S., 165°41'E.), lying 2.5 miles E of the cut.

Larger vessels, with local knowledge, can find anchorage, in a depth of about 20.1m, mud, with the summit of Ile Mara bearing about 090°.

The sea is always calm in the bay, but in Mara Cut there is generally a swell and at times a tidal bore. Through the S part of the bay, except after a heavy rain, the line of demarcation between the sand and coral reef, and the deep water over a sandy bottom, is always visible.

Several miles up the Moindu River, which discharges into the head of the bay, is the town of Moindu.

Directions.—The navigation of Coupee Mara requires extensive local knowledge and great caution. The cut's entrance is approached on a course of 037°, which leads through the narrows towards a breaking reef located about 0.5 mile within the entrance. When about 0.3 mile from this reef alter course rapidly to about 338°, so to clear the elbow of the reef N of the breakers on the E side of the channel. Then follow the edge of the shoals, avoiding the 1.2m rock lying about 0.8 mile within the cuts entrance, on the E side of the 338° course. Having cleared the rock, alter course to 030° and follow it until the S end of Mara Island bears 090°; then steer 020° until the N end of Ilot Kundogi is in line with the S end of Ile Mara, bearing 115°, when course may be shaped for the anchorage.

The coast between Coupee Mara and the entrance to Baie de Bourail, about 15 miles NW, is fronted by a reef within which is a lagoon encumbered by coral heads.

5.31 Baie de Bourail (21°38'S., 165°26'E.) is a spacious harbor with depths of 73m in the entrance, decreasing gradually to about 10m, about 0.5 mile from the bays head. A heavy

swell runs into the bay with winds from the SW. Vessels loading ore via lighter anchor here.

Aspect.—The entrance to Baie de Bourail may be identified in good weather by heading for Table Ounio, 1,006m high, bearing 072°. This peak stands 14 miles NNE of Ile Mara. When close in, Sommet Nekou, 486m high, and Mont Nepourou, 537m high, lying about 1.5 miles N and 3 miles E, respectively, of the white beacon at the head of the bay, are conspicuous.

Ilot Siande (21°40'S., 165°27'E.), lying on the E side of the coastal reef, is wooded and makes a good mark for entering the bay.

N'diadiou Bluff lies on the E side of the entrance and between it and another bluff, 64.9m high, about 0.8 mile NNW, is the entrance to Baie N'diadiou, a narrow inlet usable only by small craft.

Pointe Akaia is the N end of the N bluff, ending in a cliff. A prominent tree stands on the S slope of the 64.9m summit SE of Pointe Akaia.

Pointe Mediema, on the W side of the entrance, is backed by Mont Mediema, 304.8m high, on the summit of which is a white house.

Vessels with local knowledge can obtain anchorage virtually anywhere in Baie de Bourail, but the NW part is preferred. The best anchorage lies with Pointe Akaia bearing 128°, in a depth of 10m. Vessels entering the bay to load ore anchor on the intersection of the white house and beacon, in line bearing 008°, and the two white beacons on Pointe Akaia, in line bearing 104°, in a depth of 13m.

There are two mooring buoys close WNW of Punta Akaia.

Directions.—There are no dangers in the entrance to Baie de Bourail, save the reefs projecting up to 2 miles from the shore. However, numerous floating trees have been reported N of a line connecting Pointa Akaia with Pointa Ponjaoua; the later point being 1.4 miles WNW of Pointa Akaia. Vessels with local knowledge enter with Summit Nekou bearing 010°, which leads nearly midway between the reefs. Vessels approaching from the N should steer for the cliff on Pointe Akaia, bearing 036°, until Sommet Nekou bears 010°.

Cap Goulvain to Baie de Gomen

5.32 The shore between Baie de Bourail and Cap Goulvain, about 11 miles WNW, is reef-fringed. Coupee du Cap Goulvain, entered about 2.5 miles W of Cap Goulvain, has not been surveyed.

Baie de la Poya, entered by a channel between the reefs, is only usable by small vessels with extensive local knowledge, as it is encumbered with reefs and shoals. The shores of this bay are bordered by cliffs on either side, and on the E point of the bay are 2 ore loading facilities and an iron hut, both visible from sea. Pic Adio, 752m high, located about 14 miles N of Cap Goulvain, is a good landmark. This peak bearing about 056°, leads to the entrance of Baie de la Poya.

Pilotage is compulsory and may be obtained at Passe de Meuo or from Passe de la Poya upon request.

Tankers up to 30,000 dwt, with a maximum length of 170m, can anchor, in 36m, at the intersection of the ranges.

Ilot Contrariete, low and wooded, lies about 1 mile S of the E side of the coastal reef forming the entrance of Baie de la Poya.

5.33 **Port de Moueo** (21°20'S., 164°59'E.) entered through Passe de Moueo, a tortuous channel, is separated from Baie de la Poya by Presqu'ile Beco and the reef extending SW from it. The pass, which requires local knowledge, is traversed by a channel dredged to a depth of 9m.

Depths—Limitations.—An ore terminal pier extends 366m S from the SW point of Presqu'ile de Moueo; a dolphin berth with a depth of 10m lies at the end. Six mooring buoys lie close S of this pier. Ore carriers up to 148m long can be accommodated. The tanker terminal can accept vessels up to 163m long, with a maximum draft of 8.2m. The liquefied gas terminal can accept vessels with a maximum draft of 4.5m.

There is a pier, about 259m long, with a depth of 7m alongside, on the N side of the point located about 1 mile NNE of **Recif de l'Observatoire** (21°21'S., 164°58'E.). The pier is reported to be in a bad state of repair.

Aspect.—Good landmarks for identifying Port de Moueo from the sea are Pico Adio; Aiguille de Muco, 12 miles NW of Pico Adio; Ilot Contrariete; and Cap Goulvain.

Ile Grimoult, 45m high on its E side, lies on the E side of the fairway, about halfway between Passe de Moueo and the head of the bay.

Pico Adio, 752m high, located about 14 miles E of Port de Moueo, stands between two high mountain ranges, the one to the N presenting an almost perpendicular side.

To the NNE of Port de Moueo, between Mount Hilo and Mount Pacua, is Mueo Needle, a slender peak standing on a slightly rounded mountain. Another peak, smaller and less pointed, is located to the E of Mueo Needle. A group of five radio towers stands on the W side of the Presqu'ile Nepoui, about 1.1 miles N of the S extremity; they form a most conspicuous mark. A light is shown from a pylon close W of the radio towers.

Pilotage.—Pilotage is compulsory. Arrangements for a pilot should be made at Noumea. The use of a tug is compulsory for tankers.

Regulations—Entry and exit is restricted to daylight hours. The Nekoro Special Marine Reserve is located SE of Nepoui. The reserve is bounded shoreward by the high tide mark and seaward by the SW end of the Nekoro peninsula, the NE point of Islet of Didot, and Boukou Point. Certain restrictions may apply.

Anchorage.—An area suitable for anchorage is located between the parallels of the S end of Ile Grimoult and the S end of the Moueo Peninsula. This area has been swept to a depth of 7.9m; the berths are restricted to vessels with a draft of less than 14.8m. The holding ground is good and the inner berths are protected, but the outer berths receive shelter only from the reefs and shallow areas.

Anchorage can be obtained, in depths of 6 to 9m, in the SW part of the bay in Baie de Nepoui, N of the pier. A spit, with a depth of 1.7m, projects 0.3 mile SW from the E entrance of Baie de Nepoui. A buoy marks the edge of the spit.

Directions.—A vessel should approach Passe de Moueo with the beacons on Presqu'ile de Beco and **Ilot Didot** (21°23'S., 165°01'E.) in line bearing 072°. When the light on the N extremity of the reef on the S side of the entrance bears

about 150°, alter course to about 092° passing between Buoy No. 1 and Buoy No. 2, which mark the entrance to the buoyed channel. An E course should be then be maintained in the buoyed channel until the range lights on the reef extending SW of Ile Grimoult come into line bearing 032°, ahead, they should then be steered for. This alignment should be maintained until the front lighted beacon is 0.2 mile distant, when course should be altered to bring Observation Rock, at the SE end of the Nepoui Peninsula, bearing 343° ahead. About 0.3 mile after passing the beacon marking the edge of the fringing reef on the W side of Ile Grimoult, course should be altered to bring the tower on Presqu'ile de Moueo ahead, bearing 024°, at night keeping within the white sector of the light on the pier between the bearings of 018° and 034°, anchoring thereafter as convenient.

The location of Passe du Moueo is sometimes difficult to determine, particularly in the morning and when the mountains are obscured by clouds. Under ordinary conditions the navigation of the pass presents no difficulties to a vessel carrying ample steerageway, but with winds from the SW and a heavy sea running in, it should not be attempted.

Vessels with a draft of more than 7.9m should not enter before half-flood. Due to the strong tidal currents in the entrance and the numerous dangers, vessels should follow the buoyed channel. From Presqu'ile Nepoui to Passe de Pouembout, about 13.5 miles NNW, the shore is reef fringed inside which only small vessels with local knowledge can navigate.

Caution.—A 6.4m patch lies at the inner end of Passe de Moueo, about 0.3 mile W of the outermost red channel beacon.

A rock, with a depth of less than 0.3m, lies 0.6 mile SSW of the W extremity of Ile Grimoult.

5.34 Passe de Pouembout (21°14'S., 164°45'E.) is the S channel of the two channels that lead to Baie Kataviti; the N channel is called Passe de Kone. Passe de Pouembout should only be used by vessels with extensive local knowledge, and Passe de Kone is not recommended as it is encumbered by rocks, the channel is tortuous, the tidal currents are strong, and there is a swell at the entrance.

Aspect.—Montagne de Kone, 237m high and wooded, lies about 15 miles NE of the entrance to Passe de Pouembout. This peak, in line with Mont Uinip, 15 miles NE, bearing 045°, leads to the entrance of Passe de Pouembout. Near the center of this channel is a reef, S of which is the navigable channel. The summit of **Table de Tiea** (21°10'S., 164°55'E.), bearing 065°, just clears the NW edge of the reef on the S side of the channel.

Ilot Koniene (21°09'S., 164°49'E.) lies close offshore E of the center of Plateau de Koniene. A reef, which dries, lies on the E side of the channel, about 2 miles SW of the islet.

Presqu'ile de Foe is a conspicuous headland located about 3 miles NNW of Ilot Koniene.

Vessels with local knowledge can find anchorage, in depths of 6 to 7m, mud, with the W end of Presqu'ile de Foe, Morne de Foe, bearing 071°, distance 1.5 miles; the holding ground here is good, mud.

Directions.—Vessels with local knowledge enter heading for the 418m summit of Table de Tiea, bearing 065°, until the black beacon on the reef located about 2.3 miles SSW of Ilot Koniene is in line with the N peak on Ilot Koniene, bearing 031°, when she should keep on this alignment until the W end of Presqu'ile Foe bears 004°, and is in range with the W detached summit of Massif de Koniambo, which is 504m high, located about 4.5 miles N of the W end of Presqu'ile Foe. Remain on the 004° course until the N peak of Ilot Koniene is in line with Le Piton, on the NW end of the same island, vessels should change course to keep this range bearing 152° astern, which leads through Seuil de Foe. From the entrance of Passe de Pouembout through Seuil de Foe to the anchorage, there was a least charted depth in the fairway of 4.8m.

5.35 Passe du Duroc (21°00'S., 164°37'E.) is located about 8 miles NW of Passe de Kone; it lies at the S termination of the navigable waters within the barrier reef at the NW end of New Caledonia. There is no passage for anything larger than small coasters within the reefs between Baie Kataviti and Passe du Duroc.

The entrance to Passe du Duroc lies between the NW end of Grand Recif de Kone and the E end of Grand Recif de Gatope, with a least width of about 0.4 mile. This channel should not be entered without local knowledge.

Aspect.—Sommet Pouani, 220m high, is the summit of **Presqu ile Guillain** (20°59'S., 164°40'E.).

Mont Katepahic, 649m high, dark, with jagged sides and a flat top, lies 4 miles NE of the NW end of Presqu'ile Guillain. Piton de Kafeate, 227m high and shaped as a sugarloaf, lies about 5.8 miles SE of Mont Katepahic.

Directions.—Vessels with local knowledge entering Passe du Duroc should keep Mont Katepahic, bearing 048°, just open NW of the NW end of Presqu ile Guillain until just within the SE end of Grand Recif de Gatope, when vessels should change course NNE staying in mid-channel.

Anse de Vouavouto (21°00'S., 164°40'E.), located along the S side of Presqu ile Guillian, is entered between Pointe Vincent and Pointe Vouavouto, about 1 mile SE. Chenal Frot, which leads into this cove, is narrow, tortuous, and requires extensive local knowledge for use. This buoyed channel is available to vessels with drafts to 7m, and the water within it is so discolored as to prevent the edges of the reefs being seen. There is a depth of 9.8m in the anchorage, about 0.6 mile SW of Pointe Vincent.

Directions.—Vessels with extensive local knowledge bound for Anse de Vouavouto should keep the range for entering Passe du Duroc in line until the black beacon on the N edge of Recif de Kone bears about 135°, when course should be changed to 128° and pass between the buoys. When the pyramidal beacons on the S side of Presqu'ile Guillain are in line bearing 067°, change course NE and keep on this alignment which will lead to the entrance of the cove.

5.36 Baie Chasseloup (20°58'S., 164°38'E.) lies NW of Presqu ile Guillain and is protected from all winds by Grand Recif de Kone on the S, Grand Recif de Gatope on the W, and Plateaux des Massacres on the NW. A white house, standing at the foot of **Mont Katepahic** (20°56'S., 164°42'E.), and a white pyramidal beacon, on the N side of Presqu'ile Guillain, are both conspicuous.

LeGrand Ronfleur, with a least depth of 0.2m, lies on the E side of Passe du Duroc, centered about 0.8 mile NE of the NW end of Grand Recif de Kone. This coral patch, which forms the N side of Chenal Frot, has buoys marking its S limits.

Anse de Pouaco indents the N part of Baie Chasseloup, and from its W entrance point a mud bank, fringed by coral, extends about 0.5 mile S.

Vessels with local knowledge can obtain good anchorage, in a depth of 5m, mud, with the E summit of **Ilot Gatope** (20°59'S., 164°39'E.) in line with Pointe Giboudot, the W end of Presqu'ile Guillain, bearing 182°, about 0.3 mile offshore. Anchorage may be found in a similar depth S of Anse de Pouaco; however, it is subject to a choppy sea which comes in with the prevailing SE wind.

Chenal Pouangue (20°56'S., 164°34'E.) lies between Plateaux des Massacres and Grand Recif de Gatope, and joins Baie Chasseloup with the inner waters NW of it. It is the only channel within the barrier reef through which a vessel can head N and should only be used by vessels with extensive local knowledge. Navigation is dangerous in Chenal Pouangue at HW if the beacons are not in position and if the sun is dead ahead, because the sides of the reefs cannot be made out.

Aspect.—Prominent mountains lying NW of Baie Chasseloup include **Piton Tsiba** (20°48'S., 164°29'E.), 470m high and conical with a pointed peak, 14 miles NW of the NW end of Presqu'ile Guillain, and about 2 miles inland; Mont Ouala (Mont Uala), 578m high, about 1.5 miles N of Piton Tsiba; Mont Ouazangou (Mont Uazangu), 584m high, 2.25 miles farther N; and Pic Homedeboua, 1,200m high, about 3 miles NE of Mont Ouazangou. This mountain is separated from Pic Homedeboua by a deep gap which is distinctive from Grand Recif de Gatope.

5.37 Coupee de l'Alliance (20°57'S., 164°25'E.) is a opening in the barrier reef about 0.2 mile wide that lies about 11 miles WNW of Passe du Duroc. It is entered between the NW end of Grand Recif de Gatope and the SE end of Recif Mathieu.

Tides—Currents.—Tidal currents in Coupee de l'Alliance are often very strong, but they set directly in or out of the cut.

Baie d'Ounda (20°52'S., 164°29'E.) is located between Pointe d'Ounda and the NW side of Plateaux des Massacres.

Recifs Peterson, which lies on the E side of the approach, is located about 3.5 miles SE of Pointe d'Ounda. Recif d'Ounda lies on the W side of the approach, about 1.5 miles SSW of the same point.

Directions.—Vessels with local knowledge using Coupee de l'Alliance to reach Baie d'Ounda head for Pic Homedeboua bearing 027°, until about 0.3 mile SW of the SE end of Recif Mathieu, when course should be changed to about 061° to pass through Coupee de l Alliance. Once clear of the SE tip of the reef, the 027° course may be resumed passing midway between Recifs Peterson and Recif d'Ounda in a least depth of 8.2m. The edges of the above reefs show up fairly well.

A tall chimney stands about 1 mile NE of Pointe d'Ounda. A pier extends SW from the point.

Vessels with local knowledge can obtain anchorage, in depths of 7 to 9m, sand and mud, about 0.5 mile S of the pier. Alternately, anchorage may be found close NW of the NW side of Plateaux des Massacres, in depths of 6 to 7m, mud.

From Pointe d'Ounda the coast trends 7.5 miles in a NW direction to Cap Deverd, the S entrance point of Baie de Gomen. The shore is fringed by a reef, but the fairway of the inner route is 1 mile or more from it and presents no special difficulties. A small pointed hill stands near the coast, about 2.5 miles NW of Pointe d'Ounda, and Teudie Peak, 132m high, stands on Cap Deverd. Deverd Islet, located 2.5 miles W of Cap Deverd, is wooded.

Vessels with extensive local knowledge proceeding W inside the barrier reef from Baie Chasseloup, from a position about 1 mile WNW of Ilot Gatope, should keep Piton de Kafeate in line astern with the W peak of **Ilot Gatope** (20°59'S., 164°39'E.), bearing 120°. Proceed on this bearing along the NE edge of Grand de Recif Gatope, until Mont Katepahie is in range with the S end of the point on the E side of the entrance to Anse de Pouaco, bearing 076°, when course should be altered W to avoid several patches, with depths ranging from 4 to 5m, lying 1.5 miles SW of the W entrance point of Anse de Pouaco. Vessels should then proceed through Chenal Pouangue in mid-channel, being guided by the beacons. In 1976, there was a least charted depth of 5m on this above track and there was deeper water S of the track. On leaving this channel, vessels should follow the S edge of Plateaux des Massacres at a moderate distance, and steer to pass between the beacon standing on the SW edge of the plateau, about 3.3 miles SSE of Pointe d'Ounda, and Recifs Peterson, taking care to avoid the patch with a depth of 4.8m, 0.75 mile SW of the beacon. Then the vessel should steer for a small pointed hill close to the coast, about 2.5 miles NNW of Pointe d'Ounda, bearing 340°, until the pier on Pointe d'Ounda is in line with Piton Tsiba, bearing about 019°, when vessels should steer with Sommet Teoudie, bearing 324°, until the small pointed hill is in line with Piton Tsiba, bearing about 073°. Then steer for Ilot Deverd, a wooded islet lying about 2.5 miles WSW of Cap Deverd, bearing 298°, which leads between Les Quatre Soeurs (Four Sisters) and another reef lying S of Cap Deverd, about 1.3 miles NE. When the small hill close within Pointe d'Iouanga (Iuanga), located about 3 miles N of Cap Deverd, bears 001° and is open W of that cape, vessels should steer 338°, and pass about 0.8 mile SW of Recif Teoudie, marked by a black beacon on its SW side, about 1.3 miles S of Cap Deverd. If bound for Baie de Gomen, vessels may round Cap Deverd at a distance of 0.5 mile. A 8.6m patch lies 0.7 mile SW of Cap Devard. A 6.6m patch lies 1.5 miles SW of the Cape.

If bound NW, the vessel may proceed through Chenal de la Fine, which has a least depth of 4.9m, or through Chenal de Kendec and then SW of Recif de l'Infernet.

5.38 Passes du Coetlogon (20°43'S., 164°14'E.) is comprised of two channels separated by an extensive reef; the N is Passe de Koumac, the S, Passe Deverd. Grand Recif Mathieu, the section of the barrier reef lying between these two cuts, has not been thoroughly examined and mariners should exercise caution when navigating along its outer side.

Aspect.—Upon approaching Passes du Coetlogon the following are prominent: Cap Devard; Ilot Devard; Ilot Kendec; **Mont Kaala** (20°37'S., 164°23'E.); and Mont Tiebaghi, lying about 14 miles NW of Monts Kaala.

Passe Deverd lies between the NW end of Grand Recif de Mathieu and a large reef that separates this channel from Passe de Koumac. There are some large boulders on the NW tip of

Grand Recif de Mathieu and a buoy is moored 0.5 mile NE of the tip.

A 7m shoal, marked by a buoy, lies about 2 miles NE of the NW end of Grand Recif de Mathieu.

Directions.—Vessels with local knowledge enter Passe Devard with Mont Ouazangou bearing 090°, or with Pic Homedeboua bearing 086°; both courses head about 0.2 mile N of the above shoal. After passing this shoal, steer 094° for the anchorage in Baie de Gomen or if bound N, change course N and pass through Chenal de Kendec.

Alternately, pass through Passe Devard on a heading of 107° on the middle of Ilot Deverd, passing about 0.5 mile SW of the 7m shoal marked by a buoy, and when Cap Deverd bears 093°, steer for it. When about 1 mile from Cap Devard, change course for the anchorage.

Passes de Koumac lies between the NW end of the reef separating the channels and the SE side of Grand Recif de Koumac.

Directions.—Vessels with local knowledge head through Passe de Koumac with the right hand summet of Monts Kaala bearing 037°, or the left-hand edge of Ilot Kendec in line with Piton de Pandrop, 7 miles NE, bearing 037°, leads to the center of the channel. When about 10.3 mile from Ilot Kendec, vessels should steer 010° and pass between the E end of Grand Recife de Koumae and the reef upon which Ilot Kendec lies.

Baie de Gomen (20°44'S., 164°23'E.) is entered between Cap Deverd and Pointe d'Iouanga. Vessels with local knowledge might find shelter here during E winds in depths of 5 to 6m, mud. This bay should be avoided during NW and W winds.

There are wharves in the SE part of the bay where nickel is discharged into lighters for loading into mineral carriers, which anchor off Cap Deverd.

Chenal de Kendec to Recif de l'Arche d'Alliance

5.39 Chenal de Kendec (20°42'S., 164°17'E.) is situated E of the reef which separates Passe Deverd from Passes de Koumac, and is available to vessels with drafts to 7m. Chenal de l'Infernet is the NW continuation of Chenal de Kendec.

Caution.—Both these channels should be used with caution, as depths of less than 4m have been reported within them. The navigational aids marking them have been reported to be unreliable.

Roche de l'Infernet, with a depth of 2.5m, lies in Chenal de l'Infernet, about 1.5 miles NNW of Ile Kendec. A 4.8m patch lies close NW of this rock.

Chenal de la Fine lies close offshore between Pointe d'Iouanga and Ilot Tangadiou, about 12 miles NW. This channel can be used by vessels with drafts up to 4.6m. It affords good anchorage in its NW part.

Ilot Magonne lies about 1 mile W of Ilot Tangadiou, with Ile de la Table about 1.3 miles further W. All three of these islands lie upon reefs, the most extensive being the one extending nearly 1 mile S of Ilot Tangadiou. Ile de la Table is wooded and has a flat-topped hill on its S end.

Recif du Baron lies about 1 mile W of Ile de la Table, separated from it by Passe du Baron. Recif Archbold lies about 1 mile W of Recif du Baron.

Recif Leleizour (20°32'S., 164°12'E.) lies about 1.3 miles N of Ile dela Table, and a small sandy islet lies upon it. This islet is visible at LW, but is often difficult to distinguish at HW. A rock, which dries 0.3m, lies about 1 mile NNE of Recif Leleizour. Two patches, each with a depth of 3.2m, lie about 1.5 miles N of Recif Leleizour.

Aspect.—Ilot Double is a conspicuous object standing in comparatively open water about 6 miles NW of Ile de la Table.

A useful mark for vessels approaching these channels from the S is the high land of **Mont Tiebaghi** (20°28'S., 164°13'E.), with its dome-shaped summit. This peak slopes NW joining Sommet Yago, which has two mounds, 230m high, about 6 miles NW.

Anchorage.—Vessels with local knowledge can anchor virtually anywhere in Chenal de la Fine. There is anchorage, in depths of 7 to 9m, about 0.4 mile NW of Pointe d'Iouanga. Anchorage may be found about 2.5 miles WNW of **Pointe Karembe** (20°38'S., 164°20'E.), in depths of 11 to 15m, sand and mud. Small vessels find anchorage, in depths of 4.9 to 5.5m, mud, about 0.8 mile W of **Pointe Pandop** (20°35'S., 164°17'E.).

Directions.—Vessels with local knowledge and drafts greater than 7m heading N inside the barrier reef from Cap Deverd or Baie de Gomen, should keep Cap Deverd bearing 093°, astern, remaining on this course until Ile Deverd bears 107°, astern, which leads out of Passe Deverd. This course passes S of and avoids the shoals with depths of 6.6 to 8.2m, lying 2 to 4 miles NE of the N end of Grand Recif Mathieu. Vessels then re-enter via Passe de Koumac.

Vessels with local knowledge and a draft of less than 7m can proceed N through Chenal Kendec; at the S entrance, Ile de la Table will be seen slightly W of Ilot Kendec, and the vessel should steer through the middle of the channel to a position 1 mile N of Ilot Kendec; then steer for the red beacon on the W side of Recif de l'Infernet, bearing 325°, until about 1 mile from it, when the vessel should steer 300° until the same beacon bears about 350°, and then steer to pass about 0.2 mile SW of the red conical buoy about 0.5 mile SW of Ile de la Table, then N through Passe du Baron, passing E of the red buoy, lying 0.5 mile NW of the NW extremity of Ile de la Table; then vessels should steer about 358° for the anchorage in Baie Paagoumene. If proceeding N of this bay, vessels should steer 328° after passing Recif Leleizour, which leads NE of Ilot Double.

Vessels with local knowledge proceeding N through Chenal de la Fine from Baie de Gomen, should follow the shore maintaining a distance of about 0.5 mile until SW of **Pointe Keremb** (20°38'S., 164°19'E.). Vessels should then head for Ilot Magonne, bearing about 310°, and pass SW of the beacon marking the SW limit of the reef extending S from Ilot Tangadiou. Then change course N heading through the channel between Ilot Tangadiou and Ilot Magonne. Then pass NE of Recif Leleizour and SW of the rock, which dries 0.3m, and the two patches each with a depth of 3.2m, lying between Recif Leleizour and Baie Paagoumene. Cap Tonnerre bearing 335°, open SW of Pointe Paagoumene, about 5.8 miles SSE, leads SW of these rocks on the NE side of the channel.

5.40 Baie Paagoumene (20°29'S., 164°11'E.) is entered between Pointe Paagoumene and Pointe Elvie, about 0.5 mile SE. Paagoumene is a port for chrome ore, loaded by a conveyor,1200m long, extending from Pointe Elvie. Ships can moor

to two dolphins and six buoys located off the end of the conveyor. During the winter, choppy seas may require loading to be suspended.

Pilots should be obtained from Noumea.

Vessels with local knowledge can obtain anchorage in depths of 5.3 to 6.9m along the beacon alignment starting 0.5 mile from Pointe Paagoumene. The anchorage is exposed to onshore winds. The E pair of range beacons have been reported destroyed. Deeper draft vessels anchor further out, in depths of 11 to 12m.

A wreck having a least depth of 6.9m, lies 0.5 mile N of Pointe Paagoumene.

Baie d'Ohland (20°28'S., 164°10'E.) is a slight indentation in the shore lying between Pointe Paagoumene and Cap Tonnerre, almost 6 miles NNW. During SE winds, temporary anchorage, in a depth of about 8m, may be found with Pointe Paagoumene bearing 160°, distance 0.75 mile. During NE winds, violent squalls come down from Mont Tiebaghi.

Ilot Double (20°28'S., 164°07'E.), which fronts Baie d Ohland, is comprised of two islets lying on a reef 2.75 miles WNW of Pointe Paagoumene. Two shoals, with depths of 9.2m and 8.1m, lie about 1 mile W and 0.5 mile SW, respectively, of the N Islet Double. An 11m patch lies 1 mile E of this islet.

5.41 Baie de Nehoue (20°20'S., 164°08'E.), located between Pointe de Babouillat and Boh Island, about 4.5 miles NW, is encumbered by several islets and many coral reefs, making its shore difficult to approach.

The islands fronting the approaches to Baie de Nehoue are Ilot Yan'dagouet, Ilot Tiam'bouene, and Ilot Ouanne, lying 6.3 miles SW, 5.5 miles W, and 5.7 miles WNW, respectively, of Pointe de Babouillat. Ilot Ouanne lies on the SE side of Recif Ouanne. A 6m depth lies 1.25 miles WNW of Ilot Yan'dagouet. A sand cay lies 1 mile SW of Ilot Ouanne.

Ilot Ti'ac lies about 3 miles NW of Cape Tonnerre. Ilot Tien'ghiene and Ilot Neangambo lie 1 mile ENE and 1.75 miles NE, respectively, of Ilot Ti'ac.

Tides—Currents.—Tidal currents between Passes de Koumac and Baie de Nehoue, within the barrier reef, set SE and NW.

Depths.—Approaches to Baie de Nehoue have been surveyed as indicated on the chart.

Anchorage.—Baie de Nehoue has few positions where vessels with local knowledge might find anchorage. The best berth, in a depth of about 7.3m, lies about 0.3 mile E of the largest islet lying close off the S entrance point of the bay. Ore carriers anchor 0.4 mile W of Pointe de Babouillat in depths of 10 to 15m to be loaded from barges.

During the prevailing SE winds, there is a choppy sea in the N part of Baie de Nehoue.

Babouillat Anchorage (20°22.2'S., 164°06.1'E.) lies 0.3 mile S of Ilot Tien, with depths of 13.8 to 18m, good holding ground. Ships load chrome ore concentrates from barges at this anchorage.

5.42 Passe de la Gazelle (20°23'S., 163°57'E.) is entered between the NW end of Grand Recif de Koumac and the SE end of Grand Recif de Poum, and it is difficult to make out from seaward. Ilot Carrey, on which stands a beacon, a sandy islet lying on a reef, is sufficiently visible and divides the passage into North Pass and South Pass. The beacon on the islet, in line with the summit on Ile Tanle, 7.5 miles ENE bearing 060°, leads towards the entrance to Passe de la Gazelle. North Pass, between Ilot Carrey and Poum Reef, appears to be preferable, because the tidal currents are not as strong as in South Pass and set in the direction of the pass. North Pass has depths for most any size vessel, while South Pass possesses a least depth of 15.4m. Passe de la Gazelle requires local knowledge for use.

Directions.—Sommet Poum (20°16'S., 164°03'E.), 414m high, bearing 035°, leads through North Channel. When Ilot Carrey bears 180°, vessels should head for the dome-shaped Dome de Tiebaghi, taking care to avoid the 7.6m shoal and the sand cay lying 3 miles E and 3.5 miles ENE, respectively, of Ilot Carrey.

If using South Pass to enter Passe de la Gazelle, vessels should round the N end of Grand Recif de Koumac by eye, and when Ilot Carrey bears 000°, head for Baie de Nehoue as described above, taking care to avoid the 9.9m shoal, which lies 5 miles WNW of Cap Tonnere.

5.43 Baie de Tanle (20°18'S., 164°04'E.), located just N of Baie de Nehoue, is sheltered against all winds except those from the SW, and is said to be the only place in the NW part of the SW coast of New Caledonia where it would be possible for a vessel to ride out a hurricane. This bay, which requires local knowledge for entry, is fronted by Ile Boh, on the E, Ile Tanle and Ilot Maaboun'ghi on the S, and Recif Bammahame on the SW. There is a narrow channel, available only to small craft, between the W side of Ile Boh and Ile Tanle.

Recif Bammahame, upon which is a narrow sand ridge which dries, lies about 0.5 mile W of Ile Tanle. Another reef lies about 1.8 miles further WNW.

Vessels with local knowledge can obtain anchorage in the S part of Baie de Tanle. The best berth, in a depth of 7.3 to 9.1m, lies with the mound on the E end of Ile Tanle bearing 180°, and the S end of Ilot Maaboun'ghi in line with the NE end of Ile Tanle, bearing about 269° and the SW end of Presqu'ile de Poum bearing about 289°, open slightly of the same point. Vessels can anchor close E of Ilot Maaboun'ghi.

The N part of Baie de Tanle, Baie de Pouani, dries, and vessels should not proceed N of the parallel of the S summit of Presqu'ile de Poum or E of the meridian of the summit of Ile Tanle.

Directions.—Vessels with local knowledge navigating the inner passage from a position NE of **Ilot Double** (20°28'S., 164°08'E.) should continue steering 328°. Those vessels bound for Baie de Nehoue should change course to 031° when Cap Tonnere bears 094°, passing between the S entrance point of the bay and Ilot Tien'ghiene. Those vessels bound for Baie de Tanle should continue on the above 328° course as far N as Recif Bammahame. Then change course NE and pass N of this reef on a course of 086°, by keeping the small cliff on the N end of Boh Island open slightly to the right of the SE point of the peninsula, located just N of the island. This course clears the sunken spit that projects N from Recif Bammahame.

Presqu'ile de Poum (20°16'S., 164°01'E.), whose SE side forms the NW side of Baie de Tanle, rises to a height of 414m

at Sommet Poum. The peak on this peninsula's NW side is pointed and easily made out. Ile Neba and Ile Yande to the NW of the peninsula cannot be mistaken for any other land.

Caution.—A patch, with a depth of 5.5m, lies about 3.5miles W of the S end of Presqu'ile de Poum, and a reef that dries lies the same distance WNW.

5.44 Baie du Croissant (Baie d'Ohope) (20°17'S., 164°02'E.) indents the SW side of Presqu'ile Poum and affords excellent protection against the prevailing SW winds. However, during strong E or NE winds, heavy squalls descend from the high land of Presqu'ile Poum into the bay as well as along the entire W side of the peninsula. A small reef lies off the bays S entrance point.

Vessels with local knowledge can obtain anchorage in Baie du Croissant, in depths of 12.8 to 14.8m, mud, about halfway between the bays entrance Points.

Passe de Poum (20°15'S., 163°53'E.) lies about 9 miles NW of Passe de la Gazelle, and it is about 1.5 miles wide between the SE end of Grand Recif des Nenema and the N end of Grand Recif de Poum. During the change of tide, a bore is encountered in the passage. Tidal currents can reach 2 knots in Passe de Poum.

Directions.—Vessels with local knowledge can transit Passe de Poum with Sommet Poum, 414m high, bearing 092°. Vessels bound N after entering the passage head for **Ilot Mouac** (20°13'S., 164°01'E.), bearing about 077°, until the W end of Ile Baaba opens E of Ile Neba, bearing less than 359°, then change course heading N to pass between Ile Neba and **Walat** or **Roche Percee (Rocher Oualaouate)** (20°10'S., 163°59'E.) which dries, and is marked by a lighted beacon,.

5.45 Baie Banare (20°12'S., 164°01'E.) is entered between Presqu'ile de Poum and Presqu'ile Bouabon'do, about 5 miles N; its shores are coral-fringed and several islets and rocks lie within it, which are best shown on the chart. The islets are all wooded or cultivated and coral-fringed. The village of Bouemanda lies on Pointe Bouemanda, the N end of Presqu'ile de Poum.

The area between the N side of Presqu'ile de Poum and Ile Mouac is known as Canal Mouac. This passage is about 0.3 mile wide between reefs on either side and has a least depth in the fairway of about 5.8m. A 4m patch, marked on its NW side by a buoy, lies about 0.6 mile SW of the SE end of Ile Mouac. Canal Mouac provides access for vessels with extensive local knowledge to the anchorage in the S part of Baie Banare for vessels from the S.

Anchorage.—The anchorages described below all require extensive local knowledge.

Temporary anchorage may be taken on the S side of the entrance to Canal Mouac, about 1.3 miles WSW of Pointe Bouemanda, in a depth of 7.6m, sand. There is a landing stage, 20m long, with a 3m depth alongside, situated about 0.5 mile ESE of Pointe Bouemanda.

The best protected anchorage lies about 0.3 mile ENE of Pointe Bouemanda, in a depth of 7.3m, sand and mud.

Anchorage may be found about 10.1 mile NE of the NE end of Ilot Mouac, in a depth of 10.1m, sand and mud, taking care to avoid the shoal extending WNW from Ilot Yeuoe. Anchorage may be obtained, in a depth of about 6.4m, about 0.5 mile NE of Rocher Pouragan, which lies on the reef fringing the SE end of Presqu'ile Bouabon'do, with the NW ends of Ilot Paaio and Ilot Pionne in line, bearing 221°, open SE of Rocher Pouragan.

There are several other anchorages for small vessels, protected from SE winds. These are 0.2 mile ENE of Ilot Yeuoe, in a depth of 5.8m; about 0.2 mile NNE of Recif Bai, situated 0.35 mile N of Ilot Yeuoe, in a depth of 5.8m; and 1.25 miles NNE of the N extremity of Ilot Nen'diale about 0.5 mile offshore, in depths of 5.8 to 7m, mud.

Directions.—Vessels with extensive local knowledge utilizing Canal Mouac pass S of the red buoy marking the shoal SW of the Ile Mouac and N of the black buoy, whose position is approximate, lying about 0.9 mile SW of Pointe Boueman'do When the NW end of Ile Mouac bears 327°, steer about 055°, passing E of the shoal off the SE coast of Ile Mouac and then to the anchorage.

Vessels approaching the anchorage off Pointe Bouemanda from the N, should pass off the W sides of Ilots Yaba and Paaio, and then pass E of Ilot Touaye to avoid the foul ground.

Ile Neba (20°09'S., 163°56'E.), the W of the islands lying off Baie Banare, is flat in the center with several hills at either end, and is covered with coconut palms. Vessels with local knowledge can obtain temporary anchorage, in a depth of about 16m, off the middle of the W side of Ile Neba.

Basse LoLo, a rock with a depth of 4m, lies about 1.8 miles S of the SE end of Ile Neba. Depths of 5.1m and 6.9m lie 1 mile WSW and 2 miles ESE, respectively, of Basse LoLo. A patch, with a depth of 8m, whose position is doubtful, lies 3 miles WNW of the N end of Ile Neba.

5.46 Ile Baaba (20°03'S., 163°59'E.) lies off the NW extremity of New Caledonia, being separated from it by a narrow boat channel. The E side of Ile Baaba is clear of dangers; the W side has a reef projecting about 2.3 miles W from its N end, and there are several islets on it.

Ilot Yenghiebane, lying close S of Ile Baaba, is a dull red-colored islet with a village on its NE side. Small vessels with local knowledge can obtain anchorage, off the NW side of Ilot Yenghiebane, in depths 7 to 11m. A 5m patch, whose position is approximate, lies about 1.3 miles W of the W side of the islet.

Ile Yande (20°03'S., 163°49'E.), rising to 326m in its N part, lies about 7.5 miles W of Ile Baaba. The E side of the island is bold, while the W side has a gentle slope. There are coconut plantations in the island. A reef extends along the islands SW shore.

Vessels with local knowledge can obtain anchorage, in a depth of about 22m, sand and coral, protected from the prevailing SE wind off the W side of Ile Yande, with the NW end bearing 047° and the W end, bearing 152°. There is a continuous swell at the anchorage. During SW winds, vessels may obtain anchorage off the middle of the E side of Ile Yande, where there is a beach bordered by coconut palms.

Passe d'Yande (20°05'S., 163°46'E.) is between a detached reef close off the NW end of Grand Recif des Nenema and Recif Francais. The sea breaks heavily over Recif Francais. Passe d'Yande is over 1 mile wide and free of dangers in the fairway. The summit of Ile Yande, bearing 045°, leads through the passage, then the track leads in a 337° direction between Recif des

Francais and Ile Yande.

Tidal currents in Passe d'Yande attain rates up to 3 knots.

Directions.—From a position about 2.5 miles W of Ile Tanle, vessels with local knowledge should steer 342°, which leads 0.35 mile W of Pointe de Poum, the W end of Presqu'ile de Poum. Continue on this course passing W of Ile Pi-onne, Rocher Oualaouate, and passing E of Ile Neba. Vessels bound for Iles Belep, after passing Ile Pi-onne, steer 321° as far as Ilots Daos, which may be passed on either side.

Ile Ti'a (19°59'S., 163°56'E.) lies about 2.5 miles NW of the N end of Ile Baaba. A reef extends nearly 0.8 mile S from the islets S shore. A rock lies about 0.5 mile SW of the W side of Ile Ti'a.

Recif de l'Arche d'Alliance (19°52'S., 163°51'E.), located 7 miles NW of Ile Ti'a, is over 1 mile long N-S, and generally breaks during SE winds. A reef that uncovers is located 4 miles NE of the N end of Ile Pott. Another reef is reported to lie 6.5 miles NE of the N end of Ile Pott.

New Caledonia—Northeast Coast

5.47 The NE coast of New Caledonia, like the SW coast, has an off-lying barrier reef extending its entire length. Within the barrier reef the depths vary from 40 to 90m. The bottom is generally hard rock and coral, and although there is mud in places, it is only a thin layer. Vessels should use only recommended anchorages. During bad weather, vessels should seek a safe anchorage or proceed to sea by the first safe passage.

Port Yate (22°09'S., 166°54'E.) is the estuary of the Riviere Yate, a large stream which flows into the head of the port. Mount Guemba, 591m high, stands about 1 mile S of the port and is conspicuous. The fairway is very narrow and difficult, even for small vessels. The old Yate light in line with a tower atop Mount Guemba, bearing 233°, leads through the reefs. Vessels should not use the port unless it is absolutely necessary. Depths in the port range from 5.8 to 12.8m. There is a small wharf in the port which is used mainly by small craft. A light is shown from a tower on a white building, situated about 1 mile SSW of the S entrance point of the port; the light structure is conspicuous, however, it is no longer in operation. Two leading beacons, in line bearing 283°, are situated on the N side of the port.

Port Ounia (22°02'S., 166°51'E.) is entered about 2.5 miles WNW of the Riviere Mamie. The port is protected from the N by Recif Kouanne, which is awash, and lies about 0.3 mile offshore. The reef is marked by a beacon on the SE end; prominent black rocks mark the NW and SE ends of the reef. Between Port Yate and Port Ounia, there is no anchorage between the barrier and coastal reefs; the sea is at times very rough, and the bottom is rocky. A shoal, with a depth of 4.6m, lies 0.25 mile SW of the W end of Recif Kouanne. The port can be entered on either side of Recif Kouanne, but the E side is mainly for small vessels. The W entrance is marked by two white beacons, in line bearing 141°. Anchorage may be obtained, in a depth of 23m, mud, good holding ground, 0.4 mile on a bearing 266° from the rock that lies SE of Recif Kouanne.

Port Ounia to Thio

5.48 The coast between Port Ounia and the entrance to the Riviere Pourina, about 4.5 miles WNW, is fringed by a narrow reef, a 0.3 mile off of which there are depths of about 15.7m. About midway between the port and the river there is a conspicuous black rock lying on the coastal reef. Two reefs, which always break, lie 2.25 miles NE and 2.5 miles NNE, respectively, of the black rock. A patch, with a depth of 3.7m, lies about 0.5 mile E of the SE extremity of the N reef.

Cap Tonnedu (21°59'S., 166°46'E.) is a salient point recognizable from the sea. A shoal, with a depth of 5.8m, lies about 0.4 mile NW of the rock off Cap Tonnedu. Baie Ouinne is entered between Cap Tonnedu and Pointe Ouinne, about 2.8 miles NW. Anchorage may be obtained by vessels with local knowledge, in a depth of 30m, mud, off the W of Cap Tonnedu, with the point bearing 040°.

Baie Kouakoue (21°55'S., 166°39'E.) is entered 6.25 miles NW of Cap Tonnedu. Cap de Kouakoue, the SE entrance point, is visible a considerable distance from the East. A small wooded bluff, nearly 1.5 miles W of Cap de Kouakoue, divides the bay into two parts. Passe de Kouakoue, the passage through the barrier reef, is not recommended. The bay affords anchorage, in a depth of about 38.4m, good holding ground, in its SE part.

Between **Ilot Porc-Epic** (21°55'S., 166°37'E.) and the mouth of the Riviere Comboui, 11 miles NW, the coast is exposed to the heavy sea, due to the break in the barrier reef, which renders it generally unapproachable. Vessels should not approach within 2 miles of this stretch of coast.

The break in the barrier reef lying off this part of the coast is divided into three passages, Passe Sud-Est du Solitaire, Passe Nord-Ouest du Solitaire, and Passe Pavee, by Recif du Solitaire and two small reefs NW of it.

5.49 **Recif du Solitaire** (21°48'S., 166°38'E.) is a detached rocky reef, on which the sea always breaks, and lies about 6 miles N of Ilot Porc-Epic. It can be identified from a distance by the breakers and a small rock on its SW edge.

Passe Sud-Est du Solitaire is deep and nearly 2 miles wide between the reef on either side, and is considered to be the best passage through the barrier reef off the E coast of New Caledonia. Ilot Por-Epic, bearing 198°, leads through the middle of the passage.

Passe Nord-Ouest du Solitaire (21°47'S., 166°38'E.), on the NW side of Recif du Solitaire, is 0.75 mile wide and deep in the fairway. Mont Humboldt, bearing 244°, leads through this passage. **Passe Pavee** (21°47'S., 166°36'E.), which is separated from Passe Nord-Ouest du Solitaire by the two reefs lying NW of Recif du Solitaire, has a width of 1.25 miles, but the width of the fairway is reduced to 0.5 mile by two rocks lying in the middle of the passage. This reef is hazardous because the landward side of the reef almost always breaks while the seaward side may not.

Passe Est de Ngoe, 2.75 miles NW of Passe Pavee, is about 1 mile wide and is deep in the fairway. Passe Nord de Ngoe, about 4.5 miles NW of Passe Est de Ngoe, is about 0.5 mile wide between the sunken edges of the reefs on either side, and deep in the fairway and its approach. Ilot Sinde, bearing 176°, leads through the middle of the passage.

5.50 Baie Ngoe (21°47'S., 166°30'E.), in the NW part of which is Port Comboui, is an open anchorage about 10.5 miles NW of Ilot Porc-Epic, encumbered with coral heads. Recif de Ngoe is an extensive reef lying about 1 mile offshore and forms the E side of Port Comboui. Near the NW end of the reef lies a sandy islet.

Anchorage may be obtained by vessels with local knowledge, in a depth of about 27.4m, good holding ground, off the mouth of the Riviere Comboui. Anchorage is also available, in a depth of 25m, 0.9 mile E of the S mouth of the Riviere Comboui, on the alignment of two pairs of white pyramidal beacons.

Ilot Mamere (21°45'S., 166°30'E.) is a wooded islet lying on a reef 0.75 mile NW of Recif de Ngoe. A rock, with a depth of 4m, lies 0.4 mile SSW of Ilot Mamere. Between the islet and the coast is Passage Sud de Mamere, a deep muddy channel about 0.5 mile wide between the reefs on either side, which are defined and steep-to. Tupeti Island lies at the N end of Mamere Channel and is a conspicuous landmark. The tidal current in Passage Sud de Mamere is weak.

Port Bouquet (21°41'S., 166°21'E.) is accessible by three passages, known as Passe Sud-Est, Passe Centrale, and Passe Nord-Ouest. There are many dangers in the port, which requires local knowledge for entry. Vessels may anchor in any part of the port where there is room to swing clear of the coral shoals lying offshore. The best anchorages are in the middle of **Anse Tou-peti** (21°41'S., 166°25'E.), and in **Anse Nemou** (21°40'S., 166°22'E.), off the N side of Ile Nemou, and SW of Pointe Nemmeni, in a depth of 29.3m, good holding ground, with the SW extremities of Toupeti Island and Nemon Island in line bearing about 121°.

Ilot Kinde (21°36'S., 166°20'E.), located on a coral reef 3 miles N of Pointe Nemmeni, is wooded and surrounded by a sandy beach. Although small and low, the islet is conspicuous. Numerous coral heads are located in the vicinity of the islet and some are in the track of vessels passing N of Port Bouquet. Ilot Nileouti, located on the barrier reef about 3.5 miles NW of Passe Tupeti and 1.5 miles SE of Passe Thio, is surrounded by a sandy beach and covered with trees. It is a good mark for vessels making Passe Tupeti or Passe Thio.

5.51 Passe Thio (21°32'S., 166°19'E.) is entered between Ilot Nileouti and a reef marked by a lighted beacon, 1.25 miles West. A set of range lights stand on the shore. These lights are 395m apart and the front light stands 8m high on a pylon in position 21°36.5'S, 166°12.5'E. The lights are aligned on 227°, with an intensified sector range between 224°-230° that leads within the limits of the recommended track.

Rade de Thio (21°36'S., 166°14'E.) is located between the NW end of the chain of reefs extending NW from the N extremity of Pointe Nemmeni and the coast SW. The roadstead has depths of 9.1 to 18.3m, good holding ground, but is not sheltered. An ore berth here will accept vessels up to 170m in length, with a breadth of 26m and a draft of 10.8m.

Pilotage.—Pilotage is compulsory. Pilots can be obtained from Noumea with 24 hours notice. Berthing is not permitted at night. Pilot boards in the vicinity of 21°09.1'S, 165°44.4'E.

Anchorage.—Anchorage may be obtained in Rade de Thio, N of the small craft harbor, in depths of 11 to 18m.

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Ore berth at Rade de Thio

Note.—The ore conveyor, mentioned above, is located in position 21°36.9'S, 166°14.9'E.

5.52 Baie de Nakety (Baie de Nekete) (21°31'S., 166°05'E.) lies about 10 miles NW of Thio and is easily recognized by Ile Nani on its NW side. The island divides the bay into two parts, the N part is known as Anse de Lavaissiere. The two parts of the bay are connected by a boat channel, SW of Ile Nani. The Riviere Ouen Nekete, which discharges into Baie de Nekete, is available to vessels drawing less than 2.4m to reach the town of Nekete.

Anchorage.—Anchorage is afforded vessels in Baie de Nekete in its SE sector, about 0.7 mile from shore, in a depth of 25.6m bearing 215° from the E headland. Anchorage is also afforded in Anse de Lavaissiere, in a depth of 25m, in the SE part, near a small sandy beach at the SW end of which is a stream. An anchorage, used by ore carriers up to 10,000 dwt, is situated about 0.5 mile SSE of the summit of Ile Nani. The anchorage is on the alignment of two pairs of privately-owned beacons standing in the hills on the E side of the bay; one pair in line bears 160° and the other pair in line bears 071°.

Baie de Canala (21°28'S., 165°57'E.) lies on the W side of Presquile de Bogota, and is entered W of Cap Dumoulin. The shores are indented by several coves which afford shelter from winds and seas. The W shore is free of dangers. Some patches, with depths of 5.5 to 10m, lie about 0.4 mile from the SW shore of the bay. A vessel bound to Baie de Canala from seaward should enter the barrier reef through Passe de Nekete or by one of the other passages farther SE, and a vessel leaving the bay should proceed through **Passe de Canala** (21°18'S., 165°57'E.), which is marked by a beacon on its NE side.

Anchorage.—Anchorage may be obtained in any part of the bay. Port d'Urville, in the SE corner of the bay, affords good anchorage, in depths of 14.6 to 16.5m, off the mouth of the Riviere Canala. Vessels sheltering for the night can anchor in the small bay on the E side of Baie de Canala, about 1.5 miles S of Cap Dumoulin, in a depth of 29.3m, about 0.2 mile SSE of the N entrance point to this small bay.

Baie Laugier (21°23'S., 165°51'E.), entered between Cap Begat and the NE extremity of the peninsula which separates it from Baie Kouaoua, about 1 mile SW, is deep and safe, except at its head, where it is encumbered with reefs and shoals. The reef which fringes Cap Begat extends nearly 0.3 mile SW, but the shores of the bay inside its entrance points are almost entirely free of fringing reefs.

5.53 Baie de Kouaoua (21°23'S., 165°49'E.) (World Port Index No. 57275) lies about 2 miles W of Baie Laugier and is separated from it by a promontory. The port handles vessels loading ore.

Depths—Limitations.—The channel is narrowed to about 0.2 mile before reaching the anchorage, between a protruding point on the E side and a shoal flat which extends from the W shore. The head of the bay is foul for about 1.3 miles from the mouth of a stream which discharges into it. There are some shoals in the bay, which are marked by buoys and can best be seen on the chart.

A wharf on the W side of the bay will accommodate vessels up to 160m in length, with a draft of 8.5m. Vessels at the anchorage are loaded via lighter.

Pilotage.—Pilotage is compulsory. The pilot boards in the vicinity of position 21°09.1'S, 165°44.4'E.

Anchorage.—Two white beacons at the head of the bay, in line bearing 152°, lead to the anchorage in depths of not less than 12.8m. A pair of white beacons on the W shore, in line bearing 252°, give the position of the anchorage. Vessels may anchor, in a depth of 29.3m, about 1 mile S of Cap Begat, with the W entrance point bearing 295°.

The most sheltered anchorage in the bay is about 0.5 mile SSE of the second protruding point on the E side. In case of necessity anchorage may be obtained N of the promontory, in a depth of 29.3m, good holding ground. There is also anchorage in Baie Laugier, 1.25 miles S of Cap Begat, in 28m, with the W entrance point bearing about 295°.

Caution.—Depths may be less than the charted values due to silting.

5.54 Baie de Kouea (21°21'S., 165°49'E.) is located 3.25 miles W of Cap Begat. The entrance is open to the N and is about 0.4 mile wide. Anchorage may be taken, in 14.6m, with Cap Begat in range with the wooded rock standing on the reef that extends from the E entrance point of the bay. Baie de Koua, located just NW of Baie de Kouea, can only be used by small craft. There is a conspicuous wharf near the mouth of the river which discharges into the bay.

Cap Koua may be recognized from the SE by the prominent angle it forms in the coast line and by a rock in the form of a sugar loaf, the extreme point of which appears a little E of the sloping cliffs of the cape, which attain a height of 88m. A 2.8m and a 1.8m patch, both dangerous, lie 2 miles and 3 miles E, respectively, of the cape. **Cap des Trois Sapins** (21°18'S., 165°44'E.) lies 1 mile W of Cap Koua. It is a salient, round, black rock or hill, and is connected with the land behind by an isthmus. The cape is fringed by a reef which extends nearly 90m offshore, and extends W along the shore of Baie de Poro.

5.55 Baie de Poro (21°18'S., 165°43'E.) lies between Cap des Trois Sapins and a point about 2 miles to the W. A chain of reefs extends nearly 4 miles along the coast from a position about 1 mile W of the above cape. The middle and largest of these reefs is separated from the coast by a channel about 135m wide, with depths of 4.4 to 14.6m, which is practicable for small vessels with local knowledge.

A ruined church stands on the W shore of Baie de Poro, about 1.8 miles WSW of Cap des Trois Sapins and is conspicuous. A reef on which there is a sand cay lies 2.5miles N of Cap des Trois Sapins. A beacon stands on the W end of this reef. A shoal, marked on its W side by a buoy, lies 0.75 mile NNW of Cap des Trois Sapins. A 5m patch, marked by a lighted buoy, lies 2 miles NNW of the above cape.

Ilot Toveru (21°16'S., 165°40'E.), which is low and wooded, lies on the W reef of the above chain. A beacon stands on this islet. There are two navigable channels through the reefs SE of the islet. The E is 0.2 mile wide and clear of dangers. Shoals, with depths of 4 to 7.1m, obstruct the fairway of the W channel, which is 0.25 mile wide between the reefs. A light is shown on the head of a wharf 0.1 mile WSW of Cap des Trois Sapins.

The pier, which has an ore loader at its end, will accommodate vessels up to 170m long, with a maximum draft of 10m.

Pilotage.—Pilotage is compulsory. See the Noumea Port description in paragraph 5.21 for details on pilotage and regulations. Berthing is accomplished during daylight hours only.

Anchorage.—Anchorage is available on the range line, about 0.3 mile from shore, in an area dredged to 10m.

5.56 Houailou (21°17'S., 165°38'E.) is a village situated 1.5 miles W of Ilot Toveru. Cargo is worked at the anchorage and landed at a wharf near the village. The anchorage is SW of the reef lying SE of Ilot Toveru, in a depth of 16.5m, about 0.4 mile offshore. It was reported vessels should anchor NE of Morne de Houailou during the Southeast Trades, in preference to the above anchorage.

Ilot Neni (21°15'S., 165°41'E.), located 1.5 miles NE of Ilot Toveru, is low and covered with palm trees. On the W side of the reef which surrounds the islet is a small sand cay, visible only at a short distance. About 0.5 miles W of the islet is a sunken reef, upon which the sea seldom breaks in ordinary weather; at LWS, three rocks show on this reef. A 5.2m shoal, marked by a buoy, lies about 2 miles ESE of the islet.

Cap Bocage is a headland, 287m high, at the SE extremity of a deep-sided promontory, about 4 miles to the NW. The isthmus at its W end, which connects it to the mainland, is very low. When seen from the SE it resembles a high island. **Baie de Lebris (Baie de Ba)** (21°13'S., 165°36'E.) is located on the S side of Cap Bocage. The depths decrease from 10.9m in the entrance to 4.5m half way up the bay, and are very shallow in the inner part. The best anchorage, in 7.3m, lies 1.5 miles WSW of Cap Bocage. It is better to anchor nearer the N shore than the S, as there is always a heavy sea on the latter. Landing is also best on the N shore.

Passe Est de Houailou (21°11'S., 165°48'E.) is an opening in the barrier reef 8.5 miles NNE of Cap Bocage. Near the middle of the passage is a rock with a depth of 4.6m, which reduces the width of the navigable channel SE of it to about 1.3 miles. The channel NW of the rock is further obstructed by several other rocks, with depths of 1.8 to 2.7m, lying within 0.5

mile S of the reef on which Ilots Maronu lie, which forms the NW side of the passage.

In the middle of the pass the ebb current sets NE, near Ilots Maronu the flood sets SW, and along the reef on the SE side of the passage the flood sets SE. The leading mark through this passage is Cap des Trois Sapins, bearing 207°.

Passe Ouest de Houailou (21°09'S., 165°45'E.) lies 6.5 miles NW of Passe Est de Houailou. The passage is 4 miles wide, but is encumbered by a group of three shoals, with depths of from 2.7 to 4.6m, which reduces the width of the navigable channel on their SE side to about 1.5 miles. A lighted buoy marks the SE side of a 5m shoal on the NW side of the SE channel.

Pilots for the above two passages boards in the vicinity of position 21°09.1'S, 165°44.3'E.

Passe Saint Exupere and Passe d'Ugue, about 3 miles and 6 miles NW, respectively, of Passe Quest de Houailou, are encumbered with dangerous rocks, rending them unsuitable for passage.

Baie Lebris (21°13'S., 165°36'E.) is located on the S side of Cap Bocage. The depths decrease from 10.9m in the entrance to 4.5m halfway up the bay, and are very shallow in the inner part.

5.57 Baie Ugue (21°09'S., 165°33'E.) (World Port Index No. 57325), 5 miles NW of Cap Bocage, is a small cove about 1 mile long and 0.3 mile wide between the reefs off the entrance points. The NW entrance point is wooded with pine trees. The shore reef on the S side is moderately steep-to, but a shoal which dries lies off the W end of the reef. The head of the bay, into which a river discharges, is foul and shallow. Small craft can anchor W of the drying shoal and larger vessels can anchor NE of the shoal, in a depth of 12.8m, the holding ground is good.

An ore loader stands on the SE entrance point of the bay. Two ore berths are available here, the largest of which will accommodate vessels up to 190m in length, with drafts of 11m.

Pilotage.—Pilotage is compulsory. See the Noumea port description in paragraph 5.21 for details on pilotage and regulations.

5.58 The **Riviere Moneo** (21°08'S., 165°30'E.) discharges 3 miles W of Baie Ugue. Vessels may anchor off the mouths of the river, in depths of 16.5 to 20.1m, SSE of Moneo Shoal. A buoy marks the S side of this shoal. The Riviere Mu discharges 4 miles NW of the Riviere Moneo, from which it is separated by a precipitous headland. A sandy beach extends from the headland to the entrance of the river, which when seen from the E is marked by a low point covered with trees.

Ilots Harcourt, consisting of Ilot Ague and Ilot Karu, lie on reefs 2 miles N and 3.75 miles NNW, respectively, of the W entrance point of Baie Ugue. The islets are wooded and are useful marks for avoiding the adjacent dangers. There is an extensive detached reef between the two islets; three detached shoals lie within 3 miles WNW of Ilot Karu.

Basses Bayonnaise (21°01'S., 165°30'E.) are a dangerous group of reefs and shoals about 3 miles NNW of Ilot Karu. In the middle of the group there is a reef nearly awash, and at the N end, about 5 miles from Ilot Karu, there are some patches, with depths of 0.9m. A 4.9m patch lies 3.25 miles E of the reef awash. Caution is necessary when navigating in this vicinity.

The Riviere Ponerihouen discharges 3 miles NW of the Riviere Mou; the coast between them is covered with mangroves. The village of Ponerihouen stands about 2 miles above the mouth and can be reached by boats. Vessels may obtain temporary anchorage, in good weather, in depths of 11 to 19.8m, with the N extremity of the mangroves on the S side of the entrance to the river bearing about 247°, distant about 0.5 mile.

Ilot Saint Ignace (21°02'S., 165°25'E.) lies about 1.5 miles N of the mouth of the Riviere Ponerihouen. It stands on a reef from which points project both N and S. Between the island and the shore reef there is a narrow, crooked passage, in which boats may find good shelter.

Anchorage, sheltered from the trade winds, can be obtained under the lee of Ilot Saint Ignace, in depths of 4 to 7.9m, but getting away from the anchorage at night is difficult.

Cap Baye, about 4 miles N of the **Riviere Tchamba** (21°01'S., 165°24'E.), from the SE appears as a mountainous headland with two summits. Between the foot of the mountains in the background and the coast is a narrow plain, bordered by palm trees.

5.59 Passe du Cap Baye (20°58'S., 165°32'E.) is located 6 miles E of Cap Baye. The passage is about 1.5 miles wide and is deep in the fairway. Shoals, with depths of 4.9m and less, extend 1.5 miles WSW from the N end of the reef which forms the S entrance point of the passage. The tidal currents in this passage set NW and SE. Passe de la Fourmi is located 5.5 miles NW of Passe du Cap Baye. The channels between the dangers which lie in the passage are narrow and intricate, and should not be used by large vessels.

Ilot Ena (Ilot Tidiauot) lies about 3 miles NW of Cap Baye and about 0.8 mile offshore. The islet is bordered by a sandy beach and covered with pine trees on its SE side. About 1 mile NW of the islet is a reef, which dries at LWS, on which the sea always breaks. This reef is marked close SW by a beacon. A conspicuous white chapel is situated on the coast about 2.5 miles WSW of Ilot Ena. Vessels can obtain anchorage 1 mile SW of the islet, off the mouth of a small stream, in depths of 14.6 to 20.1m. The anchorage is protected from the SE swell by Cap Baye, and from the NE by the barrier reef.

Poindimie, about 4.5 miles W of Cap Baye, the spire of the church and the college, a large white building, are good marks. The college is visible from the barrier reef W of the meridian of Ilot Ena. Anchorage can be obtained off Poindimie, in depths of 14.8 to 24.9m, mud and sand, using the spire and Ilot Ena as marks. There is a small wharf at Poindimie, used by boats.

5.60 Wagap (20°52'S., 165°16'E.), about 5 miles NW of Poindimie, has a stone jetty at the end of an avenue which leads from the settlement to an opening in the coastal reef. Good anchorage may be obtained about 0.5 mile from the jetty, in a depth of 16.5m, sand, with the line of avenue open, bearing 225°, and the low extremity of Cap Baye in line with the S side of Ilot Ena, bearing about 121°. It is not prudent to go closer inshore, as the bottom is foul. A white house, 3.5 miles N of Wagap, is a good landmark.

The tidal currents between Cap Baye and **Cap Touho** (20°48'S., 165°16'E.) set NW on the flood and SE on the ebb, but are greatly influenced by the prevailing wind.

Cap Touho lies about 9 miles NNW of Poindimie; it is a conspicuous headland and is the last of the great projecting capes on the E side of New Caledonia. It is dominated by a high hill, of bright green color, and three clusters of pine trees. A beacon is situated about 0.5 mile E of Cap Touho. Ilot Atit, located on the shore reef NE of the N extremity of Cap Touho, is covered with mangroves. The shore reef at this point reaches out for about 0.8 mile and narrows the main channel between it and the barrier reef to about 1 mile. An aeronautical radiobeacon stands on Cap Touho.

Passe Centrale (20°50'S., 165°23'E.), about 5 miles NW of Passe de la Fourmi, is about 1.8 miles wide, but encumbered in its E part by shoals, with depths of 2.1 to 10.1m. There is a small sand cay on the barrier reef, on the SE side of the passage, about 0.7 mile E of the W extremity of the reef. Passe de la Bonite lies close N of Passe Centrale and is practically a part of Grande Passe de Touho. It is 0.9 mile wide and lies in a NNW-SSE position. The reefs on each side of the passage have a sand islet on them. Although the passage is reportedly clear of dangers in the fairway, it is not recommended.

Grande Passe de Touho (20°48'S., 165°19'E.) lies about 2 miles E of Cap Touho and is the finest passage through the barrier reef on the E side of New Caledonia. It has a width of about 4 miles between Grande Recif Mengalia on the N side and the reef which forms the W side of Passe de la Bonite. Shoals lie within 0.75 mile S of the S extremity of Grande Recif Mengalia, and on the N side of Passe de Touho. Ilot Ain lies 1.5 miles N of the S extremity of Grand Recif Mengalia. It is wooded and surrounded by a sandy beach. It is useful as a landmark.

Cap Touho to Port Hienghene

5.61 Baie de Touho (20°47'S., 165°13'E.), located just W of Cap Touho, is encumbered with numerous heads of coral which render it unfit for large vessels. The bay, however, affords good shelter for small craft.

Anchorage.—Large vessels should anchor outside of the large reef fronting the bay, about 1.5 miles N or NE of the guard house. Shallow draft vessels can anchor, in 5.5m, about 0.1 mile off the end of the wharf, which is situated on the E shore of the bay, close NE of the guard house. The wharf has a depth of 4m.

A small reef, awash, lies 1,100m N of the foot of the hill on the W side of the entrance to **Crique Touho** (20°46'S., 165°11'E.), about 2.5 miles W of Baie de Touho. The reef is marked by a red buoy.

Ilot Ouao (20°43'S., 165°08'E.) lies about 5 miles WNW of the W entrance point of Baie de Touho. It is fringed by a reef, which extends 1.5 miles to the East. The waters on the W side of the reef are incompletely surveyed. Ilot Yengu, about 3.5 miles NW of Ilot Ouao, is fringed by a reef on its NE side, which extends about 0.3 mile offshore. A rock, with a depth of less than 1.8m, lies close SW of Ilot Yengu.

The Riviere Tipindje discharges about 11 miles WNW of Baie de Touho. About 0.8 mile SE of the entrance to the river is a hill, on which stands **Pyramide de la Pindie** (20°44'S., 165°03'E.). About 0.3 mile S of the E entrance point of the river is Rocher Violet, the S most of the curious basaltic rocks which border the coast.

Banc de la Tipindje (20°43'S., 165°02'E.), between Pyramide de la Pindie and Houere (Huere), 2.5 miles NW, extends more than 0.5 mile from shore. The outer edge of the bank is marked by a buoy. It is moored about 0.5 mile NE of the N entrance point of the Riviere Tipindje.

Les Charpentiers is a reef, which dries, lying 3 miles W of Ilot Yengu and 1.5 miles offshore. Ilot Ienga lies about 2.5 miles NW of Ilot Yengu. The islet is wooded and fringed by a reef which extends about 0.4 mile from its E side. Ilot Iehgabate lies on a reef about 3.5 miles WNW of Ilot Yengu. Between these two islets are a number of reefs separated by deep narrow channels. Recif Pulanan lies about 1.5 miles W of Ilot Yengu.

5.62 Port Hienghene (Hyengen) (20°41'S., 164°57'E.) lies 5 miles NW of the Riviere Tipindje, about midway between Cap Touho and Cap Colnett. It is exposed to the wind and sea from the NE and N, and should be avoided under these conditions, but during winds within two points on either side of SE, it affords good shelter. The towers, at the SE entrance point, and Ilot Nindio, at the NW entrance point, are good landmarks. The village of Hienghene is situated on the SW shore of the bay.

Anchorage.—It is not desirable to go too far into the bay. A good anchorage for a small vessel will be found, in a depth of 6.4m, mud, with the towers bearing 090°. A prominent church stands on the NW shore of the bay, 0.5 mile W of Ilot Nindio. A mooring buoy, used by cruise ships, is located 400m W of the towers.

Grande Passe, between Recif Doiman and Dongan-Yengu, is about 3.3 miles wide and deep in the fairway except for Le Cousin, a shoal with a depth of 8.2m. The depths between Grande Passe and the coast are irregular and shoals may exist which are not shown on the chart.

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Port Hienghene—The Towers

Passe de Hienghene (20°36'S., 164°59'E.) is about 3 miles wide between Recif Douok and Ile Hingeabat (Ilot Yeh Hingen). Ilot Tilguitt lies about 1 mile W of Ile Hingeabat. The two above islets are low and wooded, and are separated from the mainland by a narrow channel. On the W side of the reefs surrounding the two islets a buoy is moored.

Passe de Ouaieme (Wiciem) (20°36'S., 164°54'E.), between the reef on which Ilot Tilguitt lies and Recif de Panie, about 2.5 miles NW, is divided into two parts by a shoal, with a depth of 4.9m, near the middle, and a patch, with a depth of 4.6m, lying about 0.4 mile E of the NE extremity of Recif de Panie. **Passe de Puail** (20°35'S., 164°51'E.), separated from Passe de Ouaieme by Recif de Panie, is narrow and dangerous, and is not recommended.

Passe de Tao lies between Recif Tao and Recif Colnett. The passage lies in a NW-SE direction, and is about 0.5 mile wide, but is obstructed in the center of the fairway by two patches, with depths of 8.2m. There are some shoals projecting from the reef on each side, and a patch, with a depth of 2.7m, lies about 0.5 mile NW of the NW extremity of Recif Tao. There is a pier, with a depth of 7m at its head, near Tao Village. Passe de Tao is not recommended.

Cap Colnett (20°30'S., 164°46'E.) is a salient point 15 miles NW of Baie Hienghene. It is the highest part of New Caledonia. The mountains in the vicinity of the cape are nearly all sharp serrated ridges. Sommet Colnett stands about 3 miles SSW of the cape and has an elevation of 1,514m. A shoal, with a depth of 0.6m, lies about 0.5 mile E of the cape, about 0.3 mile offshore.

Cap Colnett to Ile Pam

5.63 Between Cap Colnett and Pointe Nen'diaran, about 30 miles NW, the coastal reef is steep-to. Several small streams discharge, and the resulting breaks in the reef affords shelter to small craft. The NW part is very mountainous and its coast is fringed with mangroves.

Port Henry (20°25'S., 164°38'E.) is situated about 8.5 miles NW of Cap Colnett. Anchorage may be obtained, in a depth of 7.3m, mud and sand, good holding ground. It has been reported that many vessels have ridden out gales without sustaining any damage. There is a jetty at Port Henry.

Passe le Leizour, between the NW end of Grand Recif Colnett and Grand Recif de la Seine, is 0.75 mile wide, but is narrowed by the submerged prolongation of the reefs on either side to about 0.3 mile. The entrance to the passage may be located from the N by the cascade at Tao, bearing 159°, and in clear weather by **Sommet Panie** (20°36'S., 164°47'E.), bearing 170°.

Passe de Pouebo (Passe de Puebo) lies between the NW end of Grand Recif de la Seine and the SE end of Grand Recif Pouma. The white church at Port Pouebo, bearing 226°, leads through the passage. The passage can be identified by its remarkable funnel-shaped entrance. On the NE side of Grand Recif de la Seine is the entrance to a lagoon, which should not be mistaken for a passage through the reefs.

Passe de Balade and Passe d'Amoss, between Grand Recif Pouma and Grand Recif de Cook, are separated from each other by Recif Balade. Passe de Balade is 0.5 mile wide and safe. Passe d'Amoss is not recommended as it has not been surveyed.

The inner passages can best be seen on the chart.

5.64 **Port Pouebo** (20°22'S., 164°35'E.), between the N side of Muelebe Flat and Bailly Point, is about 0.9 mile long and 0.3 mile wide between the steep-to reefs on either side. There is no difficulty entering the port, but it is sufficient to keep midway between Muelebe Flat and the reef fringing Bailly Point. A beacon stands on the NE extremity of Muelebe Flat; a second beacon, reported (1996) destroyed, stands on the NW extremity.

The river which discharges into the port can be ascended by boats as far as the mission station, where there is a conspicuous white church. Anchorage can be taken as desired by a bearing on Bailly Point. Large vessels can anchor off the harbor entrance in 30m, good holding ground, with the white church bearing 227° 2 miles distant. Strong NE winds send in a heavy swell.

Plateau de Freycinet (20°17'S., 164°30'E.), located 6 miles NW of Bailly Point, is a coral reef which is steep-to on the S or channel side. The flat is prolonged to the SE by two patches which nearly always breaks. About 1 mile SE of Recif Anlo, the S of the two patches, is an isolated sunken rock on which the sea always breaks. There are several shoal spots extending 0.9 mile W from the flat. A beacon (reported ruined, 2008) stands on the edge of the coastal reef abreast of Recif Anlo. **Ilot Poudioue** (20°17'S., 164°30'E.), low and bare, lies on the coastal reef S of Plateau de Freycinet. There is an anchorage 0.7 mile NW of Ilot Poudioue, but should only be used during good weather. Anchorage may be obtained, in a depth of 12 to 12.8m, with Ilot Poudioue bearing 115°, and the W blockhouse on shore, bearing 195°.

In the channels S of Plateau de Freycinet, the flood current sets SE and the ebb current sets NW.

Anse de Tiari (20°14'S., 164°21'E.) is entered W of Pointe Daoubin. Anchorage may be obtained, in depths of 20.1 to 25.6m, with Pointe Daoubin bearing 105°, distant about 0.5 mile. Pointe Nen'Diaran lies about 2.8 miles W of Pointe Daoubin. The point is the abrupt termination of the mountain range which occupies the NE side of New Caledonia. A prominent white house stands on the side of a hill about 1 mile SE of the village of Tiari.

Ile Pam to Ilot Daougae

5.65 **Ile Pam** (20°15'S., 164°17'E.), located about 0.8 mile W of Pointe Nen'Diaran, is a narrow island about 3 miles in length, in a N-S direction. The island is traversed throughout its length by a chain of hills. On the E side of the island the hills slope to the shore, whereas, on the W side there is a band of mangroves between the shore and the base of the hills. Beacons mark the NE extremity of a reef which extends 0.5 mile N from the island. Two other beacons mark the reef.

Baie de Pam (20°14'S., 164°18'E.) is entered between Ile Pam and Pointe Nen'Diaran. The deposits from **Fleuve Diahot de Bon De** (20°20'S., 164°20'E.) tend to diminish the depths in the bay, especially in the SE part, where there is a large bank that partially uncovers at LWS. A narrow spit lies about 0.5

mile N of this bank, with depths of 3.7 to 4.9m, leaving a channel with depths of 4.9 to 7.3m on its E side. The extremity of the sandspit which extends about 0.2 mile W from Pointe Nen'Diaran is marked by a beacon.

Directions.—A vessel entering Baie de Pam should keep midway between the beacon W of Pointe Nen'Diaran and the E side of Ile Pam, and anchor, in a depth of about 11m, about 0.3 mile N of the rocky islet lying close off the E side of Ile Pam, located about 0.8 mile SSW of Pointe Nen'Diaran. A small vessel may anchor E of the bank in a depth of 3.7m.

Baie d'Harcourt, located W of Ile Pam, can be approached from the E through Goulets d'Arama or Canal de l'Alcmene. A white cross on the red cliff near the village of Arama, in the SW part of the bay is conspicuous. The waters in this bay and in the channels leading to it, especially after heavy rains or gales, is turbid to a marked degree, and large light-colored patches which may be mistaken for shoals sometimes appear on the surface.

Anchorage.—The best anchorage is toward the E side of the bay near Ile Pam, in depths of 12.8 to 14.6m, in white mud, very good holding ground, with the summit of the island bearing 090°. Good anchorage can also be taken about 0.8 mile from the mouth of the small river which discharges close N of the village of Arama, with the red cliff bearing between 247° to 270°, and **Ilot Nen'Dahande** (20°10'S., 164°15'E.) bearing between 020° and 026°, in depths of 7.3 to 8.2m, mud and sand.

5.66 Ile Balabio (20°07'S., 164°12'E.) lies with its SE extremity 6 miles NW of Pointe Nen'Diaran. The island is high and wooded, and its W side is bordered by mangroves. The inner channels between the island and the main island are restricted by the surrounding and off-lying reefs, particularly near Pointe d'Oumap. The island is fringed by reefs, rocks, and off-lying islets.

Ilot Nen'dahande, about 0.8 mile SE of the SE extremity of Ile Balabio, is high, and from the E is saddle-shaped. The islet is one of the best marks for navigating the N channels.

Canal Napias (20°10'S., 164°15'E.) is a narrow and crooked channel that opens between the reef of the same name and the SE point of the extensive reef on the SE side of Ile Balabio. The channel should only be used by vessels with local knowledge. The channel has not been thoroughly surveyed and there may be depths of less than 6.7m.

Canal de l'Alcmene (20°12'S., 164°14'E.) has a least width of 0.5 mile and is easy to access. The channel is marked with navigational aids. A patch, with a depth of 4m, lies nearly in mid-channel, 1 mile NNE of **Ilot Taabam** (20°13'S., 164°13'E.).

Canal Devarenne lies between Plateau Devarenne and the SW side of Recif de Balabio. It is the only channel within the barrier reef through which a vessel of moderate draft can pass from one side of the main island to the other. It has a least width of 0.45 mile and a least depth in the fairway of 5.8m. The greatest depths are on the Recif de Balabio side. The channel is marked by beacons and buoys, but reliance should not be placed on the existence of these aids in this vicinity.

The water is smooth in these channels, and vessels may anchor anywhere under the lee of Ile Balabio, or N of Plateau Devarenne. A vessel may obtain temporary anchorage, in depths of 9.1 to 11m, about 0.5 mile W of Ilot St. Phalle and Ilot Sables d'Olane.

Mouillage de la Fine, W of the N extremity of Ile Balabio, is only suitable for vessels of moderate size. The recommended berth is in a depth of about 6.4m, in white sand with good holding ground, with the small hill on the W extremity of Ile Balabio bearing 180°, and Ilot Tahanlagh, located close N of the N extremity of the same island, bearing 030°.

The flood current sets W through all the channels in the barrier reef; the W current in Goulets d'Arama and Canal Devarenne is very strong, attaining a maximum rate of over 5 knots.

Pointe d'Oumap is located on the mainland W of the S entrance to Canal Devarenne. The point is a projecting red cliff flanked on each side by a sandy beach. Pointe d'Pouthier lies about 5.8 miles NW of Pointe d'Oumap. There is temporary anchorage, in about 8.2m, 0.4 mile NNW of Pointe d'Pouthier.

Ilot Daougae (20°04'S., 164°02'E.) is located on the shore reef which borders the N extremity of New Caledonia. The highest part of Ilot Daougae, a cliff at the N end, forms a good landmark. Good anchorage sheltered from SE winds may be obtained 1 mile WNW of the islet, in depths of 8.3 to 12m, sand.

Passe d'Amoss to Grand Passage

5.67 The barrier reef continues for nearly 100 miles from Passe d'Amoss and is known as Grand Recif de Cook. The SE part is marked, and is steep-to on its outer side, SW of it is an extensive unsurveyed area which should be avoided. There is a continuous line of breakers with a few openings throughout the reef. Grande Fausse Passe, 36 miles NW of Passe d'Amoss, is accessible only for boats.

Passe Ongomboua (19°20'S., 163°46'E.) lies about 27 miles NNW of Grande Fausse Passe. Ilot Ongomboua, which is low, sandy, and covered with grass, lies in the middle of the passage; there is a channel on either side which lie obliquely to the general direction of the reef, and each with a depth of about 18.3m. This is the first practicable passage in the reef NW of Passe d'Amoss.

There are five other passages through the barrier reef between Passe Ongomboua and the NW end of the reef, 40 miles NNW. The first of these, 8 miles NNW of Passe Ongomboua, is divided into two channels by a sandy islet nearly covered at HW; the fifth and N passage (19°00'S., 163°35'E.) is about 5 miles wide. The tidal currents through the above passages are very strong.

Caution.—None of these passages through the barrier reef have been surveyed, therefore, the descriptions should not be considered to be accurate. The reefs N of 19°30'S are imperfectly charted. There is generally a heavy sea breaking on the northernmost of these reefs.

5.68 Grand Passage (18°44'S., 163°15'E.) lies between the N extremity of Grand Recif de Cook and the S extremity of Recifs d'Entrecasteaux, and is about 20 miles wide. The current through the passage is generally W at a rate of 1 knot, though a NW current of about 2 knots has been experienced after a period of strong winds. Since the N limits of the barrier reefs were determined, several vessels have touched, and some

been lost, on reefs in Grand Passage.

It is necessary to exercise the greatest prudence in navigating in these unsurveyed waters, and it is recommended to pass through them during daylight, and only then with the sun behind, so as to ensure being able to discern the changes in the color of the sea from aloft. There are no aids to navigation for night passage.

Recif Pelotas (18°34'S., 163°12'E.), about 6 miles long, lies on the N side of Grand Passage. The sea breaks over the reef.

Recifs D'Entrecasteaux (18°15'S., 163°05'E.) are a continuation N of Grand Recif de Cook on the E side, and Recif des Francais on the W side. The reefs form two lagoons, both accessible to vessels with local knowledge.

Lagon de la Surprise (18°27'S., 163°07'E.) is the S lagoon and the larger of the two. From the S extremity of this lagoon, the S lagoon of this group of reefs, a single reef, surrounds the SE, NE, and part of the NW sides of the lagoon; in the remaining portion of the enclosing reef there are several openings and three islands.

5.69 Ile de la Surprise (18°29'S., 163°05'E.) lies on the SW part of the reef enclosing the lagoon. The surface of the island is half covered with palm trees. Like the other islands of this group it is bordered by a gently sloping white sandy beach. A good mark is a black iron mast situated S of a clump of coconut trees. There is a white beacon on the W extremity of the island.

The weather side of the island is inaccessible, but the lee side, although protected by coral heads, is easily approached by boats, which can land on a beach near a small stone building with a white roof (reported to be in ruins in 2008).

There are four passages into the lagoon available to vessels with local knowledge, but they should only be used during the daylight hours. Passe de Ile de la Surprise lies on the W side of Ila de la Surprise and is deep. The passage between Ile Fabre and Ile Leleizour is 0.5 mile wide and deep. The passage across the lagoon, 12 miles SE, is clear of dangers to the anchorage off Ile de la Surprise. The channel W of Ile Fabre is foul and should not be used.

There is a passage located about 2.5 miles ESE of Passe de Ile de la Surprise, which has been used by a steam vessel. There is another opening near the SE elbow of the reef, which carries considerable depths, but the currents are very strong across it and the sea is much heavier than the ones mentioned above. The other openings on the NW side appears to be encumbered by rocks.

Anchorage.—The anchorage off Ile de la Surprise is on the N side of the island, in about 25.6m, with the NW extremity of the island bearing 227° and the SE extremity bearing 196°, good holding ground, but there is a current of 2 knots and a fresh SE wind. A vessel anchored, in 29.3m, good holding ground, with the wharf on Ile de la Surprise bearing 260°, distant about 1.5 miles; there was a fresh trade wind and a moderate sea.

Anchorage may be obtained by vessels with local knowledge off the NW side of Ile Fabre, in a depth of 45.7m, about 1 mile offshore. Anchorage is afforded vessels with local knowledge, in a depth of 32.9m, with the W extremity of **Ile Le Leizour** (18°20'S., 162°58'E.) bearing about 180° distant 0.5 mile.

5.70 Lagon de L'ile Huon (18°05'S., 162°50'E.) is separated from Lagon de la Surprise by a deep passage, 6 miles wide. On the N extremity of the encircling reef are some coral blocks of moderate heights. Within the lagoon, both at the N and S ends, there are several coral heads. On the W side of the lagoon there are several openings a short distance apart, Passe du Sud, the S opening is 500m wide and very deep. To enter the pass, a vessel should keep about 0.1 mile N of the breakers on the S reef.

Ile Huon (18°01'S., 162°55'E.) lies near the middle of the encircling reef on the E side of the lagoon, and is the N island of Recif d'Entrecasteaux. The island is prolonged at each end by a bank of sand as high as the surface of the island. Grass is the only vegetation on the island. West of Ile Huon there is a rock, with a depth of 4.9m, with the extremities of the island bearing 070° and 129°, respectively.

Anchorage.—A protected anchorage may be obtained by vessels with local knowledge in a depth of 19.8m, sand and coral, with the N end of the island bearing 053° and the S end bering 136°. During strong SE winds, the water is smooth and the holding ground good. This anchorage is the only one possible during winter.

Petrie Reef (18°33'S., 164°25'E.) was reported to lie 4.5 miles further E than charted, however, this charting error is doubtful. A sandbank, awash, lies on the S end of the reef which extends about 8.5 miles NNW. Foul ground, with two reefs on it, extends about the same distance NW, forming a basin about 4 miles wide, open to the NW. Anchorage may be obtained in this basin during good weather, sheltered from the swell, except between NW and SW winds. The bottom is white sand, and the depths diminish gradually towards the reef. A wreck lies on the N end of the E reef.

Near Petrie Reef, at spring tides, the tidal current sets N and S at a rate of 1 knot. Off the N extremity a strong tide rip has been observed, the current, at the time setting NE. It was reported breakers were seen 33 miles SSE of the S end of Petrie Reef.

5.71 Recif des Francais (19°39'S., 163°22'E.) consists of a number of reefs extending from Grand Passage for about 75 miles SSE to Passe de Yande. It consists of a double row of nearly parallel reefs, separated by a narrow, deep lagoon strewn with a number of coral heads. The width of this chain decreases from 3 miles at Passe de Yande to 1 mile at Petite Passe.

Passe du Nord is a break in the reef about 14 miles NW of Passe du d'Estrees. It is not sufficiently known to be of use for navigation. Passe du d'Estrees lies about 11 miles NW of Petite Passe and is divided into two parts by an islet. The passage S of the islet has been examined and is deep and safe. The reef on the S side of the S passage is steep-to. Three rocks, visible about 5 miles, stand on a reef located about 2 miles N of the passage. Petite Passe, a small opening in the reef about 23 miles NW of Passe de Yande, is not recommended.

Archipel de Belep (19°41'S., 163°39'E.), the S island of which lies 20 miles NW of the N extremity of New Caledonia, are a group of islands extending in a N-S direction for a distance of 23 miles. The group consists of two large islands, a small island, and several islets.

Ilot Daos du Sul and Ilot Daos du Nord are the S islands of the Archipel de Belep. The islets are of sufficient height to be seen from Ile Yande and Ilot Ti-a. The E and W sides of both are steep-to. A rock, awash, lies about 0.3 mile N of the N islet of Daos du Sud. Just S of the S islet are three needle-shaped rocks named Les Trois Soeurs. **Ile Nienane** (19°49'S., 163°41'E.), located between Daos du Nord and Ile Art, is a high bare rock.

Ile Art (19°42'S., 163°39'E.), the largest of Archipel de Belep, is moderately bold; at its S end it rises to a height of 252m. The E side is steep, except for the fringing reef S of Baie Male, which always shows, and a reef extends 0.75 mile off the NE coast. Peiroma, an inlet at the S end of the island, has not been examined, but appears foul; two rocks, the SW of which is marked by a conspicuous white cross, lie at the SW extremity of the inlet. Andiane is a slight indentation at the SW end of the island in which anchorage may be obtained, in depths of 16.5 to 20.1m.

Baie Uala (19°43'S., 163°38'E.) lies on the W side of Ile Art about 5 miles from its S extremity and is about 0.8 mile wide at its entrance. There is a weather station on the N entrance point of the bay. Anchorage is afforded, in depths of 10.1 to 11.9m, in the inner part of the bay, with the hill on the NW entrance point bearing 310°, sheltered from the wind from the NW through E to S. There is also anchorage, in a depth of 6.7m, with a rocky point on the SE shore bearing 155° and the church bearing 047°.

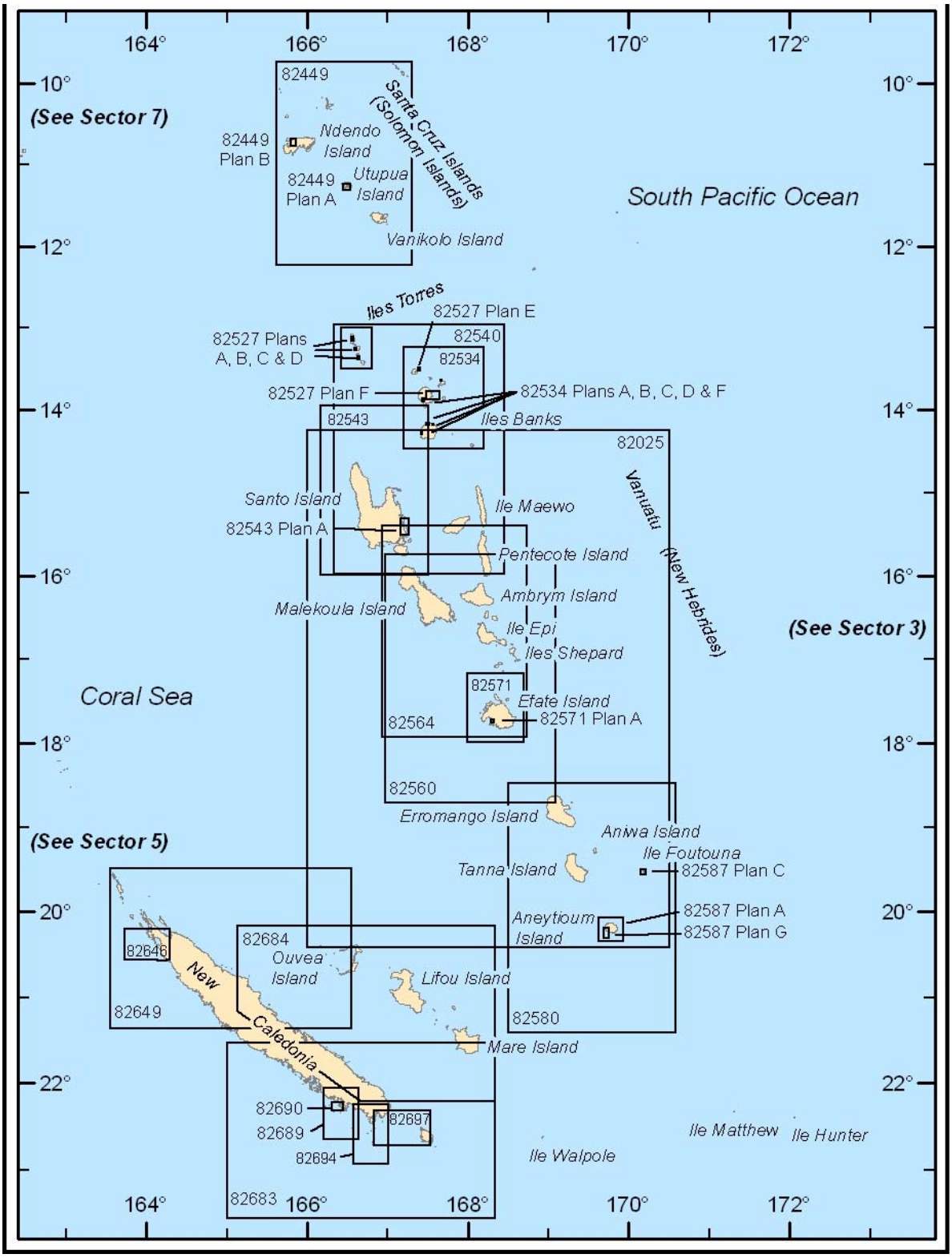
5.72 Baie Aue (19°40'S., 163°38'E.) indents the N half of the W coast of Ile Art to a distance of 1 mile. At an average distance of 1 mile from the shore, the bay is fronted by three reefs extending in a general N-S direction. The two largest reefs are separated by a channel having a width of 0.3 mile and depths of 10.9m in the fairway. The bay is exposed to winds from the S through W to NW.

Anchorage.—Anchorage is usually taken, in 18.3m, good holding ground, with the W extremity of Ile Art bearing 183°, and the small cliff at the N end of the sandy beach at the head of the bay bearing 097°. While this position is good at all seasons, it must not be assumed to be safe during a hurricane. The anchorage is exposed to winds from the NW and S. During heavy NW seas, a relatively better position is nearer the reef than the shore.

Ile Pott (19°34'S., 163°36'E.) lies 1.5 miles NNW of Ile Art, the navigable channel between them being over 1 mile wide and clear of dangers in the fairway. The small bay on the W side of the island is encumbered with coral rocks. Small craft may obtain anchorage off the S end of the island.

A reef, which dries, the charted position of which is approximate, lies about 4 miles ENE of the N extremity of Ile Pott. A reef, which also dries, lies about 6.5 miles NE of the N extremity of the island.

The tidal currents between **Ilot Ti-a** (19°59'S., 163°56'E.) and Ile Art are strongest off the edges of the reefs and set SW and NE.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **6** — CHART INFORMATION

SECTOR 6

ILES LOYAUTE TO THE SANTA CRUZ ISLANDS (INCLUDING VANUATU, THE BANKS ISLANDS, AND THE TORRES ISLANDS)

Plan.—This sector describes the entitled groups of islands and their off-lying reefs and dangers. The descriptive sequence is in a S-N direction, starting with Iles Loyaute and terminating with the Santa Cruz Island group, about 720 miles to the N.

General Remarks

6.1 Iles Loyaute are dependencies of New Caledonia, while the Banks Islands and the Torres Islands are the dependencies of Vanuatu. The Santa Cruz islands are the territory of the Solomon Islands.

Winds—Weather.—The Southeast Trades dominate the region of the Iles Loyaute; E to SE winds are most dependable between November and May, and there is less from these directions and an increase in S to SW winds between June and October.

Annual rainfall is fairly heavy; the wettest part of the year is between January and April, with definitely drier conditions in the latter part of the year.

This area lies near the region of maximum frequency of tropical cyclones in the South Pacific. The season of most common occurrence of these storms is between December and March.

The Southeast Trades definitely dominate the Vanuatu area, from May to October or November; more than 80 per cent of the winds blow between E and S, and W winds are practically unknown. During the remainder of the year, although E to SE winds still predominate, directions are much more variable.

From January to March the N part of the region experiences considerable NW winds and many calms. In these same months tropical cyclones arise in or cross the Vanuatu area, usually traveling S; this type of storm is quite rare in the N but not uncommon in the S part of the group.

Rainfall is generally heavy, ranging from over 2,800mm per annum on the exposed E sides of the islands, to around 1,800 to 2,300mm in more sheltered locations. The least rainy months are June, July, and August, when the trade is most strongly dominant.

Winds are steadiest and on the average, strongest, over the Santa Cruz Island region when the Southeast Trades prevail, usually beginning in May and lasting through October, during this time about 70 per cent of all winds are less than 10 per cent showing a W component. From November to April, however, the winds are much more variable, though still predominantly E, and at this season the stronger winds blow from N directions.

North gales are occasionally experienced, due probably to formation of tropical cyclones not far S or W.

Caution.—Beacons are subject to cyclonic and other damage, and may take considerable time to replace or repair.

Iles Loyaute

6.2 This group of islands is located about 70 miles E of New Caledonia and consists of three large islands, Mare, Lifou, and D'Ouvea. There are also a number of small islands, islets, and rocks, the most prominent being Dudune Island (Ndundure Island), Tiga Island, North Pleiades Island, and South Pleiades Island. Iles Loyaute have not yet been completely surveyed, and from past information no reliance can be placed on the set of the currents in this locality.

Between Iles Loyaute and Efate Island, about 180 miles NNE, a WNW set at a rate of 0.75 knot has been observed. About 10 miles W of Ile Mare the currents usually set SE, while between Ile Mare and Ile Lifou the current is strong but irregular.

Between Iles Loyaute and New Caledonia, a NW set is usually encountered, the strength of which is increased considerably after several days of fresh SE winds. During N or NW winds, rates may be decreased or a countercurrent may become established. After a period of N winds, it may be several days before the normal NW set is reestablished.

Aspect.—The three main islands of Iles Loyaute consist of raised coral and do not exceed a height of 150m. The islands of D'Ouvea Atoll do not exceed a height of 30m. The coasts of all these islands are formed mostly of steep, craggy cliffs; in other parts wooded cliffs descend in gradual slopes to the sea. In the low-lying areas there are numerous coconut palms.

Pilotage.—Pilotage is compulsory for the following vessels within the waters of New Caledonia:

1. All foreign vessels regardless of their length.
2. All French vessels more than 60m in length.

French warships are exempt from pilotage, as well as pleasure craft less than 60m in length. Masters of pleasure craft less than 60m in length are advised to consider engaging the services of a pilot if unfamiliar with the area.

See the Noumea port description in paragraph 5.21 for further information.

Regulations.—Tank vessels within the waters of New Caledonia, or in distress and within 50 miles of New Caledonia, are governed by special regulations, which may be found in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia. See also the Noumea port description in paragraph 5.21 for further information.

Signals.—See the Noumea port description in paragraph 5.21 for further information.

Anchorage.—In all the anchorages around Iles Loyaute, the bottom is composed of coral covered by a thin layer of sand, making the holding power of the ground only moderate. Vessels should use a good scope of cable here and be prepared to get underway if the weather deteriorates.

6.3 **Ile Mare** (21°30'S., 168°00'E.), the SE island of the group, has several uncharted coral patches reported to lie off the N end of the island. Baie de Tandine, on the SW side of the island, is considered to be the best anchorage off the island. A monument stands at the head of this bay. A wharf lies near the

monument. Vessels can obtain anchorage with the wharf bearing 055°, 649m offshore, in a depth of 37m.

Baie du Nord (Baie de Ro) (21°21'S., 167°55'E.) is located on the N side of Ile Mare. There is a conspicuous temple near the W entrance point of the bay and a white house in ruins on the E entrance point. A small sandy beach lies at the head of the bay. Anchorage can be obtained about 0.3 mile off the sandy beach, in a depth of 28m. Caution is advised, as there is a risk of fouling the anchor on the coral bottom.

Baie de l'Allier (Baie Poane) lies on the NE side of Ile Mare and is the largest and deepest bay of the island. There is an anchorage off the S shore of the bay, about 0.4 mile offshore, in depths of 35 to 37m. This anchorage is indifferent and is not recommended for a long stay, except in good weather.

Baie de Niri (Baie Aoui) (21°37'S., 167°55'E.) lies on the SW side of Ile Mare and offers shelter from winds between the N and E. There are some sunken reefs in the N part of the bay which do not break. However, the sea almost constantly breaks on two reefs located 0.2 to 0.3 mile W of the landing place of a small village. There is an anchorage off the village, but caution must be used because of the reefs.

Ile Dudune (Ile Ndundure) (21°20'S., 167°44'E.) is located about 3 miles NW of Cape Mackau, the NW extremity of Ile Mare. This low and barren island has two mounds which appear as two islands when seen from a distance. The shores of the island, as well as the passage separating the island from Ile Mare, are said to be free of dangers.

6.4 **Ile Leliogat** (21°17'S., 167°33'E.) is low and almost barren. The shores of the island appear to be free of dangers, but the weather side is steep and the sea generally breaks violently upon it. Ile Oua (Ile Ua) lies 2.5 miles NNE of Ile Leliogat and is equally low and free of dangers.

The **Ile Tiga** (21°06'S., 167°48'E.) coastline is formed of perpendicular cliffs. The S, SE, and NW points of the island are foul to a distance of 0.2 mile or more, but the SW and E coasts are clear. A village stands at the NW end of the island.

Ile Vauvilliers (21°08'S., 167°35'E.), about 11 miles W of Tiga Island, is 1.5 miles long and 0.5 mile wide. Though its coasts are clear of dangers, it is advisable to leave it to the W when passing at night, as the pine trees on the SE part enable it to be seen more clearly on that side.

Ile Lifou (20°55'S., 167°15'E.) is the largest and most important of the Iles Loyaute group. The island lies with Cape de Flotte, its S extremity, 23 miles NW of Cape Mackau. A number of villages stand on the shores of the island. Vessels can obtain anchorage in the various bays about the island. A light is shown from Cap des Pins on the SE side of the island.

Baie de Wahda (21°06'S., 167°26'E.) lies between Cape de Flotte and Cap des Pins. The shore of the bay is fringed by a narrow reef. Isolated houses close to the shore can be seen from close offshore.

Baie du Chateaubriand lies about 14 miles NW of Cap des Pins. The bay is extensive, but its shores have not been examined. The bay is obstructed with coral patches, and a barrier reef lies off the shore from 0.25 to 0.3 mile. There are two wharfs in the bay. One is 40m long, with an alongside depth of 5.5m and a dolphin off its E end, and can accommodate vessels up to 70m long; the other quay, which is 60m long, with a depth of 4.5m alongside, has a ro-ro facility at its S end. Range beacons, a directional light, and buoys mark the channel leading to the wharfs. Temporary anchorage might be obtained during W winds close W of the S entrance point. The village of We lies at the head of the bay.

Cap Bernardin (20°44'S., 167°18'E.) lies 9 miles N of Baie du Chateaubriand and is reported to be free of dangers. The cape forms the NE extremity of the island. Two white houses stand near the cape. From Cape Bernardin to Cape Escarpe, the N extremity of the island, the coast is bare, precipitous, and free from off-lying dangers.

6.5 **Baie du Doking** (20°43'S., 167°11'E.) lies 4 miles SW of Cape Escarpe. Doking village is situated on the E side of the bay, about 0.8 mile S of the NE entrance point. A temple with a gray roof stands in the village, but is obscured from seaward by vegetation; a water tower situated close SE of the temple is a better mark. A vessel may obtain anchorage off the SE shore of the bay, in depths of 33 to 37m, sand and coral, with the temple bearing 046°, distance about 1 mile, or with the temple bearing 049°, distant about 1.3 miles.

Recif Jouan, about 4 miles NW of the NW extremity of Ile Lifou, consists of two separate coarse coral islets, each about 1.8m high, lying on a reef on which the sea breaks. Midway between the reef and the island there are considerable depths and no sign of any dangers.

Baie du Sandal (20°51'S., 167°07'E.) is entered between Aime Martin Point and Lefevre Point, 8 miles South. The shores of the bay present the same aspects, steep and wooded cliffs of moderate height, with sandy beaches. Iatio Point lies 4 miles E of Aime Martin Point and is marked by a white chapel. A reef, awash, lies 0.2 mile WSW of Iatio Point.

Baie de Chepenehe (20°47'S., 167°09'E.) is located between Iatio Point and Shepenehe Point. On the NE shore of the bay is a conspicuous black rock, and about 0.2 mile E of this rock is a prominent monument. The village of Shepenehe lies close SE of the monument. Anchorage can be taken, in a depth of about 25m, with the monument bearing 015°, 0.5 mile distant. It is inadvisable for a vessel without local knowledge to anchor at night or attempt to ride out a SW gale at this anchorage.

Baie de Gaatcha (20°54'S., 167°07'E.) lies on the S side of Baie du Sandal and affords shelter from all winds from the WSW through S to NE. A vessel bound for the anchorage should pass about 0.2 mile N of Cape Mande and steer E until the church at the head of the bay bears 180°. Steer for the church on this bearing and anchor, in 26m, about 0.5 mile offshore. Vessels are advised to use caution to avoid the two reefs, awash, just N of the anchorage. A small vessel may anchor, in a depth of 1m, with the church bearing 120°, distant about 0.3 mile.

6.6 **Shelter Reef** (20°53'S., 167°03'E.), located 1.5 miles N of Cape Mande, is composed of coral and has a width of about 0.3 mile. The sea does not always break on it, but it may be seen from aloft under ordinary light conditions. The current runs strong near the reef. Vessels should carefully guard against this reef, for it lies on the route of vessels passing between Lefevre Point and Baie de Chepenehe.

D'Ouvea Atoll (Ovea Atoll) (20°33'S., 166°25'E.) is a group of closely-connected islands and reefs, the nearest point of

which is about 26 miles WNW of the NW part of Ile Lifou. The atoll comprises a large island and a number of smaller ones, forming an irregular triangle with its base (the large island) to the E. From the N and S extremities of the large island extend converging chains of islands and reefs which nearly meet at a point about 20 miles W of the middle of the large island, enclosing a vast lagoon with general depths of 9.1 to 37m, in which there are several anchorages, and entrance to which may be gained by the different passages between the reefs.

Ile Ouvea (20°33'S., 166°34'E.), the largest and E island of the atoll, extends for a distance of 22 miles in a NNE-SSW direction. The middle part of the island is reduced to an average breadth of 0.8 mile by Baie de Fayaoue, a deep-water bay on its E side. The E side of the island throughout its whole length is steep and clear of dangers, but the W side is low with sandy beaches, off-lying shoals, and shallow water. The SW extremity is detached from the main island.

6.7 **Mouly Island** (Muli Island) (20°42'S., 166°25'E.), the detached SW part of Ile Ouvea, has on its S side a reef 0.1 mile wide. The reef fringing the W end should be watched with care, as there are several detached heads. There is a church and a cross on the NW side of the island. The passage between Mouly Island and Ile Ouvea is shallow and is only used by small boats.

Ueneti Island (Ile Ounes), close W of the NW extremity of Ile Ouvea, is surmounted by flat-topped hills. There is a village and a church on the S side of the island. The channel between the two islands is navigable only by small boats.

The Northern Pleiades are a chain of reefs and islets forming the N side of the lagoon, extending in a W direction from Ile Ouvea. North Island lies about 0.5 mile W of Ueneti Island and is the E of the Northern Pleiades. **Whale Island** (Baleine Island) (20°25'S., 166°31'E.) is located 0.8 mile SW of North Island. There is no practicable passage between the islands, as the sea breaks between them.

Tortoise Island (20°25'S., 166°29'E.) lies nearly 0.5 mile SW of Whale Island. When viewed from a distance, it appears somewhat like a tortoise. Whale Passage lies between Whale Island and Tortoise Island and has a width of about 0.4 mile. There are several heads of coral covered by a depth of about 7.3m, with deeper water between. Seaward of the Whale Island side of the channel are two coral reefs to be avoided.

Pine Island (Pins Island) (20°27'S., 166°28'E.) is located 2 miles SW of Whale Island. The island is easily known by two clusters of pine trees near its center, and is the only island of the Northern Pleiades upon which pine trees are seen. The sea breaks on a reef on the NW side of the island. Lizard Island lies about 1 mile W of Pine Island; the passage between the two islands is known as Bull Passage (Taureau Passage). Tidal currents are strong in this passage.

6.8 **Deguala Island** (20°22'S., 166°24'E.) lies about 3 miles W of Lizard Island and is the largest island of the Northern Pleiades. Anemata Island (Anguene Island) lies about 9 miles WSW of Deguala Island, the islands and islets between these two islands can best be seen on the chart.

Anemata Passage, at the W extremity of D'Ouvea Atoll, lies SW of Anemata Island. It is about 3 miles in breadth and clear of dangers. The S side of the passage is bound by a reef extending in a NW-SE direction for about 5 miles. This reef uncovers at LW to a large extent, shows well, and is steep-to. A strong eddy is experienced on the S side of this passage.

The Southern Pleiades consists of the islands and reefs which form the SW side of the D'Ouvea Atoll lagoon. The passages between these islands are wider and more easily navigable than those of the Northern Pleiades.

6.9 **Round Island** (20°35'S., 166°16'E.) is at the E end of the long reef forming the S side of Anemata Passage. The reef fringing the island is not more than 90m wide. Long Island, located 2 miles S of Round Island, is covered with brushwood. Round Island and Meurthe Passages are divided into two passages by Middle Island. Meurthe Passage is the wider and more easily navigable.

Styx Island lies 3 miles E of Long Island. Both islands stand on the same reef. Styx Passage lies between Styx Island and Metouaine Island. The passage is about 0.8 mile wide and free of dangers. The reef and islands SE of Styx Passage extend in a SE direction for a distance of nearly 4 miles, reaching almost to Muli Island. The narrow channel separating them from the latter is Coetlogon Passage. The passage is about 0.2 mile wide. A shoal patch, with a depth of 6m, lies in mid-channel close within the entrance. A reef, 0.1 mile in width forms the N side of the passage. It is covered with a depth of 1m and seldom breaks. The reef is marked by a buoy. A strong current sets toward the reef.

D'Ouvea Atoll—Anchorages

6.10 Vessels may obtain anchorage anywhere in the lagoon on the W side of Ile Ouvea. Being composed of coral and a thin layer of sand, the holding ground is mediocre. Vessels should use a long scope of chain, as the holding depends on the weight of the anchor and chain.

Muli Island Anchorage is situated off the N side of the island, about 1.5 miles E of Coetlogon Passage. This is the best anchorage the lagoon affords. The depths in the anchorage are from 9 to 11m, about 0.5 mile N of Muli Island church.

Lekin Anchorage (Lekine Anchorage) (20°40'S., 166°29'E.) lies 5.5 miles ENE of Coetlogon Passage, off the village of Lekin. It appears to be a good place for small vessels to anchor near shore, in a depth of 5.5m. Care should be taken to avoid a 1.2m patch about 0.5 mile NE of the SW extremity of Ile Ouvea. Boats can land on the beach.

Faiaue Anchorage is situated 3.5 miles NE of Lekin village. A church with two spires and a red roof, two radio masts, and a flagstaff are useful landmarks. Anchorage is available, in a depth of 10m, 2 miles W of the church. A shoal, which has a depth of 5.2m, lies about 1.5 miles WNW of the church. Foul ground, with depths of less than 1.8m, extends 0.5 mile off the coast abreast Faiaue.

Mouillage de Saint-Joseph is located off the village of Saint-Joseph, near the N end of the island, and affords temporary anchorage only. Vessels anchor, in a depth of 8m, with the church bearing 080°, and a hill 7 miles NW of **Cap Escarpe** (20°26'S., 166°40'E.) bearing not less than 347°. The bottom is hard, and there are several coral heads in the vicinity.

A jetty, with alongside depths of 4m, is situated about 6.5 miles S of Saint-Joseph.

Beautemps-Beaupre Atoll, which lies about 7 miles NW of D'Ouvea Atoll, encloses a lagoon which is entered on its W side. The main reef which encloses the lagoon, and on which the sea breaks furiously, is on the E or weather side. The W side of the lagoon is formed of detached reefs. There is a small sandy islet on the reef near the E extremity of the atoll. **Beautemps-Beaupre Island** (20°25'S., 166°09'E.), the principal island, is wooded, except near its E extremity, which is bare. The island was reported to be just above water.

Anchorage.—Anchorage may be obtained, in a depth of 20m, good holding ground, with the E end of Beautemps-Beaupre Island bearing 160°, 1.3 miles distant.

Astrolabe Reefs (19°35'S., 165°38'E.) lie about 35 miles NW of Beautemps-Beaupre Island. Shoals having depths of 11 to 16.5m extend 0.5 mile N from the S reef and 0.5 mile S from the N reef, leaving a channel between of 90m width and depths of about 40m, but with strong eddies. Vessels can anchor 0.3 mile from the N reef, in a depth of 40m. The position is protected from the sea throughout the E semicircle, and a detached reef to the SW breaks the force of the sea in that direction.

Breakers on the reef were visible at 3 miles, but the sandy islet was difficult to see from offshore. A reasonably-sheltered anchorage for small craft was found, in depths of 10 to 12m, sand bottom, in the lagoon about 0.5 mile N of S corner of the reef. Coral heads are to be avoided in the area.

Vanuatu (New Hebrides Islands)

6.11 Vanuatu (New Hebrides Islands) lies NE of Iles Loyaute and consists of about 40 mountainous islands, islets, and rocks. The islands are wooded and have numerous fertile valleys. Some of the islands are entirely of volcanic formation, others are of coral, and several are a combination of both. There are several active volcanoes, and earthquakes are not uncommon.

Winds—Weather.—On the average, the islands of Vanuatu are affected by two hurricanes a year.

Tides—Currents.—Vessels approaching these islands from the S should give them a wide berth as there appears to be a strong set towards them.

Caution.—During W winds, which occur usually during the hurricane season, patches of discolored water are frequently observed in deep water W of Vanuatu. These patches are caused by conglomerates of bright sand-colored plankton, which give a disconcerting impression of shoal water.

6.12 Aneitioum Island (Anatom Island) (20°12'S., 169°46'E.), the S island of Vanuatu, is 9 miles long in an E-W direction and 7 miles wide. It has two peaks and appears as two islands. Port Aneityum, on the SW side of the island, is formed by a projecting point of land, Coconut Ridge, and by a coral reef nearly 2 miles long. A conspicuous wreck is stranded on the reef 0.6 mile SSW of the S end of **Inyeug Islet** (20°15'S., 169°46'E.). The reef is awash at half tide and always breaks.

The anchorage is approached from the W, with a flat rock on the fringing reef close S of the island's SE extremity bearing 100°. Two sets of beacons lead into the port; the first, in line bearing 100°, stand on Coconut Ridge, while the second pair, in line bearing 060°, stand 0.4 mile N of the first pair, and are seen between two houses with green roofs.

Inyeug Islet

Anchorage.—Anchorage is available, in a depth of 13m, with the second pair of beacons in line, and Coconut Ridge bearing 127°. A 10.1m patch lies about 0.2 mile NW of this depth.

Caution.—Caution is advised here as squalls at this anchorage are often violent. If W winds are expected, vessels are advised to moor with both anchors down, bows to the W.

Volcanic activity was reported (1996) about 50 miles SSE of Aneitioum Island.

6.13 Immahie Reef (20°13'S., 169°41'E.) lies 2.5 miles NW of Port Aneityum and about 0.5 mile from the nearest shore. It is nearly awash and about 1 mile in length in a N-S direction. There are shallow heads between the reef and shore. Anau-un-se is an opening in the coastal reef. Its entrance is about 42m wide and is deep in the fairway.

Anchorage.—Anchorage may be obtained, in depths of 11 to 12m, about 90m offshore, with **Saddle Peaks** (20°11'S., 169°44'E.) bearing about 134°. This inlet is only suitable for small craft.

Ijipthav (20°08'S., 169°44'E.) lies about 1.5 miles NE of Anau-un-se. Anchorage may be obtained, in depths of 7 to 9m, 0.1 to 0.2 mile offshore. Landing is obstructed by a coral flat that borders the shore.

Port Patrick, entered about 2.5 miles E of Ijipthav, lies between two detached coral reefs, the entrance being 0.3 mile wide, with depths of more than 9.1m. The N edge of the reef on the W side always breaks, A detached reef lies in the middle of the harbor.

Anchorage.—Anchorage is available, in a depth of 33m, sand, coral, and shells, with a church bearing 110°, and the N edge of the W detached reef bearing 290°. Anchorage also may be obtained, in depths of 18 to 22m, between the detached reef and the shore reef S of it. This anchorage is suitable for small vessels.

6.14 Futuna Island (Ile Foutouna) (19°32'S., 170°10'E.) is flat topped. Foul ground extends 0.2 mile from its NE extremity and 0.1 mile from its E extremity, elsewhere it is steep-to. The island has three easily identified sandy beaches. There is a mission station near the N end of the island on the E side of the island the current sets S at a rate of 1 to 2.5 knots; on the W side of the island the current sets to the N. It was reported (1973) the island lies 3.7 miles, bearing 076° from its charted position.

Tanna Island (19°30'S., 169°20'E.) is about 20 miles long and 9 miles wide. The island is densely wooded, except in the NW part. Mount Yasur, an active and prominent volcano, lies about 2.3 miles W of the E extremity of the island.

Heavy tide rips and discolored water occur off the NE and E extremity of the island.

Port Resolution (19°31'S., 169°27'E.) lies close N of the E extremity of Tanna Island. The port is no longer used as an anchorage due to silting. Sulphur Bay lies close NW of Port Resolution and is an indentation of considerable size. The bay has not been examined.

Weasisi Bay (19°28'S., 169°22'E.), 6 miles NW of Port Resolution, affords good anchorage during the prevailing SE winds, but ashes from the volcano make it disagreeable to stay. Large vessels anchor in 12m while small vessels anchor in 7m.

Lenakel Anchorage (19°33'S., 169°16'E.) is a small bight on the W side of Tanna Island. The shore N and S of the anchorage is fringed with coral reefs to a distance of 0.2 to 0.3 mile. A rock, awash, which appears yellow in good weather and breaks in a light swell, lies 0.15 mile offshore and 0.65 mile SE of Worthington Point. The anchorage has not been thoroughly examined and other dangers may exist.

Aniwa Island lies about 11.5 miles NE of the NE extremity of Tanna Island. It was reported (1973) that the island is 4 miles from its charted position on a bearing of 320°. The island is about 3.5 miles long and entirely lacking in good anchorages. Reefs have been reported to lie 0.2 mile off the island's W side.

6.15 Erromango Island (18°49'S., 169°05'E.) presents a very rough appearance and is almost entirely surrounded by sheer cliffs. The S side of the island is densely wooded, with white limestone cliffs showing in places. The mountains inland are wooded to their summits. Pilbarra Point is the SE extremity of the island and is reported to lie 2 miles S of its charted position; the E coast was reported to be 2 miles E of its charted position. It was also reported that Erromango Island and Goat Island lay about 4 miles SSE of their charted positions (1973).

Dillon Bay (18°47'S., 168°58'E.) indents the W coast of the island. Its position may be known by a deep gap in the hills, and by four distinct terraces formed in the seaward slope of the S point of the bay.

Anchorage.—Anchorage for ships over 100 tons can be taken about 0.4 mile W of the river mouth, which gives about 0.3 mile swinging room. This anchorage is not recommended in a SW wind, as it is close to the fringing reef on the N side. A strong W wind may occur at any time between November and April, and cause a heavy swell in the anchorage.

Polenia Bay, on the E coast of Erromango Island, is about 5 miles wide and recedes up to 3 miles. The SE side of the bay is formed by a peninsula, of which Traitor Head (Ouborre Point) is the extremity and affords good shelter to the bay. Anchorage has been taken off the head, in a depth of 31m, 0.5 mile offshore, with the extremity of the head bearing 162°, and Goat Island bearing 055°.

6.16 Port Narevin (18°45'S., 169°12'E.) lies in the SE part of Polenia Bay. The bottom slopes gently and the depths across the entrance are 9.1 to 10.9m. The entrance is about 0.5 mile wide between reefs, which extend from each side. The outer edges of the reefs are steep-to and the sea breaks on them. There is anchorage in the E side of the bay, about 0.3 mile offshore, and the same distance between the reefs, in a depth of 11m. There is a mission station situated in the port.

Cook Bay, a broad and deep indentation on the S side of Ouborre Point, is exposed to the prevailing Southeast Trades and has not been explored. The shores are low and wooded. It was reported that a depth of 6.4m existed 1.3 miles from Ouborre Point.

Tides—Currents.—A strong W set has been reported between Erromango Island and Efate Island when the trade winds are blowing.

Efate Island (17°40'S., 168°23'E.) is one of the most important islands of Vanuatu, having two excellent harbors,

and Havannah. The island is 25 miles long and about 18 miles wide. Vanua Tap, a high hill overlooking Vila Harbor, is a good landmark when approaching the island from the SW or W. A beacon stands on the W end of Vanua Tap.

Tides—Currents.—The currents in the vicinity of the island generally run with the prevailing trade wind at a rate of 0.25 to 0.75 knot, but they are not very regular and at times there may be a weak set to the E.

6.17 South Bay (Teouma Bay) (17°48'S., 168°22'E.), entered between Narapo Point and Tapis Point, 2 miles NW, has considerable depths up to its head. The best anchorage is in the NW corner of the bay, in a depth of 14.6m, about 0.2 mile from the beach. The coast between South Bay and Pango Point, 6 miles WNW, is broken by a number of small bays.

Mele Bay (Meli Bay)(17°44'S., 168°15'E.) is entered between Pango Point, which shows a light, and Devil Point (Matao Tiupeniu Point), 5 miles NW. At its N end is Mele Islet Anchorage, and on its E side, is Vila Harbor. The bay is completely open to the SW. Depths in the bay are too great for anchoring except off Mele Islet, where vessels may obtain anchorage, in depths of 27 to 37m, about 0.1 mile N of the NE extremity of the islet. An aeronautical light is shown close NE of the islet.

Port Vila (17°44'S., 168°19'E.)

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6.18 Port Vila is a protected harbor on the E side of Mele Bay. The city is the seat of government for the Republic of Vanuatu. Facilities for all types of cargo are availible, with a major export being copra.

Winds—Weather.—The harbor affords excellent shelter in all but W winds and hurricanes.

Tides—Currents.—The mean tidal rise is 0.8m, while the spring rise is 1m.

Caution is advised as tide rips occur off Devil Point (Matao Tiupeniu Point), the W entrance point of the bay.

Depths—Limitations.—Mele Bay is deep and clear of dangers. The approach to the outer harbor passes between shoals extending S of Malapoa Point (Arbel Point), and NW from Ifira Island. There is a least depth of 11.9m on the range line. The N portion of the harbor is deep and clear, except in the NE segment, where foul ground extends nearly 0.2 mile offshore.

Pontoon Bay, E of Ifira Island, is deep and clear of dangers,

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Port Vila—Main Wharf—Pontoon Bay

except for foul ground extending almost 0.2 mile E from it. The main berths are in the S portion of this bay and will be described below.

The channel to Paray Bay leads N and E of Iririki Island (Reriki Island); it is obstructed by three coral reefs, and is marked by buoys. Vessels using this channel are restricted to a draft of 2.7m at HW. Power cables run across the channel with a vertical clearance of 19m.

Main Wharf, situated at the head of Pontoon Bay, has a length of 212m and an alongside depth of 10.7m. This berth can handle ro-ro and container vessels. Ardimann Wharf, with a length of 50m, has an alongside depth of 8m. This berth is used by small tankers and car carriers.

Several berths, including a petroleum terminal, exist along the shore of Paray Bay, offering alongside depths of 1.2 to 3m.

Aspect.—A prominent triple-topped hill is a good landmark when approaching Mele Bay, as is a wooded hill on the E side of the bay. A white beacon stands on the W end of the latter hill. Pango Point is the termination of a thickly wooded strip of low land, and may be identified by the hill with the beacon on it, mentioned above. This point should not be confused with another point 3 miles ESE of it. Devil Point (Matao Tiupeniu Point) is low and wooded.

Port Vila is surrounded by steep, wooded hills. On the E and N sides of the harbor, there is a narrow flat coastal strip, while white cliffs exist in the harbor's SE corner. Ifira Island, which has a flat limestone plateau, forms the W side of Port Villa. A drying reef connects it to a flat, wooded peninsula on the mainland S of the island. An overhead cable, with a maximum vertical clearance of 12m, spans the channel between the island and the shore. Iririki Island (Reriki Island), also of limestone and wooded, lies in the E part of the harbor. A reef, partly awash, connects the S end of the island to the S shore of the harbor.

Pilotage.—Pilotage is compulsory for vessels over 60m in length. Pilotage should be ordered at least 48 hours in advance, confirming 2 hours prior to arrival. The boarding ground is situated 2 miles WSW of the channel entrance buoys. By day, the vessel will display the usual signals, while at night it will show a flashing red light.

Regulations.—At Main Wharf, berthing and unberthing will occur day or night, by request. At the other wharves, berthing is allowed by day, while departure is permitted day or night.

Speed in the harbor is limited to 5 knots.

Signals.—Vessels should send their ETA through Port Villa Radio (YJM) at least 72 hours in advance, confirming 2 hours prior to arrival. The pilot station and the pilot vessel may be contacted via VHF channels 16, 6, 8, 12, 13, and 14, from 0630 until 1830.

Anchorage.—Large vessels anchor just S of the entrance range, with a beacon on the N side of Iririki Island (Reriki Island) bearing 121°, 0.4 mile distant. This berth offers depths of 29m over a bottom of grey mud and fine sand, good holding ground. Anchorage is also available, in a depth of 20m, over coarse sand, good holding ground, with the beacon on Iririki Island (Reriki Island) bearing 091°, 0.3 mile distant. Vessels may also anchor in Pontoon Bay clear of the foul area in the bay's center, best seen on the chart.

Directions.—Keep an eye out for the tide rips S of Devil Point (Matao Tiupeniu Point), and the two fish rafts moored 7 miles SW and 5.3 miles NW, respectively, of Devil Point (Matao Tiupeniu Point) A set of range lights, in line bearing 078°, are shown from the shore of Port Villa, and mark the entrance channel. Beacons stand on the N and S shore of Iririki Island (Reriki Island) and just W of Main Wharf.

Caution.—The range markers, reported as 6m red triangles of open lattice construction attached to a square pedestal, are difficult to identify.

Mele Bay to Port Havannah

6.19 Devil Point (Matao Tiupeniu Point) (17°45'S., 168°11'E.), the W entrance point of Mele Bay, is a low wooded promontory. It is the S extremity of the peninsula that separates Mele Bay from the entrance to Port Havannah. Some rocky ledges extend a short distance off the point. Strong tide rips and overfalls frequently extend several miles S of this point, even in calm weather.

Leinamaia Point (Toukoutouk Point), 2.5 miles NW of Devil (Matao Tiupeniu) Point, is a low tongue of land covered with trees. The open bay on the E side of this point is unfit for anchorage. On the NW side of the point, and 0.25 mile from its extremity, are some white houses that show well from seaward. Vessels can anchor off these houses in 22m, with the extremity of the point bearing 201° and a cliffy point bearing 063°, distant 0.5 mile. Paul Rock lies 3.5 miles N of Leinamaia Point (Toukoutouk Point) and 0.4 mile from the shore.

6.20 Eretoka Island (Eradaka Island) (17°38'S., 168°09'E.) lies 4.5 miles N of Leinamaia Point (Toukoutouk Point). It resembles a low-crowned hat from all points of view. The NW side of the island is fringed with a reef which extends more than 0.2 mile NW from its NE extremity. A reef extends 0.2 mile from the SW extremity of the island and terminates in depths of 3.6m about 0.3 mile offshore. Depths of less than 10.9m extend about 0.5 mile SW from the island. A light is shown near the summit.

Lelepa Island lies 2.5 miles NE of Eretoka Island (Eradaka Island) and forms the SW side of Port Havannah. The gullies and slopes of the island are wooded, but the highest parts are covered with grass. Temporary anchorage may be obtained off

the NW side of the island, as the water shoals gradually; the 35m curve lies 0.3 mile from the shore. Leinamaia Point (Toukoutouk Point), in line with the 36m islet off the W point of Lelepa Island, leads clear of all dangers off the W shore. A signal station stands on the summit of the island.

Moso Island (Verao Island) (17°32'S., 168°16'E.) is separated from the N end of Lelepa Island by a narrow passage and forms the NW side of Port Havannah. The island is comparatively low, but has several grass covered hills. A reef extends 0.1 mile off Payne Point, the SW end of the island, and about 1.5 miles NE a sunken reef, which does not always break, extends 0.4 mile from the shore. A reef, nearly awash and usually marked by breakers, extends 0.35 mile from the NW point of the island.

6.21 Port Havannah (17°34'S., 168°16'E.) is enclosed between the NW coast of Efate Island and Lelepa Island and Moso Island. It is available to all classes of vessels, but the depths are so great that there are few places where convenient anchorage can be taken. Two channels, Hilliard Channel and Little Entrance, lead into Port Havannah; a boat channel connects its inner end with the sea.

Hilliard Channel (17°37'S., 168°13'E.) has a navigable width of 0.5 mile, is very deep and free of dangers, with the exception of the fringing reef, which on the E side extends nearly 0.2 mile from the shore. Little Entrance, the N entrance of Port Havannah, has a least depth of 10.1m in mid-channel. The channel is 0.3 mile wide, but because of the shoals extending from each side of the entrance points, its navigable width is reduced to about 0.1 mile.

Pilotage.—Mariners without local knowledge are cautioned not to enter Port Havannah without a pilot. Vessels bound for the harbor may obtain pilots at Port Vila.

Anchorage.—From **White Sand Point** (17°35'S., 168°14'E.) to its head, almost 4 miles NE, Port Havannah narrows considerably, and the outer 2.5 miles of this stretch is occupied by anchorage berths, with depths of 28 to 92m. Anchorage can be taken in Matapu Bay, in 29m, sand. The best berth is in a position with White Sand Point and **Reef Point** (17°34'S., 168°15'E.) in line bearing 252°, and a storehouse on shore bearing 108°.

6.22 Undine Bay (17°29'S., 168°20'E.) is formed by the N coasts of Moso Island and Efate Island, together with Pele Island, Nguna Island (Ngouna Island), and Kakula Island. The bay is open to the NW and can also be entered from the E through a channel between Kakula Island and Pele Island.

Palao Bay (17°32'S., 168°22'E.) indents the N shore of Efate Island at the inner end of Undine Bay. The shores of the bay are fringed with reefs and should not be approached within 0.5 mile. Anchorage is not recommended as the bottom is foul.

Nguna Island (Ngouna Island), which is volcanic with steep sides, is thickly wooded in its SW part. Tapoutoara, a bold crater located near the center of the island, makes a good landmark when approaching Efate Island and Undine Bay. There is a mission station and church near the SE point of the island.

Anchorage.—Anchorage may be obtained off a small stream near the mission station, in a depth of 12.8m, about 0.2 mile offshore. There is also anchorage off the NW side of the island, in a depth of 20m, but is not recommended with onshore winds.

Nguna Island from E—Tapoutoara on the left

6.23 Pele Island (17°29'S., 168°25'E.) lies close SE of Nguna Island (Ngouna Island) and is also volcanic. The passage between the two islands is shallow and strewn with coral heads. Foul ground extends some distance off the W side of Pele Island, and vessels should keep at least 0.75 mile offshore. Kakula Island is low, wooded, and lies on a coral reef that projects 1 mile from the N shore of Efate Island.

Rinali Reef is a small isolated patch lying more than 0.1 mile off the edge of the fringing reef 1.25 miles E of the N end of Kakula Island. It is readily seen, as the sea always breaks on it. Mangea Reefs are two coral patches marked by breakers and lie 2.75 miles SE of Rinali Reef.

Mao Island (Emau Island) (17°28'S., 168°30'E.), about 3 miles E of Pele Island, is almost circular, nearly 2 miles in diameter, and thick with vegetation. Its sides rise steeply to a large crater in the middle of the island. There are several villages on the S side of the island. There is fairly good anchorage off the W side of the island, in a depth of 20.1m, with the S hill of Mao Island in line with a hut on the beach bearing 088°, and the SW extremity of the island bearing 147°.

The depths decrease rapidly as the island is approached from the W. Should the wind be to the N, anchorage can be taken on the SW side, in 16.4m, with the S extremity of the island bearing 097° and the S edge of the crater bearing 047°. The tidal currents set strongly and erratically around the island.

Scott Rocks (17°28'S., 168°34'E.), about 3 miles E of Mao Island, are two pinnacle rocks about 45m apart, with a depth of 28m between them. The E rock has a least depth of 6.7m; the W rock has a depth of 7.3m. These rocks are steep-to all around and do not break even in a heavy sea. The current in this vicinity often runs strongly to the W, but it is irregular.

6.24 Forari Bay (Metensa Bay) (17°41'S., 168°33'E.) (World Port Index No. 57245) lies about 3 miles W of Maniouro Point, the E point of Efate Island, and is a good anchorage for small craft, except with winds from the N to E. Several coral heads obstruct the entrance to the bay. A rock, with a depth of 3m, lies 0.2 mile ESE of a wooded point at the head of the bay. The center of the S part of the bay has depths of 8 to 10.9m.

Depths—Limitations.—A T-headed pier is situated on the S shore of the bay. Vessels up to 160m in length, with maximum drafts of 8.4m call here to load manganese. A set of range

lights, in line bearing 225°, marks the entrance channel. This berth is open E, and there is almost always a swell. Berthing is impossible in NE winds.

Pilotage.—Pilotage is available, but no details are available at present.

Signals.—Signals are displayed from a flagstaff on top of a cliff near the range lights. If a deterioration in the weather has been forecast, a red ball by day or a red light at night will be displayed.

Anchorage.—Anchorage can be taken off the entrance of the bay, in depths of 20 to 28m, sand and coral.

6.25 Manuro Point (17°41'S., 168°36'E.), the E extremity of Efate Island, is low, rounded, and thickly wooded. A fringing reef extends 0.2 mile off the point; its outer edge is steep-to. Tide rips extend a considerable distance from the point and give the appearance of shoals.

Meslep Point (Tabuis Point) lies 6.8 miles SSW of Manuro Point. A sunken reef 2.5 miles long lies about 0.3 mile offshore and parallel with the point. A low point 3.5 miles WSW of the point has a rocky spit extending off it for a distance of 0.4 mile. About 3 miles farther W is the mouth of the **Rentapad River** (Ningut River) (17°49'S., 168°28'E.), which boats can only pass over the reef in its entrance. Mackenzie Hill, on the W side of the river, is a conspicuous landmark.

Islands North of Efate Island

6.26 Mataso Island (Two Hills Island) (17°15'S., 168°26'E.) lies about 10 miles NE of the N extremity of Nguna Island (Ngouna Island). The island has two high hills and from a distance appear as two islands. The N hill has a sharp peak and is very prominent from offshore. A rock, 1.5 high, lies about 0.1 mile off the N extremity of the island, and a rock, 1.2m high, lies 0.1 mile off the E extremity of the island. Temporary anchorage may be taken in the bight on the S side of the island, in a depth of 26m, sand and coral, about 0.2 mile offshore. The anchorage is subjected to a swell that comes around the S point of the island. Etarik Rock (Wot Rock), an inaccessible islet, lies about 1.5 miles E of the S end of Mataso Island.

Tides—Currents.—Currents run strongly in the vicinity of Matso Island and Etarik Rock, causing heavy tide rips at times N of the island and NW of the rock. Tidal currents S of the island set E, curving N between the island and the rock, but are greatly influenced by the wind.

Makura Island (17°08'S., 168°26'E.) lies about 6 miles N of Mataso Island. The island is steep-to all around, but there is anchorage off the W end of the island, in a depth of 20.1m, 0.2 mile from shore, with the tangents of the island bearing 063° and 137°. At the anchorage, the ebb current sets N with a maximum velocity of 1.5 knots at springs. The flood current off the W end of the island produces tide rips that have the appearance of shoal water.

Emae Island (Mai Island) lies about 5 miles NW of Makura Island. The island has three conspicuous hills, which at a distance appear as separate islands. The island is thickly wooded and several villages stand on its shores. Sesaki Anchorage, on the island's N coast, offers depths of 30m, sand, with Sesaki Point bearing 090°, 0.4 mile distant. This anchorage offers protection in winds from the NNE through E to SW.

Pula Iwa Reef (Cook Reef) (17°03'S., 168°16'E.) is a dangerous atoll lying 2.5 miles WNW of the W extremity of Emae Island. The outer edge of the reef dries in many places, and is steep-to except on its S side, where a spit, with a depth of 18.3m, extends nearly 0.5 mile offshore. The sea breaks heavily on the weather side, but the lee side is not well marked unless the daylight is favorable for seeing the discolored water.

The Shepherd Islands

6.27 The **Shepherd Islands** (16°56'N., 168°36'E.), NE of Emae Island, are a volcanic group consisting of seven islands and several islets and rocks lying on a bank, with depths of less than 183m, extending SE from the SE extremity of Epi Island.

Tongariki Island (17°00'S., 168°38'E.), the S and second largest of the Shepherd Islands, has a length of more than 2 miles in an E-W direction, and a width of 0.8 mile. The island is steep-to, its shores are formed of boulders, volcanic rocks, and a few black sand beaches, the interior is thickly wooded to the summit. The white house of a mission station, on a ridge near the middle of the island, is conspicuous from the N.

Anchorage.—Anchorage may be obtained, in a depth of 22m, during the prevailing wind, about 0.2 mile off the NW side of the island, with the SW extremity bearing 201° and the NW extremity bearing 052°.

6.28 Amora Rocks, SSE of the S extremity of Tongariki Island, are bare, jagged, and 34m high. The rocks are steep-to and there is a channel between them and the island, but it is not recommended because of the strong tidal current.

Buninga Island (17°02'S., 168°35'E.), the SW island of the group, is not over 0.8 mile in diameter. It is thickly covered with vegetation and has a rather flat summit, where a native village stands. Michelsen Rock, 0.3 mile E of the NE point of the island, should be given a wide berth, as it has a depth of 1.8m and is not easily detected. Falea Island lies 2 miles NNE of Buninga Island and is thickly wooded and uninhabited.

Ewose Island (Iwose Island) (16°57'S., 168°35'E.) lies 1.5 miles NW of Falea Island. Shoals, on which the sea often breaks, extend 0.1 mile from the E side of the island. A rock, awash, lies midway along the W side of the island, 90m offshore. Anchorage may be obtained, in a depth of 20m, off the NW side of the island, with the SW extremity bearing 142°, in line with the summit of Falea Island, and the NW extremity bearing 024°.

6.29 Tongoa Island (16°54'S., 168°34'E.), 1.5 miles N of Ewose Island, is the largest and most important of the Shepherd Islands. It is populous, partly cultivated, and wooded to its summit. From a distance, the island appears to consist of a group of mountains, most of which are cone-shaped, and a few table-topped. Tavani Akoma, a conspicuous mountain, is located on the E side of the island. Selembanga Church, about 0.5 mile NW of Tavani Akoma, is a conspicuous white building and a good landmark. Boiling Point, the N extremity of the island, is fronted by a ledge of rocks, covered at LW, to a distance of 136m, beyond which the water deepens quickly.

Anchorage.—The best anchorage off Tongoa Island is off the coast, in a depth of 18m, 0.2 mile W of the boat houses at Aiwos (Panita), with the bluff in line with the W extremity of

Tevala Islet bearing 010°, and Nambwaia Rock in line with a point close S of the anchorage bearing 173°. Anchorage may also be obtained, in a depth of 20m, about 1 mile farther N.

6.30 Vatu Miala (16°52'S., 168°31'E.) lies almost 2 miles NW of the NW extremity of Tongoa Island. It is a remarkable, pillar-shaped, inaccessible rock. There are a few trees on its summit. From a distance it appears as a vessel under sail.

Laika Island, nearly 2 miles N of Boiling Point, is a small island with two hills. The steep cliffs that border the N, W, and S sides gradually diminish in height toward the E side, where there are two points enclosing a shallow bay. Laika Bank is a shoal patch lying a little more than 1 mile W of the island. The bank gives the appearance of a whale, and a sulphurous smell exists in this vicinity. Somerville Bank lies nearly midway between Boiling Point and Laika Island. Mid Rock, 3m high, lies near the middle of the S side of the bank and is a good mark. The channel N of Somerville Bank is subject to strong and irregular tidal currents and is not recommended. The channel S of the bank is wide and free of dangers.

Tevala Islet (16°49'S., 168°33'E.) is a small and almost inaccessible island located about 0.8 mile W of Laika Island. Its sides are steep cliffs and its summit is wooded. At 135m off the N side of the island there is a rock, nearly awash, upon which the sea generally breaks. It is not advisable to use the passage between Tevala Island and Laika Bank.

Epi Island

6.31 Epi Island (16°44'N., 168°17'E.) lies with Cape Cone, its SE extremity, about 3.8 miles NW of Tongoa Island. Tavani Kutali, 833m high, is the highest and most conspicuous mountain on the island; it lies near the middle of the E side of the island. The island as a whole is very mountainous and wooded. The shores of the island consists of white sandy beaches and rocky points, bordered by a narrow reef. When approaching the island from the S, allowance should be made for the S sub-tropical current which is reported to set strongly toward the island.

Cape Cone (16°51'S., 168°29'E.) is a bold bluff that forms the SE extremity of Epi Island. The land back of the cape is low and from a distance the cape appears almost as an island. The channel between the cape and Vatu Miala is wide and free of dangers. Tide rips off the cape sometimes gives the impression of shoal water. There is a small bay on the W side of the cape, but landing is difficult and can only be effected when the sea is smooth.

Sakao Bay lies about 6.3 miles WNW of Cape Cone. The bay affords anchorage off the village of Sakao, in a depth of 12m, with the summit of Namuka Island bearing 215° and Sakao Point, in line with the S extremity of Epi Island, bearing 114°. The flood current at the anchorage sets WNW and the ebb sets SE. Anchorage may be obtained on a black sandy bottom off almost any part of the S coast of Epi Island.

Malingi Point (16°49'S., 168°16'E.) lies 5.5 miles W of Namuka Island. The point is low, wooded, and fringed by a reef that extends 0.15 mile from the shore. At 0.5 mile from the point is Buguta Cove, where a narrow passage between the reefs leads to a good landing place on a white sandy beach. At the mouth of the river at the head of the cove is Bumboko Village. Voambi Cove, 2 miles W of Maling Point, affords temporary anchorage for small vessels, in a depth of 14.6m.

Epi Island—Lamen Bay tender pier

Epi Island—Lamen Bay tender pier

6.32 Diamond Bay (16°46'S., 168°10'E.) lies 3.5 miles WNW of Voambi Cove. At the head of the bay there is a conspicuous white house and a stone jetty with a crane at its head. A rock, 1.5m high, lies on the fringing reef at the head of the bay. A vessel should approach the rock, bearing 057°, and anchor, in depths of 18 to 27m. This anchorage is not recommended in a strong trade wind, as the swell sets in and the berth is too near the sharp point of the reef to be safe.

Nelson Bay lies 2 miles NNW of Diamond Bay. A conspicuous white house is situated 0.2 mile S of the mouth of a river at the head of the bay. Anchorage may be obtained, in depths of 12 to 14m, with the N bank of the river in line with a hill bearing 069°, and the highest of three rocks off Vatito Point bearing 159°. Landing can be effected at the river mouth, where a

passage has been cut through the reef.

Revolieu Bay (16°43'S., 168°09'E.) lies about 1.5 miles N of the N entrance point of Nelson Bay. A black sandy beach is found at the S end of the bay, on which a prominent black rock can be seen. Good anchorage can be taken by vessels up to 60m in length, in 20m, with the black rock bearing 083° and Monduk Point bearing 145°. Anchorage, in 11m, is available with black rock bearing 067° and Monduk Point bearing 155°.

Foreland Anchorage (16°41'S., 168°08'E.) lies 3 miles NNW of Revolieu Bay. Cape Foreland, close S of the anchorage, shows a light. The anchorage consists of a small bay with a sandy beach. Miranda Rock has a small mushroom-shaped head, with a depth of 3.6m. It is not easy to see as the water around it is often discolored. The S fall of the cliffs on the N side of the gorge at the head of the bay, bearing 111°, leads S of Miranda Rock and to the recommended anchorage. The anchor should be dropped as soon as a depth of 22m is obtained, as the depths decrease rapidly and the bottom farther in becomes foul. A vessel from the S can approach with the house at the head of the bay in line with a hill bearing 071°.

DeChauliac Bank, 13 miles W of Foreland Anchorage, is a coral bank with a least depth of 81m on the E side.

6.33 Ringdove Bay (16°38'S., 168°09'E.) lies about 4 miles NNE of Foreland Anchorage. The bay affords good protection from all but W winds. There is a prominent house which can easily be identified about midway between the entrance points. Dick Reef, which dries about 0.3m, lies close to the S entrance point to the bay. Vessels anchor ENE or S of the reef.

Lamen Island lies 1 mile SW of Ndouana Point, the NW extremity of Epi Island. The island is inhabited and densely wooded. There is a channel between Lamen Island and Ndouana Point. In this channel the tidal currents attain a velocity of 3 to 4 knots at springs, setting S and N.

Allier Reef (16°34'S., 168°06'E.), about 1.8 miles NW of Lamen Island, has a least depth of 3.6m; the reef breaks in heavy weather. There is a depth of 37m about 1.8 miles NW of Allier Reef.

6.34 Moavi Point (16°34'S., 168°11'E.), nearly 2 miles ENE of Ndouana Point, is easily recognized by two islets on the edge of the fringing reef. There is anchorage for small vessels in good weather on the W side of the point, where there is a break in the fringing reef. Vessels can anchor out of the tidal currents, in a depth of 14.6m, with Moavi Point bearing 080°.

Big Bay (Drummond Bay) (16°41'S., 168°16'E.) lies about 7.5 miles SE of Moavi Point. Two small coral patches, always marked by breakers, lie close together at about 0.2 mile off Ariel Point, the E point of the bay, and sunken rocks and reefs extend 0.2 mile offshore for a distance of 0.5 mile SW of the point. The bay affords fair anchorage, but there is always a considerable swell. The Bluff (Nitau), 2.5 miles E of Big Bay, is a bold projecting headland. A schoolhouse on The Bluff is conspicuous and a good landmark. Little Bluff lies 3.5 miles SE of The Bluff.

Sugarloaf Point (16°46'S., 168°22'E.) is 6 miles ESE of Little Bluff. In the bay W of the promontory, of which the point is a part, there is reported to be fair anchorage. The recommended position is about 0.3 mile off the W end of a beach of rough boulders, in a depth of 22m, with the tangent of the rounded promontory of Sugarloaf Point bearing 062°.

Islands North of Epi Island

6.35 Paama Island (16°28'S., 168°14'E.) lies about 4 miles N of Epi Island. The channel between the two islands is free of dangers. The island is volcanic and densely wooded. Close off the SE extremity of the island is a group of rocks, the largest of which is The Ninepin, which has a remarkable conical shape. There is a mission station, with a conspicuous boathouse, about 1.5 miles S of the N extremity of the island.

There is excellent anchorage off the middle of the W side of the island. The locality is known by a black sandy beach at the opening of a large valley, and by "Hole in the Wall," which is a small cave, half blocked by stones, located at the S end of the beach. The best anchorage, in 7 to 24m, lies with "Hole in the Wall" bearing 113° and the SW extremity of the island bearing 186°.

Lopevi Island (16°31'S., 168°21'E.) lies about 3 miles E of Paama Island and is also volcanic. The summit, which has a small crater, is nearly always in the clouds, but it forms an imposing sight when it is visible. The shores of the island are steep-to and appear free of dangers. The nearest place a vessel could anchor, and only in good weather, would be about 3 miles S of the island on a patch of volcanic deposit, with a least depth of 53m.

Ambrym Island (16°15'S., 168°09'E.) is of mountainous aspect, densely wooded, and appears to be entirely volcanic. In the middle of the island there are several prominent peaks which surround an enormous crater. The summit, Mount Marum, is usually covered with clouds. Point Sud-Est, the E extremity of the island, is a bold cliffy bluff at the end of a range of hills that extends the full length of the island.

D'Estrees Point, the S extremity of the island, is sandy and fringed with trees. A bank, on the E side of the point, extends 1.25 miles from the nearest shore. The bank is composed of sand, and was reported to have less water than charted. An area extending 1.5 miles offshore for 3.5 miles each side of the point is considered dangerous to navigation because of submarine upheavals.

6.36 Port Vato (16°19'S., 168°02'E.) lies about 7 miles SW of D'Estrees Point. The port is 1.5 miles wide across the entrance and indents the coast to a distance of 0.8 mile. Sanasoup Point, the W entrance point to the port, has rocky ledges lying close offshore. In ordinary weather. there is fairly good anchorage off the E shore of the port, in 14.6m.

Craig Point (16°16'S., 167°55'E.) is fringed with a narrow ledge of rocks above water.

Craig Cove (16°15'S., 167°55'E.) lies about 0.8 mile N of Craig Point. The cove affords anchorage, in depths of 33 to 46m. There is a fringing reef around the shores of the cove. A bank, with a depth of 29m, lies about 0.5 mile WNW of **George Point** (16°15.7'S., 167°54.7'E.), the SE point of the cove. A concrete wharf, 60m in length, extends over a reef in a WSW direction, 0.2 miles NE of George Point and has a depth of 5.1m at the head. Dip Point, also known as Ranwakon Point, forms the W extremity of Ambrym Island, and lies about 0.5

mile NNW of Craig Cove. Lamb Point, nearly 1.3 miles N of Dip Point, is a low point formed by volcanic ash. The coast in this vicinity is fringed by shoals.

Anchorage.—At 1.3 miles E of Lamb Point there is an indentation in the shore, in back of which there is a lagoon with no opening to the sea. During the Southeast Trades, temporary anchorage can be taken in the indentation off the lagoon, in a depth of 37m, volcanic sand, poor holding ground. This berth is known as Dip Point Anchorage. Soundings increase rapidly towards offshore. Depths of 80m are observed at a distance of 120m from the coast.

6.37 Ranon Anchorage (16°08'S., 168°07'E.) lies on the W side of the massive N projection of Ambrym Island, about 11 miles ENE of Dip Point Anchorage. There are a number of houses with red roofs which are conspicuous from seaward off the anchorage. Two beacons on the shore, in line bearing 139°, lead to the anchorage; these beacons were not spotted in 2002. A vessel can anchor, in 26 to 29m, about 0.2 mile offshore, with a conspicuous red boathouse close S of the range beacons bearing 146°, and the S end of the black cliffs bearing 072.5°. Vessels are recommended to use two anchors. A light stands on a point 0.5 mile S of the anchorage.

Rodd's Anchorage is 2 miles N of Ranon Anchorage and close S of the NW end of Ambrym Island. It may be recognized by a hut on a small sandy beach, the only white sandy beach in the vicinity. A reef extends 0.1 mile off Metanwar Point, on the N side of the anchorage, and has on its outer edge a rock that dries 1.2m. The anchorage should be approached with the N end of the white sandy beach bearing 090°.

Anchorage can be obtained, in a depth of 22m, with Metanwar Point bearing 040° and a white painted tree bearing 126°.

North Point (16°06'S., 168°09'E.), the N extremity of Ambrym Island, is fringed by a reef which extends up to 0.25 mile offshore. There is a mission station near North Point, where anchorage may be obtained, in depths of 22 to 27m, W of a black rock, 2.4m high, lying near the outer edge of the fringing reef. The tidal current here runs at the rate of 1 to 2 knots, so a good scope of anchor chain is necessary.

Caution.—A submarine volcano is reported (1999) to exist about 1 mile W of Ranwakon Point. Depths may be less than charted.

Pentecost Island

6.38 Pentecost Island (15°45'N., 168°12'E.) is 34 miles long in a N-S direction and about 6 miles wide. It is densely wooded and a chain of mountains that extend three-fourths of its length attains its highest peak near the middle of the island. The only part of the island that has been surveyed is the section on the W coast between its S extremity and Naroboulou Point (Lifu Point), located 23 miles N. Along the W coast of the island the tidal currents are very weak. The flood current is believed to set N and the ebb current S. Selwyn Strait is a deep, clear passage between Ambrym Island and Pentecost Island. The strait is about 5.5 miles wide.

Tree Rock Point (Gousounransit Point) (15°58'S., 168°16'E.) forms the SE extremity of Pentecost Island. The coast N of the point has not been surveyed, but several high off-lying rocks were seen a few miles N. For nearly 4 miles SW of the point, the coast is bold and rocky.

Ferry arriving at the beach in Ranon.

Ferry at Ranon.

Martelli Bay (16°00'S., 168°13'E.) lies about 4 miles SW of Tree Rock Point. The bay affords temporary anchorage to small vessels with local knowledge. Devil Point, the W entrance point of Martelli Bay, is a prominent reddish cliff which forms the SE extremity of the island.

Gousounonla Point (Fan Mara Mara Point) lies on the SW part of the island, about 3 miles NW of Devil Point. There are two conspicuous houses about 1.3 miles SE of the point. A prominent church with a tin roof can also be seen from offshore.

Homo Bay (15°57'S., 168°11'E.) is entered between Gousounonla Point and Dupuy Point. On the N corner of the bay there are several rocky patches, which dry, close off the beach. Mushroom Rock, 9.1m high, lies close off Dupuy Point. The house of a trader on the shore of the bay is a good landmark.

Anchorage.—Anchorage may be obtained by vessels with local knowledge, in a depth of 14m, N of Mushroom Rock, about 0.2 mile offshore. The mouth of a small river lies abreast the anchorage. Good landing can be made on the beach in good weather.

6.39 Truchy Point (15°53'S., 168°10'E.) lies 3.5 miles N of Mushroom Rock. The point is sandy and free of reefs. Anchorage may be obtained by vessels with local knowledge off the point, in depths of 12 to 14m, with good holding ground. A mountain, about 2 miles E of the point, falls steeply on its SW side and is very conspicuous.

Casuarina Point (15°51'S., 168°10'E.) lies 1.5 miles N of Truchy Point and is named for the trees that grow on its shores. From this point N, a reef fringes the coast and extends about 0.1 mile offshore. Flat-topped mountains run parallel to the coast and slope steeply to the sea. About 4.5 miles N of the point there is a waterfall visible through a cleft in the mounts between the bearings of 021° and 055°.

Anchorage.—Anchorage can be taken by vessels with local knowledge off the waterfall, in depths of 16 to 18m, sand. On the N side of the anchorage there is a very distinctive light-colored square patch on the rocks close to the water. Small vessels with local knowledge may obtain anchorage, in a depth of about 27m, in Melsisi Bay, about 6.5 miles N of Casuarina Point.

Whale Point, nearly 8 miles N of Casuarina Point, is a bluff rounded point which rises to a fairly prominent hill with a green patch on it.

Steep Cliff Bay (Batnavni Bay) (15°40'S., 168°07'E.) is entered between Sadac Point and Naroboulou Point (Lifu Point). The shores of the bay are fringed with reefs. There is a rocky patch, 135m from shore and 0.1 mile N from Toadstool Rock, which is 0.8 mile NNE of Sadac Point.

Anchorage.—There is good anchorage for one vessel at about the middle of the bay, in a depth of 22m, about 0.3 mile offshore.

6.40 Mamurame Bay (15°38'S., 168°07'E.) lies close NE of Naroboulou Point. A house stands about 0.8 mile N of the point. The shores of the bay are fringed by a reef 0.1 mile wide, and there is a rock in the NE part of the bay off a mission station.

Anchorage.—Anchorage may be obtained by vessels with local knowledge, in a depth of 22m, with 0.2 mile swinging room.

Loltong Bay lies about 6 miles NNE of Naroboulou Point. Anchorage may be taken off a mission church, in a depth of about 18m, but the anchorage is considered poor. The anchorage lies with the church bearing 150°, distant 0.5 mile offshore. A little farther inshore the holding ground is better.

Vunmarama Anchorage (Lataiva Anchorage) (15°29'S., 168°10'E.) lies about 1 mile SW of Tara Point, the N extremity of Pentecost Island. The anchorage affords a precarious steep-to berth, in a depth of about 22m. A mission house stands near the coast about 0.5 mile SSE of the N entrance of the anchorage. Foul ground is said to extend for about 0.5 mile offshore, and a bank, with depths of 18.3 to 22m, lies 0.5 mile offshore about 0.6 mile SW of the N entrance point.

The E coast of Pentecost Island has not been surveyed. It is fringed by a narrow reef which renders landing impossible nearly everywhere. At about the middle of the E side, a cove appears to offer anchorage, but it has not been examined.

Maewo Island (Aurora Island) and Aoba Island (Oba Island)

6.41 Maewo Island (Aurora Island) (15°10'S., 168°10'E.) is the N island of the Vanuata group. The island is about 30 miles long, N-S, and about 3 miles wide. A mission station stands on the NE side of the island. About 0.5 mile E of the SE extremity is a small islet, with trees on its summit.

Patteson Passage (15°25'S., 168°09'E.) leads between the N end of Pentecost Island and the S end of Maewo Island. The passage is deep, free of dangers, and is about 2 miles wide between the 200m curve on either side. During strong SE winds, heavy swells and strong currents have been experienced in the passage.

Narovorovo Anchorage (15°12'S., 168°09'E.) is a bight on the W side of Maewo Island, nearly abreast the low land that separates the two high sections of the island. Rocks, from 1.5 to 3m high, front the N shore of the anchorage, and Bastion Rock, 10.7m high, lies close off the S extremity of the bight. A reef, which dries, lies 0.25 mile SW of Bastion Rock. Good anchorage may be obtained, in a depth of 22m, 0.35 mile W of a small river entrance.

Betarara Anchorage (15°10'S., 168°08'E.) lies about 5 miles N of Narovorovo Anchorage. There is anchorage, in a depth of about 14.6m, with **Double Rock** (15°10'S., 168°08'E.), 3m high, at the head of the bay, bearing 088°, distant 0.2 mile.

Lakerere Anchorage (15°01'S., 168°07'E.) lies about 5 miles N of Betarara Anchorage. A double waterfall, which is about 0.5 mile inland, is distinctive on nearing the anchorage, but is only visible when bearing between 077° and 090°, between which bearing a vessel is recommended to anchor. A vessel has anchored in 14.6m, good holding ground, with the waterfall bearing 088° and the left tangent of the shore bearing 353°.

6.42 Aoba Island (Oba Island) (15°23'S., 167°50'E.) lies about 8 miles SW of Maewo Island. The island is 22 miles long, SW-NW, and has a width of about 7 miles. It has a high summit which from a distance appears as a whale. A small crater near the summit often emits smoke. There are a number of anchorages on the NW coast. The flood current sets to the N and generally causes a choppy sea. In the channel between Aoba Island and Maewo Island there are strong currents and races.

Lolowai Bay and **Watounrowo Bay** (Vanihe Bay) (15°17'S., 167°57'E.), two bays near the N extremity of Aoba Island, are separated from each other by a narrow peninsula which terminates in yellow cliffs. Lolowai Bay, the E of the two bays, is nearly filled by a coral flat on which there are several black rocks above water. The bay has received only a casual examination, but a vessel can anchor outside the coral flat, in a depth of 22m, between the yellow cliffs and a rock, 1.8m high, and the E side of the entrance, with the extremity of the yellow cliff in line with the W point of Watounrowo Bay. This anchorage is dangerous during heavy weather, but during good weather is one of the best around the island.

In Watounrowo Bay, there is a copra station which is con-

spicuous from offshore. A white beach between black rocks can also be seen. The white beach is partly protected by small patches of coral, between which boats can pass and effect a landing, usually without difficulty.

6.43 Bice Road (Longuagua Road) (15°19'S., 167°55'E.) is an open anchorage about 2 miles SW of Watounrowo Bay. There is anchorage, in a depth of 18.3m, 0.15 mile off the reef, which fringes the coast to a distance of nearly 0.1 mile offshore. Two leading beacons, in line on a bearing of 188°, leads to the anchorage. Two miles W of Bice Road there is an anchorage, in 26m, off a mission station, which is visible from seaward, and another mission 0.75 mile E has a conspicuous red roof.

Walourigi Anchorage (15°20'S., 167°50'E.) lies about 5 miles NW of Bice Road, in about the middle of the W coast of Aoba Island. The holding ground is poor and there is a constant surf on the beach. A narrow rocky point projects from the black beach and divides it. A trading station stands W of this rocky point, but is not readily seen from offshore. Miranda Reef is located about 0.5 mile NE of the anchorage, and about 0.8 miles offshore.

Lorni Bluff is located about 4 miles SW of Walourigi Anchorage. A conspicuous house and store can be seen from offshore. Vessels anchor in a suitable depth, with the house bearing 167°. There is a depth of 28m, 0.2 mile from the shore, the bottom then shoals quickly to 12.8m and then gradually to the beach.

Laone Anchorage (15°24'S., 167°46'E.), 6 miles SW from Walourigi Anchorage, is in about 26m, 0.2 mile off a small black sandy beach.

Ambore Anchorage (Ndui Ndui Anchorage) (15°23'S., 167°43'E.) is situated about 8 miles SW of Walourigi Anchorage. It may be recognized by a large white "A" painted on the cliff and two copra sheds on the beach. The anchorage is not considered good due to the poor holding ground. Vessels can anchor, in 35m, by steering for a conspicuous conical hill bearing 165°, located about 3 miles from the SW extremity of Aoba Island. As the coast is approached, steer for the first white beach NE of this hill. The anchorage is impracticable, with the least swell from the W. A stranded wreck is conspicuous 1 mile NW of Ambore Anchorage.

6.44 Walaha (15°26'S., 167°41'E.) is a trading station, 3.8 miles SW of Ambore Anchorage. It is not visible from offshore, but can be located by a small double hill behind it. Indifferent anchorage can be found about 0.1 mile from the shore. **Ngwala Rock** (Devil Rock) (15°27.0'S., 167°39.8'E.), off the SW end of the island, is a high columnar rock with a little foliage on its summit. Vatu Tangaloi (Devil Point) forms the SW extremity of Aoba Island.

The SE side of Aoba Island appears to be free of dangers, but there is no part of this coast suitable for anchorage. The E coast consists mainly of sandy beaches. The NE extremity of the island is fringed by a reef which extends 0.5 mile offshore and should be given a wide berth.

Malekoula Island

6.45 Malekoula Island (Malekula Island) (16°15'S., 167°30'E.), one of the larger islands of Vanuatu, lies about 15 miles W of Ambrym Island. There are numerous peaks and mountains, of which the highest is Mount Penot, 891m high, near the center of the island. The W coast of the island has only been cursorily surveyed.

The Malekoula Islands—South Side

6.46 The **Maskelyne Islands** (16°32'S., 167°50'E.) lie close to the SE extremity of Malekoula Island. There are anchorages among the islands and an excellent passage through them with good range marks, forming a short cut for vessels rounding the S end of Malekoula Island. The outer islands of the group are comparatively low and difficult to see at night or in thick weather. Kulivu Island, Koivu Island, and several small islets, lie on a coral reef that extends 1 mile S of Koivu Island.

Sakau Island (16°30'S., 167°49'E.) lies N of Kulivu Island and is separated from it by East Channel. A pier and some houses stand at Mboa Noan Point, the NW extremity of Sakau Island, off which there is an anchorage.

There are four channels between the Maskelyne Islands. Northeast Channel leads between Sakau Island and the SE end of Malekoula Island. East Channel and Southwest Channel form an excellent deep-water passage through the group and have good range markers. South Channel is not recommended, as there are no good landmarks. The other three channels are deep in their fairways, and fairly clear of dangers.

Tidal currents run in the channels at a rate of 4 knots at springs in the narrower sections. Cross currents are encountered when leaving one channel to enter another. During periods of strong S winds, overfalls are formed at the SW entrance to the Southwest Channel.

Anchorage.—The only good anchorage in the Maskelyne Islands group is off the sandy beach S of Mboa Noan Point, at the W end of Sakau Island. A recommended position is in a depth of 27m, sand and coral, with Cape Doucere, on the N side of the E entrance of Northeast Channel, in line with Mboa Noan Point bearing 043°, and the SW extremity of Sakau Island bearing 167°. The depths are irregular here, but a vessel will be out of the tidal current and protected from E winds. This berth is too close to shore for other than small vessels.

A vessel without local knowledge should not attempt to anchor W of the detached shoals between the W end of Sakau Island and the main island which lies to the W, unless there is good light, or LW when all the reefs are visible.

6.47 Cape Doucere (16°28'S., 167°50'E.) is a low flat mangrove-covered point, with a coral boulder 3m high, lying on the fringing reef close S of it. The point lies on the N side of Northeast Channel and is the SE point of Malekoula Island. Gaspard Point lies 0.5 mile SW of Cape Doucere. On the W side of Gaspard Point is an inlet used mainly by small craft because of the barrier of sunken rocks in the fairway. A vessel could obtain anchorage close inside its entrance, in 22m, in a position off the reef which extends about 0.3 mile SW from Gaspard Point. Caution should be used to avoid the reefs and Fairway Patches.

6.48 Cook Bay (16°29'S., 167°48'E.), a large indentation

1.5 miles SW of Gaspard Point, is not recommended as an anchorage. Serguey Point, on the SW side of Cook Bay, is fringed by mangroves and has a small hill back of it. South Point, 2.5 miles S of Serguey Point, is a bold bluff and backed at 1 mile NW by Mount Maskelyne.

Lembru Cay (16°33'S., 167°41'E.), about 2.8 miles W of South Point, is a small sand cay, 1m high, which stands on a coral reef nearly 1 mile long in a N-S direction. Vito Set lies 1.5 miles NW of Lembru Cay. Limaning, an islet similar to Vito, stands on a reef about midway between Vito and the shore to the NE.

Anchorage is a small bight in the coast about midway between South Point and Limban Point. Two beacons on the NE shore of the bight, in line bearing 032°, lead to an anchorage, in a depth of 31m, off the bight. Hambi Island, about 0.8 mile off the coast near Forlong Anchorage, is densely wooded. There is fair anchorage off the N side of Hambi Island, in a depth of 12m, with Mount Maskelyne in line with the N extremity of the island bearing 102° and the W extremity of the island bearing 212°.

Lemua Island (16°31'S., 167°35'E.), a wooded island, lies close off the Malekoula Island shore, about 4 miles W of Hambi Island. There is an anchorage W of Lemua Island, which is indicated by two pairs of beacons in line bearing 080° and 160°, respectively.

6.49 Port Ravallac (16°31'S., 167°35'E.) is an anchorage between Lemua Island and the coast of Malekoula Island. Shoals extend from the Malekoula shore and narrow the available space for anchoring to about 0.1 mile. A shoal lies in the fairway N of Lemua Island, and vessels should therefore approach the anchorage by rounding the SW end of the island.

The anchorage, in a depth of 10m, sandy bottom, lies with the N extremity of Lemua Island in line bearing 072° with Mount Baraitova and with Tamyok Point bearing 333°.

Ure Island (Tomman Island) (16°35'S., 167°48'E.) lies about 0.8 mile off the SE extremity of Malekoula Island. The island is surrounded by a narrow fringing reef; the sea breaks heavily on its S and SE sides. A mass of coral patches lie off the NW end of the island and obstruct the W end of the passage between the island and Malekoula shore.

Anchorage.—The anchorage is in the area between the NE side of the island and the Malekoula shore. The best position is in a depth of 14 to 16m, with **Ayles Islet** (16°35'S., 167°29'E.) bearing 094°, distant about 0.3 mile. There is also anchorage 0.25 mile off the N extremity of Ure Island, in a depth of 22m, with the NE extremity of the island bearing 150°, and the NW extremity bearing 233°. Vessels bound to and from the anchorage should not attempt to pass N of Ure Island.

Malekoula Island—West Coast

6.50 Caroline Bay (16°34'S., 167°28'E.) lies about 1.5 miles NNW of Ure Island. There is temporary anchorage in the bay, in depths of 14.6 to 18.3m. A vessel should approach the bay with Molembi Islet bearing 037°, and anchor when the two extremities of Malekoula Island bear about 120°.

Southwest Bay (16°29'S., 167°25'E.) lies about 7 miles NNW of Ure Island. A red sandstone bluff is prominent 1.25 miles ENE of Benehour Point, its S entrance point. A coral reef, which seldom dries but which usually can be seen, extends 1 mile N from Benehour Point. The sea breaks on the N end of this reef. Depths less than charted may exist on the reef extending NW from Benehour Point and the inshore coral reefs in Southwest Bay.

Anchorage.—When approaching Southwest Bay, pass not less than 1 mile N of **Ten Stick Islet** (16°29'S., 167°25'E.). Anchorage can be obtained, in 10 to 30m, within the shelter of the bay, good holding ground. The recommended anchorage, in 14.6m, lies with the lagoon entrance bearing 160°, distant 0.5 mile. Occasionally, a W wind blows for periods up to 2 weeks, making the anchorage untenable and landing difficult.

Mounvet Point (Hook Point) (16°25'S., 167°24'E.) lies 4 miles NNW of Southwest Bay. The point is low, but on each side of it are conspicuous gray cliffs. A reef, which breaks, extends about 0.5 mile SW and W from the point. Reef Point lies 4.5 miles NNW of Mounvet Point and is low and wooded. Dixon Reefs lie 1 mile off Reef Point. Pacey Point, 7 miles N of Reef Point, is the N end of the above series of cliffs, all about the same height and prominent from the W.

6.51 Lamboubou Harbor (16°12'S., 167°22'E.) is an inlet of coral formation with a least width of 0.2 mile, but the reefs which fringe the shores reduce the fairway to 90m, 0.1 mile within the entrance. The bottom consists of coral and sand, and the holding ground is fairly good. The sea breaks continuously on the edges of the reefs at the entrance. Vessels that anchor here should be ready to leave at short notice.

The coast between Lamboubou Harbor and **First Point** (Worharet Point) (16°10'S., 167°15'E.), about 8 miles WNW, forms a bight which has not been surveyed. First Point is low, rocky, and steep-to. Second Point, also low, is located about 3 miles NE of First Point.

Elephant Point (16°08'S., 167°10'E.), about 1.8 miles NNE of Second Point, is bold, conspicuous, and resembles an elephant in outline. Rock Point lies about 2 miles NNW of Elephant Point and is the W extremity of Malekoula Island. A conspicuous dark rock lies off Rock Point.

Espiegle Bay (Pseukel Bay) (15°59'S., 167°11'E.) is located about 7 miles NNE of Rock Point. A vessel has anchored here, in a depth of 22m, with the S entrance point of the bay bearing 178° and a white patch on the S side of the gully at the head of the bay bearing 131°. Oleman Bay (Malua Bay), 0.75 miles S of Espiegle Bay, is an excellent small anchorage, with good holding ground. Wowo Bay, close W of North Cape, the N extremity of Malekoula Island, affords temporary anchorage, in a depth of 22m, sand and coral.

Malekoula Island—Northeast Coast

6.52 Vao Island (15°54'S., 167°18'E.) is located about 5 miles ESE of North Cape. Vidil Point, the SW point of the island, is formed by a sandy spit. The whiteness of the sandy bottom makes the spit appear to extend farther than it actually does. Vessels can anchor about 0.2 mile W of Vidil Point, in 14.6 to 16.5m, with Laron Point open to Vidil Point, bearing 116°. The holding ground at this berth is reported to be poor.

Bracey Patch (15°54'S., 167°20'E.), 0.4 mile NE of Laron Point, is composed of sand and coral and has a least depth of

2.7m. It is not easy to see unless the light is favorable, but vessels can pass between the reef and the Malekoula Island shore by keeping 0.2 mile from the edge of the shore reef. Chingontara Point lies about 1.3 miles S of Bracey Patch.

Crydon Reef lies 1.75 miles SE of Bracey Patch and is composed of sand and coral, with a depth of 1.2m. It usually breaks at LW, but at other times is hard to see. The passage between the reef and Malekoula Island is clear, but there are no defined marks that can be used in navigating it.

Atchin Island (15°56'S., 167°20'E.) lies about 1 mile S of Croydon Reef. The island is fringed by a reef, which extends about 0.1 mile offshore, except at the SW extremity, which is sandy and steep-to. There is fair anchorage W of the island, in 37m, with Chingontara Point bearing 000°, and the N extremity of the island 105°.

Wala Island is located 2.5 miles SE of Atchin Island. The island is fringed by a reef 0.1 to 0.2 mile wide, except the S point, which is of sand. A mission station stands on an elevation on the SE side of the island. Good anchorage may be obtained close W of the S extremity of the island, where considerable depths extend close offshore. The best berth is in a depth of 31m, with the N end of Rano Island in line with the S extremity of Wala Island, bearing about 094°, and the NE extremity of Pinalum Point in line with the LW mark of the sand spit on the W side of Rano Island, bearing about 136°. A vessel should not anchor in less than 31m.

6.53 Rano Island (15°59'S., 167°23'E.) is composed of upraised coral and is densely wooded. The N and E sides of the island are fringed by a reef about 0.2 mile wide. There is no anchorage off the island. Pinalum Point lies about 1.5 miles SE of Rano Island, and is bold and cliffy. A reef extends 0.2 mile from its N side.

Norsup Bay (16°02'S., 167°24'E.), 3 miles SSW of Pinalum Point, is entered between Norsup Island and a point about 1.5 miles NNW. The outer part of the bay is deep, with depths of 73 to 110m abreast the island, but from the center of the bay abreast the SW tip of the island to the head of the bay, 0.75 mile SW, the bottom shoals from 46m to 11m, 0.2 mile off the head of the bay.

Anchorage.—Good anchorage can be found, on the axis of the bay, in suitable depths in this area. Larger ships are recommended to anchor in the center of the bay in 40m, with Tautu Point open of the S tip of Norsup Island; this provides about 0.3 mile swinging room. On the point nearest to Norsup Island there is a hospital and school; a boat jetty is in front of the school. These are all good landmarks when anchoring.

Uripiv Island (16°04'S., 167°26'E.), on the E side of the entrance to Port Stanley, lies 1.5 miles E of Tautu Point. The island is wooded and has a white sandy beach. A conspicuous house stands on the SW shore, and there are several villages on the island. Uri Island, is located 0.75 mile S of Uripiv Island. The two above islands are separated by a deep channel. A village stands on the E side of the island and can be seen from offshore. The W end of Uri Island is covered with mangroves and has a white sandy point from which reefs extend 0.15 mile. On the reef on the NE side is a conspicuous coral boulder 3.6m high.

6.54 Port Stanley (16°04'S., 167°25'E.) is a bay 5.5 miles long in a NW-SE direction, which is protected on the E side by a peninsula and Uripiv Island and Uri Island. The prevailing depths are too great for the port to be considered a good harbor, but there are several places anchorage can be obtained. Tautu Point, on which a village stands, is the W entrance point to Port Stanley. Good Bay indents the shore S of this point. The W shore of Good Bay to the head of Port Stanley is fringed with mangroves and backed by wooded hills. The S part of the port is mainly obstructed by reefs, and the eye is the only guide in navigating it.

Anchorage.—A recommended berth in Port Stanley is 0.15 mile off the S shore of Uri Island on a small patch of sand and coral, in a depth of 22m, with the extremities of the island bearing 063° and 319°. There is also anchorage in Good Bay, near its head, in depths of 18 to 26m.

Brigstocke Bay is a small indentation on the W side of **Taio Point** (16°07'S., 167°29'E.). The reefs are steep-to in the outer part of the bay, and small vessels may find temporary anchorage. An inner extension of the bay is shallow and obstructed by coral heads.

6.55 Bushmans Bay (16°09'S., 167°30'E.) is 1 mile wide and provides a convenient and safe anchorage. Vessels may take anchorage anywhere near the head of the bay, but it is not advisable to go too close in the SE part, as the water shoals rather quickly to a reef which does not usually show. The best berth is opposite a small stream at the middle of the beach, in a depth of 18.3m, with Wreck Point bearing 099° and the W side of the entrance bearing 018°.

Crab Bay, on the W side of Wreck Point, is nearly enclosed on the W by the extensive Mary Eliza Reef, which dries 0.6 to 0.9m. The bay is mainly obstructed by reefs, but has a nice snug and quiet anchorage in the middle. The entrance to the bay is only about 0.2 mile wide. The eye is the only guide for approaching the anchorage, as there are no good marks, but there are no difficulties in good weather. Vessels anchor about 0.3 mile within the entrance in 26m, with the N extremity of Wreck Point bearing 099° and with Sandy Point, the W extremity of the same peninsula, bearing 156°. Small craft can find good shelter in the SE part of the bay.

Sarmette Bay (16°11'S., 167°33'E.) lies about 2 miles SSE of Wreck Point. Reefs fringe both sides of the bay, but are absent from the head of the bay. A 2.7m shoal lies about 0.4 mile SE of the NW entrance point to the bay. A rock, 2.4m high, lies close off the SE entrance point.

Anchorage.—Anchorage may be obtained near the middle of the bay, in depths of 11 to 18m, 0.3 mile offshore. Vessel should not anchor in less than 11m and care should be taken to avoid the detached shoal. Two lights, in line bearing 233°, are shown whenever vessels are expected. They stand on the W side of the bay.

6.56 McNabb Bay (16°13'S., 167°34'E.) is a bight in the coast about 1 mile wide at its entrance, and lies 1.5 miles SE of Sarmette Bay. The shore reef ends abruptly on each side within the bay, and anchorage may be obtained, in depths of 22 to 24m, near the middle, 0.2 mile offshore. The depths are considerable outside the anchorage and there is usually a heavy swell during the SE trade winds.

Pangkumu Bay (16°16'S., 167°39'E.) lies about 5 miles SE

of McNabb Bay and affords excellent protection and smooth water during the prevailing trade wind. A mission house stands at the head of the bay and makes a good landmark when approaching the anchorage. Close E of the mission house is a steep reddish bluff. The best anchorage is N of the mission house, in depths of 12 to 14m, with a large black boulder on the reef in line with the mission house bearing 179°, and two prominent coral boulders on the reef towards Bongnaun Point in line bearing 069°.

Tesman Bay (16°18'S., 167°40'E.) is entered between the NW entrance point of Assen Bay and Bongnaun Point. It is an excellent anchorage with N or W winds, but during the prevailing trades there is considerable swell. Anchorage may be obtained about 0.4 mile from the head of the bay, in 12m.

Mansa Reef (16°18'S., 167°43'E.) consists of several dangerous patches of coral extending over a distance of 1 mile, and lies about 2.5 miles SE of Bongnaun Point. The least depth found over this danger was 1.8m, but as there are living coral heads, less water may be found. The shoal is usually distinguishable by the light green color of the water. Winsor Patch lies about 1 mile SE of Bongnaun Point, and has a depth of 7m.

Assen Bay affords fairly good anchorage, in a depth of about 7m, protected from the usual trade winds. Mount Leggatt, 2.5 miles SW of the bay, is a good landmark. The mountain has a conspicuous dome-shaped summit and is the highest in the area.

6.57 Aulua Bay (16°19'S., 167°43'E.) is a slight recession in the coast and is entirely open to the NE. A drying reef extends 0.4 mile from the W shore of the bay and has near its outer end a coral boulder 1.8m high. Near the E end of the bay is a white cliff that is conspicuous and a good landmark. There is a mission station at the head of the bay.

Anchorage.—Good anchorage may be obtained off the mission house, in a depth of 18m, with the mission bearing 190°, distant 0.3 mile, and the white cliff bearing 142°.

Sasun Bay (Banan Bay), entered between Bangon Point and a point about 1.3 miles W, provides excellent shelter from the Southeast Trades, but is exposed to winds from NW and NE. A coral shoal, with a least depth of 6.1m, lies in the middle of the bay. Anchorage in SE winds can be found about 0.6 mile WSW of Bangon Point, in a depth of about 13.7m, but there is no reliable lead into the bay and care must be taken to avoid the dangers on the E side of the bay.

False Bay (16°24'S., 167°47'E.) lies on the N side of Ashuk Head, the W entrance point to Port Sandwich. Coral reefs extend about 0.1 mile from the shore on each side, but the head of the bay is clear. Crested Hill, 0.5 mile back of the NW shore of the bay, shows well from all directions.

Port Sandwich (16°26'S., 167°47'E.) is entered between Lamap Point and Ashuk Head. The entrance is a little more than 0.5 mile wide between the reefs; access is easy in any weather. The harbor is one of the best in Vanuatu, as it affords protection from all winds and has good holding ground. Sharks have been reported to be a serious danger to swimmers at Port Sandwich.

Lamap village is situated close S of Lamap Point. A light is shown about 0.2 mile SE of the N extremity of Lamap Point. A reef fringes the shore off this point and along the E shore of the port to Planter Point. The reef off Lamap Point, which dries, is marked by the sea breaking on it, even in the calmest weather.

Ashuk Head, on the W side of the entrance to the port, is a prominent bluff and wooded. The coast SSW of the head consists of coral cliffs and a sandy beach, with a few scattered mangroves.

Gedge Patches (16°26'S., 167°47'E.), having several coral heads covered with depths of 1.8 to 2.7m, lie on the E side of the fairway about 0.5 mile N of Planter Point. A vessel should not attempt to pass between the patches and the shore reef on the E side of the harbor. The N and W sides of Gedge Patches are marked by buoys.

Anchorage.—Middle Bay, on the W side of the port, affords anchorage, in a depth of 26m, with Planters Point bearing 177° and Deep Point in line with the NW edge of the reef which extends from Lamap Point bearing 065°. There are two anchorages off Planters Point, which can best be seen on the chart.

Espiritu Santo Island

6.58 Espiritu Santo Island (15°20'S., 166°55'E.), known locally as Santo Island, is the largest of the Vanuatu group. The island is very mountainous on its S and W side. A group of islands lies fairly close off is SE extremity.

Bougainville Strait (15°49'S., 167°12'E.) separates Espiritu Santo Island from Malekoule Island. The strait is deep and free of dangers. Pasco Bank, with a least depth of 24m, lies 3.75 miles NNW of North Cape, the N extremity of Malekoule Island.

Malo Island (15°41'S., 167°10'E.) lies off the SE coast of Espiritu Santo, and is separated from it by a channel 1.8 miles wide. The island is composed of coral, 91 to 122m high, and is densely wooded. Malo Peak, 341m high, lies near the NW end of the island and is prominent from all directions except from the SE.

Abnetare (15°39'S., 167°05'E.) lies near the NW extremity of the island and is the site of a mission station. Vessels can anchor off the mission station, in 18 to 20m, about 0.2 mile from the shore reef, with the NW extremity of Malo Island bearing 063°, and Malo Peak in line with the mission station bearing 123°. There is always some swell here; the tidal currents have a velocity of about 1 knot, with the flood setting S and the ebb setting N.

The Malokilikili Islets, about 31m high, lie E and NE of **Lachaise Point** (15°43'S., 167°14'E.), on the E side of Malo Island. The passage between the islets and Malo Island is obstructed by numerous reefs and can only be used by boats.

Anchorage.—Anchorage, with good protection from all but N winds, may be obtained NW of North Malokilikili Islet, in a depth of 12m, sand, with the island's N point bearing 090°, 0.4 mile distant.

6.59 Bruat Channel (15°37'S., 167°10'E.) separates the N side of Malo Island from the S side of Aore Island. The channel is nearly 10 miles long and has a width in the fairway of 0.3 to 1.5 miles. Suchun Lagre Island lies about 3.5 miles W of Ned Point, the NE extremity of Malo Island, and is separated from the N shore of Malo Island by a boat passage.

Anchorage.—Good anchorage can be found about 0.4 mile E of Suchun Lagre Island, in depths of 16 to 18m, 0.4 mile offshore, and outside the strong tidal currents setting through the

channel.

Ratoua Island, lying N of Suchun Lagre Island, is densely wooded and about 37m high. Between it and Aore Island is a narrow boat channel, the E end of which dries. Guichen Reef, from 0.1 to 0.3 mile SSW of the SW extremity of Ratoua Island, is a dangerous group of coral heads, with a depth of 1.8m. This reef narrows the fairway in Bruat Channel to about 0.3 mile. The tidal currents across the reef attain a velocity of 5 to 6 knots.

Port Lautour (15°37'S., 167°10'E.) is sheltered from all except W winds and is out of the tidal current; it lies on the W side of Ratoua Island.

Anchorage.—Anchorage can be taken, in a depth of about 26m, with the S extremity of Wekesa Island in line with the N extremity of Araki Island, about 11 miles W, bearing 268°. Caution should be used when anchoring as there is foul ground extending 0.2 mile from the N shore of Ratoua Island.

Turtle Island (Wekesa Island), 0.4 mile off the N side of Bruat Channel and 1.8 miles W of Ratoua Island, is small and surmounted by bushes. It is surrounded by a reef that extends W of the island in a long narrow spit for a distance of nearly 0.4 mile. Vessels should not pass N of the island unless the light is favorable, as the passage is obstructed by foul ground that extends 0.3 mile from the N shore.

6.60 Aore Island (15°34'S., 167°10'E.) lies between Malo Island and the SE shore of Espiritu Santo. Its NW side forms the SE side of Segond Canal. Its E shore is indented by two bays which do not afford good shelter or anchorage. A light is shown from the NE point of the island. A pilot station is situated about 1 mile E of the light.

Tutuba Island, 1.5 miles E of Aore Island, is of a formation similar to Aore Island, mainly coral. There are several villages about the island. A fringing reef encircles the island except at the SW extremity, which terminates in a steep-to sandy spit. There are moderate depths on the E side of the island and the W side is steep-to. A light is shown 2 miles S of its N end.

Bogacio Island (15°35'S., 167°14'E.) lies in the middle of the channel between the SW part of Tutuba Island and the E side of Aore Island. The channel on either side of the island is clear and deep. There is anchorage for one small vessel between Bogacio Island and Tutuba Island, in a depth of 31.1m.

Segond Channel, separating Aore Island from Espirito Santo Island, is a much-used deep-water channel. On the N shore of the channel lies the port of Luganville.

Luganville (Santo) (15°31'S., 167°10'E.)

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6.61 Luganville is the administrative and commercial center of Espirito Santo Island, and is a port of entry. The largest vessel to use the port was 230m in length. The port handles both wet and dry cargoes, importing general goods and oils and exporting fish products and copra.

Winds—Weather.—The prevailing wind here is from the SE, but follows a regular seasonal pattern. In winter, light airs exist, freshening rapidly to a maximum of 20 knots at about 0800. During the afternoon the winds generally die out. In the summer, the pattern is less regular, with the wind SE in the morning but frequently backing to the E in the afternoon. Occasionally, for a period of several days the wind will blow from the SW, force 3 to 5. Winds seldom blow greater than 30 knots other than during a hurricane.

Tides—Currents.—The tidal rise at MHHW is 1.2m, while the rise at MLLW is 0.3m.

Tidal currents within Segond Channel set W on the flood and E on the ebb, attaining rates up to 2 knots. Along the channel's N shore, currents are stronger. Off Main Wharf, the flood attains rates of 2.5 knots with fresh E winds. West of Main Wharf, this current alters to the SW, rounding the spit off the river SW of the wharf. The ebb is weaker, attaining rates of 1.5 knots with SW winds, and is further weakened by strong and persistent trade winds.

Tidal currents in the W portion of Segond Channel attain rates of 3.5 knots, with cross currents and eddies having been reported, especially during the monsoon when the rivers are full.

Depths—Limitations.—Segond Channel is deep and free of dangers in its NE portion, but the SW end of the channel is restricted to a width of about 0.4 mile by dangers extending from both shores. The channel at this end has a least charted depth of 12.8m.

Black Rock Point should be given a wide berth due to the 8.5m patch that was reported to lie 0.3 mile SE of the point.

The LPG terminal, situated 1.3 miles NE of Black Rock Point, will accommodate vessels up to 80m in length. Main Wharf, 2.3 miles NW of Black Rock Point, handles container, ro-ro, and tank vessels. The wharf has an alongside depth of 10.5m and will accommodate vessels up to 200m in length.

BP Terminal, 1.8 miles SW of Main Wharf, regularly berths vessels up to 200m in length.

Segond Channel

Aspect.—The shores of Segond Channel are low, with trees reaching to the water's edge. Several coconut plantations may also be seen here.

A conspicuous building is situated 1.3 miles N of Black Rock Point, 1.3 miles WNW of which is situated four tanks. A flagstaff stands W of Main Wharf. Tanks and a radio mast are situated 0.1 mile N and 0.3 mile S, respectively, of BP Terminal.

Pilotage.—Pilotage is compulsory for vessels over 60m in length and is available 24 hours.

Vessels should send their ETA and request for pilotage through the harbormaster, or the vessel's agent, at least 24 hours in advance. The pilot office is open from 0730 to 1130 and from 1315 to 1630.

Vessels board the pilot from a white vessel 1 mile E of Black Rock Point, or 1 mile S of **Bridgestock Point** (15°36'S., 167°06'E.) by prior arrangement. By night, the pilot vessel displays a red flashing light.

Regulations.—Visiting yachts are required to clear customs on arrival, landing on a jetty W of the main wharf.

Vessels should send their ETA and practique requests to the harbormaster through Port Villa Radio (YJM). The pilot office may be contacted via VHF channel 16, while the pilot vessel may be raised on VHF channel 16, 2182 kHz, or by radiotelegraphy. The vessel's call sign is "Pilot Vessel Moli Vatur."

Signals.—Current signals are shown from main wharf, as follows:

1. Flood current—yellow flag
2. Ebb current—red flag.

Anchorage.—The recommended anchorage, sheltered from SE winds, in a depth of 25m, good holding ground, lies 1.5 miles SW of Main Wharf. This berth is also sheltered from the major portion of the flood current.

Anchorage is also available in Luganville Bay, 0.5 mile SW of the W entrance point of the river located W of Main Wharf and 0.4 mile offshore. This berth offers depths of 17m, sand and mud. Another berth is available, in a depth 44m, 0.2 mile further out.

Anchorage can be taken 0.5 mile NNE of **Belchif Point** (15°33'S., 167°08'E.), in a depth of 29m, yellow mud bottom.

Dart Anchorage, S of Belchif Point, and the E entrance point of the Renee River, offers anchorage, in a depth of 18m, bottom quality not stated. The berths are situated about 0.2 mile and 0.4 mile SE of Belchif Point.

A Prohibited Anchorage lies off Main Wharf; the pilot should be consulted for details.

Directions.—Large vessels normally approach Segond Channel from the E. Lights are shown from Ile Toutouba, Black Rock Point, and a position about 1.8 miles NE of Black Rock Point.

The W entrance to Segond Channel, S of Brigstocke Point, and the fairways from seaward to it should only be used in daylight, fair weather, and only by vessels with local knowledge.

Reports have recommended berthing port side-to, with the starboard anchor out. The approach to Main Wharf has been reported to be difficult, as the tidal current occasionally sets NW onto the wharf.

Dangers to be avoided when approaching the berths of the port include Pate Bidal, a shoal with a depth of 0.3m lying 0.5 mile WSW of Main Wharf. Caution is advised as Pate Bidal has been reported to have extended 0.2 mile WSW. Guyon Reef, which dries, lies close N of the BP Terminal and is marked by a beacon.

Espiritu Santo Island—South Side

6.62 Baldwin Cove (15°35'S., 167°01'E.) lies about 3 miles WNW of Brigstocke Point. The cove is sheltered by a number of islets and reefs. Square Hill, a conspicuous, flat topped hill, lies 1.25 miles NW of the head of the cove. Venui Island, on the E side of the cove, is separated from Espiritu Santo by a passage which is deep and clear of dangers except for a 9.1m patch about 135m offshore on the E side of the S entrance.

Tangice Island (15°35'S., 167°01'E.) lies on the W side of the cove, with Carlo Islet 0.1 mile off its SE point. The islet is wooded and surrounded by reefs and shoals that project 135m from it.

Baldwin Cove provides anchorage for one small vessel. The recommended position is 0.3 mile NW of Venui Island and 0.15 mile from the E shore of the cove, in a depth of 18.3m, sand and coral. There are probably other anchorages in the cove, but they cannot be recommended without further exploration.

Ulilapa Island (15°37'S., 167°01'E.), 41m high and wooded, lies about 1 mile S of Tangice Island. Tubana Island, similar in appearance to Ulilapa Island, is smaller and lies 0.35 mile off the W end of Ulilapa Island. Both of these islands are uninhabited. There is a deep channel between these islands and Espiritu Santo.

Araki Island (Hat Island), a remarkable flat-topped island, lies 3.25 miles WSW of Tubana Island. The island shows up against the land behind it and is a distinctive object from the South. Elia Island, 2 miles NE of Araki Island, is wooded and only 0.1 mile in diameter.

Tangoa Island (15°35'S., 166°59'E.) lies close off the shore at Annand Point, which is a sandy spit, identified by some conspicuous huts situated about 2 miles W of Baldwin Cove. A reef, with a small, black, drying rock on its outer edge, extends 90m off the NE side of the island.

6.63 Tangoa Anchorage (15°35'S., 166°59'E.) lies N of Tangoa Island, on either side of Annand Point. The best anchorage is W of the point, in 22m, sand and mud, with the extremities of Tangoa Island bearing 231° and 108°. The tidal current at the anchorage sets E and W, turning about 1 to 2 hours after HW and LW.

Powell Point, located about 3 miles W of Araki Island, is steep and rocky, and has a small bare, rocky islet, about 0.3 mile off it. On the N side of the point there is a small cove with an islet close to shore, behind which is a trading station. West of Powell Point there is a bay about 2.5 miles wide at its entrance, with a beach of large pebbles through which two streams discharge. Landing can be effected at the E end of the beach.

South Cape (15°40'S., 166°50'E.), about 4.5 miles SW of Powell Point, is the S part of a bold promontory that marks the W termination of the S coast of Espiritu Santo. The extensive seaward face of the promontory is clear of off-lying dangers and is steep-to except on its SW point, where a fringing reef projects 0.1 mile. Nub Hill, 260m high, lies behind South Cape and is a distinctive object from the SE.

Espiritu Santo Island—West Side

6.64 Cape Lisburn (Mataabe) (15°38'S., 166°46'E.) lies 4.5 miles NW of South Cape and is composed of coral cliffs. There are a number of villages about 1 mile SE of the cape. A rock, 0.9m high, lies close W of the cape. There is anchorage for small

vessels, about 0.3 mile offshore, with good shelter from E winds, in a depth of 12.8m, 0.65 mile NE of the cape. Large vessels should anchor farther out. A prominent object seen from the anchorage is Murder Rock, 3.5 miles N of Cape Lisburn.

Remarkable Point (15°23'S., 166°39'E.), about 17 miles NNW of Cape Lisburn, is low, but is dominated by two peaks over 610m high close back of it. An area of shoal water extends W and NW for a distance of 7 miles off Remarkable Point; depths are unknown but dangers to navigation lie 6 miles WNW and 1.25 miles NW of Remarkable Point.

Nogogu (Nogougou) (14°55'S., 166°34'E.) is a village situated 28.5 miles N of Remarkable Point. There is a mission station at the village where a conspicuous flagstaff can be seen. Two miles S of Nogogu there is a remarkable black cliff with a white patch. There is anchorage, in a depth of 24m, about 0.4 mile offshore, W of a conspicuous cliff close S of the village. Tetawoia Reef, N of the village, extends 1.5 miles from the shore and has a depth of 6.4m at its outer end.

Vessels can anchor off **Pwelum Point** (14°55'S., 166°33'E.), about 1 mile N of Nogogu, in a depth of 12m, 0.1 mile from the shore, with the mission church bearing 133°.

The Tasselmann Islets, consisting of a group of rocks with foul ground extending seaward from them to deep water nearly 1 mile offshore, lie close S of Ere Point, located about 6 miles NNW of Nogogu village. Vairai Bay, 14 miles N of Nogogu, is a small indentation where coastal vessels anchor.

6.65 Cape Cumberland (14°38'S., 166°37'E.), the N extremity of Espiritu Santo, extends from the high land in a low tongue for about 2 miles. In the vicinity of the cape, ruins of buildings of unknown origin and of considerable size are scattered over a 3 mile area. The same type of ruins can be found at a village about 5 miles from the cape. Heavy tide rips occur N of the cape.

A depth of 24m was reported 7 miles NW of Cape Cumberland; a depth of 31m was reported to lie about 3.5 miles N of the cape. A shoal, with a depth of 11m, was reported to lie about 15.8 miles ENE of the cape.

St. Philip and St. James Bay (Big Bay) occupies most of the entire N side of Espiritu Santo. The peninsula on the W side consists of mountain ridges, varying in height up to 1,220m. The hills at the head of the bay form a plateau, about 245m high, which decreases in height toward Cape Quiros, at the N end of the E shore of the bay. The bay is deep, but several patches of reefs and shoals extend from its shores in places.

Wora Bay (14°48'S., 166°44'E.), 13 miles SE of Cape Cumberland, affords temporary anchorage during offshore winds, in a depth of 73m, 0.25 mile from shore. A red patch on a hill, bearing 200°, makes a good mark when approaching the anchorage. A conspicuous green patch on the shore, 5.5 miles S of Wora, forms a good landmark.

Ajuga Point (15°02'S., 166°48'E.), on the W side of St. Philip and St. James Bay, is surrounded by a reef that projects nearly 1 mile seaward. Terebiu mission station, 1.75 miles S of the point, has a good anchorage. There are conspicuous white spots on the shore 2 and 3 miles SW of Terebiu.

Talomako Anchorage (15°09'S., 166°50'E.) is situated near the head of the bay on the W side. The recommended anchorage, in a depth of 22m, sand, lies with Cape de Touar, 3 miles SW of Cape Quiros, bearing 037°, and a conspicuous rock close NE of the nearby mission station, bearing 264°.

De La Table Anchorage (15°09'S., 166°56'E.) is at the E end of the head of the bay. Vessels anchor, in depths of 16.5 to 20.1m, good holding ground, about 0.5 mile NW of a rivulet in the SE corner of the bay. There is usually some surf on the beach.

Cape Quiros, the NE extremity of Espiritu Santo, is low and wooded. A conspicuous white patch exists on the coast, about 0.8 mile SE of the cape. A strong indraft into the bay has been reported in the vicinity of the cape. This S set was experienced 15 miles to the N of the cape.

Espiritu Santo Island—East Side

6.66 Sakao Island (Ladhi Island) (14°57'S., 167°07'E.) lies about 5 miles ESE of Cape Quiros. The island is wooded and has an abrupt bluff on its N side. The channel between the island and the shore is deep, but is subject to strong eddies.

Shoal patches, with a least depth of 22m, lie between 4.5 miles and 7 miles SE of Ladhi Island.

Thion Island (Dolphin Island) lies about 4.5 miles SSW of Sakau Island. From some angles the island appears to have a flat top, but from the SW its profile resembles a dolphin's head. A reef extends a short distance from the NW part of the island, and a bank, with a depth of 12.8m, lies 0.2 mile W of the same point. Bucephale Islet, small and wooded, lies close off the SW side of Thion Island.

Port Olry (15°02'S., 167°04'E.) is formed by Thion Island and an indentation of the coast to the W. The entrance to the port is N of Thion Island, and the anchorage is in the clear area, about 0.4 mile in diameter, between the island and the shore to the W. The inner section of the port is blocked by a reef having numerous coral heads through which there is a possible passage for light draft vessels. Vessels may obtain anchorage, in 26m, about 0.3 mile W of Bucephale Islet, with the SW extremity of Thion Island bearing 145°.

6.67 Hog Harbor (15°08'S., 167°06'E.) (World Port Index No. 57170) and Lonock Bay, which is the inner part of the harbor, lies about 6 miles S of Olry Island. Ladhu Island, also known as Elephant Island, lies off the harbor and may be passed on either side when entering the bay. Anderson Reef, the position of which is approximate, lies 2 miles NW of the W extremity of Ladhu Island. Malviror Reef and Moror Reef lie off the E side of the harbor.

There is a sheltered anchorage, about 0.3 mile from shore at the head of Lonock Bay, in a depth of 25.6m, with Farquhar Point, on the W side of the bay, bearing about 280°.

Reguin Bay (Shark Bay) (15°16'S., 167°09'E.), about 7 miles S of Hog Harbor, lies inside of the W side of Ladharo (Pilot) Island. The bay affords anchorage, in a depth of 29m, irregular bottom, with two leading beacons situated at the head of the bay bearing 284°. The anchorage is sheltered by Ladharo Island. Pilotin Islet lies about 1.3 miles SE of Ladharo Island, with a passage between it and the coast.

6.68 Turtle Bay (15°21'S., 167°11'E.) lies about 5.5 miles S of Requin Bay. The bay affords anchorage, in a depth of 18.3m. Henaff Point, the N entrance point to Turtle Bay, shows

a beacon N and S of the point, and two buoys in line off the point. There is a wharf and a beacon on the W side of the bay; another beacon stands on the NW side of the head of the bay. A dangerous coral head lies close E of the wharf.

Tambo Passage is the deep and clear passage to Turtle Bay. A fairway through the middle of the passage has been wire dragged to a depth of 16.7m. To enter Turtle Bay by way of Tambo Passage, permission must be obtained from the local authorities, and a pilot must be boarded.

On the S side of the passage is Turtle Islet (Mailila Islet), from which reefs extend 0.25 mile to the N. Mafea Island, densely wooded, lies about 1 mile SSE of Turtle Islet. A number of tall palm trees and a beacon stand on the W coast of Mafea Island. Several islets, connected by reefs and marked by beacons and buoys, lie close to the Espiritu Santo shore and can best be seen on the chart.

Ais Island (Aesi Island) (15°26'S., 167°15'E.), 3 miles long in a N-S direction, low, and wooded, lies between Mafea Island on the N and Palikoulo Island to the South. Ais Island and Mafea Island are separated by Undine Passage, which is deep and clear of dangers. Ais Island and Palikoulo Island are separated by Diamond Passage, which is also deep and free of dangers. The fairways through both of these passages has been wire dragged to a depth of 16.7m. Palikoulo Island, which shows a light, is connected to the Palikoulo Peninsula by a causeway.

Anchorage may be obtained off the SW side of Ais Island, sheltered from winds between the N and E, in depths of 29 to 40m, with the center of the village bearing 070° and Palikoulo Point bearing 166°. A shoal, with a depth of 8.2m, lies about 0.1 mile NNE of the anchorage. The fairway to the anchorage is marked by buoys and can best be seen on the chart.

6.69 Surundu Bay (15°28'S., 167°13'E.) indents the shore of Espiritu Santo W of the S end of Ais Island. The bay has numerous reefs and coral patches, but affords good anchorage to small craft. The entrance, known as Cassiopee Passage, has a least depth of 2.1m.

6.70 Palikoulo Bay (15°29'S., 167°14'E.), entered between Palikoulo Point and Cape Undine, 1.25 miles NW, is sheltered except from winds between the N and E, but the depths are irregular. A 4.7m patch, best seen on the chart, lies about 0.8 miles SW of Palikoulo Point, and is marked by a buoy. A wreck is reported to lie stranded on a reef about 1 mile SW of Palikoulo Point. The buoys charted along the shores of Palikoulo Bay were reported to no longer exist

Depths—Limitations.—There is a wharf, about 40m long with depths of 9.7 to 10.6m, on the E side of Palikoulo Bay. The largest vessel to berth at this wharf was a 16,000 grt tanker. The wharf was reported to be in need of repair. There is one tanker mooring buoy, with a pipeline to the shore.

Pilotage.—Pilotage is compulsory, except for vessels of the South Pacific Fishing Company. Arrangements should be made through the Luganville harbormaster.

Anchorage.—Small vessels can find good, but restricted anchorage, in about 18.3m, at the head of the bay, with the pier at Benkula village bearing about 186°, and the opening between the N extremity of the Palikoulo Peninsula and Palikoulo Island, bearing 052°.

Santa Maria Island—Conspicuous 120m waterfall

The Banks Islands

6.71 The **Banks Islands** (13°15'S., 167°15'E.) consist of a number of volcanic islands lying from 50 to 100 miles NE of the N point of Espiritu Santo. With the exception of Dives Bay and Port Patteson, there are no harbors in the group. Landings on the S and SE sides of the islands is usually impracticable, but on the lee side it can be effected without risk. Earthquakes are frequent, but no great damage has been recorded.

Winds—Weather.—The cyclones which are experienced in the S part of Vanuatu are seldom felt in the Banks Islands.

Tides—Currents.—The currents among the islands of this group appear to be affected by the winds, their rate being from 0.5 to 1 knot, according to the force of the wind.

Santa Maria Island (Gaua Island) (14°15'S., 167°30'E.) lies about 50 miles NE of the N extremity of Espiritu Santo Island. The island is nearly round, flat topped, and thickly wooded. The NW and SW points of the island are both steep cliffs. The NE and N coasts are bordered to a distance of 0.75 mile by a reef in which there are three openings, each affording anchorage to small vessels in good weather.

In the center of the island there is a large lake, with a depth of 99m. A 120m waterfall is conspicuous from seaward from points E of the island as it descends from the lake. There are some sulphur springs on the W side of the hills forming the ba-

sin of the lake.

Caution.—Caution must be exercised when approaching the E or NE side of the island at night, as the low land projecting in front of the mountains render the estimation of distance difficult. Mission stations are established at several places along the coast.

6.72 Lakona Bay (14°17'S., 167°25'E.) lies about 2 miles N of the SW extremity of Santa Maria Island. Anchorage is afforded, in a depth of 18.3m, 0.3 mile offshore and 0.5 mile SW of a conspicuous waterfall located in the N part of the bay. Anchorage may be obtained, in a depth of 26m, in a bight about 0.5 mile outside the fringing reef, off a mission station, about 1.8 miles N of the waterfall in Lakona Bay.

Masevonu Anchorage (14°10'S., 167°30'E.) lies on the N side of Santa Maria Island, 2.5 miles E of Low Rocky Point. Vessels anchor, in about 22m, about 0.1 mile from the reef which forms the E side of the anchorage. The locality may be recognized by a conspicuous large house which stands about 0.5 mile E of the anchorage.

Losolava Anchorage lies about 3.5 miles E of Masevonu Anchorage. The sea breaks heavily on the reefs on either side of the entrance, which is about 0.2 mile wide. There is a small red rock about 1 mile W of the entrance, which assists in identifying it, and close W of the rock there is a small hill close to the coast.

Anchorage is afforded inside the entrance, in depths of 14 to 24m, or farther inside, in depths of 9 to 11m, within a few hundred meters of the shore. It may be necessary to lay out a kedge, as there is not much swinging room.

Do not enter unless the sun is in a favorable position, as the eye is the only guide. After passing through the entrance, it is necessary to keep close to the reef on the E side to avoid the projecting reef on the W side. Caution is necessary as uncharted coral heads may exist.

Tarasag Bay (14°12'S., 167°36'E.) lies on the NE side of Santa Maria Island, about 3 miles SE of Losolava Anchorage. There is a conspicuous waterfall in the Lusal River, which discharges into the bay. East Point lies 2.5 miles S of Tarasag Bay. South of East Point there is an opening in the shore reef which serves as an anchorage for small craft with local knowledge.

Merig Islet (St. Claire Islet) (14°17'S., 167°48'E.), lies about 11 miles E of Santa Maria Island. There are no anchorages near the islet and landing is difficult. The islet is reported to be inhabited.

Mera Lava Island (Star Peak Island) (14°25'S., 168°02'E.), located 16 miles SE of Merig Islet, is the SE island of the Bank group. The island rises to a conical-shaped peak, bearing evidence of having been at one time an active volcano. The island is steep-to except off the NE point, where there is a small islet, 0.2 mile offshore. There is said to be temporary anchorage for a small vessel on the lee side of the island. Landing may be effected on the small beach at the NE point of the island.

Vanua Lava Island

6.73 Vanua Lava Island (13°48'S., 167°29'E.) is located 14 miles N of Santa Maria Island and is the largest of the Banks group. A volcanic mountain range runs nearly throughout its whole length. Near the middle of the range is Mount Suretamati, a crater 915m high, frequently emitting volumes of steam. The principal villages are situated on the NW side of the island.

Ngeuseu Mbeuit Point (Paut Point) (Ngousouboot Point) (13°56'S., 167°27'E.) is the S extremity of the high peninsula at the S end of Vanua Lava. East of the point the coast curves round and extends to the NNW for over 2 miles, and then resumes its E trend forming Kerembitia Bay (Mosina Bay) at the turn.

Kerembitia Bay (Mosina Bay), on the E side of the low land joining the high peninsula to the main island, is open to the SE and during the greater part of the year, is too exposed to be suitable for anchorage. Anchorage may be obtained off a village at the head of the bay, about 0.3 mile from a sandy beach.

South Head (13°51'S., 167°35'E.) lies 6.5 miles ENE of Kerembitia Bay (Mosina Bay). South Head should not be approached within 0.15 mile, as the sea has been observed to break on a reef which extends from the head. Kakea Islet and Niwula Islet, located 0.9 mile SE and 1.75 miles E of South Head, are low, flat, and wooded. The reef encircling these two islets extends from 0.3 to 0.5 mile from their coasts.

Maseunar Channel (Dudley Channel), which separates Kakea Islet from South Head, is 0.9 mile wide and has a least depth of 14.6m in the fairway. The reef on the SE side of the channel has been reported to extend further NW into the channel than charted; it has been reported to be easily seen. A rock, with a depth of 7.3m or less, lies in the N entrance to Maseunar Channel (Dudley Channel), about 0.5 mile NE of South Head. The tidal current in the channel sets N on the flood and S on the ebb. An aeronautical light is shown 3 miles W of South Head.

6.74 Ashwell Bluff (13°48'S., 167°34'E.), located about 2 miles N of Ngus Naosiur Point (Grange Point), is 60m high and wooded. The bluff is conspicuous and appears as an island from all directions. Nusa Point, its S extremity, is the N entrance point to Port Patteson.

NASA Space Shuttle Image

Vanua Lava Island—S portion

Port Patteson (13°50'S., 167°33'E.) is entered between

Ngus Naosiur Point (Grange Point) and Nusa Point. The port consists of two bays, South Bay and Nawono Bay. There is safe anchorage in both bays. Nawono Bay offers good anchorage, in 14.6 to 18.3m, in the middle of the bay. Metlow Reef (Meatlu Reef), which always breaks, lies in the middle of Port Patteson.

South Bay lies between Ngus Naosiur Point (Grange Point) on the E and Ngere Gesai Point (Spout Point) on the W. The shores of the bay are fringed by a reef. The shore reef on the S side is reported to have extended seaward. A heavy SE swell is frequent in the bay.

The anchorage in South Bay is moderately good, though open to the N and NE. Vessels should anchor nearer to Ngus Naosiur Point (Grange Point) than to the S or W shore. Vessels anchor, in about 33m, with Ngus Naosiur Point (Grange Point) bearing 088° and Tovi Aar (Tawen Kwat) bearing 200°.

Ravenga Island (13°46'S., 167°33'E.) lies about 1.8 miles N of the N extremity of Ashwell Bluff. The island lies on a coral reef. Foul ground is reported to exist to the E of the island, and in strong E winds the sea has been seen to break to a distance of over 1 mile from shore. The island is separated from Vanua Lava by a passage having a width of 0.5 mile and depths of 9.1m. The passage has been reported to be free of dangers. Shoal patches have been reported to lie E to N of Ravenga Island, and can best be seen on the chart.

From abreast of Ravenga Island, the coast of Vanua Lava Island trends NW for 6 miles to the N extremity of the island, then it trends 6 miles SW to **Red Cliffs** (13°45'S., 167°24'E.), S of which is a conspicuous waterfall. There is a mission station 1 mile N of Red Cliffs. Anchorage may be obtained, in 18.3m, 0.3 mile from the shore at a large village situated 3.5 miles NE of Red Cliffs.

Temporary anchorage may be obtained all along the NW coast of the island, as nowhere do the depths deepen suddenly to prevent anchoring.

Veutumboso Bay (Avreas Bay) (13°54'S., 167°28'E.) lies on the SW side of Vanua Lava Island, 3 miles N of Ngeuseu Mbeuit Point (Paut Point). The bay affords shelter against winds from N through E to SSE. A house, situated on a hill above the black lava rocks, is conspicuous from seaward, but is hidden from the anchorage. Vessels may obtain anchorage, in 18.3 to 28m, in any part of the bay, at about 0.3 mile from the shore.

Islands East and North of Vanua Lava Island

6.75 **Mota Island** (Sugarloaf Island) (13°49'S., 167°42'E.) lies 6 miles E of Port Patteson. The island has a conical peak, with a shoulder projecting to the W, from which direction the peak takes the form of a symmetrical cone. The cliffy coast is fringed by a narrow reef making landing difficult. The best place for a landing is near the mission station on the NW side of the island.

There is no anchorage off Mota Island. Small vessels occasionally lay a kedge anchor out on the reef, to which they ride for a short period of time.

Saddle Island (Valua Island) is located about 8 miles NNW of Mota Island. The N part of the island consists of a mountain and hills. The S side is made up by a rocky bluff, about 1.5 miles from its SW extremity, which is low. It has been reported the E end of the island lies about 1.5 miles farther E than charted, and that foul ground extends E from it for about 0.5 mile. Ra Islet lies on a reef about 0.2 mile off the SE extremity of the island. A mission station stands on the islet.

Mele Bay (Mili Bay) (13°39'S., 167°40'E.) is the indentation on the NW side of Saddle Island, which affords an indifferent anchorage. A vessel should approach the bay with the mouth of the river bearing about 128°, and anchor, in a depth of 37m, when the two points of land to the N come in line bearing 000°, and a mushroom-shaped rock on the reef, 0.75 mile S of the anchorage, is in line with the W extremity of Mota Lava.

6.76 The **Reef Islets** (Rowa Islets) (13°36'S., 167°32'E.) are three small, low, sandy, wooded islets located on a dangerous reef, which lies about 7 miles WNW of Saddle Island. The reef is crescent-shaped, with the concave side to leeward. The weather side dries to a considerable extent at LW, and is always marked by breakers, but the lee side is calm and smooth and therefore dangerous. The area within a line connecting the NW extremity of the reef and the S islet, is almost filled by a shallow reef. The SW extremity on which the sea also breaks is bold to within 0.5 mile. Both extremities are easily visible.

A vessel can obtain temporary anchorage, in 9.1 to 12.8m, about 1 mile from the S islet, and 0.2 mile from the reef, with the summit of Mota Island bearing 140°.

Rowa, the N islet, is the only one inhabited. There is a mission and trading station on the islet. Sanna, the S islet and largest on the reef, lies about 1 mile S of Rowa Islet and terminates at its S end in a bank of sand.

Ureparapara Island (13°31'S., 167°20'E.) lies about 9 miles WNW of the Reef Islets. The island is nearly circular in shape and is free from any off-lying dangers. Dives Bay, on the NE side of the island, is an excellent harbor. A narrow belt of reef surrounds the island, except at its NE and SE side, but otherwise the coasts are steep-to. Landing may be effected on the lee side of the island near some villages. Tidal eddies have been observed off the SE and SW sides of the island.

Dives Bay, on the NE side of the island, provides anchorage near the head of the bay. The best berth seems to be in 18.3 to 22m, off a white sandy beach. The anchorage cannot be recommended, because the bottom is foul and squalls descend from the mountain sides.

Vot Tande (Vat Ganai) (13°15'S., 167°39'E.), an islet about 22 miles NE of Ureparapara Island, is the northernmost of the Banks Islands. It is composed of two rocks, about 76m high, the top been covered with trees. A vertical rock, about 15m high, lies close off the NE side of the islet.

Caution.—Vot Tande (Vat Ganai) has been reported to lie 1.3 miles NE (1966) and 1 mile S (1989) of its charted position.

The Torres Islands

6.77 The **Torres Islands** (13°17'S., 166°37'E.) consists of five islands lying from about 35 to 50 miles WNW of the Banks Islands. They are of coral formation, some being flat-

topped, others rising in terraces to peaked hills.

Toga Island (South Island) (13°26'S., 166°41'E.) lies about 37 miles W of Ureparapara Island. The island is flat-topped and bluff in most places. A reef extends at least 135m from the SE point of the island, and fringes the other points and the coast where not abruptly terminated by cliffs. The best landing place is between Breneod Point and Merret Point, the NW and N extremities of the island.

The anchorage off **Pilier Point** (13°27'S., 166°41'E.) is precarious. A heavy swell sets in during fresh trade winds. Dumanoir Channel, separating Toga Island from Loh Island, is about 2.3 miles wide and apparently deep, but has not been surveyed. A reef, the extent of which is not known, projects into the channel from the S extremity of Loh Island. Heavy overfalls are found in this channel.

Loh Island (Saddle Island) (13°22'S., 166°38'E.), located 2.25 miles NNW of Toga Island, has the shape of a saddle, which gives it the appearance of two islands when seen from the SW. The SW and W sides of the island are fringed by reefs for a short distance offshore. A reef extends from the S extremity of the island.

Vi Paka Anchorage (13°22'S., 166°38'E.), a bay on the W side of Loh Island, affords anchorage, in 33m, about 0.3 mile offshore, with Leffondre Point bearing 324°. A vessel reported finding anchorage, in 49m, 1 mile NNE of the S peak of the island.

Log Bay (13°21'S., 166°39'E.), on the NE side of Loh Island, recedes about 0.5 mile in a W direction. Reefs fringe the entrance points and other parts of the bay. The bay has patches of sandy beach and landing on the NW side is not difficult.

Grande Channel (13°18'S., 166°38'E.), separating Tegua Island from Loh Island, is 2.5 miles wide and deep in the fairway. It was reported that reefs and discolored water extend 0.4 mile off the N end of Loh Island.

6.78 Tegua Island (Middle Island) (13°16'S., 166°37'E.) lies on the N side of Grande Channel, 2.75 miles N of Loh Island. Scorff Bay, 1.75 miles ENE of the S extremity, is clear of dangers, except for the reefs at the head of the bay. The depths in the bay have been reported to be more irregular than those charted. Anchorage may be obtained, in a depth of 38m, with the entrance points of the bay bearing 188° and 124°.

From **Dupond Point** (13°16'S., 166°39'E.) to Loutil Point, the NE extremity of Tegua Island, there is a fringing reef. Basilisk Shoal lies off the NE side of Tegua Island, about 1.3 miles NNE of Loutil Point, but the position is doubtful. The shoal was reported to have a depth of 11m.

Metoma Island (Ovale Island) (13°14'S., 166°36'E.), between Hiu Island and Tegua Island, is the smallest of the Torres group. D'Hestreux Passage, between Metuma Island and Tegua Island, is navigable only by boats. Cosmao Passage lies between Hiu Island and Metoma Island. On both sides of the channel, fringing reefs extend from the shore, reducing the navigable width to about 0.3 mile. Depths of 18.3 to 35m are charted in the fairway.

Hayter Bay (Lonakwarenga Bay) (13°16'S., 166°36'E.), on the W side of Tegua Island, affords anchorage, in 29m, about 0.5 mile from its head. The anchorage is partly protected by Ngwel Reef (Ethel Reef), lying in the SW approach to the bay. Ngwel Reef (Ethel Reef) is separated from the S entrance point of Hayter Bay by Guichen Channel, about 0.3 mile wide and deep in the fairway.

Ravallec Shoal, with a depth of 9.1m, lies about 0.5 mile NW of **Pilot Point** (13°15'S., 166°36'E.), the N entrance point to Hayter Bay. A patch, with a depth of 5.5m, and a shoal on which the sea breaks, lie about 0.2 mile SSW and about 0.4 mile SSE, respectively, of Pilot Point, each being about 0.2 mile from the N shore. Other dangers not charted may exist in this vicinity.

6.79 Hiu Island (North Island) (13°09'S., 166°35'E.), the largest and highest of the Torres group, is about 7 miles in length and 3 miles in width. The S part of the island is an elevated and thickly-wooded plateau rising at a distance of about 2.5 miles from the S extremity to a height of 518m, from where it slopes gradually in terraces toward the N extremity. The shore points of the island are low and prolonged under water to as much as 0.15 mile. It is recommended to give these points a good berth.

Picot Bay lies on the NW side of Hiu Island and affords tolerable anchorage. Vessels may obtain anchorage, in a depth of 29m, with a distinctive patch of white sand on the beach bearing 099°. Vessels also anchor 0.5 mile offshore, with the white patch on the N end of a hill bearing 126°.

Giraudeau Reef (13°05'S., 166°35'E.), which generally breaks, extends nearly 1 mile off the N extremity of Hiu Island. A wide berth should be given to the reef.

Islands and Dangers Northeast of the Torres Islands

6.80 Tikopia Island (Tucopia Island) (12°18'S., 168°49'E.) lies about 138 miles ENE of Hiu Island. It has been reported that the island may be approached in safety on all sides. The island appears as an old volcano, of which one of the sides has fallen into the sea. The interior of the crater consists of a deep fresh water lake. From the SW point, a reef, plainly seen, extends out about 1 mile. There are sandy beaches on the E and W sides of the island. Several huts stand on the beaches.

Ringdove Anchorage (12°16'S., 168°48'E.) is a bight in the fringing reef on the W side of Tikopia Island; it affords some shelter from the prevailing winds. It was reported a vessel obtained anchorage in a depth of 27m, with the N edge of a conspicuous bluff bearing 107°, the NW extremity of the island bearing 059°, and the SW extremity bearing 201°. This position affords swinging room of about 0.1 mile clear of the shoal patches to the E. In 1985, a vessel reported anchoring with the bluff bearing 104°, 0.4 mile distant.

Small craft can anchor, in 11 to 18.3m, with the conspicuous bluff bearing about 100°, about 160m from the edge of the fringing reef.

Anuda Island (Cherry Island) (11°35'S., 169°51'E.) lies about 73 miles NE of Tikopia Island. This minute island is densely covered with vegetation and there is a sandy beach along its W side. A drying reef fringes the S and W sides of the island and attains a maximum width of 0.2 mile off the S side.

About 0.9 mile SE of the S end of the island lies Southeast Rock, 6.1m above water, which is joined to the island by a

rocky bank, and 0.25 mile SE of the rock is an apparently isolated sunken rock on which the sea breaks heavily in rough weather. A rock which the sea breaks on lies 0.4 mile ENE of the N extremity of the island.

Anchorage.—Anchorage has been taken, in 26m, about 0.5 mile W of the island. The best anchorage, in depths of 9 to 11m, lies about 0.2 mile from the beach, abreast the landing place on the SW side of the island.

6.81 Fatutaka Island (Mitre Island) (11°55'S., 170°12'E.) lies 26 miles SE of Anuda Island. The island is steep and wooded, and consists of two hills and a rock, giving it the appearance of a mitre. A shoal, with a depth of 23m, lies 71 miles E of Fatutaka.

Strathmore Shoal (11°09'S., 170°42'E.) is about 135m in extent, with depths of 7.3 to 9.1m. In 1961, the shoal was reported to lie about 6.5 miles ESE of its charted position. A shoal, with a depth of 9.1m, was reported to lie about 35 miles N of Anuda Island. This shoal has not been examined. In 1989, a shoal with a depth of 14m was reported to lie in position 11°03'S, 169°55'E.

Pandora Bank (12°11'S., 172°05'E.) has a depth of 20.1m and is steep-to on its W side. A ship obtained a sounding of 26m in position 12°01'S, 172°09'E. This sounding may have been obtained on Pandora Bank, which may be much more extensive than originally supposed, or the sounding may indicate a separate bank. A bank, with depths of 20.1 to 37m, was reported extending 6 miles bearing 062° from a point in position 12°32'S, 172°03'E.

Charlotte Bank (11°47'S., 173°13'E.) has a depth of 27m and is reported to lie about 14.5 miles from its charted position.

Hazel Holme Bank (12°48'S., 174°01'E.), with a least depth of 31m, is 5 miles long in a NE-SW direction, and has a maximum width of 3.5 miles. A depth of 29m is charted 25 miles SE of Hazel Holme Bank.

Alexa Bank (11°36'S., 175°07'E.) has the shape of a triangle, with the apex being its W extremity and the base is its E side. The bank is 18 miles in length in an E-W direction. Depths on the bank range from 24 to 46m. Penguin Bank, located 3.5 miles NE of Alexa Bank, has a least depth of 27m.

Morton Bank (11°44'S., 176°18'E.) is a steep-to reef about 2 miles in extent in a N-S direction. The bank has a least depth of 16.5m, fine coral sand. It has been reported that the bank lies about 3 miles SSW of the above position.

The Santa Cruz Islands

6.82 The **Santa Cruz Islands** (10°00'S., 165°35'E.) lie from 85 to 190 miles N of the Torres Islands, and consist of four large islands and several smaller ones. The current between the Torres Islands and the Santa Cruz Islands generally runs to the W, varying between the SW and NW, according to the direction of the wind. The rate of the current depends on the force of the wind.

The **Vanikolo Islands** (Vanikoro Islands) (11°40'S., 166°54'E.) are composed of two islands of volcanic origin, Vanikolo Island and Tevai Island. Mount Popogia, 924m high, rises almost in the center of Vanikolo Island and streams of lava are still perceptible. The barrier reef encircling these islands in some places lies up to 2.5 miles from the shore. A short reef also encircles nearly every part of the coast of each of these islands. Between the barrier reef and the shore reef, the depths vary from 18.3 to 82m, but there are numerous coral rocks which render the inner navigation very dangerous.

When a vessel is approaching from the SW, the sandy beach at **Peou** (11°41'S., 166°50'E.) forms a good landmark, as it can be seen a good distance from offshore. This beach, with a small patch about 0.5 mile to the E, is all that can be found within a stretch of 5 to 6 miles.

6.83 Tevai Island (11°38'S., 166°58'E.), which nearly occupies all of the large bay on the NE side of Vanikolo Island, is covered with pine trees. It is separated from Vanikolo Island by Dillon Passage, about 0.3 mile wide between shorelines. Tevai Bay, between the S side of Tevai Island and the E end of Vanikolo Island, is about 1 mile in width in the entrance N of Dillon Head. There is an anchorage for small vessels in Tevai Bay, off the village of Ocili, but it is not recommended.

Manevai Bay (11°39'S., 166°56'E.), W of Tevai Island, is divided into two parts, an outer anchorage and an inner anchorage. The bay may be entered from the E through Dillon Passage, or from the N through Hayes Channel, an opening in the barrier reef. The shores of Manevai Bay are bordered by reefs, which render landing difficult. Small vessels may enter the bay by Northeast Passage, which lies N of Tevai Island.

The bay affords anchorage in the open space NE of Mausoleum Bank, in 51m, mud. The best anchorage for moderate-sized vessels, in 26 to 29m, lies S of Mausoleum Bank.

The **Naunha Passages** (Naunonga Passages) (11°35'S., 166°54'E.) are two openings in the barrier reef off the N side of Vanikolo Island. The W passage lies 0.3 mile W of Naunha Islet and has an unexamined shoal in its fairway. The E passage has depths of 12.8 to 16.4m, but there are some patches with depths of 8.2 to 9.1m. Vessels with local knowledge generally use the E passage.

Nimbe Bay (11°42'S., 166°56'E.) is entered about 2 miles WSW of Astrolabe Point, the SE extremity of Vanikolo Island. In the middle of the entrance between the reefs, which extend from both entrance points, are three detached reefs with channels between them, and there are a number of coral heads near the middle of the bay.

Saboe Bay, located 3.5 miles W of Nimbe Bay, has depths of 46m and is clear except for a detached reef, marked by a buoy, on the E side of the entrance. It has been reported the bay affords good anchorage, however, it is not recommended for large ships, because of the constricted nature of the entrance. Anchorage has been taken, in 37m, good holding ground, near the head of the bay.

6.84 Pallu Passage (11°43'S., 166°49'E.) is an opening in the barrier reef on the SW side of Vanikolo Island. The narrowest part of the entrance has a width of 160m. The passage is marked by a number of navigational aids. Anchorage has been taken, in 22m, with the white store in the village of Peou bearing 032°, distant 0.2 mile. The anchorage is considered satisfactory for vessels under 5,000 grt.

Utupua Island (11°19'S., 166°32'E.) is located about 20 miles NW of Vanikolo Island. The island is almost completely encircled by a coral reef, which extends in some places to about 2.5 miles from the shore. The NW side of the reef breaks

in heavy weather, further to the SW the reef is awash. The principal villages lie on the N and W coast of the island. The island was reported to lie 2.5 miles N of its charted position.

Basilisk Harbor (11°16'S., 166°30'E.) is about 1 mile wide between Hayter Point, the N entrance point, and Moresby Point, the S entrance point. Ringdove Passage, an opening about 0.2 mile wide in the barrier reef through which vessels have to pass to enter Basilisk Harbor, is situated 1.75 miles WSW of Moresby Point. There is a patch, with a depth of 5.8m, on the SE side of the fairway close within the entrance, and a patch with a depth of 5.8m, near the NE extremity of the reef on the W side of the entrance.

Byron Bay, lies on the E side of the harbor, near its head, and affords anchorage, in depths of 22 to 26m. There is no swinging room for a large ship because of the reefs projecting from the shores of the bay.

6.85 Ndendo Island (Ndende Island) (10°46'S., 165°57'E.), located 39 miles NW of Utupua Island, is the largest of the Santa Cruz Islands. The island consists of mountains, hills, and a coastline indented with many inlets and bays. The vegetation on the island is dense and the rainfall heavy. The S side of the island has not been examined.

Graciosa Bay (10°44'S., 165°48'E.) located at the W end of the N side of Ndendo Island, may be entered through N passage or W passage. The bay is about 3.5 miles in length and 1.5 to 2 miles in width. The bay serves as the main port for the outer islands. **Manoora Shoal** (10°46'S., 165°49'E.), a coral bank with a least depth of 16.1m, lies 0.6 mile off the head of the bay. Lata Jetty, 20m in length, lies 0.6 miles S of Luova Point (Spurgeon Point). A wharf, 15m in length, with a least depth of 3m alongside, lies 0.3 mile SW of Manoora Shoal. The wharf was reported (1989) destroyed and suitable only for small craft.

Anchorage.—Anchorage may be obtained on Manoora Shoal, in a depth of 14.9m, good holding ground. Good anchorage was found, in a depth of 60m, about 0.3 mile SSW of Shaw Point. Anchorage may also be taken in a small bay close S of the W entrance to West Passage. This anchorage is sheltered from the prevailing winds, but is very restricted, with only 0.2 mile between reefs.

6.86 West Passage (10°42'S., 165°47'E.) is divided at its E end by a reef, on which lies a black rock. West Passage is not recommended for other than small craft. A light is shown from the SW extremity of Tomotu Neo.

North Passage leads into Graciosa Bay between Cape Trevanion, the N extremity of Trevanion Island, and Carteret Point. The passage is reported to be deep and free of dangers.

Trevanion Island (Temotu Island) (10°41'S., 165°47'E.) lies off the NW side of Ndendo Island and partly fronts Graciosa Bay. The island is rather low, covered with trees, and separated from Ndendo Island by West Passage.

Lord Howe Island (Tomotu Noi Island) (10°51'S., 166°02'E.), separated from the SE side of Ndendo Island by a deep channel about 0.8 mile wide, is reported to lie farther S than charted. It has been reported that good anchorage, in 14.6 to 22m, may be obtained in an inlet abreast the W end of Lord Howe Island.

Swallow Bay (10°41'S., 166°04'E.), entered about 2 miles W of Cape Byron, the NE extremity of Ndendo Island, is only a slight indentation in the coast. Rocks extend from both entrance points. The bottom affords poor holding ground. Depths in the bay are very deep.

Carlisle Bay is located about 3.5 miles W of Shallow Bay. The bay affords good shelter from SE and S winds within the reefs, but is partly open to the NE.

6.87 Byron Bay (10°40'S., 165°59'E.) lies about 1.5 miles W of Carlisle Bay and affords anchorage in the center of the bay, in depths of 27 to 37m. A vessel was reported to have anchored in a depth of 22m, with the entrance points of the bay bearing 054° and 324°.

Tinakula Island (Tamami Island) (10°24'S., 165°47'E.) lies 15 miles N of Cape Trevanion. The island is a volcanic cone, with its lower part covered with vegetation and its upper part bare. The volcano is active from time to time. **Forrest Reef** (10°15'S., 165°47'E.) was reported (1899) to lie about 7 or 8 miles N of Tinakula Island, but its position is doubtful. A bank, 400m in length, running in an E/W directions, with a depth of 82m over it was reported in the same position (1900). Less water may actual exist in this vicinity.

The Reef Islands

6.88 The **Reef Islands** (10°15'S., 166°06'E.), about 22 miles N of the E end of Ndendo Island, are dangerous to approach on account of the extensive reefs which extend from them, especially on their W side. The islands occupy an extent of about 40 miles in an E-W direction from Banga Ndende, the SE island of the group, to Nupani, the NW island of the group.

Brougham Shoal (9°38'S., 165°26'E.) over which the sea breaks heavily, extends 10 miles E-W and 4 miles N-S; the position was confirmed in 1987.

Patteson Shoal (9°51'S., 166°07'E.) has a least depth of 12.4m, reported in 1987.

Goldfinch Shoal (10°17'S., 166°50'E.) was reported (1987) to have a least depth of 11.4m.

Banga Ndende Island (Nibanga Island) (10°21'S., 166°17'E.), the SE island of the group, is a small round bold-looking island, with apparently deep water around it. Banepi Island, the E island of the group, lies about 3 miles NNE of Banga Ndende Island, to which it is similar in size and appearance, but not as high. The island is wooded and has a small bight on its W side.

Lomlom Island (10°18'S., 166°15'E.), located 1 mile W of Banepi Island, is the largest island of the group. It appears to be free of dangers except off its SW extremity, where a reef with several large rocks within its edge extend SW for 1.5 miles. Mohawk Bay is an indentation in the reef on the W side of Lomlom Island. On the reef forming the bay the water is shallow and in places dries at LW, and there are several islets standing on the reef.

6.89 Fenualoa Island (10°16'S., 166°12'E.) lies close NW of Lomlom Island and is separated from it by Forrest Passage, which is free of dangers. A reef extends 1.5 miles off the S end

of Fenualoa Island in a SW direction. There is a deep channel between this reef and a reef to the W of it. Nifiloli Island lies about 1.5 miles NNW of Fenualoa Island, and lies on a reef extending from the N end of Fenualoa Island. Round Islet lies on the same reef, about 1 mile W of Nifiloli Island.

Pileni Island lies 2.5 miles NW of Round Island and stands on a detached reef. A mission station stands on the SW point of the island. There appears to be a deep channel between Pileni Island and the N edge of Great Reef. Makalom Islet (Sand Islet) lies on the SW edge of a detached reef, about 3 miles W of Pileni Island. There is a deep-water channel between the two islands.

Great Reef is an irregular atoll with a deep water entrance at its W end and Forrest Passage at its E end. There are also some passages on its S side, all of which appear deep. The currents set SW along the N side of Great Reef, and there are overfalls off its W extremity. **Matema Islet** (10°17'S., 166°11'E.) lies on a detached reef on the S side of Great Reef. There is a landing place on the W side of the islet.

Nukapu Islet (10°07'S., 165°57'E.) lies on the E side of a reef, about 7.5 miles NW of Makalom Islet. The islet is narrow and about 1 mile in length. It has been reported a village stands on the S end of the island. The reef on which the islet stands extends about 1.5 miles to the W of the islet.

Nalogo Island lies on the E side of a reef, about 18.5 miles W of Nukapu Islet. **Nupani Island** (10°04'S., 165°44'E.) lies on the N side of the same reef and about 2 miles NNW of Nalogo Island. These two islands are the NW of the Reef Islands. The reef on which the islands stand is about 4 miles in length N-S, with a spur projecting 1.5 miles SW from its S end. The sea generally breaks on the end of the spur.

The Duff Islands

6.90 The **Duff Islands** (9°57'S., 167°12'E.) lie with Taumako Island, about 53 miles ENE of Lomlom Island, of the Reef Islands. The group consists of nine islands of apparently volcanic rocks. The islands extend 17 miles in a NW-SE direction.

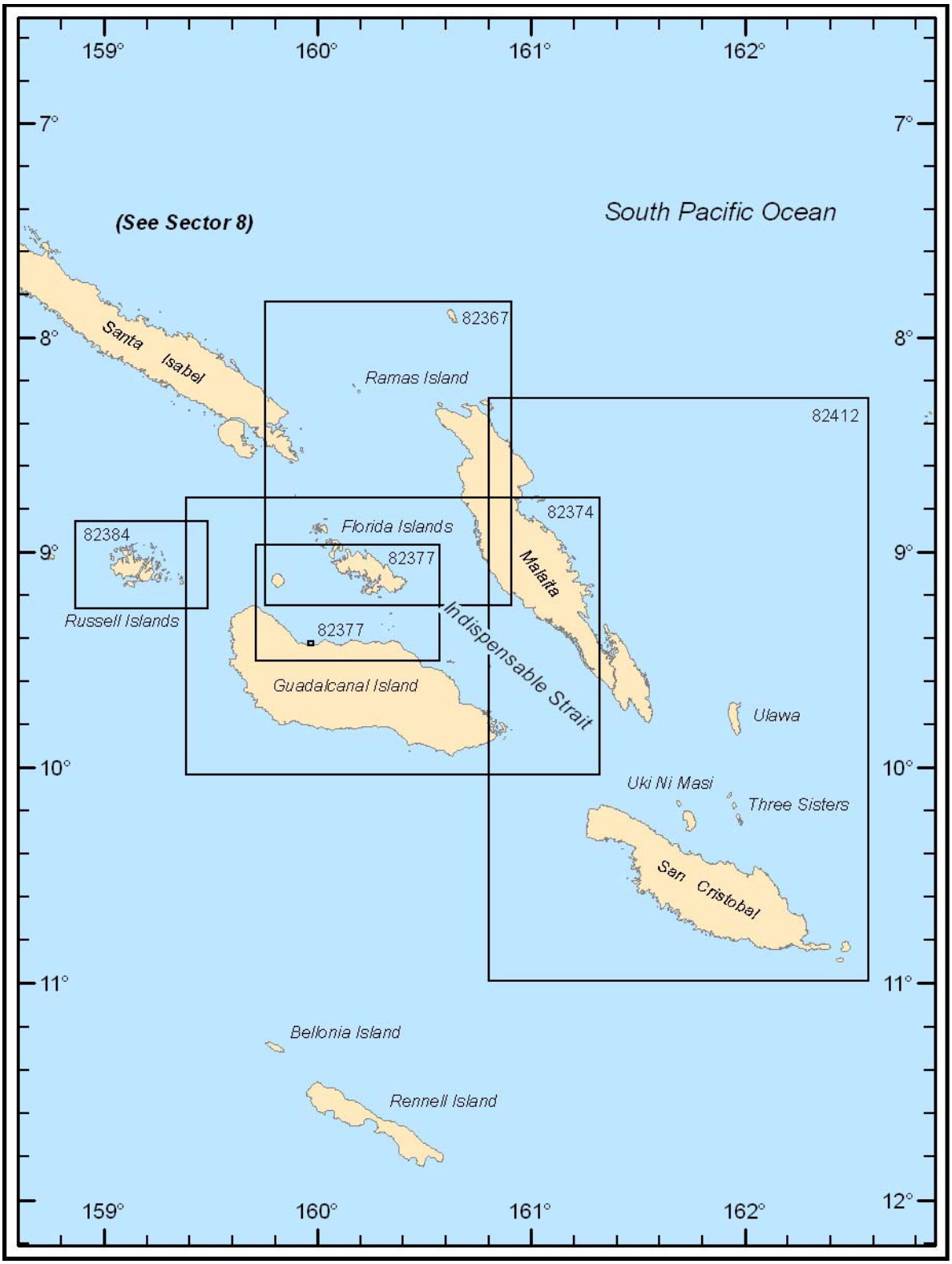
Hawkin Shoal (10°18'S., 167°22'E.), with a least reported depth of 14.6m, extends SE covering a distance of 40 miles from the Duff Islands.

Taumako Island (9°57'S., 167°12'E.) is the largest of the Duff Islands. A village stands on the SW side of the island and is conspicuous for a distance offshore. The village is built on a flat coral islet about 0.1 mile in diameter and separated from the main island by a narrow lagoon. It was reported anchorage was taken, in a depth of 18.3m, about 1.5 miles offshore, with the village bearing 056° and the S of the Loteva Islets bearing 101°. Several coral banks, with very deep water between them, were found inside the anchorage.

A shoal, with a least depth of 10.5m, lies 56 miles E of Taumako Island.

The Loteva Islets, about 61m high, lie about 5 miles SE of Taumako Island and form the SE extremity of the group. **Papa Island** (Treasurers Island) (9°53'S., 167°07'E.), located 5 miles NW of Taumako Island, is second to that island in size. It is 100m high and has a village on its S side.

There is a small islet between Taumako Island and Papa Island. The Tuleki Islands lie within 3 miles NNW of Papa Island. The S island of the group has a remarkable rock in the form of an obelisk on its E side; the two largest islands are wooded.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR 7 — CHART INFORMATION

SECTOR 7

THE SOLOMON ISLANDS—EAST PART

Plan.—This sector, covering the E islands of the Solomons, describes the island of San Cristobal, including the islands and dangers N and SW of it, then the island of Malaita, and then Indispensable Strait. Guadalcanal Island is next discussed, followed by the Florida Islands, the Russel Islands, and finally Buka Island. The general arrangement of this sector is from SE to NW.

General Remarks

7.1 The Solomon Islands, between 5°S and 13°S, and 154°30'E and 162°45'E, extend over an area 600 miles long in a NW-SE direction and up to 100 miles wide. They include seven major islands and between 20 and 30 smaller islands and numerous islets. The seven major islands are San Cristobal, Malaita, Guadalcanal, Santa Isabel, Choiseul, New Georgia, and Bougainville, the first three of which are discussed in this sector and the remainder in Sector 8. The group consist of a double row of large mountainous islands attaining heights, as in the case of Guadalcanal and Bougainville, of 2,439 to 3,048m.

In appearance the islands present many similar characteristics, consisting of a chain of lofty mountains, mostly covered with dense forest and rank undergrowth, occasionally giving place to long grass and ferns. The slopes incline gently to the sea, and the shores are lined with mangroves in places.

The larger islands are watered by numerous streams, at the mouths of which, as well as on the swamps and sandy shores of uninhabited coral islets, crocodiles abound.

Some of these islands are entirely of volcanic formation, while others are calcareous, but there are also many cases in which both these formations are combined.

Mount Bagana and Mount Balbi, on Bougainville Island, are active volcanoes, and Savo, Simbo, and other islands sometimes exhibit signs of latent activity. Fumaroles and hot springs occur in several islands, and around these deposits of sulphur, alum, gypsum, and opal may be found. Earthquakes are common in these islands.

Winds—Weather.—In the Solomon Islands, the Southeast Trades are usually established in April and continues until the end of October; during this season more than 75 per cent of the winds are E, and 60 per cent are from E to SE. The trade is steadier and stronger over the S part of the group.

From November to April, the winds blow predominantly between the NE and NW, though great variability marks this season, and appreciable percentages of E and S winds occur.

Winds of storm force are practically unknown. Very few tropical cyclones, mostly at early stages, have affected this area. The season of the Southeast Trades is drier than the remainder of the year, although ample rainfall occurs even with the trade winds, but from December to March the rainfall is exceedingly heavy. Thunderstorms are frequent during the latter period and fairly common otherwise, except that they are infrequent at the heart of the trade in July and August.

In the vicinity of the larger islands the winds are affected by land and sea breeze influences.

May to October is the drier season of the year, with rainfall averaging about 125mm per month. During the rest of the year it averages 230mm to 265mm with March being the wettest at over 310mm of rainfall. What is lacks in rainfall however, it makes up for in humidity. July to September the humidity is about 73 per cent rising to a maximum in March of 80 per cent.

Average temperature the year around is between 26°C and 27°C, making it one of the most consistent climates the year around.

Tides—Currents.—The South Equatorial Current and the South Subtropical Current, the major prevailing surface currents in the area of the Solomon Islands, set W across the Pacific Ocean under the influence of the Southeast Trades, the strength of which gradually decreases with increasing S latitude.

From October through March, during the Northwest Monsoon, part of the South Equatorial Current turns S and SE along the NE coast of New Guinea, but this monsoon does not reach the Solomon Islands in any appreciable extent in February when it is strongest. During this time the current may become South.

From April through September, during the Southeast Trades, part of the South Subtropical Current flows through the Solomon Islands, but being influenced by the wind has a considerable degree of variability.

During the Northwest Monsoon, the average velocity of the current is about 0.8 knot; during the Southeast Trades, it averages about 1 knot.

Caution.—Extensive lines of barrier reef occur in parts of the Solomon Islands, as off the E coast of New Georgia, Santa Isabel Island, and the S coast of Choiseul Island. Some of these, as well as the greater portion of the islands, are still not completely surveyed; a great deal of caution is necessary when navigating among the group. No reliance should be placed on lights in the Solomon Islands; some are frequently unlit. Lighted structures on the reefs may be washed away and those on land may become obscured by trees.

Islands and Dangers North and Southwest of San Cristobal Island

7.2 The **Indispensable Reefs** (12°36'S., 160°20'E.), with their center about 160 miles SW of the E extremity of San Cristobal, are three reefs stretching more than 60 miles in a NW-SE direction. They are steep-to and each encloses a large deep lagoon. They are separated by deep passages 1.5 to 2 miles wide.

South Reef (12°55'S., 160°33'E.) is 13 miles long and about 5 miles wide; it encloses a lagoon with depths from 18 to 35m. It is reported to be a poor radar target. A wreck is beached on the NE side of the reef.

Middle Reef (12°38'S., 160°23'E.) is J-shaped and extends 32 miles from SE-NW. Little Nottingham Islet is a small islet

located near the center of the reef, while a small lagoon is found in the N portion. Vessels can reach the principal lagoon through three openings in the reef located, respectively; on the E side, about 8 miles N of the reef's S extremity; on the W side, about 4 miles SW of Little Nottingham Islet; and in the N proximity of the island. Strong overfalls giving the impression of breakers are created at the E and S extremities of Middle Reef.

North Reef (12°19'S., 160°07'E.) is 11 miles long with a maximum width of 4.5 miles and surrounds a lagoon with very few obstructing coral clusters which is sheltered. It offers two narrow openings; one on the N side, about 5 miles from the E extremity of the reef; the other in the NW portion, 1.5 miles S of the rock marking the NW extremity of the reef.

Currents in the vicinity of the reefs generally set to the W and attain a rate up to 2.5 knots.

Between these reefs and Rennell Island to the N, currents set strongly to the W, with rates of up to 2 knots.

Rennell Island (11°40'S., 160°18'E.), about 40 miles NNE of North Reef, is about 150m high, heavily wooded and bordered with cliffs. Rennell has the largest freshwater lake in the Pacific Ocean. The island is inhabited. Overfalls are heavy on the reef surrounding the island.

Anchorage is available, in about 15m, in an indentation in the coastal reef at Kanggava Bay, in the middle of the S coast of Rennell Island. Caution is advised as the bay is encumbered by coral heads and is dangerous when the wind is from the SW.

7.3 Bellona Island (11°18'S., 159°47'E.), about 16 miles NNW of the W end of Rennell Island, is also inhabited. Passage between the two islands appears to be safe when more than 0.5 mile off either of their coasts. The island, with a uniform height of 65m, is heavily wooded and is sheer, except at its SE and NW ends. Near the NE extremity of this island, small vessels can anchor, in 27m, about 0.2 mile off the white sandy beach; the anchorage is sheltered from the Southeast Trades. Landing at the NW extremity of the island is possible.

Hammondsport Bank (10°32'S., 159°38'E.), about 47 miles NNW of Bellona Island, has depths of 42 to 50m.

The **Stewart Islands** (8°25'S., 162°52'E.), about 150 miles NNE of the E extremity of San Cristobal, are a group of four islands on a triangular atoll. They are Sikaiana, the largest and principal island at the E end of the atoll and the only inhabited island; Matuaui, Matiuloto (Faore), and Tehaolei.

The islands and the reef of the atoll enclose a large lagoon into which there is only one small boat passage. This passage, between Matiuloto and Tehaolei, has a depth of 0.3m and strong currents makes it dangerous to navigate.

Caution.—Vessels should approach this island group and reef with caution because it is steep-to and soundings give no warning. There are no anchorages.

San Cristobal Island

7.4 Santa Catalina Island (10°54'S., 162°27'E.), about 5 miles SE of the SE extremity of San Cristobal Island, is a level-topped island, 97m high. This coral island is thickly wooded and surrounded by a narrow fringing reef. The village of Mamako is on the N side of the island.

There is an anchorage for small vessels off the N side of the island, but it is exposed and subject to strong tidal currents.

Paraghawa Strait (10°52'S., 162°27'E.) is 1.75 miles wide, deep, and clear of dangers; it separates Santa Ana Islandon the N and Santa Catalina Island S of it.

The channel between Naghora Point and Santa Ana Island is 3.5 miles wide, deep, and clear of danger. Tidal currents in the channel flow N and S; during the Southeast Trades the spring rate is 1 to 2 knots. When the Southeast Trades are intense, overfalls occur off Naghora Point and in the area 4 miles E of Santa Catalina Island; they are dangerous for small boats.

Santa Ana Island, N of Santa Catalina Island, is a nearly circular island, 159m high. When seen from the E or W, the island has the profile of a broad-brimmed and low-crowned hat. The island is fringed by a reef, and, with the exception of some cultivated patches, is densely wooded.

7.5 Port Mary (10°50'S., 162°27'E.), on the W side of Santa Ana Island, is formed by a break in the fringing reef and a slight indentation in the coast. The entrance is 0.2 mile wide between the reefs on either side, but its navigable width is reduced to 228m by some detached shoals which extend 145m N from the reef on the S side. Caution is advised as the reefs have been reported to be extending, and also reported to dry (1985).

Port Mary affords good anchorage, in 28m, sand, except during the Northwest Monsoon, when it is unsafe.

Tides—Currents.—The tidal currents frequently set diagonally across the entrance of Port Mary.

In mid-channel, between Santa Ana Island and Cape Surville, the currents have a velocity of 1 to 2 knots at springs during SE winds. The current sets N and S. During the strength of the trade winds there are rips off the points of the coastal reefs, which would be dangerous for boats.

The general character of the mountainous interior of San Cristobal is that of a parallel series of level-topped ridges, separated by deep valleys, with a few dome-shaped or conical mountains. The summit, 1,250m high, is 38 miles WNW of Naghora Point.

For the most part, the S coast rises precipitously from the sea; the N coast, with the exception of a precipitous part between Mahua Point and Flat Rock, has a strip of lowland between the shore and the mountain. Most of the villages are on the N side of the island.

North of San Cristobal Island are the islands of Uki Ni Masi, Three Sisters, and Ulawa. Several of these islands are densely wooded. Ulawa, the N island, rises to a height of about 366m.

7.6 Naghora Point (Cape Surville) (10°50'S., 162°23'E.), the E end of San Cristobal, is the extremity of a narrow peninsula and is dominated by a 152m hill. A reef extends about 1 mile from the N side of the peninsula and about 0.6 mile from Naghora Point.

Na Wakio Islet (Bulimatervua Islet) (10°50'S., 162°23'E.), wooded and 21m high, is on the fringing reef on the NE side of the point. A detached 3.7m reef is 0.4 mile off the fringing reef, about 2.3 miles WNW of Bulimatervua Island.

Anchorage, sheltered from the sea, can be taken with local knowledge in the indentation in the coastal reef just E of **Na Finua Island** (Nafinua Island) (10°49'S., 162°18'E.). The anchorage, in 26m, sand and coral, lies with the island bearing 318°, distant 0.25 mile. Vessels should approach with the

island bearing 211° and, when the anchorage entrance is made out, alter course to 188°.

Star Harbor (10°49'S., 162°17'E.), an indentation about 0.5 miles W of Na Finua Island, offers sheltered anchorage, in a depth of 38m. Anchorage for large vessels is available, in a depth of 75m, 1.5 miles NW of Na Finua Island, but this is temporary anchorage only.

To reach Star Harbor, steer for the center of an island located 2 miles WSW of Na Finua Island, bearing 222°. When a pair of beacons standing on the reef close SW of Na Finua Island are in line bearing 147.5°, steer for them on that bearing; if the beacons cannot be seen, steer for the S end of the island on the same bearing. Alter course to 242.5° when the two beacons standing close E of the island 2 miles WSW of Na Finua Island are in line. This last set of range beacons leads to the anchorage.

A village is situated about 0.6 mile SE of the anchorage, the channel to which is about 90m wide, with a least depth of 6m, and is marked by beacons.

Star Harbor is said to be the only safe anchorage on the N coast of San Cristobal Island during the Northwest Monsoon.

The coast from Star Harbor to Hunarite Point (Fanarite Point), about 8 miles to the N, continues to be fringed with coral reefs with occasional breaks.

Hunarite Point (Fanarite Point) (10°41'S., 162°16'E.) has several villages around it, and close off the point is Tree Islet, 9m high.

Mount Erskine, 3 miles SSW of Hunarite Point, is a conspicuous double-pointed peak, 476m high. It is the E peak of the high peaks on San Cristobal Island.

There is no safe anchorage in the bay W of Hunarite Point because, during the Southeast Trades, a swell sets in on the beach and the winds frequently shifts to NE.

7.7 **Mahua Point** (Cape Mahua) (10°28'S., 162°05'E.) is the most conspicuous promontory on the N coast. Near the coast, it rises over 305m; 4.5 miles to the S it rises to a 610m table land.

Anchorage can be taken on the E side of **Wanione Bay** (Wanoni Bay) (10°28'S., 162°02'E.), in 24m, with the left hand edge of Mahua Point bearing 018° and the prominent white cross on the hill behind the mission bearing 133°. Anchorage can also be taken 0.5 mile farther S, in 14.6m, off a black sandy beach. These anchorages are exposed to NW winds.

One of the large streams discharging into Wanione Bay brings down trees and snags during heavy rains and causes discoloration of the sea for several miles offshore.

Taware Point (Tawaro Point) (10°26'S., 161°55'E.), marked by a light, is on the E side of a small bay between that point and Manahinua Point (Manahina Point).

Anchorage.—Anchorage, in 37m, can be taken in the bay with the government station bearing 119° and Taware Point bearing 038°. This anchorage is unsafe with winds from the W to NW. Anchorage can also be taken about 1 mile WSW of Manahinua Point, in 9.1 to 12m, sand, 0.25 mile offshore.

Pakera Point (Lakena Point) (10°24'S., 161°48'E.), which may be recognized by a conspicuous clump of trees, is about 6.5 miles WNW of Manahinua Point. The coast between these two points consists of a dark sandy beach, on which, during strong SE trade winds, the sea breaks heavily.

Maoraha, an islet with trees 15.2m high, lies 3 miles W of Pakera Point, and 0.5 mile offshore. The reef on which it stands extends 183m N and 137m E from it. A 4.9m shoal is between the island and the point SE of it. Anchorage can be taken, in 35m, 0.15 mile off the island, with its center bearing 076°.

Castle Peak, a conspicuous peak about 140m high, rises close to the coast about 4.5 miles WNW of Maoraha. Safe anchorage can be taken by small vessels during the Northwest Monsoon in Waimansi Bay, a cove close E of Castle Peak.

Anchorage can be taken in the SE part of Wiaiae Bay (Waiai Bay), just W of Castle Peak, in 14.6 to 18m.

Wangalaha Point (Wangoraha Point) (10°17'S., 161°35'E.) is marked by a light.

Cape Recherche (10°10'S., 161°20'E.) is the N extremity of San Cristobal Island. There are several landing places between this cape and Wango Bay.

Marou Bay (Maru Bay), 2 miles SW of Cape Recherche, affords anchorage, in about 18.3m, close to a steep dark beach; this anchorage is sheltered from SE winds.

Tides—Currents.—Currents have been observed to set S at 1 knot in the channel between San Cristobal Island and Guadalcanal Island.

San Cristobal Island—South Coast

7.8 The coast between Naghora Point and **Cape Sydney** (10°45'S., 161°45'E.), about 38 miles W, is little known, but the fringing reef is reported to extend not more than 0.75 mile offshore.

A rock, with a depth of less than 1.8m, about 2 miles E of Cape Sydney, is reported to be farther offshore than charted. The sea breaks over this rock in heavy weather.

Marunga Harbor, entered close N of Cape Sydney, is open to the W. The land on the N side of the harbor is 762m high. The land on the S side is 457m high and slopes W to the S entrance point, 61m high.

The bay is reported to afford anchorage, in 14.6 to 22m, with a 2.4m rock, off the inner point of the S side of the bay, in line with the S entrance point, bearing about 235°, and the mouth of a stream in the SE part of the bay bearing 146°.

Haununu Bay, entered NW of Haununu Bluff, is reported to have depths of 33m to 51m and to be sheltered from all winds. Foul ground extends about 1 mile SW from the N entrance point of the bay.

7.9 **Marau Island** (10°31'S., 161°28'E.) is hilly. Anchorage can be taken, in 14.6 to 18.3m, off the N side of the island.

Makira Harbor (Bay Harbor) (10°26'S., 161°27'E.), surrounded by hills 183 to 275m high, is probably the safest anchorage in the Solomon Islands and has depths of 45 to 55m over the greatest part of it.

The bay is entered through a deep channel, 0.25 mile wide, but the fairway is reduced to a width of about 0.2 mile by dangers on either side. The bay is difficult to identify, especially if approaching from the W.

Tides—Currents.—During the Northwest Monsoon, the current outside the bay sets SSE at about 2 knots.

Anchorage.—Anchorage may be taken, in about 46m, mud, about 0.3 mile from the head of the N arm of the bay, abreast

the village of Makira, or in about 31m just N of Observatory Point.

Directions.—Vessels approaching from the SW may identify the bay by sighting Oroa Island (Philip Island) and Io Island (Eyo Island). Vessels approaching from W will sight Haraniia Point (Achard Point), recognized by a white sandy beach to the E of it.

To enter the bay, bring the SE shoulder of Harbor Ridge to bear 058° and steer in on that bearing until clear of Passage Ledge, then when clear of the ledge, steer to pass about midway between the entrance points. Harbor Ridge is difficult to identify on this bearing.

7.10 Io Island (Eyo Island) (10°23'S., 161°23'E.), 4 miles NW of Marika harbor, has a knob on one end. The islet is encircled by a reef. A shoal is reported to lie about 1 mile S of the island.

Haraniia Point (Achard Point) (10°21'S., 161°15'E.) is the S point of the W end of San Cristobal Island.

Good but restricted anchorage, sheltered from all winds, can be taken by vessels with local knowledge, in 14.6 to 20.1m, off the N side of Anuta Island (Yanuta Island).

A small wharf, suitable for light-draft vessels, is at Oneiba (Oniba), N of the NE end of Anuta Island.

Hada Bay (10°15'S., 161°16'E.), at about mid-point of the E end of San Cristobal Island, affords anchorage, in 18.3m, sand and mud, off the steep gravel beach at its head.

Islands North of San Cristobal Island

7.11 Uki Ni Masi Island(10°15'S., 161°44'E.), 204m high, is separated from the NE coast of San Cristobal Island by a 4.5 mile wide channel. Except for Selwyn Bay, the island is fringed by a reef extending from 0.1 to 0.5 mile offshore. There are several villages on the island and a settlement on Selwyn Bay. A mission school is situated on the S shore of the bay.

Anchorage.—Selwyn Bay, on the W side of the island, affords good anchorage, sheltered during the Southeast Trades, in 31m, sand, 0.15 mile SW of the mouth of the N streams discharging into the bay. The shore between the two streams is reported to be fronted at times by a shallow bank, the deposit brought down by those streams. Large vessels should anchor in a depth of not less than 37m.

Anchorage can also be obtained about 0.3 mile offshore, with Ngotongoto Point bearing 329° and Pwaunania Point, the SW point of the island, bearing 197°. This anchorage is safe only in good weather with winds from the N through E to S.

During the Northwest Monsoon, anchorage can be taken in the N part of the bay, E of Ngotongoto Point, in about 37m. The surf on the beach is heavy. This anchorage, open to W and SW winds, is not safe.

Pio Island (Bio Island)(10°10'S., 161°41'E.), an uninhabited island, 73m high, is just NW of Uki Ni Masi; it is densely wooded and fringed by a steep-to reef. The channel between Pio Island and Uki Ni Masi Island is clear of dangers except for rips during the Southeast Trades. A shoal, with a depth of 3m, and a bank, with a depth of 18m, are found 1 miles and 2.5 miles NW, respectively, of the NW extremity of Pio Island. A shoal, with a depth of 9m, is located about 2.5 miles NNE of the island.

Tides—Currents.—In the channel between Uki Ni Masi Island and San Cristobal Island a W current is usually experienced during the Southeast Trades. Near the shores on each side the current runs E and W, and their strength is much influenced by the wind. Tide rips are met with off the S point of Uki Ni Masi Island and also near the coast of San Cristobal Island.

7.12 The Three Sisters Islands consists of **Aliite Island** (Ahiti Island) (10°08'S., 161°55'E.), the N island, 76m high; Malaulalo, the middle island, 70m high; and Malaupaina, the S and largest, 70m high. These densely-wooded and marshy islands are uninhabited, but are occasionally visited by fishermen from San Cristobal Island. The islands, except for the N and E coasts of Aliite Island, are fringed by a reef extending 0.25 to 0.5 mile offshore.

Oriana Ledge, NE of Aliite Island, has not been closely examined and should be avoided.

Mosquito Anchorage, on the W side of Malaupaina Island, is a small indentation fronted by a detached reef which dries at half tide. There is a narrow and clear channel at either end of the detached reef, the S and broader being 0.15 mile wide. Anchorage by small vessels with local knowledge may be taken, in 38m, about midway between the detached reef and the entrance of the lagoon.

The tidal currents setting N and S off the entrances of the channels are felt at springs.

Lark Shoal, about 9 miles NNE of Aliite Island, has a least depth of 9.1m. The tidal currents in the vicinity of this shoal run strongly, forming rips. A 11m shoal lies about 4 miles N of Lark Shoal, about midway between it and Ulawa Island.

Ulawa Island (9°45'S., 161°57'E.) is 366m high near the N end and is steep-to. A good lee with smooth water may be obtained on the W side of the island during the Southeast Trades; temporary anchorage can be taken off the entrance to Suumoli Harbor, on the N side of the island.

Tides—Currents.—An E set at a rate of about 0.5 knot has been observed about 8 miles N of Ulawa Island.

Anchorage.—Suu Talahia Anchorage, abreast a small stream on the W side of the island, affords anchorage, in 9.1 to 29m. Madoa, the principal village, is 0.5 mile N of the small stream, and is a mission station.

Caution.—Caution is advised when approaching the harbor as depths shoal rapidly. The harbor itself is suitable only for small craft. Two 14.6m shoals off the SE coast were not seen in 1982, but have not been disproved.

Malaita Island

7.13 Cape Zelee (Nialahau) (9°44'S., 161°34'E.), the SE extremity of Maramasike, is low, sloping, and steep-to. There is usually a rip off the cape. A white beach extends for a short distance N from Cape Zelee, and there is another about 2.5 miles beyond, where the village of Saa and a mission station are situated. This part of the coast appears to be clear of off-lying dangers.

The coast of Malaita Island, a mountainous and thickly-wooded island, is in places low and bordered by mangroves; in others it consists of dark coral, about 1m high, wooded to the

edge of the water. The land rises gradually from the coast to the mountains in the middle of the island, which vary in height from 183 to 1,219m. About midway between the ends of the island is Mount Kolovrat, 1,303m high.

Maramasike, an island E of the SE end of Malaita Island, is separated from it by a narrow channel running in a N and S direction.

Caution.—The relative positions of the NE and SW coasts of Malaita Island, and also of the mountains within both coasts, are inaccurately charted. Care must be taken when approaching the coasts not to place undue reliance upon the charted positions of the mountains.

7.14 Mabo Harbor (9°36'S., 161°32'E.), entered about 6.8 miles N of Cape Zelee, is open to the E. This circular harbor has a reef extending 183m S from the N entrance point, and 137m N from the S entrance point.

Anchorage.—Good anchorage may be taken by small vessels, in 9.1 to 12.8m, in the middle of the harbor.

Port Adam (9°32'S., 161°33'E.) is formed between the E coast of Maramasike and the Greenwich Islands, consisting of two low swampy islands, Fanelei Island (Halelei Island) and Malau Island (Mary Island), lying parallel to the coast. Both islands are covered with coconut palms and are easily distinguished from seaward, although Fanelei Island is only about 1m high. At the S end of each island is a village.

There are depths of 7.3 to 35m in this port, but its shores are irregular, and it is encumbered by projecting points, reefs, and islets. Walande Island lies near the coast about 1 mile WNW of Malau Island. Dead trees standing above water, mark the position of this sunken island.

There are three entrances to this port, and when a strong sea breeze and an ebb tide coincide there are heavy overfalls, having the appearance of breakers from seaward. The S entrance, between the coast and the S point of Fanelei Island, is about 0.4 mile wide, but the navigable portion is reduced to about half that width by projecting reefs. A heavy sea occurs in this channel during the Southeast Trades.

Safe channel, the middle entrance, and the unnamed entrance N of Malau Island, are much wider, but the latter has some detached patches in it, which are, however, easily seen from aloft.

There is good anchorage within Malau Island, in 33 to 40m, and also within Fanelei Island, in 24 to 28m.

Shoals extend up to 3 miles NW of Malau Island.

The coast NW of Port Adam to the N end of Maramasike is little known. Auru Rock (Aulu Island), a small islet, lies close offshore, about 4.5 miles NW of Walande Island.

Maramasike Passage (North Entrance) (9°16'S., 161°16'E.) is encumbered with several rocks and shoals. The passage is suitable only for light draft vessels; depths of less than 3.6m are in the narrows in the middle of the passage.

Anchorage.—Anchorage can be taken in **Takataka Bay** (9°14'S., 161°15'E.), in 18.3 to 28m, S of the village on the NE shore of the bay. The head of the bay is shoal.

7.15 Manawai Harbor (9°04'S., 161°08'E.) is small but protected, with mountain ranges extending to both entrance points. The entrance is only 0.3 mile wide but is deep. Anchorage can be taken, in 18.3 to 37m, NW or SE of a 2.7m reef about 0.8 mile SE of the village at the head of the bay.

Aio Island is a low and wooded island, about 3 miles N of the entrance of Manawai Harbor; the N end of the island is about 0.5 mile offshore. The reef on which the island lies extends about 0.8 mile NW and 0.5 mile SE of the extremities of the island.

Aio Harbor is a lagoon formed on the W side of the island between the fringing reefs. It affords anchorage in its center, in 29m, mud, but the entrance is very narrow as the reef on the N side extends about halfway across. A 3.8m shoal is close NW of the SE entrance point. The harbor should not be approached without local knowledge.

Anchorage.—Anchorage can be taken in **Olomburi Bay** (Double Bay) (8°58'S., 161°04'E.), in 37m, about 0.3 mile off the S shore, in 51m, about 0.3 mile W of the N end of the reef at the entrance and, in 44m, inside Panchingi Point.

There is a small jetty for vessels drawing up to 3.6m in **Sinarango Harbor** (8°53'S., 161°01'E.), about 8 miles NW of Olumbari Bay.

Anchorage, in 28 to 41m, is available with local knowledge in Sinalaka Bay.

Kingfish Shoal and an unnamed 9.1m shoal are close NE of the entrance to Sinalaka Bay. The depth over Kingfish Shoal was estimated to be 5 to 7m in 1982, and was reported to extend 2 miles further NW than charted.

Uru Island Anchorage affords anchorage 0.1 mile S of Uru Island, in 12.8 to 32m. The chart should be used with caution, however, because a partial survey in 1971 showed extensive shoreline and depth changes.

7.16 Cape Arsacides (8°39'S., 161°00'E.) is low. but gradually rises to 610m about 8 miles to the NW.

Anchorage.—Anchorage with local knowledge may be obtained during the Northwest Monsoon, in 18.3 to 22m, off Fakanakafo, about 3.5 miles SW of Cape Arsacides.

The coast NW of Cape Arsacides to Urasi Cove is fringed by a reef extending as far seaward as 1 mile.

Manaoba Island, marked by a light, is a low wooded island surrounded by reefs lying close off the NE coast of Malaitao.

The island is fringed by a coral reef and forms the N side of Lau Lagoon. The narrow N entrance to the lagoon is deep and marked by beacons, and may be used by small vessels with local knowledge. The S entrance is only navigable by boats. There are two mission stations on the S side of the lagoon on the NE end of Malaita Island.

Tides—Currents.—Currents off the NE side of Malaita Island set SE and NW at an estimated rate of 3 knots.

Anchorage.—Anchorage may be obtained by vessels with local knowledge off the NW end of Manaoba Island, in 74m, excellent holding ground.

7.17 Suaba Bay (Suafa Bay) (8°20'S., 160°40'E.) affords anchorage, in 29m, about 0.6 mile from the middle of the head of the bay.

Ndai Island (7°54'S., 160°37'E.) is covered with trees from 46 to 52m high. A fringing reef surrounds the island and extends about 1 mile off the NE point, being quite narrow elsewhere. There are apparently no off-lying dangers and depths of 183m were obtained 1 mile offshore.

Anchorage.—The only sheltered anchorage is near the SW end, where a bay 0.5 mile wide indents the coast. A sunken

reef extends across the entrance of this bay, but there is a deep passage about 0.1 mile wide near the SW entrance of the bay. Inside the reef the depths are from 5.5 to 10.9m, sand and coral; outside, the depths deepen sharply to 92m. The bay affords excellent shelter for a small vessel during the Southeast Trades. A village is situated on the shore of the NE part of the bay.

It was reported that excellent anchorage for large vessels can be taken along the NW coast of Ndai Island, opposite a conspicuous small cove, in 33m, good holding ground. Several charted shoals with depths of as little as 14.6m are between Ndai Island and the N end of Malaita Island.

7.18 Suulaha Cove (9°41'S., 161°31'E.) is entered about 3.5 miles NW of Cape Zelee and affords anchorage, in 9 to 28m. High trees line the shores of the cove, and a village stands on the N side of the mouth of a stream discharging into the head of the cove. A shoal depth of 9.1m lies nearly 1 mile S of the SE entrance point of the cove.

Suupeine Bay, at the head of the bay NW of Suulaha Cove, is said to afford anchorage, in 9.1m, but it is somewhat open to the trade winds.

Cape Hartig, about 6.3 miles WNW of Cape Zelee, is recognized by its white beach, and stretching S from it is foul ground.

Ariel Harbor (Teriari Harbor), a confined anchorage entered from the NW, is fronted on its SW side by a reef which extends 0.5 mile NW and parallel to the coast. Two low, wooded islets are on this reef, and close NW of the N islet is a conspicuous boulder, also on the reef. There are depths of 12.8 to 16.5m in the harbor.

Maramasike Passage (South Entrance) is marked by two white beaches on the Malaita shore, known as Port Bougard.

This passage should be used only by vessels of light draft, due to depths of 3.7m, in places, near the center of the passage. The channel through the passage was reported (1963) to have shoaled and altered position.

A chain of islands close off the coast of Malaita extends about 16 miles NW from Uhu, an island about 8 miles NW of the S entrance of Maramasike Passage. The shores of these islands are uniform, low, wooded to the water's edge, and all faced with a fringing reef. There are villages on the mainland abreast the narrow passages between the islands.

The entrance of Wairokai Bay, SE of the NW island of the chain, is 0.3 mile wide and deep. At the head of Wairokai Bay, a stream discharges, off which there is good anchorage, in 14 to 27m, about 0.1 mile offshore.

Royalis Harbor (Waisisi Harbor)(9°18'S., 161°05'E.), about 3.5 miles NW of Wairokai Bay, is nearly landlocked and affords good anchorage, in 33 to 36m, mud. The entrance of the harbor is 230m wide between the fringing reefs on either side, and has depths of 38 to 47m.

7.19 Suu Harbor (9°10'S., 160°55'E.), protected from the Northwest Monsoon, has depths over 92m in the entrance, which is apparently free from dangers, while the inner part of the harbor is shoal. Vessels with local knowledge can take anchorage, in 36m, on the N side of the harbor.

7.20 To approach Suu Harbor, bring a prominent gap in the mountains to bear 047°. This course will lead into the harbor.

Bina Harbor (8°55'S., 160°45'E.), about 18 miles NW of Suu Harbor, is fronted with several wooded islands fringed with coral ledges.

There are two deep and clear entrances to the harbor; one is S of Abuabua Island (Amboambua Island), between that island and Taaluli Island (Taluli Island), while the other is N of Abuabua Island, between that island and Baali Island (Bali Island).

Bina Island (8°55.8'S., 160°45.4'E.), E of Abuabua Island, is about 40m high and has several detached shoals extending SW from it.

Vessels wishing to anchor S of Bina Island should enter the passage between Abuabua Island and Taaluli Island, steering about 070° and anchoring as convenient.

There is a break in the chain of mountains near Alite Harbor, but to the NW the range rises again to about 610m. This peculiarity, together with the high irregular land to the SE and the low land between, forms a good mark for this part of the coast.

Anchorage.—Anchorage is available with local knowledge in **Alite Harbor** (8°53'S., 160°44'E.), just N of Bina Harbor, and in **Langa Langa Harbor** (8°52'S., 160°46'E.), farther N and separated from Alite Harbor by a peninsula.

Caution.—Alite Reef (8°53'S., 160°37'E.), centered about 7 miles E of Malaita Island, dries in places, and is not always visible, especially in calm weather and near dawn and dusk; it is marked near its SE end by a light.

7.21 Auki Harbor (8°43'S., 160°42'E.) is entered between a detached reef, which dries 0.9m, and extends nearly parallel with the coast, and Entrance Point, about 0.2 mile N of the N end of the detached reef. Auki Harbor is the headquarters of the District Commissioner for the Malaita District.

Depths—Limitations.—The entrance between the reefs on either side is about 245m wide, but the navigable channel is reduced to about 0.1 mile by off-lying patches. The depths in the entrance are 19 to 37m.

A settlement on the NE side of the harbor offers two piers, the N of which is the main berthing facility. The pier is about 37m in length, with alongside depths of 3 to 4m. The pier is connected to the shore by a causeway 114m in length.

A light, and range lights in line bearing about 052°, mark the harbor; the range may be difficult to locate in the low morning sun.

Anchorage.—Anchorage may be taken, in about 24m, coral sand, poor holding ground, in the center of the harbor.

7.22 Between Auki Harbor and Cape Ritters, about 10.5 miles NNW are **Fiu Bay** (8°43'S., 160°41'E.) and **Koa Bay** (8°38'S., 160°39'E.), which afford good anchorage during the Southeast Trades. Vessels not familiar with this area should approach this coast with caution and under favorable light because uncharted dangers probably exist.

Coleridge Bay (8°33'S., 160°42'E.) has densely-wooded shores, with trees about 31m high on its S side and a sandy beach on the E shore.

There is a mission hospital and a leper colony at Coleridge Bay.

Anchorage.—Anchorage, sheltered from the Southeast Trades, is available, in 18.3 to 27m, 0.35 mile W of the mouth of a river, at the SE head of the bay. The depths apparently decrease gradually toward the shore within the anchorage.

7.23 **Bitama Harbor** (8°24'S., 160°35'E.), protected from W by a narrow peninsula, is located 12 miles N of Coleridge Bay. A spit, with depths of less than 3m, extends less than 0.1 mile NW from the N point of the peninsula; depths of less than 10.1m extend 0.2 mile farther NW. The entrance to the harbor is 0.15 mile wide, with depths over 29m. A light is shown from a tower on the N end of the peninsula. The village of Bitama is situated on the E shore, near the head of the harbor. There is a small jetty at the village for vessels with a draft of up to 3m and a length of up to 37m.

Cape Astrolabe (8°20'S., 160°34'E.) is the NW extremity of Malaita. The mainland is high and evenly rounded, with a steeper shore than that to the S of Coleridge Bay. The lower slopes are partly cultivated. Mbatakana Islet (Basakana Islet), close N of Cape Astrolabe and separated from it by a deep channel, is thickly wooded and 49m high to the tops of the trees.

7.24 Indispensable Strait is between the W coast of Malaita on the E and Guadalcanal Island, Nggela Sule (Sula) (Florida Island), and Santa Isabel Isabel on the W. It is apparently deep throughout to within a few miles of the shore on either side. Alite Reef, which has been discussed previously in paragraph 7.20, appears to be the only principal off-lying danger, although reefs extend about 10 miles SE from the SE end of Nggela Sule and parallel the fairway of the strait.

Winds—Weather.—The weather in Indispensable Strait at the season of the Southeast Trades is uncertain. Heavy squalls of wind and rain frequently pass over, with intense darkness at night, and the wind frequently shifts several points.

Tides—Currents.—The water is generally smooth, and a W set may be expected. Extensive tide rips occur at various stages of the tide throughout the N part of Indispensable Strait; they bear no relation to the depth of water.

Caution.—Surveys have indicated numerous changes to the hydrography, topography, and the aids to navigation in and around Indispensable Strait. Vessels are urged to exercise caution.

7.25 **Ramos Island** (8°15'S., 160°11'E.) is in the N entrance of Indispensable Strait, about 23 miles WSW of Cape Astrolabe. From a distance the island appears as two islands, the highest part being to the W. The island and the two islets, Dick and Bird, lying within 2 miles NW of it, are densely wooded.

An extensive bank with depths of 9 to 18m and many shallower spots extend about 13 miles E and more than 27 miles W, respectively, from Ramos Island. The bank varies in width from 5 miles at its E end to 15 miles at its W end.

Depths—Limitations.—A channel through the above extensive bank is indicated by dashed lines on the chart. The channel has been wire dragged to 9.1m, except for one spot about 9.5 miles NNW of Ramos Island. It is reported that less depths than charted may exist outside the wire dragged area.

Guadalcanal Island

7.26 Guadalcanal Island has an irregular chain of mountains extending from the SE to NW extremities of the island. From the E end of the island, lofty irregular mountain masses, covered with dense forests and which are frequently enveloped in clouds, gradually increase in height to a 1,935m summit, about 21 miles W of Malapa. Mount Vatupochau (Mount Vatupuchau), about 7 miles further NW and separated from the N coast by an extensive plain, is 1,428m high; it is wedge-shaped, slopes W, and has a double summit.

On the S side of the island the mountain slopes are only separated from the shore by a narrow fringe of low land, but on the N side a low, undulating tract descends gradually to the coast, and here several streams flow into the sea. A dark forest growth covers the elevated E part of the island, and in the W half there is an extensive prairie district covered with high grass and dotted here and there with patches of forest.

Mount Popomanaseu (Mount Popomanasiu), near the center of the S coast, is 2,440m high. The Kavo Range, a few miles N and NW of Mount Popomanaseu, and on the N side of the Itina River valley, is from 2,134 to 2,286m high.

Mount Tatuve (Lions Head), 1,994m high, is a broad-topped steep-sided mountain standing out from the main chain in the central part of the island, about 8 miles E of Mount Popomanaseu.

Caution.—Recent volcanic activity may have altered coastal features and depths in the vicinity of Guadalcanal Island, especially near the S coast and in Marau Sound. Caution should be exercised in this area, particularly in the vicinity of offshore reefs.

7.27 Along the N side of Guadalcanal Island, the 200m curve lies from 0.25 mile to 6 miles offshore; along the S side depths of 366m lie as close as 3 miles offshore.

Nudha Island (Nura Island)(9°31'S., 160°48'E.), on a reef about 10 miles off the NE coast of Guadalcanal Island at the SW end of Indispensable Strait, is nearly 0.8 mile long and is covered with thick brush and trees, 46m high. The center of the island is below HW level and is probably flooded during the Northwest Monsoon. The reef in places extends nearly 0.5 mile offshore, and dries 0.6 to 0.9m, with boulders on the outer edge.

Anchorage.—Good shelter was obtained by a vessel, in 55m, sand and coral, NW of the S extremity of the island, and about 0.2 mile from the shore reef; the wind was fresh to strong from the SE.

Caution.—Strong tide rips are reported to occur at times to the S of Nudha.

7.28 The **Rua Sura Islands** (9°30'S., 160°37'E.), three in number, lie about 3 miles off the NE coast of Guadalcanal Island and are about 2.25 miles long. Rua Sura, the center and largest island of the group, is fringed by a reef, which dries 0.3 to 0.6m, on its N and NE sides. At the E end of the island, the shore reef encloses a lagoon with a narrow entrance. The S part of this lagoon has depths of 7.5 to 14.6m and forms an excellent boat harbor at all times. There is a coconut plantation on the island, with scattered trees from 30 to 37m high.

Sura Kiki (Rua Kiki), the E island, is densely wooded and

about 43m high to the tops of the trees. A ridge, with a depth of 3m at its outer end, extends about 0.3 mile ENE from the island, which is fringed by a reef.

Papari Island (Rua Suli), the W island, is fringed by a reef and is merely a narrow strip of reef just above HW, with trees 18 to 24m high.

North-East Reef, about 2.3 miles long, fronts the NE side of the Rua Sura Islands and dries in patches at its NW end. It has general depths of less than 1.8m and is separated from the N side of Rua Sura by a deep passage 0.2 to 0.4 mile wide with irregular depths. The SE end of this passage is almost closed by a least depth of 5.2m. North-East Reef is steep-to on its seaward side; detached patches lie off its NW end.

North-West Reef, about 0.8 mile NW of Papari Island and marked by a light, is 0.3 to 0.4 mile long and steep-to on all sides. Near its center is a boulder which dries 0.9m at LW, and 0.2 mile off its E edge is a small rocky 10.9m patch.

Lark Reef and Mid Reefs dry at LW and have above-water boulders.

Tides—Currents.—Guadalcanal Island tides are semi-diurnal, with diurnal tides occurring a few days during the month.

Tidal currents set to the W and E following the coastlines of Guadalcanal Island and the Florida Islands, and attain a velocity of 2 knots at springs. During the Southeast Monsoon, the currents are irregular. Shoals and irregularities on the bottom between Guadalcanal Islandl and the Florida Islands cause strong tide rips.

Anchorage.—During the Southeast Trades, anchorage can be taken, in 22m, sand and coral, between the W end of Mid Reefs and the coastal reef off the N side of Rua Sura, but the swinging room is limited to 110m and off-lying patches of reef exist nearly 0.1 mile from the coastal reef.

Anchorage can also be taken during the Southeast Trades, in 55m, sand and coral, about 0.3 mile NE of the W end of Papari Island.

7.29 Marau Sound, at the E end of Guadalcanal Island, is the area enclosed by the numerous islands and coral reefs, with many deep passages between them, fronting the E end of Guadalcanal Island. The hills and valleys of Guadalcanal Island, as well as the islands in the sound, are all densely wooded with high dark trees common to these islands. **Marau Peak** (9°51'S., 160°47'E.), on the mainland W of the sound, is 702m high.

Caution.—Volcanic activity may have caused movement of the reefs and seabed in the Marau Sound area.

Extending off the islands and the mainland are barrier reefs, which lie in a somewhat even curve and form an excellent natural breakwater. The flat coral islands scattered over the SE part of Marau Sound, and those lying off the NW part are much alike, with a flat sandy base and a thick covering of high trees.

Taunu Shoal, which has a least depth of 3.6m and upon which the sea breaks at times, lies 0.75 mile E of the barrier reef, about 3.3 miles ESE of the SE extremity of Marapa. A 9.1m patch lies about 1.8 miles N of Taunu Shoal.

7.30 **Marapa Island** (Malapa Island) (9°48'S., 160°52'E.), the largest island in Marau Sound, has a ridge extending along the length of the island. This ridge rises to an elevation of 201m in a rounded summit at its N end, and is a good mark for a vessel approaching the sound from the NW.

There are several passages between the detached reefs leading into the sound, the two principal ones being South-East Entrance and North-East Entrance. The direct channel connecting these two entrances is practically clear of dangers, except at the S end, although very narrow in places.

Other channels within the sound are Runcie Pass, leading NE from South-East Entrance, Woodhouse Passage, Avoca Channel, Cormorant Entrance, and several others.

South-East Entrance, between the reef extending E from a point about 0.5 mile SSW of **Graham Point** (9°51'S., 160°50'E.), the E extremity of Guadalcanal Island, and the reef on which **Rauhi Island** (Entrance Island)(9°52'S., 160°53'E.) lies, is almost 0.8 miles wide and clear of dangers, except for Emerald Rocks, lying about 1 mile within the entrance. These rocks, lying about 1 mile ESE of Graham Point, consist of two patches with a least depth of 3.2m. Unless these rocks are properly marked, no vessel without local knowledge should attempt the South-East Entrance, except with the sun in a favorable position.

Range lights, in line bearing 006.5°, mark the entrance.

North-East Entrance is about 0.8 mile wide between Beaver Shoals, 0.6 mile NE of Maruiapa Island, and the barrier reef lying about 0.8 mile N of Marapa Island. The sea sometimes breaks on Beaver Shoals, but the other reefs show well. Between the entrance and Harbor Reef, off the entrance of Danae Bay, the outstanding danger is the reef on which the Wilson Islands lie, but in the entrance itself there is a small rocky patch with a least depth of 16.5m, nearly in mid-channel, and about 0.3 mile ESE of Beaver Shoals.

Range lights for North-East Entrance are shown from the reef W of Keura Island. The lights in line bear 203°.

Passage can be made through Marau Sound by entering North-East Entrance, then pass W of the Wilson Islands and their surrounding reefs, then pass between Wahere Island (Komancho Island) and **Tawaihi Island** (9°50.0'S., 160°50.5'E.), then pass between **Maraunibina Island** (9°50.7'S., 160°50.3'E.) and **Emerald Rocks** (9°51.1'S., 160°51.0'E.), taking care to clear their surrounding reefs. Vessels then leave by way of South East Entrance. Passage from S to N is by the reverse route.

7.31 **Cormorant Entrance** (9°49'S., 160°54'E.) leads into Marau Sound from the E. Passage can be made through to a junction with the passage between North-East Entrance and South-East Entrance, mentioned above in paragraph 7.30, via **Woodhouse Passage** (9°50'S., 160°52'E.), which is S of Marapa Island.

Tides—Currents.—The tidal currents in Marau Sound are strong and irregular, depending on the season of the year. The currents run through the deep passages with a velocity of 1 to 4 knots, sometimes retaining the same direction for several days.

Local traders state that the water is generally higher during the Northwest Monsoon, consequently the reefs are more difficult to see at this season.

Directions.—Vessels approaching Marau Sound from the SE, find Marau Peak, previously discussed in paragraph 7.29, a good mark, and as the sound is neared the high ridge of Marapa Island will be made out. The small islands begin to appear at a distance of 12 miles, and at 3 miles from the entrance the barri-

er reef and Pigeon Peak on Tawaihi Island should be distinguished.

The E end of Tawaihi Island, bearing 352°, just open W of **Cimiruka Island** (9°50'S., 160°51'E.), leads through the entrance, which can easily be made out, as the barrier reef shows plainly. The range lights, in line, also lead through South-East Entrance. A vessel can pass on either side of Emerald Rocks, but the passage to the W of them, and then E of Maraunibina Islet and its reef, is to be preferred. Keep in mid-channel between Maraunibina Islet and Tawaihi Island, and if bound for Danae Bay, round Jetty Point at 0.1 mile distant.

To enter Marau Sound by North-East Entrance, bring Pigeon Peak in line bearing 186° with the E extremity of the S of the Wilson Islands. This course leads close E of the 16.5m patch ESE of Beaver Shoals. The range lights, in line bearing 203°, also lead through North-East Entrance. When the NE ends of Marapa Island and East Islet are in line bearing about 126°, a vessel will have passed Beaver Shoals; then steer for Harbor Hill on Wahere, bearing 211°, until abreast Renard Bay. Then alter course to pass 0.1 mile W of the NW end of Tawaihi Island.

7.32 The N coast of Guadalcanal Island between **Point Mair** (9°46'S., 160°48'E.) and Vata Eo Point (Vate-O Point), about 7 miles to the W, is generally steep-to and has high trees close to the water line, except at the E end where there is a narrow belt of mangroves. Three islets front the coast N of Point Mair, 0.3 to 0.4 mile offshore; they are covered with coconut palms and lie on coral reefs, which are steep-to. Arona Island (North Island) is 38m high; Symons Island is 35m high; and Pari Island is 32m high.

A small cove at Poposa (Korai), about 4 miles NW of Point Mair, affords anchorage for small vessels with local knowledge.

Kaoka Bay (Kau Kau Bay), entered between Vata Eo Point and a point 4.5 miles NW, has several rivers emptying into it on its S side, but these mouths are obstructed by sand, except after heavy rains. There is also considerable coconut cultivation on the S side of the bay. The bay is deep, but anchorage can be taken, in 49m, mud, about 0.2 mile offshore abreast a trader's house on the SE side of the bay.

Talutoo Island (Talatoa Island), a low islet on a coral reef, is about 0.3 mile offshore about 7.8 miles NW of Vata Eo Point. The reef is steep-to and there is a conspicuous banyan tree, about 40m high, near the center of the islet.

A former lighthouse, 18.3m high, and a tower close E about 12.2m high, stand on Talutoo Island.

Pope Rock, with a depth of 2.7m, is about 0.5 mile SE of Talutoo Island. It is steep-to and usually marked by discolored water. A submerged rock is close N.

The coast, between Talutoo Island and Tambusu Point, has many streams and small villages. Rere Point, about 2 miles NW of Talutoo Island, is fringed by a narrow reef and has a plantation on its W side. Good shelter may be found during the Southeast Monsoon about 0.3 mile W of Rere Point, in 37m. Anchorage can also be taken during the Northwest Monsoon E of the point and inside a reef of sunken rocks; this reef extends ESE from the point and affords protection from the W swell. The anchorages on either side of Rere Point, depending on the season, are reported to be large enough for vessels up to 152m long. A light is shown on Rere Point and is partly obscured by trees.

The coast from Tambusu Point to the SE entrance of Aola Bay is sandy, with high trees reaching nearly to the HW line. The Susu River and the Kombito River discharge along this coast.

7.33 **Aola Bay** (9°32'S., 160°30'E.) can be identified from a distance by a small white sandy beach on Mbara Island, a small islet at the E end of the bay, because the other beaches in the vicinity are of black sand. On the shores of the bay are several villages and a coconut plantation. The Aola River, discharging in the NW part of the bay, is blocked by a 0.9m bar. The principal export is logs.

Mbara Island (Bara Island), in the E part of the bay, lies on a reef on which there are some boulders. The islet, 38m high, is overgrown with trees and scrub, and is separated from the coastal reef of the main island by a channel 0.2 mile wide with depths of 11m to 12.8m in the fairway. A 3.7m shoal is about 0.2 mile NW of the islet.

The Needles, about 1 mile WNW of Mbara and close off the mouth of the Aola River, is a reef which dries 0.9m.

Pilotage.—Pilotage for the bay is available. Vessels should contact the local authorities on pilotage as information on this port is scanty. It has been reported that the local authorities may be contacted via radiotelephone.

Anchorage.—Vessels up to 130m in length, with a maximum draft of 9.1m, anchor parallel to the shore to load timber. A small pier is available, but no details on it are presently available.

Aola Bay affords anchorage, except during N winds, in depths decreasing gradually from 33m to 5.5m, mud. During the Southeast Trades, sheltered anchorage can be taken, in 18.3m, mud, W of Mbara Island and E of it during the Northwest Monsoon.

Aola Bay and Marau Sound afford the only convenient anchorage on this part of the coast. There are several places where temporary anchorage may be found, but the coast is usually so steep-to that a vessel has to stand very close in to get within the 37m curve.

7.34 Between Hall Point and the two mouths of the Nggurambusu River (Gurabusu River), the coastal bank, with depths of less than 5.5m, extends about 0.3 mile offshore. Hall Point is fringed by reefs which dry 0.3m, and the two mouths of the Nggurambusu River are obstructed by bars which are constantly shifting

Vulelua Island (Neal Islet) lies on a reef about 0.8 mile N of Hall Point and 0.4 mile offshore. It is planted with coconut palms; near its center is a conspicuous banyan tree.

Weldon Reef, 0.25 mile N of Vulelua Island, dries 0.3m.

Thrower Reef, with a depth of 3.7m, lies 0.75 mile NE of Vulelua Island.

Moresby Shoals, two rocky heads with a depth of 2.3m and 5.5m, are 1.25 miles NNE of Vulelua Island. Fairway Rock, with a depth of 0.9m, is about 0.8 mile ESE of the island.

All of these dangers appear to be separated by deep channels. The last three mentioned do not break during the SE trade.

Anchorage can be taken during the Southeast Trades by small vessels, in 11m, close off the W side of Vulelua Island. In good weather, small vessels can anchor about 0.1 mile SE of the island.

Small vessels can pass either inside or outside of Vulelua Island, in either case keeping close to that islet and Weldon Reef.

Caution.—Soundings give no warning of approach to these dangers, and they are not always marked by discolored water, because the silt from the Nggurambusu River and other streams, after rains, causes the sea in this area to become a uniform mud color.

7.35 Between Nggura Point (Gura Point) and Taivu Point (Taivo Point), about 7 miles NW, then to Lungga Point (Lunga Point), about 10 miles farther W, the coast is a narrow, sandy beach backed by trees, about 37m high. Along this stretch there are occasional large coconut plantations and several small streams. An undulating plain extends from 4 to 7 miles from the coast to the foot of the mountains. Numerous traders' houses and stores are situated on the coast, and there are a few small villages.

The coast between Nggura Point and a position about 7 miles W of Taivu Point should not be approached within 1 to 2 miles; many patches of discolored water and rips have been seen.

During the rainy season, the streams along this part of the coast discolor the water, causing it to have the appearance of shoals in places. During the Southeast Monsoon, anchorage can be found off any part of this coast outside the 20m curve, which is 0.2 mile to 0.5 mile offshore. The bottom is mud and sand.

Tenaru, with a coconut plantation and a small native hospital with a conspicuous red cross painted on the roof, is situated about 3.5 miles SW of Koli Point. There is a small wooden pier at Tenaru, but landing is often hampered by the swell.

Taivu Point is marked by a light. Several beacons are along the coast between Taivu Point and Beaande Point but they have been reported to be either missing or obscured by foliage.

Lengo Channel (see paragraph 7.46), Sealark Channel (see paragraph 7.45), and Nggela Channel (see paragraph 7.45) are the three passages between Guadalcanal Island and the Florida Islands.

7.36 **Lungga Point** (Lunga Point) (9°24'S., 160°02'E.) is a rounded headland at the mouth of the Lungga River (Lunga River). The settlement of Lungga (Lunga) is about 1.3 miles SE of the point, which has trees about 46m high. A light is shown from the point and an aeronautical beacon is about 1.5 miles to the SSE.

Aspect.—The coast of Lungga Roads consists of a steeply shelving black sand beach, with coconut plantations behind it, for about 2 miles SW of Lungga Point, then it becomes rocky, with a narrow fringing coral reef for 1.25 miles. A college, at an elevation of 30m, about 0.5 mile inland from the sandy beach, is conspicuous from the NW. A factory and the adjacent farm buildings, near the coast close W of the sandy beach, are also conspicuous from seaward.

Anchorage.—Anchorage can be taken, in 7.3m, about 0.5 mile off the settlement.

Lungga Roads (Lunga Roads), lying between Lungga Point and Point Cruz, affords shelter during SE winds, in 36m, about 0.4 mile offshore. The bottom is principally sand.

Caution.—Two dangerous wrecks lie about 0.5 mile and 1 mile from shore off the settlement at Lungga.

Honiara (9°25'S., 159°57'E.)

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7.37 Honiara is the capital of the Solomon Islands and is the largest urban center in the islands. Copra, frozen and canned fish, timber, palm oil, marine shell, cocoa, and tobacco are exported. Food, fuel, and general cargo are imported. Honiara is a port of entry.

Winds—Weather.—The cyclone season is from December to April, with winds generally varying between N and W up to force 5 during this period. From April to November, winds are from the NE.

Depths—Limitations.—The harbor approaches are clear of dangers except for Pelope Shoal, with a charted depth of 9m, and a 16.2m foul patch charted 0.1 mile W of it.

A deep-water wharf, 115m in length, lies on the SE side of Point Cruz. The draft of ships berthing here is restricted to 9.2m, due to the presence of Pelope Shoal, and the foul ground mentioned above. A small wharf extends from the W end of the deep-water wharf, offering alongside depths of 3.4 to 5.4m and a length of 85m. Several small craft piers extend from the slope fronting Honiara, offering alongside depths of 2.4 to 4.8m. A barge ramp, 6m wide with a depth of 1m, can also be found. An offshore, multi-point mooring petroleum berth is situated about 0.2 mile SE of the deep-water wharf. Vessels drawing up to 12m and 200m in length utilize the berth, securing on a NE heading with both anchors down.

Honiara

Aspect.—Along with the factory and college mentioned for Lungga Point, conspicuous tanks are situated 0.1 mile SW of Point Cruz, and a green water tank stands 1 mile SSE of the same point.

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Honiara

Honiara

Point Cruz, originally a low tongue of coral, has been built up considerably. Reclamation has taken place on both sides of the tongue, which is fringed by reef on all sides. Honiara lies on both sides of the point.

Pilotage.—Pilotage for the port is compulsory for vessels over 200 grt or 40m in length, between 159°57'E and 159°59'E, as well as S of 9°25'S. Vessels should radio their ETA and request for pilotage at least 24 hours in advance; the pilots keep watch on VHF channel 16, 2 hours before the vessel's expected arrival time. The boarding ground is situated 0.75 mile NE of Point Cruz.

Signals.—Storm signals are displayed from the Marine Office and the Yacht Club. By day, a black triangle, point up, and three white lights in a triangle at night, indicate that cyclonic or gale force winds are expected.

Anchorage.—Anchorage is prohibited in the harbor proper, within an area best seen on the chart.

Anchorage is available in Lungga Roads, which has already been described in paragraph 7.36. Large vessels can shelter in the lee and deep water off Savo Island. Small craft anchor in a natural basin on the W side of Point Cruz, in a depth of 18.2m.

Directions.—A light is shown from Point Cruz. Range lights, in line bearing 234.5°, lead to the main berthing facilities, while lights in line bearing 185.75°, mark the passage from seaward to the small craft anchorage.

Normally, vessels arriving at night anchor and enter harbor in daylight.

7.38 Between Point Cruz and Cape Esperance, about 18 miles to the NW, there is no safe anchorage for vessels of any size in either monsoon. Temporary anchorage can be taken in good weather several hundred meters offshore at the coconut plantations situated about 4 miles, 11 miles, and 15 miles NW, respectively, of Point Cruz. Vessels call here occasionally to load copra.

Cape Esperance (9°13'S., 159°42'E.), marked by a light, is the N extremity of Guadalcanal Island and has several summits near it. Mount Esperance, 1.5 miles S of the cape, is 662m high. Immediately N of Mount Esperance is Visale Peak, 361m high; this peak is conspicuous from the E and has a prominent triangular landslide scar on its N slope. Mount Roundhead, 585m high and 0.5 mile SE of Mount Esperance, is also conspicuous from the East. Mount Gallego, 1,085m high and about 6 miles SE of Cape Esperance, has an extensive plain at its foot that reaches to the coast.

Between Cape Esperance and **Nuhu Point** (Nughu Point) (9°22'S., 159°35'E.), shoals are as far as 5 miles offshore and vessels should not approach this section of the coast within this distance unless they are bound for Coughlan Harbor, Maravovo, or Lavuro. Good shelter may be obtained on this coast during the Southeast Trades.

7.39 **Coughlan Harbor** (9°16'S., 159°38'E.), about 4.5 miles SW of Cape Esperance, is an open roadstead which affords good shelter during the Southeast Trades and is partially protected from W winds by Sow Reef and Pig Reef. Small vessels with local knowledge can take anchorage, in 16.5m to 20.1m, sand, S and SE of Sow Reef. The best approach to Coughlan Harbor is from the NW, avoiding the dangers described below, and passing about 0.3 mile off the W end of Sow Reef.

There are numerous villages on the beach between Cape Esperance and Coughlan Harbor, and 1 mile W of the former is Visale, a mission station. During the Southeast Trades, small craft can take anchorage off the mission station.

Maravovo, a mission station, is situated on the high ground close SW of Coughlan Harbor. There is a church, a hospital, and several buildings conspicuous from the NE.

Lavuro Passage (Lavoro Passage) is about 3 miles SW of Maravovo (Marouovo Mission). During the Southeast Trades, anchorage may be taken off a reef with the settlement bearing 090°, distant 0.75 mile. A road connects the settlement with Honiara.

Between Nuhu Point (Nughu Point) and **Paila Point** (West Cape) (9°32'S., 159°35'E.), the W extremity of Guadalcanal Island, the channel off the coast is reported to be deep and clear except for charted dangers which are as far as 5 miles offshore

and which should be given a wide berth.

Hat Hill, a remarkable cone 609m high, and another cone 914m high, 3 miles ENE and 8 miles NE, respectively, from Paila Point, are two prominent summits conspicuous when approaching from the S.

An islet on foul ground just W of Paila Point is marked by a light.

7.40 Between Paila Point and **Cape Hunter** (9°49'S., 159°49'E.), about 24 miles to the SE, there are some prominent points and corresponding indentations which afford anchorage off this stretch of mountainous coast.

Kopau Harbor, SE of Paila Point, is a circular basin about 0.4 mile wide between the fringing reefs on either side of the entrance. A reef fringes almost the entire shore of the basin, except for a small opening in the E part, where there is a landing place.

Flora Rock (9°32'S., 159°36'E.), with a least reported depth of 2.7m, consists of a series of small rocks on a shallow ridge just S of center of the harbor.

Anchorage can be taken in Kopau Harbor, in 14.6 to 18.3m, about 0.1 mile SE of Flora Rock.

Beaufort Bay (9°36'S., 159°39'E.) is a large indentation just N of Cape Beaufort, which offers anchorage, in a depth of 18.2m.

Wanderer Bay is entered between Serapina Point and Maasambagha Point (Cape Austen).

The Kosughu River (Boyo Creek) discharges into the bay; silting has probably led to depths less than charted. Denham Roadstead, at the head of the bay, affords anchorage, in 11m, about 0.3 mile NW of the mouth of the Kosuhgu River.

Anchorage can be taken, in 37m, sand, 0.5 mile WNW of Vatuvelevele Point (Aowawa Point), but the roadstead should be avoided during onshore winds.

7.41 **Cape Hunter** (9°49'S., 159°49'E.) is the W end of a bluff promontory, 481m high. The coast in the vicinity is covered with trees from the shore to the summit of the mountains. Foul ground extends about 0.3 mile from the cape, and at the E end of the promontory is Vatuolo, a rock, 11.2m high.

Hunter Roadstead, on the NW side of Cape Hunter, affords anchorage, in 22m, fine sand, 0.5 mile W of Euro village. The roadstead is unsafe during onshore winds.

The S coast of Guadalcanal Island is sheltered during the Northwest Monsoon, except when the wind backs to the SW.

Lauvi Point (Lauvie Point), about 36 miles E of Cape Hunter, is about 15.2m high, and about 1.5 miles S of Lauvi Point lies Korasahalu Islet (Korasagalu Islet). The islet is covered with bushes and there are some trees up to 15m high; a coral reef surrounds the islet and shoal water extends E and W from it. There is a deep passage between Lauvi Point and the islet. Caution is advised as volcanic activity has been reported in the vicinity. Valena afu Reef, which breaks occasionally, is about 3 miles WSW of Lauvi Point.

Cape Henslow, about 13.5 miles E of Lauvi Point, is a bold point with a fringing reef.

Between the coast and the main mountain range there are several peaks. Mount Vatusuangaghi (Vatuvisa), a sharp peak, 1,602m high, is about 5 miles WSW of Mount Popomanaseu (Popomanasiu). The Itina River discharges close E of Cape Hunter and brings with it large trees which strew the beaches on either side of the entrance. Boulders of coral have been noticed in this vicinity.

Caution.—Vessels are advised to remain clear of the S coast of Guadalcanal, from the SE entrance of Marau Sound to Cape Hunter, due to the possibility of hostile action being directed against them from shore.

7.42 **Savo Island** (9°08'S., 159°49'E.), which lies in the passage between the W extremities of Nggela Island and Guadalcanal Island, is a wooded volcanic island with several peaks, the highest of which, nearly in the center, has an elevation of 485m. A narrow steep-to reef fringes the island, and there is a steep white beach at the N end. Several villages and a mission station are situated on the island. There are coconut groves and some agriculture.

The 200m curve is no more than 0.6 mile offshore and at 1 mile offshore the depths are 550m; the bottom is chiefly composed of small volcanic stones.

Earthquakes are frequent.

Tides—Currents.—The tidal currents along the shores of Savo follow the trend of the coast line, running N and S with a variable strength of 0.5 to 1.5 knots, and are uncertain. Tide rips are formed where the currents meet off the N and S points of the island and these tide rips create an impression of off-lying dangers. In the past, during good settled weather, the N current was found to commence about 1 hour after LW and the S current at about HW by the shore.

Anchorage.—Anchorage can be taken, in 18.3m, about 0.2 mile off a village on the SW side of the island. A rock, with a depth of less than 1.8m, is near the coast N of the village. Anchorage can also be taken, in 18.3 to 37m, about 0.2 mile off a village on the NW side of the island. Some above-water rocks front the beach and there is a white house here. This is locally known as Black Rocks Anchorage.

Iron Bottom Sound is the name assigned to the body of water lying between the Florida Islands and Guadalcanal Island to the W of Sealark Channel.

The Florida Islands (Nggela Group)

7.43 The Florida Islands (Nggela Group) are made up of Nggela Sule (Sula), the largest of these volcanic islands; Mbokonimbeti Island (Olevuga Island); Vatilau; and several other small islands NW of Nggela Island.

Nggela Sule (Sula) is actually two islands separated by narrow Utuha Passage and is wooded with grassy tracts bare of trees.

The prominent peaks on Nggela Sule are Tanamanu Mountain (Sharp Peak), a conspicuous bare conical hill, 211m high, at the E end of Nggela Sule; Cleverley Hill, 259m high, about 1 mile WNW of Tanamanu Mountain; Dome Mountain, 358m high, about 3 miles W of Tanamanu Island; Mount Perry, 348m high, about 5 miles NW of Dome Mountain; and Mount Pata (Mount Barnett), 416m high, the summit of the island.

Mbokonimbeti Island (Olevuga Island), separated from Nggela Sule by Sandfly Passage, rises to a height of 318m in Mount Panamanauvi (Olevuga), at its S end.

Vatilau Island, NW of Mbokonimbeti Island, has Vatilau Peak, 320m high.

Depths—Limitations.—The SE end of Nggela Sule is separated from Guadalcanal by three deep channels, Lengo Channel, Sealark Channel, and Nggela Channel, all of which run through foul ground. The Florida Islands are surrounded by the 200m curve, which is parallel with the group and about 3 miles offshore, except in the vicinity of the three channels mentioned above. Dangers within the 200m curve will be discussed later in this sector.

7.44 Tanatau Rock (9°08'S., 160°25'E.), 12.2m high, is on a low shelving point which forms Tanatau Point, the E end of Nggela Sule. A breaking reef extends 0.2 mile NE from the point.

Hitchcock Shoal, the only known danger in this area outside the 200m curve, is a detached coral patch, with a least depth of 6.4m, about 8.5 miles SE of Tantatu Point.

Matumba Bay (9°10'S., 160°22'E.), about 3.8 miles SW of Tanatau Point, affords shelter for small craft with local knowledge during W winds in the N part of the bay, but a heavy swell sets in during strong SE winds. The entrance of the bay is 0.2 mile wide between the reefs fringing the entrance points; the depths at the anchorage are 14.6 to 18.3m.

The Tanaindale Islands (Outside Islands), three in number, are 13.7m, 16.7m, and 27m high, and extend 0.5 mile S from the W entrance to Matumba Bay. The S islet is marked by a light. A tower, about 12.2m high, stands close N of the light.

Mandoleana Island (Mandoliana Island)(9°12'S., 160°17'E.) is about 1 mile offshore. Foul ground extends off the island about 0.2 to 0.4 mile except on the NE side, where it is steep-to.

Edgell Bank, with a depth of 16.4m, and Norfolk Shoal, with a depth of 14.6m, are 1.3 miles S and 1.5 miles WSW, respectively, from Mandoleana Island. Strong tide rips usually mark their positions.

Anchorage.—Anchorage can be taken, in 16.4 to 18.3m, mud, about midway between the N side of Mandoleana Island and the coast. Anchorage can also be taken during the Southeast Trades off the NW point of the island, but this can be uncomfortable because of strong tides setting between the island and the coast.

The coast between a position N of Mandoleana Island and Tapoporu Harbor (Barango Harbor) is indented and foul.

Channels between Guadalcanal Island and the Florida Islands

7.45 Nggela Channel is the fairway immediately S of the E part of the Florida Islands and traverses the Eastern Fields and Western Fields and the open water between them.

The Eastern Fields, E and S of Tanatau Point, are several shoal soundings and well-defined banks; the principal one is Ridge Bank, about 4 miles ESE of Tanatau Point.

The Western Fields are SW of Mandoleana Island. Walker Rocks, on the N edge of the fields, is 2.75 miles SSW of Mandoleana Island.

All of the charted dangers on the Eastern Fields and the Western Fields are marked by tide rips and can usually be distinguished by discoloration.

Nughu Island (Nugu Island), 5.5 miles SE of Mandoleana Island, lies on the S edge of the Eastern Fields and the Western Fields, about midway between their extremes. The island, completely fringed by a reef and covered with trees 38m high, is nearly divided at its E end, where there is a narrow isthmus of broken coral, which the sea sometimes inundates at HW. Tide rips extend about 1 mile ENE from the E end of Nughu. Jones Reef, a 4.9m patch, is about 0.8 mile N from the W end of Nughu, and Knowles Patches, with depths of 6.1 to 10.9m, extend about 2.5 miles W from the same point.

Irregular depths are found for a distance of about 7 miles W and WSW from Nughu Island. A 10.1m patch, within this area, lies about 4.8 miles WSW of Nughu.

Directions.—From a position 3 miles bearing 076° from Tanatau Point, make good a course of 228° to pass SE of a 6.9m patch, and NW of a 7.3m patch lying about 1.3 and 3.3 miles S, respectively, of Tanatau. Both of these dangers will probably be seen by their discoloration. When abeam of Matumba Bay, course may be altered to pass about 0.8 mile S of Mandoleana Island and N of Edgell Bank, and when abeam of Norfolk Shoal, a course can be shaped to pass about 1 mile SW of Mbungana Island (Bungana Island), off the entrance to Tapoporu Harbor (Barango Harbor). The principal danger for deep-draft vessels in this channel is Walker Rocks, because they do not show discoloration.

Sealark Channel, about 1.5 miles in width and deep and clear, is between the 200m curves extending S from Florida Island and N from Guadalcanal Island. A recommended course of 075°-255° leads midway between the dangers on either side. Nughu Island, a good mark for entering the channel, along with the dangers on the N side of the channel, have been discussed previously above.

7.46 Tanapari Cay (Tanapari Island) (9°20'S., 160°18'E.), on the S side of Sealark Channel, was a sand cay only a few inches high in 1953. The cay lies near the W end of a narrow coral reef which is just covered at LW and steep-to on its N side. A boulder which dries 1.2m stands on the reef about 0.3 mile NE of the cay. A 3.2m patch is about 0.5 mile SW of Tanapari Cay.

There are irregular depths for a distance of about 5 miles WSW of Tanapari Cay. Maxwell Shoal, with a least depth of 5m, is about 2.5 miles WSW of Tanapari Cay. A light is shown from the reef.

Sealark Reef, 2 miles E of Tanapari Cay, is marked by a light and has some above-water rocks on its W side; it is steep-to on its N side.

Lengo Channel is the S of the three channels separating the Florida Islands and Guadalcanal Island. The channel is 3 to 4 miles wide, with depths of 33 to 55m. Rivers discharging into the channel from Guadalcanal Island often discolor the water giving the appearance of shoals.

Anchorage.—Anchorage may be obtained off any part of the coast on the S side of **Lengo Channel** (9°22'S., 160°20'E.) during the Southeast Trades, in depths of more than 20m, mud and sand, from 0.25 to 0.5 mile offshore.

Caution.—Simmonds Bank is small and usually marked by a strong tide rip; it has a least depth of 22m. It is near midchannel at the E end of Lengo Channel.

Ringdove Shoal, with a least depth of 5.5m, lies at the W portion of Lengo Channel, about 3 miles offshore from Guad-

alcanal Island. James Rock is covered with 12m, 3.5 miles NE of Taghoma Point.

7.47 Mbungana Island (Bungana Island) (9°11'S., 160°12'E.), an island about 66m high, is at the entrance to Tapoporu Harbor (Barango Harbor).

Tapoporu Harbor (Barango Harbor), entered between **Tanakonola Point** (Barango Point) (9°11'S., 160°13'E.) and Wreck Point, about 0.8 mile NW, affords shelter during the Southeast Trades. Anchorage may be taken W and N of Bishop Cove, on the E side of the harbor and the first indentation above Tanakonola Point. Small craft can anchor, in 30 to 33m, sand and mud, at the head of the harbor.

Port Purvis (Water Point) is entered between **Plumer Point** (9°09'S., 160°14'E.) and Lyons Point, which is about 0.6 mile farther NW and is marked by a light. It is a sheltered harbor at the S end of Utaha Passage, which will be discussed later in paragraph 7.53. The harbor is surrounded by high hills, some of which to the S are bare, while others are densely wooded. The shore is fringed with reefs and lined with mangrove, broken occasionally by strips of sandy beach.

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Entrance to Port Purvis

Lyons Point can be identified by a bare patch of rocks which resembles a native house; foul grounds extend about 0.3 mile NW from the point.

Table Rock, which is charted and is about 0.2 mile off the NW shore, is the only known detached danger in the port; on it are some heads that uncover 0.3m at LW. This rock and the coral spits projecting off the points are easily distinguished with a favorable light.

Anchorage in Port Purvis is protected, being open only to the NW. The holding ground, in 14.6m to 22m, is reported to be excellent; the bottom is green mud.

Hutchison Harbor, entered about 0.8 mile NW of Lyons Point, has depths of 26 to 55m for a distance of about 1.5 miles within the entrance, then it narrows to a width of about 0.1 mile. Several anchorage berths are available in the harbor.

Between Port Purvis and Hutchison Harbor is an inlet, open to the SW, with general depths of 18.3m to 49m, mud. A 9.1m patch is close inside the entrance of this inlet. A reef extends about 0.4 mile SW from the N entrance point of the inlet, and a 12.8m patch lies about 0.15 mile W of the outer end of the reef.

Ghavutu Harbor (Gavutu Harbor), W of Hutchison Harbor and separated from it by a peninsula, affords anchorage, in 33 to 36m, mud, close NE of a partly ruined wharf at the N end of the harbor.

7.48 Tulaghi Harbor (Tulagi Harbor) (9°06'S., 160°09'E.), W of Ghavutu Harbor, affords secure anchorage protected from all but SE winds. Range lights, in line bearing 109°, lead into the harbor.

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Tulaghi Harbor

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Tulaghi Harbor

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Tulaghi Harbor

Depths—Limitations.—Government Wharf, with a length of 46m and an alongside depth of 4.6m, lies on the SE end of Tulaghi Island. A wharf for fishing vessels, situated 0.4 mile NW of Government Wharf, will accommodate vessels up to 120m in length with a draft of 7.5m. The local authorities may be contacted through Honiara Radio.

Pilotage.—Pilotage is available on request to the Port Authority at Honiara.

Anchorage.—Anchorage can be taken, in 35 to 39m, mud, good holding ground, in the bight off the N side of Tulaghi Island.

7.49 The coast of Nggela Sule, from Tulaghi Harbor to Sandfly Passage, about 6 miles W, is high, wooded and steep-to, with a coastal mountain range rising to 316m SW of Mount Rata (Mount Barnett). Bayldon Shoals, rock and coral, with a least depth of 7.3m, is the outermost danger and are about 2 miles SW of the SE end of Tulaghi Island. Tide rips are charted in the vicinity of the shoal.

Mbokonimbeti Island (Olevuga Island), separated from the W end of Nggela Sule by Sandfly Passage, is shaped like an anchor with its crown to the N. A mission station is on the W side of the island, about 1.3 miles NW of its W extremity. Anchorage may be taken by small craft with local knowledge, in 28 to 37m, sand and mud, about 0.1 mile off the reef at the mission station. Several shoals and shoal depths extend from, or lie in the vicinity of this island, and may best be seen on the chart.

7.50 Soghonara Island (Sogonara Island), 91m high, and Ndalakalau Island (Dalakalau Island), 76m high, are 2.5 miles and 5 miles WNW, respectively, of the W extremity of Mbokonimbeta Island. Passage Rock, which dries about 1.2m, is midway between the above islands. Mangalonga Island, the greater part of which is fringed with a reef, is about 0.5 mile W of the NW end of Mbokonimbeta Island, and a small unnamed islet is on a reef which extends 0.75 miles SW from Mangalonga Island. There are several other islands in the areas.

Vatilau Island, NW of Mbokonimbeta Island, is separated from it and the other islands W of that island by a passage with a least width of 1 mile, and which has tide rips extending across it. A reef, and a shoal, with a depth of 9m, lies in the center of the passage.

Several smaller islands are N and W of Vatilau Island. Kombuana Island (Pombuana Island), 76m high, is the N and has a reef, marked by tide rips, extending 0.5 mile S of it. Sambani Island (Buena Vista Island) is on a reef extending 0.25 mile N from the NW end of Vatilau Island; a small submerged rock is 0.25 mile farther N.

Mbodhoghori Island (Borogohi Island), 76m high and located on a reef extending W from Hanesavo's NW end, has some coconut trees on its N side and two rocky hummocks on its S side. A rock, covered less than 1.8m, and a 10.1m shoal are about 1 mile N of Mbodhoghori Island.

Hanesavo Harbor (8°54'S., 159°59'E.), between the W side of Vatilau Island and the SE side of Hanesavo Island, is about 1 mile wide at its entrance; drying reefs fringe both sides of the harbor and a reef, with two islets, extends about 0.3 mile SW from the SE entrance to the harbor.

Naghotano Island (Ngangotanga Island), 76m high, is SW of Hanesavo Island and is fringed by a reef. A small islet is on a reef extending from the NW side of the island; a 11.9m shoal is 0.4 mile NE.

7.51 Sandfly Passage, separating Nggela Sule from Mbokonimbeta Island, is clear of dangers at its SE end, but farther E the soundings become irregular, and tidal currents meeting the uneven bottom cause eddies and overfalls, especially in the narrow N end of the passage, where some dangerous rocks exist.

There are several conspicuous landmarks along the passage with many grassy slopes and summits interspersed between the thickly wooded hills. These landmarks include Mount Rata (Mount Barnett), on Nggela Sule; Mount Panamanauvi (Mount Olevuga), on Mbokonimbeta Island; Horn Hill, a sharp bare peak, 195m high, just E of Tanavula Point which is conspicuous from the S and E; and Haroro Hill, 214m high and thickly wooded, on a peninsula on the E side of the passage and about 3.3 miles NE of Horn Hill.

The coast of Nggela Sule side of Sandfly Passage is indented and fringed by a reef as is the Mbokonimbeta Island side. Depths of 37 to 55m are found in the bights at a moderate distance from the points of the fringing reef.

Tanavula Point, the SW entrance to the passage, is low, cliffy, and almost bare of trees.

7.52 **Hararo Point** (9°01'S., 160°07'E.) almost 4 miles NE of Tanavula Point, is the N point of a peninsula extending into the passage at about its midpoint.

Tanuli Point, the NE entrance point to Sandfly Passage, is bare and the coast between it and Lark Point, about 1 mile SW, is fringed by a steep-to reef extending up to 0.1 mile offshore.

The coast on the Mbokonimbeta Island side of Sandfly Passage opens into Laitonga Bay, a large bight, close E of the SW extremity of Mbokonimbeta Island. The bay has depths of 55 to 73m, sand and coral, and an arm extending N has depths of 20.1 to 55m, mud.

Tides—Currents.—The strength of tidal currents is affect-

ed by the prevailing winds and attain a rate of 2 to 3 knots at springs in the narrower channels. Strong tide rips are off both entrances and near the shores of the passages.

Anchorage.—Vessels with local knowledge can anchor, in 37 to 61m, sand and coral, anywhere in the passage out of the influence of the tidal currents. Vessels can anchor, as indicated on the chart, in 55 to 61m, sand and coral, about 0.4 mile NW of **Mbiki Islet** (9°00'S., 160°06'E.) in Laitonga Bay on the W side of the passage; and, in 48 to 55m, sand and coral, in **Roderick Dhu Bay** (9°00'S., 160°08'E.), on the E side of the passage.

Directions.—When tide rips in either entrance indicate strong currents, close attention must be paid to steering because there are many eddies due to the uneven bottom. Deep-draft vessels should not attempt the passage because of the reefs in the N entrance.

Vessels entering Sandfly Passage SW entrance should steer for **Haroro Hill** (9°01'S., 160°07'E.), bearing 072°, which leads midway through the entrance. When past **Rogers Rock** (9°02'S., 160°04'E.), 24m high and lying close offshore 0.75 mile E of Tanavula Point, alter course to 057° with **Hay Hill** (9°00'S., 160°08'E.) ahead. This course leads nearly midway between Hararo Point and the shoals extending into the W side of the passage. When almost abeam of Hararo Point steer to pass W of Mid Reef and, when safely clear of it, alter course E to avoid Vatukulita Rocks and the other foul area off the NE side of Mbokonimbeta Island.

Haroro Hill is conspicuous when entering the passage.

The main danger to vessels of moderate draft when entering the N entrance to the passage is Mid Reef. but a mid-channel course leads almost 0.2 mile W of it.

Caution.—Mid Reef (9°00'S., 160°07'E.) is on a rocky ridge nearly in mid-channel near the N entrance to Sandfly Passage. The ridge has uneven depths of 9.1 to 37m and the reef has depths of 3.6 to 5.5m. Overfalls and rips over the ridge are occasionally heavy.

A shoal, with a depth of 9m, is charted just W of the reef.

7.53 The coast of Nggela Sule from its E and **Tana Tau Point** (9°08'S., 160°25'E.) to the entrance of Mboli Harbor, about 8 miles NW, should be approached with caution because of the many charted shoal areas offshore.

Laghale island (Legace Island) (9°05'S., 160°24'E.), 30m high and fringed by a reef, is about 3.5 miles N of Tanatau Point.

Mboli Harbor, at the N entrance to Utaha Passage, affords good shelter during SE winds in 14.6 to 16.5m, but during N or NE winds the anchorage is too exposed for large vessels. Small vessels can anchor off the mission station on the E side of the harbor or farther S where there is complete shelter.

A drying reef with several islets extends 0.5 mile NW from the E entrance of the harbor and two coral reefs with a foul area between them obstruct the seaward end of Utaha Passage; this limits the use of the passage to small vessels only. Range lights lead into Mboli Harbor.

Utaha Passage (Mboli Passage), dividing Nggela Sule into two parts, is narrow and winding, especially at the N end, with heavy mangroves lining the entire passage. High heavily-wooded hills line the banks except at the N part where there are large grass-covered hills. There are many sand and coral shoals extending from the shores, and numerous streams, which muddy the water after heavy rains, empty into the passage.

Tides—Currents.—Strong tidal currents with a rate of 3 to 4 knots in the N part form numerous rips and eddies at the sharp bends. Currents meet off a point on the W side of the S entrance to the passage.

Anchorage.—Vura Anchorage, on the W side of a peninsula about 6 miles NW of Mboli Harbor, is apparently deep, with foul ground toward its head. Anuha Island is 0.5 mile N of the above peninsula with a deep channel between. Vatughahi Rocks (Vatugahi Rocks) with coconut palms on the reef fringing Anuha Island.

Anchorage can be taken, in 7.3 to 9.1m, on the bank 0.2 mile SW of the S end of Anuha Island.

Caution.—The coast between Vura Anchorage and Tanuli Point, at the NE entrance to Sandfly Passage, is fringed by a reef extending about 0.2 mile offshore. There are several charted detached shoals off this part of the coast.

The Russell Islands

7.54 The Russell Islands, ranging 18 to 37 miles NW of Guadalcanal Island, consist of Pavuvu Island, the smaller island of Mbanika Island, separated by Sunlight Channel, a deep passage, a large number of surrounding small islands which are steep-to and several charted shoals and reefs. Large coconut plantations are on the islands.

Pavuvu Island is mountainous with peaks up to 457m high which slope down to level ground and form several peninsulas on the N side.

Mbanika Island has high ground up to 122m and level or undulating land elsewhere.

When approaching the Russell Islands, the mountains of Pavuvu Island are the first highlands seen. The land blends with the horizon, and breakers are not seen before the land. The shore is made up of sandy beaches, with fringes of coconut palms in the background.

Depths in the approaches to the Russell Islands are generally deep and clear, but caution is necessary in the SW approach because the islands there are not completely surveyed.

Renard Sound (Kokolanohol Sound) (9°04'S., 159°14'E.), on the NE side of Mbanika Island, has deep-water anchorage and is always sheltered. Much debris is reported on the bottom and caution should be taken to avoid fouling anchors. The bay serves as a port for Yandina Plantation.

7.55 **Yandina** (9°05'S., 159°13'E.) (World Port Index No. 57070) is a copra and cocoa loading port.

Winds—Weather.—From October to April, the winds are from the N and W; at other times they are from the S and SE. The wharf is open to these winds, which can make berthing difficult.

Depths—Limitations.—A wharf, about 53m in length, is situated 0.25 mile W of Renard Sound's S entrance point. Mooring dolphins stand E and W of the wharf, which has an alongside depth of 7.6m.

Pilotage.—Pilotage is not compulsory, but is recommended, and may be ordered through the Solomon Islands Ports Authority. The local authorities may be contacted through Honiara Radio.

Directions.—Vessels approaching Renard Sound should pass N and W of Koemurun Island, then W of Kokia Island, 2 miles to the SW.

When approaching from the E, pass between Laumuan Island and Lologhan Island, about 0.65 mile N, then between Fanau Island and Moe Island, then S and W of Daumie Island.

When approaching from the NE, pass N of Oumala Island, then between Ufaon Island and Lamu Island, taking care to avoid the charted 3.1m reported pinnacle rock about 1.3 miles NW of Oumala Island.

Vessels can also approach Renard Sound by passing between Kakau Island and the charted shoals 0.5 mile and 1.25 miles, respectively, to the S of that island, then pass N and W of Kokia Island.

When approaching from the S, enter between Louio Island and Levelen Island, then keep in mid-channel between Mbanikan Island and Loun Island.

Caution.—It has been reported that the coral reefs on either side of the approach channel to Renard Sound, and of the sound itself, are easily discernible by day and that the reefs extend 1m underwater from the shore and then drop almost perpendicular, so that the color of the water clearly indicates the channel with sufficient depth for navigation.

7.56 Sunlight Channel (Sera Me Ohol Channel), separating the Pavuvu Islands and Mbanika Island, has a general width of 0.35 mile and depths of 33 to more than 183m. Moko Island divides the N part of the channel into two smaller channels. Hoi Island is in the S entrance; the passage to the W of the island is foul. A submarine cable is laid across Sunlight Channel, about 1.4 miles N of Hoi Island. Mooring buoys are close N off Hoi Island. Areas in the channel which have been wire-dragged to 12.2m are shown on the chart.

Tides—Currents.—Tidal currents are negligible, except in the S approach to Sunlight Channel E of Hoi Island, where a maximum of 2 knots has been observed and the average is 1 knot. Strengths occur at irregular intervals.

Directions.—Sunlight Channel can be approached from the NE or from the S by small vessels with local knowledge. The approach from the N is midway between Koemurun Island and Fulau Island, then midway between Fulau Island and Lever Point, the N point of Mbanika Island, then passing W of Moko Island.

One approach to the S entrance to Sunlight Passage is between Taina Island and Menmui Point, the SW extremity of Mbanika Island; another approach is between Cape Mbaloka, the S extremity of Pavuvu Island, and Monoluon Island, an island 1.25 miles SW. Sand Island, in about the middle of the latter approach, may be passed on either side.

A barrier reef with numerous islets 3.0 to 15.2m high and covered with vegetation, is at the N side of Pavuvu Island. **Langholon Island** (8°59'S., 159°15'E.), marked by a light, is the E islet on this barrier reef.

A large part of the area inside the barrier reef, including Nono Bay and Pipisala Bay, two indentations on the N coast of Pavuvu Island, and the entrances into these bays have been wire-dragged and are shown on the chart.

Inside the barrier reef there are several coral reefs, some of considerable size, all of which are visible from aloft under favorable conditions.

Nono Bay, on the NE side of Pavuvu Island, affords sheltered anchorage. The passages into the bay are partially marked by aids.

7.57 Pipisala Bay (9°00'S., 159°08'E.), at the N end of Pavuvu Island, affords good sheltered anchorage, in 46m, about 0.2 mile from the shore reef extending 0.25 mile from the head of the bay. Ships make occasional calls to load copra. Such ships must first call at a port of entry to obtain lighters and labor.

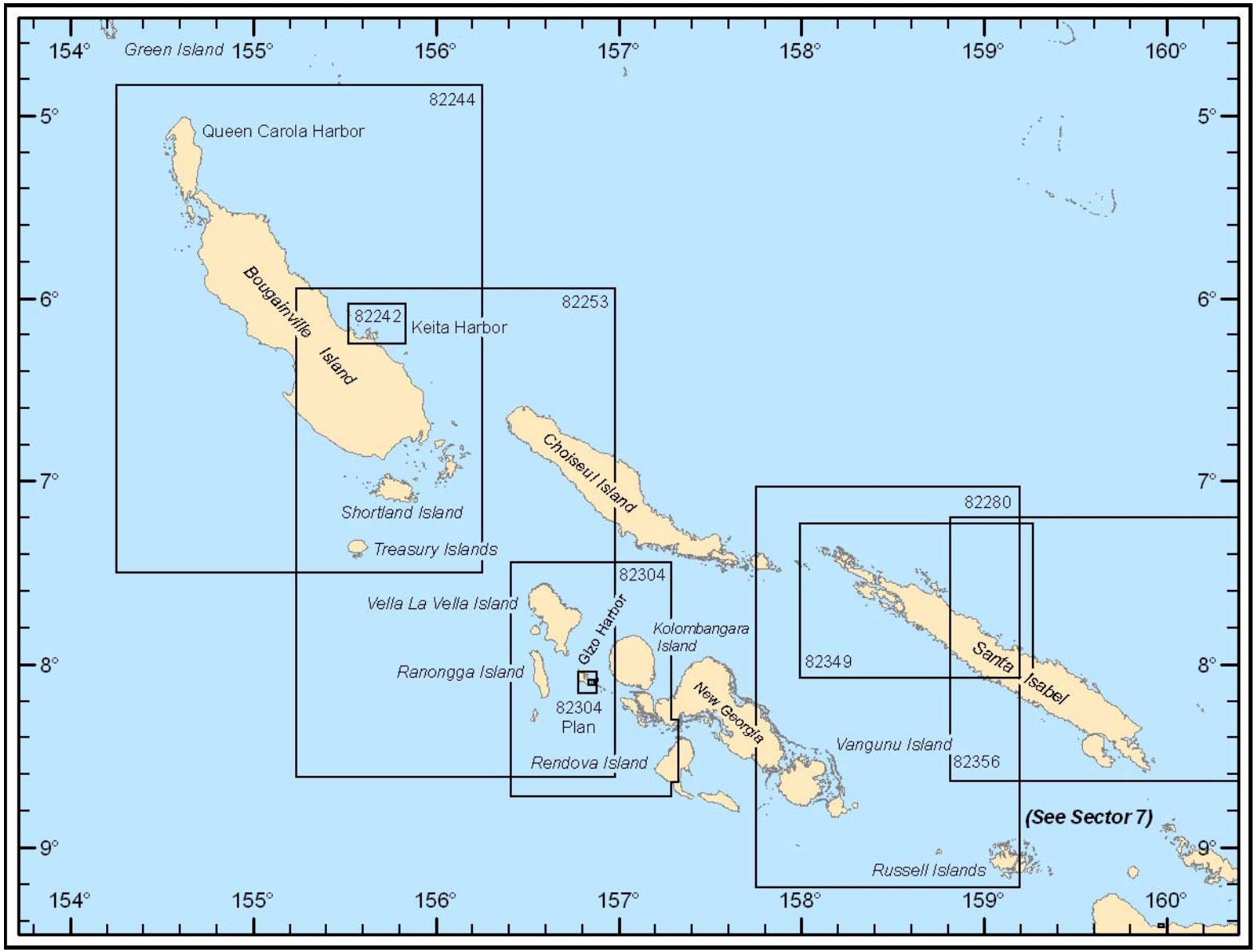
The inlet between Marulaon Island and Karamula Island has considerable depths, but affords no anchorage.

West Bay is an extensive bay off the NW coast of Pavuvu Island. Macquitti Bay, the E arm of West Bay, has been wire-dragged as indicated on the chart. Anchorage can be taken in Anonyma Cove, at the head of that bay, in 33m, mud. The cove, 0.25 mile wide at the entrance, is fringed by a reef extending 90m offshore.

Hooper Bay, a S arm of West Bay, is reported to afford anchorage, in 18.3 to 42m, but the entrance is narrowed to about 0.15 mile by reefs extending from both sides of the entrance. There is a small pier on the W side of the bay, just inside the entrance.

Buraku Island (Mborokua Island) (9°01'S., 158°45'E.), volcanic and 326m high, is 16 miles W of the Russell Islands. This isolated island resembles a truncated cone when seen from N. The island is heavily wooded and fringed with coral; breakers extend about 0.3 mile S from the SE and SW extremities of the island. There is a bight off the SW side of the island where reefs extend nearly 0.1 mile offshore from the entrance points.

Natives, who sometimes visit this uninhabited island, have reported no off-lying reefs.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **8** — CHART INFORMATION

SECTOR 8

THE SOLOMON ISLANDS—CENTRAL AND WEST PARTS

Plan.—This sector describes the islands, reefs, and sounds of the Solomon Group NW of the Russell Islands. The arrangement is from SE to NW.

General Remarks

8.1 The Solomon Islands are comprised of seven major islands, four of which, Santa Isabel, Choiseul, New Georgia, and Bougainville, are described in this sector.

Santa Isabel (Santa Isabel Island) is separated from Malaita by Indispensable Strait, and from the New Georgia Group by New Georgia Sound (The Slot). Choiseul Island is separated from Santa Isabel by Manning Strait, and from the New Georgia Islands by the continuation of the sound. Bougainville Island, the largest of the Solomon Islands, lies W of the W extremity of Choiseul Island.

Bougainville forms a portion of the Republic of Papua New Gunea, while the remainder form the nation of the Solomon Islands.

The coastal description of Santa Isabel will be given following an analysis of the dangers around Santa Isabel and the off-lying islands N of the Solomon Islands.

Aspect.—The islands are similar in general appearance, having towering mountains and being covered in dense forest. The slopes incline gently to the sea, with mangroves fronting the shore.

Off-lying Islands and Dangers

8.2 The **Tasman Islands** (Nukumanu Islands) (4°33'S., 159°30'E.) are comprised of about 39 small and low islands on an atoll reef extending about 11 miles E-W. A vessel visiting this group entered the lagoon by the N pass on the W side of the atoll.

Anchorage.—Anchorage was taken near the SE end of the lagoon, in 16m, W of the S end of Nogu Dabu Island, the largest island.

The **Ontong Java Islands** (5°33'S., 159°44'E.) are very extensive and cover an area between 5°38'S and 4°56'S, and 159°07'E and 159°45'E. There are a number of low and sandy islands and islets, which are generally covered with coconut palms, lying on and within the edge of an atoll reef. Luaniua, at the SE end, and Keila Island, in the middle of the SW side, are the largest islands. The crown of reefs is broken in numerous places by generally narrow passes. Kaveiko Pass, 2 miles SSW of the S end of Luaniua, is marked. The seas break heavily at the entrance to the pass. Kaveiniu Pass, 2.8 miles WSW of Kaveiko Pass, is wider and appears safe. Reefs on either side are readily visible.

These two passes are the prime passes used for access to the anchorages in the SE part of the atoll, particularly on the W side of Luaniua.

Frindsbury Reef (5°00'S., 159°09'E.), a detached reef about 7 miles NW of the NW side of the Ontong Java Islands, is marked by breakers.

Caution.—Fish rafts fitted with radar reflectors are moored in a line about 15 miles E of the group and may best be seen on the chart.

8.3 **Roncador Reef** (6°13'S., 159°22'E.) lies about 40 miles S of the Ontong Java Islands and is disposed in such a manner as to appear as a crown around a lagoon. It is about 6 miles in extent; the entrance to the lagoon is through two passes in the S part. The lagoon affords anchorage, in 27 to 36m, broken coral. Dangers are readily visible from aloft when the light is favorable.

A wreck aground in position 6°15.8'S, 159°22.8'E provides a good radar target.

The **Carteret Islands** (Kilinailau Islands) (04°44'S., 155°16'E.) is a group of six islands on the reefs of an atoll 41 miles ENE of the N end of Buka Island. There is a trading post about midway on the W side of the atoll. Three passes allow vessels to enter the lagoon, but the NW pass is not recommended; it can be followed by vessels drawing up to 2.4m, but there are many reefs and shoals between this entrance and the anchorage.

The SW pass forms a marked break in the reef. Its edges can be distinguished when the light is good. The entrance is about 0.2 mile wide, with minimum depths of 5.5m. Inside the lagoon the channel breaks into two branches running NW.

The S pass is 0.25 mile wide, with minimum depths of 5.5m; the tidal currents reach a velocity of 6 knots.

Vessels can anchor, in about 13m, with the S edge of Iehan Island bearing of 090°, distant 0.4 mile.

Two wrecks are beached, respectively, on the S side and on the N side of the reef; a third wreck is beached in the N part of the lagoon.

The **Mortlock Islands** (Tauu Islands) (4°49'S., 157°03'E.) have been reported to lie 7.5 miles, bearing 350°, from their charted position. This group of some 20 islands and islets are on the reefs of an atoll about 110 miles NNE of Cape Alexander and Choiseul Island. Low and covered with coconut palms, the majority are grouped on the E side of the lagoon. Tauu, the largest, is the S island.

During the Southeast Trades, there is anchorage on the E side of the lagoon, about 135m offshore. During the Northeast Monsoon, a choppy sea prevails, but anchorage can be found in the NW part of the lagoon.

8.4 **Santa Isabel** (8°10'S., 159°30'E.), an island lying N of New Georgia Sound, is entirely traversed by a ridge of mountains. Its highest is **Mount Marescot** (8°13'S., 159°34'E.), 30 miles NW of Vikenara. The island is sparsely populated, except near Thousand Ships Bay, at the SE end, and Kia Bay, at the NW end.

Depths in the approaches to the island are deep and clear, but

there are vast areas around this island that have not been surveyed. Utmost caution is advised when navigating these waters.

Vikenara Point (8°34'S., 159°54'E.) is the SE extremity of Santa Isabel. It is precipitous and dangerous. A continuous narrow coastal reef extends WNW from Vikenara Point to **Sogha Point** (Soga Point) (8°31'S., 159°48'E.). **Vitoria Island** (8°34'S., 159°52'E.), also fringed with a reef, stands 1.5 miles WSW of the point. It is wooded and 60m high.

Mahighe Island (Mahige Island) (8°31'S., 159°55'E.) lies 2.5 miles NNE of Vikenara Point. An 11 to 18m bank, as well as other dangers, extends out for about 3.3 miles to the E of Mahighe Island. Soundings are very irregular in this area. The passage between the island and the dangerous islets that flank the Santa Isabel coast is good, with a navigable width of about 1 mile. With the channel narrowed by reefs and shoals on the W side, two prominent rocks lie on the reef 2.5 miles N of Vikenara Point, with foul ground about 1 mile NNW and SSE of them. Two islands, Pilo Island and Kilio Island, lie on the reefs W of the above rocks.

Sigana Island (8°31'S., 159°52'E.) lies on the W end of a reef about 1 mile W of Kilio; a narrow boat channel separates it from the main island.

Anchorage.—There is a small and protected anchorage S of Sigana Island, in 31 to 33m. The area lies between the three islets mentioned above.

8.5 Ngalignagho Island (Nalignago Islet) (8°25'S., 159°55'E.) is located 5 miles N of Mahighe Island. This small sand cay is in the center of a coral reef surrounded by shoals. Dangerous projections extend out N and S of the reef. Irregular depths are in evidence between the cay and the coast W of it. More shoals than charted may exist. Ngalignagho Island is the more distant to seaward of the dangers found in the vicinity of the entrance to Tanabuli Bay. In the approach to this bay, there are a group of islands lying between **Boko Point** (8°27'S., 159°52'E.) and **Martin Point** (8°24'S., 159°50'E.); these islands, known as Jagi, Kapika, Kolare, and Siasigara, lie close off the coast. Passages exist between these islands, but they have not been examined.

Tanabuli Bay (Tatamba Bay) (8°24'S., 159°49'E.) is entered between Martin Point, steep and 150m high on Tanabuli Island, and **Draper Point** (8°24'S., 159°48'E.) on Santa Isabel, about 0.7 mile W. The inlet is extensive and irregular. Reefs fringe both sides of the entrance. The entrance on the approach appears to be closed in by the reef extending NW from Martin Point. The bay has 2 arms, one to the W, the other to the South. The inner reaches of the bay should be navigated cautiously as there are several dangers present. The shores of Tanabuli Bay are fringed with reefs.

Anchorage.—Good anchorage for small vessels can be obtained,. in 30m, mud, in the middle of a cove formed by an indentation in the reefs close W of Draper Point. The anchorage, formed by the reef, is slightly wider than 0.2 mile.

Between Draper Point and **Floakoro Point** (Fulakora Point) (8°21'S., 159°51'E.), about 4 miles NE, the coast is fringed by a reef to a distance of about 0.3 mile in places. Floakoro Point, which is sandy, is marked by a beacon. A spit, with depths of 7 to 12m, extends from the point for about 2 miles to the E.

The coast NW of Floakoro Point is elevated and fringed by a narrow reef.

Fapuhli Island (Fapuli Islet) (8°16'S., 159°46'E.), conspicuous, wooded, and about 30m high, lies close offshore. Haevo, a peculiar stone on the coastal reef, lies about 1 mile NW of Fapuhli Island. It is reported that less water than charted exists along the coast. Several coral banks of various depths lie N of Floakoro Point and extend from 6 to 14 miles off the coast between that point and Maringe Lagoon. A careful lookout and extreme caution must be exercised when navigating in this locality.

8.6 Maringe Lagoon (8°07'S., 159°33'E.), formed between the mainland and a chain of islets surrounded by reefs, is entered between Fera Island and Sulei Island, the two NW islands. The entrance narrows to about 0.8 mile between the reef extending beyond Fera Island to the SE and Tafa Reef (Mid Reef), which is detached from Sulei Island to the NW. The NW end of Fera Island is marked by a rather prominent shed. Except for the dangers off Fera Island, the fairway is clear and deep.

The approach through the entrance is with the cleft in the mountains 4 miles WNW of Mount Marescot bearing 224°; it has been reported (1992) that this cleft was not seen, but on the same bearing lies a bald patch on a hill behind Vale Point, which is useful for identifying the entrance. At HW, a N set of 0.5 to 0.75 knot was experienced at the entrance; on the ebb tide, a weak N set is experienced. Danger Shoal, very shallow on the SW side, inside the entrance, is marked by a beacon. It is generally difficult to identify.

Buala Light (8°08'S., 157°37'E.) is shown from the SE end of Vaghena Islet in the SE entrance to Maringe Lagoon. The SE entrance leads between Sogna Reef and the main island along the SW side of Sogna Reef, which dries in patches. The passage narrows and turns between Buala Light and Juakau Islet, and leads into the lagoon, however, local knowledge is necessary.

Buala is situated 1.5 miles W of the light. Buala, the administrative center of Santa Isabel, lies on the SE shore of the lagoon, and the settlement of Ghojoruru, a coconut and rubber plantation, is situated about 6.5 miles NW of it.

Anchorage.—Anchorage is available, in 27 to 36m, S and SE of Danger Shoal. There is another anchorage, in 31m, off **Ghojoruru Point** (Gojoruru Point) (8°05'S., 159°31'E.) (World Port Index No. 57080), but local knowledge is essential, as there is a marked channel leading to this anchorage.

8.7 Edwards Bank (7°44'S., 159°43'E.), with a depth of 5.5m, is marked by breakers 24 miles NNE of the entrance to Maringe Lagoon.

The coast abreast Sulei Island to **Solanadiro Point** (Solanandiro Point) (7°59'S., 159°21'E.) presents a fairly unbroken line. Characteristic of this coastline are the reefs with islands on them. Between Solanadiro Point and the entrance of Estrella Bay, there are several indentations in the coast and a number of off-lying dangers. There are passages between these dangers and also between these dangers and the coast off Santa Isabel, but they have not been completely surveyed. Caution is advised when navigating inside these reefs.

Estrella Bay (Ghehe Bay) (7°55'S., 159°11'E.) is located on

the E side of a remarkable promontory. Kesuo Cove, the narrow inlet off the bay, is about 0.4 mile wide at the entrance between fringing reefs that also ring the shore.

Anchorage.—There is good anchorage anywhere in Kesuo Cove. A vessel anchored off White Rock, which lies on the coastal reef close within the S entrance of the cove, in 29m, mud.

8.8 The coast between **Ghasetataauro Rock** (Gasetataturo) (7°55'S., 159°12'E.) NW to Cape Megapode has not been examined. It breaks for several bays and is fronted by many dangerous reefs and shoals. Vessels passing along this coast are recommended to keep at least 8 miles offshore.

Cape Megapode (7°48'S., 158°59'E.) is a low, rounded, heavily-wooded point. With its fringing reef, it meets the sunken barrier. About 5 miles WSW of Cape Megapode is Mount Gatere, a conspicuous double peak, 540m high. From the cape NW, a submerged barrier reef extends to the **Ghizunabeana Islands** (Gijunabeana) (7°33'S., 158°42'E.), enclosing a lagoon, about 3 miles wide. The seas break at intervals over the reef when the swell is heavy. The reef apparently has no passage.

The Ghizunabeana Islands are a group of islands lying on a reef. Rekata Bay, extending between these islands and the main island, contains several islets and dangers. It is reported that Rekata Bay is best approached from the NW, but the Penrose Patches, lying 2 miles ENE of Cape Pachena, and which component parts of a reef extending N and S, are difficult to distinguish.

Anchorage.—Anchorage has been taken, in 26m, mud, about 0.6 mile NW of Taimihaza Island (Taimihaja). There was anchorage, in 37m, E of Memehana Island.

8.9 The coast WNW from Cape Paehena to **Litundo Point** (Wreck Point) (7°31'S., 158°26'E.) is indented by several bays, densely wooded, and protected by a barrier reef, cut by several passages. The lagoon inside the barrier reef has not been surveyed.

Austria Sound (N Entrance) (7°28'S., 158°25'E.), leading into Kia Bay, is 0.75 mile wide between the reefs extending from the Kakatina Islands and Rapita Island on the E and W sides. It is deep in the fairway through to Kia Bay.

Kia Bay (7°30'S., 158°25'E.), at the N end of the channel between Santa Isabel Island and Barola Island, is part of a lagoon contained between the barrier reef. Its outer part is deep and affords no anchorage.

Caution.—Durour Ridge, with depths of less than 457m, lies almost 20 miles N of Cape Paehena. The ridge has been surveyed and was found to have three separate shoal patches, with depths from W to E of 7m, 11.9m, and 10m, respectively. It was reported (2002) that dangerous underwater rocks of uncertain depths lie 13 miles W of Durour Ridge in position 7°10.8'S, 158°22.2'E. Fish rafts, fitted with radar reflectors, are situated about 20 miles NE of the ridge. Apart from these dangers, the coast appears to be free of dangers in the approach.

8.10 Barola Island, which appears as a continuation of the NW extremity of Santa Isabel, has a range of hills running its entire length. The N side is protected by a barrier reef which lies 1 to 2 miles offshore, enclosing a partially examined lagoon.

The coast between Port Praslin and Cape Comfort (Lave Point), the NW point of Bates Island, is low and wooded, and presents a broken appearance from seaward.

The barrier reef continues WNW from Cape Comfort to a point about 10 miles NE of Kumboro Peak, at the NE end of Choiseul Island. That part of the reef extending 11 miles from Cape Comfort has not been surveyed, but the remainder, forming a barrier to the entrance to Manning Strait, has been surveyed.

Manning Strait is the passage separating the islands off the NW end of Santa Isabel from those off the SE end of Choiseul Island and has not been completely surveyed. The strait is divided by the two island groups forming the **Aravon Islands** (7°27'S., 158°00'E.). Both groups, Kerehikapa Island to the W and Sikopo Island to the E, are featureless and uninhabited. Reefs extend from the E sides of each island affording sheltered and good anchorage for vessels with knowledge of this area. In Sikopo Harbor, on the E side of Sikopo Island, anchorage may be obtained, in a depth of 25m, in all seasons.

Tides—Currents.—The pattern of tidal currents in Manning Strait is rather complex, since the tides on the N coasts of Choiseul Island and Santa Isabel are mostly semi-diurnal, with a range up to 1.5m, while on the S coasts of those islands they are mainly diurnal, with a range of less than 1m; therefore, there is great difference even from the pattern at the N and S ends of the Arnavon Islands. Nevertheless, the tidal current in the main channel through the strait sets along it at a rate of less than 2 knots. Rates up to 3.5 knots have been observed over the shoal areas and in the restricted channels.

The current in Northern Passage sets through it at a rate up to 2.25 knots, while outside the passage it sets parallel to the barrier reef.

The current attains a rate of 2 to 4 knots in Kologilo Passage. Slack water occurs in the passage at about half tide along the shore.

The current has a rate up to 2.5 knots in the three S passages. Tide rips and eddies may be experienced S of the submarine barrier reef, and a heavy swell occurs at times in Pasco Passage and over the reef close W of it.

Depths—Limitations.—As defined by the 20m curve, the barrier reef in the N entrance to Manning Strait is continuous from Suki Island to North Passage. West of North Passage, the reef becomes more broken, with deep water between the shoal areas. Within the 20m curve, the reef has isolated depths of 7 to 14m. **Fahlander Shoal** (7°11'S., 157°35'E.), about 6 miles NE of Cape Kumboro, has a least depth of 7m and breaks in heavy weather. The E edge of Fahlander Shoal has a depth of 8.2m, with lesser depths extending to the West. Depths of 5.5 to 9.1m lie about 2.3 miles S and 2.8 miles SE of the 8.2m depth. **Wooding Patches** (7°15'S., 157°43'E.) has depths of 15.6 to 22m. A 13.6m shoal, with an unexamined shoal patch close W of it, lies 1.5 miles WNW of Wooding Patches. Several shoals lie S of Wooding Patches; Asbey Reef, with a depth of 10.8m, lies 5 miles ESE of Wooding Patches, while Audrey Reef, with a charted depth of 6m, is located 6 miles further SE.

Laiena Rock, 5m high, is located about 0.8 mile NNW of Silkopo Island, and is surrounded by an extensive reef. **Haberlin Reef** (7°24'S., 158°02'E.), located about 5.5 miles E

of Laiena Rock, has a least depth of 7.2m, and is the main danger on the E side of the strait.

The barrier reef at the S entrance to Manning Strait runs from Hilohavo Islet to Raverave Islet, with isolated depths of 3.4 to 9.1m, and deep water passes between the shoal areas.

Directions.—Two defined, deep entrances exist through the N barrier reef. **Northern Passage** (7°14'S., 157°50'E.) is about 1 mile wide and has a least depth of 34m. Haycock Island, bearing 174.5°, leads through the reef. There are several openings in the reef W of Northern Passage, with depths of over 21.5m. The deepest entrance, which is the second entrance referred to above, lies between Fahlander Shoal and the barrier reef 4 miles E of the shoal. The channel cannot be recommended as the track has not been fully surveyed, and requires local knowledge.

Three main passages lead through the reef in the S approach to the strait. **Pascoe Passage** (7°39'S., 158°17'E.) is about 2 miles wide, with a least charted depth of 33m. **Mount Sears** (7°28'S., 158°16'E.), a 278m high peak located on the W end of Barona Fa Island, steered for on a bearing of 357°, leads from seaward through the passage.

Middle Passage, about 0.5 mile wide, lies about 5.5 miles W of Pascoe Passage, and has a least charted depth of 68m. A patch, with a depth of 20m, lies near the center of the channel. Mount Sears, bearing 029°, leads through the pass.

West Passage is the shallowest of the three S entrances to the strait, showing a least charted depth of 23m. A shoal patch, with a depth of 11m and depths of 19 to 20m, lie on the E and W sides of the channel.

If the vessel has a sufficient height of eye to sight it, **Suki Island** (7°19'S., 158°05'E.), bearing 001°, leads through the passage. An alternate mark for entering the passage is to steer with the W edge of the S Aravon Islands bearing ahead 355.5°. Caution is advised when using this alternate mark, as the track passes close E of a 19m patch 0.75 miles S of the Aravon Island mentioned above.

Once clear of the barrier reef, vessels may safely navigate the E portion of the Manning Strait following the recommended track. There are no obvious steering marks, but the dangers are easily seen under most weather conditions. The SE end of the track lies bearing 357.5°, 8.5 miles from Mount Sears, while the NW end lies bearing 277°, 14.5 miles from Suki Island. A course of 307° defines the track between them.

The channel on the W side of the strait requires local knowledge.

The NW end of Santa Isabel is prolonged by smaller islands and islets that Manning Strait separates from the islands off the SE end of Choiseul Island. Two prominent islands, Nohabuna Island and Malaghara Island, located 2.5 miles SSW of **Suki Island** (7°19'S., 158°05'E.), form this NW extremity of the archipelago. Molakobi Island, 108m high, is the largest of nine islands of this group lying W of Kologilo Passage. The only breaks in the chain of islands and reefs of the archipelago are the narrow torturous passes. Gaghe Island, which is the highest, is dominated on its SW side by Mount Beaumont, the summit of which is rounded and rises to 290m.

Dart Sound indents to the E, between Barora Ite Island and the Barola Islands, and connects with the central part of Austria Sound. Dart Sound holds several islets, and a few shoals. Beacons mark the reef which fringes the islets on the SW side of the channel connecting Dart Sound and Austria Sound.

Rob Roy Channel, which exits on the W side of Austria Sound near its S entrance, is apparently deep but should be navigated with caution. Coral shoals and islets are found in its SE part.

8.11 **Austria Sound** (South Entrance) (7°42'S., 158°29'E.) opens between the W islet in the Barrier Islands and Retujivala Island. The bay is spacious, containing several islands separated from the main island by a narrow continuous channel of varying depths, known as South Channel and Northwest Channel. The entire area S of this bay is encumbered by coral shoals, and the passage between Barora Ite Island and Santa Isabel is accessible only to boats. Tidal currents here can be 5 to 7 knots. The best anchorage is situated in the S part of Austria Sound on the N side of the Barrier Islets, in a depth of 35m, 0.1 mile from **Chislett Island** (7°43'S., 158°30'E.), with the island bearing 090°.

The coast between the S entrance of Austria Sound to Port Korigole SE is bordered by numerous islets on reefs. The passage between the islets and the coast are narrow and shallow.

Port Allardyce (7°41'S., 158°39'E.) is formed and protected on the SE by a 30m high peninsula, and on the W by islets on a large reef. Its entrance, at least 300m wide between reefs, is deep and safe. Beacons standing on the main island, in line bearing 030.5°, lead through the harbor entrance. It is reported to be the only large vessel anchorage known and would be obtained in the middle of the harbor, in 44 to 49m. A small vessel will find excellent anchorage, in 15m, at the entrance of the cove on the SE side of the harbor.

Korigole Harbor (8°03'S., 158°58'E.) lies in the SE part of the bay entered between Rob Roy Point, the W extremity of Finuana and Hujuai Point. Sharp Peak, a prominent hill, 485m high, located 8 miles E of Hujuai Point, is a good landmark when approaching Korighole Harbor. There is anchorage, in 13m, mud, with Rob Roy Point bearing 240°, distant 0.6 mile.

8.12 The coast to **Furona Island** (8°08'S., 159°05'E.) is low and fringed by reefs that project for more than 1 mile seaward. Santa Isabel is then fronted by a barrier reef to San Jorge Island. The outer edge lies from about 1.5 to 4 miles offshore. The reef is sheer toward the open sea and is in large part submerged, and extreme caution must be exercised when approaching the coast. The channel between the barrier reef and the coast is accessible via several passes, but it has not been surveyed completely. Particularly dangerous is that portion of the barrier reef W of San Jorge Island which is much broken and submerged.

San Jorge Island (8°26'S., 159°36'E.) is separated from the main island on the E by Thousand Ships Bay and on the N by the narrow Ortega Channel, which is only practical for boats. There are two flat-topped summits on the island.

Thousand Ships Bay (8°27'S., 159°41'E.) is formed between the E side of San Jorge Island and the main island. Depths range from 27 to 55m in this bay, which is encumbered with islands and reefs.

The shores of the bay are fringed by a reef and bordered by mangroves. The bay opens between Lilihignia Island, near the coast, about 3 miles NW of Sogha Point. **Utuha Island** (8°30'S., 159°43'E.) is on the N side of a reef in the middle of

the entrance. Dampier Shoal lies 1.25 miles W of Utuha Island. Round Island, 1.5 miles NW of Lilihignia Island, is on the N end of a reef. There are other dangers N and NE of the islet. Vulavu Anchorage lies in the SE part of a bay, about 6 miles NW of Vitora Island. For the most part the anchorage is clear of dangers. Depths in the bay within the 30m curve are moderate. Vulavu village lies on the E shore of the bay and near the anchorage where small vessels may obtain anchorage during the Southeast Trades, in 11.9m, sand.

8.13 Cape Labee (7°29'S., 157°53'E.) is the SE extremity of a circular chain of palm-covered islets that enclose a lagoon. Haycock Island, on the W side of the lagoon, appears above the lagoon long before the other islets and becomes a useful landmark. It marks the W side of Manning Strait. The group of islands W of Cape Labee extend for about 25 miles to the shallow passage separating Rob Roy from Choiseul Island. The islands are generally low and are densely forested except for a few clearings on **Vaghena Island** (Wagina Island) (7°26'S., 157°46'E.). Vaghena Island and Rob Roy Island, between Haycock Island and Choiseul Island, are about 60m high and have numerous islets and reefs nearby. To the S, a string of shoals connects Ravirevi Island and Rengge Island (Rengi Island), 14.5 miles W. This area has not been completely surveyed and unknown dangers exist inside the 200m curve. Shoals extend for about 10 miles to seaward N of Vaghena Island.

Hamilton Channel, W of Vaghena Island, is the principal channel through this group of islands. The N end of the channel is encumbered by shoals which follow no pattern, and the S end is obstructed by a rock with a depth of 16.8m. The channel between Rob Roy Island and **Susuku Island** (7°26'S., 157°38'E.) is narrow but deep. The passage between Rob Roy Island and Choiseul Island is obstructed by rocks. Tidal currents will attain a velocity of 5 to 8 knots in these passages.

Choiseul Island

8.14 Choiseul Island (7°00'S., 157°00'E.) is an island, separated from Santa Isabel by Manning Strait and from the New Georgia Islands by the continuation of New Georgia Strait. It is 83 miles long and 20 miles wide. Mountainous and covered with forests, Choiseul Island culminates at over 960m at Mount Gourdin (Mount Maitabe), in the center of the island.

Only the SW coast has been surveyed and great caution is necessary when approaching the NE coast and the S coast as far W as **Sumbi Point** (7°18'S., 157°01'E.). It has been established that the barrier reef on the NE coast rises to over 183m and extends 5 to 7 miles offshore.

Cape Kumboro (7°18'S., 157°31'E.), the E end of the island, is dominated by Kumboro Peak, 625m high, standing about 2 miles S of the cape. Laiana Island lies about 4.5 miles ESE of it. Several islands extending SW from Laiana Island to the coast form the E side of Taura Bay. Reefs, forming the outer barrier, lie up to 5.5 miles NE and 12 miles E of the Cape. The seas break heavily on these reefs.

Cape Alexander (6°35'S., 156°30'E.), near the N end of Choiseul Island, is low and rolling. The coast is fronted by a fringing reef varying in width from about 0.3 mile off Cape Alexander to 0.75 mile off West Cape, about 7 miles SW.

Choiseul Bay (6°42'S., 156°25'E.) indents the W side of the island and is protected on the W by a barrier reef broken by three entrances. **Emerald Entrance** (6°42'S., 156°34'E.), the best of the three, leads between the reef bordering Siposai Island to the S and a detached part of the barrier reef and the reef bordering Parama Island to the N. It is marked by beacons. Small vessels should favor the N side of the channel to avoid shoal patches located beyond the edge of the reef.

Anchorage is available here and requires local knowledge.

Immediately S of the entrance of Choiseul Bay, the tidal currents set SE to NW at a velocity of 2 to 3 knots at springs.

The coast SE to Mole Island (Moli Island) is slightly indented and the hills inland, steep and densely wooded, rise to 427m.

Heming Bank (6°46'S., 156°24'E.) is an extensive area consisting of coral and sand with a least depth of 6.7m. The N entrance of Oldham Deep, W of the SW corner of Heming Bank, is the beginning of a passage over 200m trending S from its entrance, then slightly East. Several shoal patches, with a depth of less than 30m, lie close to both sides of Oldham Deep.

Off the coast, Ghuruvasu Point is distinguished by its distinctive patches of white cliff. Mole Island, a low island covered with palms, lies close offshore and is not readily discernible from seaward except from the S at a distance of about 7 miles.

Webb Reefs, located about 10 miles S of Mole Island, has depths of 11.4 to 13m. Adjacent to the barrier reef between Cook Reefs and Webb Reefs are several patches with depths of 21 to 50m. Numerous patches appear NW of Webb Reef as far as the S entrance of Bougainville Strait and are not easily distinguished. Cook Reefs extend NW and SW, 5.25 miles SSW of **Sasa Point** (6°57'S., 156°41'E.).

8.15 The **Zinoa Islands** (6°53'S., 156°37'E.) are easily identified because the trees on the two southernmost of the Zinoa Islands form to give the effect of a remarkable "top hat," about 70m high.

Anchorage.—Sheltered anchorage can be obtained about 137m offshore anywhere from off the Zinoa Islands SE to **Sasamungga Point** (7°02'S., 156°46'E.), in depths of 20 to 40m.

The 200m curve, which lies about 5.5 miles offshore abreast Sasamungga, trends about 19 miles WNW, then W and S across the S approach to Bougainville Strait. When abreast the Zinoa Islands, it is 10 miles offshore. The dangers inside the 200m curve have not been investigated.

The coastal range SE to the **Kolombangara River** (6°58'S., 156°43'E.) rises to a height of 548m and then it is broken by a valley where the river discharges. The tide rips usually occurring close seaward of its mouth are as radar conspicuous as its two entrance points. Small bays with intervening low headlands is characteristic of the coast from Sasamungga to **Vaghoe Point** (Vughoe Point) (7°16'S., 156°52'E.). There are a number of villages in the vicinity of Vaghoe Point. A conspicuous church, with an iron roof and bell tower, is the most prominent building on the S coast of Choiseul Island, particularly when reflecting off the afternoon sun, in the village of **Mboe** (Poe) (7°05'S., 156°48'E.). Both Sumbi Point and Sambe Point are distinguishable from seaward by their whitish cliffs about 20m high. **Manggo Bay** (7°19'S., 157°04'E.) lies between these points, but has not been fully

surveyed, although a vessel's survey found a number of dangers in its SW part.

The land rises steeply to a series of irregular ranges of considerable height which are heavily wooded and very difficult to distinguish as the coast trends S to Sambe Point. The mariner should be able to identify the summits of Mount Sambe, Mount Keleve, and Mount Tomba and Mount Lou Cone, 3 miles NNW of Mount Sambe. These summits are frequently covered by clouds.

Caution. —Many reefs and islets front the coast from Sambi Head to Muzo Island and extend up to 2.5 miles offshore. Vessels should keep at least 3 miles off Sumbi Point, 9 miles off Saasa Point, and 5 miles offshore between Muzo Island and Sambe Point. Extreme caution must be exercised if the 183m curve is crossed, as the area within it has not been surveyed and reefs are usually found within this curve. These conditions prevail in the stretch of coastline between Muzo Island and Cape Labee. Reefs and shoals here reach seaward for a distance up to 4.5 miles, the positions of which can best be seen on the chart.

A vessel approaching the Choiseul Group from the SE will first sight Kumboro Peak and soon thereafter identify some of the peaks on the range running W along this part of the coast, followed by Haycock Island, Raverave, Ghiri along with Sunda and Undalou, about 1.5 miles NE of Ghiri. The islands of Rengge and Muzo, about 9 and 16 miles WNW, respectively, of Ghiri will also be able to be identified. The identity of the islands mentioned can best be made at long range as they come up against the partially dipped background of Vaghena Island and Rob Roy Island.

The New Georgia Islands

8.16 The New Georgia Islands are separated from Choiseu Islandl and Santa Isabel, about 30 and 50 miles NE, respectively, by New Georgia Sound. The largest islands are volcanic in origin and the mountains are in quite symmetrical cones. They rise from 900 to more than 1,200m, and their summits are often lost in the clouds. Submarine volcanic manifestations have been reported in the S approaches to the group. The survey of these islands is very incomplete, generally dating from the end of the 19th century.

New Georgia (New Georgia Island) (8°20'S., 157°30'E.) is the largest of this group. The description of the group will be counterclockwise from the SE portion. The S coast of New Georgia will be described with Blanche Channel in paragraph 8.32.

Nggatokae (Gatukai) (8°47'S., 158°11'E.) is bold and steep except on the N. The summit of Nggatokae is a volcanic cone, flattened at the top, rising 887m into the clouds. Cape Pitt, forming the SE part of Nggatokae, is a bold, dark cliff. A bay NW of Peava Village is clear of dangers, but there is no anchorage for a vessel.

Kicha Island, a small wooded island with no fringing reef, lies 5 miles ENE of Cape Pitt.

Mbulo Island, separated from Kicha Island to the SE by a deep channel, is a densely-wooded island that is steep-to, except at one place on its E side. It is of coral formation.

Malemale Island (Male Male Island) is small and low. A steep-to reef, which breaks if there is a swell, extends 0.2 mile from the island.

Brougham Shoal (9°02'S., 158°18'E.) is an unexamined offlying danger about 15 miles S of Mbulo Island, reported to have a least depth of 7.3m. It may break in heavy weather.

Shoal water exists in an area of about 4 miles, 15.5 miles SW of the S point of Nggatokae. The area has been frequented by numerous underwater volcanic activity.

8.17 **Vangunu Island** (8°40'S., 158°00'E.) is SE of the principal islands of the New Georgia Islands. It is located about 60 miles WNW of the Russel Islands. It is separated from New Georgia by the narrow and tortuous Njai Pass. Reefs and islands surround Vangunu Island on all sides, delimiting two big lagoons, Kolo Lagoon and Marovo Lagoon on the E and W. Marovo Island has been surveyed and can be approached by breaks in the barrier reef.

The extinct volcano that constitutes the major part of the island culminates in **Mount Vangunu** (8°41'S., 158°00'E.). The crown of the crater, which is open to the SE, has 700 to 1,100m high summits that are usually hidden in clouds. The Mbareke Peninsula, on the NE side of the island, while not as high as Mount Vangunu, has several remarkable summits.

The series of long but narrow coral islands extending N from Nggatokae Island and running parallel with the NE shores of Vangunu Island and New Georgia are evidently an upheaved ancient barrier reef; they are all densely wooded and are referred to as Tomba by the natives. With the exception of **Minfanga Island** (Mboli Island) (8°41'S., 158°13'E.), none of the barrier islands are inhabited. The channel between the two barrier walls is deep, ranging between 73 to 219m. From a point near **Luma-liha Island** (8°27'S., 158°04'E.), the barrier reef and islands continue in a W direction, gradually decreasing the distance offshore, with numerous breaks in their continuity. There are numerous clear and deep passages through the steep-to fringing reefs as shown on the chart.

New Georgia

8.18 New Georgia is predominately mountainous. At its NW end is a range of mountains with peaks rising to 914m or more. Mount Vina Roni, shaped somewhat like a reclining lion, stands 13 miles S of the N part of the island.

The NE coast of New Georgia continues with a chain of islands that is an extension of those that shelter Marovo Lagoon. These islands are heavily wooded and are separated from each other by passages for small vessels. They have few landmarks.

Hohopa Point (8°15'S., 157°49'E.), at the bend made by Mondo Mondo Island, is a projection of the coastal reef. Ramata Island, about 10 miles NW of the point, is marked by a village near its NW end and by a house with a nearby old fort built on the summit of a 14m escarpment.

8.19 **Lever Harbor** (8°01'S., 157°35'E.) (World Port Index No. 56965) is a small, but deep, inlet located about 7.5 miles SE of Visuvisu Point. The harbor, which is entered to the W of a 12m high, rocky point, offers shelter from all but N winds to vessels loading timber. A white beacon stands on the seaward side of the point. The shores of the inlet are low and fringed by mangroves and coral reefs.

Depths—Limitations.—The fairway has a least width of

about 90m near the entrance, but widens further in. Three sets of range beacons lead through the harbor. The first stand in line bearing 214°, and leads from seaward. The second pair stand on the coastal reef N of the harbor entrance; in line astern bearing 348° the beacons lead past a small oil wharf on the W shore, and a small timber jetty connected to a stone causeway on the E shore. A third set of beacons at the head of the harbor, in line bearing 227°, lead to three timber berths on the SE shore. Vessels using the timber berths Med-moor to bollards on shore, anchoring on a soft mud and fine sand bottom, good holding ground.

Caution.—Caution is advised, as this harbor requires local knowledge.

The coast and the barrier reef NW of **Kolombagia Island** (8°01'S., 157°35'E.) to Visuvisu Point the N end of New Georgia has not been surveyed. There is a light shown from the reef fringing the point.

Kula Gulf

8.20 Kula Gulf lies between the NW coast of New Georgia and the E side of Kolombangara Island. Depths are great. The W and apparently the E side of the gulf are steep-to. Blackett Strait opens in its SW corner between Arundel Island and Kolombangara Island. At the head of the gulf, Hathorn Sound and Diamond Narrows separate Arundel Island from New Georgia. The coast between Visuvisu Point, the N extremity of New Georgia, and Rice Anchorage has not been surveyed.

Rice Anchorage (8°08'S., 157°19'E.), close S of Ndukonduko Point, is about 0.3 mile wide between a drying reef to the S of the N point and the one that fringes the S point. A bank, sand and mud, projects the E shore of the anchorage about 0.2 mile offshore where a river empties. Small vessels can anchor, in 36m, mud, sheltered from NE and NW winds.

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Enoghae Inlet

Enoghae Inlet (8°10'S., 157°18'E.), opens 3 miles SSW of Ndukonduko Point. This sound is tortuous and has a deep entrance about 200m wide between lateral dangers, but narrows to less than 90m off Transit Point. Vessels will anchor, in 22m, mud about 0.5 mile SSE of Transit point.

Kolombangara Island, the E side of which forms the W shore of Kula Gulf is free from off-lying dangers, and steep-to outside the coastal reef, which extends only a short distance. This coastal reef is always visible except off the NE where Vao Rock (Waugh Rock) and other shoals lie about 0.3 mile offshore.

Vao Rock (Waugh Rock) (7°55'S., 157°11'E.), on which the sea breaks occasionally, is an easily identified and enduring landmark used by vessels navigating Kula Gulf. It is reported to be an indispensable navigational aid at night.

8.21 **Kolombangara Island** (7°59'S., 157°04'E.) is an extinct volcano of imposing proportions, rising directly from the sea to a series of remarkable peaks over 1,600m, and forming the top of the crater. There are craters on the E and W sides of this crater.

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Kolombangara Island from Blackett Strait W of Ringi Cove

Port Bambari (Jack) (8°04'S., 157°12'E.), a good anchorage, is entered through a deep, but very narrow channel 1.5 miles S of Surumuni Cove. The entrance is not easily seen until the square summit of Kolombangara Island's crater bears 270°. It is then advisable to hug the N point, which is shear, on entering, then head for mid-channel and anchor, in 25m, 0.5 mile inside the channel.

Hathorn Sound (North Entrance) (8°11'S., 157°12'E.), the shores of which indents toward the S between New Georgia and Arundel Island, is almost fringed by reefs, but has been found to be clear of dangers outside of the reef and have depths in excess of 30m. A light marks the E side of Hathorn Sound at Tunguirili Point.

8.22 **Port Noro** (8°13'S., 157°11'E.) (World Port Index No. 56975), situated on the E shore of Hathorn Sound was developed (1980) as a deep-water facility for vessels loading copra and frozen fish.

Solomon Taiyo Wharf, 60m in length, is situated adjacent a fish freezing plant at the N end of the sound. Reportedly the wharf has alongside depths of 9m and will accommodate vessels up to 4,000 grt. Noro Overseas Wharf, about 0.8 mile S of the fish pier, has a length of 62m, and a 14m depth alongside.

Pilotage.—Pilotage is available on request. The local authorities may be contacted through the Solomon Islands Ports Authority in Gizo.

Anchorage.—Anchorage is available near the head of the sound, with a low flat island off the E shore, located about 2 miles S of the wharf bearing 098°, 0.2 mile distant, in a depth of 31m, or, in a depth of 33m, a little further N.

Vessels are urged to contact the local authorities for the latest information on this port before planning a voyage here.

Diamond Narrows, a continuation of Hathorn Sound in a S direction, is only about 90m wide, with a least depth of 9m. The channel is not recommended for deep-draft vessels because of the numerous islands, shoals, and sunken rocks in the S approach.

Tides—Currents.—Tidal currents run with considerable strength through Diamond Narrows, but a vessel anchored in Hathorn Sound would not feel its influence. In the narrows they are reported to attain a velocity of 5 knots at strength. The rising tide in Diamond Narrows is N, while the falling tide is S.

Vella Gulf

8.23 Vella Gulf is delimited on the E by Kolombangara Island, on the S by Gizo Island, and on the W by Vella Lavella. The gulf is wide open to the N. Its S accesses are Ferguson Channel and Gizo Strait. At the head of the gulf is Blackett Strait.

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http://www.domeisland.com/destroyers
Vella Gulf—Gizo Strait from N

Lotu Harbor (Sandfly Harbor) (7°59'S., 156°57'E.) and **Meresu Cove** (8°02'S., 156°58'E.) are anchorages acceptable for small craft with local knowledge. Meresu Cove, 90m wide, has depths of 18.3m in the entrance and 14.6 to 18.3m within.

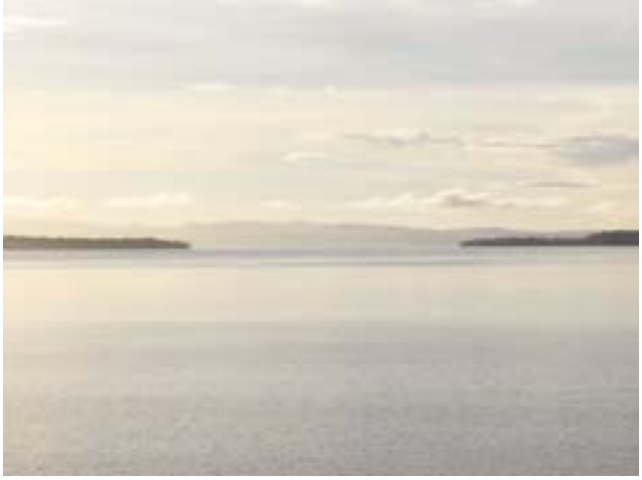
Vovohe Cove (8°07'S., 157°06'E.) is a safe anchorage for small vessels, in 29.3 to 31m. The entrance and most of the cove has been dragged to a depth of 10.7m.

8.24 **Ringgi Cove** (8°07'S., 157°07'E.) (World Port Index No. 57005) is located close E of Vovohe Cove. Both of the cove's headlands are steep-to, particularly the E side of the passage. Passage to the inner cove is restricted to small local vessels. The E side of the cove is formed by a promontory. It has been reported that this port is no longer used for timber exports.

Depths—Limitations.—Close within the E entrance points stand some conspicuous tanks, and a wharf 27m long. Some cranes are situated 0.25 mile SSE of the wharf. The wharf has been reported to have depths of 24m alongside, and has also been reported to handle vessels with a maximum length of 60m, and a maximum draft of 8m. Larger vessels are reported to Med-moor to a bollard.

Anchorage.—Anchorage has been taken by vessels up to 10,000 grt in the outer part of the cove.

8.25 Blackett Strait is the deep channel which separates Kolombangara Island from Gizo Island, Vonavona (Wanawana), and Arundel Island. The S side of its E part is bordered by the barrier reef, which extends to the N of Vonavona and Arundel Island. It is sheer, and this side must be favored when transiting the E part of the strait. The channel is about 3 miles wide abreast Makuti Island, E of which it widens for a short distance, but gradually narrows and is but 0.5 mile wide at its E end where it enters Kula Gulf.



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East entrance to Blackett Strait from W

The tidal currents run at a velocity of 2 knots through the narrowest part of the strait, setting E and W, with eddies and tide rips in places.

Vella Lavella, fringed by islands and reefs, is indented by numerous small bays. An off-lying barrier reef, of which approaching soundings give virtually no indication, forms an arc over 11 miles off the NE quadrant of the coast. Vessels running the coast in this area should not approach within 6 miles. The

coast continuing to the S extremity of Vella Lavella is fringed by reefs and there is no suitable anchorage for large vessels.

Of importance on this side of the coast are the mission stations of **Mibilua** (Biboa) (7°55'S., 156°41'E.) and **Ndovele Cove** (Doveli Cove) (7°35'S., 156°38'E.). Ndovele Cove and Paraso Bay afford limited anchorage, but have very deep water.

The W coast of this island is reported to be free from off-lying dangers beyond 1 mile between **Sorezaru Point** (7°33'S., 156°37'E.) and **Sauka Point** (Sokovovi Point) (7°37'S., 156°29'E.). Conspicuous rocks lie on the coastal reef, indented by several small bays on this part of the coast.

Anchorage.—Anchorage may be taken about 1 mile S of **Mundi Mundi** (7°39'S., 156°30'E.), in 29m. Caution is advised because several foul patches exist near this anchorage.

8.26 The coast between Sauka Point and **Cape Middleton** (7°42'S., 156°31'E.) is fronted by reefs and foul ground extending 1 mile offshore. These reefs extend about 2.5 miles SSE from Cape Middleton to Omaura Island. Sandfly Bay is encumbered with dangers and Mbava (Baga) is to a large extent surrounded by fringing reefs.

Anchorage.—Anchorage is good for large vessels, in 34.7m, about 0.4 mile N of Inia Island, which is close-in E of Mbava Island.

Beagle Channel, between Mbava and Turovilu Island, can only be transited in favorable light because of dangers that exist there. The tidal currents, which flow N and S, can attain speeds of 4 knots at spring tides.

8.27 **Nakaza Island** (7°53'S., 156°30'E.), separated from Mbava by clear deep water, is 12m high and lies on a detached reef, which extends about 2.5 miles W from the island. A light is shown from this island. The NW approach, between Mbava and Nakaza, is clear, but at times strong tide rips are encountered. It is therefore desirable to keep within 1 mile of Mbava when on a NW track.

Vella Lavella is an island covered with forests. It is mountainous with saw tooth ranges and steep summits, several of which are extinct volcanoes, some of which are visible from about 60 miles. Mount Semaj, 850m high, is a rounded peak in the center of the island. Mount Nasus, 820m high, is a rounded summit with twin peaks at the N end of the island. Mount Walker is hidden from view, as is Mount Brooks. There is an airport situated on Vella Lavella.

Wilson Strait separates Vella Lavella and Ganongga and joins Gizo Strait to the E. This strait is free from dangers, and the shore on either side may be approached to a distance of 0.5 mile.

Ranongga (Ganongga) (8°11'S., 156°35'E.), separated from Simbo Island by a clear and deep channel 4 miles wide, is steep-to with no off-lying dangers along its E and W coasts. The N extremity is fringed by reefs projecting 0.5 to 1.5 miles offshore. The area around Ghzi Island (Woi Island) is very dangerous. There are several missions on the island, mostly at the S end. With the exception of low land at the N and S extremities, the interior is hilly, attaining an elevation from 305 to 670m.

The swell, almost a permanent phenomenon off the coasts of Ranongga, makes open anchorages very precarious. Tidal currents during the Southeast Trades were found to be weak in the vicinity of the island. At various times, there was a slight set to the NW.

NASA Image

Vella Lavella and Kolombangara

Caution.—It was reported that Ranongga and its associated reefs lie 2 to 4 miles further W of their charted positions.

8.28 **Simbo Island** (8°18'S., 156°31'E.), lying about 18 miles SW of Gizo Island, is composed of two mountainous portions, joined by a narrow belt of lowlands. The S part is flanked on the E side by an elongated island and the very narrow channel that separates them is entered at the N end by boats only. Coral reefs on the N portion of the island front the E and W sides.

Off-lying dangers exist a little over 2 miles S of Cape Satisfaction, the S extremity of Simbo Island, with depths of 12.8 to 18.3m. Between this bank and Simbo Island, another bank exists, with depths of 9 to 23m. Two rocks and heavy breakers lie 0.5 mile E of Cape Satisfaction.

Port Simbo (8°17'S., 156°32'E.), on the W side of the island, formed by the indentation in the coast and protected on the N by a coastal reef, and on the W by a detached reef, makes Simbo a snug harbor. The approach channel leads in from the S between the detached reef and the coastal reef. Black Rock,

1.5m high, lies on the fringing reef on the E side of the S entrance.

Anchorage.—Anchorage can be obtained in the harbor midway between the entrance points, in 16 to 27m. Swinging room is very restricted, but shelter is provided from all winds. The entrance is marked by two beacons.

8.29 Ferguson Passage, leading into Blackett Strait from the S, separates the reefs off Gizo Island from those which extend from Vonavona Island. The passage, about 1.5 miles wide, is free of dangers and steep-to on both sides.

The passage may be recognized by the difference in height of the islands on either side; those on the Gizo Island side are planted with coconut palms, while those on Vonavona Island are thickly wooded and somewhat higher. **Makuti Island** (8°08'S., 156°58'E.), on the E side of the channel's opening into Blackett Strait, is on the NE end of a sheer detached reef.

Gizo Island (8°06'S., 156°50'E.) and a chain of smaller islands that work their way out SE of Gizo Island are surrounded by a barrier reef. North and E, the reef, plainly visible and marked with islands and coral rocks, dries in places. South and W, the reef is submerged and there are scattered shoals separated by deep water. The danger line marking the reef is the 183m curve.

Nusatupi Island, Bambanga Island, and Plum Pudding Island (Kasolo) (Kennedy Island) all lie SE of Gizo Island. The island lies approximately 1 mile NNE of Bambanga Island.

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Plum Pudding Island from SE

Gizo Island is mountainous and heavily wooded, except for **Titiana Point** (8°07'S., 156°49'E.), its S end and **Pailongge Point** (Pailongo Point) (8°06'S., 156°48'E.), about 2 miles WNW, where there are villages in the midst of coconut palms.

The channels in the E part of the barrier reef are tortuous and are practical only for small vessels with good local knowledge and with favorable light.

The only channel for ocean vessels is SW of Titiana Point, in the approach to Gizo Anchorage; it has a swept depth of 12.8m. The track passes about 0.1 mile W of Wright Shoal, and several other dangers best seen on the chart. Caution is advised on entering the harbor during the late morning hours, when the glare of the sun causes the range beacons and reef edges to become difficult to distinguish.

8.30 Gizo Harbor (8°06'S., 156°51'E.) (World Port Index No. 56970) is the administrative and headquarters for the Western District of the Solomon Islands. The harbor is the center for the export of copra, cocoa, fish, timber, and cattle. It is a port of entry.

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Gizo Harbor

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Gizo Harbor

Depths—Limitations.—The port has two main wharves, as well as numerous small wharves and jetties on the S side of the harbor. Government Wharf, 80m long, with a depth of 5m alongside, is situated 0.15 mile NW of a flagstaff near the E

end of town. A wooden wharf, 36m long with a depth of 5m alongside, is situated 0.5 mile NW of the flagstaff.

Pilotage.—Pilotage is available for the port; the local authorities should be consulted for details.

Anchorage.—Anchorage can be found in a small bay on the N side of the SE end of Gizo Island. Logha Island (Loga Island) protects it to the NE and the reef extending nearly 0.5 mile SE of the island. Anchorage can also be taken, in 23.8m, sand and shell, with Nusambaruku front leading beacon bearing 301°, 0.35 mile from the island. A foul patch was reported midway between this anchorage and Nusambaruku Point.

South of the S entrance to the harbor, anchorage can be found, in a depth of 39m, with coarse sand and good holding, with Epangge Island front leading light bearing 059°, distant 1 mile. The anchorage is exposed to S winds and swells.

Vonavona Island (Papara Island)

8.31 Vonavona Island (Papara Island) (8°12'S., 157°02'E.), separated from Kohinggo Island (Arundel Island) by a lagoon of the same name, appears to be of coral formation, generally flat, and about 61m high. The island is densely wooded to the water's edge. The SW side of Vonavona has a broad bay. Nearly the entire W coast is fringed by a narrow reef. A barrier reef with islands and rocks extends for about 4 miles to the NW of **Pature Point** (8°11'S., 157°01'E.). This reef forms the E side of Ferguson Passage; about 0.5 mile within its extremity lies the Pailerongoso Islands.

A passage, marked by beacons, leads through the lagoon and is suitable for small craft with drafts not exceeding 3m; it is tortuous and requires considerable local knowledge.

From the Pailerongoso Islands, the barrier reef extends E to the N extremity of Kohinggo Island, following the S side of Blackett Strait. There are many islands on the reef, which is steep-to throughout its entire length and has no anchorage off it.

The barrier reef, which rims the S coast of New Georgia, extends between Rhodes Point at the S end of Vonovona Island, E to Roviana Island, in the W entrance to Blanche Channel. This reef, over 1 mile wide in places, shelters a lagoon cluttered with numerous reefs on the W side is Port Munda.

8.32 Munda Harbor (8°20'S., 157°13'E.), lying above the barrier reef and Munda Point, is considerably encumbered with islands, shoals, and coral heads. Access to Port Mundais is via a 30m wide channel, with depths of at least 4.5m, cut in the bar that extends between Nusalavata Island and Mbirimbiri Island, on the barrier reef. The axis of the channel is marked by a 054° lighted range. It is advised to hold strictly to this range because there are remains of metal stakes on both sides. Beyond the bar, a channel which requires local knowledge leads to small wharves near Munda Point.

Roviana Lagoon is formed by a string of barrier islands and reefs which commence at Port Munda and extend in an E direction to **Mbalumbali Island** (8°24'S., 157°32'E.), which marks the W side of Gubbins Channel. This barrier of wooded islands look very much alike and have narrow passages between them. The lagoon is about 20 miles in length and varies in width from 1 to 3 miles, the narrowest part being at the E end. The seaward side of the islands mentioned has a narrow fringing reef which is steep-to, depths of 182.9m and more being found within 0.1 mile offshore.

Roviana Island, at the SW end of the lagoon and on an elbow of the reef W of Tambatuni, is prominent.

Blanche Channel is enclosed between the main island of New Georgia Island and the Hele Islands on its N and E sides, and by Tetipari Island and Rendova Island on its S and W sides. The channel and its entrances are deep throughout; the shores are steep-to, and there are no dangers. A discussion of New Georgia SE to Viru Harbor and on to Vangunu Island will continue in paragraph 8.36 after analyzing the islands S of Roviana Lagoon.

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Blanche Channel—Munda Harbor from SE

8.33 Rendova Island (8°32'S., 157°18'E.), on the SW side of New Georgia, is entirely mountainous and densely wooded. The highest summits are in the N part of the island where Rendova Peak, an extinct crater, broken down on its W side, culminates in a height of 1,060m. Tetipari Island, the island E of the SE end of Rendova Island, has no prominent peaks. Balfour Channel, deep and safe, separates the two islands. The tidal current runs through the channel with moderate velocity.

Rava Point (Point Pleasant), the SE extremity of Rendova Island, is fringed by a narrow reef. The whole of the SW coast is backed by steep hills. The W end is bordered by a black sand beach and is sheer. Tidal currents which parallel the coast are quite strong here.

The coast is steep for 7 miles to the NE of Baniata Point, after which it is bordered by a barrier reef for no more than 2.5 miles. There are several islands on the N part of the reef, which is cut by several passes. There are several reefs in the lagoon between the barrier reef and the coast, however there is good anchorage in Port Rendova.

8.34 Port Rendova (8°24'S., 157°20'E.) is situated between the NW coast of the island and the islands W of it. Three main entrances lead through the barrier reef and are described below.

South Western Pass has been wire dragged to 12m to a mini-

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Rendova Island from Iron Bottom Sound

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Viru Harbor

mum width of 411m. Vessels should enter in mid-channel on a course of 141° and when inside, turn to port into the harbor area. Exercise caution when approaching this pass from SW. Reefs at the W end of Rendova Harbor have not been surveyed, except in the vicinity of the passage.

Note.—A considerable portion of the harbor has been wire-dragged to 12m.

Western Entrance, lying between the islands of Kuru Kuru and Lumbari has been wire dragged to 12m over a least width of 69m, and is about 229m wide between the 10m depth contour. The pass should only be used under favorable conditions of light. There are no dangers in the approach, with the exception of a drying reef lying 500m SW of Lumbari Island.

Renard Entrance, 229m wide between the reefs, has been dredged to 9m over a minimum width of 90m. A vessel must execute a sharp turn to starboard to avoid the reef lying about 0.2 mile SW of the SW end of Kokorana Island. This reef and a 5.4m shoal patch, about 0.2 mile WSW of the SE end of Bau Island, constitute the principal dangers encountered in entering the harbor through this passage, although the tidal current sets strongly across the mouth of Renard Entrance.

Anchorage.—Anchorage is found in Rendova Harbor in an area 3 miles in length from NE to SW, with an average width of 0.35 mile, in a dredged depth of 12m, with the exception of several isolated shoals.

The E coast of Rendova Island, between Rava Point and Buzuma Cove, consists of sand beaches, on which the sea breaks for about 4 miles; it, then follows with woods to the water's edge for 5 miles. There is good anchorage, in 31m, within the second point of the head land of Bizuma Cove, taking precautions to pass safely the sunken fringing reef off this point.

Sikuleleki (Blanche) and Renard (Baromani), two islands SE of the E end of the above-mentioned headland, have clear and deep passages between them. The coast from the Turenga River, about 6 miles N of Buzuma Cove, to the E end of Rendova Harbor is steep-to and fronted by several wooded islands with passages between them.

8.35 Tetipari Island (Tetepare Island) (8°44'S., 157°34'E.), heavily wooded to the water's edge, is a very hilly island without any conspicuous peaks. The S coast, almost precipitous, is fringed with reefs which project more than 0.5 mile offshore in places, but is otherwise steep-to. On the reef just W of the middle of this coast is a rock, 18.2m high, with trees on it. The NE coast is cliffy and steep-to between Cape Rice and Somerville Point, the NE and N extremities, respectively, of the island. At the W extremity of the N side of the island is Waugh Bay. There is anchorage in Waugh Bay during the SE trades, in a depth of 50m, in the W part of the bay, about 0.2 mile offshore.

New Georgia—South Coast

8.36 The S coast of New Georgia, from abreast Mbelombelo to Tambaka Point, is featureless, but becomes cliffy near Port Viru. Near Mbelombelo, the coastal reef starts, enclosing Roviana Lagoon.

Port Viru (8°30'S., 157°44'E.), affording the only anchorage along the entire SW coast, is about 1.5 miles in length, with depths of 13 to 22m, and is landlocked without swell. The entrance, flanked by cliffs on either side, is 0.15 mile wide but fringing reefs, marked by beacons, reduce its useful width to less than 0.1 mile. Within the entrance the channel turns sharply ENE for 0.25 mile, then NNE into the harbor, and then to the anchorage. Swinging room for a vessel over 36m is limited because of the mud bank and reef off the mouths of the streams on the W side. Vessels call here to load timber.

Monro Bay, entered between Viru Harbor and Rapichana Point, is bordered by cliffs about 40m high. There is no anchorage here because of the great depths.

Reynolds Bay, entered between **Hecla Point** (8°38'S., 157°48'E.) and Rapichana Point, is bordered with a narrow coral ridge, with trees on it that reach 30m. Rapichana Point is prominent and fronted by small barrier reefs.

The Hele Islands lie on the barrier reef extending about 14

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Viru Harbor

miles S from Hecla Point on New Georgia. The reef extends S for about 8 miles and then SW to Morton Island. Both N and S of the island, the reef is submerged; the N portion, known as Hele Bar, has a depth of 3.7m, while the S part has depths of 5.5 to 7.3m. East Island and South Island, at the S end of the barrier reef, are covered with large trees and are connected by an immersed reef. A white tower with a light is situated on **South Island** (8°48'5"S., 157°46'E.).

Underwater volcanic activity has taken place S of South Island, the locations of which are best seen on the chart.

8.37 Nono Lagoon (Panga Bay) (8°43'S., 157°52'E.), formed between Vangunu Island and the Hele Islands and S of Njai Passage, is encumbered with reefs. It is the SW part of the great lagoon which surrounds Vangunu Island and is bordered on the W by the Hele Islands. Nono Lagoon is only partially examined. Naji Passage, leading from Marovo Lagoon into Nono Lagoon, has a least width of 0.3 mile, is deep, and appears clear of dangers, but this passage has only been partially examined.

Wickham Harbor (8°44'S., 158°05'E.), the area between Nggatokae and Vangunu Island, about 4.5 miles wide, is nearly spanned by a hook-shaped island, on which the tops of the trees rise to a height of about 30m. Wickham Anchorage, between the N side of the island and the SE side of Vangunu, affords anchorage, in 44m, coral and sand, midway between the hook-shaped island and the SE end of Vangumu Island. Though this anchorage has been used by small vessels, it is apparently deep, clear, and spacious.

Caution.—The coast between Kokoana Islet and Emma Point, 3 miles NE, is indented by several bays which are partially obstructed by reefs and shoals extending in places to 0.5 mile offshore. Extreme caution is needed when navigating in depths of less than 36m.

Bougainville Island—Off-lying Islands and Reefs

8.38 The **Treasury Islands** (7°25'S., 155°34'E.) consists of Mono Island and Sterling Island, separated by Blanche Channel. Mono Island, heavily wooded, rises to 355m. The N and W sides are precipitous and sheer. There is no barrier reef around the island. It is clear of hazards with the exception of a few scattered islands and detached rocks.

Sterling Island consists of raised coral but, as opposed to Mono Island, is smaller and lower. There are two sheltered bays on the N side of the island.

Blanche Harbor (7°24'S., 155°34'E.) is primarily a small craft anchorage since it is very narrow. This haven contains several islands, including Watson Island and Wilson Island, which lie in the central part. The best anchorage, during the Southeast Trades, in 18.3m, sand, lies immediately W of a line forming the W end of Watson Island and the mouth of a stream N of it. The village of Falamai is on a promontory on the E coast of the anchorage.

The swell during the Northwest Monsoon can be felt on the W side of Watson Island, and heavy W squalls can occur. The best anchorage in this season is on the E side of Watson Island, or in the bay S of Wilson Island, but if the latter is used, beware of the rocks off the Sterling Island coast.

The tidal currents in Blanche Harbor set E and W are strong.

Caution.—A shoal was reported to lie about 52 miles WSW of Sterling Island. Breakers were also reported in the vicinity of position 8°41.0'S, 154°42.5'E.

Alu Island (Shortland Island), about 200m high and heavily wooded, is surrounded by smaller islands, islets, and numerous dangers in its vicinity. Prominent off the SE side of Alu Island are Magusaiai Island and Poporang Island, separated from Alu by a narrow beaconed channel navigable by boats.

8.39 Shortland Harbor (7°05'S., 155°54'E.) (World Port Index No. 56950) is now operated by the Solomon Islands Defense Force as a border patrol boat base. All commercial activity has ceased. The harbor is formed by the SE coast of Shortland Island and the islands off it.

Pirumeri Island (7°08'S., 155°53'E.) is a coral island, cultivated except on its NW side. Battery Island lies on the reef extending N from Pirumeri Island. A beacon, in the form of a white cross, stands on the hillside close within the N extremity of Poporang Island. Ona Island and Orlofi Island lie NE of Poporang Island. A light is shown from the E side of the reef fringing Onua Island.

Tides—Currents.—Tidal currents in the channels between the various islands are strong; and in the channel W of Faisi Island they attain a velocity of 2 to 3 knots.

Depths—Limitations.—Lofung Harbor is a deep narrow channel in the N part of Shortland Harbor. It was used by ocean-going vessels loading timber.

The passage into Lofung Harbor should not be attempted without a pilot. Entry is permitted during daylight hours only.

Anchorage.—Anchorage, with good shelter and holding ground, can be taken W of Faisi Island. Faisi Island is NE of the island of Magusiai. Vessels up to 3,000 grt can moor at this anchorage, which is sheltered in all seasons.

8.40 To the W of Alu Island are a number of islands and patches. Gomai Point is the W extremity of Aloataghale Island, an island lying on a reef extending from the SW edge of Alu Island. Two groups of small detached islands, varying in height from 18 to 30m and surrounded by reefs, lie about 7 to 10 miles NW, respectively, of Gomai Point. There are deep channels E of these respective groups, either of which may be considered as the SW entrance of Bougainville Strait.

There are numerous islands and dangers lying within 1.75 miles of the NE side of Alu Island. Their names and positions are best seen on the chart. Balalac Island (Ballale Island), located 5.5 miles N of Poporang, is the S island of a number of small islands scattered about in the area between Alu Island and **Ovau** (6°48'S., 156°01'E.). Ovau, lying between the NW part of Fauro Island and Bougainville Island, is 408m high and has a deep clear channel on either side, but the tidal currents are strong.

Fauro Island (6°55'S., 156°05'E.), S of Oema Island, is of volcanic origin. It is indented by many bays and dominated by several peaks; the highest of which is 587m, culminating about 5 miles from the S end. The coasts are very jagged, where there are numerous islands and reefs, particularly in the SW, extending 5 to 6 miles outward. Mania Island is the largest. It is wooded and conspicuous. Northeast of Mamia Island, about 1.7 miles, is Aoa Island. There is a good anchorage 0.2 to 0.4 mile off the E side of this island, in 47m, but a rock lying 0.15 mile E of the island must be avoided.

Toma Harbor (Togha Harbor), at the S end of Fauro Island, is protected by the barrier and other reefs here and affords good anchorage, in 31 to 36m, mud and clay.

Sinasora Bay, at the S side of the promontory of **Maero Point** (East Cape) (6°55'S., 156°08'E.), the E extremity of Fauro Island, affords a snug anchorage, in 33 to 42m.

Masamasa Island and the **Piedu Islands** (6°51'S., 156°09'E.) are the two largest of a group of islands lying E of the N end of Fauro Island and N of Maero Point. About 1 mile N of Fauro Island, is Kanasata Island, with a bank extending 0.3 mile NE with 14.6m from it, and a drying reef with a remarkable column of rock 40m high extending 0.2 mile E of the island. Oema Island, 6 miles N of Kanasata, culminates in a height of 245m. Oema Atoll, 1.5 miles NE, is marked by several islands on the crown of reefs.

Bougainville Strait

8.41 Bougainville Strait, separating Choiseul Island from Bougainville Island and Shortland Island to the W, runs NNW between **Redman Island** (6°43'S., 156°24'E.) and Obeani Island, the E island of the Shortland group 14.5 miles WSW. A ridge, with depths of less than 200m, lies between these two islands. The other distinct channel with its NE-SW heading follows the coast of the SE end of Bougainville, but is not recommended.

Bougainville Strait lies on the direct route between Australia and Japan. Despite the complexity of the reefs as shown on the chart, there should be no difficulty for medium-draft vessels in maintaining a safe course through it.

Tides—Currents.—In the middle of the fairway through Bougainville Strait, about 8 miles NE of Maero Point (East Cape), the E extremity of Fauro Island, the tidal current attains a maximum rate of about 2 knots in a SE direction about 1 hour after LHW, and about 1.5 knots in a NW direction about 6 hours before LHW.

The currents are influenced by the shape of the sea bed, particularly where it rises steeply to the central part of the strait, and probably attain rates of up to 3 knots in the narrower channels between reefs.

Directions—The best route through the strait for vessels drawing 16m is on a course of 344°-164° passing midway between Else Reef and Hallpike Reef, at the S end of the passage, and Haslam Reef and Oldham Reef, at the N end of the passage, passing 6.5 miles off Obeani Island. This track is almost along the direction of the tidal current.

Caution.—The water near Bougainville Strait is very clear, and the light-colored sand on many of the reefs is clearly visible, even in depths of more than 15m, making the depth look much less than it really is.

Bougainville Island

8.42 Bougainville Island, the largest of the Solomon Islands and separated from Choiseul Island by Bougainville Strait, has an extensive wooded range of mountains extending the entire length of the island. The coast, though varied, also is covered with dense forest. This range in the SE part is known as the Crown Prince mountains. The Emperor Mountains are in the NW part of the island. Mount Balbi, in the NW, is the highest peak, reaching 2,591m. It is a steep pyramid with a jagged-edged active crater. Mount Taroka and Mount Bagana, in the Crown Prince Range, are 2,107m and 1,999m high, respectively, and are located about 27 miles and 58 miles NW, respectively, of Cape Friendship.

Cape Friendship (6°43'S., 155°58'E.), the E extremity of Bougainville Island, is marked by a distinctive red cliff. Rantan Island, 78m high, lies about 0.6 mile offshore, 1.5 miles N of Cape Friendship. A light is shown from a tower in position 6°41'S, 155°59'E. There is a 1m rock on a shoal 0.5 mile N of Rantan.

Caution.—The island must be approached with caution because, with the exception of the SE and S coasts, the approaches have not been surveyed completely. The W coast in particular is suspect, as there are many undetected shoals and coral heads that may exist in the vicinity of Empress Augusta Bay. The island is not accurately charted and it is questionable whether or not the actual positions may vary from the charted positions.

Bougainville Island—East Coast

8.43 The NE coast from Cape Friendship to Luluai Point, 12 miles N, is backed by the mountains with dense woods. This coastal profile continues to Kieta Harbor. There is a defined barrier reef which begins about 4 miles NE of Luluai Point. As best seen on the chart, there are reefs NNE of Rantan Island on the 200m curve. Two other small reefs lie SE of this danger; SE of Luluai Point there is a steep-to reef.

The principal islands on the barrier reef are **Otua Island** (6°27'S., 155°58'E.) and the Zeune Islands. The sea never breaks over the 12 miles of reef that stretches between these islands. Furthermore, the reefs cannot even be seen without the

sun in a favorable position; also, the inshore waters of Bougainville Island have not been thoroughly surveyed. Because of these conditions, caution should prevail when navigating this part of the coast.

A light is shown from the E extremity of Otua Island.

Anchorage is available along the NE coast of Bougainville in Torau Bay, Toimonapu Bay, Orowere Bay, and Koromira Bay. Torau Bay lies N of Cape Friendship. The remaining bays are located NW of Laluai Point.

Koromira Point (6°22'S., 155°49'E.) is marked by a white house with a red roof flanked by a tower. This conspicuous landmark is reported to be of assistance in navigating adjacent the Zeune Islands. With good knowledge of local conditions, anchor in Koromira Bay, S of the point. About 2 miles NE of the point vessels anchor, in 14m, 0.25 mile off a plantation. Along this stretch of coast between Koromira Point and Kieta Harbor, anchorage is also available in Reboine Bay and Toborei Bay. Anchor in Toborei Bay, in depths of 27 to 31m.

8.44 Keita (6°12'S., 155°40'E.) (World Port Index No. 56855) is a small port situated on the SE coast of Keita Harbor.

Winds—Weather.—In heavy SE winds, a heavy sea enters the harbor through the passage between Bakawari Island and the mainland S of it.

Depths—Limitations.—Geraro Reef, Moto Reef, and Banaru Reef are three extensive detached reefs forming a barrier reef off this stretch of coast. The seaward approach to Keita Harbor lies between Banaru Reef and Moto Reef. Several shoal patches lie off the W side of the passage. Wogoromudo Reef is charted 2.75 miles NE of a conspicuous radio mast, described below.

A wharf, with an alongside depth of 4.8m, lies 0.35 mile SE of the radio mast mentioned below. The main wharf is situated on the S side of the harbor, 0.8 mile SE of the radio mast. This facility has a least depth of 7.3m alongside, and will accommodate vessels up to 183m in length. Two berths each 58m in length, with alongside depths of 4.8m, are situated W of the main wharf.

Aspect.—Keita Harbor is a natural bay formed between the Keita Peninsula and Bakawari Island; the harbor is about 2.5 miles long, with an average width of 1 mile. Keita Peninsula reaches a height of 406m. At the S end of the peninsula, on a 173m high hill, stands a conspicuous radio mast; a church is situated 1.25 miles ESE of the radio mast. Arovo Island, 61m high, lies off the N end of the Keita Peninsula.

Pilotage.—Pilotage is compulsory and should be ordered at least 12 hours in advance, confirming 4 to 5 hours before arrival. The pilot boards about 1 mile NE of the pass through the barrier reef. Pilotage is available in daylight only.

Regulations.—See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for details on regulations pertaining to vessels in the waters of Papua New Guinea.

Signals.—The pilots may be contacted on VHF channel 16.

Anchorage.—Keita Harbor provides excellent anchorage in all weathers, in a depth of about 45m.

Directions.—A light is shown from the W end of Moto Reef, marking the E side of the passage. A light on Banaru Reef marks the passage's W side. A light is shown from Wogoromodo Reef and from the edge of the coastal reef 0.6 mile ENE of the radio tower.

8.45 Anewa Bay (6°12'S., 155°33'E.) (World Port Index No. 56875) was closed in 1989 and is not likely to re-open again in the near future. Information is retained for reference should the port re-open.

Anewa Bay was an exporter of copper concentrate. The port is entered between Kerekerina Point and Dokome Point. This is a deep water port which can accommodate any size vessel at the anchorage. Tanks and an electric power station have been built at the far end of the bay.

Tides—Currents.—The maximum tidal range that can be expected in Anewa Bay is about 1.5m.

Depths—Limitations.—A 1.65 mile wide channel leads from seaward; Kurukiki Reef, Takanupe Island, and Bara Shoal border the W side of the channel, while Banaru Reef and Karikiberia Shoal lie on the channel's E side. A depth of 5.6m, best seen on the chart, lies 2 miles W of Kurukiki Reef. An ore-loading wharf, situated on the N side of the bay, is 76m in length, with alongside depths of 12.1m.

Aspect.—Kerekerina Point stands at the end of a neck of land separating Arawa Bay from Anewa Bay. A power plant, with two chimneys showing red fixed lights, stands 1 mile W of the point. A radio tower marked by a light stands 0.2 mile W of the power station.

Lights are shown from Takanupe Island, both entrance points of the bay, and from a hill 0.3 mile W of the power station.

Pilotage.—Pilotage is compulsory and should be ordered at least 48 hours in advance, confirming 24 hours before arrival. If the vessel's ETA varies more than 45 minutes from its previously radioed ETA, it should reconfirm the ETA through Rabaul Radio.

Pilots are available between 0600 and 2200; pilots board 1 mile NE of Kuruki Island.

Regulations.—See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for details on regulations pertaining to vessels in the waters of Papua New Guinea.

Signals.—Both the harbormaster and the pilot vessel may be contacted on VHF channels 6, 12, and 16.

Anchorage.—Vessels awaiting a berth should anchor 1 mile NE of the bay's NE entrance point, in charted depths of 53 to 60m, bottom quality not stated.

8.46 The NE coast of Bougainville Island, between the Kieta Peninsula and **Cape Mabiri** (5°59'S., 155°25'E.), is scattered with islands, reefs, and shoals which lie up to 6 miles offshore. There is little known of them and for the most part they are uncharted.

Anchorage.—The W side of the Kieta Peninsula in Kobuan Bay affords anchorage, in 16.5 to 27.4m. It is a clear sheltered bay except for a reef extending 0.3 mile N from the SW opening. Arawa Bay, W of Kobuan Bay, has a sheltered anchorage except during heavy NW winds, in 11 to 12.8m, 0.3 mile off Arawa Plantation.

Rorovana Bay affords shelter during the Southeast Trades, but is open to the NW. Anchorage is available in the SE part of the bay, but a watch must be maintained for submerged coral patches. At Mabiri Plantation, the best anchorage is reported to be in a small cove on the NW side of Cape Mabiri, though some swell exists there. Between Cape Mabiri and the barrier reef, good anchorage is possible.

8.47 Numa Numa Harbor (5°52'S., 155°14'E.) is entered between the N end of the reef on which Casuarian Islet stands, and a point about 5 miles W of the reef's N end. Local knowledge is required for this anchorage.

Damback Island lies on the barrier reef about 11 miles NW of Numa Numa. This barrier reef extends about 10 miles SE from the island, parallel with the coastal reef. Depths of 3.7 to 5.5m extend up to 1 mile NE of the reef of Inus point.

A wreck on a reef, about 1 mile S of Inus Point, is a prominent landmark.

Close NW of Cape Nichuss, there is anchorage, in 18.3 to 73.2m, inside the reef. Beacons, in line bearing 225°, lead to the anchorage; a small timber export wharf lies 0.35 mile NW of the beacons.

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Buka Passage from SW

Between Cape Nehuss and Teop Harbor there are no reported navigational hazards outside the barrier reef. This part of the coast has great depths. Small vessels can pass between the offlying reefs and the coast from Cape Nehuss NW to Teopasino. The passage, which is wide and deep, leads inside of Damback Island and Toruta Island. At Teopasino, a partially-sheltered anchorage will accommodate vessels with local knowledge. Range beacons, in line bearing 177°, lead to the anchorage, in 27m, 0.15 mile offshore.

Teop Harbor indents between a tongue of reefs on which Teop Island and Horan Island lie. There is shoal water extending about 0.5 mile NE from Horan Island. There is a white stone pillar situated on an island on the W side of the harbor. Deep water extends in close to the shore, and good protection will be found inside the harbor. Anchorage can be taken, in 34.7m, midway between the island on which the white stone pillar stands and a river at the head of the harbor.

This anchorage requires local knowledge.

8.48 Cape l'Averdy (5°34'S., 155°05'E.) is composed of white chalk cliffs, heavily wooded, and fringed by a reef. A light is shown from the cape. About 2 miles W of the cape lies the entrance to Tinputz Harbor (Tinputs Harbor), which has considerable depths. The shores of the outer harbor are sheer with short stretches of sandy beach, whereas, the shores of the inner harbor are all sandy. Anchorage is taken close offshore because of the great depths. There is a mission station at Tinputz Harbor. A beacon stands on the coastal reef on the E side of Tinputz Harbor, 0.3 mile from its head.

Raua Harbor opens about 9.5 miles W of Cape l'Averdy. The entrance is narrow but widens inside, where two small vessels can anchor, in 55 to 64m. The head of the harbor is said to be free of reefs, but mud banks, which change position when the river is in flood, extend 45 to 90m from shore.

Baniu Bay (Beniu Bay) affords anchorage, in 35m. Depths of 33m or more are found close to shore. The SE corner of the bay is reported to be foul.

Buka Island

8.49 Buka Island, off the NW end of Bougainville Island, is separated from it by Buka Passage. The E coast of the island affords no anchorage. This part of the coast is steep, appears sheer with a few sand beaches. Mount Bei, the island's summit, rises to a height of 500m and is located 10.5 miles N of Cape Lalahan, the S extremity of the island. The interior, except in the SW, where it is hilly, is low and undulating.

The Buka Passage is clear, with a least width of about 0.1 mile. The NE approaches and the channel itself are safe. The SW approaches to the passage are divided by many islands and reefs into two main channels.

Caution.—Mariners are warned that mines laid during WW II still exist in some areas.

8.50 Madehas Island (5°28'S., 154°38'E.) commands the W approach to Buka Passage. The island rises to 137m and is fringed by a narrow reef, except at its N end, where the fringing reef and a detached reef and shoals extend out 0.45 mile. These dangers are marked by a beacon.

A light is shown from the summit of Madehas Island.

Sohano Island, 58m high, lies at the SW end of Buka Passage and is surrounded by a steep-to coral reef that dries. A pier, with an alongside depth of 3.7m, is available here, while another pier with the same alongside depth lies 0.85 mile NE of the island's NE end.

Minan Island lies on the N end of Minan Reef, which lies midway between Madehas Island and Sohano Island.

Ramun Bay, on the S side of Buka Island is entered N of Madehas Island.

Tides—Currents.—Tidal currents, with a velocity of about 4 knots, are reported in Buka Passage. The flood current sets to the W and the ebb current sets to the E. The survey indicated a flood current of 6 knots and an ebb current of 4.5 knots.

Depths—Limitations.—Kakil Wharf is situated on the NW side of Buka Passage. A modern dock, of new concrete construction with ample fendering, supports regular merchant traffic. The M/V Clipper Odyssey, 5,200 tons with an loa of 103m and a draft of 4.27m, docked at the Kakil Wharf in April 2005.

Aspect.—A large black and gray warehouse sits at the root of the Kakil Wharf. A radio tower lies just NE of Kakil Wharf.

A local airfield, close to the pier, has regular service to Rabaul and Honiara.

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Buka Passage—Kakil Wharf

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Buka Passage—Kakil Wharf

Pilotage.—No pilots are available for Buka Passage.

Anchorage.—Anchorage is afforded, in 18 to 26m, on the W side of Ramun Bay near the entrance. Anchorage is prohibited between Sohano Island and Buka Island because of submarine cables.

Directions.—A vessel drawing 6m or less should pass between the S coast of Buka Island and Madehas Island, taking care to clear the reefs extending from Madehas Island, then N of Minan Island, then NE through the passage proper. When traversing the passage proper, keep to the center of the fairway until open water is reached.

The S approach channel to the passage's SW entrance requires local knowledge.

8.51 Cape Kori (5°24'S., 154°42'E.), at the S end of the E side of Buka Island, is steep and has two caves. North of Cape Kori is Cape Hatsia, which is distinguished by a wide terrace with a narrow sandy beach. There is a village on the plateau, but most of the inhabitants live on the coast. Masasang, in the vicinity, is the pottery industry district on Buka Island. Between Cape Putputun and Cape Kotopan S of Cape Henpan, there are several large villages and sandy beaches. This part of the coast appears to be the most thickly-populated district of the island. At Hanahan Bay, entered between Cape Putputunand Cape Kotopan, the coast is low.

Cape Hanpan (Cape Henpan) (5°01'S., 154°37'E.), the N extremity of Buka Island, is reported to be of moderate elevation. When sighting the cape from the N, it is difficult to determine the distance off Cape Hanpan, as the trees at its N end make it appear to be closer than it really is.

8.52 Queen Carola Harbor (5°10'S., 154°33'E.) (World Port Index No. 56852), the NW end of Buka Island, is formed by a bend in the coast and is sheltered by the barrier reef N of the Zoller Islands. There is good holding ground in moderate depths, and a good entrance for large vessels. Tanagole Bay is the NE part of the harbor, in which there are several islands. The barrier reef lies on the W side of the harbor, which partly dries and is usually marked by breakers. The entrance to Queen Carola Harbor opens between Hetau Island and Cape Rungnoun (Cape Dunganon), with a passage 1.65 miles wide between the reefs, but it is divided into two deep passages by the extensive reef on which a sand cay, charted as Malulu Island, lies. The N passage is about 0.4 mile wide, with reported depths of 18.3m.

A 4.9m shoal lies E of the N entrance of the harbor, about 1 mile SSE of Cape Rungnoun.

The district surrounding the harbor is composed of extensive mangrove swamps. Hetau Island is densely populated. A 90m pier projects from the SE side of Cape Rungnoun. A conspicuous white building stands on the pier and is the only building visible from seaward. Tanagole Bay contains numerous reefs and shoals between that bay and Japaru Island. Some of the reefs and shoals are marked by beacons.

Anchorage.—Anchorage can be taken in Queen Carola Harbor, in 11 to 24m. Large vessels are reported to have anchored in good holding ground, N of Japaru Island and NE of Pororan Island. Small vessels usually anchor off the plantations closer inshore.

8.53 The Zoller Islands, joined by a reef, consists of Petats Island and Jame Island (Yame Island). A passage, about 0.1 mile wide, separates the reefs extending from Matsungan Island and Petats Island. Vessels using this passage should favor the Matsungan Island side. There is a small pier on the N side of Petats Island and two on the SE end of Jame Island.

A passage, with a least depth of 18.3m, leads N of Jame Island to an anchorage off the NE side of Petats Island, with good holding ground, in 25.6m. The barrier reef extending 2 to 3 miles off the W coast of Buka Island appears defined and free of dangers.

Sal Island (5°26'S., 154°34'E.) is at the S end of this barrier

reef. Matsungan Island and Sal Island are separated from the coast by Natunana Channel. A detached reef, awash at HW, lies midway between these two islands.

In the middle of the S entrance of Natunana Channel, about midway between Sal Island and Cape Lalahan, there are four patches, with depths of 4.3 to 9.1m. These patches extend from about 0.8 mile to 2 miles SE from the shoal end of Sal Island. Shoal depths of 5.5 to 10m lie about 2 miles NE of the N end of Sal Island.

A tidal current of 4.25 to 6 knots has been reported close SW of Sal Island.

Bougainville Island—West Coast

8.54 Caution.—Extreme caution is necessary along the W coast of the island, particularly in the vicinity of Empress Agusta Bay, as many undetected coral heads and shoals may exist here. Reefs and shoals, some of which are doubtful, lie up to 22 miles offshore.

Matchin Bay is formed by the W side of the N end of Bougainville Island. Protection for the bay is provided by Taiof Island (Toiokh Island) and Tanoara Island (Katitz Island), and numerous reefs and islands on the W. The bay itself is cluttered with islands and reefs.

Matchin Bay has not been thoroughly surveyed; charted shoals positions may be inaccurate and uncharted shoals may exist.

Taiof Island (5°32'S., 154°39'E.) has three distinctive densely wooded peaks, reaching from 268 to 335m high. Most of the island is fringed by reefs and mangrove swamps, but the NW coast clears with coral and sand on the foreshore, where there are a few villages.

North Channel, between Taiof Island and Madehas Island, is the principal entrance to Matchin Bay, and can be used by large vessels, but the mariner must use caution in the W approaches and be aware of the reef off the N end of Taiof Island. The S approach to the bay is through South Channel, between the S end of Tanoara Island, 204m high, and Lebau Island. This channel should not be attempted without local knowledge, as there are numerous shoals, marked and unmarked, as well as scattered reefs near the Soraken peninsula.

It is reported a clear passage, with depths up to 29.3m, leads between the N extremity of the Soraken Peninsula and the reef 0.25 mile N to the anchorage in Soraken Harbor, in 27m, good holding ground of coral and mud.

The mariner will encounter the Hilder Group when navigating S on the W coast of Bougainville Island. This group consists of five islands, each surrounded by a reef. The W island is 13.7m high to the tops of the trees, with Pachem Island (Hohn Island) 2 miles E of it. Mik Mik Island is the E island of the group.

8.55 Between Matchim Bay and Cape Molke, the shoals and islands offshore decrease in size and number. In heavy swell conditions, any shoal with less than 9m will break, and a build-up of wave height will be apparent over any broken ground with depths under 48m.

Numerous dangers, the existence of which seem to be doubtful, are charted up to 16 miles offshore between **Cape Molke** (6°02'S., 154°49'E.) and Cape Torokina. The coastline in this area is fringed with tall scrub backed by swampland and becomes more rugged between Cape Molke and Cape Torokina.

There are several useful and conspicuous marks in the approach to Cape Torokina. Mount Bagana and Mount Balbi are prominent from this coast. A white square patch of rock on a vertical cliff, 10 miles NNW of the cape, and the angular fall of a flat-topped ridge, about 10 miles NNE of the cape, are also conspicuous. This declivity forms a cut in the skyline and is said to be identifiable from a greater distance than either Mount Bagana or Mount Balbi because of the cloud cover over these mountains. A small jetty is situated close W of a prominent radio tower standing on Cape Torokina.

Puruata Island lies about 0.5 mile W of Cape Torokina.

Anchorage.—Anchorage can be taken W of Puruata Island in good holding ground, sand bottom, but a heavy swell often sets in from the SE. Caution is urged when approaching this anchorage as dangers, not shown on the chart, may exist.

8.56 Empress Augusta Bay is entered between Motupena Point (6°31'S., 155°09'E.) and Cape Torokina. Its approaches are scattered with numerous dangers reaching out for 22 miles to the W of Motupena Point and for 18 miles to the WSW of Cape Torokina. It is reported there could be other dangers not yet discovered in the approaches. Lothian Shoals, on which the sea breaks, lie about 13 miles SW of Cape Torokina. Empress Augusta Bay is fringed with mangroves, which decrease in breadth as the vessel comes up on the N part of the bay. The background is formed by imposing mountains, among which to the N is Mount Bagana, an active volcano.

Caution.—It is probable that more foul ground than is charted exists off the SW coast of Bougainville Island. Care is necessary when navigating in this vicinity.

8.57 The coast trending SE for about 40 miles from Motupena Point to Moila Point is low and fronted at a distance of about 10 miles by a broken barrier reef with some islands on it in places. There are depths over 200m with no bottom, 1 mile outside this barrier. Numerous steep-to coral patches, best seen on the chart, have been reported to lie from 10 to 15 miles off this coastline.

A detached reef, on which **Antarara Island** (6°56'S., 155°23'E.) and Alungokaku Island, lie presents an off-lying danger, 19 miles W of Moila Point, and 9 miles offshore. Discolored water, best seen on the chart, was reported in several patches, between Antarara Island and Kabukeal Island. This report is more than 50 years old. A coral reef, awash, lies about 18 miles W of Antarara Island and the same distance offshore. A reef lies 16 miles WNW of Antarara Island and 12 miles offshore, and reefs were reported to lie from 7 to 12.5 miles NW of the same island. Breakers were reported about 9 miles S of Motupena Point.

8.58 The coast between Moila Point and Pupukuna Point, forming the W side of Bougainville Strait, is in large part low, and is bordered by white sand beaches cut by rivers. Inland, the land rises gradually. There are several villages along the coast, and Buin, 6.3 miles NNE of Moila Point, has a mission and is a commercial center.

The S end of Bougainville Island is reported to be the densely-populated part of the island.

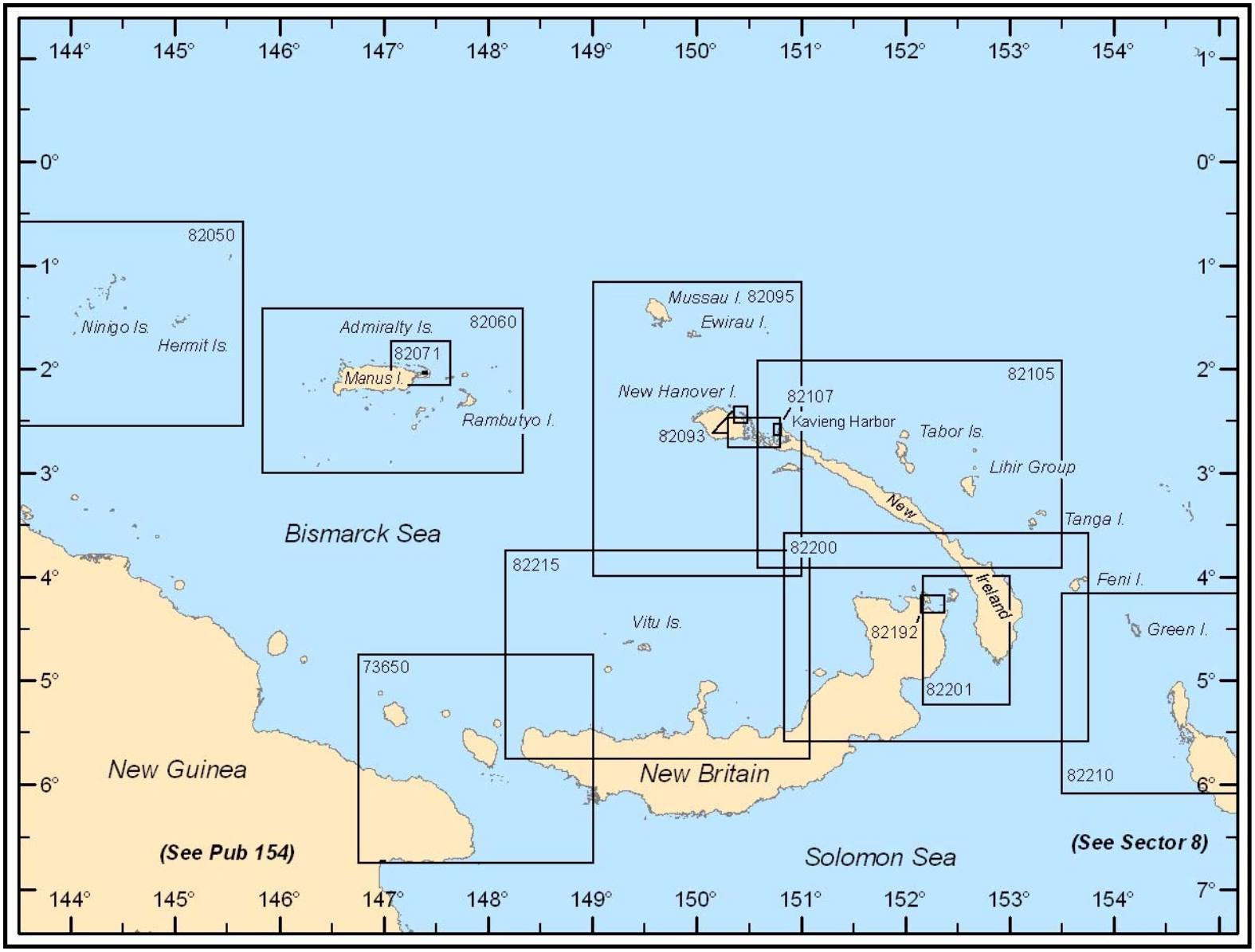
Erventa Island and Popotala Island lie off this part of the coast and in the dangerous approaches to Bougainville Island. A 3.4m patch lies about 0.3 mile SSW of Erventa Island and a sunken rock lies about 0.4 mile SSE of Popotala Island. A 11.3m patch lies about 0.6 mile NNE of Popotala Island.

Caution.—A dangerous wreck lies sunk 2.5 miles SW of Erventa Island, the position of which is approximate. A second wreck lies about 1 mile offshore, about 4.8 miles NE of Moila Point; several stranded wrecks lie close of the coast NW of Pupukuna Point.

8.59 Tonolei Harbor (6°47'S., 155°53'E.) opens between Pupukuna Point and East Point. It is backed by high, densely-wooded hills, particularly on the E side. Sand Island, on a coral patch on the E side of the entrance is 6m high. It is generally passed on the W side, where there is ample room. A 1 mile channel, marked and dredged, leads to Tonolei Harbor.

Anchorage.—Anchorage, with good shelter from the prevailing winds, can be found anywhere in Port Tonolei, in 25 to 36m, sand and mud.

East Point (6°49'S., 155°55'E.) is marked by a light.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **9** — CHART INFORMATION

SECTOR 9

THE BISMARCK ARCHIPELAGO

Plan.—This sector first describes the NE coast of New Ireland from SE to NW. Next, the SW coast of New Ireland, including St. George's Channel and Gazelle Channel, is described from SE to NW. The NW coast of New Ireland, the coasts of New Hanover, and the passages between them are then described from E to W. The S and N coasts of New Britain are then described from E to W and from W to E, respectively. Finally, the Admiralty Islands and the Ninigo Group are described.

General Remarks

9.1 The Bismarck Archipelago, which is a part of Papua New Guinea, includes all the islands between 0°45'S and 6°20'S, and between 142°50'E and 154°00'E. The archipelago includes the large islands of New Ireland and New Britain, and the smaller adjacent island groups such as New Hanover, the Duke of York Group, and the Admiralty Islands.

Winds—Weather.—The Bismarck Archipelago is dominated by the NE trades from November to June. Gales seldom occur. The prevailing winds during the summer months are lighter and blow more often from the E and SE. The season of the lightest winds is usually from September to November.

Pressure changes are usually small. The average range of the barometer is between 1009mb and 1013mb. Fog is rare in this area.

Tides—Currents.—Data is lacking on tidal currents in this area, but the rates are believed to be from 0.5 to 2 knots with the strongest currents occurring in the narrower passages and channels. Non-tidal surface currents are usually weaker, having rates of 0.35 to 1.5 knots.

Along the NE coast of New Guinea and in the vicinity of the Admiralty Islands, the current sets NW, varying in velocity from 0.5 to 2 knots. During the early months of the year, it sets E along the N coast of New Guinea.

Observations indicate that the currents on the N coast of New Guinea are mostly weak and usually set with the wind. This also applies to the Solomon Islands and the Bismarck Archipelago. The currents in the narrow passages are exceptions to this rule.

The tropic tidal ranges in this area vary from 0.6 to 0.8m. The tides are mostly of a diurnal nature.

Caution.—Many of the islands described in this chapter have only been partially examined.

Numerous off-lying reefs have been discovered off the coasts of New Britain, and the charts are not always to be relied upon. The S coast of the island is inaccurately charted.

The area extending from the S side of Manus Island for 40 miles and including the Purdy Islands, is so little known that it should be regarded as dangerous.

It has been reported that vessels should pass outside of the islands off-lying the NE coast of New Ireland or to the S of it due to the uncertainty of the depths along the island's NE coast.

Islands East and Northeast of New Ireland

9.2 The **Green Islands** (4°28'S., 154°11'E.), consisting of Nissan Island, Barahun Island, Sirot Island, and Pinipel Island, are on a raised densely-wooded coral atoll centered about 80 miles ENE of the S extremity of New Ireland. The islands are inhabited.

Pinipel Island, 101m high, is detached from the main atoll and 1.5 miles to the NNW. The island is cliffy and reported to be a good radar target. A reef extends from its W side.

Nissan Island, the largest island of the group, almost completely encloses a lagoon which has three entrances on its W side.

Tides—Currents.—A S current usually prevails along the W side of Nissan Atoll, being strongest off Middle Channel. At times, this set is reversed.

The maximum strength of the tidal currents in both Middle Channel and South Channel is 2 knots, except at springs, when it may reach 3 knots. During the Northwest Monsoon, there are overfalls in the entrance with the ebb current. The currents inside the lagoon are weak.

Tides at Nissan Atoll are very irregular, diurnal tides occurring at times. The mean tidal range at the entrance of South Channel is about 0.7m.

Anchorage.—Anchorage is available with local knowledge in the lagoon. The main entrance is between the S end of Barahun Island and the S arm of Nissan Island, 0.35 mile S. The fairway between fringing reefs is 36 to 45m wide and has a least depth of 5.2m. A mid-channel course of 076° leads through the entrance. This entrance should not be attempted during strong NW winds. The other entrances are more difficult or for small boats only. Depths inside the lagoon range from 22 to 60m, with foul ground extending from the W and S sides. A small wharf, with a depth of 1.8m alongside, is at the NE side of the lagoon.

9.3 The **Feni Islands** (4°05'S., 153°40'E.) consist of two wooded islands and two small islets. They appear as five rounded hummocks from offshore.The Feni Islands are a good radar target from 20 miles. Except for native gardens, plantations, and groves of coconut palms scattered on the sloping terrain near the shore, the islands are forested.

These islands are reported to be about 1.5 miles SE of their charted position.

Ambitle Island rises to a height of 562m in its middle part; its N part is low and swampy. The island serves as a good radar target from 20 miles, but gives a poor return at 30 miles. A geyser, which throws up water to a height of 15.2m, is located on the island. A small islet stands on the SE side of a reef, about 0.2 mile off the NW side of the island.

Babase Island is 266m high and has four peaks. It has undulating and gently sloping terrain alternating with steep sloping hills. Balum Islet, which is reported to be covered with forested hills, lies close off the N side of Babase Island.

Reefs, which sometimes break, extend from 1 to 1.5 miles N from both islands. A small drying reef lies off the E side of the group.

Salat Strait, the channel between Ambitle Island and Babase Island, is only about 0.2 mile wide and has depths of 9m in mid-channel. A rock, with a depth of less than 3.1m, lies near the middle of the N approach to the strait. A reef is located at the S end, on the E side of the channel. Several large reefs have also been reported in the N approach to the channel.

Anchorage.—Vessels with local knowledge can find good anchorage, in 24 to 26m, off the native village in the N bay on the E side of Ambitle Island. A coral patch, with a depth of 3.7m, is reported to lie about 0.3 mile off the S point of this bay.

Anchorage can be taken in Nanum Bay on the SW side of Ambitle Island. Fair shelter is afforded from the Northwest Monsoon and Southeast Trades.

Small vessels with local knowledge can anchor, in 9m, sheltered from both monsoons, between the before-mentioned small islet and the NW side of Ambitle Island.

The **Nuguria Islands** (3°12'S., 154°30'E.) are two groups of atoll islands and sand banks surrounded by reefs. There are about 50 islets scattered along these atolls. Coconut plantations are situated on some of the islets. Vessels call occasionally to load copra and trochus shells. The two atolls are separated by a safe passage, about 3 miles wide.

Caution.—It was reported that the Nuguria Islands are about 5.5 miles WSW of their charted position.

Sable Islet, about 2.4m high and surrounded by a reef to a considerable distance, is 10 miles SSW of the S end of the Nuguria Islands.

9.4 The **Tanga Islands** (3°30'S., 153°18'E.) has Tefa Island, the S islet of the group, connected with Lif Island by a reef. The latter island rises to a considerable height. The Tanga Islands consist of three rather large islands and several smaller ones. The smaller islands are surrounded by sandy shores.

Malendok Island is the largest of the group and rises to a height of 480m. The shores are cliffy and rise steeply from the fringing reef. A coconut plantation is situated on the SW side of the island.

Boang Island is separated from Malendok Island by a 3 mile wide channel. Depths of 24 to 29m are found in the channel. A reef, with a depth of 3m, extends 1.75 miles from the SW side of Boang Island. A small islet stands on this reef. Boang Island has some sandy shores, but is mostly cliffy and steep. Boang Island is reported to be a poor radar target from 18 miles. Native gardens and coconut groves are situated on the S side of the island. A reef, on which are two small islets, extends about 1.3 miles W from the NW extremity of the island.

Anchorage.—Vessels with local knowledge can anchor, in about 35m, sand and coral, under the spit that extends NE from the SE end of Lif Island, with the native village bearing 276°. This anchorage is about 0.1 mile from the fringing reef. Vessels are cautioned against anchoring here during SE winds.

Anchorage can also be taken, in 26 to 29m, E of the reef and about 0.3 mile off the SW side of Boang Island. There is an anchorage off the village at the NW end of Boang Island.

Caution.—The outline of the Tanga Islands is reported to be incorrectly defined on the charts and they were reported to be 2.75 miles WNW of their charted position.

9.5 The Lihir Islands consist of Lihir Island (Niolam) and four smaller islands known as Sanambiet Island, Masahet Island, Mali Island, and Mahur Island.

Lihir Gold Mine at night

Lihir Gold Mine barge operations

Lihir Island (Niolam) (3°08'S., 152°35'E.) is volcanic and has some active mud craters. It rises to a height of 800m near its S end, and has a steep, rugged, and wooded coast, except for native gardens, coconut groves, and some areas of grass and scrub. There are some confined stretches of sand, but in most places cliffs and steep slopes rise directly from the fringing reef. Villages and settlements are situated in areas of low and sloping terrain near the shore. A conspicuous white building, with a green roof and short steeple, stands near the shore 2 miles NW of the S end of Lihir.

Luise Harbor, a small bay formed between two mountain spurs, indents the E coast of Lihir Island. Anchorage can be taken, in 18.3 to 22m, with a prominent red rock bearing 276°, distant 0.25 mile. The N part of the bay is shoal. Farther in to the SW and offering more shelter from SE winds, there is anchorage in shallower depths. A shoal, with a depth of 5.5m, extends about 1.5 miles N from the NW extremity of Lihir Island.

A large open pit gold mining operation was established in 1997 on the E side of the island.

Sanambiet Island and Mali Island, with a small islet between them, stand on a reef close off the NE end of Lihir Island. The former is 37m high and the latter is 88m high; both are wooded.

Mahur Island is about 233m high, densely wooded, level topped, and has steep sides. There is a narrow sandy shore on the W side fringed by a narrow reef. The island is a good radar target from 19 miles, but gives a poor return from 28 miles.

Masahet Island is about 211m high and steep. A narrow white sandy beach with coconut palms fronts the E side of the island. Native settlements and landing places are situated on the SW side of the island.

9.6 The **Tabar Islands** (2°45'S., 152°00'E.) consist of Tabar Island, hilly with mountains rising to a height of 526m near the N end and 622m in the S part. Much of the coast is cliffy and steep sloping. The coast is fringed by a reef. Most of the settlements are situated on low ground near the shore. Tabar Island was reported (1971) to lie about 1 mile S of its charted position.

The Tabar Islands consist of the above island, Tatau Island, Simberi Island, and a few islets. The three large islands are mountainous and mostly covered with rain forests. Plantations and coconut groves are situated on the low ground along the coasts.

Tatau Island, 375m high, is close N of Tabar Island; its shores, indented by small bays and coves, are sand and pebbles closely backed by steep slopes.

Saraware Passage is the channel between Tabar Island and Tatau Island; the passage has a least depth of 16.4m and is about 90m wide at its narrowest point.

Simberi Island, separated from Tatau Island by a channel 1 mile wide between the fringing reefs, is circular in shape, 5 miles in diameter, and fringed by a reef. A dangerous rock has been reported to lie 4 miles W of the island. A volcanic cone slopes steeply to a height of 320m near the center of the island. The coast is steep, sloping, and cliffy, with some intervening stretches of sand. Some settlements are situated on the slopes near the shore. Reefs extend 6 miles from the W side of Simberi Island. Marwiu Islet and another islet are located on the reef on the NW side of the island. These reefs break heavily at times.

Anchorage.—With local knowledge anchorage can be taken, as follows:

1. For small vessels, in 9.1 to 18.3m, from 0.3 to 0.4 mile offshore, off a coconut plantation on the NW side of Tabar Island, about 1.3 miles from its N end.
2. For small vessels, at the NE end of the channel between Tabar Island and Tatau Island. This anchorage is fronted by a reef, marked by a beacon, and is considered preferable to the anchorage mentioned immediately above.
3. In 22m, in Sigarriga Harbor, sheltered by wooded hills. This harbor is about 0.3 mile within the SW entrance to the channel between Tabar Island and Tatau Island. It should not be attempted by vessels over 61m in length unless fitted with twin propellers.
4. Off the W side of Simberi Island, inside the reef, in 24 to 26m, poor holding ground. This anchorage should not be used during the Northwest Monsoon.

9.7 **Lyra Reef** (1°45'S., 153°20'E.), with its S end about 90 miles NE of Simberi Island, is a steep-to, submerged coral atoll, about 25 miles in diameter. The depths around the perimeter of the reef are generally less than 37m, and in places are less than 11m. The least sounding taken on the reef proper was 6.1m on its N side. Within the reef there are depths of over 183m, but this area has not been surveyed. A gap on the NW side of the reef gives access to this deep water. The limits of the reef and the depths are subject to change, so less water than charted may be found. Depths of more than 2,743m are found within 5 miles of the reef. Other dangers in the area include:

1. A reef reported in position 2°05'S, 153°31'E.
2. Breakers reported NW of the charted position of Lyra Reef.
3. A depth of 22m reported in position 2°03'S, 153°21'E.
4. A depth of 29m reported in position 2°01'S, 153°31'E.
5. A reef about 0.1 mile long in a N-S direction reported in position 2°02'S, 153°48'E.
6. Breakers and shoal water reported in position 2°11'S, 153°03'E.

New Ireland

9.8 New Ireland is long and narrow island located NE of New Britain in the Bismarck Archipelago. A chain of mountains forms the spine of the island and attains an elevation of about 2,149m in the broad S part. The mountain chain rises from low hills that are a short distance inland from the forked NW coast and extends the length of the island. Separating the mountains in the chain are four principal passes, three between 92m and 153m high, and the fourth about 610m high. Westward of Cape Sena, on the E side of the island, the interior is broken and the mountains vary in height.

The Lelat Plateau is located near the middle of the island. Mount Bongmut, 1,300m high and located 5 miles SW of Cape Lemeris, stands on this plateau. Between this mountain and Cape Sena, there are two prominent dips, with the range falling to a height of 92m in the E and 183m in the W.

The Schleinitz Mountains, NW of the Lelat Plateau, attain a height of 750m. Northwest of this range the mountains become lower and gradually fall to 213 to 244m. Mount Bokave, 500m high and prominent, is located about 40 miles SE of North

Cape. The land SE of this cape is nearly flat, but is slightly elevated in the interior.

The mountains are densely wooded to the summits and only the lower spurs are inhabited. The N coast is steep-to and has a clear passage between it and the off-lying islands. The NW part is of coral formation and reef-fringed.

Caution.—Vessels should pass outside of the islands off-lying New Ireland, or to the S of it due to the uncertainty of the depths off the island's NE coast.

New Ireland—Northeast Coast

9.9 Widely-separated groups of islands lie between 13 and 115 miles off the E and NE coasts of New Ireland. The wide channels between the island groups and those separating them from New Ireland are mostly clear and have depths in excess of 183m.

The NE and E coasts of New Ireland are reef-fringed; widely-scattered islets, detached reefs, and shoals are encountered within 2 miles of the shore. Shoal water is reported to extend seaward for about 4 miles from a position about 8 miles NE of Cape St. George.

Tides—Currents.—A NNE current, with a rate of about 1.4 knots, was reported to the E of the S end of New Ireland. Observations over an 18 day period in November and December in an area from 5 to 25 miles SE of Cape St. George showed an average set to the SW at a rate of a little over 1 knot. This current was remarkably uniform during the period in which it was observed. Numerous tide rips occur in this area.

The current off the NE coast of New Ireland, between Cape Mamorodu and North Cape, set to the SE at a rate of 0.5 knot during the Northwest Monsoon. The tidal currents along the NE coast set NW during the rising tide and SE during the falling tide. A reliable source has stated that currents usually run NW at a rate of about 1 knot off the NE coast of New Ireland.

Cape St. George (4°51'S., 152°54'E.), marked by a light, is the extreme S point of New Ireland and is dominated by a mountain range and the high and rugged land to the N.

Between Cape St. George and Lambonot Point, 1.75 miles NE, the coast is rugged and steep-to. Iro Island, which lies about 0.6 mile E of Lambonot Point, is the outer danger. Loumtas Rock is about 0.5 mile SE of the same point.

Lanisso Bay, entered between Lambonot Point and Cape Bougainville, 3 miles NE, offers some protection from N winds. Laussamanni Rock lies in the N part of the bay, 2 miles N of Lambonot Point.

Lavinia Cove indents the W side of Lanisso Bay. The water shoals rapidly within the entrance and the S side and head of the cove appear encumbered with foul ground.

Anchorage.—Anchorage, protected from W winds, can be taken, in 9 to 13m, within the bluff forming the S entrance point of the cove.

9.10 Between Cape Bougainville and East Cape, the coast is bordered with stretches of sand alternating with small swamps and cliffs. This coast has not been examined closely, but shoals have been reported to extend up to 4 miles offshore from a point 3.5 miles N of Cape Bougainville. Cape Bougainville is reported to be a good radar target at 19 miles. It has been reported that the Alas Islands, 10.5 miles NE of Cape Bougainville, are close to the shore and are not very prominent, but Tawau Island, 8 miles NE of the same point, is high, has a vertical rocky base, and serves as an excellent landmark.

Between **East Cape** (4°14'S., 153°06'E.) and Cape Matanatamberan, the coast, which is known as the Lauru District, has not been closely examined. The former point is about 61m high and is densely wooded for some distance, rising abruptly to a height of 381m.

Between Cape Matanatamberan and Cape Sass, 117 miles NW, the coast has not been completely surveyed; then to North Cape, it has only been partially examined. A mission station is situated at Kudukudu, about 13 miles W of Cape Matanatamberan.

Muliama Harbor, about 10 miles NW of East Cape, is formed by an off-lying reef that lies up to 2 miles offshore. The harbor is about 0.2 mile wide and has depths over 3.6m. Small vessels with local knowledge can find anchorage, in 10.9 to 12.8m, protected from all winds except those from the N and E.

On the W side of Cape Sena, off Kombon Plantation, anchorage is available, in 22m, uneven bottom, about 0.5 mile offshore.

Porpop Harbor, entered about 1.5 miles S of Cape Matanatamberan, is nearly 1 mile long in a NNW-SSE direction and 137 to 457m wide between reefs. Depths in the harbor are at least 14.6m.

9.11 Elizabeth Bay, entered between Cape Matanatamberan and Cape Dingra, is open to all but SE winds. It affords anchorage to vessels with local knowledge, in 35m, partly protected from the N by shoals and reefs. There are many villages around the shores of the bay.

Caution.—Between Cape Namarodu and a point about 8 miles SSE, there is a sunken barrier reef lying from 0.5 to 1.5 miles offshore. It is reported to have a depth of 4.9m; the sea often breaks on it. Vessels should give the coast a wide berth in this vicinity.

9.12 **Nabuto Bay** (3°38'S., 152°27'E.), entered W of Cape Namarodu, is fringed by a reef that extends 0.5 mile offshore. The W side and head of the bay are fringed by reefs which extend 0.65 mile and 0.25 mile offshore, respectively.

Namatanai Road indents the SE part of Nabuto Bay; there is a small inner harbor with its entrance between the reefs, about 90m wide, which affords good anchorage and shelter to small craft. There is a government station, post office, and airport at Namatanai. Bopire village is situated on the W side of the bay. There is a wharf in the harbor, with a depth of 3.7m alongside.

The depths in Nabuto Bay are very irregular and the bay is open to winds between the NE and NW. A heavy swell sets into the bay during strong SE winds.

Anchorage.—Anchorage can be taken, in 29m, in Namatanai Road, about 0.3 mile from the coastal reef, with a chapel bearing 205°. This leads over a bank, with depths of 12.8 to 16.5m, about 0.3 mile E of **Trapez Reef** (3°39'S., 152°27'E.).

Anchorage can be taken, in 20m, with the boathouse at Bopire in line with a depression in the mountain ridge bearing 261°. Caution is necessary as this range passes close N of a 4.6m shoal. Vessels up to 76m long can also anchor, in 18.3m, about 0.2 mile off the fringing reef on each side of the harbor.

Between Nabuto Bay and Karu Bay, about 20 miles NW, the coast is bordered by sandy stretches that are separated in most

places by low cliffs and steep rising slopes. Belik, a plantation village, is situated about 15 miles NW of Cape Namarodu. **Mumu Islet** (3°26'S., 152°16'E.) is about 0.3 mile offshore and about 3.5 miles NW of the plantation. The islet is 46m high and densely wooded. A small river, which is spanned by a bridge near its mouth, discharges into Karu Bay, S of the islet.

Anchorage.—Anchorage can be taken by large vessels with local knowledge, in 33 to 35m, in Karu Bay. The anchorage is sheltered from the N by Mumu Islet and on the E by a reef about 0.4 mile offshore. Vessels approaching from the N should pass close W of Mumu Islet, avoiding the fringing reef, and two reefs, each with a depth of 4.6m, about 0.3 mile and 0.4 mile SSW of the islet. These reefs can usually be distinguished.

9.13 Cape Panakondo (3°08'S., 151°46'E.) is a prominent projection 18 miles WNW of Cape Lemeris, which is also prominent. The coast, between Karu Bay and a position about 4 miles SE of Cape Panakondo, has some stretches of sand, but for the most part rises in cliffs and steep slopes that are the seaward edges of low, narrow terraces. Backing the low terraces are steep limestone slopes that culminate on the high plateau of the interior. Several small coconut plantations are near the shore, but elsewhere the coast and inland slopes are covered with rain forest.

Between a position about 4 miles SE of Cape Panakondo and Fangalawa Bay, the coast is fronted by sandy beaches. The sandy shores are broken by small cliffy headlands and swamps which surround the heads of some of the inlets. Backing the coastal lowlands are mountains, the slopes of which are cut by gorges that have swift streams flowing through during the wet season.

Between Fangalawa Bay and North Cape, the shore is low and sandy in most places. Low cliffs and steep slopes, which rise to low terraces, interrupt the sandy beaches. There are coconut plantations on the coast, but they rarely extend over 2 miles inland. On the lower slopes of the hills are many villages and settlements which have native gardens.

Kapsu Point (2°41'S., 151°02'E.) can be identified by an overhanging conical-shaped mountain, which is prominent among the chain of hills. Kapsu Road, about 2 miles SE of Kapsu Point, affords indifferent anchorage for vessels with local knowledge, in 24m, because of the heavy swell that sets into the bay, and to the confined space, within which a convenient depth can be obtained. Abreast the site of the trader's house, there is a boat passage leading through the reefs.

Beacons, which are not reliable, mark a 273° range to the anchorage.

North Cape (2°33'S., 150°49'E.) is low and covered with coconut palms.

St. George's Channel

9.14 St. George's Channel (4°30'S., 152°30'E.) separates New Ireland from New Britain and leads into the Bismarck Sea. It is one of the major shipping lanes for a passage between Australia and Japan, through the Solomon Sea. The channel is deep and clear of apparent dangers in the fairway. The passage is also used by vessels bound NW to the Caroline Islands and the Marianas Islands, and to **San Bernadino Strait** (13°00'N., 124°30'E.).

The channel is divided in two by the Duke of York Group in the N. From a position about 10 miles E of **Cape Gazelle** (4°19'S., 152°24'E.), the track leads N and NW to the vicinity of **Labur Bay** (3°39'S., 152°21'E.), passing through the narrowest part of Saint George's Channel between the Duke of York Group and the W coast of New Ireland. The passage appears deep and clear of dangers.

The Gazelle Peninsula, the E side of which forms the W side of St. George's Channel, consists of many mountain ranges. The principal of these are the Crater Peninsula and the Rembarr Range in the NE; the Gawit Range, the Raulei Range, the Karas Range, and other ranges in the NW; an unnamed range in the SE; and the Lakit Range in the SW. The peninsula is reported to be a poor radar target from 33 miles.

The 520m peak, 2.25 miles W of Adler Bay, which will be discussed in paragraph 9.19, is distinctive against the higher range inland.

Several prominent peaks are located in the NE part of the Gazelle Peninsula, particularly on the Crater Peninsula. Prominent among them are Mount Wunakokor, 777m high and located 15 miles WSW of Cape Gazelle; the Mother (Mount Kombiu), an extinct volcano, 658m high, and located 13 miles NW of the same cape; South Daughter (Mount Turanguna), 482m high, and North Daughter (Mount Towanumbatir), 591m high, about 1.8 miles SSE and 3 miles NW, respectively of Mount Kombiu. The last three mountains are an imposing and picturesque group.

Mount Tavurvur, an active volcano, 230m high, is W of Mount Turanguna; there are still other active craters on the inner side of the peninsula.

Winds—Weather.—Thick weather is reported to be an usual occurrence in the vicinity of the Duke of York Group during heavy SE storms.

Tides—Currents.—Between the entrance of St. George's Channel and a position about 230 miles to the SSE, the current was found to be setting S at a rate of 1.5 knots.

A current has been observed in St. George's Channel setting NNW at a rate up to 2 or 3 knots. North of the channel, a NW set of about 1 knot has been observed.

A vessel has experienced a S current running at a rate of 2.5 knots when passing through this channel.

During the Southeast Trades, there is an eddy current setting S close off the E coast of New Britain. A strong current sets round Cape Archway into Wide Bay, W of it and skirting the shore, and then sets out at Cape Cormoran.

A reliable source has stated that during SE winds, a NNW set of 3 to 4 knots may be experienced in the narrows of St. George's Channel. The same source also stated that NW winds diminish the rate of the current, but never reverse it.

The prevailing current appears, near the Duke of York Group, to set S, but it is affected by the monsoons. After a strong SE breeze, the current will be found setting to the N, but if this is succeeded by calm or light breezes, the current resumes its S direction.

The currents are stronger on the E side than on the W side of the Duke of York Group. They sometimes attain a strength of 2 to 3 knots on the E side of the group.

A report states that currents up to 4 knots have been experienced in the Duke of York Group during the Southeast Monsoon.

A 1 knot current setting in a W direction has been experienced in Gazelle Channel, but it did not extend beyond the channel limits.

Caution.—The SW side of New Ireland is steep-to, with all coastal dangers within 1.75 miles of the shore. The E coast of the Gazelle Peninsula, forming the W side of St. George's Channel, is also steep-to.

The Duke of York Group

9.15 The Duke of York Group, which consists of 13 islands, is in the N part of St. George's Channel. Duke of York Island, irregular in shape, is the largest island of the group. Makada Island, at the NW end of the group, and Ulu Island, at the SW end, are the only others of any size. They are 139m and 77m high, respectively. All the islands, with the exception of Makada Island, are low, densely wooded, and partly cultivated.

There are four harbors in the group; Mioko Harbor and Kerawara Harbor are located at the S end, while Balanawang Harbor and Makada Harbor are located at the N end.

There are several mission stations in the group. The principal settlement is on Mioko Island.

Mioko Harbor (4°13'S., 152°27'E.), the best harbor in the group, is sheltered, easy to access, and has good holding ground. Mualim Island is in the entrance of the harbor. Mioko Island, Utuan Island, and Ulu Island form the S and SW sides of the harbor. Duke of York Island forms the N side of the harbor. Mission stations are situated on these islands.

Tides—Currents.—Springs rise 0.7m and neaps rise 0.5m in the harbor. Tidal currents attain a rate of 2 to 3 knots in the passages.

Depths—Limitations.—There are depths of 10.9 to 14.6m in the harbor. East Passage had depths of over 14.6m in the fairway, but vessels drawing 4.9m or more should navigate with caution; local knowledge is advised. Northwest Passage, NW of Mualim Island, is foul.

Anchorage.—Vessels can anchor, in 12.8m, sand, about 230m N of the flagstaff on the SW point of Mioko Island. Care must be taken to avoid several shoal patches in the N approach.

Vessels should approach East Passage with the SW extremity of Mualim Island bearing 321°. This course leads about 0.1 mile NE of a 2.4m patch 0.2 mile E of the E extremity of Mioko Island. When nearing Mualim Island, the course should be altered to pass within 0.1 mile of its SW end, so as to avoid a spit, with a depth of 4.6m, that extends NE of the NE side of Mioko Island.

When the E end of **Utuan Island** (4°13'S., 152°28'E.) bears about 230° and is open to the NW extremity of Mioko Island, the course should be altered to the W until the flagstaff standing on the N side of a house on the SW extremity of Mioko Island bears 191°. Then a 191° course leads to the anchorage. This latter course leads close E of a 9.7m shoal, 0.4 mile NE of the flagstaff.

9.16 Balanuwang Harbor (Balanawang Harbor) (4°07'S., 152°28'E.), indenting the N end of Duke of York Island, is sheltered from all but N winds. Vessels can anchor, in 26m, about 0.2 mile from the head of the harbor. The anchorage is not recommended.

Kerawara Harbor, between Ulu Island on the N and Kerawara Island and Kabakon Island on the S, provides a sheltered anchorage. The SE entrance, between Mioko Reef, extending 1.75 mile W from the W end of Mioko Island and the reef enclosing Kerawara Island, is narrow and unmarked. The harbor should be entered only by small vessels with local knowledge.

Foul Bay, entered between the N end of Ulu Island and Nakukuru Point, appears to offer sheltered anchorage from SE winds. Foul ground extends up to 1 mile off the shores of the bay, leaving a small area in its center with depths of 40 to 61m.

Makada Harbor, between the NW side of Duke of York Island and Makada Island, can be entered from the NW or SW. It is suitable only for small vessels with local knowledge and with favorable light. Mission stations are situated along the shores of the bay.

Tides—Currents.—Springs rise 0.9m and neaps rise 0.6m in Makada Harbor. The flood current runs about 7 hours to the N and the ebb 3.5 hours to the S at a rate of 1 knot to 3 knots. The tidal current sets strongly through the SW entrance.

The **Credner Islands** (4°16'S., 152°22'E.), located between the Duke of York Group and New Britain, are low and densely wooded. Each islet is surrounded by a reef, with deep water between.

St. George's Channel—East Side

9.17 Between Cape St. George and a point of land 5 miles S of Labur Bay, about 78 miles NNW, there are stretches of rocks, sand, and pebbles. The greater part of the coast is composed of cliffs and steep slopes rising directly from the water's edge. Inland from the low portions of the coast and backing the cliffs and steep slopes that rise directly from the water's edge are narrow terraces and belts of low hills. Farther inland are the steep slopes of the interior mountains. Coconut plantations and grass-covered areas are found scattered along the coast; elsewhere, the coasts and inland mountains are covered with dense rain forest.

Kambotorosch Harbor (4°49'S., 152°53'E.), entered about 1.8 miles N of Cape St. George, is protected from the Northwest Monsoon by Lambom Island and Latau Island. Heavy gusts from the SE blow over the high land in the vicinity of the harbor. Small vessels can anchor, in 40 to 50m, with the E end of Lambom Island bearing 330° and the W entrance point of the harbor bearing 262°.

Gower Harbor, between Lambom Island and the coast, has depths of 68 to 95m in the fairway, but is too deep for anchoring.

Lassim Bay (Breton Harbor), entered about 1 mile N of Lambom Island, has two coves at its head, namely Lawanai Cove (English Cove) and Suir Cove (Irish Cove). The outer part of the harbor is deep, but the coves are suitable only for small craft with local knowledge.

Between the entrance of Lassim Bay (Breton Harbor) and Cape Waum, the coast is fringed by a narrow reef. The range of hills inland is about 610m high. A shoal bank, with a depth of 6.4m over its outer end, extends 0.4 mile SW from the S extremity of the cape. Watarea Rock lies 0.3 mile W of the cape. A rock, with a depth of less than 1.8m, is close N of Watarea Rock.

Lamassa Bay, formed between the coast of New Ireland, on the E, and Lamassa Island and Ningin Island, on the W, has considerable depths. A shoal depth of 3.6m is about 0.3 mile N

of Lamassa Island. Lamassa Island is 244m high. Ningin Island is between Lamassa Island and Cape Waum. A spit, with depths of 4.9m over its outer end, extends about 0.3 mile SE from the S end of Lamassa Island. A spit, with a depth of 4.9m, extends about 0.2 mile SE from the S extremity of Ningin Island. Port Sulphur, in the SE part of the bay, indents the NE side of Cape Waum. Sperber Point and Condor Point are 6 miles and 13 miles NW, respectively, of Cape Waum.

Anchorage.—Vessels can anchor off the NE side of Lamassa Island, about 0.1 mile offshore, in 55 to 64m. The best approach to this anchorage is S of Ningin Island. Small vessels can anchor in Port Sulphur.

Close S of Gilingil Point, anchorage is available, in 40m, about 0.2 mile offshore. This anchorage affords no shelter in any weather.

9.18 King Bay (4°24'S., 152°42'E.) is a slight indentation in the coast. King, a small village, is situated on the N shore of the bay. The King River discharges into the bay about 0.3 mile N of the village. Trees line the coast and there are palms in the vicinity of the village. Dangai Peak, E of the bay, is 778m high and prominent. Anchorage can be taken, in 39 to 48m, nearly midway between the village and the river mouth.

Between King Bay and Tambaker Point, the coast is fringed in many places by a reef that covers at HW. A bay indents the N side of Tambaker Point and has several small rivers flowing into it. A valley extends E from the head of the bay.

Between Huru Point and Cape Erkokon, about 16 miles ENE, there are many open bights. The mountain range, which rises to an elevation of 1,870m E of the former point, descends close to the coast along this stretch. Several mission stations are scattered along this coast.

St. George's Channel—West Side

9.19 The W side of St. George's Channel is formed by the E coast of the Gazelle Peninsula, which forms the NE part of New Britain. The Gazelle Peninsula has many mountain ranges.

Cape Archway (4°58'S., 152°15'E.) is formed by an archway of rocks projecting into the sea. Between the cape and Iltis Point, 19 miles NNE, the coast is backed by mountains attaining a height of about 1,174m.

Between Cape Archway and a position 18 miles S of Cape Gazelle, the coast is bordered by shores of rock, coral, and sand that alternate with cliffs and steep slopes. The coast is backed by narrow margins of low, undulating, and generally sparsely-forested terrain, inland of which are the steep densely-forested slopes of hills and mountains. In several places the margins of low ground are wide and are planted in coconut palms.

Between a position 18 miles S of Cape Gazelle to that of the cape, the shore is sandy in places. The sandy shores are interrupted by cliffs, which are the terminals of low ridges and isolated hills. Backing the sandy shores are areas of low, hilly, and undulating terrain. The coast is developed and is interspersed with many plantations.

Eber Bay, a slight indentation in the coast, is located 6 miles NNE of Cape Archway and is suitable only for small craft. An 8m shoal is located in the middle of the bay, about 0.5 mile off the mouth of a small river.

Adler Bay is a small cove located about 4 miles NNE of Eber Bay. It is of little commercial importance. The coast in the vicinity of Adler Bay is said to be steep-to.

Iltis Point, a salient point lying about midway between Cape Archway and Cape Gazelle, has a shoal, as defined by the 9.1m curve, extending some distance offshore. Vessels should give the point a wide berth.

Induna Island lies close offshore, about 5 miles N of Iltis Point. The island has been reported to be only a group of boulders. Anchorage, which is sheltered, may be taken by small craft, in a depth of 31m, sand, between the shore and a steep-to reef extending S from Induna Island; the anchorage is best approached from the N. A stranded wreck lies just SE of the anchorage.

Rugen Harbor, about 2.3 miles NNW of the small islet, is a landlocked inlet suitable only for small craft with local knowledge. A sawmill is situated on the N side of the harbor. Anchorage may be obtained, in a depth of 11.9m, sheltered from wind and sea, inside the harbor. There are shoals, with depths of 1.2 and 2.4m, close S and W, respectively, of the anchorage. These shoals are marked by beacons.

Tamalili Anchorage, an indentation in the coast located about 2 miles S of Cape Gazelle, is open to E and S winds. A reef, with depths of 3 to 9.1m, fronts the shore at a distance of from 0.2 to 0.5 mile. Depths of 37 to 55m are found within the reef, but the area is confined and is suitable only for small craft with local knowledge.

9.20 Cape Gazelle (4°19'S., 152°24'E.), marked by a light on its N side, is the end of a long spur from Mount Wunakokor. The cape is 46 to 61m high.

Cape Wanata, about 1 mile SSE of Cape Gazelle, is also marked by a light.

Between Cape Gazelle and Raluana Point, the shore is mostly sandy and interrupted by cliffs. Areas of low, hilly, and undulating terrain back the sandy shores.

Kabakaul, a village, is situated about 4 miles WSW of Cape Gazelle. There is a small pier at the village. A reef, which dries in places, extends up to 0.1 mile offshore between the village and Lesson Point.

9.21 Kokopo Roadstead (4°20'S., 152°17'E.) (World Port Index No. 56820) is formed by a bight in the coast between Lesson Point and Raluana Point, 6.5 miles WNW. There are no off-lying dangers, but at a position about 3 miles W of Lesson Point, a reef extends 0.25 mile NE from the coast. Its outer extremity is marked by a pipe. Kokopo settlement stands among an extensive coconut plantation on the shore. The District Officer's house stands on the 78m hill SW of the settlement and about 0.3 mile inland. There are some trading stores, a post office, and small machine shops.

Kokopo became the new capital of East New Britain Province after Rabaul was damaged by volcanic activity in 1994.

Depths—Limitations.—There is a mission station at Vunapope. Cement Wharf, near the mission, has 2.4m of water at its head, it is no longer in use (1969).

An L-shaped jetty is constructed at Vunapope Mission Station. The berthing face is 23m long, with an alongside depth of about 9m.

Anchorage.—Anchorage can be taken off Vunapope, in 46m, good holding ground, with Lesson Point and Mushroom Islet in line bearing 086°. Small vessels with local knowledge can anchor farther inshore, in 33m.

Caution.—A wreck lies alongside another jetty just E of the Cement Wharf

9.22 Blanche Bay is entered between Raluana Point and Praed Point. Raluana Point has a spit extending 0.25 mile seaward from it and a mission and trading station, with a small jetty, are 0.6 mile SE. Praed Point, at the foot of Mount Turunguna, has a mission village.

Karavia Bay indents the S shore and Matupi Harbor and Simpson Harbor indent the N shore of Blanche Bay. The N shore of the bay is overlooked by the three picturesque and magnificent mountain cones, with the rugged outline of two small volcanoes in the foreground. Mount Tavurvur is an active volcano.

There are several villages on the S shore with mission stations in most of them.

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View from Blanche Bay approaching Rabaul

Approaches to Rabaul

9.23 Mackenzie Shoal, the outer danger, has a depth of 5.2m and is about 0.5 mile SW of Praed Point; it is marked by a light.

The shores of Karavia Bay are rather steep-to, with deep water up to 0.3 mile offshore.

Between Praed Point and Sulphur Point, the coast is reef-fringed to a distance of 0.1 mile. A 3.3m shoal is outside the fringing reef, about 0.4 mile ESE of Sulphur Point. A wreck is stranded on the fringing reef N of this shoal.

The entrance of Matupit Harbor (Matupi Harbor) is 0.75 mile wide, but the channel, with depths of 22 to 55m, is only 0.25 mile wide between the 10m curves. A spit, with depths of less than 1.8m, extends 0.3 mile SE from the SE side of Matupit Island (Matupi Island). A detached shoal, with a depth of less than 1.8m, is on the W side of the fairway, E of the island.

The shores of Simpson Harbor are mainly sand with an occasional narrow reef. There are no dangers except for Dawapia Rocks (Beehive Rocks) and the shoal E of them. Dawapia Rocks are two prominent sandstone rocks lying in the middle of the S part of the harbor, and they are marked by a lighted beacon about 0.1 mile East. They stand on the SE part of a reef, about 0.2 mile long and steep-to. These rocks are each about 90m long; the N rock is 60m high. A 1.8m shoal is 0.1 mile E of the rocks.

Dawapia Rocks (Beehives Rocks)

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Dawapia Rocks (Beehives Rocks)

Caution.—It has been reported that Simpson Harbor is fouled with many wrecks, some of which are dangerous to navigation. Some of these wrecks may not be properly charted; further, depths and heights are based on datum that may be about 0.6m too low.

There is considerable pumice floating in the harbor, but it is not dangerous to navigation.

Volcanic action and seismic waves constitute potential dan-

gers in the area.

Hot salt water springs and boiling steam may be seen in numerous places around the N and E shores of Matupi Harbor. The gases in these springs give off a pungent odor. The floor of Matupi Harbor appears to be slowly rising due to volcanic action in the area, which is causing the land in the vicinity to tilt.

9.24 Karavia Bay indents the SW part of Blanche Bay, between Raluana Point and Vulcan Point. The latter point has 6.1m cliffs, backed by a wooded crater which rises to a height of 238m to the tree tops. The shores of Karavia Bay consist of a uniform range of hills rising steeply from the beach to a height of about 457m, about 0.8 mile S. The hills are wooded, except for some cleared areas. The beach is densely covered with coconut palms. The wreckage of several ships stranded on the shore are visible.

Albino Bay and Escape Bay are slight indentations in the N shore of Blanche Bay, between Praed Point and Sulphur Point. Both bays are backed by mountains, but there is some flat land between the mountains and the shore of Escape Bay.

Matupi Harbor is entered between Sulphur Point and Matupi Island. Matupi Island, 12.2m high, is joined by a causeway to the SW end of the Crater Peninsula. There are two mission stations on the island. It was reported that a prominent red and white radio tower stands about 0.3 mile NE of the charted church at Malaguna.

Simpson Harbor, on whose shores the port of Rabaul is situated, indents the NW portion of Blanche Bay. A government building and a hospital stand on Namanula Hill, E of the town. Missions are situated on the W side of the harbor.

Sulphur Creek indents the E shore just S of Rabaul. A hot spring is located on the N side of its entrance. The water in the creek is hot and salty. The airport, reported destroyed in 1997, is situated S of the creek.

Anchorage.—Karavia Bay is too deep for anchorage; however, temporary anchorage can be taken, in 18.3 to 26m, sand and coral, W of Raluana Point. Some protection is afforded from SE winds and swells.

Matupi Harbor offers protection from all but S winds. Vessels can anchor, in 10.9 to 37m, off the NE side of Matupi Island.

Rabaul (4°12'S., 152°11'E.)

World Port Index No. 56810

9.25 Rabaul, on the E side of the N end of Simpson Harbor, is the administrative center and port of entry for New Britain.

Winds—Weather.—The Southeast Trades usually commence in May, freshen considerably in July, August, and September, and then gradually subside. The wind increases during the forenoon and blows with great regularity until 1 or 2 hours before sunset, when, after an interval of calm, there is usually a land breeze. This is called the dry season, but in this case it only means that less rain falls than during the Northwest Monsoon. Dry weather for 2 or 3 weeks is exceptional.

The Northwest Monsoon starts in December and usually continues to the end of March. Calms and light airs, with usually very little rain, prevail between the seasons. The calm seasons are very sultry and oppressive. The Northwest Monsoon comes in as a strong squall, with the wind approaching a moderate gale force and blowing for days without ceasing, while very heavy rains fall continuously. Between these periods the weather is good, though frequently cloudy, and there also are many days of bright sunshine. The nights are rendered pleasant at nearly all seasons by the land breeze.

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Rabaul and Simpson Harbor

Day temperatures range from 30° to 33°C; night temperatures range from 24° to 25°C. The maximum temperature is 36°C, occurring quite frequently; the minimum is about 17°C. Abrupt variations hardly ever occur.

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Rabaul and Simpson Harbor

Tides—Currents.—The mean tidal rise at Rabaul is 0.4m, while the spring range is 0.6m. Little current is found in

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Rabaul and Simpson Harbor

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http://www.domeisland.com/destroyers
Bay Road Wharf

Blanche Bay.

Depths—Limitations.—Dawapia Rocks, two remarkable rocks located on the SE side of a steep-to rocky patch, lie in the entrance to Simpson Harbor. A beacon marks another patch, 0.1 mile ESE of the rocks.

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Bay Road Wharf

Four wharves exist on the N shore of Simpson Harbor. Bay Road Wharf, the W facility, is 152m in length, with alongside depths of 8m. A small craft wharf, with a depth of 2.7m alongside, stands close E of Bay Road Wharf. Blanche Street Wharf, 0.1 mile E of Bay Road Wharf, is 122m long, with an alongside depth of 8m. Kamaki Wharf, a converted wreck situated close E of Blanche Street Wharf, and a small craft wharf further E, have been reported to be disused (1982). Copra Products Wharf, 0.75 mile SW of Blanche Street Wharf, provides a berth 85m in length, with alongside depths of 6.4m. Several other wharves are situated about the harbor, with alongside depths of 1.8 to 3.9m. Tank vessels are handled at Blanche Street. Wharf.

Aspect.—The port area is surrounded by a high fence.

Pilotage.—Pilotage is compulsory and should be ordered at least 12 hours in advance, confirming 4 to 5 hours before arrival. Pilotage is available 24 hours, and may be obtained from a blue-hulled vessel 1 mile SE of the light shown S of Matupi Island.

Regulations.—See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for regulations pertaining to vessels within the waters of Papua New Guinea. The local authorities should be consulted for information on harbor regulations.

Signals.—Rabaul Radio (P2R) is a full service radio communications facility manned 24 hours. Both the pilot and the local authorities may be contacted through this station.

The pilot station may be contacted on VHF channels 6, 8, 12, and 16, from 0600 to 2145, or when a vessel is expected.

Anchorage.—Anchorage is prohibited within 0.1 mile of the range line and within the Prohibited Anchorage area, best seen on the chart. The Quarantine Anchorage stands off the harbor's head, and may best be seen on the chart.

The passenger ship anchorage, about 0.6 mile SSE of the front range light, has a depth of 20m and is best seen on the chart.

Directions.—The fairway from Cape Gazelle to Simpson Harbor is wide, deep, and marked by lights and a lighted range. Additionally, vessels have reported that visual and radar navigation was excellent.

Vessels bound for Matupi Harbor should alter course to 349° when the W edge of Rabalanakaia Crater bears 349°, and steer through the entrance on that course. When the center of Mount Tavurvur bears 096°, vessels can alter the course W for the anchorage.

Caution.—Vessels have reported that the pilot recommends

remaining to the W of the range line when entering Simpson Harbor to avoid silting which has occurred on the port's E shore. Vessels have also advised berthing between daybreak and 0800 to avoid the NW winds which set off the wharves.

Major volcanic activity occurred in the port area in 1994.

9.26 Between Praed Point and Cape Tawui (Cape Tavui) are narrow sandy shores, fringed by a reef and by shoal depths out to 0.5 mile in places. The shores are backed in places by narrow strips of flat and gently sloping terrain. Cliffs and steep slopes rise to high hills and low mountains just inland of the marginal coast.

Mount Kombiu is the dominant feature of this stretch of coast, which has several villages and mission stations. It was reported that a prominent microwave antenna stands at the peak of Mount Kombiu.

Cape Tawui (Cape Tavui), marked by a light, is the termination of a low spur of the coastal range of hills and is the N extremity of New Britain.

Between a point about 5 miles S of **Labur Bay** (3°41'S., 152°22'E.) and Komalu Bay, about 20 miles NW, the coast is bordered by low cliffs that rise to narrow terraces and steep sloping hills. Backing the hills and terraces are the steep forested slopes of a low mountain ridge that rises from the low pass SE of Labur Bay and slopes to a pass about 152m high located inland of Komalu Bay.

Between Labur Bay and Cape Strauch, a wooded tongue of land about 28 miles NW, there are many small inlets, villages, and small coconut plantations.

Between Komalu Bay and Katherine Harbor, about 45 miles NW, the greater part of the coast is bordered by sandy shores. In places, particularly along the SE part of the coast, cliffs rise close inland from the shore. A narrow plain extends NW along the coast. This plain is backed by the steep slopes of a high limestone plateau. The SE side of the plateau rises from the low pass located inland of Komalu Bay. The plateau, with an elevation of 1,480m, slopes to a pass about 610m high that is located inland of Katherine Harbor. Much of the coast and the inland plateau is densely forested, but there are several coconut plantations.

Kalili Harbor, SE of Cape Strauch, is a small reef enclosed bay. Pana Island, small and wooded, is close off the SE entrance point of the bay. The passage into the bay requires local knowledge and favorable light conditions to negotiate the 70m wide entrance. The anchorage in the bay is approached on course 050°, with two white beacons in line, and entering between two reefs, each marked by a pole. When between the poles, course is altered NNW in line on a second set of white beacons. Then steer between the reefs in the harbor as required. The anchorage stands in the center of the harbor, in depths of 13m to 22m.

9.27 **Katherine Harbor** (3°12'S., 151°39'E.) is a small indentation in the coast bordered by a fringing reef. It is about 0.2 mile long and can be identified by two wooded rocky islets which lie S of it. Katherine Harbor serves as a good radar target from 29 miles. Small vessels with local knowledge can take anchorage, in 50m, in the harbor, midway between the reefs on either side. The anchorage is open to the SW. Small streams discharge into the harbor. A large village is situated NNW of the harbor.

Between Katherine Harbor and a position abreast Dyaul Island, there are a few sandy stretches, but the coast is cliffy and steep. The steep slopes rise to narrow terraces backed by mountain slopes. The mountains increase in height from the high pass located inland of Katherine Harbor. The NW slopes of the mountains grade downward to a height of about 153m. Swift mountain streams that flow only during the wet season have cut deep ravines in the coast and the lower mountain slopes. The coast and inland mountains are densely forested, except for several coconut plantations near the shore.

Latangai Island (2°54'S., 151°09'E.) is connected with New Ireland by a reef, the S side of which is steep-to.

Dyaul Island is separated from the NW end of New Ireland by Gazelle Channel. Mount Bendemann, 226m high and prominent, is located in the N central part of the island. The remainder of the island has an average height of about 61m. Anchorage for small craft can only be obtained in the harbors, because the fringing reef is steep-to and caution is required because the indentations are encumbered with reefs.

The island is fringed by reefs, narrow at the E end, but extending up to 1.5 miles off the W end.

Mait Island stands on the reef that is separated from the W end of Dyaul Island by the narrow Mait Channel. The latter is foul, especially in the S part, and is only navigable by boats, and it is even dangerous for them. There are several boulders, above-water, scattered over the reef fringing the island. The reef has been reported as extending farther SW than charted. There are coconut and breadfruit trees at the N end of Mait Island. A light marks the S point of Mait Island.

Gazelle Channel, separating Dyaul Island from New Ireland, appears to be deep and free of dangers, except for coastal reefs. The S entrance is between Latangai Island and the E end of Dyaul Island. The W entrance is marked by Dietert Peak, 230m high, on the N side, and Mount Bendemann on the S side.

A W current, with a rate of about 1 knot, has been experienced in the channel, but it did not extend beyond the limits of the channel on the coast of New Ireland.

There are several small boat harbors along the part of the N Ireland coast that forms the N part of the channel.

New Ireland—Northwest Coast

9.28 **North Cape** (2°33'S., 150°49'E.), marked by a light, is low and covered with coconut palms. The coast SE of the cape has been previously described in paragraph 9.9.

The NW coast of New Ireland, between its NW point and North Cape, is composed of two peninsulas, between which lies Balgai Bay. Mud and sand borders the NW side of the SW peninsula and gives place to mangrove that extends around the bay. The mangrove is backed by low hills with swamps in many of the low depressions between them. The swampy area around Balgai Bay is the largest area of swamp on New Ireland.

Sandy shores are found along the NW end of the NE peninsula. Backing the sandy shore along the SW end of that peninsula is a broad area of low ground that gives place NW to a strip of low ground, about 91m wide, that is backed by a grassy ridge. The ridge is about 9.1m high, but in places it is almost

12.2m high and steep. Kavieng, the most important settlement on New Ireland, is situated close inland of the ridge.

The islands and islets lying between New Ireland and New Hanover are generally low and flat. Around the islands are reef-fringed stretches of sand that alternate with extensive areas of swamps and bordering mangrove. Some of the smaller islands and islets are almost barren, but most of them are wooded. Coconut plantations are found on the larger islands.

New Hanover is hilly and mountainous, with a maximum height of 875m located near the middle of the SW side of the island. The mountains decrease in height toward the S coast. The island slopes down sharply in the N to a flat plain. Mount Suilaua, about 3 miles S of the summit, is a sharp volcanic cone with a serrated peak, 566m high. Mount Deimling, 650m high and prominent, is about 9.3 miles ENE of Mount Suilaua. The mountain ridge divides toward the center of the island. The W extremity of New Hanover slopes up to Mount Pavialamis, 7.5 miles E. The peaks of the island are usually covered with cloud or haze.

Between the E coast of New Hanover and the NW end of New Ireland, there are many islands, reefs, and shoals. Two navigable and deep passages, Steffen Strait and Byron Strait, lead through these dangers. The former is the more important, as channels connect it with Kavieng Harbor.

The S and SW coasts of New Hanover are fringed by reefs, but seldom beyond a distance of 0.5 mile. The NW coast of the island is fringed with a reef to about 3 miles offshore. Many coral islets are on the reef.

A barrier reef is off the NE coast of New Hanover and extends in a SE direction to the entrance of Byron Strait. Several islands are on this reef.

Off-lying Islands and Dangers

9.29 Tingwon Group, 15 miles WSW of New Hanover, are three low wooded islets on the E part of a narrow reef which is apparently steep-to. The islets, composed of coral, limestone, and sand, are quite flat, but some have low dune-like ridges. Coconut palms are found on all the islets, and at the N end of Tingwon Island there is a thin forest and a small native village. A small craft anchorage is in a small cove about 1.5 mile WNW of the S point of Beligila Islet.

Caution.—It has been reported (1993) that the Tingwon Group lies 2 miles W of its charted position.

9.30 Tench Island (1°38'S., 150°43'E.) is 0.5 mile long, oval-shaped, and prominent from offshore. The W part of the island is densely wooded. Reefs extend up to 0.2 mile offshore, except for one place on the W side.

Emirau Island (1°38'S., 150°00'E.) is deeply indented and has some densely-wooded hills, about 37m high, on its N part. It is about 47 miles N of the W end of New Hanover. When seen from NW, it appears saddle-shaped towards its N end. There are stretches of sand around the island, but considerable parts of the island, particularly the NE coast, are composed of cliffs that rise from the water's edge or close inland from the shore. On the S part of the islands are stretches of mangrove and areas of swamp. There are several coconut plantations on the S part of the island. An air facility is situated near the middle of the N coast of the island.

Winds—Weather.—The Northwest Monsoon lasts from December through March. It is a season of sudden squalls, with calm weather in between. During the Southeast Monsoon (May to September), there is a steady continuous blow, with sudden squalls. Some very heavy storms from the SW occur during the doldrums, between seasons, which sometimes are a 4 or 6 weeks late or early. Average surface wind velocities are 5 to 6 knots during the afternoons. Land and sea breeze effects are negligible.

The heaviest rain occurs during the Northwest Monsoon. A maximum of 485mm per month occurs during July and August.

Tides—Currents.—Tides are irregular, but mostly of a diurnal nature. Springs rise 0.9m and neaps rise 0.3m.

Currents in the vicinity of Emirau Island set with the prevailing wind and are not strong. There are tide rips off the SW end of the island.

Depths—Limitations.—Emirau Island is fringed by a shelf of coral reef which, along the S and SW coasts, is surmounted by small islands and islets. Outside the fringing reef are several small shoal patches. The outer danger, a 9.1m shoal, is about 5.5 miles W of the SW end of the island. The shoal has a diameter of 320m. A shoal tongue, as defined by the 20m curve, extends 2 miles NW from Cape Tietgens.

A 5.5m shoal was reported about 1.5 miles NW of the N end of the island.

A 1.8m shoal, about 0.2 mile long, is about 0.5 mile E of the S end of the island.

A shoal area, about 0.3 mile long and having depths of 7.3 to 12.8m, is located about 1 mile N of the E end of the island.

Caution.—Emirau Island has been reported (1996) to lie 3 miles SW of its charted position.

9.31 Hamburg Bay (1°38'S., 149°58'E.) (World Port Index No. 56740) indents the N side of Emirau Island. The bay is 3 miles wide, between Cape Ballin and Cape Tietgens, the NW end of the island, and indents the coast to a distance of 2 miles. Two coral fingers extend into the bay from the fringing reef.

Tides—Currents.—A fresh SW wind sometimes causes a current to set through the harbor at a rate of 2 knots.

Depths—Limitations.—There are two piers in the harbor, one of which has a depth of 9.1m and can accommodate a vessel up to 107m long.

Anchorage.—Anchorage can be taken by small vessels with local knowledge, in 16 to 18m, near the head of the bay.

9.32 Eulolou Harbor is at the SE end of **Emirau Island** (1°40'S., 150°00'E.), between that island and Elomusau, a small islet located SE of the E end of the larger island. The entrance is from the S, passing W of a shoal. There is a shoal at the N end of the harbor and another in the middle of the fairway at the S end.

Anchorage.—Small vessels with local knowledge can anchor, in 11 to 15m, in the harbor, but the swinging room is limited. It was reported that the E end of Etuitui Islet, bearing 026° and just open of the E point of Emirau Island, leads to the anchorage.

In addition to the anchorages in the various harbors, vessels can anchor outside the Eulolou Harbor entrance in the open roadstead, where some shelter is afforded during the Northwest

Monsoon.

Vessels can take open anchorage off the S side of Emirau Island, between the S extremity of the island and the W extremity. The coastal reef is steep-to, but some protection is afforded from NE winds.

9.33 Mussau Island (1°30'S., 149°46'E.) is about 57 miles NNW of New Hanover. It is composed of terraces and folded ridges that rise to a peak about 651m high near its mid-part. The terraces rise very steeply in some places in steps of 91 to 305m, but the terrace surfaces are mainly ranges of small hills. On an E bearing, Mussau Island appears wedge-shaped, with the steeper side of the wedge being to the S.

Sandy shores extend around the coast, but a considerable part of the island is ringed by high cliffs that rise at varying distances inland from the shore. The island is covered with rain forest, interspersed with areas of light scrub and grass. Coconut plantations and villages are found along the E and S sides of the island.

A trading station is situated on Ekaleu Islet, 6 miles W of the S end of Mussau Island.

Tides—Currents.—A strong W or NW set is frequently encountered in Melle Channel. Between Mussau Island and Emirau Island a similar current is often met.

The current sets WNW at a rate of 1 knot between New Hanover and Mussau Island.

Depths—Limitations.—Melle Channel, the passage between the reefs, was reported to be clear of dangers, except for Pieho Reef. It should, however, only be used by small vessels with local knowledge.

Anchorage.—A vessel has anchored, in 35m, to the SE of the trading station on Ekaleu Islet.

A sheltered anchorage can be taken, in 16m, in the entrance of Elueke Bight, about 3 miles S of the N end of the island. The N end of Mussau Island, bearing 001°, and the mouth of the N stream emptying into the bight bearing 122°, serve as anchor bearings.

Caution.—Mussau Island is fringed by a reef that broadens to a width of 2 miles along the S coast.

Mussau Island has been reported (1985) to lie 2 miles SW of its charted position.

Several small islets stand on the reef fringing the S coast of the island. South of the reef and separated from it by a narrow deep passage, known as Melle Channel, is an atoll on which lie several small islets. Pieho Reef, visible even in a heavy sea, is located at the E entrance of the channel, about 1.3 miles S of the S end of Mussau Island.

Kavieng Harbor—Approaches

9.34 Steffen Strait, deep and clear in the fairway, is entered from the S between the W end of Baudisson Island (Binnegem Island) and Selapiu Island. The strait leads in a N direction to its intersection with Nusa Channel. Baudisson Island, separated from New Ireland by Albatross Channel, has several villages on it. Cape Jeschke, the W end of Baudisson Island, is fringed by a reef which is steep-to and has several drying rocks on it.

A chain of islands extends N from the NW end of Baudisson Island and forms the E side of Steffen Strait. This group consists of Kulinus Island (Kulaumis Island), Nonowau Islandl (Nanavaul Island), Wadei Island (Vutte Island), Nusaum Island, and Lemus Island; there are many reef-fringed islands E of the above-named islands. The W side of Steffen Strait is formed by Selapiu Island, Ribnitz Island, and Bangatang Island.

All of the above islands are tree-covered and are more than 30m high; Selapiu Island, the highest, is 127m high.

Tides—Currents.—Tidal currents in Steffen Strait attain a rate of 2 knots, setting N on the flood, and S on the ebb.

Depths—Limitations.—Steffen Strait has depths of more than 18.3m in the fairway. A shoal, with depths of less than 1.8m, is 2 miles E of the S end of Selapiu Island. A 7.3m shoal is E of this last shoal, about 1 mile SW of Cape Jeschke. A 3.6m shoal is N of the same shoal, about 1 mile SW of Cape Jeschke. A 4.9m shoal lies about 0.7 mile WSW of Cape Jeschke. A bank, with a least depth of 18.9m, has been reported about 1.3 miles WNW of the SW end of Baudisson Island.

Albatross Channel, separating New Ireland and Manne Island, has depths of as little as 2.1m.

Kulinus Passage (Kulaunus Channel), separating Kulinus Island and Nonowaul Island, and connecting Steffen Strait with Silver Sound, is deep in the fairway, but has a 7m shoal in mid-channel, about 0.5 mile NE of the N end of Kulinus Island; the fairway is between this shoal and Kulinus Island.

Lisseno Number 1 Island, 45m high, is at the E end of the sound. Foul ground, with a depth of 1.5m near its end, extends about 0.6 mile WNW from the islet. Several shoals, with depths of 3.9 to 5.5m, are within 0.5 mile WSW of the islet. A patch, with a depth of 2.4m, is 0.5 mile N of the leading line, about 1.5 miles W of the islet. A 5.5m shoal is nearly 1 mile WNW of the islet.

Nusa Channel, deep and clear in the fairway, connects Steffen Strait with Kavieng Harbor. Wadei Island, Ungan Island, Kabotteron Island, the Enuk Islands, and Usien Island (Nausen Island) form the S side of the channel. A number of reefs and shoals are near and between the islands on the S side of the channel.

Lemus Island, Nusaum Island, Nusalomon Island, and Edmago Island form the N side of the channel. These islands are all fringed with reefs.

Aspect.—A light shown from the SE end of the reef off the E side of Selapiu Island marks the S entrance to Steffen Strait. Range beacons, marking a 055.5° range, are situated on the W side of the reef extending W from Kulinus Island and on the N side of the same island. Range lights, in line bearing 081°, mark Nusa Channel.

Anchorage.—Protected anchorage can be found in suitable depths on Silver Sound.

Directions.—Albatross Channel should only be used by small vessels up to 61m long, with local knowledge, because the dangers are unmarked.

Vessels approaching Steffen Strait from the S should pass inside of Dyaul Island, keeping over to the New Ireland side. Large vessels should proceed toward the bluff, steep-to, and densely wooded S end of Selapiu Island. The island can be readily identified by Mausoleum Berg, 124m high and flat, 2.75 miles NNW of its S end. Vessels should steer to pass about 0.5 mile E of the S end of the island. The 053.5° range situated on Kulinus Island and the reef to its W leads between

the reef E of Selapiu Island and a 4.9m shoal. Strong rips occur near the S end of the reef E of Selapiu Island. When the W end of Lemus Island bears 001°, steer on that course for it. If proceeding for Nusa Channel, round the N end of Wadei Island (Vutte Island), so as to pass in mid-channel between that island and Nusaum Island, then steer a course with the S end of Edmago Island bearing 075°. When the light shown from Cape Siwusat (Cape Sveusat) bears 081°, steer for it on that bearing. When the beacons standing N of the wharf at Kavieng are in line bearing 034°39', steer for them.

Vessels approaching Steffen Strait from the N should enter the Strait by passing between Bangatang Island and Lemus Island; then round the S end of Lemus Island and proceed as directed in the S approach. Passage between any of the islands forming the N side of Nusa Channel is not recommended.

Vessels may also enter Kavieng Harbor via Silver Sound, which is less desirable than via Nusa Channel. Enter Steffen Channel either from the S or N as directed above. When Kulinus Passage (Kulaumus Channel) opens, alter course to pass between Nonowaul Island (Nanavaul Island) and Kulinus Island (Kulaumis Island). The N end of Lisseno Number 1 Island, in line bearing 072° with the N side of Usienlik Island (Usseinlik Island), leads through Silver Sound. Usienlik Island is 25m high and is 2.5 miles ENE of Lisseno Number 1 Island. Care must be exercised to avoid the charted shoal spots close to this islet. When the E end of **Schneider Island** (2°38'S., 150°43'E.) bears 010°, course should be altered to that bearing until the 116m summit just N of Mausoleum Berg is in line with the S end of Kabottern Island on a bearing 260°. Then bring this bearing astern. When well-passed Globig Island, steer to pass between Globig Island and Usien Island (Nausen Island), taking care to avoid all charted shoal spots; then steer in on the courses previously given for Nusa Channel and Kavieng Harbor.

9.35 **Kavieng Harbor** (2°35'S., 150°48'E.) (World Port Index No. 56760), the administrative center for the New Ireland District, is the port of entry for that district. It is also the principal port in New Ireland. Copra is the principal export. Cargo is worked by ships gear.

Winds—Weather.—Winds are generally from the NW.

Tides—Currents.—Tidal currents in the harbor are strong; the ebb sets S and the flood N. The rate is generally about 2 knots, but up to 6 knots have been reported.

Depths—Limitations.—Nusa Channel has a width of about 0.3 mile between the 10.9m curves at its NE intersection with Kavieng Harbor. Vessels with drafts up to 9.1m can enter the harbor through this channel. The fairway has depths of 18.3m or more.

Nissel Passage and North Entrance are limited to small craft with local knowledge.

The wharf, situated on the E side of the harbor, provides a berth 94m in length, with alongside depths of 7m.

Kavieng Harbor is formed between the NE end of New Ireland and Nago Island, Nusalik Island, and Nusa Island, which stand on an extensive reef.

Pilotage.—Pilots are available from Rabaul upon advance request. There are no tugs available.

Anchorage.—Anchorage is available, in a depth of 20m, sand, with East Reef Light bearing 042°, distant about 0.4 mile.

Photo by Robert Eklund http://www.roberteklund.info
Kavieng Harbor

Anchorage is also available, in 14.6 or 16.4m, N of Lisseno Number 1 Island and in Silver Sound, discussed previously in paragraph 9.34.

The quarantine anchorage is situated 0.75 mile SSW of the wharf, and may best be seen on the chart.

Caution.—A submarine cable extends from the SE end of Nago Island NE across Nusa Channel; anchorage is prohibited in the vicinity of this cable.

Moritz Rock, 2.7m high and about 0.5 mile WSW of the SW end of Patio Island, is on a narrow reef which extends almost 1 mile WSW of that island. An 8.2m shoal is about 0.5 mile SW of Moritz Rock.

Alexander Passage is clear and has depths of 21.9 to 25.6m in the fairway.

Senta Pass, between Patio Island and Tsoilaunung Island (Tsoi Launung Island), is suitable only for small craft with local knowledge, because its inner part is foul.

9.36 Byron Strait, with depths of 20.1 to 31.1m in the fairway, is an alternate main channel through the cluster of islands and reefs W of the W end of New Ireland. It passes between Selapiu Island and Kawang Island and an unnamed island immediately NE of Kawang Island on the E, and Patio Island, Nubils Island (Nub Island), and many small islands and reefs SW of Nubils Island on the West. Patio Island and Nubils Island are densely wooded. The S part of the strait is only 0.25 mile wide and is bordered by reefs on either side, which converge at the S entrance, reducing the width of the channel with moderate depths to 366m, and of the channel with over 10.1m to 183m. The N part of the strait is wide and deep between the fringing reefs. A shoal depth of 7.3m is about 5.8 miles NNW of the N extremity of Kawang Island.

Byron Strait should only be used under favorable light conditions, as the fairway has a width of about 0.1 mile at its S entrance. Tidal currents in the strait set NE on the flood and SW on the ebb, attaining rates of 2 knots.

Planet Channel, Chamisso Channel, and Mascot Channel (Mascotte Channel), W of Byron Strait, are subsidiary entranc-

es to the inner waters. They connect with Alexander Passage and Ysabel Passage and should be used only by small vessels with local knowledge.

Alexander Passage (Alexandra Pass) is the main entrance from the S to Ysabel Passage and to the waters inside the barrier reef on the E side of New Hanover. The pass is entered from about the middle of Byron Strait through a 0.75 mile wide gap in the barrier between Nubils Island and Patio Island.

Entering through the S entrance, bring the S point of Utokol Island (Utukul Island) to bear 008° and steer for it on that bearing. Caution is necessary because the greater depths are found on the E side of the entrance. Then, when inside the entrance, vessels should then keep more to the W side of the strait where the reef is steep-to and more easily seen. The reef on the E side slopes gradually and detached rocks are off of it.

Anchorage.—Anchorage can be taken in the S part of Byron Strait, or in the wider part of Alexander Passage, in depths of 26 to 29m. The Byron Strait anchorage is exposed to S winds.

New Hanover

9.37 New Hanover (Lavongai Island) is separated from the NW end of New Ireland by a group of islands on either side of Steffen Strait and Bryon Strait.

The S coast appears to be fringed with a reef which is steep-to; there are no known offshore dangers.

Metanas Harbor (Metanus Harbor), 11 miles W of the S entrance of Byron Strait, is small, but sheltered. The depths range from 29 to 42m; there is anchorage space for three vessels up to 79m long. Larger vessels must moor. Bat-Tam Island, forming the E side of the entrance, is prominent because of its tortoise-like shape. Only vessels with local knowledge should attempt entry; they should pass close off the island when entering.

Lobungai Harbor (Lavongai Harbor), a small cove, is 4 miles W of Metanas Harbor. A mission station, with a large church and a coconut plantation, is on the shores of the harbor.

Cape Botiangim (2°41'S., 150°11'E.) is rounded and wooded. It is reported to be a poor radar target from 20 miles. Baongung Harbor (Baungung Harbor), a small bay 8 miles NW of the cape, is open to the SW. A river discharges into the N part of the bay. A native village, marked by surrounding cultivated land, is on the E shore of the bay near its head. Vessels with local knowledge can anchor, in 37 to 55m, near the village.

Cape Matanalem, the W end of New Hanover, is low and apparently a coral formation. West Harbor is suitable only for small craft with local knowledge.

A barrier reef with many islets is off the NE coast of New Hanover and extends to Byron Strait, which has been previously discussed in paragraph 9.36. Nemto Island, 6.3 miles E of the N extremity of New Hanover, is at the W end of the barrier reef, and Patio Island is at the S end. A conspicuous stranded wreck is reported 1 mile E of Nemto Island.

Ysabel Passage, between the NE and E coasts of New Hanover and the barrier reef, is sheltered throughout and provides an inner passage for small vessels with local knowledge. The S part of the pass is foul and should only be attempted under favorable conditions of light. Depths of 8.7 to 22m are found along the recommended track.

The best entrance from the S is through Byron Strait and Alexandra Pass. The channels W of Byron Strait are suitable only for small vessels with local knowledge. These channels have been previously discussed in paragraph 9.36.

The best entrance from the NW is between Nemto Island and New Hanover. This entrance is 3.5 miles wide and deep in the fairway, except for a 6.4m shoal about 3 miles NW of Nemto Island.

Northeast Passage (Northeast Pass), with a depth of 7.6m, is the fairway and 1 mile wide, 5 miles SE of Nemto Island; the sea is reported to break in this passage.

Middle Reef is about mid-channel in Ysabel Passage, just E of the junction with Northeast Passage.

Anchorage.—Vessels can anchor in convenient depths in the wide NW part, or in the clear area of the S part, of Ysabel Passage. A vessel has anchored E of Cape Entrance, near Ungalik Island, 2.75 miles ESE of the cape, with the extremities of that island bearing 079° and 112°, and Nemto Island bearing 062°, distant 2 miles.

The NW coast of New Hanover, between **Cape Entrance** (2°21'S., 150°13'E.) and Cape Matanalem, has a belt of low land extending to the foot of the hills. Several low islands stand on the barrier reef, which is apparently steep-to and is up to 3 miles offshore. Navigation between these islands and New Hanover is limited to small vessels with local knowledge.

New Britain

9.38 New Britain is a large crescent-shaped island between the S part of New Ireland and the NE coast of New Guinea. The Gazelle Peninsula, the NE part of the island, is mountainous and is the scene of volcanic action. The aspect of this peninsula has been previously described in paragraph 9.14. A high and very rugged range of mountains extends through the length of the island. Mount Uluwun, the highest peak and an active volcano, 2,300m high, is about 53 miles SSW of the NW point of the Gazelle Peninsula.

New Britain is covered with virgin forest; even the volcanoes are mostly covered to their summits. There are a number of fairly large rivers and some protected harbors.

New Britain—South Coast

9.39 The S coast has some swamps, but in most places sandy shores alternate with cliffs and steep slopes. Inland of the sandy shores and backing some of the cliffs are strips of low, undulating, and hilly terrain, narrow in most places, but extending considerable distances inland near the W end of the island.

The S coast is hilly and has a series of raised coral terraces, the highest of which are found along the SE half of the coast. Here the highest of several terraces rise to a height of 457m. Cliffs, with an average height of 61m, are found along the SW part of the S coast, between Cape Merkus and extending almost to Cape Bali.

The S part of New Britain has a uniform skyline which becomes more elevated toward the NE, except for the S peak in a volcanic cluster near the W end of the island.

Dampier Strait is about 13 miles wide between the W end of New Britain and Umboi Island. The latter is volcanic, mountainous, and rises to a height of 457m. The E side of the strait is steep and rugged. It is backed by mountains that attain a height

of nearly 1,829m.

9.40 The S coast of New Britain is mostly steep-to. Between **Cape Archway** (4°58'S., 152°15'E.) and Cape Merkus, the coast is apparently free from dangers beyond a distance of 3 miles. The remainder of the S coast of New Britain is fronted by reefs, shoals, and reported dangers to a distance up to 20 miles.

Dampier Strait has a swept channel with a depth of 18.3m leading through the dangers. Its S approach is obstructed by a number of dangers, separated by deep-water passages which may be navigated with the sun in favorable position.

Vitiaz Strait, which is described in Pub. 164, Sailing Directions (Enroute) New Guinea, should be used in preference to Dampier Strait.

The **Arawe Islands** (6°06'S., 148°58'E.) front the coast of New Britain for a distance of 15 miles NW of Cape Merkus. They extend up to 7.5 miles offshore, and the navigation among them is very intricate. Kaptimati Island (Kauptimete Island) is the outermost islet; it is located 5 miles W of Cape Merkus and is reported to be a good radar target from 21 miles.

Caution.—The S coast of New Britain has not been completely surveyed; there may be dangers in addition to the numerous charted ones.

Breakers have been reported about 20 miles W of **Bowen Shoal** (6°05'S., 148°40'E.).

Visibility is greatly reduced along the S coast of New Britain during SE storms.

9.41 **Cape Archway** (4°58'S., 152°15'E.) has been previously described in paragraph 9.19 as a part of St. George's Channel.

Wide Bay, between Cape Archway and Cape Cormoran, is clear and deep. Cape Cormoran is high, vertical, and cliffy.

Jammer Bay, entered 4.5 miles W of Cape Archway, affords anchorage, in 11 to 16.5m, on a ledge at the head of the bay. This ledge falls off steeply to 55m. The anchorage is open to all but NW winds.

Henry Reid Bay (5°00'S., 152°00'E.), at the head of Wide Bay, is about 4 miles wide between Zungen Point and South Point. Zungen Point is about 13.5 miles W of Cape Archway. The shore is mostly reef free; where reefs do exist they do not extend more than 55m from the shore. The N shore of the bay is intersected by the mouths of two small rivers and is low and densely wooded.

Brown Island is close to shore, about 1 mile NW of South Point. A 5m shoal is 1 mile NE of the island, and on the N edge of this shoal is a rock, awash. A line of sunken rocks is about 0.2 mile SE of the island.

Anchorage can be taken, in 27.4m, with Zungen Point bearing 153°, distant 0.5 mile.

Between Cape Cormoran and Cape Orford, the coast is backed by a volcano and a mountain range. The latter cape is high and prominent. Between this cape and Cape Kwoi, 18 miles WSW, the coast is high, steep, and densely wooded. Kway Peak, about 549m high and about 7 miles NW of Cape Kwoi, is a prominent isolated mountain. It appears conical in shape when viewed from the E.

A light is shown in the vicinity of Cape Orford.

Jacquinot Bay is entered between Cape Jacquinot, about 12 miles W of Cape Kwoi, and Cape Cunningham, about 8 miles SW. The latter point is low and covered with bushes. A chain of reefs is up to 0.3 mile offshore to W of this point: The bay is reported to be clear of dangers and to be very deep. There is an observation pillar on Observation Point, about 3.5 miles WNW of Cape Cunningham. There are several native villages on the S shore of the bay.

Anchorage.—Anchorage can be taken off the cove which is about 0.8 mile S of the observation pillar. Small vessels with local knowledge can anchor between the before-mentioned chain of reefs and the main island.

Pomio Village is situated on the N shore of Jacquinot Bay, about 7.5 miles NNW of Cape Jacquinot.

Two leading beacons, in line bearing 352°, lead through the entrance in the reefs, where the channel is about 55m wide.

Pomio Harbor, formed by two reefs between 0.1 and 0.2 mile offshore from the village, is sheltered and has general depths of 14.6 to 18.3m. Vessels up to 40m long can be accommodated. There is a wharf at the E end of the harbor, about 21m long, with depths alongside of 4.5 to 5.5m. There is foul ground E of the wharf.

9.42 Between Cape Cunningham and **Cape Beechey** (5°56'S., 151°12'E.), the coast is regular and steep-to. The coast, SW of the latter cape, consists of deep bays, separated by low points, and backed by land that attains a height of 914m, about 7 miles inland. Small vessels with local knowledge can anchor W of the reef off the cape. Cape Dampier, 11 miles SW of Cape Beechey, is high, steep, and prominent. A group of rocks is charted W of Cape Dampier.

Montagu Harbor, entered W of a point located about 10 miles W of Cape Dampier, is open to SW winds.

Vahsel Harbor, entered between Hedele Point and Roebuck Point, about 1 mile SW, is partially exposed to SE winds. The former point, about 6 miles SW of the NE entrance point of Montagu Harbor, has a reef on which the sea breaks heavily, extending 183m S from it. Roebuck Point is 50m high, flat, and backed by some conical peaks. Extending E and NE for a distance of 0.6 mile from the point is a reef on which the sea breaks heavily. A small mangrove-covered islet lies close within the N extremity of this reef. An islet stands on a reef, about 1.5 miles E of Roebuck Point.

Anchorage can be taken by small vessels with local knowledge, in 3 to 4.5m, in the SW part of Vahsel Harbor. Vessels approaching the harbor should pass N of the mangrove-covered islet, and not less than 0.15 mile off it because of its fringing reef.

Fulleborn Harbor, entered about 8 miles WSW of Roebuck Point, is bounded on the E by Cape Schirlitz, conspicuous for its flatness. A large reef, which breaks heavily, divides the entrance into two channels; the E channel is reported as being deep. Anchorage can be taken in moderate depths in either of the coves at the head of the harbor.

Linden Harbor, between the mainland and several off-lying islands connected by reefs, affords anchorage, in 29 to 37m. There are five entrances into the harbor, the W of which has a depth of 7.3m. Some of the channels are very narrow. The edges of the reefs are steep-to, as is the shore of the mainland in the E part of the harbor. Coconut plantations line the shore of the harbor.

Thilenius Harbor (Gasmata), about 8 miles W of Linden Harbor, is sheltered by a chain of islands, within which are several islets and reefs. The E entrance is the main entrance.

Ablingi Harbor, entered between Awob Point and Cape Kablungu, 5 miles WSW, is open to S winds. The latter point is precipitous and about 30m high. A river discharges into the head of the harbor. A reef extends from Awob Point; close S of the point is Ablingi Island. A light is shown on the S side of Ablingi Island.

Anchorage.—Anchorage can be taken by vessels with local knowledge, in 4.5 to 9.1m, on the W side near the head of the harbor. The anchorage is protected from the S by a projecting point.

9.43 Luschan Harbor (6°18'S., 150°01'E.), entered W of Cape Kablungu is open to SW. It affords anchorage, in 28m, S of the entrance of the Johanna River.

Between Luschan Harbor and **Cape Bali** (6°19'S., 149°41'E.), the coast is indented by some open coves and is fronted by numerous islands and reefs to within 3 miles of the shore. The latter point is high and has round thickly-wooded projections. Cape Bali is reported to be a poor radar target from 27 miles. About 10 miles W of Cape Bali and about 4 miles offshore are the Aweleng Islands, which are low. Breakers have been reported to the N of these islands.

Mowe Harbor, entered about 9 miles NW of Cape Bali, is protected by three high islands, inside which are several small coral patches which may easily be avoided. A reef, with rocks above water, is close SE of Geglep Island, the SE island. Alau Passage, N of Ganglo Island, the N island, is considered to be the best entrance. It presents no difficulty as the reef fringing the NW end of the island shows clearly. Anchorage can be taken in the N part of the harbor, W of Ais Island, in 10 to 22m. The islet is located close off the E shore, about 1 mile ENE of the NW of the of Ganglo Island.

Between Mowe Harbor and Cape Merkus, the coast is indented by a wide bight. A number of small rivers flow out through this coast which is from 91 to 122m high. Some reefs and islets are close off the NE corner of the bight. The Pulie River, which discharges between two hills located about 8 miles NE of the cape, causes discoloration of the water as far W as the cape.

9.44 Arawe Harbor (6°09'S., 149°02'E.) is located between Cape Merkus, on the N and E, Pilelo Island, on the S, Arawe Island, on the SW, and by Ausak Island and Kumbun Island, on the W and NW. The cape is fringed by a drying reef which extends about 0.1 mile SW. The shore NW of the cape is also fringed by reefs and fronted by several detached reefs. There are three entrances to the harbor, one N of Pilelo Island, and the others E and W, respectively, of Arawe Island. A small jetty is about 0.3 mile N of Cape Merkus.

Pilelo Island, 44m high, is fringed by a narrow reef. It lies S of and is separated from Cape Merkus by a deep channel which is about 0.4 mile wide.

Arawe Island and Ausak Island, separated by Kumbun Passage, are fringed by reefs. The latter island is connected by reef on its S side to the E end of Kumbun Island.

Caution.—A reef lies 0.5 mile E of the N end of Arawe Island. A 7.3m shoal lies 0.5 mile W of the jetty. A 3.7m patch lies N of this shoal, about 0.5 mile WSW of the jetty. A reef lies 135m WNW of the jetty. A larger reef lies about 0.2 mile WNW of the jetty.

A 9.1m depth lies about 411m W of the jetty. A foul area extends 183m off the N side of the E end of Arawe Island.

Between Cape Merkus and **Cape Bushing** (5°50'S., 148°34'E.), the coast is fronted by the Arawe Islands and some off-lying reefs. Several bays, with small rivers entering them, indent this coast. The points separating the bays are of moderate height and appear as islands from a distance. **Cape Peiho** (5°56'S., 148°45'E.) is a prominent headland.

Caution.—The waters off the W coast and off the W part of the S coast of New Britain have not been completely surveyed. Dangers other than those charted may exist.

Dampier Strait

9.45 Vitiaz Strait, which is described in Pub 164, Sailing Directions (Enroute) New Guinea, should be used in preference to Dampier Strait.

Dampier Strait is about 13 miles wide between Grass Point, the W extremity of New Britain, and Cape Umboi, the E end of Umboi Island. There are many dangers in the S part of the strait, but there are deep channels which can be navigated under favorable conditions of light.

Whirlwind Reef, in the N approach to Dampier Strait, about 44 miles NNW of Cape Glouchester, consists of a sand cay which dries 0.3m standing on the N edge of a reef. The latter is about 2 miles long and has the shape of a horseshoe. Some rocks, from 0.3 to 0.6m high, are about 3 miles N of the sand cay.

In 1989, Whirlwind Reef was reported to lie 1.25 miles NE, and the rock 1.5 miles E of their respective charted positions.

Between Cape Bushing and Grass Point, the coast is fringed by a narrow reef. The E part of this coast is fronted by several reported dangers. The latter point has a number of grassy fields in its vicinity; the remainder of the coast is wooded. Mount Tangi, 1,548m high, and Mount Talawe, 1,827m high, back this coast and serve as prominent landmarks.

The N part of this coast, between Lagunen Point and Dorf Point, is cliffy and from 15 to 30m high. A lagoon lies beyond the former point, within the fringing reef. There are several villages along this coast. Cape Glouchester, the NW extremity of New Britain, will be described later in paragraph 9.53.

Ritter Island (5°31'S., 148°07'E.), 137m high and steep, is about 12 miles WNW of Lagunen Point.

Caution.—Ritter Island has had an active volcanic career. A submarine volcano, which last erupted in 1974, lies close S of the island. The area should be given a wide berth.

Sakar Island, partly wooded and formed by a volcano, is 998m high. The mountain slopes gently to the sea in all directions.

Umboi Island, volcanic and mountainous, is 1,585m high; it is densely wooded, except for some cultivated parts. The extreme S part of the island is quite low. On the N and W sides, high land descends steeply to the sea.

9.46 Tolokiwa Island (5°19'S., 147°37'E.), 12 miles NW of the NW extremity of Umboi Island, is a volcanic cone, 1,396m high; it is wooded and inhabited. The island is fringed by a reef extending 0.5 to 1 mile offshore. An islet about 1 mile W of the NW side of the island forms a harbor for small craft.

The Siassi Islands are on an area of extensive reefs S of Umboi Island. The E part of this area impinges on the swept channel portion of Dampier Strait. The area has not been completely surveyed.

Marien Harbor, on the S end of Umboi Island, is a small protected inlet approachable only by small craft with local knowledge.

Between **Graah Point** (5°49'S., 148°02'E.) and **Cape Umboi** (5°38'S., 148°06'E.), the coast is fringed by a narrow reef and fronted by dangers. This entire coastal water area has not been examined.

The W coast of Umboi Island, between the S end of the island and Higgins Point, is fringed by reefs and fronted by dangers. Between Higgins Point and Cape King, the coast is fairly regular. A fringing reef borders the coast for a distance of 7.5 miles S of Cape King. Rocks are found 0.75 mile offshore, about 6.5 miles S of Cape King. Cape King is rocky; spurs from the high land within extend down to the coast; the cape is fringed with a reef that dries in patches to almost 0.2 mile offshore.

A 7.3m shoal lies 7.75 miles W of Higgins Point; O'Brien Shoal, unsurveyed and with a depth of 3.7m, is about 6.8 miles NNW of it. A 9.1m shoal lies about 5.5 miles N of O'Brien Shoal.

Hein Islet, 29m high and wooded, is about 3 miles NNW of Cape King; charted shoals are E and SW of it. The area between Hein Islet and Sakar Island has not been surveyed.

Luther Anchorage, open to the NNW, is between Cape King and a reef extending from Rawlings Point. Anchorage should be attempted only with local knowledge and favorable light. Approach Cape King on a bearing of about 095° until Hein Islet is astern bearing 333°, then bring that islet astern on that bearing and steer for the anchorage. Vessels can anchor, in 24m, with Rawlings Point bearing 227° and Hein Islet bearing 332°.

New Britain—North Coast

9.47 The N coast of New Britain, between Cape Gloucester and the NW point of the Gazelle Peninsula, is formed by stretches of mud, rock, and sand. These stretches are interrupted by cliffs and steep slopes that generally are the seaward sides of hills and mountains and the terminals of mountain ridges. Low, undulating, and hilly terrain backs the sandy stretches. Muddy shores are as a rule bordered by mangroves and swamps.

A belt of active volcanoes is found along the N coast. The low relief of this coast is broken by a large number of volcanic peaks, which attain a maximum height of about 2,286m in its NE part. A large number of eruptions have occurred in recent times. Geysers and hot springs are numerous. The Willaumez Peninsula has many volcanoes with lofty cones. The cluster of volcanoes at the W end of the island is separated from those in the range to the E by a broad isthmus of undulating terrain.

The W and N coasts of the Gazelle Peninsula have stretches of mud, rock, and sand that alternate with cliffs and steep slopes. Low, hilly, and undulating terrain backs the coast. The interior of the peninsula is hilly and mountainous.

Mountains begin to appear as Borgen Bay is approached. The low-lying shores, covered with black sand, extend a short distance back to a belt of trees, and gradually slope off into mountains 1,829m high.

The Willaumez Peninsula, projecting 30 miles NNE from the coast, is mountainous and has a large crater lake at its NE end. The W coast of the peninsula is heavily wooded and has several prominent peaks. Mount Bangum, 991m high, is about 2.5 miles E of Cape Schellong. Mount Bulu, 1,164m high, is located about 2.5 miles E of Cape Goltz. Mount Lotomgan, a distinctive summit, 593m high, is about 5 miles SSE of Mount Bulu. The Willaumez Peninsula is a good radar target from 25 miles.

Mount du Faure, 752m high, backs the SW coast of Stettin Bay. Mount Welcker, 1,105m high, is the N and highest of a group of mountains extending from 5 to 13 miles NNW of Mount du Faure.

Cape Hoskins (5°26'S., 150°32'E.) is bold, cliffy, and backed by high mountains. Mount Matalelock, 1,056m high, and Mount Mululus, 1,313m high, are located 10 miles WSW and SW, respectively, of the cape. Mount Pyramid, 272m high, is 12 miles SE of the cape. A range of high mountains, running N and S, extends a short distance inland of a line joining the cape with Mount Pyramid. Mount Lolla, 819m high, is near the N end of this ridge.

9.48 **Lolobau Island** (4°55'S., 151°10'E.), W of Cape Torkoro, is prominent from the offing. Its summit is an active volcano, 932m high, with a prominent split. The volcano, as a rule, does not emit much smoke, except after a heavy rain. A conical peak, 580m high, lies near the E end of the island which terminates in a red cliff. Lolobau is about 0.4 mile ESE of its charted position.

Cape Torkoro is steep-to with high cliffs. Mount Galloseulo, 1,173m high and prominent, is located about 25.5 miles SW of the summit of Lolobau Island. Mount Bamus, an active volcano, 12 miles NE of the summit of Mount Galloseulo, rises to a height of 2,248m. The Father (Mount Ulawun), 9 miles SSW of the cape, is an active volcano, 2,300m high. Mount Likuruanga, 990m high and appearing as an island from the offing, lies close within the cape and is separated from Mount Ulawun by a belt of low land.

Watom Island (4°07'S., 152°05'E.), 5 miles W of Cape Tawui, is 351m high. It has a broken ridge without any marked summit.

The N coast of New Britain, between Cape Gloucester and the N extremity of the Willaumez Peninsula, has not been closely examined. Reefs and dangers are charted up to 10 miles offshore.

Kimbe Bay, between the Willaumez Peninsula and Cape Torkoro, is spacious, but is encumbered by numerous reefs.

Between Cape Torkoro and Cape Lambert, the coast is fronted by reefs and dangers to a distance up to 8 miles. The N coast of the Gazelle Peninsula is divided into two peninsulas by Ataliklikun Bay. The N coast of the W peninsula is fringed by a barrier reef which lies up to 7 miles offshore. The N coast of the E peninsula is fairly steep-to.

Islands and Dangers North of New Britain

9.49 The **Witu Islands** (Vitu Islands) (4°42'S., 149°16'E.) consist of several islands and widely-scattered reefs. There are scattered dangers around the islands, but the channels between

the islands and reefs are wide and deep. The Witu Islands are of volcanic origin and between 152 to 590m high; they are partly or entirely reef-fringed. Unea Island and Garove Island are mountainous and are the most important islands. The lesser islands of the Witu Islands are wooded, hilly, and mountainous; there are probably very few areas of low-lying terrain on the islands.

Unea Island (4°55'S., 149°09'E.) is the S island of the Witu Islands. It is 590m high, dome-shaped, and wooded. Near the E end of the island are two peaks, 500m and 462m high, respectively. The W part of the island is about 150m high, grassy, and undulating.

The island is fringed by a reef extending up to 0.6 mile offshore. Some islets and rocks are on the NW side and off the S end of this reef. A fairly continuous barrier reef, lying up to 1.5 miles offshore, surrounds the island, except on its SE side. Duaga Islet, 49m high, is on this reef about 2.3 miles ESE of the N end of the island. Two wide and deep passages lead through the barrier reef near the islet to the open water inside. These reefs and passes are readily identifiable under proper conditions of light.

The fringing reef on the W side of the S end of Unea Island was reported to have extended seaward; passage between it and Johann Albrecht Reef, about 0.4 mile SSW, is unsafe. The sea breaks on Johann Albrecht Reef, 1.25 miles SSW of the island.

Nambabad Islet is on the fringing reef close S of the S extremity of Unea Island. A light is shown from Nambabad Islet.

Duaga Harbor, Bali Harbor, and Papua Bay provide sheltered anchorage, according to season, for small craft with local knowledge.

9.50 Garove Island(4°41'S., 149°30'E.), formed by the broken rim of an old crater, is shaped like a horseshoe. It rises to a height of 350m and is densely wooded. Sandy shores, interrupted by cliffs and steep rocky slopes, are found around the island. Inland are lowlands that range from narrow coastal strips to valleys extending as far as 2.5 miles inland. There are some swamps, but most of the low ground is covered with plantations. A trading station and many coconut palms are found on the NE side of the island.

A chain of forested hills extends through the island with deep valleys. From offshore, Garove Island appears as several small islands.

Reefs, extending but a short distance on the N side and about 0.5 mile from the SE point, fringe the island.

9.51 Peter Haven (4°40'S., 149°33'E.) (World Port Index No. 56850) is formed by a sunken crater. It is protected by reefs separated by passages. The middle passage is the only one used by large vessels. A 271° range, marked by beacons, leads through the passage. A wharf, with a depth of 7.6m alongside, is on the E side of the inner harbor. Anchorage is available in the outer harbor, in 33m, and in the inner harbor, in about 15m, with limited swinging room.

Johann Albrecht Harbor (4°42'S., 149°30'E.) is very deep and is formed by a large crater with a sunken lip to the S. The harbor is too deep for anchoring due to depths of 72 to 145m. Vessels with local knowledge can anchor in the E part of the harbor. in 37m. Anchorage for small vessels is on the SW side of the harbor, in depths of 18 to 37m. Such vessels can also anchor, in 7.3 to

Peter Haven—Inner Harbor

12.8m, N of a small islet which is close off the E shore of the harbor.

The holding ground is good, mainly black sand and coral. The anchorages are affected by swells in strong SE winds.

Widu Harbor, an open cove on the W coast of Garove Island, affords shelter to small vessels, having local knowledge, during the Southeast Monsoon. A 3.9m shoal is charted near the head of the bay, almost 0.5 mile NE of Cape Widu. Vessels entering the harbor should avoid the spit off the S entrance and the shoals in the N part of the harbor. Anchorage can be taken, in about 37m.

Widu Reef, about 0.5 mile long, is about 2.8 miles WNW of Cape Widu. It dries at LW and usually breaks.

Mundua Island, Vambu Island, and Undaga Island, the largest of this group of islands and dangers, are 152m high and wooded. Cape Kurabo forms the SE end of Mundua Island. They should be avoided by all except small vessels with local knowledge, due to the number of charted reefs and shoals N of the group. Other dangers extend E and W from the group. Many of these dangers have not been examined.

Planet Harbor (4°38'S., 149°20'E.), on the W side of Mundua Island, provides anchorage, in 40m, for small vessels with local knowledge. Such vessels should only enter under favorable conditions of light in order to avoid the reefs.

Narage Island (4°33'S., 149°07'E.) is a round island, surrounded by a reef, which on the N side is about 0.3 mile offshore. There is a boiling spring on a sandy beach on the SE side, and another on the SW side, where there is a geyser that throws up water to a height of 9.1m.

Caution.—A breaking reef, about 3.5 miles long, is about 1.4 miles N of the island. A breaking reef is about 1 mile WNW of the island. A rock, with a depth of 5.5m, is about 1.3 miles SW of the island. Two rocks, with depths of 5m, about 0.8 mile SE of the island.

A chain of reefs extends about 5 miles in a SW direction from a position about 3 miles SW of the island. A shoal was reported to be about 4.5 miles E of the island.

9.52 Ottilien Reef, 18 miles W of Narage Island, is an atoll formed by a group of four reefs. The W reef is always uncov-

ered and is marked by breakers. A sand cay is on this reef. There are entrances on the N and S sides of the atoll.

Whirlwind Reefs, about 55 miles WNW of Unea Island, have been previously described in paragraph 9.45.

Sherburne Reef, 97 miles NW of Narage Island, consists of two parts, the S of which nearly dries. A passage, 0.3 mile wide, leads through the W side of the S reef into the lagoon. Small vessels with local knowledge can anchor in the lagoon, clear of the isolated patches. The N reef has a deep passage, 183m wide, on its W side.

Circular Reef, about 11 miles WSW of Sherburne Reef, nearly dries. A passage, 183m wide, leads from the S into the lagoon, where there are a number of shoal patches which show up well under favorable conditions of light. Shoal ground extends 4 miles S from the S end of the reef.

Between Cape Gloucester and Silimati Point, 7 miles ESE, the coast is slightly indented by a shallow bight. The broken barrier reef fronting this coast has been described earlier in this section.

Caution.—Foul ground is found extending seaward along the entire N coast of New Britain; many portions of this area are unsurveyed or are not completely surveyed.

9.53 **Cape Gloucester** (5°27'S., 148°25'E.) is 30m high and wooded. Razorback Hill rises steeply to 174m, nearly 2 miles SSW of the cape.

A broken barrier reef, with drying rocks and a general depth of less than 1.8m, is 4 to 6 miles offshore N of Cape Gloucester. Fronting the coast, the reef extends nearly 20 miles E from its W extremity, which is about 5 miles NW of Cape Gloucester.

A shoal area, about 0.3 mile long and which dries in places, is about 0.5 mile NW of Cape Gloucester.

Borgen Bay is entered between Silimati Point and Ulo Point. It affords anchorage for small vessels with local knowledge and with good light conditions in the clear part of the bay, in 37 to 46m. Shelter is best during the Southeast Monsoon, but heavy swells roll in during the Northwest Monsoon.

Between **Ulo Point** (5°31'S., 148°35'E.) and the Willaumez Peninsula, the coast is little known and is fronted by reefs. There are some villages E of Cape Gauffre, which is 5 miles ENE of Ulo Point, and E of Cape Kiepert, 4.5 miles farther East. Reefs, some of which are above-water, extend up to 2.5 miles off Cape Gauffre. This point should be given a wide berth.

Rottock Bay (El Bay), between Cape Kiepert and an unnamed point 9 miles E, has not been closely surveyed.

Several reef-fringed islets, including Tamuniai Islet, lie off the coast between the unnamed point and Cape Raoult, about 6.5 miles East. The entire coastline is fronted by reefs extending offshore for a considerable distance in places. Cape Raoult (Cape Raoul) is low; Samudo Islet is about 2 miles N of it.

Between Cape Raoult and Cape Neumayer, about 15 miles SE, the coast is considerably indented, fringed with reefs, and fronted by dangers. Maruro Reef, about 2 miles long, is about 5.5 miles NW of Cape Neumayer. A 5.5m shoal patch, the position of which is approximate, is about 4 miles N of the same point. Breakers were reported about 4.5 miles, bearing 320° from the NW extremity of Maruro Reef.

Small vessels with local knowledge and favorable light conditions can anchor in Rein Bay, entered close S of Cape Neumayer, in 12.8m, about 0.5 mile SSW of the sandy islet about 0.6 mile S of the cape. Utano Islet is about 1.5 miles ENE of Cape Neumayer.

Mount Penck, of which Rudiger Point is a spur, is prominent. **Emeline Bay** (5°28'S., 149°39'E.), W of Rudiger Point, is moderately clear and affords anchorage for vessels with local knowledge in its E part.

9.54 Eleonoro Bay, entered between Rudiger Point and Kavutu Point (Wilson Point), 7 miles ESE, is sheltered by a group of islands lying NE and E of Kavutu Point. Talasea Island and Nugakau Island lie within 1.75 miles ENE of Rudiger Point. A post office is situated on the Nugakau Island. Kalapiai Island, the largest and S island, lies 2 miles SE of Rudiger Point. Vessels with local knowledge can find good anchorage in the bay, especially in Comet Harbor, a sheltered cove in the SE part of the bay. Depths of 14.6m are found in the cove.

Riebeck Bay, entered between Kavutu Point and Cape Bastian, about 12 miles NE, appears to be encumbered by reefs, but there is a well-sheltered cove in the NE corner. Vessels with local knowledge will find anchorage, in 20.1m, about 0.5 mile off the shores of this cove.

The Willaumez Peninsula, marked by a light on **Cape Hollman** (5°00'S., 150°05'E.), its N point, projects about 30 miles NNW from the coast of New Britain. Its W coast is fronted at intervals by detached reefs, somewhat in the form of a barrier reef. The outermost is about 6 miles W of Cape Schellong, the W extremity of the peninsula.

The N coast of the Willaumez Peninsula, between Cape Hollman and Cape Campbell, to Cape Heussner, about 2.3 miles SSW, is fringed by reefs and fronted by dangers to a distance of 2 miles. A reef, with some rocky islets on it, extends 2 miles E from Cape Heussner. There is a narrow passage between the inner islet and the reef fringing the cape.

Kimbe Bay, between the Willaumez Peninsula and Cape Turkoro, is spacious but is encumbered by reefs.

Sunset over the Willaumez Peninsula and Kimbe Bay

Kimbe Island (5°12'S., 150°22'E.), 148m high, is marked by a light shown from its summit.

Oto Reef, 8.75 miles SSW of Kimbe Island, is marked by a beacon.

Wulai Island (5°21'S., 150°29'E.), about 5 miles NNW of Cape Hoskins, is surrounded by a reef with two deep passages on its SW side. A narrow, but clear passage, marked by range beacons, leads through the SE part of the reef. Good anchorage can be taken by vessels with local knowledge, in 10.9 to 46m, inside the reef.

Lollo Reef lies between Wulai Island and Cape Hoskins.

Wangore Bay, between Cape Heussner and the N entrance point of Talasea Harbor, about 12 miles SSE, is deep and exposed. A number of islets and reefs are up to 3 miles NE of Cape Heussner.

9.55 Garua Harbor (5°17'S., 150°05'E.) is entered about 13 miles SSW of Cape Heussner. The harbor is protected, but there are reefs and rocks lying within about 3.5 miles of the entrance.

Garua Island is in the entrance of the harbor, close NE of the S entrance point. There is a jetty off Talasea Government Station, on the S side of the harbor, close within the entrance. A jetty is situated on the N side of Garua Island.

Observation Island, reef fringed, is about 0.8 mile NNW of the N end of Garua Island.

Anchorage.—Anchorage can be taken by vessels with local knowledge off the government station. The anchorage, in 40 to 46m, S of Observation Island, has a rocky bottom.

Caution.—The appearance and disappearance of various islets and reefs have been reported in this vicinity, apparently due to volcanic action. Great care is necessary when navigating in these waters. Several geysers and mud springs are found along the shores of Talasea Harbor. Many uncharted coral heads have been reported in the harbor.

Stettin Bay, spacious and deep, indents the coast between the S entrance point of Talasea Harbor and an unnamed point located about 6.5 miles W of Cape Hoskins. A river flows into the bay, about 13 miles SW of the unnamed point.

The shores of the bay are fringed by a reef; detached dangers are up to 4 miles offshore. Vessels with local knowledge can anchor, in 37m or more, from 1 to 2 miles from the head of the bay. Such vessels should make the approach only under favorable conditions of light.

9.56 Kimbe (5°33'S., 150°09'E.) (World Port Index No. 56835), which is the District Headquarters for this area, is situated 2.75 miles NE of Mount Du Faure on the N coast of New Britain Island.

Depths—Limitations.—Kimbe Wharf, built from reclaimed land, consists of Berth No. 1, a T-shaped pier face, 120m long, with a depth of 12m alongside. A dolphin is situated about 25m NW of the pier. Berth No. 2 is 50m long, with a depth of 5.5m alongside and stands inshore of Berth No. 1. Vessels may berth at Kimbe Wharf either port or starboard side-to as the pilot may advise.

Berth No. 3, standing on the E side of the Small Ships Wharf, is 17m long, with a depth of 5.9m alongside. Berth No. 4 and Berth No. 5 stand on the W side of the same wharf. A barge ramp, which is 9m wide, projects from the shore stands close E of the Small Ship Wharf. Caution is advised as an obstruction lies 0.35 mile NE of the wharf.

Pilotage.—Pilotage is compulsory. Notice should be given 4 hours before ETA and 6 hours before ETD, with amendments at least 2 hours before each, if required. The pilot boards 1.9 miles SSE of Grabo Reef.

Anchorage.—The Quarantine Anchorage is situated 2 miles NE of the wharf.

Caution.—A wreck, depth 20m, lies about 1 mile N of Kimble Wharf.

9.57 Commodore Bay, encumbered by reefs in its outer part, indents the coast between Cape Hoskins, which is bold, cliffy, and backed by high mountains, and Cape Reilnitz, about 13.5 miles East. Cape Reilnitz is a spur of Saddle Mountain, which rises to a height of about 213m 1 mile ENE.

Islets, reefs, and detached dangers lie up to 6.5 miles offshore between the E entrance to Commodore Bay and Cape Koas, about 27 miles NE.

Bangula Bay (5°24'S., 150°55'E.) is entered through a wide and deep channel between Stein Reef and Karel Reef.

Anchorage.—Anchorage is available, in 37m, in Planet Bay, a small cove indenting the SW corner of Bangula Bay; rocks, with depths of less than 1.8m, SW of the anchorage should be avoided.

Anchorage is also available between Karel Reef and the SE shore of Bangula Bay.

Due Reef (5°17'S., 150°58'E.), marked by a light, lies 3.5 miles W of Apapulu.

Small vessels with local knowledge can anchor about 0.4 mile W of the mouth of the Olimo Tavo River, about 4 miles SSW of Cape Koas.

Vessels can also anchor in an open cove about 8 miles SW of Cape Tokoro and about 0.4 mile offshore. Smaller vessels can anchor farther in, about 0.1 mile offshore, in 29m.

Photo by Robert Citron, http://www.volcano.si.edu/images/full/016053

Lolobau Island

9.58 Lolobau Island (4°55'S., 151°10'E.) has some sandy shores, but in most places steep slopes, gullied by many small streams, rise from the sea or close inland from the shore. The island is covered with rain forest except near the settlements and plantations. The island is fringed with reefs up to 1.25 miles offshore.

Tiwongo Island is separated from the SE end of Lolobau Island by a narrow channel; Tiwo Reef is 0.6 mile S, and Passage Reef 1.75 miles SSW, respectively, from Tiwongo Islet.

Anchorage.—Anchorage is afforded to small craft in a depth of about 8m in a passage between Tiwongo Island and Lolobau Island; vessels can also anchor, in a depth of 16.5m, on the W side of Tiwongo Island.

Hermo Reef and Ake Reef are about 3 miles SW of the S end of Lolobau Island. Several unnamed danger areas extend as far as 1 mile seaward from the Willaumez Peninsula into Expectation Strait.

The E approach to Expectation Strait is encumbered with reefs, including Tokoro Reefs, Sido Reef, Eli Reef, Hete Reef, and Loto Reef.

Muli Island and Banban Island, 60m and 210m high, respectively, are 2.75 and 3.75 miles WNW of the W end of Lolobau Island. Many detached reefs which are hard to identify are N and W of the islands; the N is North Reef.

Banban Reefs, also hard to identify, extend 11 miles WSW from Banban Island. Father Reef, a large group of detached patches, are at the W end of Banban Reefs.

9.59 Kakolan Islet (4°54'S., 152°23'E.), 60m high, is close off the NW side of Cape Torkoro.

Between Cape Torkoro and Cape Lambert, the coast curves N round Offene Bay; for about 30 miles N of the head of the bay is bordered by long stretches of mud, between which are some sandy shores. Continuing N along the W side of the Gazelle Peninsula to Cape Lambert, the shore becomes rocky and steep sloping, with some scattered stretches of sand. The sandy shores are backed by margins of low and undulating terrain that are generally less than 1.5 miles wide between the shore and the high mountains backing the coast. The muddy shores are backed by swamps and intersected by streams. The coast and inland mountains are covered with rain forest. Hixon Bay, which indents the coast between Kakolan Islet and Rangambol Point, is fringed by a narrow reef. Its low shores rise gradually to Mount Likuruanga and Mount Ulawun. Two small rivers, the banks of which are mostly swampy and overgrown with sago palms, flow into the head of the bay. There is a village near the mouth of the E river.

Mimi Reef, Korleili Reef, and an unnamed reef are in the E approach to Hixon Bay.

Anchorage.—During the Southeast Monsoon, vessels can anchor in depths decreasing gradually from 36.6m, about 0.5 mile off the shores of the bay. Small vessels with local knowledge can anchor, in 14.6m to 16.5m, 0.3 mile off the mouth of the E river.

Small vessels with local knowledge can anchor SE of Rangambol Point, inside some reefs. The entrance between the reefs is clear and there is anchorage space within of about 0.3 mile.

The Korindindi River and the Nessai River flow into the head of Offene Bay, about 5.8 miles ESE and 8.5 miles ENE, respectively of Rangambol Point. A village stands at the mouth of the latter river. An extensive flat, grassy plain, which lies out against the surrounding brushwood, is in this vicinity.

9.60 Tavanatangir Harbor (Powell) (4°48'S., 151°41'E.), entered between **Ailo Point** (4°49'S., 151°41'E.) and an unnamed point nearly 1.5 miles NW, is protected by a line of reefs. The Tavanatangir River discharges into and indents the NE part of the harbor. A deep channel, about 0.2 mile wide, leads into the inner harbor.

The passages between the reefs vary from 91 to 549m wide. Ailo Point is fringed by a reef that extends 0.25 mile offshore, leaving a deep 0.25 mile wide channel between it and the S detached reef. The main channel into the harbor leads between the S detached reef and the North. It has a width of about 549m. A light is shown from the S end of the N reef. The reef, 1.5 miles N of the S reef, is close off the main island, leaving only a very narrow passage between; S of this reef the channel, though narrow, is straight and deep.

Keila Islet, standing on a reef close E of the outer line of reefs, has a white sandy beach and serves as a prominent mark for approaching the harbor.

Between the N entrance point of Tanvanatangir Harbor and Mulua Point, about 2 miles NNW, the coast has a level sandy shore and is overgrown with brushwood. Between the latter point and Wunambere Point, about 10 miles N, the coast is intersected by three small rivers and fronted by reefs to a distance of 1.75 miles. A prominent waterfall is located near the mouth of the Toriu River, about 2.8 miles N of Mulua Point.

9.61 Pondo Harbor (4°34'S., 151°39'E.) (World Port Index No. 56840) is between the reefs extending S from Pondo Point and the reefs extending 1.75 miles W from a position on the coast, about 2 miles SE. Pondo Point, 3 miles NW of Wunambere Point, is low, and like the coast in this vicinity, covered with trees. A small river flows out close E of the point. The settlement of Pondo is in the NE corner of the harbor. A small pier, reported to have a depth of 4.5m at its head, is situated in the N part of the harbor.

Anchorage.—Anchorage can be taken by vessels with local knowledge, in 36 to 55m, in the middle of the harbor. Small vessels with local knowledge can anchor, in 16.5m, white sand, in the N part of the harbor, N of a shoal with a depth of 0.6m, midway between the E side of the harbor and the spit extending S from Pondo Point.

Caution.—A spit, with depths of less than 1.8m, extends 750m S from Pondo Point. A deep channel, about 366m wide, separates the S end of this spit from a shoal, with depths of 3.1 to 7.9m South. Between the S end of this shoal and the coast to the E, there are some detached shoals and reefs, with deep channels between them.

9.62 Between Pondo Point and Rangombol Point, 2.75 miles N, the coast is flat and sandy. Between the Rangombol Point and Matiu Point, 7 miles NNW, the coast is covered with mangroves. Several small rivers intersect the swampy shore.

Missamissakor, a rocky, uninhabited islet, is nearly 1 mile SE of Matiu Point. Small boats often shelter there.

Matiu Point, which is covered with mangroves, is fronted by a broad reef. A small, rocky islet lies close offshore in a position nearly 1 mile SE of the point. A large waterfall is located near a point 2 miles SE of Matiu Point. The Tongaliekanei River flows out about 3.3 miles NNW of the point. Between the river mouth and Rarakarakau Point, about 2 miles S, the coast is covered by high trees. A sandy beach is N of the river mouth.

Between Rarakarakau Point and Ponosarer Point, 5 miles N, the coast is fringed with mangroves and intersected by two

small rivers.

The W coast of the Gazelle Peninsula, N of Rangombol Point, is fronted by a steep-to barrier reef that is 0.75 to 2.5 miles offshore. Small vessels with local knowledge can anchor, in 9.1 to 46m, between the barrier reef and shore.

9.63 Cape Lambert (4°11'S., 151°33'E.), bold and steep, is the convergent point of several mountain ranges and is a good landmark from all directions except from the NW. Cape Wunawuwur, a wooded point, is located 2.5 miles E of Cape Lambert.

Between Cape Lambert and the W entrance point of Ataliklikun Bay, about 20 miles E, the barrier reef lies from 7 to 3 miles offshore and trends in a general ESE direction. This reef curves S from the position off Cape Lambert, passing about 2.5 miles W of Cape Pomas and then extends in a SSE direction, parallel with the W coast of the peninsula.

Elizabeth Reef, which dries and is apparently of volcanic origin, forms part of the barrier reef, and is 5.5 miles NW of Cape Lambert. A wreck lies stranded on this reef.

Norton Banks are on the barrier reef, about 2.8 miles NW of Cape Pomas. Rarende Reef and Rarende Angale Reef, separated by a narrow channel, are 2.5 miles W of Cape Pomas. There are several passages through the barrier, but they are only suitable for vessels with local knowledge under favorable light conditions. A beacon marks the N side of a narrow passage through the barrier reef, about 2 miles SW of Cape Pomas. Another beacon is 4.5 miles WSW of Cape Lambert.

A light is shown from the barrier reef, 6.75 miles N of Cape Lambert.

Many above and below-water dangers are charted between the barrier reef and the coast.

The Talele Islets, 3.25 miles ENE of Cape Lambert, are a group of islets on a cluster of reefs surrounded by deep water. One of the islets is 18m high.

Caution.—Local magnetic disturbance has been reported in the vicinity of Nambung Point.

9.64 Between Cape Lambert and the W entrance point of Ataliklikun Bay, there are several small inlets that afford anchorages to small vessels with local knowledge.

Lassul Bay is deep and clear of dangers in its W part. A passage about 183m wide between patches and the shore bank are on the E side of the bay. Depths of 9 to 22m are in the passage. The bay is reported to be fairly well sheltered even during N winds.

Between Giretar Point, 1.5 miles E of the E entrance point of Lassul Bay, and Sussum Point, 2.25 miles E, there are several small inlets fronted by islets and dangers. A plantation, with a flagstaff, is situated just W of Sussum Point. A patch, with a depth of 2.7m, is 0.75 mile NE of Giretar Point.

A beacon is about 0.8 mile NW of Giretar Point; another beacon 3 miles WNW marks the E end of a reef.

Massava Bay, entered between Sussum Point and a point about 1.5 miles W of the W entrance point of Ataliklikun Bay, affords restricted and sheltered anchorage, in 26 to 29m, about 0.3 mile offshore. The E side of the bay is fringed by reef.

Massikonapuka Islet, 0.75 mile NNW of Sussum Point, is at the E end of an inner barrier reef. Massava Islet is about 0.5 mile E of the same point. The islet, which is surrounded by reef, is wooded; the tops of the trees reaching a height of about 34m. The portion of the bay E of the islet is clear.

9.65 The channel, which separates Massava Islet from the coast to the W, is obstructed by a reef with a narrow passage on either side. A shoal, with a depth of 5.5m, is about 0.3 mile N of Sussum Point.

Ataliklikun Bay, entered between the point 1.5 miles E of the W entrance point of Massawa Bay, and Cape Liguan, about 8 miles NE, is very deep. The latter point is dominated by a mountain, 430m high, at the W end of the Rembarr Range.

A reef extends about 1 mile offshore, close N of the Cape Liguan. Two shoals, with depths of 3.2m and 2.7m, respectively, are close outside this reef. Kambeira Bay, an open roadstead and the site of a trading station, indents the E shore of the bay, about 4 miles SE of the cape.

Urara Island, about 2.5 miles WNW of Cape Liguan, is fringed by a reef that extends 0.5 mile W and a short distance East. The island is low and wooded. A light is shown on the reef, close S of Urara Island. The light is obscured from the N.

Reimers Reef extends about 1.5 miles NW from a position about 0.8 mile NW of the reef extending W from Urara Island.

A reef fringes the shores of Kambeira Bay to a distance of 0.35 mile.

Seesten Reef, awash and steep-to, is in the SW part of Ataliklikun Bay, about 0.8 mile off a mission station.

Anchorage.—Small vessels can anchor, in 18.2m, sand, about 0.5 mile off the shores of Kambeira Bay. The depths shoal sharply within the 10m curve. Vessels approaching from the NE should steer to pass midway between the reefs extending from Cape Liguan and Urara Island, and then for the anchorage.

Between Cape Liguan and Cape Tawui, the rugged coast is rather steep-to, but has some dangers lying up to 1 mile offshore. Talili Bay indents the SE part of this coast.

Watom Island, separated from the coastal dangers by a wide and deep channel, is deeply furrowed and covered with vegetation. The bare rock showing through gives a many-tinted appearance to the island. A narrow fringing reef extends from the W side of the island.

The passage between Watom Island and New Britain is clear of dangers, except for Kambawel and Tomatikotop Reefs. Vessels using this passage are recommended to keep close to Watom Island, which is clear of off-lying reefs.

Kambawel Reef, awash, is about 1 mile offshore and about 5 miles E of Cape Liguan.

Tomatikotop Reef, which has a depth of 0.3m, lies close offshore, about 3 miles SSW of Cape Tawui.

9.66 Talili Bay (4°12'S., 152°08'E.) indents the coast between Kambakunda Point and Tomatikotop Reef, about 3 miles NE. The point, which is 7.5 miles E of Cape Liguan, is bluff and has the village of Kambakunda standing on it. There is a mission house at the village. A white cliff is about 0.3 mile S of the village.

There are patches of fringing reef around the shores of the bay. The 5.5m curve is from 137 to 548m offshore.

An SPM berth situated in Talili Bay can accommodate tankers up to 183m long, with a draft of 12.8m.

Anchorage.—Talili Bay is not recommended, except as a temporary anchorage, because the shore bank is steep and the

bay is open to the N.

Anchorage is reported to be available, in 9m, W of Kambakunda Point, with the E end of Watom Island bearing 006°.

Anchorage can be taken, in 24m, on the W of the head of the bay.

Anchorage can be taken off Kurakakaul trading station, about 1.5 miles ESE of Kambakunda village.

Anchorage can be taken off the E shore with Ratawul Beach, 3.5 miles S of Cape Tawui, bearing 164°, 548m distant, in 18.3 to 22m, sand.

The Admiralty Islands and the Ninigo Islands

9.67 The Admiralty Islands consist of one large island and numerous smaller ones. Manus Island, the largest of the group, is densely wooded and hilly throughout. The saw-toothed mountains rise to a height of about 718m near their middle part and slope steeply, particularly to the N and South. A steep conical mountain is near the E end of the island. The sandy shores of the island are backed by narrow coastal strips of low and undulating ground.

A group of islands, of which Los Negros Island is the principal one, are off the NE end of Manus Island. Los Negros Island is low and has sandy shores. Coconut plantations are found along the coasts of both islands.

Seeadler Harbor (2°00'S., 147°19'E.), the most important port in the Admiralty Islands, is formed by Los Negros Island and a barrier reef on the N and E, and the NE coast of Manus Island on the S.

The off-lying islands are mostly flat and low; some islets, however, are formed by high hills. The vegetation throughout the island group is rain forest, except where planted in coconuts. Many of these islands are partly or entirely covered with coconut palms.

The Hermit Islands, about 90 miles WNW of Manus Island, are enclosed by a narrow reef, which is less than 1 mile wide and which surrounds an extensive lagoon. The group consists of four high reef-fringed islands in the middle of the lagoon, and 13 smaller islands on the reef. On the two largest islands have hills ranging from 111 to 244m high. The hills are separated by valleys and low narrow isthmuses. There are margins of low and gently sloping ground around the hills that are covered with coconut palms. The islands in the lagoon are forested, except when planted in coconut palms. The islands on the narrow reef are mostly planted in coconut palms.

The Kaniet Islands, consisting of five small reef-fringed islets, are about 38 miles NNE of the Hermit Islands. They are low, flat, thickly covered with coconut palms, and connected to each other by reefs. The Kaniet Islands have been reported to be 1.5 miles ENE of their charted position. In 1987, the Kaniet Islands were reported to lie 3 miles NE of their charted position.

The Ninigo Islands, about 140 miles WNW of Manus Island, consist of six atolls, separated from each other by deep channels. There are about fifty islets on the atolls. Some of these low islets are covered with coconut trees, about 30m high. There are a few swampy areas.

The Purdy Islands are a small coral group of islets lying about 40 miles SSW of the W end of Manus Island.

9.68 **Sherburn Reef** (Doppel Reef) (3°21'S., 148°00'E.), lying 85 miles SSE of the E extremity of Manus Island, consists of two parts; the S reef, which is the largest, nearly dries. This reef has a deep passage of 0.3 mile wide on its W and a boat passage on its E; some small isolated reef patches lie in the lagoon. The N reef has a deep passage about 0.1 mile wide on its W side; anchorage may be available in the lagoon, which is clear of reef patches.

Circular Reef (Kreis Reef) (3°26'S., 147°47'E.) lies about 11 miles WSW of Sherburn Reef; shoal water extends 4 miles S from the S end of the reef, and the reef nearly dries. A passage lies on the S side of Kreis reef, about 0.3 mile wide. Good anchorage may be obtained in the lagoon, but clear of several patches of reef which show up in a good light.

In 1991, a reef was reported to lie in approximate position 3°07'S, 148°10'E, about 16 miles NE of Sherburne Reef.

Tides—Currents.—The prevailing current in the vicinity of Manus Island sets WNW at a rate of 1.5 to 2 knots. A cessation or reversal of this current may be experienced during the strength of the Northwest Monsoon.

A strong E current was experienced in the vicinity of the Purdy Islands during the months of February and March.

Currents in the vicinity of the Ninigo Islands appear to alternate in direction between SE and NW. The average rate is reported to be 1.25 knots, but little is known of these currents.

A strong NE current has been observed between Rambutyo Island and Baluan Island.

Depths—Limitations.—The many off-lying islets and islands lying E, S, and W of Manus Island are surrounded by depths greater than 183m; deep water also closely approaches the N and E coasts of that island. Manus Island is fronted on the N by a broken line of barrier reefs that extend to the NW point of Los Negros Island.

Caution.—The Admiralty Islands have not been completely surveyed and vessels should navigate with caution in this area. Numerous uncharted reefs are reported to exist in the sea area bounded by the **Western Islands** (2°13'S., 145°54'E.), the SW extremity of Manus Island, Mbuke Island and Petersen Reefs. Many reefs and uncharted dangers are between Mbuke Island and the S coast of Manus Island.

Water spouts are frequently seen in the vicinity of the Admiralty Islands. Large quantities of floating pumice stone have been sighted W of the Purdy Islands; they appeared as flat islands from the offing.

Submarine disturbances have been reported about 3 miles SSE and 1 mile S of the S end of Lou Island. The SW entrance of St. Andrew Strait has been reported to be foul. A considerable area of foul ground has been reported in the N entrance of St. Andrew Strait. The islands in the vicinity of this strait have been reported to be incorrectly charted.

The relative positions of Lou Island, the Fedarb Islands, and the St. Andrew Islands are reported to be in error. The outline of Lou Island is also reported to be in error.

Shoal water has been reported between the Papialou Islands and Alim Island. A 14.6m bank has been reported about 18 miles SE of the Papialou Islands.

The islands and dangers W of Rambutyo Island have been reported to be incorrectly charted.

9.69 The S coast of Los Negros Island and the SE coast of Manus Island are fringed by a narrow reef. Patamu Island is about 1.8 miles S from the W entrance point of the small bay between Manus Island and Los Negros Island. The enclosing reef extends 274m S from the island and forms the N side of the preferred channel into Kelaua Harbor.

Kelaua Harbor (2°06'S., 147°16'E.) is small and has a number of reefs in its entrance. The reef which supports Patamu Island extends 0.1 mile S from that island to the N side of the preferred channel into Kelaua Harbor. A reef, extending 91 to 183m offshore, fringes the N and S shores of the bay. Shoal ground, defined by the 1.8m depth line, extends 0.4 mile from the head of the bay. The village of Lauis is on a chain of hills, about 3 miles upriver of the entrance of the Lauis River, which discharges into the head of the bay.

Anchorage.—Anchorage can be taken, in about 31m, with the N end of Patamu Island bearing 080° and the S entrance point of the harbor bearing 131°. Vessels entering the harbor should do so with the sun abaft the beam, because the reefs are then more easily seen. The fringing reef of Patamu Island should be kept aboard until Inner Reef is identifiable, the passage N of which is to be preferred. Anchorage may be obtained by vessels with local knowledge, in depths of from 27 to 37m, in the S part of Kelaua Harbor, where there is room for several vessels.

Caution.—Outer Reef, 0.4 mile ENE of the S entrance point of the bay, has a least depth of 1.8m. Southward and SW of it are two reefs, with depths of 2.4m.

Middle Reef, with a depth of 4m, is about 600m S of Patamu Island.

Inner Reef, with a depth of 0.9m, is 700m SW of Patamu Island.

9.70 Between Sanders Point, 7.5 miles SW of the S entrance point of Kelaua Harbor, and South West Point, the approaches to the S shore of Manus Island are encumbered with reefs, shoals, and coral-fringed islands and islets lying up to 43 miles offshore.

Sanders Point is low and can be identified by a white sandy beach and a large clump of coconut palms, the only ones in the vicinity. The point is fringed by a wide reef which is reported to have extended farther W and S than charted.

Big Ndrova Island and Little Ndrova Island are close together, 2 miles ESE of Sanders Point, with a clear passage between them. Big Ndrova Island is 41m high.

Between Sanders Point and Sabumo Point, about 14 miles W, the coast is indented by two foul bays and is fronted by many dangers. Sabumo Point, low and wooded, is the termination of a range of mountains sloping gently toward the sea. Ndruval Island, 29m high and 1.5 miles SE of the point, is sandy and covered with a kind of reed grass. There are two hummocks on the island.

Between Sabumo Point and South West Point, about 26 miles W, the coast is fronted by numerous dangers. Malai Bay and South West Bay, separated by a large headland, indent the W part of this coast. Both bays are lined with mangroves, foul, and suitable only for small vessels with local knowledge.

South West Point is moderately high and densely wooded. Between this point and Alacrity Point, about 4.5 miles NNW, a reef fringes the shore to a distance of 2 miles. The coast is broken and rugged, and indented by many foul inlets. The vegetation along this coast is dense.

Between Alacrity Point and Sopa Sopa Head, the coast is very irregular, fringed by reefs, and fronted by dangers. Kali Bay, which indents this coast, has not been closely examined. It is said to be foul.

Caution.—The W approach to Manus Island is encumbered by shoals, reefs, and reef-fringed islands extending up to 20 miles off the S end. These dangers are more widely separated and are nearer to the N part of the coast.

Bipi Island (2°06'S., 146°24'E.), about 1 mile long and 9.1m high, is about 8 miles NW of Alacrity Point. Sisi Liu Island, 9.1m high and somewhat smaller than the above island, is about 1.5 miles NE of it, and Pahi Islet is about 2.8 miles farther NW. The islands are surrounded by reefs, and foul ground is between them and the Manus Island coast.

9.71 The N coast of Manus Island is fronted by a broken line of barrier reefs, approached through unobstructed water with general depths over 56m. The line of reefs lies between 2.5 and 5.5 miles from the coast and extends from a position N of Sopa Sopa Head to the NW point of Los Negros Island. The E end of the lagoon formed between the barrier reefs and the coast formed by Los Negros Island. Deep navigable passages extend through the barrier reef, but the lagoon is considerably encumbered with scattered reefs, shoals, rocks, and reef-fringed islands.

Caution.—Firing exercises take place N of Manus Island in an area bounded by a line joining position 1°47'S, 147°40'E and position 1°47'S, 147°00'E. A navigation warning is broadcast when such exercises are in progress.

9.72 Between Sopa Sopa Head and Mosely Point, the coast is indented by Shallow Bay, which is encumbered with mud banks. A number of low, flat, and densely-wooded islets are in the entrance of the bay. Higham Island, located nearly 1.5 miles E of Sopa Sopa Head, is planted in coconut palms. The head is rocky and fringed by a reef that extends about 0.5 mile offshore. Within the head, the land rises in a gradual slope to a saddle hill, 148m high, about 2.5 miles S of the point.

A group of three islands are about 5 miles WNW of Sopa Sopa Head. Mosely Island (Massong Island) and Buchanan Island (Bulumara Island) are on the same reef. Murray Island (Palawat Island) is detached and is surrounded by a wide fringing reef. All of these islands are covered with coconut palms. Considerable shoal water extends S from the group.

Harengan Island, 1.5 miles N of Sopa Sopa Head, is 51m high and densely wooded. On the W edge of the reef surrounding the island is Twin Rocks, about 6m high.

9.73 **Nares Harbor** (1°57'S., 146°39'E.), in the lagoon off the W end of the N coast of Manus Island, is formed by the reef-fringed shore, E of Mosely Point, two reef-fringed islands on the W, and Marengan Reef on the N. The harbor is sheltered, because the islands and reefs form a natural breakwater. The S shore of the harbor, E of Mosely Point, is reef fringed to a distance of 1 mile. A small promontory is about 2.5 miles ESE of Mosely Point.

A considerable tidal current has been observed to set E and

W in the harbor without any perceptible rise or fall. Depths in the harbor vary between 18m and 57m.

Marengan Reef, which forms a natural breakwater, consists of two parts. The N edge of the reef is defined and has few apparent off-lying dangers. The S edge is not defined. It has several mushroom rocks cropping up close to it, with deep water around. Two sandy islands, 24 to 30m high, stand on the W part of the reef. Marengan Island, densely wooded and having some coconut palms, has a village on its N side. Sori Island, which lies near the E end of the E part of the reef, is low, flat, and densely wooded. A village is on the S side of the island and there are some coconut palms. Mbuchonsaul Islet, a sand cay with a few trees on it, is close to the E end of the reef.

Challenger Shoal, 1.25 miles E of the same islet, has a least depth of 6.4m at its W end and 5.5m at its E end. Two shoals, with depths of 6.4m and 8.7m, respectively, are about 4 miles E of the islet.

Reefs and dangers lie up to 1 mile off the S shore of Nares Harbor.

Noru Island and Okoru Island (Krese Island), low, flat, and densely wooded, are on an extensive reef; both are planted with coconuts.

Anchorage.—Anchorage can be taken about 0.8 mile S of Sori Island, in about 33 to 37m. This position is SW of and clear of a 5m shoal.

There is also apparently good anchorage in the area between Harengen Island and the reef surrounding Okoru Island and Noru Island, taking care to avoid the 9.1 to 12m shoal patches.

Directions.—Vessels approaching from the W should run parallel to and about 1 mile off the N scale of Marengan Reef until Mbuchonsaul Islet bears 226°; then alter course to 177° with **Failure Rocks** (1°58'S., 146°42'E.) ahead. This course leads mid-channel between Challenger Shoal and Havergal Shoal, about 0.8 mile West. When Ahet Island is open S of Sori Island, bearing 295°, the vessel will be S of Havergal Shoal. Then alter course W, steering for Browne Island until the W point of Sori Island bears 005°. Course should then be altered to about 004°, taking anchorage as convenient.

Vessels approaching from the N or E should steer for Sori Island and head for Mbuchonsaul Islet when it can be identified. Care should be taken that Mbuchonsaul Islet does not bear more than 230°, until Failure Rocks bears 177°; then follow the directions as above.

Caution.—Danger areas, each 183m in diameter, are situated the following distances and bearings from the charted position of a beacon, which has been reported as missing, 0.5 mile N of the E end of Noru Island, as follows:

a. 1.35 miles bearing 326°.
b. 0.95 mile bearing 328°.
c. 0.70 mile bearing 318.5°.
d. 0.25 mile bearing 340°.
e. 1.66 miles bearing 124.5°.
f. 2.55 miles bearing 110°.

Navigational aids in this area are not reliable.

9.74 Between **Aripau Point** (1°59'S., 146°44'E.) and Aheyos Point, the N extremity of Manus Island, about 7.8 miles ENE, the coast is first broken by headlands and bays; and then is unbroken. Malwes Island is about 3 miles WSW of the Aheyos Point; Sapa Lousa Island is 2 miles farther in the same direction. Both islands are surrounded by reefs.

Between Aheyos Point and the W entrance point of Balscot Bay, about 6.5 miles E, the coast is fairly regular and is fronted by a barrier reef. Numerous coral heads are between the barrier reef and the coast.

Balscot Bay, although small and reef-fringed, is deep and is reported to afford good anchorage for small vessels with local knowledge.

Between the E entrance point of Balscot Bay and the W entrance point of Drugal Bay, there are a number of prominent points and coves fringed by a wide coastal reef, with several off-lying shoals. A 3.2m shoal patch is charted near the head of the bay.

The coastal coral fringe continues as far as the W entrance of Bowat Bay, and is wide and without break. The bay is reported to be lined with mangroves, fringed with reefs, and very shoal. Bowat village and mission station are on the E side of the bay.

Anchorage.—Ponam Island is about 2 miles within the W end of the large barrier reef which fronts the N extremity of the island. Anchorage may be obtained by vessels, with local knowledge, between the large barrier reef and Manus Island, in depths of 21.9 to 31.1m, but the holding ground is not good and the anchorage is open to W winds. The channel W of the NW extremity of the barrier reef leading to the anchorage area has been swept to a depth of 12.2m. The anchorage area has been swept to depths of 9.1 to 12.2m. There are two 0.5 mile anchorage berths wire-dragged to 12m; three other berths have been wire-dragged to depths of 9.1 to 12.2m.

Caution.—Caution should be used when navigating outside the wire-dragged area because undetected coral heads may exist as well as those indicated on the chart; because the water is muddy, these dangers are hard to identify.

9.75 A string of islands, of which the largest and easternmost is Los Negros Island, extends E from the NE extremity of Manus Island and then curves around to the N and W, forming Seeadler Harbor. Lorengau Bay which is of commercial interest, Lombrum Bay and Papitalai Harbor, which are both military sites, indent the S shore of Seeadler Harbor. A number of coconut plantations are found along the shores of the harbor.

Tides—Currents.—The tidal rise at MHHW is 0.8m. At MLLW, the rise is about 0.2m. There is little current in the harbor.

Depths—Limitations.—Depths of 12.8 to 32.9m, interspersed with coral reefs having depths of 0.9m to 7.3m, are found throughout the harbor. Depths of at least 15.2m are found in the wire-dragged entrance channel between the reef fringing Ndrilo Island and that fringing Hauwei Island. The passage between the reef fringing Pityilu Island and that fringing Hauwei Island has depths of 4.6 to 12.8m in the fairway.

Aspect.—Ndrilo Island and Hauwei Island are planted in coconut palms and are about 27m high.

Rara Islet, densely wooded and about 37m high, is off the entrance of Lorengau Bay.

Pityilu Island is low and has some buildings on it. There is an airfield on the island, which is reported as unusable.

The NW end of Ndrilo Island is marked by a light close to an abandoned lighthouse.

Three conspicuous oil tanks are 0.3 mile WSW of Lombrum Point.

Pilotage.—Pilotage is not compulsory, but a pilot is available from Madang on 48 hours notice. Pilots board in the vicinity of a position 0.9 mile, bearing 127° from the abandoned lighthouse on Ndrilo Island. No tugs are available.

Anchorage.—Anchorage for a number of large ships is available in an area about 15 miles long and from 2 to 4 miles wide. A great number of berths for all size ships have been established in the swept areas, which have been dragged to 6.1 to 15.2m. The holding ground is reported to be excellent, but a heavy swell sets into the harbor during the Northwest Monsoon. Vessels wishing to anchor during daylight hours should arrive not later than 1 hour prior to sunset.

Anchorage for merchant vessels can be taken, in 16.5m, good holding ground, about 0.3 mile SW of Rara Islet.

Anchorage for small vessels with local knowledge can be taken in Lombrum Bay and in Papitalai Harbor. There are two mooring buoys in Lombrum Bay.

A recommended anchorage is 1.3 miles, bearing 210° from Bear Point.

Directions.—Vessels should enter Seeadler Harbor by passing midway between the reefs fringing Ndrilo Island and Hauwei Island. The E point of Rara Islet bearing 200° leads through this passage. Vessels bound for the anchorage off Lorengau Bay should continue on this course, which will pass E of a 4.3m shoal lying 1 mile N of Rara Island and W of a shoal extending WSW from Rara Island. The track then leads S to Nabu Wharf, passing either W or E of a shoal which is marked by beacons at its E and W extremities.

Caution.—Numerous charted submerged dangers are in Seeadler Harbor; these are hard to identify when the waters are muddy. Care must be taken when navigating outside of swept areas because undiscovered dangers may exist.

Lorengau Bay is shoal, and it and Papitacai Harbor are encumbered with shoals and fringed by a reef.

9.76 Lorengau (2°01'S., 147°17'E.) (World Port Index No. 56730) consists of Nambu Wharf, a short T-headed pier which extends from the end of a causeway projecting from Parendo Point; the berth is unsafe for working cargo; the berth has a depth of 5.1m alongside. Salesia Wharf stands 1.5 miles ESE of Nambu Wharf.

A naval base situated at **Lombrum** (2°02'S., 147°23'E.) has a wharf alongside, which vessels up to 183m in length, with drafts of 10.1m, may berth. A small oil pier is available in Papitalai Harbor.

See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for details on regulations pertaining to vessels in the waters of Papua New Guinea. The Quarantine Anchorage may best be seen on the chart.

Hyane Harbor (2°03'S., 147°26'E.), on the E side of Los Negros Island, is small and reef-fringed. The harbor is suitable only for small vessels with not more than 3m draft; with local knowledge they can anchor, in 27.4m, in the S part of the harbor.

The entrance channel, marked by buoys, is only 46m wide and is 7.6m deep; considerable swell is reported outside the entrance during the Northwest Monsoon.

Islands and Dangers East and South of Manus Island

9.77 Nauna Island (2°12'S., 148°12'E.), the easternmost of the Admiralty Islands, is about 131m high and densely wooded. It has a cliffy N coast and is fringed by reefs extending about 183m offshore. A narrow sandy beach, with coconut palms, extends nearly around this small islet. A light is situated on the W side of the island.

The Los Reyes Islands, comprising Mbatmanda Island and Putuli Island, separated by a 1.5 mile wide passage, are about 17 miles NNW of Nauna Island. The islands are low, densely wooded, and about 49m high. The Los Reyes Islands have been reported to be 1.5 miles NE of their charted position.

Towi Island, small and of volcanic origin, is 4.75 miles WSW of Putuli Island. It is densely wooded and 46m high.

Tong Island, flat, densely wooded, and about 18m high, is 8.5 miles WSW of Towi Island. A danger area, 1 mile in diameter, is centered about 2 miles ENE of Tong Island.

Pak Island, 5 miles WSW of Tong Island, is about 21m high. The E and W ends of the island are forested and the area between is planted in coconut palms. The coasts are steep, rugged, and reef-fringed. A rock, with a depth of less than 1.8m, lies close W of the W end of Pak Island.

Ulunau Island, small and reef-fringed, is separated from the N side of the W end of Pak Island by a narrow passage. A small jetty stands on the S side of the passage.

A shoal, with depth of 5.8m, is 1 mile NE of Ulunau Island. A shoal, with a depth of 6.7m, is about 1.5 miles ENE of the same islet.

Small vessels with local knowledge can anchor, in 12.8 to 16.5m, a little over 0.5 mile E of Ulunau Island.

Sea Reef, which is unexamined and has a least depth of 6.4m, extends 1.75 miles NNW from a position about 2.5 miles N of the W end of Pak Island.

Rambutyo Island is 306m high and wooded; its W part is low and flat. Backing the shore and encircling the island is a margin of low and undulating terrain that on the SW coast encompasses an area of considerable extent. The broad area of low ground is planted with coconut palms. Many huts are found along the shore and many pilings are found on the W side of the island.

The shores of the island are reef fringed. Langembulos Island, 18m high, is on the SW end of this reef. The Horno Islands are on the reef that extends about 6 miles NW from the N point of the island.

Islands and Dangers West of Rambutyo Island

9.78 The San Miguel Islands are two small coral atolls with six small islets, about 18m high and densely wooded. An area of irregular depths, having a least depth of 8.2m, extends about 2.5 miles S from a position about 2 miles SSW of Anabat Island, the S island of the group.

The Fedarb Islands consist of four densely-wooded and reef-fringed islands. They are separated from the above islands by an area of apparent foul ground. Sivisa Island, the E of the Fedarb Islands, has a prominent conical peak, about 76m high.

A danger area, on which the seas break heavily even in calm weather, is about 1 mile NE of Sivisa Island.

Lou Island, steep, rugged and having three peaks, is separated from the Fedarb Islands by foul ground. The island attains a height of 210m and is densely wooded. A reef extends SSW from the S end of the island. An islet, 37m high and surrounded by a shoal that extends 0.5 mile SSW from it, is about 1 mile S of the same end.

The Saint Andrew Islands, four in number, are at the NE end of a foul ground area. The islands are densely wooded and from 18 to 21m high. Ngowui Island, which is on the E side of the N approach to Saint Andrew Anchorage, is about 18m high and densely wooded.

Waikatu Island is about 21m high and densely wooded. Foul ground extends about 0.4 mile E and SE from the E side of the island.

Paliai Island (2°27'S., 147°25'E.), E of the foul ground extending E from Waikatu Island, is about 18m high and densely wooded.

Anchorage.—Saint Andrew Anchorage has depths of 18 to 27m; it is exposed to all winds, but reefs and foul ground afford protection from heavy seas. Vessels with local knowledge approach from the NW. Anchorage can be taken, in 22m, with the S end of Waikatu Island in line bearing 258° with the N end of Paliai Island.

The Pam Islands, separated from Saint Andrew Islands by foul ground, consist of two similar size islets, on the same reef, and a smaller islet. They are about 107m and 75m high, respectively. Two small reefs are about 2 miles W and 1 mile WNW of the S island. A shoal is about 2 miles E of the same island.

Saint Andrew Strait, between Lou Island and Saint Andrew Island, should only be navigated by vessels with local knowledge and then under only the most favorable conditions of light. Several shoals are reported in the N approach, between Lou Island and the Fedarb Islands. Two of these are nearly in mid-channel. Both the N and SW entrances of the strait are reported to be foul.

Baluan Island (2°33'S., 147°17'E.) is about 246m high and covered with rainforest. The island has an even slope from summit to shore, except for a conical cliff on its NE coast. Foul ground extends up to 1 mile offshore. Several small islets are up to 1 mile off the NE coast; the NE attains a height of 77m.

Pearse Shoal, with a reported depth of 9m, is about 5 miles WNW of the W end of Baluan Island.

9.79 The **Papialou Islands** (2°44'S., 147°21'E.) are coral-fringed and 0.75 mile apart. The NE and larger island is 18m high and wooded; the SW island is 21m high and partly covered with low bushes. The reef surrounding the islands is reported as extending about 0.8 mile farther SW than charted.

Alim Island, about 22 miles SW of Baluan Island, is covered with coconut palms. It has been reported to be 1.25 miles WSW from its charted position. It is about 28m high and fringed by reef. An islet is about 1 mile SE of Alim Island on the fringing reef. A reef, about 1.3 miles long, N-S, and about 0.8 mile wide, has been reported to be with its center about 1.3 miles E of the S end of Alim Island. The island is marked by a light on its N end.

In 1989, a shoal, with a depth of 3m, was reported lying about 2.3 miles WNW of the N extremity of Alim Island. A detached circular coral reef, about 1 mile in circumference, lies about 1.5 miles ENE of the S extremity of the island.

A shoal, with a depth of 4.6m, is about 3 miles E of Alim Island.

The Johnston Islands, about 12 miles NW of Baluan Island, consists of a bushy islet and three small islands, about 30 to 38m high and densely wooded. Numerous reefs and shoal heads, some with depths of less than 1.8m, are reported in the vicinity of these islands. Their limits have not yet been clearly defined.

Stuart Bank, 2 miles WNW of the largest of the Johnston Islands, consists of a bare reef and sandbank. The highest part, near its center, is about 0.9m above HW. A reef was reported about 2 miles NNE of Stuart Bank.

Several shoals are between 4 miles W and 6 miles NW of the largest of the Johnston Islands. Numerous dangers are within 5 miles SW and 4 miles S of the same island.

Because of numerous uncharted reefs and shoals, vessels approaching Seeadler Harbor from the S have been reported to be using the following track: Pass midway between Papialou Island and Alim Island on a heading of about 356°, so as to pass midway between Baluan Island and Pearse Shoal. When abeam the N extremity of Baluan Island, alter course to about 030° so as to pass about 2 miles W of Lou Island. Then round Los Negros Island to the entrance of Seeadler Harbor.

Mbuke Island (2°23'S., 146°49'E.) is about 183m high. Numerous islands and dangers lie between it and the S coast of Manus Island. Reefs extend from the NE and SW sides of the island, and there are some dangers between it and the SW end of Manus Island.

A group of reefs, whose existence is doubtful, may be S and SW of Mbuke Island.

The Purdy Islands are a group of small coral islets lying about 40 miles SSW of the SW end of Manus Island. They are occasionally visited by inter-island vessels.

The Bat Islands, the W of the group, consist of two flat islands and an islet, covered with coconut palms and encircled by a coral reef, which is reported to be rather steep-to.

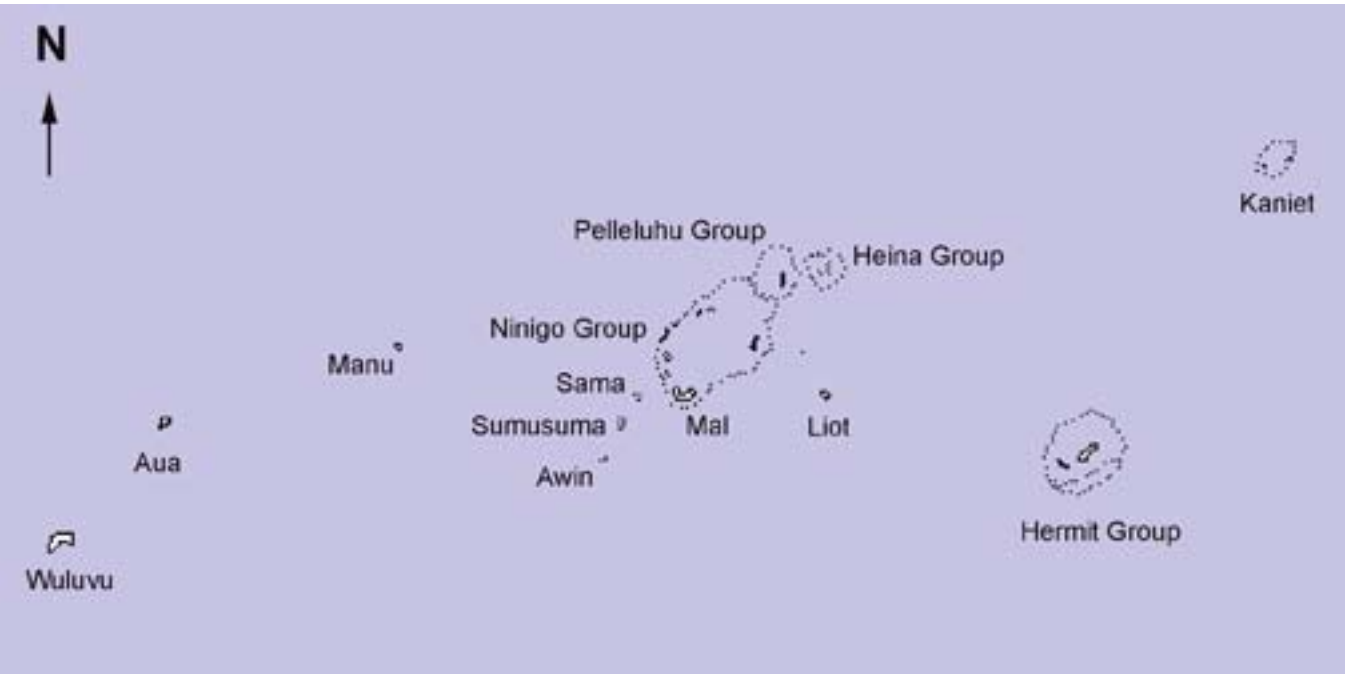
Mole Islet, at the E end of the group, and Mouse Islet, are about 3 miles apart in an ENE-WSW direction. The former is 0.75 mile long and much larger than Mouse Islet. The interior of Mole Islet is below sea level in places, and is swampy and covered with undergrowth. Its shores are sandy, and it is surrounded by a reef which forms an islet on the SW side of the island. Mouse Islet is wooded. Rat Islet, about 3 miles SW of Mouse Islet, lies on the SW end of a reef.

Islands and Dangers Southwest and West of Manus Island

9.80 Larsen Reef is about 22 miles W of Mbuke Island. The Sabben Islands, several islands on an extensive reef, are low and wooded; an extensive foul area is E and SE of these islands.

Western Island, the position of which is approximate, lies 35 miles W of Manus Island. Ships have reported passing within a few miles of the area in good visibility and made no visual or radar contact.

The **Hermit Islands** (1°30'S., 145°03'E.) are enclosed by a narrow barrier reef, which in most places is less than 1 mile wide. Several low islands lie on this reef and are covered with



The Bismarck Archipelago—Western Islands

coconut palms. There are 17 islands within the lagoon, four of which are high and form a group at the center of the lagoon. All of these islands are wooded and reef-fringed; the smaller islands are connected to the larger islands by reefs. Hills, ranging from about 111 to 244m high and separated by valleys and low, narrow isthmuses, are found on the two large islands. Margins of low and gently sloping ground are found around the hills. Coconut palms are found on this ground and also on the isthmuses. Steep slopes alternate with stretches of sandy beach, and in places, particularly around Luf Island, there is considerable mangrove along the shore.

Depths—Limitations.—There are no obstructions in the waters surrounding the atoll; depths of over 183m are found close outside the barrier reef.

There are three entrances leading into the lagoon; of these, **West Entrance** (1°31'S., 144°59'E.) is the only one suitable for large vessels. This entrance width is 1.65 miles, but a 9.1m shoal divides it into two channels. The S channel is further contracted by a shoal spit of 7.3 to 9.1m extending about 0.5 mile N from the barrier reef. Depths of over 13.7m are found in the N channel.

The N end of **Jalun Island** (1°32'S., 145°03'E.), in line bearing 109° with the 147m summit of **Luf Island** (1°32'S., 145°04'E.), leads through the N part of West Entrance. This leads about 0.3 mile S of the SW end of Northwest Reef, which is steep-to and clearly visible under favorable light conditions.

Anchorage.—Anchorage is available off the islands, with the preferred anchorage being off the S side of **Maron Island** (1°33'S., 145°02'E.), in 27m, mud.

Alacrity Harbor, an indentation in the NE side of the surrounding reef, affords good anchorage for small vessels, in about 25m, sand bottom. Coeran Passage, the N pass in the encumbered entrance, should be used; it is about 0.2 mile wide, with depths of 7.3m. Anchor in the middle of the harbor, having due regard for shoals.

The Kaniet Islands and the Sae Islands

9.81 The Kaniet Islands, about 38 miles NE of the Hermit Islands, consists of five small islets on a small coral atoll. They are within an area about 2.5 miles long in a NE-SW direction. They are low, flat, covered with coconut palms, and connected to each other by reefs. The N and largest island is about 0.5 mile long. There is sparse vegetation and some swampy areas. The reef fringing the group extends up to 0.5 mile offshore. There is a trading station on the S islet. Interisland vessels make occasional calls.

Caution.—These islands have been reported (1995) to lie 3 miles NE of their charted position.

The Sae Islands, about 15 miles NW of the Kaniet Islands, consist of two small islets connected by a drying reef in a NW-SE direction from each other. The NW and smaller of the two is nearly flat and covered with large trees and coconut palms. The SE island is higher and also wooded.

Caution.—These islands have been reported (1987) to lie 1.8 miles NE of their charted position.

The Ninigo Group and Adjacent Islands

9.82 **Liot Island** (1°24'S., 144°31'E.) is low, sandy, and densely wooded, with high trees. It is shaped like a horseshoe, open to the W. It is on the E edge of a reef enclosing a lagoon. A reef, with a depth of 9.1m, has been reported to be 5 miles

NW of Liot Island.

Pupol Reef, with a depth of 9.1m, lies 4.5 miles WNW of Liot Island.

The Ninigo Islands are about 35 miles WNW of the Hermit Islands. The group consists of six atolls, separated from each other by deep channels. There are about 50 narrow islets on the reefs, all low and flat, some of which are covered with coconut palms. There are some swampy areas. Copra, which is taken to **Longan Island** (1°13'S., 144°18'E.) (World Port Index No. 56710) on the NW side of Ninigo Atoll and to Mal in the S for shipment, is the chief export. A plantation manager resides on Longan Island. There is a trading station with a flagstaff at the E end of this island. Interisland vessels call occasionally at the anchorage off Longan Island.

Tides—Currents.—Strong currents are reported in some of the boat passages into the lagoon.

Depths—Limitations.—The passage into Ninigo Lagoon that is generally used is on the NW side between Longan Island and Meman Island. This passage, which is close to the E side of Meman Island, is about 228m wide between the fringing reefs. There is a depth of 8.2m in the fairway. Several 2.4m shoals are on a ledge that extends 0.3 mile SW from the W point of Longan Island.

A SW entrance into the lagoon exists 3.5 miles NE of Mal Island. The lagoon between the SE entrance and Lau Island is deep and clear of dangers. There is a small but prominent wooded islet on the reef 1 mile E of the E end of Mal Island. The SE entrance is marked and has a least depth of 11m, which quickly increases to 22m further in the lagoon. The reef patch at the far N of the E side of the SE entrance is marked. Between it and the tip of the reef immediately S, there is a least depth of 16.5m. When negotiating this passage between the reef patch and the reef to the S, vessels are advised to favor the S side.

The remaining passages are suitable only for small boats with local knowledge. The passage close E of Nuhu Island is unsafe as a result of an earthquake.

Anchorage.—Vessels with local knowledge can anchor, in 8.2m, about 0.2 mile from the E end of Longan Island, with the flagstaff about 91m from the same point, bearing 335°. The holding ground is reported as good.

Vessels should keep over on the Meman Island side of the channel until the S end of that island bears more than 270° before altering the course E toward the anchorage.

Heina Lagoon and Pelleluha Lagoon and the passages leading into them are suitable only for small craft with local knowledge.

Caution.—The passages into the lagoons and the waters of the lagoon should be navigated with caution, because there are numerous coral heads, especially just within the entrances.

Islands West of the Ninigo Islands

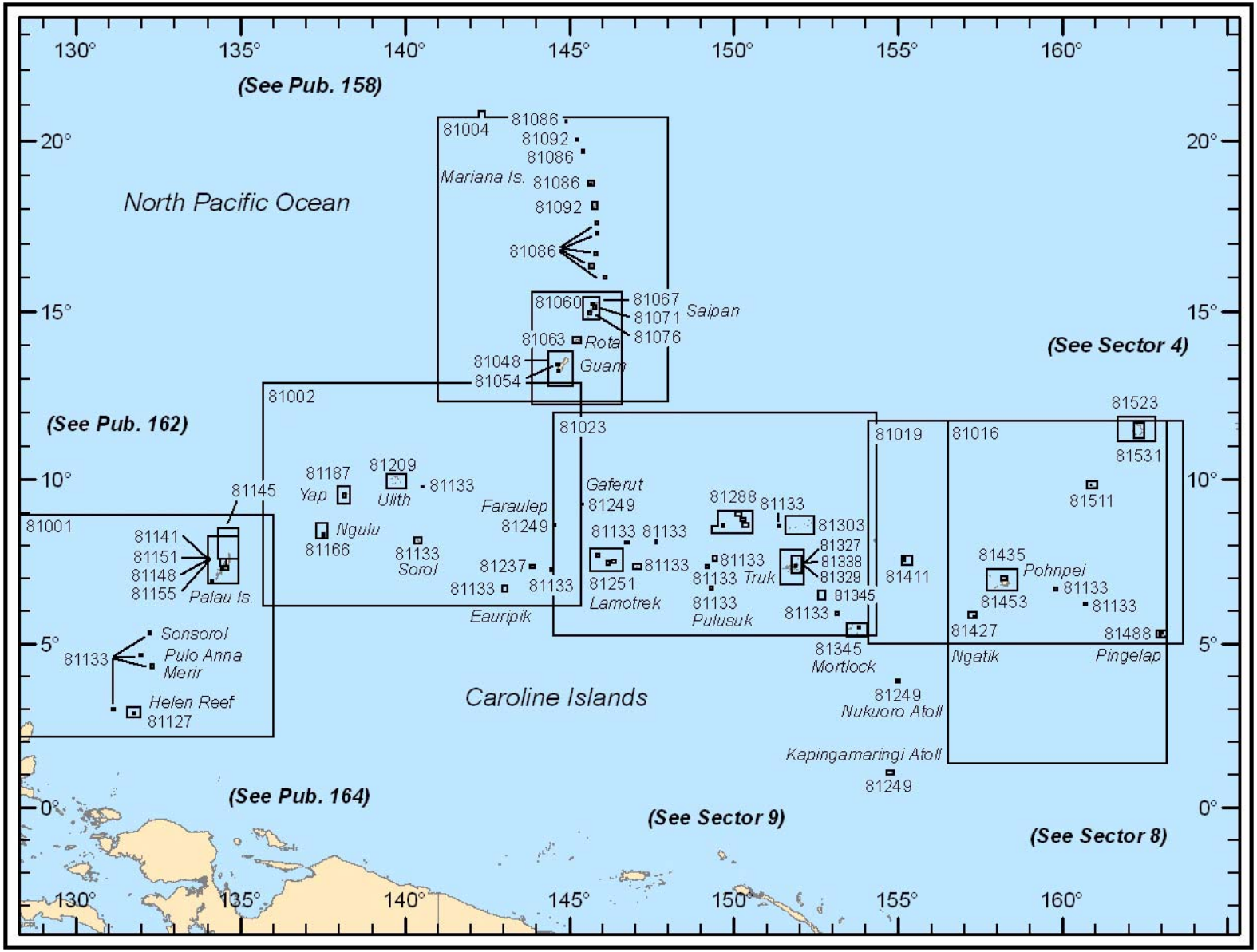
9.83 Manu Island (1°19'S., 143°35'E.) is about 275m long, 18m high, wooded, and fringed by a reef. Anchorage can be found, in 18 to 36m, off the SE or NW corners of the island, depending on the monsoon.

Aua Island, 32 miles WSW of Manu Island, is a flat, coral island, about 36.5m high to the tops of the trees. From a distance of about 5 miles the S extremity appears as a bluff headland, and some rocks, above-water, may be seen extending a short distance from the NW point. The island is 2 miles long and is surrounded by a fringing reef. The E part of the island is planted with coconut palms and the W part is forested.

A reef has been reported to be about 16 miles N of Aua Island. In 1993, it was reported that this reef was not found; no breakers or rips were visible.

Wuvulu Island (1°43'S., 142°50'E.), 18 miles SW of Aua Island, is low and is covered with trees and coconut palms, the tops of which are about 37m above the water. It is about 3.5 miles long and is fringed by a steep-to reef. Near the center of the island are some swamps.

Awuane Island and Lumike Island are two small islets close off the W and N sides, respectively, of Wuvulu Island.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **10** — CHART INFORMATION

SECTOR 10

MICRONESIA, PALAU, AND GUAM

Plan.—This sector describes the Federated States of Micronesia (FSM), formerly the Caroline Islands, from E to W, then the Republic of Palau, followed by the island of Guam.

General Remarks

10.1 The Federated States of Micronesia (FSM), formerly the Caroline Islands, was part of the U.S. Trust Territory of the Pacific Islands. The FSM consists of four states (island groups); from the far W there is Yap State, Chuuk State, Phonpei State, while on the far E is Kosrae State.

The FSM contains hundreds of islands and atolls; although, about 40 are of significant size and few of those are uninhabited. All the above four states lie between 4°N and 10°N, and between of 137°E and 164° E.

The islands of the FSM vary geographically from high mountain islands to low, coral atolls; volcanic outcrops eject on Pohnpei, Kosrae, and Chuuk. The state capital is Kolonia, on Pohnpei; a new capital is under development, about 5.5 miles SW in the Palikir Valley.

Some lagoons in the atolls of the FSM afford sheltered anchorage and have entrances sufficiently deep for large vessels; other atolls are without openings, or may have entrances suitable only for small craft. Many of the harbors are deep, but have inadequate turning room.

The **Republic of Palau** (7°30'N., 134°35'E.), at the W end of the FSM, consists of eight islands of significant size and numerous smaller islands. The Republic of Palau is an independent state, in free association with the United States. The United States and the Republic of Palau formally entered into a Compact of Free Association, whereby Palau is a self-governing republic, with the United States maintaining responsibility for Palau's defense.

The Commonwealth of the Northern Mariana Islands consists of 13 islands; they extend N from Rota to Farallon de Pajaros, and the off-lying areas to the E of the chain including Stingray Shoal, Pathfinder Reef, and Arakane Reef, and are a U.S. possession. The Marianas Group consists of a chain of steep volcanic islands extending in a N-S direction for a distance of 380 miles. Guam is the southernmost, largest, and most populous island.

Depths between the islands and the reefs of the Caroline Islands are generally between 1,800m and 3,600m, but an increasing number of seamounts are detected and reported as rising from these depths, with their peaks ranging from a few meters to several hundred meters below surface.

The Mariana Trench, with the deepest recorded soundings lie along the S end and E side of the Mariana Islands, is over 1000 miles long with an average width of about 40 miles. The Magellan Seamount Group lies to the E from the N end of the Mariana Trench; the group extends in an E-W direction.

The Yap Trench and the Palau Trench are deep trenches lying along the E sides of the Yap and Palau groups. These trenches are about 450 miles and 250 miles long, respectively, and have an average width of 25 miles.

Winds—Weather.—Frequent rain occurs in all months in the East Caroline Islands. The Truk Islands average 3,200mm annually with a maximum of 270mm per month occurring in July and August, and a minimum of 135mm in January. January, February, and March show average rainfall somewhat under 255mm per month. Thunderstorms are quite common between May and October. In the Pohnpei Island and Kosrae Island area, rainfall averages 240 to 510mm per month throughout the year.

Much rain occurs throughout the year in the West Caroline Islands, but there is a definite increase between May and October. Thunderstorms are fairly common from June to November.

Rain occurs at all seasons in the Palau Island area, but is at a minimum during the period of the Northeast Monsoon. Squally conditions appear to occur more frequently from November to January, as the Northeast Monsoon is gradually established against the variable S to E drift of preceding months. Thunderstorms are rare from January to April, and fairly common from May through August.

At Palau Island, 4,400mm of rain normally occurs annually, with 510mm in July and slightly over 150mm in March. Rainfall is somewhat lighter over the open sea. Precipitation occurs on about 50 per cent of the days from February through April, and on approximately 75 per cent during July through September. The heaviest rains occur during the early morning with a secondary maximum soon after sunset.

In the Mariana Islands, the rainy season attends the summer monsoon, at which time thunderstorms are fairly common.

Typhoons occur on the average of five times a month in the western North Pacific during the month of September. July, August, and October have almost as many. Two-thirds of all typhoons of this area occur during these four months. Typhoons are least frequent during the month of February. They average about one per month for the entire western North Pacific Ocean.

It appears that most of the typhoons of the western North Pacific form to the W of 150°E longitude. An occasional typhoon occurs farther to the E.

Typhoons rarely occur in the East Caroline Islands. Two or three a year, however, either invade, or pass slightly to the N of the West Caroline Islands. The normal typhoon path is S of Republic of Palau during the period from March to June, and again in November and December.

The part of the West Caroline Islands, including the Republic of Palau and the Mariana Islands, which lies N of the parallel of 5°N is a region of great typhoon frequency.

Typhoons sometime occur in the Yap Island area, usually in May and June, or in the last three months of the year.

An average of two typhoons affect the Palau Island area annually. A considerable number originate in or near the West Caroline Islands. The diameters are small.

An average of one storm per year originates in or passes over the Mariana Islands. The storms are as a rule relatively small in

diameter, though often very intense near the center. They usually occur from July to January.

The Caroline Islands are under the influence of the doldrum's belt, from June through November. During this period, heavy rains, thunderstorms, and violent squalls will sometimes offer hazards. Cumulus and cumulonimbus clouds with ceilings sometimes reduced to 152 to 305m for short periods, poor visibility, lighting, and confused seas accompany the more intense of these storms. Most are of short duration and seldom cover and area larger than 20 or 25 miles in diameter. The storms usually move from E to W and occur most frequently at 0600.

The East Caroline Islands are swept by the Northeast Trades. East, NE, or E winds blow almost constantly from December through April. The average rate is 8 knots. From May until December, E to SE winds increase in frequency and predominate in September through November, with and average rate of 5 knots. Averages were computed from land station records; velocities are higher over the open sea. Gales rarely occur. Over the open sea, winds are usually strongest about 0300 and lightest about 1400.

In the Truk Group, the Northeast Trades are very steady, between November and June; 85 per cent of the winds blow from NNE to E directions. By July, however, the indraft of the summer monsoon carries E to S winds from this area into Asiatic waters; thereafter through October, the trade winds are overshadowed by various S to W breezes, with an average 13 per cent of calms.

In the Ponape Island area, the Northeast Trades predominate at all seasons of the year, and blow with great steadiness over the N part of the area, between November and April. Winds are more variable and are marked by occasional shifts to SE and S between July and November, although winds still predominate.

The West Caroline Islands, including the Republic of Palau, and the Mariana Islands come under the influence of the monsoons and trades with NE winds in the northern winter and winds between E and SE in the summer. As these groups lie on the E margin of the monsoon belt, the Northeast Trades and the Northeast Monsoons merge and create winds averaging 12 to 14 knots in the open sea in the northern winter and early spring. In May, the winds over this section diminish in force and blow mostly from the NE; at this time, the Southwest Monsoon begins to be felt in the vicinity of the Republic of Palau.

In summer and early autumn, the Southwest Monsoon prevails in the vicinity of and N of the Republic of Palau, but S winds predominate in the vicinity of the Admiralty Islands. In October and November, the NE winds become established over the whole area. Winds of 12 to 16 knots are experienced during the winter months.

In the Yap Islands area, NE to ENE winds prevail from November to June, when the trades are reinforced in the cooler months by the Northeast Monsoon. The Southwest Monsoon occurs between July and October, but is less pronounced at Waleae and Lamotrek, where at that season the winds are frequently from the SE as from the SW.

In the Palau Islands area, the Northeast Monsoon is usually well established from December to April, though its appearance is often advanced or delayed by as much as a month. The Southwest Monsoon occurs from the latter part of July to about the middle of October, but E winds often occur. The winds are variable during the remaining parts of the year.

In the Mariana Islands area, which lies near the border between the Asiatic Monsoon and the belt of the Northeast Trades, the steadiest winds, over the open sea, occur; then the winter monsoon and the Northeast Trades reinforce each other (November to April). Ninety per cent of all winds are then experienced from directions between N and SE and 70 per cent from NE to E. At the time of the summer monsoon, which falls into the season between May and October, E winds also predominate, but with considerable percentages from S to W directions.

Gales seldom occur in the East Caroline Islands. Gales occur occasionally in the areas N of Palau and Guam, chiefly in winter, due to the strengthening of the Northeast Monsoon and the Northeast Trades. Sometimes, however, they occur at other seasons in connection with typhoons.

Regulations.—Regulations pertaining to navigation in U.S. Territorial waters may be found in the NOS Coast Pilots, while additional regulations will be cited in the text along with the navigational feature they affect.

Caution.—Large scale coverage for the waters included in this sector are provided by both NOS and NGA. Mariners are advised to consult the most recent chart catalogs of both agencies, corrected to the latest Notice to Mariners for the proper chart selection and coverage of this region.

Micronesian authorities advise that local fishermen in small canoes may be encountered in the following area within the Caroline Islands, as follows:

a. 8°20'N, 147°00'E.
b. 8°20'N, 148°00'E.
c. 7°30'N, 148°00'E.
d. 7°00'N, 147°00'E.
e. 7°15'N, 146°00'E.
f. 7°40'N, 145°35'E.

Mariners should exercise prudence and caution when transiting this above area, especially during darkness or periods of reduced visibility.

Particular and constant attention must be paid to the currents when navigating among the island groups. As a rule, these currents are deflected and always strengthened near the islands. Strong currents are found in the narrow passages. Many of the islands, which are encircled by reefs that are steep-to on the seaward side, are so low that it is often impossible to see them, except under favorable conditions of light.

The sea around the Truk Islands is reported to be of a pale green color, making it difficult to identify reefs.

Micronesia East of 148°E

10.2 Winds—Weather.—Kosrae Island, located on the S margin of the NE trades, which dominate from December to April inclusive, is swept by NE winds of 10 to 15 knots. The Northeast Trades shift N in June and July and light variable winds and calms prevail until the SE trades become dominant. The winds during the latter period are less strong and constant than those of the Northeast Trades. In November and December, the wind systems shift S and the island has another period of doldrums.

Squalls occur almost daily, particularly with E winds during June and July. They are of short duration, with velocities of 15 to 30 knots. November and December are also squally months.

The Northeast Trades blow from December to March over Pohnpei Island. Gales have been reported during the trades, but are estimated to occur less than 5 per cent of the time. During April, E to SE winds increase in frequency and become predominant in September and October. During this season, the winds are light and variable with frequent calms. Sudden violent W to SW winds sometimes occur with the better developed storms. These sometimes attain gale force.

The doldrums belt moves N over Pohnpei Island in June and July, when the Northeast Trades give way to the Southeast Trades. A maximum of squalls and rainfall occurs at this time over the open sea. The doldrums move S in November and December, and cause a secondary increase in squalls and precipitation.

Showers and squalls are frequent, and occur at any time of the year. Squalls are sometimes violent and have an average duration of 20 minutes. Thick cumulonimbus clouds immediately precede these squalls, bringing gusty winds and heavy rain. Thunderstorms are rare. A 5-year average indicates only about 17 annually, fairly evenly distributed during the year.

Northeast and E winds prevail in the vicinity of Kapingamarangi Atoll from December through April, with a frequency of 68 per cent and an average velocity of 11 knots. In May and June, variable winds prevail, with an average velocity of 7 knots. Calms occur about 11 per cent of the time. From July through September, SE winds occur 55 per cent of the time, with an average velocity of 8 knots. Calms occur about 5 per cent of the time. In October and November, winds average 7 knots from varying directions. Southeasterly winds predominate and occur about 24 per cent of the time. Between October and January, W winds of 15 knots are experienced 10 per cent of the time.

Squalls and thunderstorms, with a diameter of 25 to 30 miles, are accompanied by winds averaging 15 to 25 knots, with occasional gusts up to 40 or 50 knots. Thunderstorms occur on an average of 2 days per month from May through November, and once a month for the rest of the year.

The Northeast Trades blow almost constantly from December to May over the Mortlock Islands and the Truk Islands. The average velocity is about 15 knots, with an occasional gust of 30 knots. Light variable winds can be expected from July to December. The influence of the doldrums is felt for a longer period (June to November) over the Mortlock Islands. During May and June, the trades decrease in force and intensity, with increasing ESE winds. As a rule, the winds increase during the morning hours and decrease during the night.

Typhoons sometimes have occurred over Kosrae Island and Pohnpei Island, but they are rare during the winter months. Kapingamarangi Atoll is out of the usual path of the typhoons, however, severe storms have occurred on rare occasions.

A region of typhoon development is located N of the Truk Islands. As a rule, such storms do not reach full development until they pass W of Guam. They occur most frequently in late summer or autumn.

Rain is heavy at Kosrae Island and is fairly evenly distributed throughout the year. Lelu has an average of 4,850mm and Inshiappu, on the W side of the island, has an average of 6,500mm.

Pohnpei Island is very wet, rain falling practically every day from March to December. Twenty-five millimeters of rain falls about 5 days per month. January and February, the so-called dry months, have an excess of 250mm.

Kapingamarangi Atoll has its heaviest rainfall in May and June, and then again in October and November; the average rainfall is about 300mm per month. The rainfall is relatively light from February through April, and from July through September, the average being about 160mm. In December and January the monthly average is 250mm; most of the rain occurs during storms.

The Mortlock Islands usually have their heaviest rainfall between June and October. Winter and early spring, the so-called dry season, has an average of 160mm or 190mm of rainfall per month.

The Truk Islands average 3,300mm of rain annually. The rain falls mostly at night, with a maximum during the early morning hours, usually decreasing rapidly after sunrise. Minimum rainfall and cloudiness can be expected between 0900 and 1400.

Tides—Currents.—Currents in the East Caroline Islands are variable. It is reported that during E winds a strong current, setting N, has been experienced S of Pingelap Atoll. During SE and N winds, a NE current of 1 knot has been reported in this area. An E set occurs at flood tide off the W side of Pingelap Atoll.

An E current has been reported in the vicinity of Ngatik Atoll. The velocity reported is 1.25 to 1.5 knots.

The region of the Chuuk Islands lies within the Equatorial Countercurrent from about March to November. East currents usually predominate during these months. Between December and February, this region lies on or near the N margin of the above countercurrent, so that W currents are usually experienced N of the group and E currents S of them.

The tidal currents are very weak in the East Caroline Islands and are greatly affected by the ocean currents. As a rule, they are not experienced in the open sea. In the passages leading into the atolls, the tidal currents are strong and turn at about the time of HW and LW.

The Caroline Islands which occupy a wide expanse of longitude, come in varying degrees under the influence of the Equatorial Countercurrent, as well as the North Equatorial Current and the South Equatorial Current.

From June to November, the Equatorial Countercurrent flows through the whole of the group, with the exception of the Yap Islands and other islands located N of 9°N latitude, in the W part of the group. These lie on or near the boundary between this current and the North Equatorial Current.

From December to February, the North Equatorial Current flows through the group N of about 7°N latitude, so that the Republic of Palau and Yap Island lie in the W current while Truk lies on or near the boundary between the two currents. South of about 7°N, the Equatorial Countercurrent is found, with predominant directions varying between NE and SE in different parts of the group.

From March to May, E of 140°E, the countercurrent appears to be confined to a narrow belt between 6°N and 8°N. North of the latter parallel, the North Equatorial Current flows through the group, and S of the former parallel the South Equatorial

Current, if found. During the same months, W of 140°E, the Equatorial Countercurrent, setting E or NE is found. The Republic of Palau lies on or near the boundary between this countercurrent and the North Equatorial Current; the Yap Islands lie within the latter current.

The ocean currents among the Caroline Islands are rather irregular due to the obstructing islands and banks, the tides, and the monsoon drifts. The irregularity appears to be considerable between 7°N and 8°N.

The Mariana Islands lie entirely in the region of the W current. This current is generally strongest and most constant in the S part of the group, from near Saipan Island S, since this is located in the North Equatorial Current. The N part of the group lies in the North Subtropical Current, which is weaker and less constant, particularly from June to August. In the vicinity of the islands the W current changes its direction and the rate is generally increased N of the Mariana Islands, the region of variable currents is found.

In the East Caroline Islands, the rise is small, the diurnal inequality is considerable, and the tides are complicated. In the West Caroline Islands, the diurnal inequality is small, and the tides are regular.

West of 140°E, there is a slight inequality, except at full and change in spring and fall. The difference in height between successive HW is small; it is from 0.6 to 0.9m between successive LW.

Between 140°E and 147°E, and in the Mariana Islands, semi-diurnal tides prevail at springs during spring and fall. At other times, the daily inequality in the time and height of successive high and low tides is considerable. The diurnal inequality is greatest when the moon is farthest from the Equator. When the diurnal inequality is great, one LW disappears and the other becomes extremely low.

The tides between 147°E and 160°E are peculiar and complicated. Here there is considerable diurnal inequality with often a single daily tide, especially in winter.

10.3 Kosrae Island (5°20'N., 163°00'E.) is one of the most beautiful islands in the western Pacific and is the easternmost island of the Federated States of Micronesia. It is composed of basalt and is so fertile that almost any tropical plant can be grown. It is hilly and covered with dense forests. Mount Buache, located in the N portion of the island, is rounded. Mount Crozer, located near the middle of the island, is steep. A deep valley lies between these two mountains, dividing the island into two parts. The coasts are bordered by a wide belt of mangroves and other trees. The S coast is fringed by mangrove islets, more or less connected by reefs.

Cape Tupinier (5°16'N., 163°01'E.), the SE extremity of Kosrae Island, is low, rounded, and backed by wooded areas. A narrow reef fringes the point.

10.4 Port Lottin (5°17'N., 162°58'E.) (World Port Index No. 56580), situated on the S side of the island, is suitable only for small vessels with local knowledge. It provides good shelter from the Northeast Trades. The entrance is 225m wide between the reefs and is deep. A rock, 0.9m high, stands on the reef on the E side of the entrance. The reefs are hard to identify

Kosrae Island

after heavy rains. Two small wharves and a pier are situated in the harbor.

Coquille Harbor (Okat Harbor) (5°21'N., 162°57'E.) is the only commercial port for international trade on Kosrae and is located on the NW side of the island. Large numbers of fishing vessels land catches for export to Japan via Guam. The port also handles container, oil, and bulk cargo.

Depths—Limitations.—The controlling vessel dimensions for the approach channel are a length of 152m and a breadth of 30m. The channel, marked by lighted buoys, is 500m long, 91m wide, and has a least depth of 50m.

Vessels of 9,000 grt with a maximum length of 129m and a maximum draft of 8.2m regularly use the port. The wharf is 167m long, with a depth of 9.1m alongside.

Aspect.—Range lights, in line bearing 095°, lead through the approach channel to the entrance of the turning basin. From the turning basin, which has a radius of 457m, the track leads NE for 600m to the berth.

Three mooring buoys on the E edge of the turning basin have been laid for the use of fishing vessels when berths are occupied.

An airstrip is situated N of the wharf.

Pilotage.—Pilotage is compulsory for vessels over 300grt when calling for the first time. Pilots are available from 0600 to 1800 and board in the vicinity of position 5°21'N, 162°56'E, about 1 mile W of the entrance to the approach channel.

The vessel's ETA should be sent via its agents 48 hours and 24 hours prior to arrival. Contact should be made directly with the pilots when within VHF range.

Caution.—The mast height of vessels in excess of 300 grt may be higher than the adjacent airport runway approach surface. Vessels must coordinate with the port authority and adjust their arrival and departure times to avoid conflicting with aircraft movements.

Mariners must take care to ensure they correctly identify the new leading lights as the old leading light structures are still in place.

Lelu Harbor (5°20'N., 163°02'E.)

World Port Index No. 56570

10.5 Lelu Harbor, located on the E side of Kosrae Island, is sheltered from SW winds by the mountains of the interior and from NE winds by Lelu Island.

Winds—Weather.—See the beginning of paragraph 10.2 for further information.

Tides—Currents.—The spring range here is about 1.4m, while the mean range is 0.9m.

Currents with velocities up to 1.5 knots are sometimes encountered off the N and S sides of the island. Strong currents have been experienced, setting N or S, off the entrance of Lelu Harbor. It is reported that strong currents set SW across the entrance of this harbor during strong NE winds.

The tidal currents, which set in and out of the several harbors, are weak and normally attain velocities up to 0.5 knot.

Depths—Limitations.—The reefs fringing the shores of the harbor can usually be made out at LW, but muddy water, especially after heavy rains, prevents them from being recognized at HW.

The entrance channel of Lelu Harbor is about 0.1 mile wide between the reefs on either side, and is easy to recognize as the seas break on these reefs, even at HW.

Eripou, a reef awash at LW and reported to be extending N, lies on the S side of the harbor, close within the entrance, which is marked by a beacon.

The wreck of a minelayer, with mines aboard, lies in the S portion of the harbor, about 90m S of the front range light, and has a charted depth of 19.6m, while a visible wreck is charted about 0.2 mile N of the light. Wrecks with a charted depth of 9.6m are charted about 0.2 mile and 0.1 mile N of the same light.

A concrete wharf, 46m in length, with a depth alongside of 8.2m, is situated on the SW side of Lelu Island. A concrete pier is situated on the S shore of the harbor. The pier is used by an oil company and has a permanently-moored barge alongside. The channel leading to the pier was cleared to a depth of 14.9m.

Aspect.—Mount Fenkofuru, which is wooded, occupies the E part of Lelu Island, which forms the N side of the harbor. The E spur of this hill slopes down to D'Urville Point, the E extremity of the island. The W end of the island is low and has some scattered houses along the shores. A church, reported to be visible up to 10 miles from seaward, stands near the W end of Lelu Island. The hospital is situated at the NE extremity of the island. Mangroves border the SW shore of the harbor.

Contact Information.—Harbor information is handled by Kosrae Port Authority in Lelu Harbor and can be contacted as follows:

1. Telephone: 1-691-370-2154
2. E-mail: kosarpt@mail.fm

Anchorage.—Due to limited turning space it is recommended that large vessels do not enter the harbor. The best anchorage, during NE winds, is off the village of Lelu, in 13.7m, fine black sand. Anchorage can be taken, in 22m, W of Eripou. Vessels have experienced dragging, especially when E winds blow through the narrow entrance. Entering is difficult during strong E winds.

Directions.—The harbor is marked by beacons and a lighted range.

Caution.—Kosrae Island is fringed by a reef that extends up to 1 mile offshore in one place on the NW side. After heavy rains, muddy water extends some distance offshore and appears as reefs at times. During E winds, heavy swells have been encountered near the entrance of Lelu Harbor.

Reefs are reported (1996) to lie off the SW side of Lelu Island.

10.6 Pingelap Atoll (6°13'N., 160°42'E.) consists of Pingelap Island, Deke Island, and Sukeru Islet (Takai Islet), all lying on the same reef in the lagoon, in which there is a shallow passage usable only at HW. The islands are low and wooded. A village stands on the SW side of Pingelap Island. There is regular air service to Pohnpei.

Pingelap Atoll

Mokil Atoll (6°40'N., 159°47'E.) consists of three low wooded coral islands located on a reef enclosing a lagoon. The outer edge of the reef is steep-to. There are no passages into the lagoon except for two boat passages which are only usable at HW. Prominent trees, excellent marks for vessels lying-to W of the islands, stand on the S ends of Urak Island and Mokil Island and on the N end of Manton Island. A stone wall, used as a landing place, is situated on the N part of the W coast of Mokil Island.

A native village is situated on the N part of Mokil Island. A radio station is situated on Mokil Atoll.

The Senyavin Islands, which consist of Pohnpei Island, Ant Atoll, and Pakin Atoll, lie with the E end of Ponape Island, about 88 miles W of Mokil Atoll.

Pohnpei (6°55'N., 158°15'E.) is a large island composed of basalt and is surrounded by a barrier reef and by over 25 islets, some of them volcanic. Mountain ranges traverse the island throughout its length and breadth. Totolom, a peak about 4.3 miles N of the S end of the island, is 732m high and is often obscured by clouds. The summit of the island, located about 0.5 mile further N, rises to a height of 778m.

There are many streams, the upper reaches of which are narrow and have a steep slope. They flow through the valleys, forming waterfalls and rapids, and widen greatly at their mouths. During the frequent freshets, quantities of soil are car-

ried down, forming flats off the coast.

Several basaltic islands lie inside the barrier reef, detached from the main island, and many coral islets lie on the reef itself. The main island is covered with luxuriant forests of coconut palms and other trees, which slope up gently from the beaches to the mountain tops. Extensive mangrove swamps, which continue to spread, are found on the S and W side of the island. A number of passages lead through the barrier reef into the reef-studded waters surrounding the island.

Caution.—Vessels are urged to exercise the appropriate caution, as several floats are moored off the island and may best be seen on the chart.

10.7 Ronkiti Harbor (6°49'N., 158°10'E.), located on the S shore of Pohnpei, is divided into an outer harbor and an inner harbor by projecting reefs. The entrance of the outer harbor lies between Narlap, a small island covered with a thick growth of trees, and numerous drying rocks which lie near the edge of the reef on the E side of the channel. The entrance channel is about 0.4 mile wide.

The outer harbor is deep, with depths of 82m in the middle of the entrance to 18.3m or 22m at the N end. The narrows, which connect the outer harbor with the inner harbor, has a least charted depth of 14.6m in the fairway, but is only 37m wide. Sunken dangers lie on either side of the approach to the narrows. The inner harbor is snug and affords anchorage to small vessels with local knowledge near its head, in 12 to 14m.

Mudok Harbor (6°47'N., 158°17'E.), located on the S shore of Pohnpei, is entered E of Panian Island. The harbor is narrow and deep. The entrance is partially blocked by a 2.7m shoal, leaving a very narrow passage between it and the reefs opposite.

Lot Harbor (6°48'N., 158°19'E.), located on the SE extremity of Pohnpei, is a fissure in the reef, and is entered between Ponarakku Cape and Nanpuil, an island 0.2 mile ENE. The navigable channel is only about 90m wide, with a depth of 29m, decreasing as the head of the harbor is approached. Two detached reefs lie in the harbor between the entrance and the anchorage off Lot village.

10.8 Metalanim Harbor (6°52'N., 158°21'E.) is entered between the reefs N of Napali Island. The entrance, which is about 0.3 mile wide, can be identified by Takaiu Peak, a prominent sugarloaf rock, located on the N shore, about 2.5 miles WNW of Napali Island. A prominent waterfall is located on the SW side of the inner harbor. The ruins of a large castle stand on Nanmatol Island, on the S side of the harbor.

Metalanim Harbor has been swept to 12.8m within the limits shown on the chart. The outer harbor is exposed to the prevailing winds and the inner harbor is suitable only for small craft.

A reef, which dries, lies 0.3 mile WNW of the SW end of Napali Island. Two detached reefs, with depths of 1.2m, lie about 0.8 mile WNW of the same point. These dangers are difficult to identify, even in good light and at LW, unless there is a heavy swell running into the harbor.

Anchorage.—Anchorage can be taken, in 33m, about 1.5 miles within the entrance and to the W of the two detached reefs. Large vessels are recommended to moor, or to anchor E of the two detached reefs, where the depths are over 55m.

Pohnpei Harbor (6°59'N., 158°12'E.)

World Port Index No. 56590

10.9 Pohnpei Harbor is irregular in shape, confined, and encumbered with numerous reefs. It forms a natural and protected harbor.

Tides—Currents.—The tidal currents set out of Pohnpei Passage at velocities of 0.5 to 1 knot. The ocean current off the entrance usually has a W set, but E sets have been reported.

Depths—Limitations.—The main channel to the commercial port is Sokehs (Jokaj) Passage. The channel is intricate, but marked by buoys, beacons, and lights. Shoals protrude inside the buoyed channel, but these shoals are located at the channel entrance and can be easily avoided, since the channel width at this point is more than sufficient. The controlling depth in the channel is 10m, referenced to LLW.

Pohnpei Passage, about 1.5 miles E of Sokehs Passage, leading to Langer Road, is about 0.2 mile wide between the 10m curves. It has a least charted depth of 7.5m, but general depths are much greater. The inner channel, leading to a small unused pier on the NE side of Not Point, is intricate and requires local knowledge. The commercial pier on the SW side of Dekehtik (Takatik) is 280m long, with a depth of 10m alongside. A turning basin is situated W of the dock. It has a radius of 463m.

Aspect.—Tolap Peak, the summit of Sokehs Island, has a precipitous E side. Peipalap, a peak shaped like a lion's head, stands near the NE end of the same island. A fixed aeronautical warning light, shown from the peak, is useful for navigation. Tamatamansakir, 586m high and prominent, is located 3 miles S of Tolap Peak.

Sankaku Mountain, located about 3.8 miles S of Not Point, has the appearance of a symmetrical cone when viewed from the N. Upon nearing Pohnpei, the settlement of Kolonia appears to stand at the base of the mountain.

Dekehtik is a low island with dense mangroves to seaward. The Pohnpei International Airport is situated on this island, with the E-W runway situated approximately in the middle of the island. The commercial port facility is situated about 0.3 mile S of the runway at the beginning of a causeway which connects Dekehtik with Pohnpei. Four oil tanks stand about 90m E of the commercial wharf.

A rock, 2.4m high and conspicuous, stands on the barrier reef, about 2 miles NE of Pohnpei Passage.

Langar, an island of volcanic rock, lies on the E fringe of Langer Road. The summit is flat and the upper part of the island is covered with vegetation. Clumps of coconut palms and breadfruit trees cover all parts of the island. The shores of the island are fringed by mangroves.

The pier situated at Not Point is no longer used as a commercial facility; it was reported (1995) to be 335m long, with a depth of 9.1m alongside. The pier's warehouse and a 20m high windmill on top are prominent landmarks.

A disused lighthouse stands on the reef on the W side of Pohnpei Passage.

Sapwtik (Japutik), an island 40m high and covered with coconut palms, is connected to the N end of Langar by a drying reef.

Pilotage.—A licensed pilot is available. The pilot boat will meet the ship approximately 1 mile off the entrance of Sokehs Passage. Pilotage services must be requested by radio in advance.

Anchorage.—The best anchorage is in Langer Road, in 49m, taking care to avoid the unmarked shoals. It was reported that anchorage inside Sokehs Passage, about 0.5 mile NNE of Toletik Point, has good holding ground with little influence from the wind or current.

Vessels anchoring inside Sokehs Passage must ensure not to obscure the leading lights shown seaward.

The lagoon NE of Sapwtik provides anchorage space for large vessels. It is fully exposed to the NE trades, but the barrier reef offers protection from seas and swells. Scattered shoals and reefs, some of which are marked by buoys or beacons, are found in the lagoon.

Directions.—Sokehs Passage is marked by leading lights fitted on two dayboards, painted black and white vertical stripes, in line bearing 145°.

Caution.—Caution is advised as numerous uncharted coral heads are known to exist within the waters of the island.

Langer Road may be used for emergency anchorages, but local knowledge is recommended.

Prevailing heavy rain frequently obscure navigational marks.

10.10 Ant Atoll (6°48'N., 158°01'E.) consists of two relatively-large islets and 12 small islets lying on the E and S sides of an atoll which encloses a lagoon. The W and N sides of the atoll are submerged, except for Wolauna, an islet.

Tauenai Passage, located on the SE side of the atoll, leads into the lagoon between two curved reefs which extend from the entrance points. It is readily identifiable at LW as the reef bares on each side of the channel at that time. The passage is about 90m wide and has depths of over 15.2m. Inside the lagoon there are many detached reefs in the vicinity of the barrier reef, with the central part being relatively clear.

The flood current attains a velocity of 1 knot while the ebb a velocity of 2 knots in the passage. Caution is necessary as eddies are found in the entrance. The best time to enter the passage is reported to be about 5 minutes before LW, when the tidal current is at minimum strength.

Pakin Atoll (7°04'N., 157°49'E.) consists of five islands and a number of islets enclosing a lagoon. Nikalap is the largest island and lies at the NW end of the lagoon. The only channel into the lagoon is a boat passage leading through the SW side of the atoll.

Ngatik Atoll (5°49'N., 157°16'E.) consists of ten small islands and islets, all of which are low, flat, and densely covered with coconut palms. A radio station is situated on the atoll.

The pass into the lagoon lies on the SE side of the island, is about 114m wide, and clearly defined at LW. This channel should only be attempted by small vessels with local knowledge, under favorable conditions of light and tidal current. A least depth of 11m was reported in the pass entrance. The slack water ebb within the pass is reported to occur about 1 hour 30 minutes after LW at Pohnpei.

Three beacons mark the E side of the pass and indicate the channels leading from the pass to the lagoon proper. The S beacon is a plastic pipe in a concrete base, which marks the S side of a lesser channel. The N two are more substantial structures marking the main channel. In 1986, a vessel recommended making the turn on the beacon with a green triangular daymark, leaving it very close to starboard, and leaving the beacon with a red square daymark very close to port.

Some of the coral heads within the lagoon are marked with old concrete structures, or newer, locally made beacons.

Caution.—It has been reported (1986) that the entire atoll is charted 2.5 miles SSW from its actual position, with the slope of the reefs and the positions of the islands being misrepresented. Depths within the lagoon are reported to be inaccurate, with numerous uncharted and mischarted coral heads being present. An excavated channel shown on the W side of the pass does not exist. Vessels are urged to exercise the appropriate caution.

10.11 Nukuoro Atoll (3°50'N., 155°00'E.) consists of more than 40 islets, about 3.6m high, standing on the E side of the barrier reef. Nukuoro, an island covered with palm trees and tropical plants, is the center of activity. A small pier is situated on the lagoon side of Nukuoro, which is reported to be unsafe, even for small vessels. There is a radio station on the island.

Nukuoro Passage, 27 to 37m wide, leads into the lagoon between the reefs fringing the islands of Kaujema and Shenukdei. The passage is deep and is marked by tree branches stuck into the reef, but is fronted by a bar, with a least depth of 8.2m. Numerous coral patches, some of which dry, are scattered throughout the lagoon.

Caution.—The sea is usually high at the bar and becomes choppy when the tidal currents are strong. These currents sometimes attain a velocity of 6 knots on the ebb. In 1978, the passage was reported to have sufficient depth for small boat operations, but it is very narrow and has an uncharted bend of 45°. The passage should only be attempted at slack water, by small vessels with local knowledge, under the most favorable of conditions.

In 1985, a vessel reported that anchorage within the vicinity of the passage was impossible.

10.12 Kapingamarangi Atoll (1°04'N., 154°45'E.) consists of 30 small wooded islets lying on the E side of an atoll reef. The reef on the W end of the atoll is almost submerged at HW. The islands are covered with coconut palms and other trees. Touhou Island, 35m high and connected N to Veilua Island (Ueru Island) by a causeway, is the center of population and the home of a native chief. A stone and coral pier is situated on the lagoon side of Touhou Island.

The seaward side of the atoll is steep-to. The lagoon is deep, but is studded with numerous coral heads and reefs, some of which uncover. A 3m coral head and a 0.3m coral head lie just within the SE channel of Greenwich Passage, located on the SW side of the atoll. A 0.6m shoal is located about 0.5 mile ESE of the NE beacon in Greenwich Passage.

Tides—Currents.—Tidal currents reach a maximum velocity of 5 knots and have a tendency to set toward the reefs on the W side of the passage.

Seas and swell are confused and choppy during local squalls and thunderstorms. From December through April, the sea and swell are from the NE; from May through November, they are

from the SE; and from October through January, they are from the W. The heights are 0.6 to 1.2m, 0.6 to 0.9m, and 1.5 to 1.8m, respectively. The last named heights occur about 10 per cent of the time.

Depths—Limitations.—Greenwich Passage (The Passage), which is usable by small vessels with local knowledge at or near slack water, under favorable light and weather conditions, is the only entrance into the atoll from seaward. The passage consists of three channels, two of which are usable. The SE channel, which is not marked, is the narrower, shallower, and straighter of the two, and is reportedly favored by sailing vessels. It has a width of 68m and was reported to have a clear depth of 9.1m. A shoal, with a depth of 4.1m, lies at the channel's inner end.

The W channel, which has a width of 100m, is the deeper channel, and is marked by branches stuck into the reef. The channel contains a 90° bend.

Reports have indicated that currents with a velocity up to 6 knots set through the passage. The strongest ebb current was reported to occur at LW, and continues for 1 to 2 hours after LW.

A vessel reported (1985) that after negotiating the turn in the W channel, a vessel should continue to bear right to avoid a shoal. Vessels transiting the SE channel should immediately bear right and favor the reef side once through the entrance.

Anchorage.—Anchorage can be taken by small vessels with local knowledge off the lagoon side of Touhou Island. The reefs and shoals are usually visible under favorable conditions of light.

Caution.—It was reported (1989) that breakers covering an area of 1 mile long in a N-S direction were sighted in position 1°45'N, 152°02'E, 170 miles WNW of Kapingamarangi Atoll.

10.13 The **Mortlock Islands** (Nomoi Islands) (5°25'N., 153°40'E.) are the general name given to the three atolls, namely Satawan Atoll, Lukunor Atoll, and Etal Atoll. These islands lie within the limits of the Equatorial Countercurrent for most of the year, but in March and April the W or NW sets off the South Equatorial Current spread into the area. However, this current does not normally reach the islands and their vicinity which remain under the influence of the Equatorial Countercurrent.

Satawan Atoll is the largest atoll of the group. Nearly 90 islands and islets lie on the atoll reef. In general, the islands are low and are covered with coconut palms, breadfruit, and other trees. Satawan is the largest and principal island. A wharf, 64m long and 10.6m wide, extends from the lagoon side, about 228m from the N end of the island.

Tides—Currents.—In South Channel, the current attains a velocity of 0.25 knot at flood and 1.25 knots at ebb. The ebb is reported to run SSW from 3 hours after LW to the following LW. When the currents are strongest, ripples appear at the extremities of the reefs.

In North Channel, the tidal currents attain a maximum velocity of 2.75 knots. The currents turn 2 hours after HW and LW. There are tide rips on the shoals inside this channel at strength of flood.

Depths—Limitations.—Numerous above and below-water dangers exist in the lagoon, some of which are hard to discern. Large areas in the NW and SE parts of the lagoon have been swept to depths of 14.9m. A passage, nearly 1 mile wide and swept to the same depth, connects the two swept areas. Most of the dangers lie outside the swept areas.

South Channel, situated on the S side of the atoll, is the main passage leading into the lagoon and to the anchorage off Satawan. The channel has been swept to a depth of 14.9m over a least width of 270m. Reefs extending out from both sides of the channel and in the lagoon are normally visible under favorable conditions of light. Tide rips are sometimes seen in the channel.

North Channel, situated on the N side of the atoll, is deep, and winding, with a least width of 228m between the reefs. A passage leading to the anchorage in the N part of the lagoon has been swept to depths of 14.6 to 18m, except for isolated shoals and reefs. The reef extending out from More, an islet on the E side of the channel, and the islet itself, can be passed fairly close-to as they are steep-to and usually visible under favorable conditions of light.

Anchorage.—Anchorage is almost unlimited in the lagoon. Vessels can anchor, in 27m, about 0.5 mile W of Satawan. This anchorage is sheltered from E winds.

Good anchorage can be taken during the Northeast Trades, in a position SE of Lalang Islet, located E of North Channel. Anchorage can also be taken SW of Afarene islet located W of North Channel.

10.14 Lukunor Atoll (5°30'N., 153°49'E.) consists of 18 low-lying islands and islets on the atoll reef. Most of these are densely covered with coconut palms, breadfruit, and other trees. Coconut palms are scarce on the islets on the S side of the atoll. Lukunor, 1.5m high, is the principal island of the group and has some cultivated land. Two wharves, 30m and 24m long, are situated on the lagoon side of the island. Oneop Island, located on the W side of the atoll, is densely covered with coconut palms, but has some cultivated ground in its middle part. A wharf, 109m long, is situated on the lagoon side of the island.

Depths—Limitations.—The lagoon is deep, but there are a number of dangers scattered throughout. An area in the E part of the lagoon has been swept to 11.9 to 14.9m, as indicated on the chart. The entrance, between the reefs fringing Lukunor Island and Sopunur Island, has a width of 91m and has been swept to 14.9m. Kuchino Shoal, which dries 1.2m, lies close inside the entrance. A black beacon stands on its S side. This shoal divides the inner side of the entrance into two channels. The E channel is recommended. The reefs on either side of the channel are visible under favorable conditions of light. Caution is necessary as strong NE winds create a heavy swell within the entrance and the currents and wind have a tendency to set the vessel towards Sopunur Island.

Anchorage.—Chamisso Harbor, located in the E portion of the atoll, provides protection from E and NE winds. Numerous other berths are available W of Chamisso Harbor in deeper, but more exposed water. Good holding ground has been reported.

During strong W winds, vessels can anchor, in 29m, about 0.3 mile off the E side of Oneop Island.

Etal Atoll (5°35'N., 153°34'E.) consists of several low, flat islets which are covered with coconut palms and breadfruit trees. Etal is the largest and principal island. The entrance of the lagoon is located about 45m NNW of the SW tip of Etal.

The pass is bordered on either side by coral rock, fish weirs, and is both shallow and narrow.

Namoluk Atoll (5°55'N., 153°08'E.) consists of five coral islets on an atoll reef. Namoluk, 30m high and having a church on it, is the highest and NW islet of the group. A church stands on Amas, located on the SE side of the atoll. A jetty is situated at the S end of Namoluk. There is a radio station on Namoluk.

Depths of 20 to 77m are found within the lagoon, but the passage on the SW side of the atoll is suitable only for boats under the most favorable conditions. Another boat passage was reported close SE of Namoluk, but was subject to heavy tidal surge conditions.

10.15 Oroluk Lagoon (7°30'N., 155°15'E.) is formed by a chain of reefs which mostly dries and has an average width of 0.5 mile. Oroluk, a densely wooded and prominent island, lies on the NW side of the lagoon. A conspicuous wreck lies close NE of Oroluk. A second wreck is reported to lie about 2 miles further SE.

Depths—Limitations.—The seaward side of Oroluk Lagoon is steep-to, with no apparent off-lying dangers. Mariners should give the reefs surrounding the lagoon a wide berth. Many above and below-water dangers are found within the lagoon.

Pioneer Pass, located on the W side of the lagoon, is narrow and suitable only for small craft. Reefs and shoals encumber both sides of the entrance and a shoal reef lies close inside.

West Pass, 2.75 miles S of Pioneer Pass, is about 0.3 mile wide, with a shoal swept to a depth of 7.3m in the entrance. Tidal current in the pass attain a rate of 1 knot.

Another unnamed pass, 0.3 mile wide, lies 1.25 miles SE of West Pass. A coral patch, with depth of 0.9m, lies on the N side close within the entrance. A channel swept to a depth of 12.8m passes to the S of this patch.

Tides—Currents.—Currents in the vicinity of Oroluk Lagoon are strong and irregular during strong NE winds. A W current of 1 knot is experienced off Keltie Pass on the N side of the lagoon.

Anchorage.—Oroluk Lagoon is reported to afford unlimited anchorages, but offers no protection other than that provided by the atoll reef. Vessels can anchor, in a depth of 20m, about 1 mile SSE of Oroluk.

10.16 Minto Reef (8°10'N., 154°18'E.), 59 miles NW of Oroluk Island, is an atoll reef, about 4.5 miles long. A sand bank, about 1.8m high, stands on the N side of the reef. This reef is visible only under favorable conditions of light and constitutes a dangerous hazard at all other times. Several wrecks lie stranded on this reef. There are several shoal passages into the lagoon.

Losap Atoll (6°54'N., 152°42'E.) consists of about 17 islets on the atoll reef. Laol, 25m high and located at the NE end of the atoll, is the largest island of the group. A pier and a jetty are situated at the W end of Laol. Losap island, which stands on the lagoon side of the atoll reef, just W of Laol, is 31m high. There is a sandy beach on the W side of Losap. A small church stands on this island. There is also a radio station. Alanmwassel Island, on the NW side of the atoll, is 7.9m high. Pis Island, 37m high and having a church on it, is the E island of the group on the S side of the atoll.

Image courtesy of NASA

Losap Atoll

Tides—Currents.—High and LW occur at the same time as at Truk Islands. Slack water lasts about 20 minutes and occurs roughly at the time of HW and LW. The tidal currents through the passages attain velocities of 1 to 1.5 knots.

Depths—Limitations.—Depths of 31 to 68m are found in the lagoon. The scattered dangers in the lagoon lie close off the atoll reef and just inside the several entrances. As the atoll reefs are submerged, the entrance cannot be recognized until close-to. It was reported that none of the lagoon entrances are suitable for large vessels.

Several passages are reported to lead into the lagoon, one on the E side and the others on the W side. Morrappu Channel, the third passage from the S, on the SW side of the atoll, is reported to have a least depth of 4.3m and to be about 230m wide. A small, white sandy islet, 0.9m high, stands on the reef on the N side of the channel. Breakers mark each side of the channel. A vessel using Morrappu Channel reported (1968) a depth of 7.3m over the reef and a wreck stranded on the N limit of the channel. In 1978, a vessel 65m long reported using the channel without difficulty.

Morchan Channel, on the SE side of the atoll, is about 90m wide and has a depth of 4.6m in the fairway. It is narrow, tortuous, and not recommended.

Anchorage.—Small vessels can anchor, in 18.3m, from 0.3 to 0.5 mile off the W side of Losap. Protection is afforded from the prevailing NE winds.

10.17 Nema Island (Nama Island) (7°00'N., 152°35'E.) is nearly 1 mile long in a NW-SE direction and nearly 0.5 mile wide. It is somewhat higher than most islands in this general area and resembles a fort when viewed from the offing. It is covered with palm, pandanus, and breadfruit trees. A village

stands on the W side of the island.

The island is reef-fringed and shoal ground, as defined by the 10m curve, extends 0.5 mile off the N and SE sides. A weak E current has been experienced about 10 miles N of Nema Island.

Kuop Atoll (7°02'N., 151°56'E.) consists of four coral islets standing on the atoll reef enclosing a lagoon.

The lagoon is deep, except for a few scattered coral heads. A deep, but narrow small-craft passage leads across the SE side of the atoll reef. Anchorage can be taken by small craft, in 18.3 to 46m, in the lagoon.

Strong currents are reported in the channel that separates the N end of the atoll from the E part of the S side of the atoll reef that encloses the Truk Islands.

The Chuuk Islands (Truk Islands)

10.18 The **Chuuk Islands** (Truk Islands) (7°25'N., 151°50'E.) comprise the largest island group in the Caroline Islands. The group consists of nearly 98 islands and islets, 41 of which are on a great encircling reef ranging in diameter from 30 to 40 miles. There are 11 main islands up to 10 square miles in area. They are mountainous and of volcanic origin, and lie within the encircling barrier reef. The latter is broken by about five principal and numerous lesser passes. Most of the barrier reef is awash at LW. The islets on it are of coral sand, with dense growths of coconut palms. Few exceed 30m high to the tops of the trees.

The large islands within the lagoon are mostly formed of basalt, are wooded, and have some prominent peaks. The low land near the coasts consist mainly of forests of coconut palms and mangrove swamps. Sandy beaches are rare, but a few exist on Moen (Weno).

The smaller islands within the lagoon have sandy beaches and low sandy interiors covered with palm trees.

The principal settlement and commercial port is situated on the NW side of Moen (Weno).

Photo by Bernard Cloutier, http://berclo.net/inden.html
Moen (Weno)

Tides—Currents.—The range of tides in the lagoon is usually small. The average tidal range is 0.4m at Dublon Island and 0.5m at Moen (Weno). The tropic range, which is the increased diurnal range occurring semi-monthly, is 0.6m at Dublon Island and 0.6m at Moen (Weno). The maximum tide is about 0.9m. Tides usually occur twice daily within the same 2-hour period, except when the diurnal inequality is greatest and there is one tide.

Photo by Bernard Cloutier, http://berclo.net/inden.html
Moen (Weno)

The tidal currents in the passages turn approximately at HW and LW, with the flood current flowing into the lagoon and the ebb out of it.

It was reported that the currents in Northeast Pass run at a much stronger velocity than shown on the chart. In the vicinity of the pass, the tidal currents are affected by the wind, and a maximum velocity of 5 knots has been obtained. A heavy swell occurs at spring tides with strong NE winds.

Within the lagoon, the currents are complicated and seldom exceed 0.5 knot.

Depths—Limitations.—The barrier reef is broken by numerous passages, many of which have been swept to adequate depths. Extensive areas within the lagoon have been swept to depths indicated on the chart. Almost the entire N part of the lagoon has been swept to depths of 16.8m, except for the shoals, which have been swept to lesser depths. Swept areas and channels lead from the main passes to the anchorages off the main islands.

Numerous above and below-water dangers are scattered throughout the lagoon. The islands are fringed by reefs and fronted by dangers.

Northeast Pass (7°30'N., 151°59'E.), the recommended pass, is marked by breakers and by the white cylindrical light to the S and Mor Island to the N. The charts indicate several swept passages that lead from the various passages to the anchorage areas. Vessels should stay within these areas and navigate through them under only the most favorable conditions of light, due to the numerous scattered reefs and shoals. The channel leading through Northeast Pass to Moen (Weno) Island is marked by IALA Maritime Buoyage System (Region A) and swept to a depth of 11m. The harbor may also be approached through North Pass.

Passages leading into the lagoon are numerous, however,

only those passages swept are free of mines for shipping on a risk acceptable basis.

North Pass (7°41'N., 151°48'E.) has a channel 0.5 mile wide and swept to a depth of 17m.

Piaanu Pass (7°20'N., 151°26'E.) has a channel 0.5 mile wide and swept to a depth of 18m.

South Pass (7°13'N., 151°48'E.) has a channel 463m wide and swept to a depth of 17m.

Aspect.—The islands in the lagoon are divided roughly into two groups. The Shiki Islands, in the E half, consists of Moen, (Weno), Dublon Island, Fefan, Uman, and their adjacent islets. The Shichiyo Islands, in the W half, consists of Udot, Ulalu, Faleosicz, Tol, Onamue, and their adjacent islets.

Moen (Weno) is first sighted by vessels entering the lagoon through North Pass or Northeast Pass. Moen (Weno) is a complex mountainous mass of volcanic rock dominated by Mount Teroken. The coastal lowland on the W side is relatively wide and consists mainly of fresh water marshes and artificial fill. The lowlands in the E part are mainly mangrove swamps and scattered beaches. Moen (Weno) is the largest of the E group of the high volcanic islands.

Moen (Weno) consists of two mountain masses separated by a deep gap. North of this gap is Mount Ton Azan, with a double summit. The S summit, Mount Toladjau, culminates in a steep cylinder of rock. The N summit, Mount Vine Pur, is somewhat lower and rounded, but has a rocky promontory on the W side. Moen (Weno) is fringed by reefs and fronted by dangers.

A white cylindrical tower, 12.8m high, stands on a 76m hill at the E end of the island and is visible while entering Northeast Pass. In 1985, a vessel reported that the tower was visible only on certain bearings due to the growth of vegetation. The same vessel also reported that the tower is not readily visible from Northeast Pass.

10.19 Moen (Weno) (7°26'N., 151°50'E.) (World Port Index No. 56600) is a small harbor located in Uola Roads, on the W side of Moen (Weno) Island. It is a first port of entry. There is a concrete pier, 92m long, dredged to a depth of 7.3m on the W side. The SE side of the pier is 99m long and is reported to have a depth of 8.5m alongside. A channel and turning basin, both dredged to a depth of 8.5m, are situated W of the pier. Caution is advised as the channel is unmarked. Although the reefs to the N and S of the channel are readily identifiable during unfavorable winds, a single-screw vessel without assistance might experience difficulty backing out from the SE side of the pier due to the closeness of the reef to the S.

An active airfield with scheduled airline service lies on the NW side of the island. Landing aircraft make their approach from the SW and vessels should avoid anchoring in their flight path. A radio antenna is situated at the S end of the airstrip. A prominent tower stands near the airfield on the N side of the island. A beacon is situated on Pisiras (Scheiben) Island, about 1.5 miles NW of the airport.

Dublon Island (7°22'N., 151°52'E.) is deeply indented on its E side by a bay. Mount Tolomen and Mount Foukenau rise from the main mass of the island. Two peninsulas projecting E from these mountains form the above bay. Volcanic slopes on the island are steep, except in saddles between the above peaks and at the base of each peninsula. A basaltic cliff stands on the S side of Mount Tolomen.

The island is wooded, and except at the NE extremity, there are many dense mangrove forests on the coast. A large part of the coastal lowland is covered with artificial fill which forms an irregular band around most of the island.

A fisheries pier, reported to have a length of 76m on its SSE side and 46m on its W face, lies on the SE side of the island, but no details are presently available on the facility. Except for a large conspicuous petroleum tank at the head of the fisheries pier, most of the facilities shown on the large scale chart have been destroyed or covered with growth.

Eten Island, about 0.5 mile SE of Dublon Island, has a nearly flat plain at the NE end and a flat plain at the SW end. Along the NW side is a flat plain which has been extended by filling out on the reef.

Pilotage.—English-speaking pilots board vessels about 2 miles outside Northeast Pass during daylight hours.

Anchorage.—The area between Dublon Island and Eten Island has been swept to various depths, and is considered to be a good anchorage. Care must be taken when approaching the anchorage to avoid the many wrecks and shoals in the vicinity of Dublon Island and Eten Island.

Anchorage can be taken, in 12.8 to 42m, about 1.5 miles SW of the N end of Moen (Weno). The bottom is uneven, but soft. Vessels should avoid anchoring in the flight path for the approach to the runway on the NW side of Moen (Weno). Anchorage can also be taken off the SE side of the same island.

Vessels can take temporary anchorage, just inside the barrier reef in the vicinity of North Pass and South Pass.

Caution.—The swept areas and channels, best seen on the chart, that lead from the main passes to the anchorages off the main islands are declared dangerous due to mines. Due to the elapse of time, the risk in this area to surface navigation is now considered no more dangerous than the ordinary risks of navigation; but a very real risk still exists with regard to anchoring, fishing, or any form of submarine or seabed activity.

Ships should veer anchor and cable if anchoring, and submarines should not bottom in the channels due to the danger of detonating inactive mines.

Moen (Weno) anchorage has been swept and is considered safe for navigation. The area in the vicinity of Eten Island is safe for surface navigation only. Anchoring, dredging, pile driving, trawling, and submarine bottoming should be avoided.

The reefs on each side of **South Pass** (7°13'N., 151°48'E.) are hard to identify due to the general color of the water.

Vessels should navigate with caution and only under favorable conditions of light, as most of the dangers in the lagoon are unmarked.

Numerous submarine cables, the positions of which are shown on the charts, are found within the lagoon.

Numerous wrecks lie in the lagoon, especially in the general vicinity of Dublon Island, Fefan Island, and Uman Island. The floor of the lagoon is littered with bombs.

10.20 The **Hall Islands** (8°40'N., 152°00'E.) consist of two large atolls, Murilo Atoll and Nomwin Atoll, separated by a deep 6-mile wide channel. Murilo Atoll, the E atoll, has a number of small islets with coconut palms and other trees on a barrier reef. Nomwin Atoll has a number of low coral islets.

Murilo Atoll has the greater part of its S reef submerged. Most of the islands are found here. The N and NW sides of the atoll consist of a nearly unbroken reef, with openings at the NW end.

Extensive areas in the S and SE part of the lagoon have been swept. Numerous coral patches, some of which almost dry, are found within the lagoon. The passes have been swept to depths indicated on the chart.

A wreck stranded on the NE portion of the reef is reported to give a good radar return. Ruo Island, on the S side of the atoll, is reported to give a good radar return up to 16.5 miles. Stranded wrecks were reported to be on the W and S portions of the reef in.

Murilo Atoll should only be approached during favorable conditions of light, due to the submerged reefs. The reefs fringing the entrances are usually visible by color or by breakers.

Anchorage.—There are extensive anchorage areas within the lagoon, but most of the area is unprotected from the prevailing winds.

Nomwin Atoll consists of some low coral islands, some of which are densely wooded. Nomwin Island, on the S side of the atoll, has a rounded summit. Several islets and sand banks of a shifting nature stand on the reef W of the island. There are two wooded islets on the W side of the atoll. A radio station stands on Fananu Island on the E side of the atoll. A jetty extends about 90m N from the N shore of Nomwin Island.

The lagoon is encumbered with many coral patches, one of which dries. A large area in the S part of the lagoon has been swept to a depth of 14.9m, with shoal patches swept to lesser depths, as indicated on the chart. The main and best entrance to the lagoon lies between the edge of the reef 2 miles NW of Nomwin Island and the reef 1.5 miles farther NW. The entrance is divided into three passages by South Patch, awash, and North Patch.

Anchorage can be taken off the N side of Nomwin Island, fairly sheltered from S and W winds, but open to the NE. Anchorage can also be taken WSW of Fananu Island. The strength of the NE sea and wind is broken by the barrier reefs.

10.21 Fayu (8°33'N., 151°20'E.) is a low densely-wooded coral island. Reefs fringe the island to a distance of 0.5 mile offshore. The entrance to a small boat passage, with depths of 0.6 to 0.9m, lies on the NW side of the island. Several prominent rocks lie on the reef SW of the island. A stranded wreck of a 3,000 grt vessel lies on the N edge of the reef. The wreck was reported to give a reasonable radar return.

Namonuito Atoll (8°40'N., 150°00'E.) is a large triangular shaped atoll. Pisaras, at the E end of the atoll, Ulul, at the W end of the atoll, and the Magur Islands, at the N end of the atoll, are the most important islands. The atoll reef is submerged for the greater part and is marked by the lighter color of the water over it. The reef appears to be in the process of formation and can be crossed at many places where it is submerged.

Pisaras Island has coconut palms and other trees growing on it. Reefs extend NW and WNW from the island, enclosing a shallow and foul bay.

10.22 Ulul Island (8°35'N., 149°40'E.) is densely covered with coconut palms. A drying reef fringes the island. There is a radio station on the island.

The reef forming the rim of the atoll has charted depths of 0.9m to over 18.3m and can usually be identified by the discoloration of the water and by the action of the sea. The lagoon is not of uniform depth. Except for a 5.5m patch, located 14 miles W of Pisaras island, and a detached reef, with depths of 2.7 to 3.7m, located about 6 miles NW of Pisaras, there appears to be no less than 9.1m on the scattered coral heads.

Vessels can cross the atoll at any of the swept areas. An excellent place to cross is at a position about 8 miles W of Pisaras Island. Another good position at which to cross the reef is at a position 6 miles SE of Magur Island.

Anchorage.—There is reported to be good anchorage in the swept area NW of Pisaras. Protection is afforded from E and SE winds.

During W winds, vessels can anchor 0.5 mile off the E side of Ulul Island, in 27m.

Vessels can anchor outside the lagoon, in 55m, about 0.3 mile off the S part of the W side of Ulul. There is limited space, but some protection is afforded against the prevailing NE winds.

Caution.—The island has been reported (1993) to lie 1.5 miles SE of its charted position.

10.23 Pulap Atoll (7°36'N., 149°25'E.) consists of three low islands lying on the same reef. Pulap Island, the N of the three islands, is fertile and has many coconut trees on it.

Detached reefs, with depths of 9.1 to 13.7m, lie along the atoll reef and inside the lagoon. They are hard to distinguish. The submerged reefs on the E and SW sides can be discerned under favorable conditions of light.

Anchorage.—The lagoon is exposed to strong winds and heavy swells. The best anchorage is about 1 mile S of Pulap Island, in 27m, sand. Vessels can take fair weather anchorage off the N side of Tamatam, the S island of the atoll.

Caution.—Hitchfield Bank, with a least depth of 9.1m on its E edge, is located about 12 miles ENE of Pulap Atoll.

Shoals, with depths of 9.1 to 22m, have been reported to lie up to 16 miles W of the bank.

10.24 Puluwat Atoll (7°21'N., 149°11'E.) consists of five coral islands lying on the same reef. Puluwat and Alet, the two largest islands of the group, have breadfruit trees at the middle and coconut palms along the shores. The smaller islets are wooded, but have few coconut palms. A white concrete tower, 40m high, stands on the NW end of Alet. There is a radio station on Puluwat.

A coral patch, with a depth of 18.3m, is located about 1.3 miles NW of the NW end of Alet. Shoaling was reported between this patch and the NW end of the island.

Enderby Bank, with a depth of 16m, coral, lies about 3 miles WNW of Alet. A detached 12.8m patch lies about 1.5 miles SE of Puluwat. Uranie Bank, which extends about 17 miles SE from Puluwat, has depths of 11 to 61m. On its NE part, about 9.5 miles E of Puluwat, there is a depth of 11m which is marked by discoloration.

Anchorage.—Anchorage can be taken outside the lagoon, in 13.7m to 18.3m, about 1.8 miles SSE of Alet. The anchorage cannot be approached during the NE trades due to the high seas.

Vessels with a draft of 4.6m occasionally enter the lagoon and anchor. Entry should be made under favorable conditions, and only with local knowledge. Vessels enter by keeping close to the reef on the N side of the pass.

10.25 Pulusuk (6°42'N., 149°18'E.), an island on the S end of Manila Reef, is low and densely wooded. A fringing reef extends about 90m from the E side and 0.15 mile from the W side. Shoal ground, as defined by the 5.5m curve, extends 0.25 mile NE from the N end of the island.

Manila Reef (6°59'N., 149°02'E.) consists of two detached submerged reefs, together extending about 30 miles in a NNW and opposite direction, with a depth of about 165m between them. The shallowest part, at the NW end, was reported to have depths of 2.7 to 5m, but there may be places where it dries at LW. Discolored water is found over the entire reef and, with the exception of this shoal part and that surrounding Pulusuk, depths of 9.1m or over were found everywhere.

A shoal, about 0.5 mile in diameter and with depths of 1.8m or less, was reported to lie S of the NW end of Manila Reef.

Tides—Currents.—The W tidal current is reported to have a velocity of 1.5 knots, about 0.5 mile W of the N end of Pulusuk. The E tidal current had a velocity of 0.8 knot off the N side of the island, and a velocity of 1.5 knots 0.3 mile from the S end.

10.26 Lady Elgin Bank (6°18'N., 149°28'E.) appears to be an incomplete atoll. It has a least depth of 7.3m over its E side and 9.1m over its W extremity. Breakers have been reported on this shoal bank.

Helene Shoal (5°30'N., 149°15'E.) has a least depth of 8.8m over its W end and 10m over its E end. Breakers have been reported on this shoal.

Gray Feather Bank (8°00'N., 148°47'E.) is an extensive bank that takes the form of a submerged atoll. It has a least depth of 11m at its W extremity, 14.6 to 37m on its outer rim, and from 39 to 70m within.

Shin-Matsuye Bank, with depths of 14.6 to 40m, lies close W of the W extremity of Gray Feather Bank.

Mogami Bank (8°30'N., 148°45'E.), an extensive bank separated from the N side of Gray Feather Bank by a very deep passage, has a least depth of 11m over its W edge. At the E and W entrances of the passage, there are two small banks with least depths of 18.3m and 22m, respectively. Mogami Bank has the shape of a submerged atoll, with charted depths of 11 to 37m on the outer rim and 33 to 53m within.

Caution.—Vessels should only attempt to cross these banks under favorable conditions of light, as shoals other than those charted may exist. Breakers are rarely seen on the above-mentioned banks. Under favorable conditions of light, their E edges can be made out. The W edges are hard to discern at depths of more than 20m.

Micronesia West of 148°E

10.27 Winds—Weather.—From November through May, NE and E winds prevail 78 per cent of the time, with an average velocity of 10 to 12 knots. In June, winds are mostly from the NE, but begin veering toward the E during the latter half of the month; velocities average 10 knots. From July through September, S winds prevail with velocities averaging 8 knots, and calms occur 6 per cent of the time. During this period are occasional brief periods of squally weather. In October, winds begin backing toward the E with SE being the prevailing direction; velocities average 10 knots.

The winds at Ulithi Atoll consist of the Northeast Trades, which blow from late November to May, with greatest force from December to February. In May through July the wind is E and long periods of calm occur. From the end of July to the end of September, the Southwest Monsoon prevails. From September to November calms occur. Typhoons are known in this area. In a typical year, six of ten typhoons that passed between Guam and the Republic of Palau passed to the N of Ulithi Atoll. Two passed directly over the atoll and the remaining two passed to the S of the atoll.

From November through March E winds generally prevail. From April through June, and September through October, winds are NE to SE and are comparatively calm. In July and August, the wind direction is changeable; S winds come up quickly and die away in one night. A shifting from N to W is said to be a sign of bad weather.

The doldrums belt oscillates back and forth over the Yap Islands area from July through September, being the principal climatic control during this period. The Northeast Trades are predominant from November through May.

The Northeast Trades are best established in January, when NE or E winds blow 89 per cent of the time, with an average velocity of 6 knots, and occasionally exceeding 25 knots. The trades prevail from February through May, with a gradual decrease in frequency to 68 per cent in May, and with a slight decrease in velocities.

During June, the trades weaken, and winds veer toward the SE. In July through September, light variable winds, mostly with a S component, and frequent calms are prevalent; strong and gusty winds occur with brief periods of squally weather. In October, light SW winds prevail, although NE and E winds are almost as frequent. The Northeast Trades reestablish during November and December.

Gales average one a month in March, and may occur occasionally at other times. Velocities during the entire year are somewhat higher over the open sea.

In the Woleai Atoll area, precipitation is heaviest from June through October, when it averages 300mm per month and is primarily heavy showers. The drier season is from January through March with a monthly average of 150 to 160mm. In November, April, and May, rainfall averages 180mm. The number of rainy days varies from 15 in January to 22 in July.

Ulithi Atoll has the heaviest rainfall, with 380mm in January. December, with 128mm, is the month with the least rainfall. In general, precipitation is greatest during calms.

There is a distinct seasonal variation at the Yap Islands, the wettest season being from July through September, with an average of 150mm per month. Heavy rains are most frequent during the early morning.

The driest season is February through March, when the monthly average is 135mm. The rain during these months is usually of the shower type.

Fog is virtually unknown, and visibility is usually very good except during heavy rains. It has been estimated that visibility below 1.25 miles occurs once or twice a month from July

through September, and not more than once a month during the remainder of the year.

The average path of typhoon centers is N of Yap; however, three or four per year pass close enough to affect the weather, usually from September through November. Typhoons centered N of Yap cause heavy showers and increasing winds from the W. The swell is heavy from the NW, and results in a heavy confused sea.

Tides—Currents.—In the West Caroline Islands, the tidal currents usually follow the configuration of the land and set E and W. In places where no effects of the ocean currents are felt, the W tidal current flows from LW to 2 hours after LW until the same times after HW, the E tidal current from HW to 2 hours after HW until the same time after LW. These tidal currents are weak, except in narrow channels.

Inside the lagoons, the directions of the tidal currents are irregular. They seldom flow along the axis of the entrance channels, so that caution is required when entering and leaving.

The Yap Islands lie on or near the boundary between the North Equatorial Current and the Equatorial Countercurrent. Thus a W set should predominate N of the islands and an E set S of them. Ulithi Atoll lies near the boundary between the North Equatorial Current and the Equatorial Countercurrent. Thus the atoll receives NE currents as well as W and SW currents.

Between the Yap Islands and the Republic of Palau, the North Equatorial Current flows from December to May. The current usually sets in a W direction at velocities of 1 knot or more. The Equatorial Countercurrent, which sets E, is usually experienced in the area from June to November.

10.28 Pikelot Island (8°05'N., 147°38'E.) is overgrown with shrubs and several coconut palms. Reefs surround the island to a distance of 0.5 mile. Shoal patches, with depths of 9.1 to 18.3m, lie within a radius of 1 mile of the island.

A 16m detached bank lies 14 miles WNW of Pikelot. A detached shoal, about 2 miles in diameter and with a least depth of 11m, lies about 11.5 miles WNW of Pikelot. In 1954, this shoal was reported to lie about 0.8 mile S of its charted position and to have extended SW for about 4 miles.

Condor Reef (8°07'N., 147°50'E.) has a least depth of 14.6m, about 4 miles from its E end. The least depth found over the W end of the reef is 22m. Matsuye Bank, a 12.8m patch, lies about 5 miles SE of the SE end of Condor Reef. This patch and the S side of Condor Reef are marked by discoloration.

Tarang Reef (7°45'N., 147°41'E.), about 18 miles S of Pikelot Island, is small in extent and has a least depth of 14.6m. A 14.6m bank lies about 4 miles NW of the reef; both are marked by discoloration.

Oraitilipu Bank (8°10'N., 147°15'E.), 21 miles W of Pikelot Island, has a least depth of 14.6m at its SE end. The water appears blue over this bank. Banks, with depths of 7.9m, 15.8m, and 11m, have been reported 8 miles ENE, and 10 and 11 miles E, respectively.

McLaughlin Bank (9°05'N., 148°05'E.) has a least depth of 12.8m and, like any submerged atoll, has the shallowest water on its outer rim. The bottom consists of white sand.

10.29 West Fayu Island (8°05'N., 146°44'E.), densely wooded, stands on the NE side of West Fayu Atoll. A passage, located about 0.6 mile S of the island, is about 0.5 mile wide, but the navigable channel is greatly reduced by a shoal, with a least depth of 1.8m in the middle of the entrance.

A conspicuous stranded wreck lies on the edge of the reef, 0.8 mile W of West Fayu Island,; another is reported to lie 1.25 mile farther W. A conspicuous stranded wreck is reported (1991) to lie on the inside edge of the reef 2 miles WSW of West Fayu Island.

In 1982, the island was reported to lie nearly 1 mile WSW of its charted position.

Several banks and shoal depths are charted or have been reported to lie between West Fayu Island and Oraitilipu Bank, and may best be seen on the chart. A reef surrounded by breakers was reported (1971) to lie 6 miles SE of the island, and was reported to be about 2 miles long in a NE-SW direction.

Satawal (7°21'N., 147°02'E.) is a sandy and reef-fringed island. In bad weather, there are breakers all around the island. Coconut palms, sweet potatoes, and breadfruit trees grow on the island. A flagpole and some houses stand on the island. There is a radio station on Satawal.

Anchorage.—Small ships may take anchorage, in 16.5m, on the edge of the reef, about 0.3 mile WSW of the flagpole.

Caution.—Satawal Island was reported (1987) to lie about 1.75 miles NNW of its charted position. Depths of 15 and 40m have been reported to lie 13 miles and 10 miles SW, respectively, of Satawal Island.

Discolored water has been reported to lie 23 miles NE of Satawal Island. An underwater seamount, with reported depths (2005) of 15 to 30m over it, is located approximately 25 miles NNE of Satawal Island and 28 miles due W of Tarang Reef. An obstruction has been reported (2005) about 26.5 miles W of Tarang Reef in position 7°44.7'N, 147°11.6'E. A depth of 15m has been reported (2005) about 25 miles W of Tarang Reef in position 7°45.1'N, 147°12.8'E. Mariners are cautioned to exercise special care when navigating these waters.

10.30 Lamotrek Atoll (7°30'N., 146°20'E.) has three small wooded islets at its extremities. The atoll is reported to give a good radar return up to 18 miles. Coconut palms and breadfruit trees grow on the islets. A large area in the lagoon has been swept to 14.9m, except for a few isolated shoals.

The passage about 0.8 mile S of Pugue Islet, on the N islet of the atoll, is the widest and best of those leading into the lagoon. A heavy sea sets in through this channel during the NE trades.

A passage, about 0.2 mile wide, leads through the middle part of the atoll's S side. This passage is sometimes used when the NE winds are strong. The entrance is hard to identify from the offing.

Anchorage.—Anchorage may be taken within the lagoon, off the W side of Lamotrek, affording protection from E winds.

10.31 Elato Atoll (7°27'N., 146°10'E.) consists of two atolls. On the N atoll are four islets. Elato, flat and sandy, is located at the NE end of the atoll. The S atoll is separated from the N atoll by a 1 mile wide coral ridge, with a least charted depth of 20m.

The N lagoon of the N atoll has depths of up to 27m, but is mostly foul. An entrance, about 90m wide and having depths of 5.5 to 11m, is located on the E side of the atoll, about 1 mile

SW of Elato.

The S lagoon of the N atoll has depths of 6.4 to 29m and is entered through a very narrow channel close S of Kari, an islet that lies between the lagoons.

The passages into the above lagoons are suitable only for small craft with local knowledge.

Olimarao Atoll (7°41'N., 145°52'E.) consists of two flat islets on an atoll reef. Olimarao, an islet on the NE side of the atoll, and Falifi, an islet on the W side of the atoll, are covered with coconut palms and other trees.

Shallow depths are found off the NW side of the atoll reef, which is always marked by breakers. On the S side, there are two shallow passages, the E of which is 0.5 mile wide and the W about 0.3 mile. The lagoon has not been closely examined; a 7.3m coral head is reported to lie near its middle part.

A bank, with a depth of 27m and marked by discolored water, was reported to lie in 3.5 miles NNE of Olimarao Atoll. A depth of 16.5m was reported to lie 18 miles SSW of Olimarao Atoll.

10.32 Tarang Bank (8°23'N., 145°14'E.), over which there are depths of 25 to 45m, is marked by discolored water on its shallowest part.

A large shoal area lies about 16 miles E of Tarang Bank's E end and has a least charted depth of 42m; depths of 13.7 to 29m have been reported to lie in an area up to 18 miles SW and SE of the shoal area, while a 31m patch lies 13 miles E of the bank.

Earl Dalhouse Bank (8°07'N., 144°55'E.), about 20 miles SW of Tarang Bank, has a least charted depth of 25m. A coral bank, with a charted depth of 25m, lies about 8 miles NE of the bank. **Gamen Reef** (7°24'N., 144°41'E.), which breaks on its SW end, has a least depth of 5m and is marked by discolored water. The reef lies 9 miles NE of Ifalik Atoll.

Inanthe Shoal (5°56'N., 145°27'E.) has a depth of 11.8m, but a 4.5m patch marked by discolored water lies about 5 miles W of the shoal.

Ifalik Atoll (7°15'N., 144°27'E.) consists of a circular reef with three small islets on its E and S sides.

A narrow and shallow boat passage leads between the reefs close E of Ella. A small vessel entered through this passage and reported that there was a depth of 5.5m and that the width was about 45m. Anchorage was taken, in 14.6m, off the SW side of Ifalik, the E islet. There are two small piers on this side of the islet.

In 1978, a small ship, 65m in length, took satisfactory anchorage in 40m, sand, about 0.2 mile S of Ella.

10.33 Faraulep Atoll (8°36'N., 144°33'E.) consists of three low wooded islets on a reef enclosing a circular lagoon. Depths of 14.6 to 20m are found in the lagoon. There are three passages into the lagoon on the S side of the atoll. They are narrow and shallow. In 1978, a small ship, 65m in length, reported using the center channel without difficulty.

Anchorage.—Anchorage may be taken, in 18.3m, off the SW end of Eate, an islet on the S side of the atoll.

Gaferut (9°14'N., 145°23'E.), a small island, stands on a reef that extends 315m NW and 0.1 mile S from it. The island is wooded, and some of the coconut palms attain a height of 19.8m. Vessels have anchored, in 11m, near the reef's edge, about 0.4 mile SW of the S end of Gaferut.

The island was reported (1969) to lie 2.5 miles W of its charted position. In 1977, the depths encountered S of Gaferut were reported to be less than charted depths. In 1979, a small boat channel with depths of 3 to 4.5m was reported in the S portion of the reef.

10.34 Woleai Atoll (7°22'N., 143°55'E.) consists of 18 islands and islets. The atoll, the S side of which is mostly submerged, is divided into two lagoons by a ridge of reefs that extends SE from Tagaulap Island, on the N side of the atoll. Both lagoons are open S, and during strong S winds a swell sets in.

All the islands are covered with coconut palms and other trees, except Woleai, on the NE side of the atoll, which has been cleared. Sand Island and Montegosu Island (Montegos) Island) lie on the S side of the atoll. Both islets are fringed by reefs and fronted by dangers; they divide this side of the atoll into three separate channels.

Anchorage.—The two lagoons offer anchorage, protected from the prevailing NE winds, but exposed to S winds and seas. Large vessels can anchor in East Lagoon, in 27 to 37m, fine sand, about 0.4 mile W of the N part of Raur Island, on the E side of the lagoon.

Vessels sometimes anchor outside the lagoons, N of Tagaulap Island, where there is shelter from S winds.

10.35 Eauripik Atoll (6°42'N., 143°02'E.) consists of six small islets which lie on the reef, which is mostly low and steep-to. With light SW winds, there are usually breakers on the N side of the atoll, but not on the S side. All the islets, except the W, are covered with coconut palms. The latter is awash at HW.

Sorol Atoll (8°08'N., 140°23'E.) consists of 17 low islets lying on the NE side of the atoll reef. The reef on the N side of the atoll dries about 1.2m; the reef on the S side is submerged. Only the larger islets have trees on them; the remainder are low and sandy.

The outer edge of the S side of the atoll is steep-to and there is no suitable anchorage. Vessels can lie off this side and communicate with the islands by boat through a narrow shoal passage in the middle of the S side of the atoll.

A reef, with a depth of 12.8m, lies about 3.5 miles SE of the SE side of the atoll.

10.36 Fais (9°46'N., 140°31'E.) (World Port Index No. 56620) is fringed with a reef except at its NE and SW ends, which are steep-to. The middle of the island is cultivated, the remainder being covered with palms. On the NE and SW shores, cliffs rise to a height of 13.7m. Refinery Point, on the NW side of the island, is a sheer cliff, 18.3m high and jutting into the sea.

Anchorage.—There is no safe anchorage; in calm weather vessels lie offshore and load copra from native craft. A W current, with a velocity of 3 knots, has been reported off the S end of Fais.

Ulithi Atoll (9°55'N., 139°40'E.) is extensive and has over 30 islets, covered with coconut palms, on its reef. The islets, which are all reef-fringed, do not attain a height of more than

28m to the tops of the trees. The soil consists of broken coral and is not suitable for cultivation. Many of the islets are composed of shifting sand dunes. The main population center for the atoll is on Falalop.

The lagoon has been swept to depths indicated on the chart. Numerous shoal patches exist in the lagoon. It is reported that uncharted shoals may exist outside the swept areas.

Zohhoiiyoru Bank, marked by discoloration and located about 13 miles E of Ulithi Atoll, is submerged except for Gielap and Iar, islets on its NW extremity. Depths of less than 9.1m are found over the greater part of the bank.

A detached shoal, which lies between Ulithi Atoll and the N part of Zohhoiiyoru Bank, has several small islets on it.

A 7m patch has been reported to lie about 8 miles ENE of the atoll's S end.

There are a number of passages leading into the lagoon; some of these have been swept to depths indicated on the chart. Mugai Channel, situated on the E side of the atoll, is reported to be the best. The reef on the NE side of Towachi Channel, situated on the W side of the atoll, is reported to be clearly identifiable.

Tides—Currents.—Tidal currents are strong in the vicinity of Zohhoiiyoru Bank and Ulithi Atoll. Between Falalop and Asor, the currents are reported to be strong. In the lagoon, the tidal currents are weak and erratic.

Aspect.—Asor, an islet on the NE side of the atoll, is reported as being visible from 10 miles under favorable conditions.

A school house stands on Asor. A high school, formerly a Loran station, stands on Falalop. There is a 0.5 mile long E-W runway on the island.

Anchorage.—Urushi Anchorage, in the NE part of the lagoon, provides anchorage space for several vessels, in 27 to 39m, sand, good holding ground. Vessels using this anchorage must avoid several detached shoals.

Anchorage for large vessels has been reported to be available off the N of Falalop, but only under ideal conditions. Keep in mind the strong tidal currents if anchoring here.

Caution.—A fisheries buoy has been established in a position about 50 miles SW of the atoll.

10.37 The **Yap Islands** (9°32'N., 138°10'E.) comprise a group of four islands, separated by narrow and shallow channels. The group differs from other islands of the Carolines, inasmuch as they are larger, have a fertile soil, and are not of volcanic nature. The islands are hilly and covered with magnificent forests of coconut and areca palms, bamboos, and croton trees. Tageren Channel, narrow and shoal, separates Yap Island from Gagil-Tamil Island. A bridge spans the channel.

The group is fringed by a reef. There are several breaks in the reef leading to inlets and harbors, but the only one used by shipping is Tamil Harbor. The other entrances are marked by private aids, and are suitable only for small craft under ideal conditions. Garim, a jagged rock on the reef E of the S end of Yap, is prominent when viewed from the NE.

Aspect.—A visible wreck lies on the reef fringing the SW side of the harbor, while a second exposed wreck lies about 1 mile NE of the reef entrance. A third wreck is charted 0.4 mile SW of the reef entrance.

Caution.—Caution is advised if sailing off the W side of these islands, as Fish Aggregating Devices are moored up to 2.5 miles off this coast, and may best be seen on the chart.

Colonia (9°31'N., 138°08'E.)

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10.38 Colonia, the principal settlement on Yap, lies on the W side of Tamil Harbor, a natural harbor of irregular shape. Although the entrance channel is narrow, the harbor widens out somewhat within the entrance.

Tamil Harbor

Tides—Currents.—The spring range here is 1.3m, while the mean range is 0.9m.

Currents set W across the entrance to Tamil Harbor, especially during the NE trades. Tidal currents within the channel entrance range from 0.5 to 0.75 knot, while within Tamil Harbor proper the current rates are less.

Depths—Limitations.—See also the "Caution" topic below. The entrance channel has a least charted width of 45m between the 20m curves. The channel is entered about 0.3 mile E of Entrance Rock, awash at LW, and just E of a 3.6m patch located on the W side of the reef entrance. Once within the reef entrance, the fairway is deep.

A small wharf, 70m long, with depths of 3.9m is situated on the S side of the peninsula charted 2.5 miles N of Entrance Rock. The main berthing facility, 290m long with a depth of 10m alongside, lies on the N side of the peninsula; there is poor protection from S and SE winds.

Donitsch Island, which has been connected to the mainland of Yap by a causeway, has a conspicuous sewage treatment plant on it. The entire area is now charted as a peninsula, directly E of Colonia.

A white dome-shaped building situated in Colonia is prominent. A radio mast showing red obstruction lights lies about 2 miles NNW of Entrance Rock.

The entrance to Tamil Harbor is marked by lights; the channel is marked by beacons.

A light is situated on Baleabaat Island; the light is a directional fixed light with white and green sectors that lead between Lighted Beacon No. 1 and Lighted Beacon No. 2, marking the entrance.

Pilotage.—Pilotage is available on request 24 hours but is not compulsory. Vessels must advise ETA to Port State Control 48 hours prior to arrival. Vessels should contact Yap Port Control when 10 miles from the harbor entrance. The pilot will board vessels 1 mile SE of Entrance Rock in position 9°28'N, 138°09'E.

Regulations.—Vessels are urged to contact the local authorities for the latest information on regulations and arrival procedures.

Practique should be requested at least 24 hours prior to arrival through Yap Radio. Normally ship movements are allowed between 0600 and 1800. Except in case of emergency, arrival and departure will be limited to daylight hours only.

Signals.—The local authorities and the pilot may be contacted through Yap Radio on 5205 kHz or VHF channels 16 and 22A.

Anchorage.—The bottom S of Donitsch Island is foul. Vessels wishing to anchor will be directed to a safe anchorage upon request to the harbormaster. The recommended anchorage is between Donitsch Island and Biy Island, in depths of 22 to 35m, mud, however space is limited and is open to S or SE winds.

Caution.—Vessels are urged to contact the local authorities for the latest information on depths, regulations, etc., as dredging was reported (1985) within Tamil Harbor.

It is recommended that large vessels entering or leaving the harbor do so at LW, under the most favorable conditions of light. At such times the reefs are clearly visible. After heavy rains the port's waters become muddy, making it difficult to see the reefs and the channel.

It has been reported that due to the narrow and crooked entrance channel, allowance for leeway should be made in setting the approach course. Allowance for advance and transfer should also be made when considering course changes within the channel.

The commercial wharf is unprotected from S and SE winds. Due to the limited turning and anchorage room here, single screw vessels without a bow thruster may have to lie off the wharf and wait for conditions to improve before attempting to dock.

10.39 Ngulu Atoll (8°25'N., 137°30'E.) comprises a number of low islets. Coconut palms and other trees grow on the islets. The chain of reefs on the S and W sides of the atoll protects the lagoon from winds and seas from that direction. The reefs on the E side of the atoll are submerged, so that with strong E winds a swell sets into the lagoon.

Depths—Limitations.—Ngulu Island, on the S side of the atoll, is densely covered with coconut palms. North Island, near the N end of the atoll, is low and covered with coconut palms. Between these two islets, the reef is in detached patches and does not break during W winds. Several passages, some of which have been swept, lead into the lagoon. In 1963, a vessel entered the lagoon through the swept passage situated about 13.8 miles NNE of Ngulu Island, and experienced no difficulties. In 1985, a vessel reported using the swept passage 0.5 miles NW of Ngulu Island, reporting it as easy to negotiate under favorable conditions. A moderate N set was experienced at the beginning of the ebb tide in the month of October.

Anchorage.—The lagoon affords unlimited, but unprotected anchorage. Anchorage can be taken N of Ngulu Island. This area is usually smooth, though a long, rolling swell may set in during SE and NE winds.

Caution.—All navigational aids have been discontinued and no longer exist. Vessels should use caution in approaching the atoll.

The Republic of Palau (including Islands and Reefs to the Southwest)

10.40 The Republic of Palau consist of 243 islands, eight of which are of significant size. All of the islands in the chain are forested. The Palau reef, partly barrier and partly fringing, encloses all the islands except two small atolls to the N and the island of Ngeaur to the SW. The barrier reef is developed on the W side and extends about 65 miles in a general SW direction from the W entrance of Kossol Passage to the island of Peleliu, where it merges with the fringing reef surrounding that island. The W limit of the reef lies about 6 miles from the nearest island. Important passages through this part of the reef lie W and NW of the N half of Babelthuap. The barrier reef to the E is poorly developed and has numerous passes. The reef extends NE from the fringing reef around Peleliu to midway along the E coast of Babelthuap, where it merges with the fringing reef along the NE coast of this island. The Palau reef encircles Kossol Passage N of Babelthuap, completing the barrier reef.

Some of the islands appear to be of volcanic origin. They attain a greatest height of 242m in a peak in the NW part of Babelthuap. The islands S of this island are of coral and limestone formation. Peleliu and Ngeaur are flat, but on the others there are narrow hills sloping steeply down to the sea. On all of these hilly islands there has been erosion at the water's edge by the sea, forming grottoes.

Winds—Weather.—The best weather prevails between 0900 and 1400. Surface winds over the sea and on the lee shores are strongest at 0300 and weakest at 1500.

During the Northeast Monsoon (November through April), the prevailing winds are ENE, with a frequency of 60 per cent in November, 93 per cent in January, and 82 per cent in April. The average velocity is 12 knots in December through February, and from 8 to 10 knots for the remainder of the period. Calms occur from 5 to 10 per cent of the time. Gales occur very rarely. Southwest winds sometimes occur in April.

East winds continue through May and June. July through October is characterized by general light and variable winds, with increasing frequency from the SW and W. Velocities average only 6 to 8 knots. Calms occur from 10 to 15 per cent of the time. Gales are rare. In general, prevailing wind directions are ENE in May and June, SW in August and September, and evenly distributed between ENE and SW in July and October.

Typhoons appear to be more intense during the spring period (March to June).

February through April are the driest months. Two-thirds of the rainfall occurs in May through October. July, with an average of 480mm, has the maximum of any month.

Tides—Currents.—The E countercurrent, between the Republic of Palau and 2°N, is experienced throughout the year. Velocities up to 2 knots have been frequently experienced and velocities between 2 knots and 3 knots have been reported.

Currents in the Palau area are variable and attain velocities of 1 to 1.5 knots. Eastward of the group the current usually sets S, but E or NE currents, with the same velocities, have been reported. A W set prevails N of the group. Northwest and W currents have been reported W of the group.

Local and tidal currents in the vicinity of Ngeaur are extremely variable. In the channel between Ngeaur and Peleliu, W currents of 3 to 4 knots have been reported at spring tides. An earlier report stated that the currents set E through the channel at the same velocity. East sets of 1.5 knots have been reported S and E of Ngeaur. Northwest sets have been reported W of the island.

The shape of the reef influences the tidal currents off the E and W sides of the islands of Palau. In the various channels and passages, the tidal currents turn at the time of HW and LW.

10.41 Ngeaur (Angaur) (6°54'N., 134°08'E.), the S island of Palau, is densely wooded and rises to a height of 61m on its NW side. A tower stands about 0.1 mile within the E end of the island; another tower is situated about 0.4 mile farther W. An old lighthouse is situated 0.2 mile S of the N end of the island. A white shrine stands on the NW point of the island.

A former Loran station is situated on the NE side of the island. The buildings and nearby airfield are conspicuous. A red water tower stands near the center of the island.

In 1990, it was reported that a light is shown from the S end of the island.

Ngeaur Harbor is located on the W side of the island. It was the site of a phosphate mining and loading operation. All these facilities have deteriorated and fouled the harbor. A small craft basin is situated on the W side of the island near the main settlement. During the season of W winds, a heavy swell sets in and the harbor is unsafe.

Anchorage.—Anchorage cannot be taken at Ngeaur; however, a vessel 55m in length has reported anchoring (1985) about 309°, 0.75 mile from the island's SW extremity, in a depth of 16.4m. Although the vessel reported anchoring under favorable weather conditions, this anchorage cannot be recommended. A vessel has anchored on Hydrographer Bank, but reported a strong set and a risk of dragging.

10.42 Peleliu (7°00'N., 134°15'E.) lies at the S end of the reef enclosing the Republic of Palau. The major portion of the island is low and level, but the central and N portions contain numerous high rock ridges. Mangrove swamp areas, extending N and S, divide the island, except for a minor strip on which the single E-W road is built. The coastline is mostly rocky, but has about 2 miles of scattered sandy beaches. Peleliu is heavily wooded. On the SE side of the island, there is an airfield.

A causeway extends from the SW side of Peleliu Island. Several small craft berthing facilities are situated on the NE side of the island.

Barnum Bay (7°06'N., 134°16'E.) is an indentation in the coastal reef and is entered about 3 miles N of Peleliu. The bay is nearly 1 mile wide at its entrance and extends about 2 miles NE. Depths in the bay are considerable, and the reef shores are steep-to. Several small islands are located on either side of the entrance, which is further marked by a white beacon on each side.

10.43 Eil Malk (7°09'N., 134°22'E.) is a wooded island with an irregular coast, except on the E side, where there is a range of hills about 91m high. A hill, 114m high and wooded on its summit, stands nearly 1 mile S of the N end of the island; the hill is prominent from the S. The SE end of the island is 83m high; its E side, which appears gray, is prominent.

Schonian Harbor, parts of which have been swept to 16.7m, is an open area, surrounded by reefs, situated off the SW side of Eil Malk.

Denges Passage, which leads into Schonian Harbor from the E, is entered between the reef enclosing Ngeregong islet and the reefs extending from and fronting the S side of Eil Malk. The islet is wooded and low. The passage has been swept to a least depth of 7.9m. Denges Passage has a mean width of 90m and charted depths of 10.1 to 37m. The passage opens to an extensive area known as Schonian Harbor. Inside the harbor there are isolated coral heads. The reefs on either side of the passage and in the harbor are reported to be identifiable under favorable conditions of light.

Tides—Currents.—Currents setting NE are reported off Denges Passage. They flow at a velocity of 1 to 1.5 knots. Off the E central coast of Peleliu, the currents attain velocities of 1.5 to 2 knots.

In the entrance of Denges Passage, the flood current sets NW at a velocity of 2.5 knots; the ebb current sets SE at a velocity of 2.25 knots. In the narrow W part of the passage, these currents attain velocities of 3.5 knots.

Slack water, which lasts about 40 minutes, ends at about the times of HW and LW at Malakal Harbor.

It is reported that the current at the W end of the passage sometimes crosses the course.

Anchorage.—Anchorage can be taken in Schonian Harbor, good holding ground. Except for scattered shoals, the charted depths are 18.3 to 37m.

10.44 East of Eil Malk is a large irregular-shaped area entered E through two swept channels. The area has been swept to 16.7m, except for scattered shoals swept to lesser depths. These can usually be distinguished by discoloration.

The S channel, entered between the reefs E of Eil Malk, has several shoal spots of 6.4 to 9.1m at the entrance, but at the S part a channel, 0.1 mile wide is swept to 11m.

The N channel, entered between the reef extending S from the SE end of Urukthapel Island and the two large drying reefs to the S, has a least charted depth of 7.3m and has been swept to various depths over a width of 0.5 mile. The drying reefs, when uncovered, are white.

Tides—Currents.—In the S channel, the flood sets NW at a velocity of 1.25 knots while the ebb sets SE at a velocity of 1.5 knots. The tidal currents in the central part of the anchorage are irregular and apparently weak.

Sar Passage (7°11'N., 134°25'E.), which connects with the foul area W of Eil Malk, is deep and intricate. It is seldom used. Tidal currents set W and E through the passage at velocities of 3.25 knots.

Urukthapel (7°16'N., 134°27'E.) is densely wooded, rugged, and irregular in shape. There are a few beaches, backed by steep ridges covered with dense growth.

10.45 Malakal (7°20'N., 134°28'E.) is situated near the

middle of the N side of Malakal Harbor, and is joined by a causeway at its NE end to the N end of Auluptagel Island and Koror Island. The island has been expanded by extensive filling around its perimeter. The main commercial facility lies on the E side of the island and is described in paragraph 10.50. A rusty steel structure stands on the summit of Malakal. A commercial radio tower and construction quarry are conspicuous on the NW side of the island. A 305m quay wall. with buildings belonging to a marine research center, are conspicuous on the SW side of the island. The depths alongside the quay were dredged to 7.3m, however, miscellaneous debris has reduced the minimum alongside depths of the quay at several locations. It is not used for commercial operations.

Arakabesan (7°21'N., 134°28'E.) is wooded at its NW end. A hill, 110m high, stands on the S side of the island. The island consists of limestone rock. The E and SE shores are lined with mangroves and there is some flat swampy land on the N shore. Part of the W shore consists of sharp bluffs. On the N side of the E end of Arakabesan is a seaplane ramp which is in good condition. On the SW side of Arakabesan a concrete pier, 23m wide, extends 146m to the SW where it ties to a small rocky island. At the NE end of the pier a seaplane ramp extends underwater to the W, and at the SW end another seaplane ramp extends underwater to the SE. The concrete pier is in fair condition, and the ramps are in poor condition. The pier is in too shallow water to be used by vessels.

10.46 Koror (7°20'N., 134°30'E.) is the national capital of Palau and the administrative center and port of entry for the Republic of Palau. The S part of the island is rugged, steep, and densely wooded. The W part is mostly level, about 30m high, and bordered with mangrove swamps in places. The main settlement is situated on the N and W sides of the island. The charted positions of various buildings and towers are reported (1981) to be inaccurate. A bridge crossing Toachgel Mid connects Koror with Babelthuap.

Babelthuap (7°28'N., 134°32'E.) is the largest island of the Palau group. The coastal lowlands are covered with mangrove, while most of the hilly interior is covered with numerous forests, the largest of which covers the N central and E central parts of the island. Babelthuap has an extensive coastline of 98 miles, of which all but 20 miles is bounded by mangrove. Dense mangrove swamps, ranging from 1m to as much as 0.5 mile or more in width, bound low parts of the coast. Babelthuap has several lines of hills, which attain a maximum elevation of 242m, extending along the middle of the island. Some of the hills in the N part of the island are barren.

An unlighted airfield is situated 2.5 miles N of the SE end of the island and 1.5 miles inland. A green water tank stands on a hill WSW of the W end of the runway.

10.47 Malakal Pass (7°16'N., 134°28'E.), which leads from Koror Road N to Malakal Harbor, has a minimum width of 90m and depths of 7.3 to 18.3m. It has been swept to 6.7m and 7m, within the limits shown on the chart. The narrow channel leads between the SE side of Ngadarak Reef and the reefs fronting Urukthapel Island. The pass is marked by day beacons and can be navigated by medium-size ships under favorable conditions of light. The best time for entering the passage is during LWS. Caution is advised as the beacons may be washed away.

The lighthouse that stands on the SW side of the S entrance of Malakal Pass was reported to be a useful daymark for vessels approaching **Koror Road** (7°16'N., 134°29'E.) from SE.

A ship report (1977) stated that ships longer than 65.5m should not attempt this passage due to the narrowness and bending of the reef-walled channel and the swiftness of the cross-channel currents. An earlier report stated that a strong N set was observed when entering the passage. The ideal time to effect entrance was after 1000.

In Malakal Pass, the N tidal current has a velocity of 2.5 knots and the S tidal current has a velocity of 2 knots; it is reported, however, that they sometimes attain a velocity of 4 to 5 knots. In the narrow part of the channel, the tidal currents set directly through, and outside attain considerable strength. The S tidal current has been observed to set at a velocity of over 3 knots for 5 days after a new moon, causing a strong tidal race for some distance off the entrance. Strong eddies have also been reported to form within the channel itself.

Northeastward of Channel Point, on the E side of Urukthapel, the tidal currents set across the channel. At about HW, the tidal currents do not always set in the direction of the channel.

10.48 Toachel Mid (7°18'N., 134°32'E.) is the passage leading between the reefs fringing the E side of Koror and those fronting the S side of Babelthuap. The passage connects Arangel Channel, at the S end, with Koror Harbor and Komebail Lagoon, at the N end. The passage has a least width of 90m. The passage is marked with beacons in addition to the beacons at the S entrance. The beacons are locally maintained and unreliable. The bridge connecting Koror to Babelthuap crosses the passage, with a vertical clearance at the center of the span of 39m at MLW.

Toagel Mlungui (7°32'N., 134°28'E.) is the main entrance of Komebail Lagoon and then to Malakal Harbor. The passage, which is deep and narrow, trends about 2 miles in an E direction. A connecting channel trends in a SSW direction and leads to Kobasang Harbor, Malakal Harbor, and Koror Harbor. Ships should attempt the passage only under favorable conditions of light and tide.

The two white entrance range beacons, best seen on the chart, are reported to be small and difficult to identify. The channel is marked by beacons and buoys.

Aiwokako Passage (7°38'N., 134°33'E.) has a least depth of 10.1m and has been swept to 7.3 to 8.5m over a width of 348m. The passage leads into Ngardmau Bay.

Kawasak Passage (7°49'N., 134°36'E.) extends along the W side of Babelthuap inside the barrier reef. The passage is tortuous and studded with dangers. It has been swept to a depth of 18.3m as far S as Ngardmau Bay, and should be used only by small vessels with local knowledge under the most favorable conditions of light. The tidal currents in Kawasak Passage are reported as being strong.

Ngardmau Bay, between the barrier reef and the NW part of Babelthuap, has depths of 11m to over 55m. A few scattered shoals lie in the E and S parts of the bay. An irregular-shaped area leading from Aiwokako Passage comprises a fairly large part of the bay and has been swept to 14.9m.

Courtesy of Dr. James McVeigh, NOAA

Toachel Mid

Two shoals lie near the middle of the swept area. There are two piers at Ngardmau, the principal settlement on Babelthuap. The NE pier is reported to have a depth of 2.7m at its head.

10.49 Kossol Passage (7°53'N., 134°36'E.), which has been swept to 14.9m within the limits shown on the chart, has general depths of 18.3 to 37m, coral and sand. The swept area is studded with coral heads and dangers which have been swept to lesser depths. Caution is necessary as uncharted shoals may exist.

East Entrance to Kossol Passage is about 3.5 miles wide between the reef extending N from Babelthuap and the S edge of Kossol Reef. A conspicuous wreck stands on the reef, about 1 mile N of the entrance.

Depths of 16.5 to 24m are found in the middle of the passage; much of the area has been swept to 14.9m.

Vessels should approach East Entrance on a course of 290° when at least 2 miles seaward of the entrance.

Malakal Harbor (7°20'N., 134°28'E.)

World Port Index No. 56660

10.50 Malakal Harbor is formed by Urukthapel on the SW and four islets, the principal being Malakal, on the NE. The harbor has a length of 3 miles and a maximum width of 1.5 miles. The wharves in use are situated on the E side of Malakal. The shores within and outside the harbor are bordered by reefs. The port is entered only during daylight hours, as night aids are not maintained. There is 550m of principal wharfage and about a 100m frontage suitable for small craft.

Winds—Weather.—See the "Winds—Weather" topic under the Republic of Palau description in paragraph 10.40.

Normally, depending on weather, time element, or nature of cargo, vessels will be berthed stern to sea. Sudden high winds and rain squalls occur during the hours of darkness; masters of transient vessels should be cautioned to use adequate mooring lines.

Tides—Currents.—The current in Malakal Harbor was observed to change directions 1 hour 30 minutes to 2 hours before HW and LW.

Depths—Limitations.—The shore on the SW side of Malakal Harbor should not be approached within 0.5 mile as a number of detached reefs, which are hard to identify, form this side.

The E part of the harbor has been swept to 4.9 to 7.3m within the limits shown on the chart, but is encumbered by a number of detached reefs. Some of these dangers are marked by buoys.

Courtesy of Dr. James McVeigh, NOAA

Malakal Pier

The pier on the E side of Malakal is the principal terminal for ocean vessels entering the Republic of Palau. The SE side of the terminal is about 155m long. The depths along this side of the pier are 7.6m at the NE corner and increasing to 10.7m at the SW corner. Numerous large concrete blocks and other debris have fouled the wharf since construction. The maximum safe depth alongside is 7.9m. The maximum depth alongside the NE side of the wharf is 7.6m. Only the first 137m of the SW side of the wharf is usable due to a sunken barge. The alongside depths of the SW side start at 10.7m at the SW corner and decrease to 8.5m over the sunken barge. Both the NE and SW sides of the wharf shoal abruptly at the extreme inner end of this pier.

The pier is used for containers, general cargo, and unloading bulk petroleum. The NE side of the pier is used by fishing vessels unloading into a refrigerated stowage facility.

A lighter quay, having a berthing length of 114m, with a depth of 2.1m alongside, is situated on the NE side of Malakal.

A number of small piers and boat basins are situated along the shores of the harbor.

Aspect.—See the Malakal description in paragraph 10.45

Pilotage.—A pilot is available and may be contacted on 5205 kHz. All ships to be boarded by a pilot will furnish a safe and clean pilot ladder with at least one 3-inch line suspended alongside the ladder and extending to the waters edge. The pilot boards from an outboard motor equipped boat, with a white hull and red top, about 1.5 miles off the entrance of Toagel Mlungui.

Regulations.—In the event of fire occurring in or near a ship while secured at a berth or lying at anchor, the ship will sound five prolonged blasts on the whistle. These signals will be repeated at intervals until answered, using visual signals, by the Port Manager.

Courtesy of PH2 Lewis, USS GERMANTOWN

Malakal Pier

Signals.—The Port Manager maintains a visual signal station at the Port Manager's office for visual (International Code Flags) communication with ships at anchor.

Anchorage.—Vessels desiring to anchor in Malakal Harbor will be directed to a safe anchorage upon request to the Port Manager. The area W of the W entrance of Malakal Harbor has been used as an anchorage by merchant vessels.

Vessels of all types can anchor in Malakal Harbor, W and WNW of Malakal. Depths of 18.3 to 26m, sand, are found in the anchorage.

10.51 Kobasang Harbor (7°21'N., 134°27'E.), between the N side of Ngargol Island and the SW side of Arakabesan Island, offers anchorage, in 27 to 46m, sheltered from all except W winds.

Komebail Lagoon, the area N of Arakabesan, affords anchorage sheltered from NE winds.

Koror Road is protected from the W and N. Protection from NE seas is provided by Augulpelu Reef. Temporary anchorage can be taken NW of the chain of shoals, in 22 to 31m.

Anchorage can be taken in Kossol Passage or Kawasak Passage.

The **Kayangel Islands** (8°04'N., 134°42'E.) consist of four low islets lying on an oval reef. There is a thick growth of coconut palms on them. Two boat piers are situated on the lagoon side of Ngajangel, an islet on the E side of the atoll, which is 28m high to the tops of the trees.

The lagoon has a maximum depth of 9.6m, but is studded with reefs and dangers. Small craft with local knowledge can enter through a boat passage on the W side of the atoll.

Ngaruangl Reef (8°10'N., 134°38'E.) is an atoll which is separated from the Kayangel Islands by Ngaruangl Passage, very deep and 5 miles wide. The lagoon is shallow and has a boat passage through the NE part of the barrier reef.

Velasco Reef is a sunken atoll that extends 17 miles N from the N end of Ngaruangl Reef. It has a maximum width of 8 miles. Depths of 11.9 to 22m are found along the outer edges of the atoll, on which there are overfalls when the tidal currents are strong. Vessels are urged to use caution in approaching this reef.

Drying reefs and shoals lie within the lagoon. There are some fairly clear areas in the E and N parts of the lagoon.

10.52 The **Sonsorol Islands** (5°20'N., 132°13'E.) consists of two small islands surrounded by fringing reefs that extend from 0.1 to 0.3 mile offshore. Each island is thickly wooded with coconut palms and other trees. The channel, separating the two islands, is about 0.6 mile wide and clear of dangers, however, a vessel reported encountering a disturbed surface in the passage, with rips and eddies present. Vessels are advised to exercise the appropriate caution.

A SSE set at a rate of 2 knots was experienced by a ship approaching from the SW.

10.53 Pulo Anna (4°40'N., 131°58'E.), a small islet, is fringed by reef to a distance of 463m. The settlement is situated on the NW side of the island.

Tides—Currents.—A strong E tidal current has been experienced NE of the island. It has been reported that in the vicinity of Pulo Anna, a current sets ESE at a velocity of 0.5 knot to 3 knots. Tide rips have been reported N of the island. Pulo Anna lies in the flow of the Equatorial Countercurrent throughout the year. In 1975, a ship approaching from the SE experienced a SE set. A constant 2 knot SE current was found off the W side of the island.

The Kayangel Islands from N

Merir Island (4°20'N., 132°19'E.) is fringed by reef which extends 0.7 mile from its S end and 0.1 mile from its N end. The edges of the reef are steep-to, except at the N end where a spit, with a depth of 12.8m at its outer end, extends about 0.8 mile North. There is a radio station at the settlement on the NW side of the island.

A current, setting SE at a velocity of 1.5 knots, has been reported S of Merir. A vessel reported a current setting SE at a velocity over 2 knots between Merir and Pulo Anna.

A S set of 2 knots was experienced several miles NE of Merir. The tidal range was about 1.2m.

10.54 Tobi Island (3°00'22"N., 131°07'26"E.) is covered with coconut palms. A cultivated area is situated near the middle of the island. Most of the houses are situated on the SW side of the island. A dispensary and radio station are situated on the island.

The island is fringed by a reef, which at the N end, extends nearly 0.5 mile NE. A dredged channel has been reported to have been cut through the reef fringing the SW side of the island.

A SE current with a velocity of 1.25 knots has been reported

in the vicinity of the island. Tobi lies in the flow of the Equatorial Countercurrent throughout the year.

Some piers and mooring buoys are reported to be situated on the SW side of the island. It was reported that a medium-size vessel has berthed at one of the piers.

Helen Reef (2°55'N., 131°48'E.) is an atoll reef enclosing a lagoon. The reef, on which the seas break heavily, is usually dry at LW. Helen Island, densely wooded, is located near the N end of the reef. The island has a whale-like appearance when viewed from the NNE.

A channel, with a 4.6m shoal in the fairway, leads into the lagoon from near the middle of the W side of the reef. At HW, when the sea is smooth, there are sometimes no breakers on the reef so that caution is necessary when making the approach.

The tidal currents setting over Helen Reef are strong. When the tide is falling, the water flows out of the lagoon and over the reef in all directions until the reef is uncovered, and then flows out through the channel on the W side. On the rising tide, a reverse effect is noted. Toward the end of the ebb and at the beginning of the flood, the tidal currents in the channel are strong, but as only few parts of the reef completely dry, the maximum velocity does not exceed 1.8 knots.

Guam

10.55 Guam, a U.S. Territory since 1898, is not included in the Commonwealth of the Northern Marina Islands, which extends from **Rota** (14°19'N., 145°12'E.) to Farallon de Pajaros. The Northern Mariana Islands became a self-governing Commonwealth in political union with, and under the sovereignty of, the United States on 3 November 1986. Refer U.S. Coast Pilot 7 for further information on the Mariana Islands.

Guam, the southernmost and largest in the chain of islands of the Mariana Archipelago, is about 30 miles long and varies from 4 to 8 miles in width.

The N end of the island is a plateau of rolling hills set on vertical cliffs rising about 150m above sea level. The S end of the island consists of high volcanic hills. The plateau is covered with a thick growth of jungle; the volcanic hills support mainly sword grass. The highest hills are found in the W central and S parts of the island.

The capital of Guam is Agana; the chief port is Apra Harbor.

Surface, subsurface, and aircraft operations including firing exercises are conducted at various times in areas within an approximate 220 mile radius of Guam.

Winds—Weather.—The islands of the Marianas Archipelago have similar weather conditions. Under ordinary circumstances, the wind and seas in the vicinity of Guam are E due to the Northeast Trades. West winds are at times experienced during the summer months as Guam is barely within the limits of the Southwest Monsoon. These winds are light as a rule. In the vicinity of Guam, NE and ENE winds prevail for 6 months of the year. These winds blow from the NE to E 65 per cent of the time between December and May, and are strongest during these months. Between June and November, the surface winds are quite variable; calms are rare. In the S islands, the winds show a slight S trend as early as May.

In Guam, the average mean temperature is 27°C, the mean maximum is 32°C, and the mean minimum is 21°C The temperatures for the rest of the Mariana Islands are quite uniform throughout the year. January and February are the coolest months. The nights are cooler in the N islands. Temperatures above 31°C normally occur from 13 to 22 days a month between April and August. The daily minimums seldom fall below 23°C during the summer months. The yearly range of temperatures is 16°C in the S and 14°C in the North. The daily range is about 12°C.

Humidity is high throughout the year, but there is somewhat less humidity from December through May. The yearly average is about 76 per cent, the January average is 68 per cent, and the June average is 84 per cent.

Fog and mist are rarely reported in the Guam-Saipan-Tinian areas. Visibility of less than 1.25 miles can be expected on less than 1 day per month.

The yearly average cloud cover is about 0.7. The maximum coverage of 0.8 to 0.9 occurs during the summer months (July to October). Cloudiness is higher over the islands than over the adjacent seas. Clouds are more frequent during the daytime.

Tides—Currents.—Currents in the vicinity of the Mariana Islands are W. They are strongest near to and S of Saipan Island, and gradually become weaker N of that island. In June, the Equatorial Drift Current was reported to be strongest during that season at 13°N and to run to the NW at a maximum rate of 1 knot.

Variable currents are sometimes encountered near the islands. These are caused by the physical makeup of the island and by the additional force of the tidal currents.

An almost constant SW set has been reported along the NW coast of Guam during the Northeast Trades. This current has been felt up to 10 miles offshore.

Regulations.—See the NOS Coast Pilots and the chart for regulations pertaining to navigation within U.S. waters. Additional regulations will be cited in the text where appropriate.

10.56 Guam (13°25'N., 144°44'E.) is the southernmost, largest, and most populous island of the Mariana Archipelago. Guam is a territory of the United States and exercises local self-government under the U.S. Department of Interior.

Aspect.—Guam is reef-fringed, which dries in spots, over a greater part of its shoreline. From a distance the island appears flat and even; its E side is bordered by steep cliffs.

The S part of the island is mountainous, with the highest peaks being Mount Lamlam, 407m high, and Jumullong Manglo, with a height of 391m, lying 5.5 miles NNW of the S end. In the central range are Mount Tenjo, 311m high, about 5.8 miles NNE of Jumullong Manglo. Mount Alutom, about 1 mile NNE of Mount Tenjo, 330m high, and Mount Chachao, close N of Mount Alutom, 318m high, are the highest peaks in that range.

The N part of the island is comparatively low.

Caution.—Submerged submarine operating areas are situated around this island and may best be seen on the chart.

Fish aggregating devices are situated in deep water off the W and N shores of Guam; each device is marked by a special purpose lighted buoy.

A Firing Danger Area is situated off this island's SW coast; a Small Arms Safety Drop Zone is situated off the island's NW coast. Both are best seen on the chart.

10.57 Cocos Island (13°14'N., 144°39'E.) is located on the S part of a lagoon-type reef that projects about 2.5 miles SW from the SW end of Guam. A white beacon and a flagstaff stand near the SW end of Cocos Island. Babe Island, on which there is a white beacon, stands on the above reef, about 0.8 mile E of Cocos Island.

Port Merizo, suitable only for small craft, is entered through Manell Channel, on the SE side of the reef, or by Mamaon Channel, at the NW end. Caution is advised as the buoyage in the channel leading to port Merzio is privately maintained.

Ajayan Bay, entered on the W side of Aga Point, the SE end of Guam, is obstructed by reefs and is dangerous to approach if there is any sea.

Agfayan Bay, lying 1.5 miles NNE of Aga Point, open E and small, is only suitable for small vessels with local knowledge. This bay may afford anchorage for vessels with drafts less than 4.6m with local knowledge. There is a prominent rock on the S side of the bay.

Inarajan Bay, entered about 0.5 mile NE of Agfayan Bay, is open SE, but affords shelter to small craft with local knowledge during W winds. The reef fringing the SW side of the harbor is steep-to. There is a sandy beach at the head of the bay. The spire of a church near the village of Inarajan, situated on the SW side of the harbor, is prominent.

The depths decrease sharply from 22 to 5.4m when within about 0.2 mile of the entrance. Reefs and foul ground are found on each side of the inner bay. A shoal, with a depth of 5.2m, lies close offshore, S of the S entrance point.

10.58 Talofofo Bay (13°20'N., 144°46'E.), entered nearly 4 miles NNE of Inarajan Bay, affords shelter in its entrance in depths of 14.6m, mud; depths decrease gradually to its head. This bay has steep hills on all sides. Those on the N side rise sharply to 125m, with a prominent cliff forming the summit. There are two white tripod beacons at the head of the port. The Talofofo River, the largest in Guam, discharges into the head of the bay.

The E shore of Guam, from the entrance to Talofofo Bay to Pati Point, about 19.3 miles NNE, is rugged and steep; it affords no shelter; the only openings being Ylig Bay and Pago Bay. This part of coast should be avoided during the Northeast Monsoon.

Ylig Bay is entered through a deep channel, about 60m wide. The reef on either side of the entrance uncovers at half tide and is marked by breakers. The bottom shoals abruptly midway between the outer reef and the head of the bay. Reefs, foul ground, and shoals are found along the side of the channel. The Ylig River discharges into the head of the bay. A narrow sandy beach extends N from its mouth. A vessel anchored, in 73m, good holding ground, just outside the entrance of the bay.

Pago Bay is only suitable for small craft.

Umatac Bay (13°18'N., 144°39'E.), entered about 0.5 miles N of the SW end of Guam, is small and exposed to W winds and seas. A reef extends about 0.1 mile W of the S entrance point of the bay. The N entrance point is an isolated rocky elevation, on which there is a ruined fort. A ruined fort stands on the hill NE of the point. Magellan's Monument stands at the head of the harbor. A prominent church spire is situated NW of the monument.

Anchorage.—Anchorage can be taken, in 13.7m, sand and shells, with Machadgan Point bearing 163°, distant 0.17 mile. Cetti Bay, entered about 0.8 mile N of Umatac Bay, has depths over 9.1m for about halfway inside the entrance, where it shoals quickly to the head.

Facpi Point (13°20'N., 144°38'E.) terminates in an isolated rock joined to the shore by a drying reef; an elevated tank stands near the point.

Agat Bay, entered about 4 miles N of Facpi Point, affords good sheltered anchorage during NE and E winds. Apaca Point stands at the head of the bay. A shoal, with a depth of 4.6m, lies about 0.4 mile W of Apaca Point.

Apra Harbor (13°27'N., 144°37'E.)

World Port Index No. 56550

10.59 Apra Harbor is the main berthing facility on Guam, consisting of a commercial harbor, a naval complex, and a repair facility. The harbor is extensive and safe, except during the typhoon season. During this time, vessels should be prepared to get underway at short notice.

Port Authority of Guam

http://www.portguam.com

Winds—Weather.—Northeast and E winds usually prevail in the vicinity of Guam. West winds sometimes prevail during the summer months, as Guam is just within the limits of the Southwest Monsoon. These winds are usually light.

Because of haze and refraction, the beacons here are difficult to identify in the morning when the sun is high.

Tides—Currents.—The mean tidal range at Apra Harbor is 0.5m, while the spring range is 0.7m.

As Orote Point is approached, the SW current associated with the Northeast Trades tends to curve to the S and SE. The rate of the current is greatly affected by the force of the wind. During the typhoon season, the ebb current from the harbor augments the SW current and reduces any NE current that may occur. Strong rips are observed under these conditions.

The prevalent set of the current in the harbor entrance is usually S or SW regardless of the tidal currents, but a set to the N or NE may be experienced, especially during the summer months.

The flood current in the harbor entrance sets N to NNE at a maximum rate of 1.5 knots. The ebb current sometimes attains a maximum rate of 3 knots. Slack water occurs 30 minutes before LW and 45 minutes before HW. The currents and tidal currents within the harbor are weak and variable.

Heavy W swells sometimes make the entrance of Apra Outer Harbor dangerous for several days in a row. This condition occurs when a typhoon builds up in this area, progresses to the NW, and then curves to NE. Beacons and buoys are sometimes destroyed or carried away at such times.

Depths—Limitations.—Vessels are urged to contact the local authorities, and the pilot for the latest information on depths, currents, and regulations concerning entry and navigation of this harbor.

The approaches to the harbor are free and deep, as is the channel between the breakwaters.

Courtesy of Michael Henderson, Port Authority of Guam

Guam—Apra Harbor

Outer Harbor shows depths of 13.4 to 53m in its W portion, but several shoals line the passages through the E portion, and are best seen on the chart. The channel leading from Outer Harbor to Inner Harbor shows a least charted depth of 10m on the range line. Inner Harbor shows depths of 9.1 to 13.4m.

Guam's commercial port is situated on Cabras Island in Outer Harbor. The Port Authority of Guam, an autonomous agency of the Government of Guam, is responsible for the management of the port's 33-acre site. The facility offers 0.15 mile of docking space for container, break-bulk, fishing, and passenger vessels. The Guam Economic and Development Authority administers the Cabras Island Industrial Park adjacent to the Commercial Port, which includes a fuel wharf and a floating dry dock. The commercial port offers alongside depths of 9.7 to 19.8m.

Tank vessels discharge at the Mobil Pier (Pier G), which has a length of 68m and an alongside depth of 17.6m, and also at the GIROCO Pier (Pier F-1), which has a length of 243m and an alongside depth of 19.8m. The Mobil Pier is situated about 0.2 mile W of the root of Glass Breakwater, while the GIROCO Pier is positioned about 0.3 mile SE of the Mobil Pier.

Aspect.—Orote Point (Udal Point) (13°27'N., 144°37'E.) is a sharp bluff, 65m high, that lies at the W end of the Orote Peninsula, a narrow tongue of land projecting NW from the shore of Guam. Due to heavy undergrowth, the light on Orote Point is difficult to distinguish from the S even when close at hand. Orote Island lies close off the N side of the point.

Pilotage.—Pilotage is compulsory for U.S. flag merchant vessels over 1,500 grt, foreign flag merchant vessels over 500 grt, and all merchant vessels after sunset. The pilot, who requires a 4-hour advance notice, boards 2 miles W of the harbor entrance. The pilot boards at this location to insure that the vessel is properly aligned on the entrance range, due to the strong sets in the entrance; this is especially important for larger vessels.

Regulations.—See U.S. Coast Pilots for navigation regulations pertaining to vessels in U.S. waters.

All operations in Outer Harbor are under U.S. Coast Guard Captain of the Port control. Permission to enter or clear harbor must be obtained from U.S. Coast Guard Captain of the Port, Marine Safety Office, Guam. Vessels entering Outer Harbor, shifting berth, or departing harbor are required to give a minimum of 24 hours advance notice to the Captain of the Port. Failure to give such notice is a basis for denying entry.

A U.S. Coast Guard Marine Safety Office is situated at the commercial port.

Regulations from Title 33, Code of Federal Regulations, concerning Security Zones and Regulated Navigation Areas in

Courtesy of Michael Henderson, Port Authority of Guam

Apra Harbor—Mobil Pier (Pier G)

Apra Harbor are given in the accompanying table. Vessels are urged to contact the local authorities for the latest information on harbor regulations concerning this port.

A Firing Danger Area, with an acoustic range facility close S of it extends up to 1.75 miles SW of Orote Point, and may best be seen on the chart.

A Restricted Area, encompassing Inner Harbor, extends across the S end of Outer Harbor, and may best be seen on the chart.

Anchorage regulations, including those pertaining to the explosives anchorage may be obtained from:

Commander, Fourteenth Coast Guard District
300 Ala Moana Boulevard
Honolulu, HI 96850-4982

Speed is limited to not more than 12 knots in Outer Harbor and not more than 5 knots in Inner Harbor, except in emergency situations

Vessels over 15m in length shall advise the Marine Traffic Controller on VHF channel 13 of all intended movements into, within, or out of the harbor, stating the destination and departure time.

Signals.—U.S. Coast Guard Communications Center, Guam is a full-service communications station manned 24 hours. The station's call sign is NRV.

The Harbormaster's Control Tower is manned 24 hours and may be contacted on VHF channel 13. The harbormaster's call sign is WRV-574.

It has been reported that NRV will handle traffic for the harbormaster's office if the vessel is unable to reach it.

The U.S. Navy Communications Center Guam (NPN) issues facsimile charts on various frequencies. U.S. Coast Guard Communications Center, Guam (NRV) handles storm warnings and weather messages on various frequencies, including VHF channel 22.

Anchorage.—Due to the great depths and rapid shoaling of the bottom in the vicinity of Apra Harbor, anchorage outside the harbor is impossible.

Naval Anchorage A, on the S side of Outer Harbor, shows general depths of 12.8 to 49m over a charted bottom of mud, sand, clay, and coral. Naval Anchorage B, S of Drydock Island, shows depths of 13.4 to 22m, sand and mud bottom.

The explosives anchorage is situated in the W port of the harbor, centered on Buoy 702, and is best seen on the chart.

General anchorage is available S of Glass Breakwater, in general depths of 4.5 to 52m, sand, mud, and coral.

Mooring buoys are laid throughout Inner Harbor and Outer Harbor, and may best be seen on the chart.

Directions.—Vessels from the N should keep 5 miles offshore until Orote Point bears 180°, then steer for a position 2 miles W of the harbor entrance. Approaching from the W,

Mount Alutom, bearing 097° and in line with Orote Point, leads to a position 2 miles W of the harbor entrance, but is not easily identified. Vessels should enter Apra Outer Harbor with the entrance range ahead bearing 083°, passing midway between Entrance Channel Lighted Buoy 1 and Entrance Channel Lighted Buoy 2. Vessels are cautioned to give the breakwater a wide berth because of the currents and of possible submerged broken-off segments.

A crosscurrent is often experienced in the entrance. Care should be taken to keep on the entrance range. A speed of not less than 10 knots is recommended through the entrance to avoid the excessive set by the currents off the entrance.

Range lights, in line bearing 141°, lead through the channel from Western Shoal towards the entrance of Inner Harbor. Lights, in line bearing 176°, lead through the entrance to Inner Harbor.

Caution.—It has been reported that a wreck partially obstructs the GIROCO Pier. Vessels have reported fouling lines in this wreck during berthing operations.

Extracts from title 33, Code of Federal Regulations concerning Security Zones and Regulated Navigation Areas in Apra Harbor

§ 165.1401 Apra Harbor, Guam—Security Zones.

(a) The following is designated as Security Zone A—The waters of the Pacific Ocean and Apra Outer Harbor within an elliptical area of 0.32 mile radius centered at the SW and N corners of Navy Wharf H. (Southwest corner is at 13° 27'43.6"N, 144°38'55"E; the N corner is at 13°27'44.6"N, 144°39'00"E).

(b) The following is designated as Security Zone B—The 0.34 mile-wide area in Apra Outer Harbor contiguous to and bordering Security Zone A.

(c) Special regulations:

(1) Section 165.33 does not apply to Security Zones A and B, except when Navy Wharf H, or a vessel berthed at Navy Wharf H, is displaying a red (BRAVO) flag by day or a red light by night.

(2) Vessels may enter Security Zone B when transiting the harbor without the permission of the COTP.

(3) Unless the COTP orders the vessel to leave, any vessel berthed at a waterfront facility may remain in Security Zone B without the permission of the COTP.

(4) Vessels under 20m in length may anchor in the Special Anchorage Area as described in Part 110.129(a) of this chapter without the permission of the COTP.

(d) The following is designated as Security Zone C—The waters of Apra Outer Harbor, Guam around Naval mooring buoy No. 702 situated at 13°27'27.1"N and 144°38'08.1"E and Maritime Preposition Ships moored thereto. The security zone will extend 90m in all directions around the vessel and its mooring. Additionally a 50m security zone will remain in effect in all directions around buoy No. 702 when no vessels are moored thereto.

(e) Regulations. (1) In accordance with general regulations in 165.33 of this part, entry into Security Zone C is prohibited unless authorized by the Captain of the Port.

§ 165.1402 Apra Outer Harbor, Guam—Regulated Navigation Area.

(a) The following is a Regulated Navigation Area.—The waters of the Pacific Ocean and Apra Outer Harbor enclosed by a line beginning at latitude 13°26'47"N, longitude 144° 35'07"E; then to Spanish Rocks at latitude 13°27'09.5"N, longitude 144°37'20.6"E; then along the shoreline of Apra Outer Harbor to latitude 13°26'28.1"N, longitude 144° 39'52.5"E (the NW corner of Polaris Point); then to latitude 13°26'40.2"N, longitude 144°39'28.1"E; then to latitude 13° 26'32.1"N, longitude 144°39'02.8"E; then along the shoreline of Apra Outer Harbor to Orote Point at latitude 13° 26'42"N, longitude 144°36'58.5"E; then to the beginning.

(b) Regulations:

(1) Except for public vessels of the United States, Vessels may not enter Apra Outer Harbor without permission of the Captain of the Port if they have on board more than 25 tons of high explosives.

(2) Except for vessels not more than 20m in length, towboats or tugs without tows, no vessel may pass another vessel in the vicinity of the Outer Harbor entrance.

(3) Vessels over 100 grt shall:

(i) Steady on the entrance range at least 2 miles west of the entrance when approaching Apra Outer Harbor and;

(ii) Reserved

(iii) Steady on the range when departing Apra Outer Harbor.

(4) Vessels may not anchor in the fairway. The fairway is the area within 114m on either side of a line beginning at latitude 13°26'47"N, longitude 144°35'07"E; then to latitude 13°27'14.1"N, longitude 144°39'14.4"E; then to latitude 13°26'35.2"N, longitude 144°39'46.4"E; then to latitude 13°26'30.8"N, longitude 144°39'44.4"E.

(5) Vessels over 2,000 grt may not proceed at a speed exceeding 12 knots within the harbor.

(6) No vessel may leave Apra Outer Harbor until any inbound vessel over 20m in length has cleared the outer Harbor Entrance

10.60 Asan Point (13°28'N., 144°42'E.) is rocky, steep, and fringed by a reef upon which stands Camel Rock.

Agana Bay is formed by a slight indentation of the coast between Adelup Point and Oca Point, about 2.5 miles ENE. The shores of the bay are low, sandy, and fringed by a wide reef. Agana, the capital of Guam, stands along the shores of the bay. Agana consists of a large number of buildings, some of considerable height. There are adequate ranges for entrance through the reef to Agana Basin. The channel inside the reef is intricate and narrow; local knowledge is required. The entrance should only be attempted during daylight hours under favorable conditions.

Anchorage.—Anchorage, with winds between the ENE and S, may be obtained in Agana Bay; however, it is an open roadstead with a steep-to bottom and great depths. A strong current has been reported off Adelup Point.

A small craft harbor situated in Agana Bay, Agana Basin is approached from the N directly offshore. The entrance through the reef is marked by a lighted range. Small craft up to 13.7m long can be accommodated. The reef passage and channel are narrow and very dangerous for mariners without local knowledge.

Mariners unfamiliar with the channel should not attempt entrance without assistance or during other than daylight hours with favorable conditions. Assistance can be requested from the Agana Harbor Patrol on 2136 kHz daily from 0600 to 1400.

10.61 The shore between **Oca Point** (13°30'N., 144°46'E.) and Ritidian Point, the N extremity of Guam, is rocky and steep. Tumon Bay, entered between Ypao Point and Amantes Point, about 2 miles NNE, is nearly inaccessible because of reefs, except by boats with local knowledge.

A white beacon stands on the E shore of Tumon Bay and a water tank, painted red, stands about 0.5 mile inland of the bay's head.

The N coast of Guam, between Ritidian Point and Pati Point, is reef-fringed and fully exposed to the Northeast Trades.

French

FRENCH	English
A	
Anse	Bay, Cove
B	
Baie	Bay
Balise	Beacon
Banc	Shoal bank
Bas	Low
Basse	Reef, Shoal, Flat
Bassin	Basin, Dock
Blanc	White
Brisonts	Breakers
C	
Cale	Ramp, Slipway
Cap	Cape, Headland
Chenal	Channel
Colline	Hill
Corail	Coral
Côte	Coast
Courant	Current
D	
Debarcadère	Landing place
E	
Embouchure	Mouth (River)
Est	East
Épi	Short mole, Spur
G	
Golfe	Gulf
Grand-e	Great
H	
Haut	High
Haut-Fond	Shoal
I	
Ile	Island
Ilot	Islet
J	
Jaune	Yellow
Jetée	Jetty

FRENCH	English
L	
Lac	Lake
Lagon	Lagoon
Large	Broad, Wide
M	
Maison	House
Mer	Sea
Milieu	Middle
Mont	Mountain
Morne	Hill, Bluff
Mouillage	Anchorage
N	
Nez	Headland
Noir	Black
Nord	North
O	
Ouest	West
P	
Passe	Pass
Petit	Small
Phare	Lighthouse
Pic	Peak
Pierre	Stone
Plage	Shore
Plat	Flat
Pointe	Point
Pont	Bridge
Port	Harbor
Presqu'ile	Peninsula
Q	
Quai	Quay
R	
Rade	Roadstead
Récif	Reef
Rivière	River
Rocher	Rock
Rond	Round
Rouge	Red

FRENCH	English
S	
Sable	Sand
Sommet	Summit
Sud	South
T	
Tête	Head, Headland
Tour	Tower

FRENCH	English
V	
Vallée	Valley
Vert	Green
Vieux	Old, Ancient
Village	Village
Ville	Town

Polynesian Dialects

English	Marquesas	Tahiti	Rarotonga	Manahiki	Mangaian
			A		
Ant	'O, Ko	Ro	Ro, Pokorua	Loa	—
Arm	'Ima	Rima	Rima	Lima	—
Arrow	Ko-pana	Hana	Kaka'o	—	—
			B		
Bad	Pe	Ino	Kino	Kino	—
Banana	Melka	Mi'ia	MeIka	—	Koka Kokaa
Black	Ke'eke-e; Pu-ke'eke'e; Panu;	Uri-uri	Kere kere	Uriuri	Kara; Tako; Kere Kere; Kara Kara
Body	Tino	Tino	Kopopa; Tino	Tino	—
Boy	Mahal	Tama iti	Tama iti	Tama iti	—
Bow	Pana	'Au-fana	'Ana	—	—
Bread-fruit	Mei	Uru	Kuru	—	Kuru
Breathe, To	Menava	Huti-i-te-aho	Uti i te A'o	Manava	—
Brother	Tuakana; Tukana	Tuaa ana	Tuakana (elder); Teina (younger)	Teina	—
			C		
Canoe	Vaka	Vaa	Vaka	Vaka	—
Chief	Haka-iki; Iki	Arii	Ariki	Ariki	Ariki
Club	Kmukmu; 'Un'mu	Patu	Rupo	Tuki	—
Cloud	Ao	Ata	Ao	Ao	—
Coconut	Ehi	Haari	Nmu	Ni	—
Cold	Matoke; Moka-'ii; Kama'ii	Maariri	Anu	Makariri	—
Come	Me-mai	Tae-mai; Haere mai	Mai-T\aae	Haere mai	—
			D		
Darkness	Po-tano tano; Po-tako tako	Pouri	Poiri	Pouri	—
Day	Oumati	Mahana	Ra	Ao	—
Daughter	Moi	Tama hine	Tama ine	Tamaiti vahine	—
Die	Mate	Pohe	Maate	Mate	—
Distant	Memao	Maoro	Maoro	Mamao	Meina
Dog	Huhe, Moho-kio Moho; Peto	‘Uri	Kuri; Puaka aoa	—	Kuri
Drink	Inu	Inu	Inu	—	Unu
			E		
Ear	Pualka Puangia; Puaina	Tari'a	Taringa	Taringa	—
East	Fitu; Hiti	Te hitia o te ra	Itinga o ter\aa	—	—
Eat	Kai	Amu	Kai	Kai	—
Eye	Mata	Mata	Mata	Mata	—

English	Marquesas	Tahiti	Rarotonga	Manahiki	Mangaian
			F		
Father	Motua	Metua tane	Metua tane	Metua tane	—
Fear	Meta'u	Mata'u	Mataku	Mataku	—
Female	Vahine	Ufa	Vaine	Vahine	—
Fire	Ahi	Auahi	A'i	Ahi	—
Fish	Ika	I'a	Ika	Ika	—
Fowl	Moa	Moa	Moa	Moa	Moa
			G		
Girl	Pahoe	Tama hine	Tama ine	Tama iti hika	Ine
Give	Homai	Hopoi	Oronga	Kave	O or-O-ake
Go, To	Taha; Fano; He'e; Hano	'Aere	'Aere	Hano	—
Good	Meitai	Maita'i	Meitaki	Esumalie	One-venu
Great	Ipaipa	Rahi; Nui	Raai; Maa ata	Rahi	Ngao
			H		
Hair	Ouoho	Rau-uru	Rouru	Lauulu	—
Head	Oho	Uru	Mimiti	Ulu	Pao-uru
Hear, To	Kadaono; Haka-oko	R\aoo	Aka-rongo	Langona	—
Heat	Vea	Mahanahana	Ma'ana	Vevela	—
Heavens	Ani; Aki	Ra'i	Rangi	Langi	—
House	Fae; Ha'e	Fari	Are	Fare	Kere-taki
			K		
Know	Ite	Ite	Kite	Itea	—
			L		
Land	Fenua	Fenua	Enua	Henua	—
Laugh	Ata	Ata	Kata	Kata	—
Leg; Foot	Vae	'A-vae	Vae	Vae	—
Light	Meama	Marama	Marama	Malamalama	—
Lightning	Ula	Uira	Uira	Uira	—
Live	Pohoe	Ora	Ora	Ola	—
			M		
Make	Pepina	Faa; Rave	‘Anga-’anga; Rave	Fau	Ropa
Male	Ahana; Vahana	Tane	Toa	Tane	—
Man	Enata; Enana; Kenana	Ta'ata	Tangata	Tangata	Tangata
Moon	Maama	Ava'e	Marama	Marama	—
Mouth	Fafa	Vaha	Vaa	Ngutu	Vaa
Mountain	Mouka	Mau'a	Maunga	Maunga	—
			N		
New	Hou; fou	Api	'Ou	Fou	—
Night	Po	Po	Po	Po	—
North	Toko'au	Apa-toerau	Apa-tokerau	—	—
Nose	Ihu	Ihu	I'u	Isu	Uu

English	Marquesas	Tahiti	Rarotonga	Manahiki	Mangaian
			O		
Old	Tehito	Tahito	Ta'ito	Tahito	—
			P		
Place	Tu'u	Tu'u	Tuku	Tuku	—
Pig	Puaka	Pua'a	Puaka	—	—
			R		
Rat	Kiaoe	Iore	Kiore; Kimoa	Kiore	—
Rain	Ua	Uaa	Ua	Ua	—
Red	Vaeka; kiki; Puki-kiki	'Ute'ute; Mehanl	Muramura	Kukura	Kura Kura
			S		
Sand	Onetai	One	One	One	—
Ship	Ihepe	Pahi	Pai	Pahl	Pa'i
Sit	Noho	Noho	No'o	Noho	—
See	Natamata; kite	Ite	'Akara	Tito tiro	Kakaro or Karo
Small	Iti-iti	Iti; Ri'iri'i	Rikiriki	Iti	Kote or Makee-Kee
Son	Tama	Tama iti	Tama	Tama	—
English	Marquesas	Tahiti	Rarotonga	Manahiki	Mangaian
South	Tua-tona; Tua toka	Apatoa	Apa-tonga	—	—
Spear	Pakeo	Mahae	Tao	Tao	—
Star	Fetu; Hetu	Fatia	'Etu	Fetu	—
Stone	Fatu Hau	'Ofal	Toka	Fatu	Ko'atu
Sea	Tai	Miti	Tai	Tai	Moana
Sun	'A; Oumat	Ra; Mahaana	Ra	La	—
Sugar Cane	To	To	To-venevene	—	—
			T		
Taro	Tao	Taro	Taro	—	Mamio
Teeth	Niho	Niho	Ni'o	Niho	—
They	Atou	Ratou	Ratau	Latau	—
Thing, A	Mea	Mea	—	—	Apinga
Think	Matao	Mana'o	Ma'ara	Maharahara	—
Thunder	Fatutii; Hatuti'i	Fatutiri	Mangungu	Faititiri	Paku
Tongue	Eeo	Erero	Arero	Alelo	—
Tree	Akau; Ka'au	Ra'au	Rakau	Lakau	Rakau
			W		
Water	Vai	Vai	Vai	Vai	Vai
Weep	Aue	Tai	Aue; Tangu	Tangi	—
West	Te taha o te oumate	Te opu'a o te ra	Te opunga o te raa	—	—
White	Maiti; Tava-ii Tavatava	Hina-hina Tea	Teatea	Tea	Teatea
Wind	Matani; Metaki	Mata'i	Matangi	Matangi	—
			Y		
Yam	Buauhi	Uhi	Ui	—	Maa-parau

Polynesian Dialects

English	Marquesas	Tahiti	Rarotonga	Manahiki	Mangaian
One	Tahi	Hoe	Taai	Tahi	—
Two	'Ua	Piti	Rua	Lua	—
Three	To'u	Toru	Toru	Toru	—
Four	Fa; Ha	Maha	'A	Fa	—
Five	Ima	Pae; Apae	Rima	Lima	—
Six	Ono	Ono	Ono	Ono	—
Seven	Fitu	Hitu	Itu	Hitu	—
Eight	Va'u	Varu	Voru	Varu	—
Nine	Iva	Iva	Iva	Iva	—
Ten	Onohu'u	Ahuru	N'ga-'uru	Laungahulu	—
Twenty	Teku	Ta'au	Rua-nga'uro	Takau	—
Hundred	'Au	Rau; Anere	'Anere	Lima takau	—
Thousand	Mano	Mano; tautini	Tautaani	Ua lau	Mano

Caroline Islands Dialects

English	Ponape Island	Kusaie Island	Truk Island
		B	
Bamboo	Pearri; Parri	Alkesam	—
Banana	Mangat; Karrat; Ut; Tikap Kalas; us	Ute; Bubu	—
Bay or harbor	Kap-in-tau	Molsrom	Le-nien-fetok; maut-eu-waa
		C	
Canoe	Waar; Ta-n-warr	Wak	Wa'a; Menuk
Chief	Mon-chap; Ochlop-alop; Au; Mar	Kato; Leum	Samol
Cloud	Tapok; Tokoi	Pak-en-iang; Kasa	Kutru
Coconut	Ni	Nu	Nu
		D	
Distant	To'o; To	Lois; Loisla	Toau
		E	
East	Macha-en-lang; Pali	Makirung; Masa-il-lang	Kat-alap
Evening	Clau-tik	Oyuku; Yukela	Le-kum-al; Le-faf; Le-puing
		F	
Fish	Mam; Mon	Ik	Ik
Fruit	Ua	Fwako; Fwok	Ua
		H	
Hill	Hela; Tol	Eol; Ol	Truk
House	Im; Nach	Lom	Im; Fal; Fei
		I	
Island	Chap tik; Taka	Fulu; Fuol-e-sik	Ta; Fanu
		L	
Lagoon	Nam; Nalam	Nem	Nam
Land	Chap; Champa; Pom	Fwal; Fal	Fanu
Light	Marrain	Kalem	Auteu; Sarem
Lightning	Liol Likamaiu	Sarom	Fifi
		M	
Mast	Kau	Kossu; Pau	Au
Moon	Marram	Alush; Malem	Marram
Morning	Mauta; Cho-ran	Lenelik; Lutu	Le-sor; Nimuer-an
		N	
Night	Pong	Fong	Puin; Puing

English	Ponape Island	Kusaie Island	Truk Island
North	Apong; Pali Apong	Effing; Afang	Epung
		P	
Pandanus tree	Poki; Taip; Kilpar	Meng; Pop; Mai	Fach; Tatan
Place	Nacha; Teu	An; In	Ekis; Le-ni; Aperan
Plantation	Mot; Moch	Ima	Mai-mal; Tau-api
		R	
Rain	Katau; Ut	Af	Ut
Reef	Takai mai; Paina mat	Eka; Eoka	Ote; och
River	Pil-lap	Pil-tik	Tran-popu
		S	
Sail	Charrak; I	Nes	Seres; Amarra
Sand	Pik	Puku; Fok-dust	Pi
Sea	Chet; Nau chet	Mnea; Moca	Set
Shark	Pako; Tanapai	Pako	Puka
Ship	Chop; Wa'a-en uai	Wak; Wak-palang	Wa'a
South	Air; P\mali-air	Er	Eir; Eur
Stone	Takai	Eot	F'au
Storm	Melemel	Pakea	Melamel
Sugar cane	Cheu; Nau-tap	To; Tou	Kou; Wou
Sun	Katepin	Fuat; Fwat	Akar
		T	
Thunder	Nau-chapeu	Palal	Tropu-lap
Tree	Tuka	Sak	Ira; Trunakit
Turtle	Wei; Kalap	Ng\mo; Ikua	Puerpuer
		W	
Water	Pil	Kof	Konuk; Korruk
West	Kapi-lang; Pali-kapi	Api-nang; Apeilong	Roth
Wind	Aug	Eug	Asapual
Wood	Kichin-tuka	Ip-en-sak	Amut

Soloman Islands Dialects

English	Malaita	Guadacanal Island	New Georgia	Santa Isabel Island
		A		
Anchor	Ngwalu, Huma	—	Hitosoo, Sigoto	—
Bamboo	Oni, Au, Aio	Hau	—	Gau
Banana	Bau, Husi, Huti, Hudi	Vudi	Batia, Nuakua	Bundi
Bay	Suu	—	—	—
Beach	Suli one, Suliaone	—	—	—
		C		
Canoe	Haka, Iola, Baru, Iora, Lao	Vaka	Mola	Vaka
Cloud	Datha, Bwaha, Uro Salo Lola toma	—	Parako, Puni	—
Coconut Tree	Niu, Koilo	Nochera	Nohara	Niu
		D		
Distant	Da, Tau, Ha'atau, Iirii, Au	Sau	—	Dhau
		E		
East	Ta'elana thato, Maana lato	—	—	—
Evening	Tha'ulafia, Laulake	Vongi	—	
		F		
Fish	Ngwa i'a, I'a, ai'a, I'e	Cheche	Igana, Ighana	Fei, Ika
		H		
Harbor	Su'u	—	—	
Hill	Ngwa tolo, Lire, Tolo Toro kou	Vatu-range	—	Pelo, Suasusa
		I		
Island	Kokumua, Mara-marau	—	Tusa-Nusa	Moumolu
		L		
Lagoon	Ngwa, Kikimboa	—	Susuka	—
Land	Fanua, Hanua, Hanue	Vera	—	Undolu
Large	Ba'ita, Paina	Ngete	Nomana	—
		M		
Mangrove	Ko'a, Ono, Koa	—	Petu	—
Moon	Mandame, Hura Waro-waro	Vula	—	Vula
Morning	U'usanandi, Lalisi Ho'oa	Ndani	Mamarani	Vuvougoi
Mountain	Ngwa tolo ba'ita, Lire	—	Toa	—

English	Malaita	Guadacanal Island	New Georgia	Santa Isabel Island
		N		
Night	Fa rondo, Poniai Ma'e dani, Roto, Rodo	Bongi	Ipu, Bungi	Bongi
		O		
Ocean	—	—	Kolo	—
		P		
Passage in reef	—	—	Sangava	—
Pier, stone	—	—	B'utero	—
Place	Kula, Nihi	—	Papoa Palavanua	Bale, Vido
Plantation	—	—	Chinggo, Inuma	Anggutu Mathathe
Point (Cape)	Nonoraa	—	Chochopo, Mihiu	—
		R		
Rain	Dani, Uta nemo, Nema, Nemo	Usa	Mungata	Uha
Reef	Mai	—	Mati, Masa	Karango, Kalai
River	Kafo, Kafo baita, Wai Kahu, Wai peine	Ko-loki	Piongo, Obuku	Bea-hutu
Rock	—	—	Indaka	—
		S		
Sand	One	One	Keora hewa, Onone muho	Nakingga
Sand bank	Busu, One A'ate	—	—	Horara
Sea	Amali, Asi Ahowa	Tasi	Kolo indere	—
Sea deep	Matakwa, Matawa	—	Lao piru	—
Sea, shallow	Tetee, Sara	—	Tangi mati	—
Sea, rough	Amali maruki, Asi Kai ta'ara	—	—	—
Shark	Ba'ekwa, Baewa	—	—	—
Star	Bumbulu, Purupuru pou-pou	—	—	—
Stone	Fau, Hau, Kasia, Ha'u Hoiheu	Vatu	Mrawa, Ma'rawa Indaka	Gahira Vatu
Sun	Sato	Aso	Ini, Rimata	Aho
Surf	—	—	Umbata	—
		T		
Tide	Lua	—	—	—
Tide, high	—	—	Totolo mai, Ondo Singi	—
Tide, low	—	—	Totolo kala, Mati	—
Time	Mana, Horoa, Lo'ua	—	Masa	—
Tree	Dango, Drango	Hai	Hai, Hunda	Gai
Turtle	Fonu, Honu	—	Vonu, Kohale	Vonyo
		V		
Volcano	—	—	Vuvusa	—
Village	Toaa, Heheraa	—	Palavanus, Popoa	—

English	Malaita	Guadacanal Island	New Georgia	Santa Isabel Island
		W		
Water, fresh	Kafo, Kahu, Karusi Wai	Ko	Kawo	Bea
Wave (breaker)	Lua, Naho	—	—	
Wind	Thauthau, Oru, Drangi	—	Arare	Guri
Wind North	—	—	Talaoro	—
Wind NE	—	—	Hecha	—
Wind East	—	—	Naglisu	—
Wind South	—	—	Tua vela	—
Wind SE	Au	—	—	—
Wind West	—	—	Mohu	—
Wind NW	Kumburu, Awarosi	—	Twa linggutu	—

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

	Position °	'	°	'	Sec. Para
A					
ABATIKU ISLAND	0	24 N	173	46 E	4.37
ABEMAMA ATOLL	0	21 N	173	51 E	4.37
ABNETARE	15	39 S	167	05 E	6.58
ACHARAN PASSAGE	6	14 N	171	57 E	4.48
ACHARD POINT	10	21 S	161	15 E	7.10
ACTAEON	21	23 S	136	30 W	1.31
ADOLPH SEAMOUNT	11	54 S	178	10 W	3.98
AESI ISLAND	15	26 S	167	15 E	6.68
AFNAHA	12	31 S	177	09 E	3.102
AGONY ISLAND	9	50 N	169	14 E	4.56
AHE	14	30 S	146	19 W	1.54
AHITI ISLAND	10	08 S	161	55 E	7.12
AILINGINAE ATOLL	11	08 N	166	25 E	4.75
AILINGLAPALAP ATOLL	7	25 N	168	46 E	4.66
AILO POINT	4	49 S	151	41 E	9.60
AILUK ATOLL	10	20 N	169	56 E	4.57
AIRUKIRARU ISLAND	11	30 N	165	24 E	4.76
AIS ISLAND	15	26 S	167	15 E	6.68
AITUTAKI	18	54 S	159	46 W	2.45
AIWA ISLANDS	18	20 S	178	41 W	3.83
AIWOKAKO PASSAGE	7	38 N	134	33 E	10.48
AJUGA POINT	15	02 S	166	48 E	6.65
AKIAKI	18	33 S	139	13 W	1.36
AKKUMANES	19	14 S	174	06 W	2.66
ALACRITY ROCKS	18	53 S	178	26 E	3.9
ALCMENE	22	43 S	167	28 E	5.7
ALEXA BANK	11	36 S	175	07 E	6.81
ALIITE ISLAND	10	08 S	161	55 E	7.12
ALITE HARBOR	8	53 S	160	44 E	7.20
ALITE REEF	8	53 S	160	37 E	7.20
ALLIER REEF	16	34 S	168	06 E	6.33
ALOFI	19	02 S	169	56 W	2.76
AMANU	17	49 S	140	46 W	1.39
AMBORE ANCHORAGE	15	23 S	167	43 E	6.43
AMBRYM ISLAND	16	15 S	168	09 E	6.35
AMERE	22	27 S	167	06 E	5.8
AMURA	22	39 S	152	49 W	1.104
ANAA	17	25 S	145	29 W	1.46
ANAPOTO	22	39 S	152	49 W	1.104
ANATOM ISLAND	20	12 S	169	46 E	6.12
ANEITIOUM ISLAND	20	12 S	169	46 E	6.12
ANIL CHANNEL	7	48 N	168	12 E	4.67
ANNA MARIA BAY	8	56 S	140	05 W	1.7
ANSE DE TIARI	20	14 S	164	21 E	5.64
ANSE DE VOUAVOUTO	21	00 S	164	40 E	5.35
ANSE NEMOU	21	40 S	166	22 E	5.50
ANSE TOUPETI	21	41 S	166	25 E	5.50
ANT ATOLL	6	48 N	158	01 E	10.10
ANTARARA ISLAND	6	56 S	155	23 E	8.57
ANTIOPE REEF	18	15 S	168	24 W	2.76
ANUDA ISLAND	11	35 S	169	51 E	6.80
AOA BAY	14	15 S	170	35 W	2.28
AOBA ISLAND	15	23 S	167	50 E	6.42
AOLA BAY	9	32 S	160	30 E	7.33
AON ISLAND	11	13 N	169	46 E	4.59
AORE ISLAND	15	34 S	167	10 E	6.60
APATAKI	15	27 S	146	20 W	1.51
APIA HARBOR	13	39 S	171	46 W	2.32
APIA HARBOR	13	49 S	171	46 W	2.31
APOLIMA	13	49 S	172	09 W	2.35
APRA HARBOR	13	27 N	144	37 E	10.59
ARAKABESAN	7	21 N	134	28 E	10.45
ARANUKA	0	08 N	173	37 E	4.35
ARATIKA	15	27 S	145	30 W	1.49
ARAVON ISLANDS	7	27 S	158	00 E	8.10
ARAWE HARBOR	6	09 S	149	02 E	9.44
ARAWE ISLANDS	6	06 S	148	58 E	9.40
ARCHIPEL DE BELEP	19	41 S	163	39 E	5.71
ARIPAU POINT	1	59 S	146	44 E	9.74
ARNO ATOLL	7	05 N	171	40 E	4.50
ARORAE	2	39 S	176	50 E	4.28
ARUTUA	15	18 S	146	45 W	1.52
ARUTUNGA	18	53 S	159	47 W	2.46
ASAN POINT	13	28 N	144	42 E	10.60
ASAU BAY	13	30 S	172	38 W	2.38
ASHWELL BLUFF	13	48 S	167	34 E	6.74
ASTROLABE REEFS	19	35 S	165	38 E	6.10
ATA	22	20 S	176	12 W	2.48
ATAFU ISLAND	8	32 S	172	30 W	4.14
ATCHIN ISLAND	15	56 S	167	20 E	6.52
ATIU	20	02 S	158	07 W	2.44
ATOLL MANUAE	16	32 S	154	41 W	1.96
ATOLL MAUPIHAA	16	49 S	153	57 W	1.95
ATOLL MOTU ONE	15	50 S	154	31 W	1.96
ATOLL TUPAI	16	16 S	151	50 W	1.95
ATUONA	9	49 S	139	02 W	1.19
AUKI HARBOR	8	43 S	160	42 E	7.21
AULUA BAY	16	19 S	167	43 E	6.57
AUNUU ISLAND	14	17 S	170	33 W	2.24
AUR ATOLL	8	15 N	171	05 E	4.52
AURORA ISLAND	15	10 S	168	10 E	6.41
AUSTRIA SOUND NORTH	7	28 S	158	25 E	8.9
AUSTRIA SOUND SOUTH	7	42 S	158	29 E	8.11
AUTAKEN REEF	0	44 S	174	23 E	4.34
AUTAKEN SPIT	0	47 S	174	20 E	4.34
AVA ISLAND	17	22 S	178	53 W	3.78
AVALAU	8	38 S	179	05 E	4.20
AVAPEHI PASSE	16	43 S	151	03 W	1.82
AVATIU	21	12 S	159	47 W	2.43
AVREAS BAY	13	54 S	167	28 E	6.74
AYLES ISLET	16	35 S	167	29 E	6.49
B					
BABELTHUAP	7	28 N	134	32 E	10.46
BABOUILLAT ANCHORAGE	20	22 S	164	06 E	5.41
BAIE ANAHI	9	44 S	139	56 W	1.18
BAIE ANAHO	8	49 S	140	03 W	1.10
BAIE AOUI	21	37 S	167	55 E	6.3
BAIE ATIHEU	8	50 S	140	04 W	1.9
BAIE AUE	19	40 S	163	38 E	5.72

	Position °	'	°	'	Sec. Para
BAIE BANARE	20	12 S	164	01 E	5.45
BAIE CHASSELOUP	20	58 S	164	38 E	5.36
BAIE CHAVEI	8	57 S	139	35 W	1.13
BAIE D' OLAND	20	28 S	164	10 E	5.40
BAIE D'ANAHO	8	49 S	140	03 W	1.10
BAIE D'OHOPE	20	17 S	164	02 E	5.44
BAIE D'OMOA	10	30 S	138	40 W	1.23
BAIE D'OUARAI	21	46 S	165	45 E	5.29
BAIE D'OUNDA	20	52 S	164	29 E	5.37
BAIE DE BA	21	13 S	165	36 E	5.56
BAIE DE BOULARI	22	16 S	166	32 E	5.16
BAIE DE BOURAIL	21	38 S	165	26 E	5.31
BAIE DE CANALA	21	28 S	165	57 E	5.52
BAIE DE CHEPENEHE	20	47 S	167	09 E	6.5
BAIE DE COOK	17	29 S	149	49 W	1.76
BAIE DE GAATCHA	20	54 S	167	07 E	6.5
BAIE DE GOMEN	20	44 S	164	23 E	5.38
BAIE DE HAKAHAU	9	21 S	140	06 W	1.14
BAIE DE HAKAHETAU	9	21 S	140	06 W	1.15
BAIE DE HAUREI	27	37 S	144	20 W	1.99
BAIE DE KOUAOUA	21	23 S	165	49 E	5.53
BAIE DE KUEA	21	21 S	165	49 E	5.54
BAIE DE KUTO	22	40 S	167	26 E	5.7
BAIE DE MAGENTA	22	17 S	166	29 E	5.16
BAIE DE MOUEA	22	18 S	166	38 E	5.16
BAIE DE NEHOUE	20	20 S	164	08 E	5.41
BAIE DE NEKETE	21	31 S	166	05 E	5.52
BAIE DE NIRI	21	37 S	167	55 E	6.3
BAIE DE OUGO	22	34 S	167	33 E	5.7
BAIE DE PAM	20	14 S	164	18 E	5.65
BAIE DE PORO	21	18 S	165	43 E	5.55
BAIE DE PRITZBUER	21	57 S	165	57 E	5.27
BAIE DE RO	21	21 S	167	55 E	6.3
BAIE DE TANLE	20	18 S	164	04 E	5.43
BAIE DE TARAVAO	17	43 S	149	16 W	1.71
BAIE DE TOUHO	20	47 S	165	13 E	5.61
BAIE DE VAIEHU	9	23 S	140	08 W	1.15
BAIE DE WAHDA	21	06 S	167	26 E	6.4
BAIE DES DAMES	22	14 S	166	24 E	5.21
BAIE DU DOKING	20	43 S	167	11 E	6.5
BAIE DU NORD	21	21 S	167	55 E	6.3
BAIE DU PRONY	22	22 S	166	52 E	5.11
BAIE DU SANDAL	20	51 S	167	07 E	6.5
BAIE HAKAENU	8	48 S	140	10 W	1.9
BAIE HAKATAO	9	27 S	140	05 W	1.15
BAIE HANAIAPA	9	43 S	139	00 W	1.18
BAIE HANAMENU	9	46 S	139	38 W	1.18
BAIE HAVANA	10	27 S	138	39 W	1.22
BAIE IRE	22	24 S	166	48 E	5.14
BAIE KOUAKOUE	21	55 S	166	39 E	5.48
BAIE KOUO	22	24 S	166	49 E	5.14
BAIE LAUGIER	21	23 S	165	51 E	5.52
BAIE LEBRIS	21	13 S	165	36 E	5.56
BAIE MAA	22	13 S	166	20 E	5.22
BAIE MOINDU	21	44 S	165	40 E	5.30
BAIE NGOE	21	47 S	166	30 E	5.50
BAIE NUMBO	22	15 S	166	25 E	5.21
BAIE PAAGOUMENE	20	29 S	164	11 E	5.40
BAIE PUAMAU	9	46 S	138	52 W	1.17
BAIE TAIOHAE (ANA MARIA BAY)	8	56 S	140	05 W	1.7
BAIE TAPUAMU	16	37 S	151	33 W	1.91
BAIE TIOAE	22	26 S	166	46 E	5.14
BAIE UALA	19	43 S	163	38 E	5.71
BAIE UGUE	21	09 S	165	33 E	5.57
BAIE UIE	22	21 S	166	44 E	5.16
BAIE VAITAHU	9	56 S	139	07 W	1.20
BAKER ISLAND	0	12 N	176	28 W	4.12
BALANAWANG HARBOR	4	07 S	152	28 E	9.16
BALANUWANG HARBOR	4	07 S	152	28 E	9.16
BALDWIN COVE	15	35 S	167	01 E	6.62
BALEINE ISLAND	20	25 S	166	31 E	6.7
BALFOUR PATCH	19	42 S	174	34 W	2.64
BALMORAL REEF	15	40 S	175	52 E	3.99
BALUAN ISLAND	2	33 S	147	17 E	9.78
BANABA	0	53 S	169	32 E	4.43
BANC CLARK	8	06 S	139	37 W	1.11
BANC COETLOGON	22	18 S	167	07 E	5.8
BANC DE L'ORNE	22	24 S	168	56 E	5.5
BANC DE LA TIPINDIE	20	43 S	165	02 E	5.61
BANC DU VANDEGOU	22	20 S	167	03 E	5.8
BANC LAWSON	8	42 S	140	46 W	1.11
BANC TOAPU	17	43 S	149	14 W	1.70
BANGA NDENDE ISLAND	10	21 S	166	17 E	6.88
BANGULA BAY	5	24 S	150	55 E	9.57
BANK	23	40 S	134	20 W	1.30
BANKS ISLANDS	13	15 S	167	15 E	6.71
BARANGO POINT	9	11 S	160	13 E	7.47
BARNUM BAY	7	06 N	134	16 E	10.42
BASILISK HARBOR	11	16 S	166	30 E	6.84
BASSE GARNAULT	22	24 S	166	25 E	5.19
BASSES BAYONNAISE	21	01 S	165	30 E	5.58
BATNAVNI BAY	15	40 S	168	07 E	6.39
BAY HARBOR	10	26 S	161	27 E	7.9
BAYONNAISE SEAMOUNT	12	06 S	179	37 W	3.99
BEAUFORT BAY	9	36 S	159	39 E	7.40
BEAUTEMPS-BEAUPRE ISLAND	20	25 S	166	09 E	6.10
BEGANGU PASSAGE	7	30 N	168	40 E	4.66
BEGIN ISLAND	10	07 N	165	56 E	4.72
BELCHER ROCKS	18	12 S	178	32 E	3.16
BELCHIF POINT	15	33 S	167	08 E	6.61
BELLINGSHAUSEN ISLAND	15	50 S	154	31 W	1.96
BELLONA ISLAND	11	18 S	159	47 E	7.3
BERU	1	20 S	176	00 E	4.31
BETARARA ANCHORAGE	15	10 S	168	08 E	6.41
BEVERIDGE REEF	20	00 S	167	48 W	2.76
BIBOA	7	55 S	156	41 E	8.25
BICE ROAD	15	19 S	167	55 E	6.43
BIG BAY	16	41 S	168	16 E	6.34
BIGATYELANG ISLAND	7	17 N	168	43 E	4.66
BIKAR ATOLL	12	14 N	170	06 E	4.60
BIKE ISLAND	0	22 N	173	52 E	4.37
BIKIEN PASS	11	10 N	166	45 E	4.74
BIKINI ATOLL	11	35 N	165	23 E	4.76
BIKINI ISLAND	11	37 N	165	33 E	4.76
BINA HARBOR	8	55 S	160	45 E	7.20
BINA ISLAND	8	56 S	160	45 E	7.20
BINGHAM CHANNEL	1	45 N	172	58 E	4.40
BIO ISLAND	10	10 S	161	41 E	7.11
BIPI ISLAND	2	06 S	146	24 E	9.70
BIRD ISLAND	9	31 N	170	01 E	4.55
BIRNIE ISLAND	3	35 S	171	31 W	4.7
BITAMA HARBOR	8	24 S	160	35 E	7.23
BLANCHE HARBOR	7	24 S	155	34 E	8.38
BOCK CHANNEL	8	03 N	168	07 E	4.67
BOCK CHANNEL	9	02 N	165	36 E	4.71
BOCK ISLAND	11	23 N	167	22 E	4.73
BOGACIO ISLAND	15	35 S	167	14 E	6.60
BOGENAGA ISLAND	6	17 N	169	25 E	4.64
BOKO POINT	8	27 S	159	52 E	8.5
BOLTON POINT	1	43 N	172	59 E	4.40
BORA-BORA	16	30 S	151	45 W	1.92
BOUGAINVILLE STRAIT	15	49 S	167	12 E	6.58
BOWEN SHOAL	6	05 S	148	40 E	9.40
BRACEY PATCH	15	54 S	167	20 E	6.52
BREAKERS POINT	14	18 S	170	40 W	2.25
BRIDGESTOCK POINT	15	36 S	167	06 E	6.61
BROUGHAM SHOAL	9	02 S	158	18 E	8.16
BROUGHAM SHOAL	9	38 S	165	26 E	6.88
BRUAT CHANNEL	15	37 S	167	10 E	6.59
BUALA LIGHT	8	08 S	157	37 E	8.6
BUARIKI	1	28 S	175	04 E	4.33
BUCHANAN REEF	19	47 S	174	22 W	2.62
BUDD REEF	16	31 S	179	37 W	3.70
BULIMATERVUA ISLET	10	50 S	162	23 E	7.6
BUNGANA ISLAND	9	11 S	160	12 E	7.47
BUNINGA ISLAND	17	02 S	168	35 E	6.28
BURAKU ISLAND	9	01 S	158	45 E	7.57
BUSHMANS BAY	16	09 S	167	30 E	6.55
BUTARITARI ATOLL	3	10 N	172	50 E	4.42
BYRON BAY	10	40 S	165	59 E	6.87

C

CALALIN ISLAND	7	09 N	171	13 E	4.51
CANAL DE L'ALCMENE	20	12 S	164	14 E	5.66
CANAL DE LA HAVANNAH	22	20 S	167	05 E	5.8
CANAL NAPIAS	20	10 S	164	15 E	5.66
CANTON ISLAND	2	50 S	171	43 W	4.6
CAP ATUPA ATUA	8	49 S	140	00 W	1.5
CAP BALGUERIE	9	45 S	138	48 W	1.16
CAP BERNARDIN	20	44 S	167	18 E	6.4
CAP COLNETT	20	30 S	164	46 E	5.62
CAP DES CANNIBALES	22	19 S	167	01 E	5.10

	Position °	'	°	'	Sec. Para
CAP DES TROIS SAPINS	21	18 S	165	44 E	5.54
CAP ESCARPE	20	26 S	166	40 E	6.10
CAP NDOUA	22	24 S	166	55 E	5.9
CAP QUEEN CHAROLOTTE	22	21 S	167	00 E	5.10
CAP REINE CHARLOTTE	22	21 S	167	00 E	5.10
CAP TE HOPE O TE KEHO	10	02 S	139	07 W	1.21
CAP TIKAPO (CAP MARTIN)	8	57 S	140	00 W	1.6
CAP TONNEDU	21	59 S	166	46 E	5.48
CAP TOUHO	20	48 S	165	16 E	5.60
CAPE ALEXANDER	6	35 S	156	30 E	8.14
CAPE ARCHWAY	4	58 S	152	15 E	9.19
CAPE ARSACIDES	8	39 S	161	00 E	7.16
CAPE ASTROLABE	8	20 S	160	34 E	7.23
CAPE ASUISUI	13	47 S	172	32 W	2.36
CAPE BALI	6	19 S	149	41 E	9.43
CAPE BEECHEY	5	56 S	151	12 E	9.42
CAPE BOTIANGIM	2	41 S	150	11 E	9.37
CAPE BUSHING	5	50 S	148	34 E	9.44
CAPE CONE	16	51 S	168	29 E	6.31
CAPE CUMBERLAND	14	38 S	166	37 E	6.65
CAPE DOUCERE	16	28 S	167	50 E	6.47
CAPE ENTRANCE	2	21 S	150	13 E	9.37
CAPE ESPERANCE	9	13 S	159	42 E	7.38
CAPE FALEULA	13	47 S	171	50 W	2.33
CAPE FRIENDSHIP	6	43 S	155	58 E	8.42
CAPE GAZELLE	4	19 S	152	24 E	9.20
CAPE GLOUCESTER	5	27 S	148	25 E	9.53
CAPE HANPAN	5	01 S	154	37 E	8.51
CAPE HENPAN	5	01 S	154	37 E	8.51
CAPE HOLLMAN	5	00 S	150	05 E	9.54
CAPE HOSKINS	5	26 S	150	32 E	9.47
CAPE HUNTER	9	49 S	159	49 E	7.41
CAPE KORI	5	24 S	154	42 E	8.51
CAPE KUMBORO	7	18 S	157	31 E	8.14
CAPE L'AVERDY	5	34 S	155	05 E	8.48
CAPE LABEE	7	29 S	157	53 E	8.13
CAPE LAMBERT	4	11 S	151	33 E	9.63
CAPE LISBURN	15	38 S	166	46 E	6.64
CAPE MABIRI	5	59 S	155	25 E	8.46
CAPE MAHUA	10	28 S	162	05 E	7.7
CAPE MATATULA	14	15 S	170	34 W	2.24
CAPE MEGAPODE	7	48 S	158	59 E	8.8
CAPE MIDDLETON	7	42 S	156	31 E	8.26
CAPE MOLKE	6	02 S	154	49 E	8.55
CAPE MULINUU	13	30 S	172	48 W	2.37
CAPE MULITAPU'ILI	13	57 S	171	59 W	2.34
CAPE PANAKONDO	3	08 S	151	46 E	9.13
CAPE PEIHO	5	56 S	148	45 E	9.44
CAPE RECHERCHE	10	10 S	161	20 E	7.7
CAPE ST. GEORGE	4	51 S	152	54 E	9.9
CAPE SURVILLE	10	50 S	162	23 E	7.6
CAPE SYDNEY	10	45 S	161	45 E	7.8
CAPE TAPAGA	14	01 S	171	23 W	2.29
CAPE TAPUTAPU	14	19 S	170	51 W	2.28
CAPE TUASIVI	13	40 S	172	10 W	2.37
CAPE TUPINIER	5	16 N	163	01 E	10.3
CAPE UMBOI	5	38 S	148	06 E	9.46
CAPE VAILAOA	13	29 S	172	47 W	2.39
CAPE WASHINGTON	19	07 S	177	57 E	3.6
CAPE ZELEE	9	44 S	161	34 E	7.13
CAROLINE BAY	16	34 S	167	28 E	6.50
CAROLINE ISLAND	9	57 S	150	13 W	2.13
CARONDELET REEF	5	34 S	173	51 W	4.11
CARTERET ISLANDS	04	44 S	155	16 E	8.3
CASUARINA POINT	15	51 S	168	10 E	6.39
CATLOW REEF	17	40 S	177	20 E	3.23
CENTRAL PASSAGE	22	31 S	166	26 E	5.18
CEVA-I-RA REEF	21	44 S	174	38 E	5.2
CHARLOTTE BANK	11	47 S	173	13 E	6.81
CHARYBDIS REEF	17	11 S	178	02 E	3.34
CHENAL DE KENDEC	20	42 S	164	17 E	5.39
CHENAL POUANGUE	20	56 S	164	34 E	5.36
CHERRY ISLAND	11	35 S	169	51 E	6.80
CHISLETT ISLAND	7	43 S	158	30 E	8.11
CHOISEUL BAY	6	42 S	156	25 E	8.14
CHOISEUL ISLAND	7	00 S	157	00 E	8.14
CHRISTMAS ISLAND	1	52 N	157	22 W	2.8
CHUUK ISLANDS	7	25 N	151	50 E	10.18
CIMIRUKA ISLAND	9	50 S	160	51 E	7.31
CIRCULAR REEF	3	26 S	147	47 E	9.68
COCOANUT POINT	17	00 S	178	41 E	3.55
COCOS ISLAND	13	14 N	144	39 E	10.57
COLERIDGE BAY	8	33 S	160	42 E	7.22
COLONIA	9	31 N	138	08 E	10.38
COMBE SEAMOUNT	12	31 S	177	40 W	3.98
CONDOR REEF	8	07 N	147	50 E	10.28
COOK BAY	16	29 S	167	48 E	6.48
COOK REEF	17	03 S	168	16 E	6.26
COQUILLE HARBOR	5	21 N	162	57 E	10.4
CORMORANT ENTRANCE	9	49 S	160	54 E	7.31
COUGHLAN HARBOR	9	16 S	159	38 E	7.39
COUPEE DE L'ALLIANCE	20	57 S	164	25 E	5.37
CRAIG COVE	16	15 S	167	55 E	6.36
CRAIG POINT	16	16 S	167	55 E	6.36
CREDNER ISLANDS	4	16 S	152	22 E	9.16
CRIQUE TOUHO	20	46 S	165	11 E	5.61
CURACOA REEF	15	30 S	173	37 W	2.74

D

D'OUVEA ATOLL	20	33 S	166	25 E	6.6
DANGER ISLANDS	10	55 S	165	50 W	2.20
DAVY ROCK	17	22 S	177	50 E	3.33
DAWSON REEF	19	04 S	178	02 E	3.6
DE LA TABLE ANCHORAGE	15	09 S	166	56 E	6.65
DEGUALA ISLAND	20	22 S	166	24 E	6.8
DEVIL POINT	17	45 S	168	11 E	6.19
DIAMOND BAY	16	46 S	168	10 E	6.32
DIAMOND ROCK	18	46 S	178	28 E	3.10
DIDO SHOAL	20	55 S	175	00 W	2.50
DILLON BAY	18	47 S	168	58 E	6.15
DODO PASSAGE	7	07 N	171	42 E	4.50
DOLLAP CHANNEL	8	52 N	170	52 E	4.53
DOPPEL REEF	3	21 S	148	00 E	9.68
DOUBLE BAY	8	58 S	161	04 E	7.15
DOUBLE ROCK	15	10 S	168	08 E	6.41
DOVELI COVE	7	35 S	156	38 E	8.25
DRAPER POINT	8	24 S	159	48 E	8.5
DRUMMOND BAY	16	41 S	168	16 E	6.34
DUBLON ISLAND	7	22 N	151	52 E	10.19
DUCIE ATOLL	24	40 S	124	47 W	1.24
DUE REEF	5	17 S	150	58 E	9.57
DUFF ISLANDS	9	57 S	167	12 E	6.90
DUPOND POINT	13	16 S	166	39 E	6.78
DURAND REEF	22	02 S	168	39 E	5.5
DURHAM SHOAL	16	05 S	173	50 W	2.74

E

EANIKAI	1	10 S	174	43 E	4.33
EARL DALHOUSE BANK	8	07 N	144	55 E	10.32
EARNEST LEGOUVE REEF	35	12 S	150	40 W	1.100
EAST CAPE	4	14 S	153	06 E	9.10
EAST CAPE	6	55 S	156	08 E	8.40
EAST PASS	7	18 N	168	51 E	4.66
EAST POINT	6	49 S	155	55 E	8.59
EAURIPIK ATOLL	6	42 N	143	02 E	10.35
EBON ATOLL	4	38 N	168	42 E	4.62
EBON CHANNEL	4	36 N	168	41 E	4.62
EBON ISLAND	4	34 N	168	42 E	4.62
EBRILL	22	40 S	133	30 W	1.30
EDWARDS BANK	7	44 S	159	43 E	8.7
EFATE ISLAND	17	40 S	168	23 E	6.16
EIAO	8	00 S	140	42 W	1.4
EIAO	8	00 S	140	42 W	1.2
EIL MALK	7	09 N	134	22 E	10.43
ELATO ATOLL	7	27 N	146	10 E	10.31
ELEPHANT POINT	16	08 S	167	10 E	6.51
ELLINGTON WHARF	17	20 S	178	14 E	3.35
ELUK ISLAND	9	24 N	170	08 E	4.55
EMAU ISLAND	17	28 S	168	30 E	6.23
EMELINE BAY	5	28 S	149	39 E	9.53
EMERALD ENTRANCE	6	42 S	156	34 E	8.14
EMERALD ROCKS	9	51 S	160	51 E	7.30
EMIRAU ISLAND	1	38 S	150	00 E	9.30
ENDERBURY ISLAND	3	08 S	171	05 W	4.5
ENEWOTOK ISLAND	11	20 N	162	20 E	4.77
ENGLISH HARBOR	3	51 N	159	22 W	2.7
ENIAETOK ISLAND	11	17 N	166	54 E	4.74
ENIJUN CHANNEL	8	36 N	171	03 E	4.53
ENIJUN ISLAND	8	36 N	171	03 E	4.53
ENIRIK PASS	11	30 N	165	22 E	4.76

	Position °	'	°	'	Sec. Para
ENIWETAK ISLAND	11	20 N	162	20 E	4.77
ENIWETAK PASS	11	17 N	167	28 E	4.73
ENOGHAE INLET	8	10 S	157	18 E	8.20
ENTRANCE ISLAND	0	22 N	173	52 E	4.37
ENTRANCE ISLAND	9	52 S	160	53 E	7.30
ENTRANCE ISLET	7	59 S	178	20 E	4.22
EORI ISLAND	17	26 S	177	04 E	3.26
EPI ISLAND	16	44 S	168	17 E	6.31
ERADAKA ISLAND	17	38 S	168	09 E	6.20
ERAPPU CHANNEL	10	20 N	169	55 E	4.57
ERETOKA ISLAND	17	38 S	168	09 E	6.20
ERIKUB	9	01 N	170	03 E	4.54
ERROMANGO ISLAND	18	49 S	169	05 E	6.15
ERUKKU ISLAND	9	24 N	170	08 E	4.55
ESPIEGLE BAY	15	59 S	167	11 E	6.51
ESPIRITU SANTO ISLAND	15	20 S	166	55 E	6.58
ESTRELLA BAY	7	55 S	159	11 E	8.7
ETAL ATOLL	5	35 N	153	34 E	10.14
EUA ISLAND	21	22 S	174	56 W	2.48
EWOSE ISLAND	16	57 S	168	35 E	6.28
EXPLORING ISLES	17	15 S	178	55 W	3.76
EYO ISLAND	10	23 S	161	23 E	7.10

F

FAAITE	16	45 S	145	15 W	1.46
FACPI POINT	13	20 N	144	38 E	10.58
FAGALOA BAY	13	55 S	171	32 W	2.29
FAHLANDER SHOAL	7	11 S	157	35 E	8.10
FAILURE ROCKS	1	58 S	146	42 E	9.73
FAIS	9	46 N	140	31 E	10.36
FAKAHINA	16	00 S	140	08 W	1.40
FAKAOFO	9	23 S	171	15 W	4.16
FAKARAVA	16	18 S	145	35 W	1.47
FALCON BANK	19	19 S	174	07 W	2.66
FALEALILI HARBOR	14	01 S	171	41 W	2.34
FALEFATU ISLAND	8	35 S	179	08 E	4.20
FALSE BAY	16	24 S	167	47 E	6.57
FANARITE POINT	10	41 S	162	16 E	7.6
FANGAHINA	16	00 S	140	08 W	1.40
FANGATAFOA	22	15 S	138	45 W	1.33
FANGATAUFA	22	15 S	138	45 W	1.33
FANNING ATOLL	3	52 N	159	20 W	2.6
FAONE	17	40 S	149	18 W	1.71
FAPUHLI ISLAND	8	16 S	159	46 E	8.5
FAPULI ISLET	8	16 S	159	46 E	8.5
FARAULEP ATOLL	8	36 N	144	33 E	10.33
FARE	16	42 S	151	01 W	1.81
FATU HIVA	10	28 S	138	39 W	1.22
FATU HUKU	9	27 S	138	55 W	1.16
FATUMANGA	18	47 S	174	10 W	2.69
FATUTAKA ISLAND	11	55 S	170	12 E	6.81
FAURO ISLAND	6	55 S	156	05 E	8.40
FAYU	8	33 N	151	20 E	10.21
FENI ISLANDS	4	05 S	153	40 E	9.3
FENUA FALA	9	23 S	171	17 W	4.16
FENUA URA	16	32 S	154	41 W	1.96
FENUALOA ISLAND	10	16 S	166	12 E	6.89
FETOPUNGA	20	18 S	174	32 W	2.54
FIELD SEAMOUNT	12	19 S	174	48 W	3.97
FIJI ISLANDS	17	00 S	179	00 E	3.2
FILIPPO REEF	5	31 S	151	47 W	2.12
FIRST POINT	16	10 S	167	15 E	6.51
FIU BAY	8	43 S	160	41 E	7.22
FLEUVE DIAHOT DE BON DE	20	20 S	164	20 E	5.65
FLINT ISLAND	11	26 S	151	48 W	2.13
FLOAKORO POINT	8	21 S	159	51 E	8.5
FLORA ROCK	9	32 S	159	36 E	7.40
FOA ISLAND	19	45 S	174	18 W	2.63
FOELIFUKA	18	43 S	174	09 W	2.70
FONUA FALA	9	23 S	171	17 W	4.16
FONUA'OU	20	19 S	175	25 W	2.51
FONUAIKA ISLET	20	07 S	174	42 W	2.56
FONUALEI	18	01 S	174	19 W	2.73
FORARI BAY	17	41 S	168	33 E	6.24
FORELAND ANCHORAGE	16	41 S	168	08 E	6.32
FORREST REEF	10	15 S	165	47 E	6.87
FOTUHA'A ISLAND	19	48 S	174	44 W	2.63
FOUA	20	00 S	174	44 W	2.57
FOVIUNG EFAU	12	30 S	177	02 E	3.102
FRINDSBURY REEF	5	00 S	159	09 E	8.2
FROST REEF	17	25 S	179	19 W	3.80
FUA'AMOTU ISLAND	18	48 S	174	01 W	2.69
FUAFATU	8	31 S	179	03 E	4.21
FUALIFEKE ISLET	8	26 S	179	08 E	4.21
FULAKORA POINT	8	21 S	159	51 E	8.5
FULANGA ISLAND	19	08 S	178	35 W	3.87
FUNAFUTI ATOLL	8	31 S	179	08 E	4.19
FUNANGONGO ISLET	8	33 S	179	10 E	4.20
FURONA ISLAND	8	08 S	159	05 E	8.12
FUTU HIVA	10	30 S	138	40 W	1.2
FUTU IVA	10	30 S	138	40 W	1.2
FUTUNA ISLAND	19	32 S	170	10 E	6.14

G

GAFERUT	9	14 N	145	23 E	10.33
GAMEN REEF	7	24 N	144	41 E	10.32
GANGWAY ROCKS	16	38 S	179	49 W	3.71
GANONGGA	18	11 S	156	35 E	8.27
GARDNER ISLAND	4	40 S	174	31 W	4.10
GAROVE ISLANG	4	41 S	149	30 E	9.50
GARUA HARBOR	5	17 S	150	05 E	9.55
GASETATATURO	7	55 S	159	12 E	8.8
GATUKAI	8	47 S	158	11 E	8.16
GAUA ISLAND	14	15 S	167	30 E	6.71
GEA PASS	8	49 N	167	35 E	4.69
GEDGE PATCHES	16	26 S	167	47 E	6.57
GEORGE POINT	16	16 S	167	55 E	6.36
GHASETATAAURO ROCK	7	55 S	159	12 E	8.8
GHEHE BAY	7	55 S	159	11 E	8.7
GHIZUNABEANA ISLANDS	7	33 S	158	42 E	8.8
GHOJORURU POINT	8	05 S	159	31 E	8.6
GIJUNABEANA	7	33 S	158	42 E	8.8
GIRAUDEAU REEF	13	05 S	166	35 E	6.79
GIZO HARBOR	8	06 S	156	51 E	8.30
GIZO ISLAND	8	06 S	156	50 E	8.29
GLEANER REEF	22	43 S	173	54 W	2.48
GOAT ISLAND	9	32 N	169	53 E	4.55
GOJORURU POINT	8	05 S	159	31 E	8.6
GOLDFINCH SHOAL	10	17 S	166	50 E	6.88
GORRO LIGHT	22	19 S	167	02 W	5.21
GOUSOUNRANSIT POINT	15	58 S	168	16 E	6.38
GRAAH POINT	5	49 S	148	02 E	9.46
GRACIOSA BAY	10	44 S	165	48 E	6.85
GRAHAM POINT	9	51 S	160	50 E	7.30
GRAND PASSAGE	18	44 S	163	15 E	5.68
GRANDE CHANNEL	13	18 S	166	38 E	6.77
GRANDE PASSE DE TOUHO	20	48 S	165	19 E	5.60
GRAY FEATHER BANK	8	00 N	148	47 E	10.26
GREAT ASTROLABE REEF	18	50 S	178	30 E	3.8
GREEN ISLANDS	4	28 S	154	11 E	9.2
GROUPE ACTEON	21	23 S	136	30 W	1.31
GUAM	13	25 N	144	44 E	10.56

H

HA'AFEVA ISLAND	19	57 S	174	43 W	2.58
HA'ANO ISLAND	19	40 S	174	17 W	2.63
HA'APAI GROUP	19	45 S	174	30 W	2.1
HAAVAI BAY	16	44 S	151	02 W	1.83
HABERLIN REEF	7	24 S	158	02 E	8.10
HADA BAY	10	15 S	161	16 E	7.10
HAKA HETAU	9	21 S	140	06 W	1.15
HAKAU MAMA'O	21	00 S	175	13 W	2.49
HAKAU TUANIU	19	47 S	174	23 W	2.62
HAKAUFISI	20	09 S	174	55 W	2.55
HAKAUFUSI	19	01 S	174	01 W	2.67
HALAFA	12	30 S	177	01 E	3.101
HALL ISLANDS	8	40 N	152	00 E	10.20
HAMBURG BAY	1	38 S	149	58 E	9.31
HAMMONDSPORT BANK	10	32 S	159	38 E	7.3
HANA IAPA	9	43 S	139	00 W	1.18
HANA MENU	9	46 S	139	38 W	1.18
HANA VAVE	10	27 S	138	39 W	1.22
HANESAVO HARBOR	8	54 S	159	59 E	7.50
HAO	18	15 S	140	55 W	1.38
HARANIIA POINT	10	21 S	161	15 E	7.10
HARANS REEF	21	33 S	168	55 W	2.76
HARARO POINT	9	01 S	160	07 E	7.52
HARORO HILL	9	01 S	160	07 E	7.52

	Position °	'	°	'	Sec. Para
HATHORN SOUND	8	11 S	157	12 E	8.21
HATUTU	7	55 S	140	34 W	1.3
HAWKINS SHOAL	10	18 S	167	22 E	6.90
HAY HILL	9	00 S	160	08 E	7.52
HAYTER BAY	13	16 S	166	36 E	6.78
HAZEL HOLME BANK	12	48 S	174	01 E	6.81
HECLA POINT	8	38 S	157	48 E	8.36
HELEN REEF	2	55 N	131	48 E	10.54
HELENE SHOAL	5	30 N	149	15 E	10.26
HEMING BANK	6	46 S	156	24 E	8.14
HENDERSON ISLAND	24	22 S	128	19 W	1.24
HENRY REID BAY	5	00 S	152	00 E	9.41
HEREHERETUE	19	54 S	145	00 W	1.40
HERMIT ISLANDS	1	30 S	145	03 E	9.80
HERTHA	13	53 S	171	16 W	2.33
HERVEY ISLANDS	19	21 S	158	56 W	2.45
HILLIARD CHANNEL	17	37 S	168	13 E	6.21
HIU ISLAND	13	09 S	166	35 E	6.79
HIVA OA	9	47 S	138	58 W	1.16
HOFLIUA	12	30 S	176	56 E	3.101
HOG HARBOR	15	08 S	167	06 E	6.67
HOHOPA POINT	8	15 S	157	49 E	8.18
HOME BAY	0	54 S	169	33 E	4.44
HOME SEAMOUNT	12	54 S	175	37 W	3.97
HOMO BAY	15	57 S	168	11 E	6.38
HONIARA	9	25 S	159	57 E	7.37
HOOK POINT	16	25 S	167	24 E	6.50
HOPPER ATOLL	0	21 N	173	51 E	4.37
HOUAILOU	21	17 S	165	38 E	5.56
HOWLAND ISLAND	0	48 N	176	38 W	4.13
HUAHINE	16	45 S	151	00 W	1.80
HULL ISLAND	4	30 S	172	10 W	4.9
HUNARITE POINT	10	41 S	162	16 E	7.6
HUNGA HA'APAI	20	33 S	175	25 W	2.51
HUNTER ISLAND	22	24 S	172	06 E	5.2
HYANE HARBOR	2	03 S	147	26 E	9.76
HYENGEN	20	41 S	164	57 E	5.62

I

IETENDI ROCK	22	26 S	167	13 E	5.8
IFALIK ATOLL	7	15 N	144	27 E	10.32
IJIPTHAV	20	08 S	169	44 E	6.13
ILE AGAKAUITAI	23	09 S	135	02 W	1.28
ILE AMEDEE	22	29 S	166	28 E	5.19
ILE ART	19	42 S	163	39 E	5.71
ILE BAABA	20	03 S	163	59 E	5.46
ILE BALABIO	20	07 S	164	12 E	5.66
ILE BROSSE	22	43 S	167	28 E	5.7
ILE DE LA SURPRISE	18	31 S	163	01 E	5.69
ILE DES PINS	22	38 S	167	29 E	5.6
ILE DUDUNE	21	20 S	167	44 E	6.3
ILE FUTUNA	14	16 S	178	08 W	3.93
ILE GEOFFROY	22	00 S	166	07 E	5.26
ILE GIE	22	30 S	167	26 E	5.7
ILE HUGON	22	03 S	166	03 E	5.23
ILE HUNTER	22	24 S	172	06 E	5.2
ILE HUON	18	01 S	162	55 E	5.70
ILE ISIE	21	54 S	165	51 E	5.28
ILE LE LEIZOUR	18	20 S	162	58 E	5.69
ILE LE PREDOUR	21	59 S	166	00 E	5.27
ILE LELIOGAT	21	17 S	167	33 E	6.4
ILE LIFOU	20	55 S	167	15 E	6.4
ILE MARA	21	47 S	165	41 E	5.30
ILE MARE	21	30 S	168	00 E	6.3
ILE MARIA	21	50 S	154	42 W	1.104
ILE MATHIEU	22	05 S	166	06 E	5.20
ILE MATTHEW	22	21 S	171	21 E	5.3
ILE MONTRAVEL	22	23 S	166	51 E	5.11
ILE MORETIGA	22	32 S	167	26 E	5.7
ILE MOTU-ITU	16	16 S	151	50 W	1.95
ILE NDIE	22	31 S	167	14 E	5.8
ILE NDUNDURE	21	20 S	167	44 E	6.3
ILE NEBA	20	09 S	163	56 E	5.45
ILE NIENANE	19	49 S	163	41 E	5.71
ILE NUKUAETA	13	22 S	176	11 W	3.94
ILE OUEN	22	24 S	166	50 E	5.13
ILE OUVEA	20	33 S	166	34 E	6.6
ILE PAM	20	15 S	164	17 E	5.65
ILE POTT	19	34 S	163	36 E	5.72
ILE TI'A	19	59 S	163	56 E	5.46
ILE TIGA	21	06 S	167	48 E	6.4
ILE TUBUAI	23	22 S	149	26 W	1.102
ILE UERE	22	19 S	166	28 E	5.16
ILE VAUVILLIERS	21	08 S	167	35 E	6.4
ILE WALPOLE	22	37 S	168	57 E	5.4
ILE YANDE	20	03 S	163	49 E	5.46
ILEDE FREYCINET	22	14 S	166	24 E	5.21
ILES AUSTRALES	22	50 S	151	05 W	1.97
ILES DE HORNE	14	17 S	178	05 W	3.93
ILES DU DUC DE GLOUCESTER	20	37 S	143	17 W	1.40
ILES GAMBIER	23	10 S	134	57 W	1.26
ILES MAROTIRI	27	54 S	143	30 W	1.100
ILES TUBUAI	22	50 S	151	05 W	1.97
ILES WALLIS	13	18 S	176	10 W	3.94
ILOT DAOUGAE	20	04 S	164	02 E	5.66
ILOT DE NANSOUTY	17	34 S	149	17 W	1.72
ILOT DIDOT	21	23 S	165	01 E	5.33
ILOT DOUBLE	20	28 S	164	08 E	5.43
ILOT GATOPE	20	59 S	164	39 E	5.36
ILOT KINDE	21	36 S	166	20 E	5.50
ILOT KONIENE	21	09 S	164	49 E	5.34
ILOT KUNDOGI	21	48 N	165	42 E	5.30
ILOT MAITRE	22	20 S	166	25 E	5.19
ILOT MAMERE	21	45 S	166	30 E	5.50
ILOT MOUAC	20	13 S	164	01 E	5.44
ILOT NEN'DAHANDE	20	10 S	164	15 E	5.65
ILOT NENI	21	15 S	165	41 E	5.56
ILOT OUAO	20	43 S	165	08 E	5.61
ILOT PORC-EPIC	21	55 S	166	37 E	5.48
ILOT PORC-EPIC	22	20 S	166	34 E	5.16
ILOT POUDIOUE	20	17 S	164	30 E	5.64
ILOT SAINT IGNACE	21	02 S	165	25 E	5.58
ILOT SIANDE	21	40 S	165	27 E	5.31
ILOT TAABAM	20	13 S	164	13 E	5.66
ILOT TEREMBA	21	47 S	165	44 E	5.29
ILOT TI-A	19	59 S	163	56 E	5.72
ILOT TOVERU	21	16 S	165	40 E	5.55
ILOTS DE BASS	27	54 S	143	30 W	1.100
IMIEJI ANCHORAGE	6	00 N	169	40 E	4.65
IMMAHIE REEF	20	13 S	169	41 E	6.13
INANTHE SHOAL	5	56 N	145	27 E	10.32
INDISPENSABLE REEFS	12	36 S	160	20 E	7.2
INMAHIE REEF	20	13 S	169	41 E	6.13
INYEUG ISLET	20	08 S	169	44 E	6.12
IO ISLAND	10	23 S	161	23 E	7.10
IORO REEF	22	23 S	166	58 E	5.9
ISABELLA REEF	12	25 S	177	26 W	3.98
IWOSE ISLAND	16	57 S	168	35 E	6.28

J

JABOERUKKU ISLAND	12	15 N	170	08 E	4.60
JABOR	5	55 N	169	39 E	4.64
JABWELO ISLAND	12	15 N	170	08 E	4.60
JABWOT ISLAND	7	45 N	168	59 E	4.66
JACK	8	04 S	157	12 E	8.21
JALUIT ANCHORAGE	5	55 N	169	38 E	4.64
JALUIT ATOLL	6	05 N	169	37 E	4.64
JALUN ISLAND	1	32 S	145	03 E	9.80
JARVIS ISLAND	0	23 S	160	01 W	2.10
JEMO ISLAND	10	05 N	169	32 E	4.57
JOHANN ALBRECHT HARBOR	4	42 S	149	30 E	9.51
JOHNSTON ATOLL	16	45 N	169	31 W	4.2

K

KAKOLAN ISLET	4	54 S	152	23 E	9.59
KAMBA POINT	18	00 S	178	42 E	3.15
KAMBOTOROSCH HARBOR	4	49 S	152	53 E	9.17
KANATHEA ISLAND	17	16 S	179	10 W	3.80
KANDAVU ISLAND	19	00 S	178	15 E	3.3
KANTON	2	50 S	171	43 W	4.6
KAO	19	40 S	175	02 W	2.63
KAPINGAMARANGI ATOLL	1	04 N	154	45 E	10.12
KAPSU POINT	2	41 S	151	02 E	9.13
KATAFANGA	17	31 S	178	44 W	3.81
KATHERINE HARBOR	3	12 S	151	39 E	9.27
KATIU	16	25 S	144	21 W	1.48
KAUEHI	15	54 S	145	09 W	1.48
KAVALA BAY	18	58 S	178	25 E	3.7

	Position °	'	°	'	Sec. Para
KAVIENG HARBOR	2	35 S	150	48 E	9.35
KAWASAK PASSAGE	7	49 N	134	36 E	10.48
KAYANGEL ISLANDS	8	04 N	134	42 E	10.51
KECHAUTSU	9	21 N	169	55 E	4.55
KEITA	6	12 S	155	40 E	8.44
KELAUA HARBOR	2	06 S	147	16 E	9.69
KELEFESIA	20	31 S	174	44 W	2.51
KELLY REEF	17	27 S	177	34 E	3.32
KIA BAY	7	30 S	158	25 E	8.9
KIA ISLAND	16	14 S	179	06 E	3.59
KIE	22	23 S	167	04 E	5.8
KILI ISLAND	5	38 N	169	07 E	4.63
KILINAILAU ISLANDS	04	44 S	155	16 E	8.3
KIMBE	5	33 S	150	09 E	9.56
KIMBE ISLAND	5	12 S	150	22 E	9.54
KINADYENG ISLAND	6	06 N	169	38 E	4.64
KING BAY	4	24 S	152	42 E	9.18
KINGMAN REEF	6	25 N	162	26 W	2.4
KIOA ISLAND	16	39 S	179	55 E	3.67
KIRITIMATI ATOLL	1	52 N	157	22 W	2.8
KIUVA	18	03 S	178	41 E	3.16
KNOX ATOLL	5	55 N	172	09 E	4.49
KNOX ISLANDS	5	55 N	172	09 E	4.49
KOA BAY	8	38 S	160	39 E	7.22
KOBASANG HARBOR	7	21 N	134	27 E	10.51
KOJJOUJ	9	21 N	169	55 E	4.55
KOKOLANOHOL SOUND	9	04 S	159	14 E	7.54
KOKOPO ROADSTEAD	4	20 S	152	17 E	9.21
KOLOMBAGIA ISLAND	8	01 S	157	35 E	8.19
KOLOMBANGARA ISLAND	7	59 S	157	04 E	8.21
KOLOMBANGARA RIVER	6	58 S	156	43 E	8.15
KOMO ISLAND	17	41 S	178	37 W	3.85
KORIGOLE HARBOR	8	03 S	158	58 E	8.11
KORO	17	19 S	179	24 E	3.47
KORO LEVIE	16	46 S	179	59 W	3.71
KOROLEVU BAY	19	02 S	178	25 E	3.4
KOROMIRA POINT	6	22 S	155	49 E	8.43
KOROR	7	20 N	134	30 E	10.46
KOROR ROAD	7	16 N	134	29 E	10.47
KOSRAE ISLAND	5	20 N	163	00 E	10.3
KOSSOL PASSAGE	7	53 N	134	36 E	10.49
KOTABU ISLAND	3	05 N	172	45 E	4.42
KOTU ISLAND	19	57 S	174	48 W	2.58
KREIS REEF	3	26 S	147	47 E	9.68
KUATA ISLAND	17	22 S	177	09 E	3.27
KUMBULAU POINT	16	54 S	179	04 E	3.65
KUNIE	22	38 S	167	29 E	5.6
KUOP ATOLL	7	02 N	151	56 E	10.17
KURIA	0	13 N	173	24 E	4.36
KUTO PENINSULA	22	40 S	167	28 E	5.7
KUUP	3	14 N	172	57 E	4.43
KWAJALEIN	8	43 N	167	44 E	4.69
KWAJALEIN ATOLL	8	43 N	167	44 E	4.68

L

L'ORNE BANK	22	24 S	168	56 E	5.5
LABUR BAY	3	39 S	152	21 E	9.14
LACHAISE POINT	15	43 S	167	14 E	6.58
LADHI ISLAND	14	57 S	167	07 E	6.66
LADO ISLAND	9	50 N	169	19 E	4.56
LADY ELGIN BANK	6	18 N	149	28 E	10.26
LAE ATOLL	8	55 N	166	16 E	4.70
LAGEDIAK STRAIT	9	24 N	170	09 E	4.56
LAGHALE ISLAND	9	05 S	160	24 E	7.53
LAGON DE L'ILE HUON	18	05 S	162	50 E	5.70
LAGON DE LA SURPRISE	18	27 S	163	07 E	5.68
LAKEMBA ISLAND	18	13 S	178	48 W	3.82
LAKENA POINT	10	24 S	161	48 E	7.7
LAKERERE ANCHORAGE	15	01 S	168	07 E	6.41
LAKONA BAY	14	17 S	167	25 E	6.72
LALLA ROOKH SEAMOUNT	12	56 S	175	40 W	3.97
LAMBASA	16	26 S	179	23 E	3.62
LAMBOUBOU HARBOR	16	12 S	167	22 E	6.51
LAMOTREK ATOLL	7	30 N	146	20 E	10.30
LANGA LANGA HARBOR	8	52 S	160	46 E	7.20
LANGHOLON ISLAND	8	59 S	159	15 E	7.56
LAONE ANCHORAGE	15	24 S	167	46 E	6.43
LATAIVA ANCHORAGE	15	29 S	168	10 E	6.40
LATANGAI ISLAND	2	54 S	151	09 E	9.27
LATE ISLAND	18	48 S	174	39 W	2.68
LAUTOKA HARBOR	17	36 S	177	26 E	3.25
LEGACE ISLAND	9	05 S	160	24 E	7.53
LEKELEKA ISLET	20	04 S	174	37 W	2.57
LEKIN ANCHORAGE	20	40 S	166	29 E	6.10
LEKINE ANCHORAGE	20	40 S	166	29 E	6.10
LEKUMBI POINT	16	52 S	178	34 E	3.55
LELE HARBOR	5	20 N	163	02 E	10.5
LEMBRU CAY	16	33 S	167	41 E	6.48
LEMUA ISLAND	16	31 S	167	35 E	6.48
LENAKEL ANCHORAGE	19	33 S	169	16 E	6.14
LENGO CHANNEL	9	22 S	160	20 E	7.46
LESIATHEVA POINT	16	49 S	179	17 E	3.51
LEUEN ISLAND	7	45 N	168	14 E	4.67
LEVER HARBOR	8	01 S	157	35 E	8.19
LEVUKA	17	41 S	178	50 E	3.42
LIB ISLAND	8	19 N	167	24 E	4.67
LIFUKA ISLAND	19	48 S	174	21 W	2.61
LIHIR ISLAND	3	08 S	152	35 E	9.5
LIKIEP ISLAND	9	49 N	169	19 E	4.56
LIKURI HARBOR	18	03 S	177	17 E	3.21
LIMU ISLET	20	01 S	174	27 W	2.59
LINE ISLANDS	1	52 N	157	22 W	2.2
LIOT ISLAND	1	24 S	144	31 E	9.82
LITTLE MAKIN	3	23 N	172	58 E	4.43
LITUNDO POINT	7	31 S	158	26 E	8.9
LOFANGA ISLAND	19	50 S	174	33 W	2.65
LOG BAY	13	21 S	166	39 E	6.77
LOH ISLAND	13	22 S	166	38 E	6.77
LOJ ISLAND	9	09 N	169	57 E	4.54
LOLOBAU ISLAND	4	55 S	151	10 E	9.48
LOMBRUM	2	02 S	147	23 E	9.76
LOMLOM ISLAND	10	18 S	166	15 E	6.88
LONAKWARENGA BAY	13	16 S	166	36 E	6.78
LONDON	1	59 N	157	28 W	2.9
LONGAN ISLAND	1	13 S	144	18 E	9.82
LONGUAGUA ROAD	15	19 S	167	55 E	6.43
LOOKOUT REEF	16	57 S	178	48 W	3.76
LOPEVI ISLAND	16	31 S	168	21 E	6.35
LORD HOWE ISLAND	10	51 S	166	02 E	6.86
LORENGAU	2	01 S	147	17 E	9.76
LOSAP ATOLL	6	54 N	152	42 E	10.16
LOT HARBOR	6	48 N	158	19 E	10.7
LOTU HARBOR	7	59 S	156	57 E	8.23
LUAFITU	20	20 S	174	38 W	2.53
LUF ISLAND	1	32 S	145	04 E	9.80
LUGANVILLE	15	31 S	167	10 E	6.61
LUKUNOR ATOLL	5	30 N	153	49 E	10.14
LUMALIHA ISLAND	8	27 S	158	04 E	8.17
LUNGA POINT	9	24 S	160	02 E	7.36
LUNGGA POINT	9	24 S	160	02 E	7.36
LUSCHAN HARBOR	6	18 S	150	01 E	9.43
LYRA REEF	1	45 S	153	20 E	9.7

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MA REEF	22	26 S	166	51 E	5.13
MABO HARBOR	9	36 S	161	32 E	7.14
MADEHAS ISLAND	5	28 S	154	38 E	8.50
MAERO POINT	6	55 S	156	08 E	8.40
MAEWO ISLAND	15	10 S	168	10 E	6.41
MAHIGE ISLAND	8	31 S	159	55 E	8.4
MAHIGHE ISLAND	8	31 S	159	55 E	8.4
MAHUA POINT	10	28 S	162	05 E	7.7
MAIANA	1	00 N	173	01 E	4.38
MAIAO	17	39 S	150	38 W	1.79
MAJURO ATOLL	7	08 N	171	11 E	4.51
MAKATEA	15	50 S	148	15 W	1.57
MAKEMO	16	32 S	143	40 W	1.44
MAKIN ATOLL	3	05 N	172	50 E	4.42
MAKIRA HARBOR	10	26 S	161	27 E	7.9
MAKONGAI CHANNEL	17	27 S	178	55 E	3.46
MAKONGAI ISLAND	17	27 S	178	59 E	3.46
MAKULUVA ISLET LIGHT	18	11 S	178	31 E	3.16
MAKURA ISLAND	17	08 S	168	26 E	6.26
MAKUTI ISLAND	8	08 S	156	58 E	8.29
MALAKAL	7	20 N	134	28 E	10.45
MALAKAL HARBOR	7	20 N	134	28 E	10.50
MALAKAL PASS	7	16 N	134	28 E	10.47
MALAKE	17	19 S	178	09 E	3.34
MALAPA ISLAND	9	48 S	160	52 E	7.30
MALAU	16	21 S	179	22 E	3.61

	Position °	'	°	'	Sec. Para
MALDEN ISLAND	4	03 S	155	00 W	2.11
MALEKOULA ISLAND	16	15 S	167	30 E	6.45
MALI ISLAND	16	21 S	179	21 E	3.60
MALINGI POINT	16	49 S	168	16 E	6.31
MALO ISLAND	15	41 S	167	10 E	6.58
MALOELAP ATOLL	8	43 N	171	03 E	4.53
MALOLO ISLANDS	17	45 S	177	10 E	3.26
MAMBUALAU ISLET	17	58 S	178	47 E	3.40
MAMURAME BAY	15	38 S	168	07 E	6.40
MANA ISLAND	17	41 S	177	07 E	3.26
MANAWAI HARBOR	9	04 S	161	08 E	7.15
MANDOLEANA ISLAND	9	12 S	160	17 E	7.44
MANDOLIANA ISLAND	9	12 S	160	17 E	7.44
MANEVAI BAY	11	39 S	166	56 E	6.83
MANGAIA	21	55 S	157	55 W	2.41
MANGGO BAY	7	19 S	157	04 E	8.15
MANGO ISLAND	20	20 S	174	43 W	2.53
MANIHI	14	25 S	145	57 W	1.54
MANIHIKI ATOLL	10	23 S	161	01 W	2.17
MANILA REEF	6	59 N	149	02 E	10.25
MANINITA	18	51 S	174	00 W	2.68
MANONO	13	51 S	172	06 W	2.33
MANOORA SHOAL	10	46 S	165	49 E	6.85
MANRA ATOLL	4	27 S	171	15 W	4.8
MANSA REEF	16	18 S	167	43 E	6.56
MANU ISLAND	1	19 S	143	35 E	9.83
MANUA ISLANDS	14	13 S	169	33 W	2.22
MANUAE ATOLL	19	21 S	158	56 W	2.45
MANURO POINT	17	41 S	168	36 E	6.25
MAO ISLAND	17	28 S	168	30 E	6.23
MARAKEI	2	01 N	173	17 E	4.41
MARAMASIKE PASSAGE	9	16 S	161	16 E	7.14
MARAMBO ISLAND	18	59 S	178	50 W	3.86
MARAPA ISLAND	9	48 S	160	52 E	7.30
MARAU ISLAND	10	31 S	161	28 E	7.9
MARAU PEAK	9	51 S	160	47 E	7.29
MARAUNIBINA ISLAND	9	51 S	160	50 E	7.30
MARIA	22	01 S	136	11 W	1.31
MARINGE LAGOON	8	07 S	159	33 E	8.6
MAROKAU	18	05 S	142	20 W	1.26
MARON ISLAND	1	33 S	145	02 E	9.80
MARTELLI BAY	16	00 S	168	13 E	6.38
MARTIN POINT	8	24 S	159	50 E	8.5
MARUTEA SUD	21	30 S	135	30 W	1.31
MASEVONU ANCHORAGE	14	10 S	167	30 E	6.72
MASKELYNE ISLANDS	16	32 S	167	50 E	6.46
MATAABE	15	38 S	166	46 E	6.64
MATAFENUA	9	45 S	138	48 W	1.16
MATAIVA	14	53 S	148	40 W	1.56
MATANUKU ISLAND	19	10 S	178	06 E	3.5
MATAO TIUPENIU POINT	17	45 S	168	11 E	6.19
MATASO ISLAND	17	15 S	168	26 E	6.26
MATA-UTU	13	17 S	176	08 W	3.96
MATAUTU BAY	13	26 S	172	22 W	2.38
MATAUTU POINT	13	49 S	171	45 W	2.31
MATEIKA	8	36 S	179	07 E	4.20
MATEMA ISLET	10	17 S	166	11 E	6.89
MATHUATA-I-WAI	16	25 S	179	04 E	3.59
MATTHEW ISLAND	22	21 S	171	21 E	5.3
MATUKU ISLAND	19	09 S	179	45 E	3.91
MATUMBA BAY	9	10 S	160	22 E	7.44
MATUREIVAVO	21	29 S	136	24 W	1.32
MAUKE	20	09 S	157	23 W	2.44
MAUPITI	16	27 S	152	15 W	1.95
MAYO ROCK	18	55 S	178	26 E	3.10
MBA ROADS	17	25 S	177	41 E	3.32
MBALUMBALI ISLAND	8	24 S	157	32 E	8.32
MBAULAILAI	16	45 S	178	30 E	3.56
MBENGGA ISLAND	18	23 S	178	08 E	3.12
MBIKI ISLET	9	00 S	160	06 E	7.52
MBILONIYANGGONA	18	59 S	178	21 E	3.4
MBOE	7	05 S	156	48 E	8.15
MBOLI ISLAND	8	41 S	158	13 E	8.17
MBOROKUA ISLAND	9	01 S	158	45 E	7.57
MBUKE ISLAND	2	23 S	146	49 E	9.79
MBUNGANA ISLAND	9	11 S	160	12 E	7.47
MCKEAN ISLAND	3	36 S	174	08 W	4.11
MCLAUGHLIN BANK	9	05 N	148	05 E	10.28
MCNABB BAY	16	13 S	167	34 E	6.56
MEDREN ISLAND	11	24 N	162	22 E	4.77
MEDYERON ISLAND	10	11 N	165	55 E	4.72
MEETIA	17	52 S	148	04 W	1.58
MEHETIA	17	52 S	148	04 W	1.58
MEJIT ISLAND	10	17 N	170	53 E	4.58
MELE BAY	13	39 S	167	40 E	6.75
MELE BAY	17	44 S	168	15 E	6.17
MELI BAY	17	44 S	168	15 E	6.17
MELLU PASS	9	21 N	167	25 E	4.69
MERA LAVA ISLAND	14	25 S	168	02 E	6.72
MERESU COVE	8	02 S	156	58 E	8.23
MERIG ISLET	14	17 S	167	48 E	6.72
MERIR ISLAND	4	20 N	132	19 E	10.53
METALANIM HARBOR	6	52 N	158	21 E	10.8
METENSA BAY	17	41 S	168	33 E	6.24
METIS SHOAL	19	11 S	174	52 W	2.68
METOMA ISLAND	13	14 S	166	36 E	6.78
MEZETCHOKU PASSAGE	7	29 N	168	44 E	4.66
MIBILUA	7	55 S	156	41 E	8.25
MID REEF	9	00 S	160	07 E	7.52
MIDDLE ISLAND	13	16 S	166	37 E	6.78
MIDDLE REEF	12	38 S	160	23 E	7.2
MILI	6	05 N	171	44 E	4.48
MILI ATOLL	6	08 N	172	07 E	4.48
MILI BAY	13	39 S	167	40 E	6.75
MILU PASS	9	21 N	167	25 E	4.69
MINERVA REEFS	23	46 S	179	02 W	2.48
MINFANGA ISLAND	8	41 S	158	13 E	8.17
MINTO REEF	8	10 N	154	18 E	10.16
MIOKO HARBOR	4	13 S	152	27 E	9.15
MITIARO	19	50 S	157	41 W	2.44
MITRE ISLAND	11	55 S	170	12 E	6.81
MOALA ISLAND	18	35 S	179	53 E	3.88
MOAVI POINT	16	34 S	168	11 E	6.34
MOEN	7	26 N	151	50 E	10.19
MOGAMI BANK	8	30 N	148	45 E	10.26
MOHOTANI	9	09 S	138	50 W	1.21
MOKIL ATOLL	6	40 N	159	47 E	10.6
MONT AORAI	17	36 S	149	29 W	1.62
MONT BOUCHARD	25	31 S	150	30 W	1.102
MONT DORE	22	16 S	166	35 E	5.16
MONT KAALA	20	37 S	164	23 E	5.38
MONT KATEPAHIC	20	56 S	164	42 E	5.36
MONT KOUI	22	08 S	166	18 E	5.22
MONT MONE	22	10 S	166	31 E	5.18
MONT MOU	22	04 S	166	21 E	5.20
MONT OTEMANU	16	30 S	151	44 W	1.92
MONT TIEBAGHI	20	28 S	164	13 E	5.39
MONTE MOKOTO	23	07 S	134	59 W	1.29
MOON REEF	17	32 S	178	32 E	3.38
MOOREA	17	32 S	149	50 W	1.74
MOPELIA	16	49 S	153	57 W	1.95
MORANE	23	09 S	137	07 W	1.31
MORTLOCK ISLANDS	4	49 S	157	03 E	8.3
MORTLOCK ISLANDS	5	25 N	153	40 E	10.13
MORTON BANK	11	44 S	176	18 E	6.81
MOSES REEF	22	47 S	151	13 W	1.103
MOSO ISLAND	17	32 S	168	16 E	6.20
MOTA ISLAND	13	49 S	167	42 E	6.75
MOTANE	9	09 S	138	50 W	1.21
MOTHE ISLAND	18	39 S	178	31 W	3.85
MOTU AAU	17	29 S	149	28 W	1.74
MOTU ITI	8	41 S	140	37 W	1.11
MOTU MOKOE	9	22 S	140	01 W	1.14
MOTU OA	9	29 S	140	03 W	1.14
MOTU ONE	7	52 S	140	23 W	1.3
MOTU TAKAHE	9	28 S	140	04 W	1.14
MOTUA LAILAI	16	43 S	179	34 W	3.74
MOTUPENA POINT	6	31 S	155	09 E	8.56
MOTURIKI ISLAND	17	45 S	178	45 E	3.39
MOTUTUNGA	17	07 S	144	22 W	1.45
MOUILLAGE D'AMERE	22	26 S	167	09 E	5.8
MOUILLAGE DE NDIE	22	15 N	166	24 E	5.21
MOULY ISLAND	20	42 S	166	25 E	6.7
MOUNT CHALLENGER	18	59 S	178	21 E	3.4
MOUNT D'OR	22	16 S	166	35 E	5.16
MOUNT MARESCOT	8	13 S	159	34 E	8.4
MOUNT SEARS	7	28 S	158	16 E	8.10
MOUNT VANGUNU	8	41 S	158	00 E	8.17
MOUNT WASHINGTON	19	07 S	177	59 E	3.3
MOUNVET POINT	16	25 S	167	24 E	6.50
MUANAKUASI POINT	16	42 S	177	34 E	3.30
MUDOK HARBOR	6	47 N	158	17 E	10.7
MUI HOPOHOPONGA	21	09 S	175	02 W	2.49
MULI ISLAND	20	42 S	166	25 E	6.7

	Position °	'	°	'	Sec. Para
MUMU ISLET	3	26 S	152	16 E	9.12
MUNDA HARBOR	8	20 S	157	13 E	8.32
MUNDI MUNDI	7	39 S	156	30 E	8.25
MURUROA	21	50 S	138	55 W	1.34
MURURURA	21	50 S	138	55 W	1.34
MUSSAU ISLAND	1	30 S	149	46 E	9.33
N					
N ENTRANCE	7	28 S	158	25 E	8.9
N ENTRANCE	8	11 S	157	12 E	8.21
N ENTRANCE	9	16 S	161	16 E	7.14
NA FINUA ISLAND	10	49 S	162	18 E	7.6
NA WAKIO ISLET	10	50 S	162	23 E	7.6
NABUTO BAY	3	38 S	152	27 E	9.12
NAFINUA ISLAND	10	49 S	162	18 E	7.6
NAGHORA POINT	10	50 S	162	23 E	7.6
NAIKOROKORO POINT	17	38 S	177	23 E	3.24
NAINGANI	17	35 S	178	42 E	3.39
NAIRAI	17	48 S	179	26 E	3.44
NAITAMBA ISLAND	17	01 S	179	17 W	3.75
NAITHOMBOTHOMBO POINT	16	50 S	178	30 E	3.56
NAITONITONI ANCHORAGE	18	14 S	178	11 E	3.18
NAKAMA	16	46 S	179	20 E	3.52
NAKAZA ISLAND	7	53 S	156	30 E	8.27
NAKETY	21	31 S	166	05 E	5.52
NALIGNAGO ISLET	8	25 S	159	55 E	8.5
NAMALATA ISLAND	17	20 S	178	58 W	3.79
NAMBUKELEVU	19	07 S	177	59 E	3.3
NAMENA BARRIER REEF	17	05 S	179	03 E	3.53
NAMOLUK ATOLL	5	55 N	153	08 E	10.14
NAMONUITO ATOLL	8	40 N	150	00 E	10.21
NAMORIK ATOLL	5	35 N	168	07 E	4.63
NAMU ATOLL	7	58 N	168	08 E	4.67
NAMU ISLAND	8	12 N	167	58 E	4.67
NAMUKA PASSAGE	18	10 S	178	20 E	3.17
NANANU-I-RA	17	17 S	178	13 E	3.35
NANDI BAY	16	58 S	178	48 E	3.54
NANDI WATERS	17	41 S	177	15 E	3.23
NANGANO ISLAND	16	24 S	179	10 E	3.60
NANIKIRATA ISLAND	1	54 N	172	47 E	4.40
NANUKU ISLAND	18	20 S	178	09 E	3.14
NANUKU LEVU	16	43 S	179	28 W	3.69
NANUMANGA	6	18 S	176	21 E	4.25
NANUMEA	5	39 S	176	08 E	4.26
NAPUKA	14	08 S	141	12 W	1.26
NARAGE ISLAND	4	33 S	149	07 E	9.51
NARES HARBOR	1	57 S	146	39 E	9.73
NAROVOROVO ANCHORAGE	15	12 S	168	09 E	6.41
NARROW PASS	9	47 N	160	56 E	4.78
NASSAU ISLAND	11	31 S	165	25 W	2.19
NATHILAN POINT	17	30 S	177	31 E	3.31
NATHILAU POINT	17	22 S	178	01 E	3.32
NATHULA ISLAND	16	53 S	177	25 E	3.29
NATHULA POINT	16	26 S	179	07 E	3.60
NAUNA ISLAND	2	12 S	148	12 E	9.77
NAUNHA PASSAGES	11	35 S	166	54 E	6.83
NAUNONGA PASSAGES	11	35 S	166	54 E	6.83
NAURU	0	32 S	166	55 E	4.45
NAUTILUS SHOAL	1	34 S	174	55 E	4.33
NAVANDRA ISLAND	17	27 S	177	04 E	3.26
NAVATU	18	39 S	179	33 W	3.90
NAVITI ISLAND	17	07 S	177	15 E	3.29
NAVULA POINT	17	53 S	177	16 E	3.21
NAYAU ISLAND	17	58 S	179	03 W	3.82
NDAI ISLAND	7	54 S	160	37 E	7.17
NDENDE ISLAND	10	46 S	165	57 E	6.85
NDENDO ISLAND	10	46 S	165	57 E	6.85
NDOVELE COVE	7	35 S	156	38 E	8.25
NDRUA NDRUA	16	12 S	179	37 E	3.63
NDUI NDUI ANCHORAGE	15	23 S	167	43 E	6.43
NEGONEGO	18	45 S	141	49 W	1.40
NEIAFU	18	39 S	173	59 W	2.72
NEILSON REEF	27	00 S	146	00 W	1.100
NEMA ISLAND	7	00 N	152	35 E	10.17
NEW COMMERCIAL DOCK	7	06 N	171	13 E	4.51
NEW GEORGIA	8	20 S	157	30 E	8.16
NEW GEORGIA ISLAND	8	20 S	157	30 E	8.16
NGA PEAK	22	39 S	167	30 E	5.6
NGALIGNAGHO ISLAND	8	25 S	159	55 E	8.5

	Position °	'	°	'	Sec. Para
NGANA POINT	17	27 S	177	37 E	3.31
NGARALEVU POINT	19	04 S	178	19 E	3.5
NGARUANGL REEF	8	10 N	134	38 E	10.51
NGATIK ATOLL	5	49 N	157	16 E	10.10
NGAU	18	00 S	179	20 E	3.43
NGEAUR	6	54 N	134	08 E	10.41
NGEUSEU MBEUIT POINT	13	56 S	167	27 E	6.73
NGGAMEA	16	45 S	179	45 W	3.74
NGGARALASE POINT	17	27 S	178	20 E	3.37
NGGASIMBALE ISLAND	18	48 S	178	29 E	3.9
NGGATOKAE	8	47 S	158	11 E	8.16
NGGELELEVU	16	05 S	179	10 W	3.69
NGGILANGGILA	17	10 S	179	03 W	3.80
NGOUSOUBOOT POINT	13	56 S	167	27 E	6.73
NGULU ATOLL	8	25 N	137	30 E	10.39
NGWALA ROCK	15	27 S	167	40 E	6.44
NIALAHAU	9	44 S	161	34 E	7.13
NIAU	16	09 S	146	22 W	1.50
NIBANGA ISLAND	10	21 S	166	17 E	6.88
NIBWUNG	9	32 N	169	58 E	4.55
NIHIRU	16	43 S	142	55 W	1.42
NIIBUNKA	9	32 N	169	58 E	4.55
NIKUMARORO ATOLL	4	40 S	174	31 W	4.10
NIKUNAU	1	23 S	176	26 E	4.32
NIMBE BAY	11	42 S	166	56 E	6.83
NINGUT RIVER	17	49 S	168	28 E	6.25
NINIVA	19	46 S	174	38 W	2.64
NIU AUNOFO	21	04 S	175	20 W	2.49
NIUA FO'OU	15	36 S	175	38 W	2.74
NIUATOPUTAPU	15	57 S	173	45 W	2.74
NIUE ISLAND	19	02 S	169	52 W	2.75
NIULAKITA ISLAND	10	47 S	17928	E 4.17	
NIUTAO	6	06 S	177	16 E	4.24
NOGOGU	14	55 S	166	34 E	6.64
NOGOUGOU	14	55 S	166	34 E	6.64
NOKU PASSAGE	22	28 S	166	46 E	5.13
NOMOI ISLANDS	5	25 N	153	40 E	10.13
NOMUKA ISLAND	20	15 S	174	48 W	2.52
NONO LAGOON	8	43 S	157	52 E	8.37
NONOUTI	0	40 S	174	21 E	4.34
NORSUP BAY	16	02 S	167	24 E	6.53
NORTH ASTROLABE REEF	18	39 S	178	32 E	3.10
NORTH CAPE	2	33 S	150	49 E	9.28
NORTH ISLAND	13	09 S	166	35 E	6.79
NORTH MINERVA REEF	23	38 S	178	55 W	2.48
NORTH PASS	7	41 N	151	48 E	10.18
NORTH POINT	16	06 S	168	09 E	6.37
NORTH REEF	12	19 S	160	07 E	7.2
NORTHEAST PASS	7	30 N	151	59 E	10.18
NORTHERN PASSAGE	22	30 S	166	26 E	5.18
NORTHERN PASSAGE	7	14 S	157	50 E	8.10
NOUMEA	22	17 S	166	26 E	5.21
NUDHA ISLAND	9	31 S	160	48 E	7.27
NUGHU POINT	9	22 S	159	35 E	7.38
NUGURIA ISLANDS	3	12 S	154	30 E	9.3
NUHU POINT	9	22 S	159	35 E	7.38
NUI ATOLL	7	13 S	177	10 E	4.24
NUKAPU ISLET	10	07 S	165	57 E	6.89
NUKU HIVA	8	52 S	140	08 W	1.5
NUKU SONGE	19	13 S	178	21 W	3.87
NUKU'ALOFA	21	08 S	175	12 W	2.50
NUKUFAIAU	20	18 S	174	42 W	2.53
NUKUFETAU ATOLL	8	00 S	178	20 E	4.22
NUKULAELAE	9	22 S	179	51 E	4.18
NUKULAILAI	9	22 S	179	51 E	4.18
NUKUMALOLO	18	38 S	173	55 W	2.71
NUKUMANU ISLANDS	4	33 S	159	30 E	8.2
NUKUMBASANGA ISLAND	16	18 S	179	16 W	3.70
NUKUNIMANU	17	30 S	177	30 E	3.31
NUKUNONO ATOLL	9	11 S	171	52 W	4.15
NUKUNONU ATOLL	9	11 S	171	52 W	4.15
NUKUORO ATOLL	3	50 N	155	00 E	10.11
NUKUSEMANU REEFS	16	17 S	179	31 W	3.69
NUKUTULA	20	15 S	174	41 W	2.53
NUMA NUMA HARBOR	5	52 S	155	14 E	8.47
NUMATONG	0	36 S	174	13 E	4.34
NUPANI ISLAND	10	04 S	165	44 E	6.89
NURA ISLAND	9	31 S	160	48 E	7.27
NUU	13	48 S	171	39 W	2.31
NUUTELE	14	02 S	171	22 W	2.33
NW BANK	8	57 S	158	04 W	2.15

	Position °	'	°	'	Sec. Para
O					
O'UA ISLAND	20	02 S	174	41 W	2.57
OANDRAU ISLAND	16	34 S	178	47 E	3.58
OATAHUNA PASSE	22	38 S	152	47 W	1.104
OATARA	16	51 S	151	19 W	1.89
OBA ISLAND	15	23 S	167	50 E	6.42
OCA POINT	13	30 N	144	46 E	10.61
OCEAN ISLAND	0	53 S	169	32 E	4.43
OENO ATOLL	23	56 S	130	44 W	1.25
OFOLANGA ISLAND	19	36 S	174	27 W	2.65
OFU ISLAND	14	11 S	169	39 W	2.23
OKAT HARBOR	5	21 N	162	57 E	10.4
OLIMARAO ATOLL	7	41 N	145	52 E	10.31
OLOMBURI BAY	8	58 S	161	04 E	7.15
OLOSEGA ISLAND	14	11 S	169	37 W	2.23
OMOKA	9	01 S	158	04 W	2.16
ONEATA ISLAND	18	27 S	178	29 W	3.84
ONI-I-LAU	20	41 S	178	47 W	3.88
ONO CHANNEL	18	57 S	178	28 E	3.10
ONO ISLAND	18	54 S	178	29 E	3.9
ONOTOA	1	51 S	175	35 E	4.30
ONTONG JAVA ISLANDS	5	33 S	159	44 E	8.2
ORIATILIPU BANK	8	10 N	147	15 E	10.28
OROLUK LAGOON	7	30 N	155	15 E	10.15
ORONA ATOLL	4	30 S	172	10 W	4.9
OROTE POINT	13	27 N	144	37 E	10.59
OTEARIKI	3	10 N	172	42 E	4.42
OTUA ISLAND	6	27 S	155	58 E	8.43
OUERE	22	19 S	166	28 E	5.16
OUPE	22	33 S	167	31 E	5.7
OVAKA	18	45 S	174	06 W	2.69
OVALAU	17	41 S	178	49 E	3.41
OVALE ISLAND	13	14 S	166	36 E	6.78
OVAU	6	48 S	156	01 E	8.40
OVEA ATOLL	20	33 S	166	25 E	6.6
P					
PAAMA ISLAND	16	28 S	168	14 E	6.35
PAGO PAGO HARBOR	14	17 S	170	40 W	2.26
PAILA POINT	9	32 S	159	35 E	7.39
PAILONGGE POINT	8	06 S	156	48 E	8.29
PAILONGO POINT	8	06 S	156	48 E	8.29
PAKERA POINT	10	24 S	161	48 E	7.7
PAKIN ATOLL	7	04 N	157	49 E	10.10
PALAO BAY	17	32 S	168	22 E	6.22
PALIAI ISLAND	2	27 S	147	25 E	9.78
PALIKULO BAY	15	29 S	167	14 E	6.70
PALLU PASSAGE	11	43 S	166	49 E	6.84
PALMERSTON ATOLL	18	04 S	163	10 W	2.46
PALMYRA ATOLL	5	53 N	162	05 W	2.3
PALMYRA ISLAND	5	53 N	162	05 W	2.3
PANDORA BANK	12	11 S	172	05 E	6.81
PANGA BAY	8	43 S	157	52 E	8.37
PANGAI	19	48 S	174	21 W	2.63
PANGKUMU BAY	16	16 S	167	39 E	6.56
PAOPAO BAY	17	29 S	149	49 W	1.76
PAPA ISLAND	9	53 S	167	07 E	6.90
PAPETOAI	17	29 S	149	51 W	1.77
PAPIALOU ISLANDS	2	44 S	147	21 E	9.79
PARAGHAWA STRAIT	10	52 S	162	27 E	7.4
PARAOA	19	08 S	140	41 W	1.39
PARRY ISLAND	11	24 N	162	22 E	4.77
PASCO REEF	13	06 S	174	35 W	3.97
PASCOE PASSAGE	7	39 S	158	17 E	8.10
PASSE AIFA	17	47 S	149	25 W	1.65
PASSE CENTRALE	20	50 S	165	23 E	5.60
PASSE CENTRALE	22	31 S	166	26 E	5.18
PASSE D' YANDE	20	05 S	163	46 E	5.46
PASSE D'AIURUA	17	49 S	149	07 W	1.69
PASSE D'ONOHEA	17	31 S	149	21 W	1.73
PASSE DE CANALA	21	18 S	165	57 E	5.52
PASSE DE DUMBEA	22	22 S	166	15 E	5.20
PASSE DE HIENGHENE	20	36 S	164	59 E	5.62
PASSE DE KUARE	22	47 S	166	45 E	5.17
PASSE DE L'OUEST	23	06 S	135	03 W	1.28
PASSE DE LA BOUDEUSE	17	36 S	149	17 W	1.72
PASSE DE LA GAZELLE	20	23 S	163	57 E	5.42
PASSE DE OUAIEME	20	36 S	164	54 E	5.62
PASSE DE POUEMBOUT	21	14 S	164	45 E	5.34
PASSE DE POUM	20	15 S	163	53 E	5.44
PASSE DE PUAIL	20	35 S	164	51 E	5.62
PASSE DE SAINT VINCENT	22	02 S	165	58 E	5.26
PASSE DE TOEMO	22	21 S	167	01 E	5.10
PASSE DE UITOE	22	10 S	166	06 E	5.20
PASSE DU CAP BAYE	20	58 S	165	32 E	5.59
PASSE DU DUROC	21	00 S	164	37 E	5.35
PASSE DU NORD	22	30 S	166	26 E	5.18
PASSE DU SUD	22	32 S	166	26 E	5.18
PASSE EST DE HOUAILOU	21	11 S	165	49 E	5.56
PASSE HONIKULU	13	23 S	176	11 W	3.95
PASSE IRIRU	16	47 S	151	22 W	1.89
PASSE MAHANATOA	23	50 S	147	40 W	1.101
PASSE MATAUVAU	17	34 S	149	52 W	1.78
PASSE NAO NAO	16	55 S	151	24 W	1.89
PASSE NOKOUE	22	28 S	166	46 E	5.13
PASSE NORD-OUEST DU SOLITAIRE	21	47 S	166	38 E	5.49
PASSE ONGOMBUA	19	20 S	163	46 E	5.67
PASSE OUEST DE HOUAILOU	21	09 S	165	40 E	5.56
PASSE PAIPAI	16	40 S	151	31 W	1.91
PASSE PAVEE	21	47 S	166	36 E	5.49
PASSE PUNAEROA	16	54 S	151	28 W	1.89
PASSE RAUTOANUI	16	46 S	151	30 W	1.88
PASSE TAPUAERAHA	17	47 S	149	18 W	1.66
PASSE TEAVANUI	16	30 S	151	47 W	1.93
PASSE TEAVAPITI	16	45 S	151	25 W	1.85
PASSE TETUATIARE	16	50 S	151	29 W	1.88
PASSE THIO	21	32 S	166	19 E	5.51
PASSE TIANO	16	50 S	151	29 W	1.88
PASSE TOAHOTU	16	39 S	151	24 W	1.90
PASSE TOAMARO	16	51 S	151	29 W	1.89
PASSE VAIARE	17	31 S	149	46 W	1.78
PASSES DU COETLOGON	20	43 S	164	14 E	5.38
PATTESON PASSAGE	15	25 S	168	09 E	6.41
PATTESON SHOAL	9	51 S	166	07 E	6.88
PATURE POINT	8	11 S	157	01 E	8.31
PAUT POINT	13	56 S	167	27 E	6.73
PEARL ROCK	18	20 S	178	05 E	3.14
PELE ISLAND	17	29 S	168	25 E	6.23
PELELIU	7	00 N	134	15 E	10.42
PELORUS REEF	22	51 S	176	26 W	2.48
PENRHYN ATOLL	9	00 S	158	00 W	2.15
PENTECOST ISLAND	15	45 S	168	12 E	6.38
PEOU	11	41 S	166	50 E	6.82
PERIGOT	9	46 S	138	52 W	1.17
PETER HAVEN	4	40 S	149	33 E	9.51
PETITS BANCS	22	26 S	166	26 E	5.19
PETRIE REEF	18	30 S	164	20 E	5.70
PHOENIX ISLAND	3	43 S	170	43 W	4.4
PIAANU PASS	7	20 N	151	26 E	10.18
PIC NGA	22	39 S	167	30 E	5.6
PIEDU ISLANDS	6	51 S	156	09 E	8.40
PIGEN PASS	11	10 N	166	45 E	4.74
PIKELOT ISLAND	8	05 N	147	38 E	10.28
PILIER POINT	13	27 S	166	41 E	6.77
PILOT POINT	13	15 S	166	36 E	6.78
PINAKI	19	24 S	138	40 W	1.35
PINDER REEFS	17	36 S	177	25 E	3.24
PINE ISLAND	20	27 S	166	28 E	6.7
PINGELAP ATOLL	6	13 N	160	42 E	10.6
PINS ISLAND	20	27 S	166	28 E	6.7
PIO ISLAND	10	10 S	161	41 E	7.11
PIPISALA BAY	9	00 S	159	08 E	7.57
PIRUMERI ISLAND	7	08 S	155	53 E	8.39
PITCAIRN ISLAND	25	04 S	130	05 W	1.25
PITON TSIBA	20	48 S	164	29 E	5.36
PLANET HARBOR	4	38 S	149	20 E	9.51
PLATEAU DE FREYCINET	20	17 S	164	30 E	5.64
PLUMER POINT	9	09 S	160	14 E	7.47
POE	7	05 S	156	48 E	8.15
POHNPEI	6	55 N	158	15 E	10.6
POHNPEI HARBOR	6	59 N	158	12 E	10.9
POINT	14	01 S	171	23 W	2.29
POINT DU ROI TAMATOA	16	44 S	151	27 W	1.87
POINT MAIR	9	46 S	160	48 E	7.32
POINT REEF	16	50 S	179	16 E	3.50
POINT TERUAHU	22	38 S	152	47 W	1.104
POINTE ARITI	17	31 S	149	33 W	1.61
POINTE BOVIS	22	14 S	166	21 E	5.23
POINTE CHICKAKOFF	8	58 S	140	10 W	1.6
POINTE DES PINS	22	23 S	166	50 E	5.15
POINTE FAAUPO	17	29 S	149	45 W	1.76

	Position °	'	°	'	Sec. Para
POINTE FARE UTE	17	32 S	149	34 W	1.62
POINTE FAREARA	17	52 S	149	09 W	1.67
POINTE GANOA	23	08 S	135	00 W	1.29
POINTE HINAHAAPAPA	8	49 S	140	13 W	1.8
POINTE KAREMBE	20	38 S	164	20 E	5.39
POINTE KEREMB	20	38 S	164	19 E	5.39
POINTE KIUKIU	9	47 S	139	10 W	1.18
POINTE KIUTIU	9	47 S	139	10 W	1.18
POINTE MARAA	17	44 S	149	34 W	1.64
POINTE MAUTAU	9	42 S	138	59 W	1.18
POINTE MIRIMIRI	16	46 S	151	29 W	1.87
POINTE NOKOUE	22	28 S	166	47 E	5.13
POINTE NUUPERE	17	35 S	149	48 W	1.78
POINTE PANDOP	20	35 S	164	17 E	5.39
POINTE PARAO	17	35 S	149	49 W	1.77
POINTE PUNAAUIA	17	38 S	149	37 W	1.63
POINTE PUNAAVIA	17	38 S	149	37 W	1.63
POINTE PUNAHUKUA	9	23 S	140	08 W	1.15
POINTE TAHOATA	16	55 S	151	26 W	1.88
POINTE TAUTIRA	17	44 S	149	09 W	1.69
POINTE TEAEHOA	9	51 S	139	01 W	1.18
POINTE TEHAU	17	29 S	149	54 W	1.77
POINTE TEHO TE PAPA	8	57 S	139	29 W	1.12
POINTE TEKEHO	8	57 S	139	35 W	1.13
POINTE TEONEKURA	23	08 S	134	58 W	1.29
POINTE TIITAU	17	44 S	149	14 W	1.69
POINTE TOAMARO	16	41 S	151	28 W	1.90
POINTE VENUS	17	29 S	149	29 W	1.60
POLA ISLAND	14	14 S	170	40 W	2.28
POLOA BAY	14	19 S	170	50 W	2.28
PONDO HARBOR	4	34 S	151	39 E	9.61
PORT ADAM	9	32 S	161	33 E	7.14
PORT ALLARDYCE	7	41 S	158	39 E	8.11
PORT BAMBARI	8	04 S	157	12 E	8.21
PORT BOISE	22	21 S	166	16 E	5.21
PORT BOUQUET	21	41 S	166	21 E	5.50
PORT DE MOUEO	21	20 S	164	59 E	5.33
PORT DE PAPEETE	17	32 S	149	35 W	1.62
PORT DE PUEU	17	43 S	149	13 W	1.70
PORT DE UITOE	22	06 S	166	09 E	5.23
PORT DU BEAUMANOIR	17	51 S	149	13 W	1.68
PORT HAVANNAH	17	34 S	168	16 E	6.21
PORT HENRY	20	25 S	164	38 E	5.63
PORT HIENGHENE	20	41 S	164	57 E	5.62
PORT KOUTOURE	22	28 S	166	48 E	5.13
PORT LAUTOUR	15	37 S	167	10 E	6.59
PORT LOTTIN	5	17 N	162	58 E	10.4
PORT MARY	10	50 S	162	27 E	7.5
PORT NAREVIN	18	45 S	169	12 E	6.16
PORT NGEA	22	18 S	166	28 E	5.16
PORT NORO	8	13 S	157	11 E	8.22
PORT NUKULAU	18	10 S	178	31 E	3.16
PORT OLRY	15	02 S	167	04 E	6.66
PORT OUNIA	22	02 S	166	51 E	5.47
PORT PATTESON	13	50 S	167	33 E	6.74
PORT PHAETON	17	43 S	149	19 W	1.66
PORT POUEBO	20	22 S	164	35 E	5.64
PORT RAVALLAC	16	31 S	167	35 E	6.49
PORT RENDOVA	8	24 S	157	20 E	8.34
PORT RESOLUTION	19	31 S	169	27 E	6.14
PORT RIKITEA	23	07 S	134	58 W	1.30
PORT SANDWICH	16	26 S	167	47 E	6.57
PORT SIMBO	8	17 S	156	32 E	8.28
PORT STANLEY	16	04 S	167	25 E	6.54
PORT VAIRAO	17	48 S	149	17 W	1.67
PORT VATO	16	19 S	168	02 E	6.36
PORT VILA	17	44 S	168	19 E	6.18
PORT VIRU	8	30 S	157	44 E	8.36
PORT YATE	22	09 S	167	03 E	5.47
PORTLAND REEF	23	40 S	134	20 W	1.30
POUHEVA LIGHT	16	37 S	143	34 W	1.44
PRESIDENT THIERS BANK	24	40 S	145	55 W	1.102
PRESIDENT THIERS SEAMOUNT	24	40 S	145	55 W	1.102
PRESQU ILE GUILLAIN	20	59 S	164	40 E	5.35
PRESQU'ILE BEAUPRE	21	57 S	166	05 E	5.26
PRESQU'ILE DE POUM	20	17 S	164	03 E	5.43
PRICE PATCHES	17	33 S	178	35 E	3.39
PRONY	22	20 S	166	49 E	5.12
PRONY BAY	22	22 S	166	52 E	5.11
PSEUKEL BAY	15	59 S	167	11 E	6.51
PUKAPUKA	14	48 S	138	50 W	1.41
PULA IWA REEF	17	03 S	168	16 E	6.26
PULAP ATOLL	7	36 N	149	25 E	10.23
PULO ANNA	4	40 N	131	58 E	10.53
PULUSUK	6	42 N	149	18 E	10.25
PULUWAT ATOLL	7	21 N	149	11 E	10.24
PUNAAVIA	17	38 S	149	37 W	1.63
PWELUM POINT	14	55 S	166	33 E	6.64
PYRAMIDE DE LA PINDIE	20	44 S	165	03 E	5.61
Q					
QUEEN CAROLA HARBOR	5	10 S	154	33 E	8.52
R					
RABAUL	4	12 S	152	11 E	9.25
RADE DE THIO	21	36 S	166	14 E	5.51
RAIATEA	16	50 S	151	24 W	1.84, 1.85
RAIVAVAE	23	50 S	147	40 W	1.101
RAKAHANGA ATOLL	10	00 S	161	06 W	2.17
RAMBI	16	30 S	179	58 W	3.66
RAMOS ISLAND	8	15 S	160	11 E	7.25
RANGIROA	15	08 S	147	35 W	1.55
RANO ISLAND	15	59 S	167	23 E	6.53
RANON ANCHORAGE	16	08 S	168	07 E	6.37
RANONGGA	8	11 S	156	35 E	8.27
RAPA	27	36 S	144	20 W	1.98
RARAKA	16	10 S	144	54 W	1.48
RAROIA	16	05 S	142	25 W	1.43
RAROTONGA	21	14 S	159	46 W	2.42
RAUHI ISLAND	9	52 S	160	53 E	7.30
RAVAHERE	18	15 S	142	10 W	1.41
RAVENGA ISLAND	13	46 S	167	33 E	6.74
RAVIRAVI PASSAGE	16	19 S	178	56 E	3.60
RAVIRAVI POINT	16	28 S	178	57 E	3.59
REAO	18	31 S	136	23 W	1.37
RECIF BERTERO	22	02 S	133	28 W	1.30
RECIF DE L'ARCHE D'ALLIANCE	19	52 S	163	51 E	5.46
RECIF DE L'OBSERVATOIRE	21	21 S	164	58 E	5.33
RECIF DE LA MINERVE	22	40 S	133	30 W	1.30
RECIF DES FRANCAIS	19	39 S	163	22 E	5.71
RECIF DU SOLITAIRE	21	48 S	166	38 E	5.49
RECIF IORO	22	23 S	166	58 E	5.9
RECIF KOMEKAME	22	21 S	167	04 E	5.8
RECIF LELEIZOUR	20	32 S	164	12 E	5.39
RECIF MA	22	26 S	166	51 E	5.13
RECIF NIAGI	22	30 S	166	48 E	5.13
RECIF NOKANHOUI	22	45 S	167	36 E	5.6
RECIF PARATAHI	17	40 S	149	17 W	1.71
RECIF PELOTAS	18	38 S	163	12 E	5.68
RECIF SENEZ	22	18 S	166	20 E	5.20
RECIF TIARE	22	28 S	167	23 E	5.7
RECIF TOOMBO	22	33 S	166	27 E	5.18
RECIFS D'ENTRECASTEAUX	18	15 S	163	05 E	5.68
RECIFS SNARK	22	26 S	166	25 E	5.19
RED CLIFFS	13	45 S	167	24 E	6.74
REDMAN ISLAND	6	43 S	156	24 E	8.41
REEF ISLANDS	10	15 S	166	06 E	6.88
REEF ISLETS	13	36 S	167	32 E	6.76
REEF POINT	17	34 S	168	15 E	6.21
REGUIN BAY	15	16 S	167	09 E	6.67
REITORU	17	50 S	143	06 W	1.42
REMARKABLE POINT	15	23 S	166	39 E	6.64
RENARD SOUND	9	04 S	159	14 E	7.54
RENDOVA ISLAND	8	32 S	157	18 E	8.33
RENE REEF	16	44 N	179	00 E	4.3
RENNELL ISLAND	11	40 S	160	18 E	7.2
RENTAPAD RIVER	17	49 S	168	28 E	6.25
REPUBLIC OF PALAU	7	30 N	134	35 E	10.1
REVOLIEU BAY	16	43 S	168	09 E	6.32
RIBONA ISLAND	1	58 N	172	52 E	4.40
RICE ANCHORAGE	8	08 S	157	19 E	8.20
RIMATARA	22	38 S	152	47 W	1.104
RINGDOVE ANCHORAGE	12	16 S	168	48 E	6.80
RINGDOVE BAY	16	38 S	168	09 E	6.33
RINGGI COVE	8	07 S	157	07 E	8.24
RINGGOLD ISLES	16	10 S	179	30 W	3.68
RIONAL REEF	17	16 N	177	16 E	4.3
RITTER ISLAND	5	31 S	148	07 E	9.45
RIVIERE MONEO	21	08 S	165	30 E	5.58

	Position °	'	°	'	Sec. Para
RIVIERE TCHAMBA	21	01 S	165	24 E	5.58
ROBBIE BANK	11	04 S	176	53 W	3.98
ROBERTS POINT	16	19 S	179	24 E	3.62
ROCHER IETENDI	22	26 S	167	13 E	5.8
ROCHER OUALAOUATE	20	10 S	163	59 E	5.44
ROCHER THOMASSET	10	21 S	138	26 W	1.23
RODERICK DHU BAY	9	00 S	160	08 E	7.52
ROGERS ROCK	9	02 S	160	04 E	7.52
ROI-NAMUR	9	24 N	167	28 E	4.69
RONCADOR REEF	6	13 S	159	22 E	8.3
RONGELAP ATOLL	11	18 N	166	51 E	4.74
RONGERIK ATOLL	11	21 N	167	25 E	4.73
RONKITI HARBOR	6	49 N	158	10 E	10.7
ROSE ATOLL	14	33 S	168	09 W	2.22
ROTA	14	19 N	145	12 E	10.55
ROTUMA ISLAND	12	30 S	177	05 E	3.100
ROUND ISLAND	20	35 S	166	16 E	6.9
ROUND POINT	14	00 S	171	55 W	2.34
ROWA ISLETS	13	36 S	167	32 E	6.76
ROYALIST HARBOR	9	18 S	161	05 E	7.18
RUA SURA ISLANDS	9	30 S	160	37 E	7.28
RURUTU	22	27 S	151	20 W	1.103

S

S ENTRANCE	7	42 S	158	29 E	8.11
SADDLE ISLAND	13	22 S	166	38 E	6.77
SADDLE PEAKS	20	11 S	169	44 E	6.13
SAIL ROCK	16	40 S	178	18 E	3.56
SAKAO ISLAND	14	57 S	167	07 E	6.66
SAKAU ISLAND	16	30 S	167	49 E	6.46
SAL ISLAND	5	26 S	154	34 E	8.53
SALUAFATA HARBOR	13	52 S	171	37 W	2.30
SAMUSU POINT	13	59 S	171	26 W	2.29
SAN BERNADINO STRAIT	13	00 N	124	30 E	9.14
SAN JORGE ISLAND	8	26 S	159	36 E	8.12
SAND ISLAND	16	45 N	169	31 W	4.2
SANDFLY HARBOR	7	59 S	156	57 E	8.23
SANTA CATALINA ISLAND	10	54 S	162	27 E	7.4
SANTA CRUZ ISLANDS	10	00 S	165	35 E	6.82
SANTA ISABEL	8	10 S	159	30 E	8.4
SANTA MARIA ISLAND	14	15 S	167	30 E	6.71
SANTO	15	31 S	167	10 E	6.61
SAR PASSAGE	7	11 N	134	25 E	10.44
SARMETTE BAY	16	11 S	167	33 E	6.55
SASA POINT	6	57 S	156	41 E	8.14
SASAMUNGGA POINT	7	02 S	156	46 E	8.15
SATAWAL	7	21 N	147	02 E	10.29
SAUKA POINT	7	37 S	156	29 E	8.25
SAVAI'I ISLAND	13	37 S	172	29 W	2.36
SAVAVE ISLAND	8	02 S	178	18 E	4.22
SAVO ISLAND	9	08 S	159	49 E	7.42
SAVUSAVU	16	46 S	179	20 E	3.52
SCHISCHMAREV STRAIT	9	23 N	170	06 E	4.55
SCHJETMAN REEF	16	08 N	178	56 W	4.3
SCHNEIDER ISLAND	2	38 S	150	43 E	9.34
SCOTT ROCKS	17	28 S	168	34 E	6.23
SEEADLER HARBOR	2	00 S	147	19 E	9.67
SERUA REEF	18	17 S	177	58 E	3.19
SHARK BAY	15	16 S	167	09 E	6.67
SHELTER REEF	20	53 S	167	03 E	6.6
SHEPHERD ISLANDS	16	56 S	168	36 E	6.27
SHERBURN REEF	3	21 S	148	00 E	9.68
SHIP CHANNEL	5	56 N	169	39 E	4.64
SHISHMAREV STRAIT	9	23 N	170	06 E	4.55
SHORTLAND HARBOR	7	05 S	155	54 E	8.39
SIAFIAFI SEAMOUNT	12	14 S	175	30 W	3.97
SIFO ISLAND	11	08 N	166	18 E	4.75
SIGANA ISLAND	8	31 S	159	52 E	8.4
SIMBO ISLAND	8	18 S	156	31 E	8.28
SINARANGO HARBOR	8	53 S	161	01 E	7.15
SINGUMA HARBOR	17	57 S	179	16 E	3.43
SLEEPY POINT	16	39 S	178	32 E	3.57
SOGA POINT	8	31 S	159	48 E	8.4
SOGHA POINT	8	31 S	159	48 E	8.4
SOKOVOVI POINT	7	37 S	156	29 E	8.25
SOLANADIRO POINT	7	59 S	159	21 E	8.7
SOLANANDIRO POINT	7	59 S	159	21 E	8.7
SOMMET OUANVO	21	51 S	165	49 E	5.28
SOMMET PANIE	20	36 S	164	47 E	5.63
SOMMET POUM	20	16 S	164	03 E	5.42
SONSOROL ISLANDS	5	20 N	132	13 E	10.52
SOPHIA ISLAND	10	45 S	179	30 E	4.17
SOPHIE CHRISTIANSON SHOAL	41	26 S	148	26 W	1.100
SOREZARU POINT	7	33 S	156	37 E	8.25
SOROL ATOLL	8	08 N	140	23 E	10.35
SOSO BAY	19	02 S	178	17 E	3.5
SOUTH BAY	17	48 S	168	22 E	6.17
SOUTH CAPE	15	40 S	166	50 E	6.63
SOUTH CAPE	17	01 S	179	55 E	3.73
SOUTH CHANNEL	3	03 N	172	45 E	4.42
SOUTH HEAD	13	51 S	167	35 E	6.73
SOUTH ISLAND	13	26 S	166	41 E	6.77
SOUTH ISLAND	8	48 S	157	46 E	8.36
SOUTH MINERVA REEF	23	56 S	179	08 W	2.48
SOUTH OPENING	8	32 N	171	07 E	4.53
SOUTH PASS	7	13 N	151	48 E	10.18
SOUTH POINT	5	47 N	169	37 E	4.64
SOUTH REEF	12	55 S	160	33 E	7.2
SOUTHWEST BAY	16	29 S	167	25 E	6.50
ST. CLAIRE ISLET	14	17 S	167	48 E	6.72
ST. GEORGE'S CHANNEL	4	30 S	152	30 E	9.14
STAR HARBOR	10	49 S	162	17 E	7.6
STARBUCK ISLAND	5	37 S	155	54 W	2.12
STEEP CLIFF BAY	15	40 S	168	07 E	6.39
STEPS POINT	14	23 S	170	46 W	2.27
STEWART ISLANDS	8	25 S	162	52 E	7.3
STRATHMORE SHOAL	11	09 S	170	42 E	6.81
SUABA BAY	8	20 S	160	40 E	7.17
SUAFA BAY	8	20 S	160	40 E	7.17
SUGARLOAF ISLAND	13	49 S	167	42 E	6.75
SUGARLOAF POINT	16	46 S	168	22 E	6.34
SUKI ISLAND	7	19 S	158	05 E	8.10
SUMBI POINT	7	18 S	157	01 E	8.14
SURUNDU BAY	15	28 S	167	13 E	6.69
SUSUKU ISLAND	7	26 S	157	38 E	8.13
SUU HARBOR	9	10 S	160	55 E	7.19
SUULAHA COVE	9	41 S	161	31 E	7.18
SUVA HARBOR	18	08 S	178	25 E	3.17
SUWARROW ATOLL	13	16 S	163	06 W	2.18
SWAIN ISLAND	11	04 S	171	05 W	2.1
SWAINS ISLAND	11	03 S	171	05 W	2.39
SWALLOW BAY	10	41 S	166	04 E	6.86
SYBIL ROCKS	16	49 S	179	15 E	3.51
SYDNEY ISLAND	4	27 S	171	15 W	4.8
SYDNEY POINT	0	54 S	169	33 E	4.44

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TABAR ISLANDS	2	45 S	152	00 E	9.6
TABITEUEA	1	21 S	174	54 E	4.33
TABLE DE TIEA	21	10 S	164	55 E	5.34
TABUAERAN	3	52 N	159	20 W	2.6
TABUKINTETAU	3	03 N	172	54 E	4.42
TABURAO	1	49 N	173	01 E	4.40
TAENGA	16	21 S	143	08 W	1.44
TAFAHI	15	51 S	173	44 W	2.74
TAFUA SAVAI'I	13	47 S	172	15 W	2.36
TAGELIB ISLAND	7	05 N	171	43 E	4.50
TAHAA	16	38 S	151	29 W	1.90
TAHANEA	16	53 S	145	47 W	1.45
TAHITI	17	41 S	149	22 W	1.59
TAHU ATA	9	57 S	139	05 W	1.19
TAHUATA	9	57 S	139	05 W	1.19
TAIARO	15	45 S	144	38 W	1.48
TAILEVU POINT	17	39 S	178	36 E	3.38
TAIO POINT	16	07 S	167	29 E	6.54
TAIOF ISLAND	5	32 S	154	39 E	8.54
TAKA ATOLL	11	09 N	169	38 E	4.59
TAKAPOTO	14	39 S	145	12 W	1.52
TAKAROA	14	27 S	144	57 W	1.53
TAKATAKA BAY	9	14 S	161	15 E	7.14
TAKUME	15	48 S	142	12 W	1.44
TAKUTEA	19	49 S	158	18 W	2.45
TALILI BAY	4	12 S	152	08 E	9.66
TALOFOFO BAY	13	20 N	144	46 E	10.58
TALOMAKO ANCHORAGE	15	09 S	166	50 E	6.65
TAMAMI ISLAND	10	24 S	165	47 E	6.87
TAMANA	2	29 S	175	59 E	4.29
TANA TAU POIN	9	08 S	160	25 E	7.53
TANABULI BAY	8	24 S	159	49 E	8.5
TANAKONOLA POINT	9	11 S	160	13 E	7.47

	Position °	'	°	'	Sec. Para
TANAPARI CAY	9	20 S	160	18 E	7.46
TANAPARI ISLAND	9	20 S	160	18 E	7.46
TANATAU ROCK	9	08 S	160	25 E	7.44
TANAVUSO POINT	17	34 S	178	29 E	3.37
TANGA ISLANDS	3	30 S	153	18 E	9.4
TANGICE ISLAND	15	35 S	167	01 E	6.62
TANGOA ANCHORAGE	15	35 S	166	59 E	6.63
TANGOA ISLAND	15	35 S	166	59 E	6.62
TANNA ISLAND	19	30 S	169	20 E	6.14
TAONGI ATOLL	14	38 N	168	58 E	4.60
TARANG BANK	8	23 N	145	14 E	10.32
TARANG REEF	7	45 N	147	41 E	10.28
TARASAG BAY	14	12 S	167	36 E	6.72
TARAWA ATOLL	1	30 N	173	00 E	4.39
TAROA	8	43 N	171	14 E	4.53
TARTAR REEF	17	31 S	176	56 E	3.22
TASMAN ISLANDS	4	33 S	159	30 E	8.2
TATAKOTO	17	20 S	138	25 W	1.37
TATAMBA BAY	8	24 S	159	49 E	8.5
TAU ISLAND	14	15 S	169	28 W	2.22
TAUERE	17	21 S	141	29 W	1.42
TAUMAKO ISLAND	9	57 S	167	12 E	6.90
TAUU ISLANDS	4	49 S	157	03 E	8.3
TAVANATANGIR HARBOR	4	48 S	151	41 E	9.60
TAVARUA ISLAND	17	51 S	177	12 E	3.22
TAVEUNI	16	50 S	179	59 W	3.71
TAVIUNI REEF	12	05 S	174	35 W	3.98
TAVUNASITHI ISLAND	18	43 S	179	07 W	3.86
TAWAIHI ISLAND	9	50 S	160	50 E	7.30
TAWAKE	16	15 S	179	51 E	3.65
TAWARE POINT	10	26 S	161	55 E	7.7
TAWARO POINT	10	26 S	161	55 E	7.7
TE AVA FUAGEA	8	33 S	179	04 E	4.20
TE ULU BUNGU	18	33 N	178	08 E	4.21
TEAFUA PASS	8	00 S	178	20 E	4.22
TEBIKEREI	1	00 N	173	01 E	4.38
TEFALA	8	36 S	179	05 E	4.20
TEGUA ISLAND	13	16 S	166	37 E	6.78
TEHOPEOTE KEHO	10	02 S	139	07 W	1.21
TELEKIHA'APAI	20	21 S	174	31 W	2.54
TELEKITINGA	20	24 S	174	32 W	2.54
TELEKIVAVAU	20	19 S	174	31 W	2.54
TEMA REEF	11	05 S	165	38 W	2.20
TEMATAGI	21	40 S	140	37 W	1.35
TEMATANGI	21	40 S	140	37 W	1.35
TEMETAGI	21	40 S	140	37 W	1.26
TEMOE	23	21 S	134	29 W	1.30
TEMOTU ISLAND	10	41 S	165	47 E	6.86
TEMUAH ISLAND	1	47 S	175	29 E	4.30
TEN STICK ISLET	16	29 S	167	25 E	6.50
TENARARO	21	18 S	136	44 W	1.32
TENCH ISLAND	1	38 S	150	43 E	9.30
TEOUMA BAY	17	48 S	168	22 E	6.17
TEPOTO	14	03 S	141	25 W	1.41
TEPUKA	8	28 S	179	06 E	4.21
TERAINA ISLAND	4	43 N	160	24 W	2.5
TESMAN BAY	16	18 S	167	40 E	6.56
TETEPARE ISLAND	8	44 S	157	34 E	8.35
TETIAROA	17	03 S	149	34 W	1.79
TETIPARI ISLAND	8	44 S	157	34 E	8.35
TEVAI ISLAND	11	38 S	166	58 E	6.83
TEVALA ISLET	16	49 S	168	33 E	6.30
THAKAU LEKALEKA	18	36 S	177	48 E	3.11
THAKAU LEVU	18	52 S	178	22 W	3.87
THAKAU MATATHUTHU	16	10 S	179	41 E	3.68
THAKAU MOMO	17	39 S	179	18 E	3.45
THAKAU NISITHI	18	21 S	177	59 E	3.13
THAKAU TAMBU	17	40 S	178	33 W	3.81
THEVA-I-RA REEF	21	44 S	174	38 E	5.2
THIKOMBIA ISLAND	15	46 S	179	56 W	3.65
THIKOMBIA POINT	19	09 S	177	58 E	3.6
THITHIA ISLAND	17	45 S	179	20 W	3.81
THOUSAND SHIPS BAY	8	27 S	159	41 E	8.12
THUVU HARBOR	18	08 S	177	25 E	3.20
TIKEHAU	15	00 S	148	10 W	1.56
TIKEI	14	58 S	144	33 W	1.52
TIKOPIA ISLAND	12	18 S	168	49 E	6.80
TIMOE	23	21 S	134	29 W	1.30
TINAKULA ISLAND	10	24 S	165	47 E	6.87
TIOAE BAY	22	26 S	166	46 E	5.14
TITIANA POINT	8	07 S	156	49 E	8.29
TOACHEL MID	7	18 N	134	32 E	10.48
TOAGEL MLUNGUI	7	32 N	134	28 E	10.48
TOAU	15	55 S	146	02 W	1.49
TOBI ISLAND	3	00 N	131	07 E	10.54
TOFONGA	19	57 S	174	28 W	2.59
TOFUA	19	45 S	175	04 W	2.63
TOGA ISLAND	13	26 S	166	41 E	6.77
TOKOWA ISLAND	6	14 N	171	48 E	4.48
TOKU ISLAND	18	09 S	174	11 W	2.73
TOLOKIWA ISLAND	5	19 S	147	37 E	9.46
TOMBA NI YALE	18	56 S	178	20 E	3.7
TOMMAN ISLAND	16	35 S	167	48 E	6.49
TOMOTU NOI ISLAND	10	51 S	166	02 E	6.86
TONGARIKI ISLAND	17	00 S	168	38 E	6.27
TONGATAPEE GROUP	21	12 S	175	10 W	2.1
TONGATAPU	21	10 S	175	12 W	2.49
TONGOA ISLAND	16	54 S	168	34 E	6.29
TONOLEI HARBOR	6	47 S	155	53 E	8.59
TORAPPU CHANNEL	8	52 N	170	52 E	4.53
TORCH BANK	22	52 S	167	41 E	5.6
TORRES ISLANDS	13	17 S	166	37 E	6.77
TORTOISE ISLAND	20	25 S	166	29 E	6.7
TOTON ISLAND	9	24 N	170	06 E	4.55
TOTOYA ISLAND	18	58 S	179	52 W	3.90
TRAPEZ REEF	3	39 S	152	27 E	9.12
TREASURERS ISLAND	9	53 S	167	07 E	6.90
TREASURY ISLANDS	7	25 S	155	34 E	8.38
TREE ROCK POINT	15	58 S	168	16 E	6.38
TREVANION ISLAND	10	41 S	165	47 E	6.86
TRUCHY POINT	15	53 S	168	10 E	6.39
TRUK ISLANDS	7	25 N	151	50 E	10.18
TUANAKE	16	39 S	144	13 W	1.45
TUBUAI	23	22 S	149	26 W	1.102
TUBUAI MANU	17	39 S	150	38 W	1.79
TUCOPIA ISLAND	12	18 S	168	49 E	6.80
TULAGHI HARBOR	9	06 S	160	09 E	7.48
TULAGI HARBOR	9	06 S	160	09 E	7.48
TUNGUA ISLET	20	01 S	175	46 W	2.57
TUREIA	20	49 S	138	32 W	1.35
TURTLE BAY	15	21 S	167	11 E	6.68
TURTLE ROCK	17	48 S	177	19 E	3.23
TUSCARORA SEAMOUNT	11	50 S	178	15 W	3.98
TUTU	16	14 S	179	34 E	3.63
TUTUILA ISLAND	14	19 S	170	42 W	2.24
TUVANA-I-THOLO	21	00 S	178	43 W	3.88
TWO HILLS ISLAND	17	15 S	168	26 E	6.26

U

	Position °	'	°	'	Sec. Para
UA HUKA (WASHINGTON ISLAND)	8	55 S	139	33 W	1.12
UA POU	9	23 S	140	05 W	1.13
UA POU	9	25 S	140	05 W	1.2
UA PU	9	23 S	140	05 W	1.13
UANUKUHIHIFU	19	58 S	174	30 W	2.59
UEA	12	28 S	176	59 E	3.101
UGI ISLAND	10	15 S	161	44 E	7.11
UGO BAY	22	34 S	167	33 E	5.7
UIHA ISLAND	19	54 S	174	24 W	2.60
UJAE ATOLL	9	04 N	165	39 E	4.71
UJELANG ATOLL	9	50 N	160	54 E	4.78
UKI NI MASI ISLAND	10	15 S	161	44 E	7.11
ULAWA ISLAND	9	45 S	161	57 E	7.12
ULILAPA ISLAND	15	37 S	167	01 E	6.62
ULITHI ATOLL	9	55 N	139	40 E	10.36
ULO POINT	5	31 S	148	35 E	9.53
ULUL ISLAND	8	35 N	149	40 E	10.22
UMAI ATAEI	1	33 S	175	00 E	4.33
UMANTEWENA	0	44 S	174	28 E	4.34
UMATAC BAY	13	18 N	144	39 E	10.58
UNDINE BAY	17	29 S	168	20 E	6.22
UNDU POINT	16	08 S	179	58 W	3.64
UNEA ISLAND	4	55 S	149	09 E	9.49
UOLEVA	19	51 S	174	24 W	2.60
UPOLU ISLAND	13	54 S	171	44 W	2.29
URAMBUTA POINT	16	48 S	179	34 E	3.50
URE ISLAND	16	35 S	167	48 E	6.49
UREPARAPARA ISLAND	13	31 S	167	20 E	6.76
URIPIV ISLAND	16	04 S	167	26 E	6.53
URUKTHAPEL	7	16 N	134	27 E	10.44
UTHUNA MOINDULE	18	59 S	178	10 E	3.7
UTHUNA NAINGORO	19	00 S	178	29 E	3.4
UTUAN ISLAND	4	13 S	152	28 E	9.15

	Position °	'	°	'	Sec. Para
UTUHA ISLAND	8	30 S	159	43 E	8.12
UTUNGAKE	18	40 S	174	01 W	2.71
UTUPUA ISLAND	11	19 S	166	32 E	6.84
UTUROA	16	44 S	151	27 W	1.86
UVERITE POINT	17	58 S	177	15 E	3.21
V					
VAGHENA ISLAND	7	26 S	157	46 E	8.13
VAGHOE POINT	7	16 S	156	52 E	8.15
VAHITAHI	18	47 S	138	50 W	1.36
VAIEO BAY	9	23 S	140	08 W	1.15
VAILELE BAY	13	50 S	171	43 W	2.31
VAIRAATEA	19	21 S	139	13 W	1.36
VAITAPE	16	30 S	151	45 W	1.94
VAITUPU ISLAND	7	28 S	178	41 E	4.23
VAKA'EITU	18	43 S	174	06 W	2.69
VANAVANA	20	47 S	139	08 W	1.35
VANGUNU ISLAND	8	40 S	158	00 E	8.17
VANIHE BAY	15	17 S	167	57 E	6.42
VANIKOLO ISLANDS	11	40 S	166	54 E	6.82
VANIKORO ISLANDS	11	40 S	166	54 E	6.82
VANUA LAVA ISLAND	13	48 S	167	29 E	6.73
VANUA LEVU	16	35 S	179	20 E	3.48
VANUA MBALAVU ISLAND	17	14 S	179	00 W	3.77
VANUA VATU	18	22 S	179	17 W	3.82
VAO ISLAND	15	54 S	167	18 E	6.52
VAO ROCK	7	55 S	157	11 E	8.20
VASAMOTU ISLET	8	02 S	178	23 E	4.22
VAT GANAI	13	15 S	167	39 E	6.76
VATIA POINT	17	22 S	177	50 E	3.32
VATOA	19	50 S	178	13 W	3.87
VATU MIALA	16	52 S	168	31 E	6.30
VATU VARA	17	26 S	179	32 W	3.76
VATU-I-RA ISLET	17	19 S	178	28 E	3.38
VATU-I-THAKE	17	23 S	178	46 E	3.53
VATULELE	18	32 S	177	39 E	3.11
VATUMBARI POINT	18	16 S	177	54 E	3.15
VATUNDAMU POINT	16	14 S	179	32 E	3.62
VAVA'U	18	37 S	174	00 W	2.71
VAVA'U GROUP	18	40 S	174	00 W	2.1
VEITALATHANGI POINT	16	47 S	179	50 W	3.73
VENUS POINT	17	29 S	149	29 W	1.60
VERAO ISLAND	17	32 S	168	16 E	6.20
VERATA POINT	17	51 S	178	39 E	3.39
VEUTUMBOSO BAY	13	54 S	167	28 E	6.74
VI PAKA ANCHORAGE	13	22 S	166	38 E	6.77
VIANI BAY	16	45 S	179	53 E	3.49
VIKENARA POINT	8	34 S	159	54 E	8.4
VITI LEVU	17	48 S	178	00 E	3.15
VITI LEVU BAY	17	25 S	178	16 E	3.36
VITORIA ISLAND	8	34 S	159	52 E	8.4
VITU ISLANDS	4	42 S	149	16 E	9.49
VIWA ISLAND	17	09 S	176	53 E	3.28
VOLCAN MACDONALD	29	00 S	140	15 W	1.100
VOLIVOLI POINT	17	19 S	178	11 E	3.33
VOMO ISLAND	17	30 S	177	16 E	3.26
VONAVONA	8	12 S	157	02 E	8.31
VOSTOK ISLAND	10	06 S	152	25 W	2.13
VOT TANDE	13	15 S	167	39 E	6.76
VOVOHE COVE	8	07 S	157	06 E	8.23
VUGHOE POINT	7	16 S	156	52 E	8.15
VUNA POINT	16	57 S	179	53 E	3.72
VUNDA POINT TANKER TERMINAL	17	41 S	177	23 E	3.24
VUNMARAMA ANCHORAGE	15	29 S	168	10 E	6.40
W					
WACHUSETT REEF	32	18 S	151	10 W	1.100
WACHUSETT SHOAL	32	18 S	151	10 W	1.100
WAGAP	20	52 S	165	16 E	5.60
WAGINA ISLAND	7	26 S	157	46 E	8.13
WAIKAVA HARBOR	16	44 S	179	48 E	3.49
WAILANGILALA	16	45 S	179	07 W	3.75
WAINUNU BAY	16	53 S	178	53 E	3.54
WAIRANGIA POINT	16	39 S	178	37 E	3.58
WAIRUNA SHOAL	5	12 S	162	18 W	2.17
WAISISI HARBOR	9	18 S	161	05 E	7.18
WAKAYA	17	37 S	179	01 E	3.46
WAKE ISLAND	19	17 N	166	37 E	4.79
WALAHA	15	26 S	167	41 E	6.44
WALOURIGI ANCHORAGE	15	20 S	167	50 E	6.43
WALPOLE ISLAND	22	37 S	168	57 E	5.4
WANGALAHA POINT	10	17 S	161	35 E	7.7
WANGORAHA POINT	10	17 S	161	35 E	7.7
WANIONE BAY	10	28 S	162	02 E	7.7
WANONI BAY	10	28 S	162	02 E	7.7
WASHINGTON	4	43 N	160	24 W	2.5
WASHINGTON ISLAND	8	55 S	139	33 W	1.12
WATERWITCH SEAMOUNT	12	30 S	176	40 W	3.98
WATOM ISLAND	4	07 S	152	05 E	9.48
WATOUNROWO BAY	15	17 S	167	57 E	6.42
WAUGH ROCK	7	55 S	157	11 E	8.20
WAYA ISLAND	17	18 S	177	08 E	3.27
WEASISI BAY	19	28 S	169	22 E	6.14
WEST CAPE	9	32 S	159	35 E	7.39
WEST ENTRANCE	1	31 S	144	59 E	9.80
WEST FAYU ISLAND	8	05 N	146	44 E	10.29
WEST OPENING	8	19 N	171	03 E	4.52
WEST PASS	11	21 N	166	38 E	4.74
WEST PASSAGE	10	42 S	165	47 E	6.86
WESTERN ISLANDS	2	13 S	145	54 E	9.68
WESTERN PASSAGE	0	24 N	173	47 E	4.37
WHALE BANK	12	32 S	176	52 E	3.101
WHALE ISLAND	20	25 S	166	31 E	6.7
WHITE SAND POINT	17	35 S	168	14 E	6.21
WICIEM	20	36 S	164	54 E	5.62
WICKHAM HARBOR	8	44 S	158	05 E	8.37
WIDE PASS	9	49 N	160	53 E	4.78
WILDER SHOAL	8	17 N	173	25 W	4.3
WINSLOW REEF	1	36 S	174	57 W	4.12
WITU ISLANDS	4	42 S	149	16 E	9.49
WOLEAI ATOLL	7	22 N	143	55 E	10.34
WOODHOUSE PASSAGE	9	50 S	160	52 E	7.31
WOODIN CANAL	22	24 S	166	49 E	5.14
WOODING PATCHES	7	15 S	157	43 E	8.10
WORA BAY	14	48 S	166	44 E	6.65
WORHARET POINT	16	10 S	167	15 E	6.51
WOTHO ATOLL	10	06 N	165	58 E	4.72
WOTHO ISLAND	10	10 N	166	00 E	4.72
WOTJE ATOLL	9	28 N	170	02 E	4.55
WRECK POINT	7	31 S	158	26 E	8.9
WULAI ISLAND	5	21 S	150	29 E	9.54
WUVULU ISLAND	1	43 S	142	50 E	9.83
Y					
YALE BAY	18	56 S	178	20 E	3.7
YALEWA KALOU	16	40 S	177	45 E	3.31
YANDINA	9	05 S	159	13 E	7.55
YANDUA ISLAND	16	49 S	178	18 E	3.56
YANGASA LEVU	18	56 S	178	28 W	3.86
YAP ISLANDS	9	32 N	138	10 E	10.37
YASAWA	16	46 S	177	31 E	3.29
YASAWA GROUP	17	00 S	177	22 E	3.27
YATHATA ISLAND	17	15 S	179	32 W	3.75
YAWASIRARA BAY	16	43 S	177	34 E	3.30
Z					
ZEPHYR SHOAL	15	52 S	176	40 W	3.92
ZINOA ISLANDS	6	53 S	156	37 E	8.15