PUB. 124

SAILING DIRECTIONS (ENROUTE)

★

EAST COAST OF SOUTH AMERICA

★

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FOURTEENTH EDITION

Preface

Pub. 124, Sailing Directions (Enroute) East Coast of South America, Fourteenth Edition, 2014, is issued for use in conjunction with Pub. 160, Sailing Directions (Planning Guide) South Atlantic Ocean and Indian Ocean. The companion volume is Pub. 124.

Digital Nautical Charts 1, 7, and 14 provide electronic chart coverage for the area covered by this publication.

This publication has been corrected to 26 July 2014, including Notice to Mariners No. 30 of 2014. Subsequent Publication Data Updates (PDUs) have corrected this publication to 9 January 2016, including Notice to Mariners No. 2 of 2016.

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://msi.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-SFH
   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.

International Ship and Port Facility Security (ISPS) Code.—The ISPS Code is a comprehensive set of measures to enhance the security of ships and port facilities developed in response to the perceived threats to ships and port facilities in the wake of the 9/11 attacks in the United States. Information on the ISPS Code can be found at the International Maritime Organization web site:

International Maritime Organization Home Page
http://www.imo.org

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.

Maritime Administration (MARAD) Advisories.—MARAD Advisories rapidly disseminate information on maritime dangers, safety, government policy, and other time-sensitive matters pertaining to U.S.-flag vessel operations. MARAD Advisories are issued by the Office of Security to vessel masters, ship operators, and other U.S. Maritime interests. Advisories are communicated via telex or other message formats and are published on the MARAD web site and in the National Geospatial-Intelligence Agency's Weekly Notice to Mariners.

Maritime Administration (MARAD) Home Page
http://www.marad.dot.gov/newsroom

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 web site.

Time.—Time is normally expressed as local time unless specifically designated as Universal Coordinated Time (UTC).

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.

Argentina Sailing Directions.

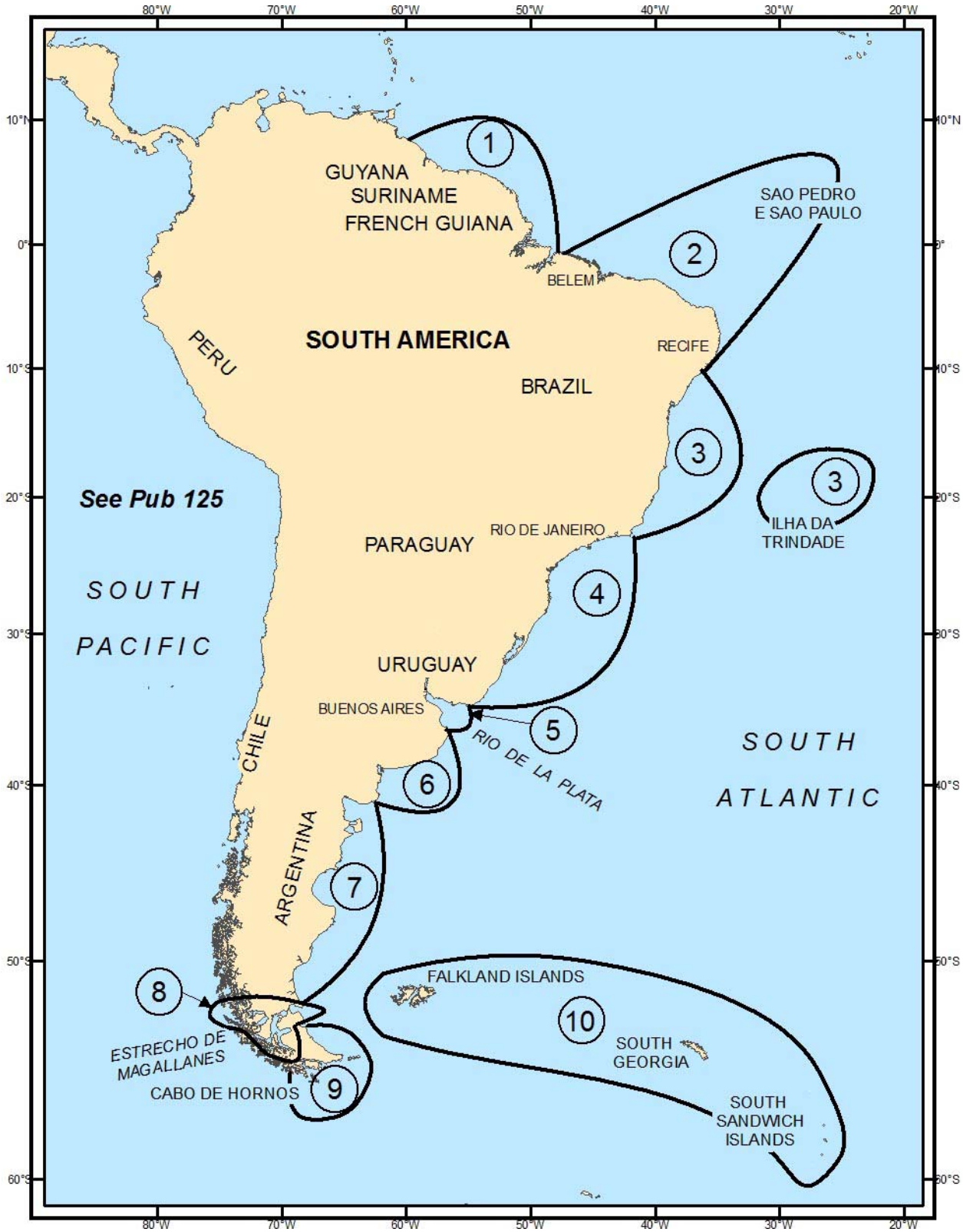
Brazil Sailing Directions.

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.



SECTOR LIMITS — PUB. 124

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)
gt	gross 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	VLOC	Very Large Ore Carrier
Lo-lo	Lift-on Lift-off	FSO	Floating Storage and Offloading
NGL	Natural Gas Liquids	FSU	Floating Storage Unit
		FPSO	Floating Production Storage and Offloading

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
CALM	Catenary Anchor Leg Mooring		

The following abbreviations may be used in the text:

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
IHO	International Hydrographic Organization	Pub.	Publication
IMO	International Maritime Organization	SOLAS	International Convention for Safety of Life at Sea
IMDG	Intermational Maritime Dangerous Goods Code		
LOA	length overall	St./Ste.	Saint/Sainte
UKC	Under keel clearance	ISPS	International Ship and Port facility Security

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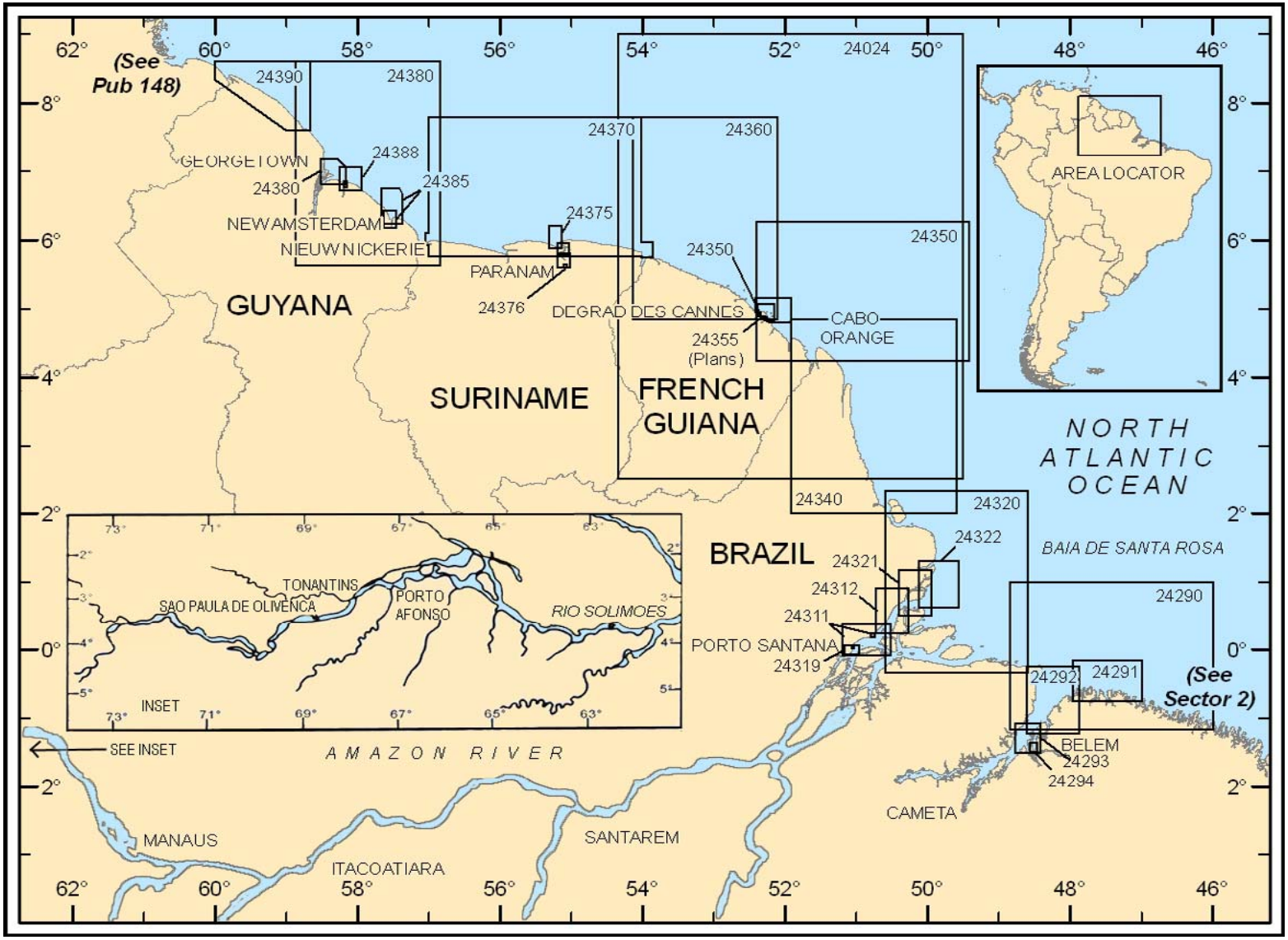
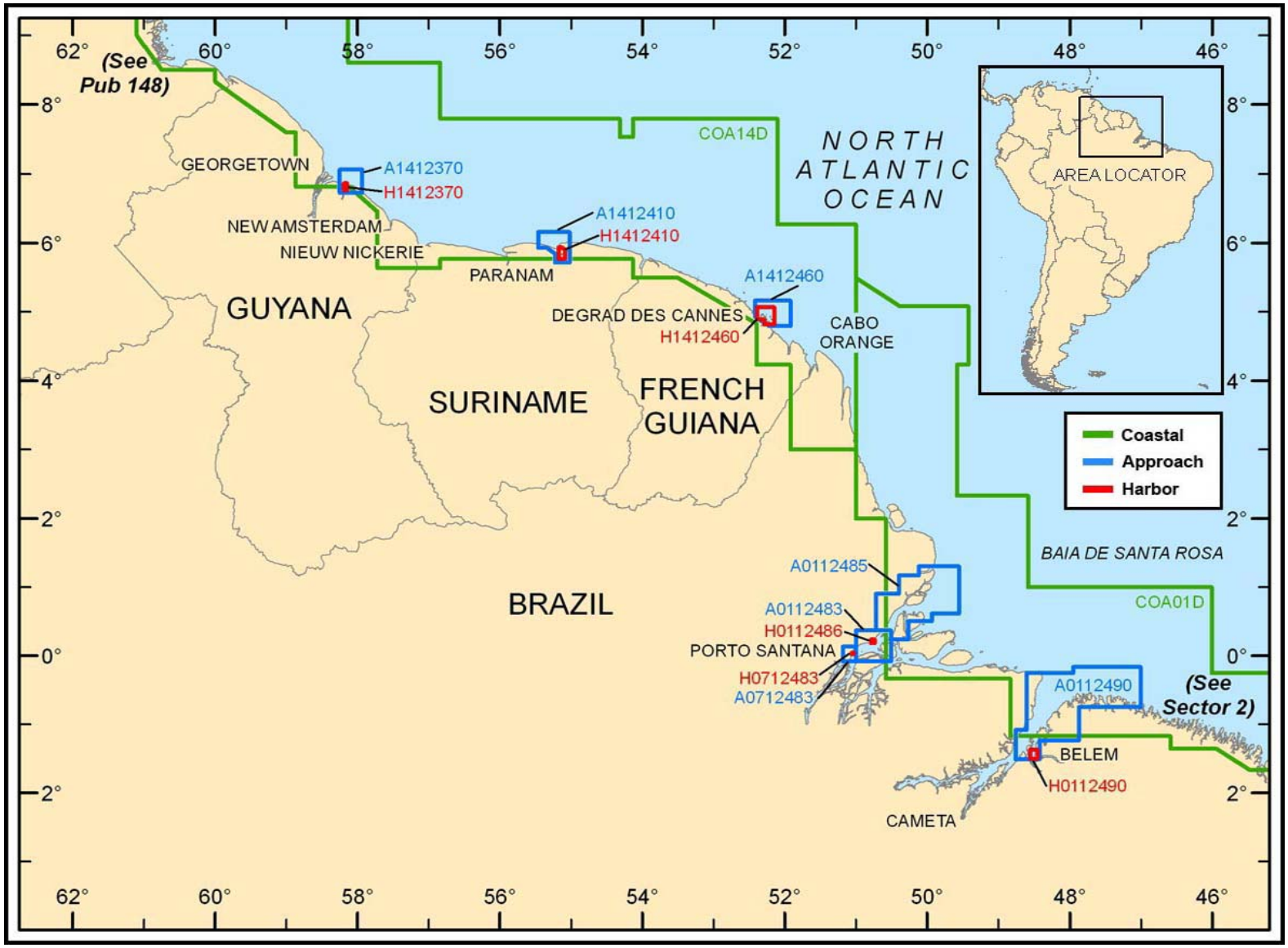


Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR 1 — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 01 and 14 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 1 — DNC LIBRARY INFORMATION

SECTOR 1

GUYANA, SURINAME, FRENCH GUIANA, AND THE NORTH COAST OF BRAZIL

Plan.—This sector describes the coasts of Guyana, Suriname, and French Guiana, along with the N coast of Brazil. The first part describes the NE coast of South America from the Rio Orinoco to Cabo Orange. The sequence of coastal features is from W to E.

The latter part of the sector describes the N coast of Brazil from Cabo Orange to Ponta Curuca and is arranged in a N to S sequence. The lower reaches of the Amazon River, the Rio Para, and the upper reaches of the Amazon River are then described in that order.

General Remarks

1.1 Winds—Weather.—The trade winds are mostly ENE, between the Rio Orinoco and Cabo Orange, in the open sea from November to July. They are strong and steady from January to April, with about 80 per cent of all winds of Beaufort force 3 or over. Force 5 or 6 are common. From August to October, the prevailing winds are E to SE, but these winds are less steady than the more N winds of other months. Gales along this coast, which is S of the hurricane belt, occur about 1 per cent of the time from February to April.

The main relatively dry season, which is sharply marked almost every year, is from September to November. The wet season is from May or June to August and begins earlier along the coast to French Guiana.

Fog or haze is more common on the coast. In the dry season, coastal mist or haze is often present in the forenoon, but visibility is usually good in the afternoon.

The average air temperature along this coast is within a degree or two of 27°C. Temperatures above 32°C are uncommon. The sea temperatures range from 27°C to 28°C except in February when they may be slightly lower.

Tides—Currents.—The full strength of the Guiana Current is encountered off this coast. The great majority of sets are between W and NNW in November to April and between WNW and N in May to October. The most predominant set throughout the year is at a rate of 1.25 knots. This current is quite constant, but occasional sets in other directions may be experienced. Rates of up to 3 to 4 knots may occur throughout the year; with the latter rate in May to July and in November to January with normal sets. The rates of other sets sometimes reach 1.5 knots.

The current is not felt close inshore. The band of width of the current apparently fluctuates. The greatest strength of this current is from 60 to 120 miles offshore.

The inner edge has been found about 20 miles off the coast of Guyana in position 7°10'N, 58°00'W. Between the Demerara River and the Suriname River, it is felt in depths of 33m.

The main current circulation is affected by tidal current influences as far as 30 miles offshore. The W tidal currents increase the rate experienced; the E tidal currents lessen the rates. At the mouths of rivers, the tidal currents set S on the rising tide; however, on the falling tide, they are deflected by the currents to NE.

Heavy rollers may be experienced along this coast from December to February, particularly in December and January when the NE trades are strongest. These rollers usually are observed where depths decrease irregularly or in depths of about 9.1m where the coastal mud and sand banks lie.

The tidal currents along the N coast of Brazil are regular and their rates increase progressively W. The currents follow the trend of the coast and are strongest inshore where depths are shallowest. The distances at which their effects are felt depends largely upon the wind and the offshore depths, but in general, the tidal currents are not felt more than 6 to 8 miles offshore.

The coasts of Guyana, Suriname and French Guiana are mostly low and forested with mangrove and tropical vegetation. The extensive coastal banks and shoals fronting much of these coasts require that ships along these coasts be well offshore outside the sight of land, except when approaching a port. Much of the charted hydrography is from old and imperfect surveys. This fact, coupled with the estuarial nature of the river ports and continual changing of the bar depths, requires the utmost prudence in navigation.

Except for the anchorage at Iles du Sulut and French Guiana, there are no sheltered anchorages for large ships.

Ships of moderate size and limited draft can gain access to the ports of Georgetown and Paramaribo at favorable tidal conditions.

The N coast of Brazil, except for a few stretches of Estado do Ceara near its E part, is low and formed of sand hills about 49 to 79m high. The sand hills are similar in appearance, being interspersed with reddish cliffs and clumps of mangroves. The mangroves are usually observed at the mouths on the W banks of the rivers, which they serve to mark.

The entrances of the rivers along this coast are, as a rule, open to the N and are obstructed by sand banks. Many of the rivers are gradually silting up and will admit only small coasters. Ships can anchor along the N coast in good weather; however, the sea becomes rough at times during flood tides.

Guyana

1.2 The coast of Guyana between Punta Playa, the N boundary, and Courantyne River, the S boundary, is mostly low with few conspicuous landmarks. The coastal bank extends up to 25 miles offshore. There are no sheltered harbors for large ships. Ships of limited draft can proceed to Georgetown on the Demerara River and to New Amsterdam on the Berbice River, but must cross the bars of these rivers and engage pilots.

The coastal bank has been reported as changing and because of the old and imperfect surveys the mariner must navigate the area with the utmost care. Numerous wrecks exist along the coast and off the entrances to the rivers. Due to the shallowness of the water, almost all are dangerous to navigation.

Punta Playa to Georgetown

1.3 **Punta Playa** (8°33'N., 60°00'W.), low and swampy, lies near the middle of the NE side of Corocora Island on the boundary between Venezuela and Guyana. It is marked by a boundary beacon. The Waini River flows NW, parallel with the coast. It empties into the sea W of **Waini Point** (8°24'N., 59°49'W.), a thickly-wooded point which can be seen at a distance of about 12 miles. A light is shown from the river bar, about 5 miles N of Waini Point. A shoal, with a depth of 0.6m lies 8.5 miles N of Waini Point, and is marked by a lighted buoy. A 4.9m patch lies approximately 13 miles N of Waini Point, and mud flats with depths of 2m or less extend 4 miles from the point.

The river entrance may be recognized by its position in relation to the hills at Cumacka, which are about 46m high and lie about 17 miles S of the entrance. These hills are the only ones of any elevation for miles along this coast. They are usually visible at dawn and have the appearance of a knoll.

A channel, marked by lighted beacons, leads across the bar, which has a least depth of 1.8m. Vessels with a draft of 3m and with local knowledge can enter the river at HWS. Vessels which are prepared to take mud have crossed the bar drawing as much as 3.7m.

Port Kaituma, on the Kaituma River, lies 66 miles from Waini Bar Light and is used by vessels to load manganese ore. A vessel which can cross the Waini River bar should have no trouble reaching Port Kaituma, provided that caution is exercised on river bends and junctions, where strong eddies are to be expected.

There is one berth at the port; it can accommodate vessels up to 3,500 dwt.

Caution.—The area from 30 miles N to 35 miles E of Waini Point is strewn with dangerous wrecks.

1.4 The mouth of the **Pomeroon River** (7°37'N., 58°45'W.) lies about 78 miles SE of Waini Point; its W entrance point is marked by a light. The river can be entered by vessels with drafts of up to 2.4m between 1 hour either side of HW.

Lights are shown from pilings about 4 miles NNE and 1.75 miles NNW, respectively, of the mouth of the river and indicate the best route to follow when entering the river. When approaching from seaward, they should be kept to port in order to avoid the extensive mudflats to the E and the shallow water to the W of the entrance. There is no channel leading to the river.

The river mouth, about 0.1 mile wide, has depths of 4m in the entrance, but there are depths up to 18m about 15 miles upriver.

The depths of water near the river mouth are subject to seasonal changes due to the increased flow of water during the rainy season. The volume of traffic also affects the depths of the approaches, as it tends to plow a way through the mud.

Truchen, about 2 miles from the river mouth, stands on the E bank and has a wharf which can accommodate small vessels up to 30m long, with drafts of less than 1.5m.

Charity, another small village, about 21 miles from the river mouth, has a wharf for river steamers with drafts of 2.4m.

1.5 From the mouth of the Pomeroon River to the mouth of the Essequibo River, a distance of about 45 miles to the SE, the coast is low, wooded, and without prominent features.

The chimney of a mill at **Anna Regina** (7°16'N., 58°29'W.) is conspicuous and visible for 15 miles on a clear day. A radio tower with lights stands close SE of the chimney. A stranded wreck, marked by a lighted buoy, lies 5.75 miles NNE of the chimney.

The Essequibo River

1.6 The Essequibo River, which is the largest river in Guyana, rises in the Acarai Mountains, in the S extremity of the country, and flows N for at least 600 miles, traversing the entire length of the country.

At about 45 miles from its mouth, it is joined by the Mazaruni River and the Cuyuni River. The port of Bartica stands at the junctions of the rivers and is used by ships of limited draft.

Navigation of the river is, in general, not difficult, but during the rainy season, frequent squalls obscure the river marks and aids. Vessels generally anchor until squalls pass over.

Tides—Currents.—The tidal currents at the mouth attain rates of up to 3 knots at springs but decrease from 2.5 to 2 knots outside. The tidal rise at springs is about 2.7m at the mouth and about 2.4m at Bartica. The river level changes with the seasons, being highest in June and lowest in November.

The maximum difference in mean level may amount to over 0.9m. The tidal influence in the river is felt as far as Aritaka, about 17 miles above Bartica.

Depths—Limitations.—At the entrance to Ship Channel, the main entrance to the river, is a bar with a least depth in the fairway of 2.1m. A ship that can cross the bar can ascend the river to Bartica and the Mazaruni River to D'Urban Island, about 50 miles from the sea and 1 mile below the first rapids.

The estuary of the river is encumbered by a number of islands from which shoals and sand banks extend from the outer islands to the 5m curve, which lies as far as 17 miles seaward.

Frequent changes in depths in the river and estuary are liable to occur owing to the shifting nature of the banks.

The sand banks on both sides of Ship Channel are fairly steep-to and must be approached with caution.

Sand banks, steep-to on their N sides, are characteristic of that part of the river between Mamarikuru Bank, 10 miles below Bartica, and Lamun Island, just above Bartica. These steep-to edges are almost at right angles to the direction of the tidal currents. Tide rips occur during ebb tide at these steep-to edges.

The main entrance of the river is through Ship Channel, which is entered between Leguan Island and the mainland.

The river fairway is marked in places by navigational aids which are changed with the shifting shoals and require local knowledge to clear them. The twin chimneys, located about 5 miles SSE of the NE end of Leguan Island, are good landmarks.

West Channel and Middle Channel, both N of Ship Channel, also lead into the Essequibo River. However, the use of West Channel and Middle Channel has been discontinued.

Pilotage.—Pilotage is compulsory and can be obtained through the port of Georgetown. Vessels must send their ETA off the outermost lighted buoy of the Demerara River 24 hours in advance; the pilot boards in this location.

Anchorage.—Ships can anchor in Ship Channel. However, the tidal currents are strong and raise a confused sea, which is dangerous to small boats, especially on Bluejacket Banks, located about 5.2 miles E of the NE end of Leguan Island.

In the river, ships should anchor with bow and stern anchors because with a single anchor the wind will invariably carry the vessel over its anchor at the slackening of the falling tide, thus causing a foul anchor. It is almost impossible to find a lee in the river, as the wind follows the line of the banks below the level of the forest.

Caution.—Several submarine cables cross the river, and anchorage is prohibited within 0.25 mile of either side of a cable. The landing places of the cables are marked by white diamond-shaped boards marked "CABLE" in black letters.

1.7 **Bartica** (6°25'N., 58°37'W.) (World Port Index No. 12360) is situated on the E side of the point separating the Mazaruni River from the Essequibo River. The port has no facilities other than a few small timber wharves, jetties, and landing slips. These are generally used by coasters, river craft, and barges. Ships handle cargo from barges at the anchorage close off Bartica. The anchorage has depths of up to 11.4m.

Georgetown (6°50'N., 58°10'W.)

World Port Index No. 12370

1.8 Georgetown is the capital and principal commercial center of Guyana. The port lies on the E bank of the Demerara River, about 11 miles ESE of Ship Channel. The city has a river frontage of about 2 miles.

Winds—Weather.—The average temperature throughout the year is 27°C. The heat is tempered by sea breezes from August through October. There are two rainy seasons; one is from mid-April to mid-August, with the other from mid-November to mid-January.

The prevailing winds are from the NE, with a maximum speed of 11 knots during the months of heaviest rainfall.

Tides—Currents.—The MHW interval at the river mouth is 4 hours. The tidal rise at MHWS is 2.9m at MLWS, 0.4m at MHWN, 2.2m; and at MLWN, 1.7m.

On the bar the tidal currents attain rates of 1.5 knots on the flood and 2.75 knots on the ebb. They are not usually experienced over 10 miles off the river mouth. They increase in strength within the river mouth at springs to about 3 knots and greater during freshets.

In the river, the flood current attains a rate of 2.5 knots during the dry season and continues to flow on the surface for more than an hour after HW. The ebb current attains a rate of 3.75 knots at springs. At neaps, the maximum rate of flood and ebb currents is about half of that at springs. The average duration of the ebb current is 7 hours 10 minutes.

During freshets, the currents in the river may attain a rate as great as 7 knots. A peculiarity of the tidal currents is an occasional SE set, known as Scapy or Jack Tide, which crosses the harbor area from Best Groyne and usually occurs toward the end of the flood at spring tides. The effect of this current is to press ships against the piers; when this happens considerable difficulty is occasionally experienced by departing ships. Scapies are of short duration that last an average of about 45 minutes.

Depths—Limitations.—The approach to the river is obstructed by a mud flat which extends about 10 miles NE from the entrance points. This mud flat is subject to change.

The Harbor Authority published a depth of 3.1m for the channel on the understanding that it might vary by 0.6m. The least charted depth across the bar was 2.7m. It was reported that a ship drawing 6.7m could cross the bar at HWS. It has been reported that the bar and approach channel are being dredged to 7.4m and the channel is marked by lighted buoys.

The mud on the bottom is known locally as "sling mud." It is from 0.6 to 1.2m thick, and is of a very soft, almost liquid consistency. Ships of 10 knots or more can force a passage through this "sling mud" even though drawing 0.3m more than the actual depth of water.

In the approach to the river within about 35 miles of land, the water becomes discolored and patches of a dark, suspicious hue will frequently be met, but no danger has been found. The outer limits of this discolored water will alter with the seasons.

It has been observed that during the rainy season the water has a reddish tinge between the Demerara River and the Maicony River, about 24 miles to the ESE.

Ships normally leave Georgetown 2 or 3 hours after HW on the bar, depending on draft.

There are six primary cargo wharves, ranging from 127 to 274m in length, with depths alongside ranging from 4.8 to 7.4m at LWS; as the bottom is soft mud, vessels may safely lie aground alongside.

There are also four tanker berths, with depths of 3.1 to 6.7m alongside.

The Demerara Sugar Terminal, situated at the S end of the port, has a wharf 127m long, with an alongside depth of 7.4m; it can accommodate vessels up to 161m long.

Aspect.—Georgetown Light, a 30m high white octagonal tower with red stripes, stands near the E entrance point of the Emerara River. A conspicuous hotel stands near the coast about 0.1 mile ENE of the light.

Saint George's Cathedral, with a conspicuous spire, stands about 0.6 mile S of the light. The red-painted clock tower of the market, standing 0.3 mile SW of the cathedral, is conspicuous.

A red chimney, about 6 miles E of the river mouth, is conspicuous from the E. A beacon near the coast and about 9 miles SE of the red chimney is also conspicuous. Buoys and range lights can best be seen on the chart. A number of wrecks lie off the coast and near the harbor entrance, most of which are marked by buoys or lights.

Pilotage.—Pilotage is compulsory and is available 24 hours. Vessels should send their draft and ETA at the pilot boarding position 12 hours in advance through Demerara (8RB). Pilots board close NE of Safe Water Pillar Lighted Buoy (6°57.0'N., 58°3.3'W.).

The pilot station also provides pilotage for New Amsterdam, the Berbice River, and the Essequibo River.

Regulations.—The following are extracts from the harbor regulations:

1. Every application for a pilot is to be accompanied by the draft particulars of the ship.
2. Should the draft particulars not be advised, the harbor authorities will assume, with the exception of ships proceeding directly to Berbice River, that the ship concerned will enter the port of Georgetown at or near the time of HW, and the pilot attendance will be arranged accordingly.
3. All ships are particularly requested to amend their ETA, as required by special message through the coastal radio station to their agents and to the harbor authorities. Ships in the vicinity of the port or pilot station should listen for the pilot boat on VHF channel 16.
4. A ship with an infection on board should anchor in the quarantine anchorage and await the arrival of the port health officer. The master should advise the harbor authorities by special message through the coastal radio station, in order that the attendance of the port health officer can be arranged without delay. The customs boarding officer boards each ship close seaward of the harbor entrance.
5. Masters are particularly warned that it is forbidden to lower a boat, or to communicate with the shore or other ships, or to allow persons or things to leave the ship until the customs boarding officer has granted permission.

Contact Information.—Georgetown Pilots and Port can be contacted, as follows:

1. VHF: VHF channels 16 and 13
2. Telephone: 592-226-9871

Anchorage.—Anchorage can be taken in the river, in 6m, abreast the berths in Georgetown and in the anchorage berths marked “A” through “E” on the chart. The holding ground is good with a mud bottom.

Ships proceeding to Linden in ballast and drawing less than 4.5m are anchored in the S limit of Georgetown Harbor. Ships of more than 4.5m draft are anchored within the harbor, but towards the S end.

The limits of the quarantine anchorage are shown on the chart in a position about 10 miles NE of Georgetown Light.

Caution.—Less water than charted has been reported in the approaches to Georgetown.

There have been reports of pirate attacks on merchants in the area.

1.9 **Linden** (MacKenzie) (6°00'N., 58°18'W.) (World Port Index No. 12380) lies on the E bank of the Demerara River, 56 miles above Georgetown, and is important as a bauxite ore terminal, having a maximum depth of 6.6m.

Ships of up to 22,000 dwt are accommodated on a regular basis. The draft is dependent on depths across the bar at Georgetown and across the shoals in some reaches of the river.

Ships are normally loaded about 0.3m in excess of the least depth on the bar at Georgetown, but at this draft they must anchor off Sand Hills, about 28 miles upriver from Georgetown, and await the following tide. Ships normally leave Linden 2 hours after HW on the bar at Georgetown.

Two ships cannot pass at some river bends at the same time. Speed of ships is limited to 10 knots by regulations. Transit can be made at night but should be avoided because of river fog and mist which occurs frequently after midnight.

A jetty for the use of inshore fisherman is situated at Houston on the E bank S of Georgetown.

Rome Terminal, with a wooden T-head pier about 35m in length, is situated just S of Houston, it is used for the discharge of petroleum products, including LPG and has an alongside depth of 3.5m. It was reported that a vessel with a draft of 3.5m set aground at this berth at LW.

A pontoon bridge, located 2 miles upstream from Georgetown, has two central retraction sections, which provide an opening 77m wide.

The tidal range at the bauxite terminal is about 0.3m less than at Georgetown at springs and less at neaps.

Depths—Limitations.—There are two bauxite berths accommodating vessels up to 173m in length and a draft of 6.4m.

An aluminum loading berth, lying about 1 mile N of the bauxite berths, can accept vessels with a maximum beam of 25.9m. An oil berth with a wooden jetty is situated about 1 mile S of the pontoon bridge on the E bank of the river. The berth is 50m long with a depth alongside of 3.8m. There are no facilities for handling LPG.

The principal oil terminal for the port is situated on the E bank of the river and consists of two tanker berths. Vessels up to 137m in length can berth at the Texaco Terminal, a small T-headed pier consisting of wooded pilings and a platform with an alongside depth of 5.5m.

Pilotage.—Pilotage is compulsory and is necessary for safe navigation up the river.

1.10 From the mouth of the Demerara River to the mouth of the Berbice River about 50 miles to the SE, the coast is low and without prominent features. Mud flats front this part of the coast as far as 6 miles offshore; the 10m curve lies as far as 12 miles offshore in places.

A light is shown near the shore at the town of **Clonbrook** (6°44'N., 57°57'W.), about 17 miles ESE of the mouth of the Demerara River. A prominent beacon stands about 0.5 mile SE of the light. A conspicuous radio mast is located about 13 miles SE of Clonbrook Light.

New Amsterdam (6°15'N., 57°31'W.)

World Port Index No. 12390

1.11 The port of New Amsterdam is situated on the E bank and about 5 miles within the mouth of the Berbice River.

Tides—Currents.—The tidal rise off New Amsterdam is 2.5m at springs and 1.3m at neaps. The flood sets SW at about 3 knots and the ebb to the N at about 5 knots. The rising tide is reported to set in a position about 1 mile NE of Berbice Light.

Depths—Limitations.—The approach to the river entrance is obstructed by a shallow muddy shore bank that extends about 3 miles NNE and 4 miles to the N, respectively, from St. Andrew Point. The 5m curve lies at the seaward end of the approach about 8 miles NNE of the above point. Within this curve, depths shoal regularly to the shore bank, which may be marked by breakers at LW. A heavy ground swell is frequently experienced in this area.

The entrance bar, formed by the shore bank, has a least charted depth of 1.5m through the channel which leads to the river mouth. The channel has a least charted depth of 2.1m inside the bar. The bar is composed of fairly hard mud. Ships

may cross the bar on even keel loaded to 0.9m less than the Demerara Bar predictions. The river entrance is subject to silting. It has been reported (2008) that there was a dredged depth of 8.3m in the approach channel.

At **Everton** (6°12'N., 57°29'W.), about 4 miles upriver from New Amsterdam, there is a bauxite-loading terminal. Ships berth starboard side-to. The pier is 457m long, with a depth alongside of 7.6m. A bauxite-loading terminal, with a loading basin dredged to a depth of 10m, has been established E of the channel in a position N of Crab Island.

Aspect.—St. Andrew Point (6°19'N., 57°31'W.), the E entrance point of the river, can be easily distinguished at a distance of 5 miles. Two chimneys stand about 8 miles E of the port and are conspicuous radar targets at 23 miles.

Pilotage.—Pilotage is compulsory. Pilots board in position 6°31'N, 57°24'W. An advance notice of 24 hours must be given.

Anchorage.—Ships can anchor, in 4.6m, about 0.1 mile off the middle of Crab Island with the S church at New Amsterdam in range with the S end of the island.

Vessels waiting for the tide can anchor 1 mile NE of Berbice Light.

Caution.—Submarine cables cross the river off New Amsterdam. The landing places are marked by white diamond-shaped boards with the word "CABLE" in block letters. Anchorage is prohibited within 0.25 mile of either side of these cables.

1.12 From the mouth of the Berbice River, the coast trends ESE for about 8 miles and then SSE for about 22 miles to the mouth of the Courantyne River. This coast is low, sparsely wooded, and without prominent features. Mud flats with depths of less than 5.5m front this part of the coast as far as 6 miles offshore. Soundings are the best guide for this stretch of the coast as the charts are not very accurate.

Suriname

1.13 The coast of Suriname between the Courantyne River, the W boundary of Suriname and the Maroni River, the E boundary of Suriname lying about 195 miles E, is mostly low with few landmarks.

The coastal bank extends a considerable distance offshore. Paramaribo, on the Suriname River, is the only port of any shipping importance along this part of the coast.

The coastal bank contains most dangers and lies as far as 23 miles offshore. The dangers such as wrecks can best be seen on the charts.

The **Courantyne River** (Corentyn River) (6°00'N., 57°07'W.) marks the boundary between Guyana and Suriname.

The MHW interval at the river mouth is 4 hours. The tidal rise at springs is 3.2m and at neaps is 2.2m.

The flood current sets SW, the ebb sets NE, and during the rainy season the latter attains a rate of 3 to 3.5 knots; its influence is felt up to a distance of 10 to 12 miles offshore.

The edge of the current is distinctly marked by discolored water.

The river entrance is reported to be fronted by a bar which partly dries. Vessels with a maximum draft of 4.7m can enter at HWS; vessels with a draft of 3.7m can enter at LWS.

During December, January, and February a heavy sea frequently prevents ships with more than 2.7m draft from entering, due to the risk of hitting bottom.

Ships that are able to enter the river can proceed to Tropica, Suriname, about 47 miles above Skeldon, which is about 4 miles inside the mouth of the river. Ships seldom ascend the river above Skeldon.

The most prominent landmarks to be seen on the approach to the river are the radio mast with obstruction lights at Skeldon, the aviation light at Nieuw Nickerie, and the chimney at Waterloo, which is 5.2 miles ESE of the river entrance.

Vessels can obtain anchorage in the river off Skeldon, in 5 to 6.4m. Vessels can also anchor off Springlands inside the river.

Nieuw Nickerie (5°57'N., 57°00'W.)

World Port Index No. 12405

1.14 Nieuw Nickerie lies on the S bank of the Nickerie River, about 2 miles above the mouth of the river.

Tides—Currents.—Tidal currents off the entrance to the Nickerie River set SW and NE, attaining a maximum rate of 4 knots at springs.

Depths—Limitations.—The fairway across the bar has a least depth of about 2.1m at LWS which controls the draft of ships proceeding upriver for 24 miles to Wageningen. The bar consists of an extended bank of soft mud. At MHW the bar is passable for ships with a draft of 4m and a maximum length of 130m. The river is navigable for vessels up to 3,000 dwt and with a draft of 4.3m for about 30 miles above Nieuw Nickerie.

There are two wharves in the town. The Suriname Navigation Wharf is 91m long, with a depth alongside of 3m. The government wharf is 120m long, with a depth alongside of 3m. A berth for tankers is located 1 mile inside the mouth of the river and consists of three small jetties that can accommodate vessels up to 100m long with a maximum draft of 4.5m.

Aspect.—A light is shown from the W entrance point of the river. Another light is shown about 0.7 mile SE of the W entrance point of the river near the police station. A tank stands 1.75 miles WSW of the river's entrance.

Pilotage.—Pilotage is compulsory for vessels over 50 gt. Requests for a pilot must be made to the harbormaster at Paramaribo at least 48 hours before arrival and corrected as necessary 12 hours before arrival. A pilot is available both night and day at Nieuw Nickerie. The pilot boards near the lighted buoy about 4 miles N of the entrance of the Nickerie River.

Contact Information.—Nieuw Nickerie pilots can be contacted, as follows:

1. VHF: VHF channels 16 and 12
2. Telephone: 597-474575
3. Facsimile: 597-472845
4. E-mail: secretariat@mas.sr

Nieuw Nickerie port can be contacted, as follows:

1. Telephone: 597-476733
2. Facsimile: 597-472940
3. E-mail: info@mas.sr

Anchorage.—Vessels with a 4.5m draft can safely anchor 3 miles NNE of the sea buoy. It is not advisable to anchor in the

river for any length of time due to the river being so narrow that swinging room is restricted.

1.15 **Paradijs** (5°54'N., 56°56'W.), about 6 miles upriver from Nieuw Nickerie, has a pier for small ships. Just above Paradijs are the remains of an old pier in the river which should be avoided by keeping close to the right bank.

Wageningen (5°46'N., 56°41'W.), a port about 24 miles upriver from Nieuw Nickerie, can be reached by vessels which can reach Nieuw Nickerie. The river is only 70m wide at this point, which restricts vessels to a maximum length of 110m. There is a wharf, 118m long, located here. From the mouth of the Nickerie River to the mouth of the Coppename River, about 62 miles to the E, the coast is low, flat, and covered with mangroves and forest. Several creeks flow into the sea along this part of the coast. A radio mast stands about 23 miles W of the entrance of the Coppename River. A number of sand banks are contained within the 5.5m curve which lies up to a distance of 10 miles offshore.

The Coppename River—The Saramacca River

1.16 These rivers have a common mouth which is easy to identify as the coast recedes considerably from **Saramacca Punt** (5°54'N., 55°58'W.), the NE entrance point of the Saramacca River. This point is conspicuous from the E and the W. The Saramacca River, about 150 miles long, is navigable for about 63 miles upstream for vessels that can cross the bar. The least depth across the bar is 1.2m. The depths gradually increase upriver. Numerous dangerous wrecks lie in the N and E approaches to the common mouth of the rivers.

Coppename Punt (5°49'N., 55°55'W.) separates the two rivers.

The Coppename River, about 100 miles long, is navigable for coastal vessels for 38 miles upstream. The least charted depth in the channel over the bar is 2.1m close W of Coppename Punt. A conspicuous radio mast stands on the E bank of the river, about 8 miles SSE of Saramacca Punt.

The Coeswijie River is a tributary of the Coppename River, and flows into it on its E side about 4 miles below Coppename Point.The Wayombo River flows into the Coppename River on its W side, about 34 miles below Coppename Punt. The Coppename River is still navigable for small vessels up the mouth of Arawarra Kreek. The creek forms the connection between the Wayombo River and the Nickerie River.

Pilotage.—Pilotage on both rivers is compulsory for vessels exceeding 50 gt. A pilot should be requested at least 24 hours before arrival from the harbormaster at Paramaribo, giving the probable time of arrival and draft.

From the mouth of the Coppename River, the coast trends E for about 45 miles to the mouth of the Suriname River. The coast is low, sandy, and wooded. The tree tops are visible from a distance of 15 miles offshore. Mudflats front this part of the coast as far as 3 miles offshore; the 5m curve lies as far as 10 miles offshore.

The Suriname River

1.17 The mouth of the river forms a recession in the shoreline S of **Braamspunt** (5°58'N., 55°10'W.), the NE entrance point of the river. This point is low but well defined.

The S shore of the river mouth is very low and difficult to distinguish from offshore. The port of Paramaribo lies on the W bank, about 13 miles within the mouth of the river. Ships of moderate draft and size can enter the river and be accommodated at Paramaribo, Smalkalden, and Paranam.

Caution.—Rollers occur off the river entrance between December and March. It is reported (2015) that a dangerous wreck, marked by a buoy exists 0.3 mile WNW of the "S6" buoy in the approaches to the Suriname River.

Paramaribo (5°50'N., 55°10'W.)

World Port Index No. 12410

1.18 The port of Paramaribo is located on the W bank of the Suriname River, about 13 miles upriver from its mouth.

The port is the capital and center of the overseas trade.

Winds—Weather.—The climate is tropical. There are two rainy seasons; a short one lasting from mid-November to mid-February, and a longer one lasting from mid-April to mid-August. The highest temperatures are in August, September, and October while the lowest temperatures occur in January and February.

The prevailing winds are from the NE.

Tides—Currents.—The MHW interval at the river mouth is 4 hours. The tidal rise at springs is about 2.2m and at neaps is about 1m.

Off the mouth of the river, the flood current sets to the W and the ebb current sets to the E. The NW coastal current predominates over the tidal current. In the river the water level recedes 0.4 to 0.6m before the beginning of the ebb current in mid-channel. The tidal influence extends for a distance of about 100 miles above the river mouth.

Depths—Limitations.—Arrival drafts in the port are dependent on depths at the outer bar near the entrance to the Suriname River. The minimum depth at LWS is 4.6m.

There is a new oil terminal platform, about 22m long, with jetty moorings about 174m apart. The terminal has a least depth at LWS of 5.5m.

Nieuwe Haven consists of a wharf, 520m long, with depths alongside of 5.1 to 7.9m. It is used for general cargo. Four ocean-going vessels can berth simultaneously.

There is berthing space for vessels of the Suriname Navigation Company with a minimum depth of 3.9m.

Bacoven Wharf, a banana pier, is 96m long, with a least depth alongside of 4.2m. Flour Pier, privately owned, consists of a platform 11m long and moorings 49m apart.

Vensur Cement Pier, also privately owned, has a wharf 55m long, with a depth alongside of 4.2m and moorings 183m apart. Vessels up to 219m long can be accommodated.

The Shell Oil Terminal is 9.6m long with an alongside depth of 5m. The moorings are 138m apart.

Belwaarde Wharf is 85m long, with reported alongside depths of 5.5 to 6.1m. It is used for sugar. It was reported that

the strong current, combined with the suction from passing ships, causes considerable strain on berthing lines.

The least depths at LWS in the channel are, as follows:

1. Outer buoy to New Amsterdam—4.6m.
2. New Amsterdam to Paramaribo—5.1m.
3. Paramaribo to Domburg—5.2m.
4. Domburg to Paranam—5.2m.

Depths in the river and its approaches are subject to change and bars are liable to form.

Ships loaded deeper than the bar draft regularly navigate through these channels, as the bottom is of very soft mud and ships can easily plow through. Vessels leaving the river regularly load to a draft of between 6.7 and 7.0m.

Two stranded wrecks lie 18.5 and 17 miles NNW of Braamspunt. Other wrecks which exist in the area can best seen on the charts.

Another dangerous wreck lies in the middle of the river about 0.3 mile W of **Suzannasdaal** (5°52'N., 55°05'W.).

Discolored water from the river has been observed a considerable distance offshore.

There are three wharves for loading ores, as follows:

1. Dock No. 1, 111m long, with a minimum depth alongside of 5.1m.
2. Dock No. 2, 126m long, with a depth alongside of 10m.
3. Dock No. 3, 361.5m long, with a minimum depth of 5.6m.

Aspect.—Suriname River Sea Buoy lies about 7 miles NNW of Braams Point. The channel, marked by lighted buoys and beacons, begins about 2.2 miles S of the sea buoy.

Positions of the channel buoys and beacons are subject to change without notice; many of them may be missing or extinguished.

An entrance light is located on the S bank, about 6 miles SW of Braams Point beacons. A landfall light is shown from a mast, 121m high, standing 6 miles SW of Braamspunt; three red lights, disposed vertically, are also shown from this mast.

A bridge, with a vertical clearance of 40m, crosses the Suriname River about 1 mile upstream of Paramaribo, as seen on the chart. When vessels approach the bridge, they shall have both anchors cleared and crewmen standing by to employ them if needed.

Pilotage.—Pilotage is compulsory for vessels greater than 50 gt. Pilots should be ordered at least 48 hours in advance. Vessels should send their ETA 36 hours, 24 hours, and 12 hours prior to arrival at Approach Lighted Buoy; if necessary, the vessel should amend its ETA after the 12-hour message. The pilot will be ordered only after the 12-hour or amended ETA message is received. The pilot boards in the vicinity of Approach Lighted Buoy.

Contact Information.—Paramaribo Vessel Traffic Center (VTC) can be contacted, as follows:

1. VHF: VHF channels 16 and 12
2. Telephone: 597-474575
3. Facsimile: 597-472940
4. E-mail: secretariat@mas.sr

Paramaribo port can be contacted, as follows:

1. Telephone: 597-476733
2. Facsimile: 597-472940
3. E-mail: info@mas.sr

Anchorage.—Vessels awaiting a berth can anchor, in depths from 5 to 10m, avoiding a submarine power cable laid across the river from **Hoek van Meerzorg** (5°49'N., 55°09'W.).

Anchorage, if waiting for a pilot, can also be obtained 8 miles NW of Braanspunt, in a depth of 4.6m.

The Suriname River above Paramaribo

1.19 The Saramacca Kanaal is entered just S of Paramaribo and can accommodate small craft and barges not exceeding 1.8m in draft and 24.3m in length. The canal joins the Suriname River with the Saramacca River.

A lighted beacon is located abreast of Waterland on the Saramacca River. Nickerie can be reached by way of the Saramacca River, the Coppename River, and the Nickerie River about 14 miles upriver from Paramaribo. It is recommended to pass N of the beacon.

Smalkalden (5°38'N., 55°05'W.) is a small bauxite-loading terminal 18 miles upriver from Paramaribo. There is a wharf 67m long, with 163m between the moorings, and a depth of 9m alongside. It has been reported that the depth alongside the pier is only 7.5m and that the largest vessel that can be accommodated is 180m long, with a draft of 6.7m.

It has been reported (2013) that the port remains closed to commercial operations.

1.20 **Paranam** (5°37'N., 55°05'W.) (World Port Index No. 12415) lies on the W bank of the river, about 1 mile above Smalkalden. Vessels up to 44,500 dwt load to outer bar draft, usually half a ship load. Vessels usually top off at Trinidad.

The least depth at loading berths is 9m. The minimum depth on the bar is 6.4m at LWS and 7.3m at HWS. The concrete pier is 107m long, with 1m between the moorings. The main commodity handled here is bauxite. There is also a 207m long alumina pier, with an alongside depth of 9m.

At Paranam the river is wide enough for ships to turn. A cable with a vertical clearance of 60m spans the river close upstream of the port. Ships can anchor upstream of Paranam directly after the first bend.

Pilotage is compulsory for transiting the river.

The Commewijne River

1.21 The Commewijne River flows into the Suriname River on its E side about 6 miles above its mouth. The banks of the river are wooded and steep-to, with its bottom consisting mostly of clay and mud. The river has many sharp bends and tugs are needed to assist ships in making these turns. The tidal influence extends as far as Moengo, a distance of about 81 miles above the river mouth. The tides at Moengo rise about 0.1m.

The channel in the Commewijne River from its junction with the Suriname River to Alkamar, about 6 miles upriver, has a least depth of 5.2m. It was reported that ships 160m long, with drafts up to 6.8m, can reach Moengo via the Commewijne River for 17 miles, the Cottica River for 53 miles, and the Boven Cottica for 11 miles.

Pilotage.—Pilotage is compulsory. The river pilot will board the vessel off Neiuw Amsterdam. Navigation of the Commewijne River is not permitted at night.

Anchorage.—Vessels anchor at Alkmar and in the turning basin at Moengo.

Moengo (Albina) (5°38'N., 54°25'W.) (World Port Index No. 12420) is a bauxite port on the E bank of the Boven Cottica.

There are two piers, one 131m long and the other 37m long, both with a depth of 7.3m alongside. Vessels are loaded in accordance with the bar draft of the Suriname River. It was reported (2003) that the loading berths were not in use.

1.22 From the mouth of the Suriname River the coast trends to the E for about 75 miles, to the mouth of the Maroni River. The coastline is low and fronted with mud flats, with the 5.5m curve extending as far as 12 miles offshore.

Kaimans Hoofd (Kaimanshoofd) (5°50'N., 54°02'W.), about 6 miles NW of the W entrance point of the Maroni River, can be identified by a clump of high trees. Depths of less than 5.5m have been reported to lie as far as 15 miles off Kaaimans Hoofd and many dangerous wrecks are reported to lie off the coast. Deep drafted vessels should give this point a wide berth.

French Guiana

1.23 The coast of French Guiana between the Maroni River, the W boundary, and Fleuve Oyapock, the E boundary, 170 miles SE of the Maroni River, is generally low and is seen as a dark line of mangroves. A number of hills rise in the background and can be seen for some distance offshore. The coastal bank extends a considerable distance offshore.

The coastal bank lies as far as 21 miles offshore. Vessels should proceed with caution as the coastal reef has been reported to extend from 1 to 9 miles farther offshore than charted.

Rocket launchings are made from **Kourou Space Center** (5°13'N., 52°46'W.) at intermittent announced times with impact areas, as follows:

1. Area No. 1.—Area is bounded by the parallel 6°30'N, and the meridian 52°00'W, to 52°30'N, 50°00'W, then in a 235° direction, the coast of French Guiana, and the meridian 53°00'W.
2. Area No. 2.—A circle of 120 miles radius centered in 6°16.7'N, 51°42.2'W, limited SW by a line oriented 120° passing through 5°12.5'N, 52°43.7'W.
3. Area No. 3.—A circle of 100 miles radius centered in 8°05.5'N, 49°49.8'W.

1.24 The **Maroni River** (5°45'N., 54°00'W.) is entered between Galibi (Hoek Galibi), lying 5.5 miles SSE of Kaimaans Hoofd, and Pointe Francaise, 2 miles E of Galibi.

Ships with drafts of 4.5m can navigate up river for 15 miles to Alpine, situated on the Suriname side of the river, and to Saint Laurent, across the river on the French Guiana side.

In 1994, the least depth in the channel as far as Saint-Laurent du Maroni was reported to be 2.2m.

At the river entrance, the spring rise is 2.6m and the neaps rise is 2.0m The tidal range at Saint Laurent is from 1.8 to 3.0m; HW occurs 3 hours later than at the entrance.

On the bar, the flood current sets SW and the ebb sets toward Tiger Banken, a drying bank extending N from Hoek Galibi.

In the fairway abreast Tiger Banken, the river current can attain a speed of 3 knots.

The seaward edge of the bar lies 6 miles NNE of the river mouth.

An entrance channel over the bar has a minimum depth of 1.2m. The bar consists of hard coarse sand. A fairly heavy swell is usually experienced on the outer part of the bar.

A lighted buoy is moored 10 miles NE of the disused lighthouse on Hoek Galibi. Numerous wrecks, dangerous to navigation, lie off the entrance and can best be seen on the chart. The buoyed channel is subject to frequent change. The disused lighthouse on Hoek Galibi, a 60m high red and black metal framework tower, is an excellent landmark. From offshore, the river entrance appears as an opening in the line of trees between Hoek Galibi and Pointe Francaise.

Pilotage.—Pilotage is compulsory. Requests for a pilot, stating the vessel's draft, should be made 48 hours in advance to the pilot station at Degrad des Cannes. The pilot boards near Lighted Buoy SL. Pilotage is available during daylight hours only.

Anchorage.—Sheltered anchorage can be taken about 0.5 mile N of **Pointe Panato** (5°43'N., 53°58'W.), about 2 miles SSW of Pointe Francaise, in 7 to 8m, mud.

1.25 **Saint Laurent** (5°30'N., 54°02'W.) (World Port Index No. 12450) has two 120m piers with a depth of 4.5m alongside. Vessels will lie aground at LW on a soft mud bottom. Vessels are moored during daylight hours only.

Fleuve Mana (5°45'N., 53°55'W.) is entered between Pointe Francaise and Pointe Isere, 2.75 miles ENE. The mouth of the river is not visible from offshore. Pointe Isere is fringed by a shallow sand spit which extends W toward the river mouth.

The coast S of Pointe Isere and E of Pointe Francaise is also fringed by a shallow sand spit which extends N and E toward the river mouth. The river mouth narrows to less than 0.5 mile in width between the sand spits.

The depths in the entrance range from 0.3 to 1.2m.Vessels should not cross the bar within 2 hours of either side of low tide. Vessels should also avoid the S bank of the river as it is encumbered by tree trunks which are immersed at HW and are dangerous. Local knowledge is essential.

The settlement of Mana lies on the W bank of the river about 11 miles above its mouth. It has a landing stage with 5.8m alongside. A radio mast, which gives an excellent radar return, is located on the N edge of the village.

1.26 From Pointe Isere to **Pointe Charlotte** (5°12'N., 52°38'W.), about 80 miles to the SE, the coast is low and covered with mangroves.

Montagne du Diable, a prominent conical hill about 16 miles W of Pointe Charlotte, can be seen for a distance of about 20 miles. The Riviere Organabo, the Riviere Iracoubo, the Riviere Counamana, and the Fleuve Sinnamary, all of which are shallow, discharge into the sea along this part of the coast.

Depths of less than 5.5m lie from 4 to 9 miles offshore, but off the mouth of the Fleuve Sinnamary these depths lie as far as 11 miles offshore; therefore, give a wide berth off the coast.

A number of wrecks lie within the 20m curve off this section of coast and can best be seen on the chart. A bank, with a least

depth of 3.2m lies about 10 miles NNE of the W entrance point of Riviere Iracoubo.

Iles du Salut

1.27 Iles du Salut (5°17'N., 52°35'W.), three in number, are located about 7 miles NE of Pointe Charlote. Ile du Diable, the northernmost, is 40m high. Ile Royale, 66m high, is the largest and westernmost, while Ile Saint-Joseph, only 30m high, is the southernmost.

Ile du Diable and most of Ile Saint-Joseph are covered with high and dense vegetation. Buildings of a former prison stand on Ile Royale and Ile Saint-Joseph. On a clear day, the islands are visible at a distance of 15 miles.The current sets generally NW. A SW current, with rates from 1 to 3 knots, and more during NE winds passes between Ile Royale and Ile Saint-Joseph, then becomes WSW and weakens S of Ile Royale. Within 91m of the S side of Ile Royale, there is a weak E countercurrent.

The flood tide flows WNW at 0.3 knot, 1 mile S of the islands, while the ebb tide flows NNW at 1 knot. Breakers mark the shallow depths which extend NE from Ile du Diable and ENE of Ile Saint-Joseph. It is difficult to approach Ile du Diable, except at the pier on its S end, and in good weather only. The passages between the islands are dangerous and are not recommended for even small boats. A heavy sea is often experienced during the wet season, from December to June.

A light is shown from the W side of Ile Royale and also at the S and SE ends of the island.

Anchorage.—The anchorage at Iles du Salut is the most important anchorage along the coast of the Guianas, this being due to the few ports along this coast capable of affording shelter to ships of moderate size.

Anchorage can be taken in the bight formed by the S side of Ile Royale and the W side of Ile Saint-Joseph. Depending on draft, vessels can anchor with the light on the W side of Ile Royale bearing 020°, distance 0.5 mile, in depths of about 9m soft mud, good shelter from the swell, and good holding ground. Depths less than those charted were reported between positions 0.5 mile WSW and 1 mile SSE of the light on the W side of Ile Royale.

Vessels over 1,600 gross tons transporting hydrocarbons or hazardous materials anchor in a circle with a radius of 0.5 mile centered bearing 300° from Ile Royale Light, distant at 3 miles.

Caution.—Alouette Bank, covered with 4.8m of water, lies about 1.7 miles NNW of Ile Royale. Depths of 3.5 to 5.5m lie between Ile Royale and this bank. An isolated 6.1m shoal lies 0.5 mile W of Ile Royale.

1.28 The mouth of the **Fleuve Kourou** (5°10'N., 52°37'W.) lies 3 miles SE of Pointe Charlotte. The river is narrow and entry is difficult as the channel leads near many dangerous rocks, the positions of which are uncertain.

High water is about 50 minutes later and LW about 30 minutes earlier than the time for Iles du Salut. Between Iles du Salut and the mouth of the river, the flood current sets SW and the ebb current sets NW.

The bar of soft sand, which shifts continually, permits the passage of ships with a draft equal to the height of the tide plus about 0.1m The sea breaks on the bar in bad weather.

A lighted buoy is moored about 3.7 miles SSW of Ile Royale Light.

The entrance channel to the river is marked by buoys, and extends to the port of Pariacabo, about 3 miles W of the river mouth, on the N bank.

It was reported (1995) that the least depth in the channel as far as Pariacabo was 2.5m.

Pilotage.—Pilotage is compulsory and is available during daylight hours only. The pilot should be requested 48 hours in advance. Pilots board in the vicinity of Lighted Buoy KO. Ships awaiting a berth can anchor N of the sea buoy or S of Iles du Salut.

1.29 Pariacabo (5°08'N., 52°39'W.) is the port for the space center at Kourou. There is a pier about 105m long, with a depth of 3.6m alongside, with a mooring buoy off each end of the pier. Recently, the pier was reported unusable.

The village of Kourou lies about 1 mile above the mouth of the river and buildings in the village are prominent from seaward.

From the mouth of the Fleuve Kourou, the coast trends to the SE for about 21 miles to the mouth of the Riviere de Cayenne. The coast is wooded and marked by a few slightly salient points, but the coast has not been fully examined.

Several rocks and small island lie as far as 5 miles offshore. Monts La Condamine, wooded with steep slopes, lies about 6 miles SSE of Pointe Charlotte, and can be seen from the offshore. The summit of the mountain is prominent.

The Riviere de Cayenne

1.30 The river is entered W of the NW end of **Ile de Cayenne** (4°56'N., 52°20'W.). Ile de Cayenne is hilly and irregular, especially in the E part and is easily identified from seaward.

The depths over the bar are subject to frequent changes. Depths over the bar vary from 0.3 to 0.7m at LW. It is recommended that mariners receive the latest depth information from the pilots before crossing the bar. It has been reported that a vessel with a draft of 4.2m could cross the bar at mean HW.

Banc du Macouria, a large sandbank which dries in places, fronts the N side of Pointe de Macouria, the W entrance point of Riviere de Cayenne.

Several rocks, above and below-water, and Iles Remire, a group of five small islands, lie as far as 5 miles off the N and E sides of Ile de Cayenne.

L'Enfant Perdu (5°02'N., 52°21'W.) is a low flat rock, located about 6 miles N of the river mouth, and shows a light.

A reef extends about 0.1 mile E and W and 14m to the S, respectively, from the rock.

A dangerous wreck lies 0.5 mile to the E of the rock. Heavy seas have been experienced in this vicinity.

An isolated 5.9m shoal is reported to lie about 2 miles NNE of the rock.

Tides—Currents.—The mean tidal range at Cayenne is about 2.3m at springs and about 1.2m at neaps.

The current about 10 miles offshore usually sets between WNW and NW, and attains a wind-assisted velocity of 2 to 3 knots. The offshore current is affected by the tidal current as

far out as L'Enfant Perdu where the flood current sets NW and the ebb NNE at rates of up to 2 knots.

Off the mouth of the Riviere de Cayenne, the flood current sets slightly towards Banc du Macouria, especially during SE winds. The ebb current sets E towards the banks extending N from Ile de Cayenne.

Within the river the currents follow the channel. The ebb current attains a rate of up to 4 knots while the flood current does not exceed a rate of more than 2.5 knots.

Aspect.—Ile Cayenne is composed of several hills and prominent mountains, with Mont Montabo, 105m high, at its N end. A water tower, marked by lights, stands about 2 miles S of Mont Montabo. A conspicuous hotel is also located near Mont Montabo.

Pilotage.—Pilotage is compulsory and is available 24 hours. Send the ETA and draft 48 hours in advance to the pilot station at Degrad des Cannes.

Contact the pilot vessel 1 hour before arrival on VHF channel 16; the pilot boards about 0.6 mile NW of Lighted Buoy CA.

Anchorage.—The only anchorage for vessels unable to cross the bar is at Ile du Salut. Vessels awaiting pilot or tide, anchor, in 6m, about 2.5 miles NE of L'Enfant Perdu. The bottom is mostly mud, good holding ground. A designated tanker anchorage, with a radius of 0.5 mile, is located about 5.5 miles ENE of L'Enfant Perdu. Vessels bound for Cayenne and expecting a long wait should anchor off Iles du Salut (see paragraph 1.27).

1.31 Cayenne (4°56'N., 52°20'W.) is situated at the NW extremity of Ile de Cayenne on the E bank of the river mouth. The port is closed to commercial traffic and is now used mainly by fishing vessels.

Larivot (4°54'N., 52°22'W.) (World Port Index No. 12460) about 2.2 miles upriver from Cayenne, is a small tanker port consisting of an L-shaped pier having a length of 100m along its outer face. The port can accommodate ships with drafts of about 4.8m. A rock with a depth of 1.5m lies close W of the pier.

It was reported (1995) that the minimum depth in the channel as far as Larivot is equal to the height of the tide at Cayenne.

1.32 The Fleuve Mahury (4°52'N., 52°14'W.) flows into the sea between Point Diamonte, the easternmost point of Ile de Cayenne and a mud flat extending NNE from Pointe Jaguar, 1.5 miles further SE.

The winds are predominately from between N and E from January to April and between E and SE from April to December.

The tidal current in the river is 1.8 knots during the flood and 2 knots during the ebb, but the currents have been known to attain rates of up to 4 knots.

A 120m wide channel leads from a position 1.25 miles E of **Le Pere** (4°56'N., 52°12'W.) in a SSW direction for 6 miles over the bar into Fleuve Mahury and then turns W to Degrad de Cannes. It has been dredged to 4.2m.

There is an occasional swell over the bar, but the bottom is soft mud, allowing ships to plow through. The entrance, marked by a lighted buoy, is located about 5 miles NE of Pointe Diamant. The channel is marked by lighted buoys and leads to the port of Degrad des Cannes, about 8 miles from the entrance buoy.

1.33 Degrad des Cannes (4°51'N., 52°16'W.) (World Port Index No. 12455), the port of French Guiana, opened in 1972. The principal wharf is 309m long, with a depth alongside of 6m. A second wharf, with facilities for ro-ro vessels, is 150m long, with depths alongside of 5m. Abreast the wharves is a 400m diameter turning basin, best seen on the chart, that has a maintained depth of 6m. The port of Degrad des Cannes replaces the port of Cayenne, to which it is connected by road. Vessels up to 160m long with a maximum draft of 5.9m can be accommodated. The tidal currents may attain a rate of 4 knots.

Pilotage is compulsory; the pilot boards in the vicinity of Lighted Buoy DC. The pilot must be requested 48 hours in advance. The vessel's draft should also be included in the request for a pilot. Vessels should be at the pilot station 2 hours before HW.

Degrad des Cannes pilots can be contacted, as follows:

1. VHF: VHF channels 12 and 16
2. Telephone: 594-594-354520
3. Facsimile: 594-594-354946
4. E-mail: spmgsecretariat@wanadoo.fr

A designated tanker anchorage, with a radius of 1 mile and depths of 7 to 10m, is located 1.5 miles NW of Lighted Buoy DC. Vessels bound for Degrad des Cannes and expecting a long wait should anchor off Iles du Salut (see paragraph 1.27).

The Riviere Oyac joins the Fleuve Mahury about 14 miles above Pointe Diamant. Ships proceed up the Riviere Oyac as far as the mouth of the Riviera Orapu, about 6 miles above the mouth of the Riviere Oyac, and then 4 miles up the Riviere Orapu to the settlement of Fourgassie, a timber-loading port.

At Fourgassie, ships must be prepared to push the bow into the bank of the river in order to turn around, as the river is only 90m wide. The least depth on the passage up to Fourgassie is 4.3m. Ships are warped to the loading place as close as their drafts will allow.

The Riviere Oyac and the Riviere Orapu are only marked with buoys at a few dangerous places; both banks of these rivers are thickly overgrown with trees.

From the mouth of the Fleuve Mahury, the coast trends SE for about 50 miles to the mouth of the Fleuve Oyapock, the boundary between French Guiana and Brazil.

The coast is low and swampy between the Fleuve Mahury and the Fleuve Approuague, about 25 miles SE. The coast between the Fleuve Approuague and the Fleuve Oyapock is low and wooded.

Prominent hilltops can be seen in the background from offshore. Mud flats of shallow depths from the coast lie as far as 10 miles offshore. Mariners are advised to give this part of the coast a wide berth.

1.34 Le Petit Connetable (4°48'N., 51°58'W.) lies about 12 miles N of the mouth of the Fleuve Aprouague. The island is flat, blackish in color and is barely awash at HW.

Le Grand Connetable, a bare rock about 50m high, lies about 2 miles E of Le Petit Connetable and can be seen at a distance of 25 miles in clear weather. Its SW side is steep-to and its E side appears to extend underwater for some distance.

Ships should not pass between Le Petit Connetable and Le Grand Connetable.

Battures du Connetable (Les Battures de Connetable) (4°56'N., 51°57'W.), lying about 6 miles NNW of Le Grand Connetable, are rocky plateaus of coral and sand with a least depth of 1.8m. During swells the sea breaks on these shoals, but during calm weather it is only marked by the eddies of a W current. Banc Cospatrick (Haut-fond Cospatrick), 1.5 miles NNW of Les Battures, with a least depth of 4m, is the summit of a bank of soft mud.

Tides—Currents.—The main current is strong and sets to the NW in the vicinity of the Connetables during the summer, but during the winter, especially on the falling tide at springs, this current runs farther offshore.

The tidal current, the strength of which is augmented by the discharge of the Fleuve Approuague, sets N and NNW and causes heavy breakers at its meeting with the main current about 3 or 4 miles outside the Connetables. This race usually disappears at SW if the outer current is weak. The inner edge of the race appears as breakers on a shoal and on its landward side the water is muddy.

Caution.—A dangerous wreck lies about 5 miles WNW of Le Petit Connetable.

It was reported (2000) there was less water between Iles Remire and the mainland on each side of the entrance to the Fleuve Mahury.

The Fleuve Approuague

1.35 The Fleuve Approuague discharges between **Pointe Behague** (4°40'N., 51°54'W.) and the coast about 6 miles W. It is identified by its width and by Pointe Behague, which is covered with mangroves. A drying mud flat extends from the W entrance point of the river to a position 7 miles NW of Pointe Behague.

The river is navigable for about 10 miles from its mouth, but small craft can proceed to Regina, about 30 miles upriver. The channel in the river, with a depth of 5m at HW, follows the E bank as far as Guizambourg, a small village about 10 miles from the river mouth. Above the village, the channel becomes narrow and winding and often leads close to dangerous rocks and shallow sand banks.

Caution.—A dangerous wreck lies about 8 miles NE of Pointe Behague.

The Fleuve Oyapock

1.36 The Fleuve Oyapock forms the boundary between French Guiana and Brazil and discharges between **Mont d'Argent** (4°21'N., 51°39'W.) and Cabo Orange, about 10 miles E.

The river is navigable for ships drawing up to 4.0m at HWS, as far as Saint Georges, about 30 miles above the river mouth. Off the river mouth, the flood current sets WNW and the ebb current sets NE, attaining a rate of up to 3 knots. The current offshore sets NNW and attains a rate of up to 2 knots.

Baia do Oiapoque (Baie d'Oyapock), which forms the mouth of the river, is 8 miles wide between Mont d'Argent, its W entrance point, and Cabo Orange, its E entrance point. The estuary of the river is encumbered with numerous shoals on which the sea breaks heavily in bad weather.

The river has not been completely surveyed and its navigation is dangerous. In the vicinity of Mont d'Argent, the coast is backed by several hills, which are visible from offshore. Mont d'Argent can be seen for a distance of about 15 miles on a clear day.

The anchorage normally used lies about 1 mile E of the SE point of Mont d'Argent, in depths of 4.9m, mud bottom, being aware of the rocks that extend almost 1 mile SSE of the point.

Also, during bad weather the currents are strong and the sea rough.

Ships drawing less than 3m can anchor off the Riviere Ouanary, between about 0.1 mile and 0.15 mile from the foot of Mont Bruyere.

There are no official pilots available, but persons having local knowledge can be obtained at Cayenne or Belem, Brazil.

Cabo Orange to Cabo Norte

1.37 The N coast of Brazil, except for a few stretches of Estado do Caera near its E part, is low and is formed of sand hills about 49 to 79m high. The sand hills are similar in appearance, being interspersed with reddish cliffs and clumps of mangroves. The mangroves are usually observed at the mouths on the W banks of the rivers, which they serve to mark.

The entrances of the rivers along this coast are as a rule open to the N and are obstructed by sand banks. Many of the rivers are gradually silting up and will omit only small coasters.

Ships can anchor along the N coast in good weather but the sea becomes rough at times during flood tides.

Cabo Orange (4°28'N., 51°29'W.), the N extremity of the Brazilian coast, is low, but its salient position is easily identified from E as the hills on the W side of the Fleuve Oyapock are visible behind it. The vegetation covering the N part of the cape is higher than at its S part and can be seen from a distance of about 12 miles. The cape should not be approached within a distance of 11 miles. The cape is marked by a light.

The coast from Cabo Orange to Cabo Norte, about 195 miles to the SSE, is low and covered with tropical vegetation which can be seen for about 12 miles. Several rivers flow into the sea along this part of the coast. The action of these river, combined with the Amazon River, cause frequent changes in the coastline. The silt carried out by these rivers forms soft mud flats which extend a considerable distance offshore in places. Mangroves spread rapidly during the dry seas over the mud flats but are destroyed during the rainy season.

The coastal bank contains all known dangers, and lies as far as 70 miles offshore. Mariners should not approach this coast in depths of less than 18.3m as strong winds cause heavy rollers over the coastal bank.

A depth of 16.5m was reported to lie outside the 330m curve in approximate position 3°18'N, 48°09'W.

The coast between Cabo Orange and Cabo Cassipore 20 miles SE, is low, subject to flooding, and is only visible about 8 miles offshore. shallow bank fringes this coast and there are depths of less than 5m as much as 12 miles offshore.

Cabo Cassipore (3°54'N., 51°06'W.) is the extremity of a low promontory which forms the E entrance point of the Rio

Cassipore. The river entrance, about 6 miles W of the cape, is wide and can be identified by the large trees on the W bank of the river which lie above the neighboring mangroves.

The river is navigable by small coasters drawing up to 2m as far as the town of Japa, 24 miles upstream. Small boats can reach Portel, 12 miles upriver from Japa.

1.38 The **Rio Cunani** (2°49'N., 50°57'W.) is entered about 65 miles SSE of Cabo Cassipore and is navigable by vessels drawing less than 3m as far as the mouth of the river. The bar should not be crossed without the advice of local pilots or a pilot obtained from Belem, and only during the intervals when the water is above half tide.

The river can be identified by Monte Cunani, 50m high, located about 4 miles S of the river mouth, which can be seen for a distance of about 16 miles. The mount is covered by vegetation that stands out from the mangrove in the same vicinity. From the NE, it appears as a narrow hill; from the SE, it appears more elongated and less distinctive.

Anchorage may be obtained off the mouth of the river, in a depth of 5m, good holding ground of mud. Vessels should use a good scope of chain due to the strong tidal currents. Vessels will roll heavily during the flood current.

The **Rio Calcoene** (2°32'N., 50°45'W.) is located about 20 miles SSE of the Rio Cunani, and shows a light from the S bank of the river mouth. The river is navigable to near the settlement of Daniel, 15 miles from the mouth, by vessels of up to 3m of draft. The mouth of the river is obstructed by drying sandbanks. The bar can be crossed with water level above half tide, with the advice of local pilots or pilots obtained from Belem.

The **Rio Amapa Grande** (2°08'N., 50°41'W.), about 24 miles SSE of the Rio Calcoene, is navigable by vessels drawing up to 3m for as far as Santa Cruz do Amapa about 6 miles from the river mouth, and close to the city of Amapa. The river bar can be crossed only with local knowledge or the help of pilots, and only when the water level is above half-tide.

An aeronautical light and a radiobeacon are located near Amapa.

1.39 **Ilha de Maraca** (2°05'N., 50°25'W.), divided into two parts by Igarape do Inferno, forms a bay which affords the only sheltered anchorage along this part of the coast. Cabo Raso do Norte, the NE extremity of the N part of the island, lies 28 miles SE of the mouth of the Rio Calcoene.

Canal do Varador de Maraca (Canal de Carapaporis), which separates the W side of island from the mainland, is fairly deep and is the main approach to the anchorage. Canal Turluri, on the S side of the island, is obstructed by a mudbank and is available only to vessels of shallow draft and local knowledge.

Small vessels should not navigate in Canal do Varador de Maraca and in the vicinity of Igarapedo Inferno just before the tidal bore occurs.

The best anchorage is with the NW extremity of the N part of the island bearing 338° and the S entrance point of the Rio Amapa bearing 280°.

It is reported that depths are not less than 5.5m mud, and that the anchorage is sheltered from the tidal currents and the bore.

Greater depths are to be found farther off the island, but the tidal currents are so strong that an anchorage there would be untenable at springs.

A ship should approach the anchorage from the NNE, giving the N part of the island a berth of at least 4 miles. The W end of the N part of the island can be kept close aboard.

The anchorage is plainly indicated by the opening of Igarape do Inferno.

The tide reaches its highest level in Canal de Varador de Maraca about 2 to 3 hours after the beginning of the flood tide.

At the equinoxes, the tide has been observed to rise 10m and tidal currents to run for a short period at a rate of 7 knots. This rate rapidly diminishes within four days after springs. During these periods, there is a heavy sea offshore.

The difference between the level of LWS and neaps seldom exceeds 2.5m. The current always sets NW.

Ilha Jipioca (1°51'N., 50°13'W.) lies about 2 miles N of the S entrance point off Canal Turluri and is inaccessible as it is surrounded by shallow mud banks.

1.40 **Cabo Norte** (1°41'N., 49°55'W.), the NW limit of the estuary of the Amazon River, lies 47 miles SE of Cabo Raso do Norte and 19 miles from Ilha Jipioca. The cape is low, wooded, and slightly higher than the neighboring coast.

The coastal bank, with depths of less than 10m extends nearly 60 miles NE of Cabo Norte. Depths of less than 5m extend 47 miles NE of the cape. This bank is dangerous during strong winds which cause heavy rollers over it. Vessels should not approach it within depths of 20m. Shoals with depths of 10.3m and 16.6m, have been reported, lie about 145 miles NE of Cabo Norte. A shoal with a depth of 11m, lies about 10 miles SW of that position.

Several shoals, with depths from 3.7 to 6.1m, lie up to 25 miles offshore between ENE and SE from Cabo Norte.

Lower Reaches of the Amazon River

1.41 The mouth of the Amazon River, together with the mouth of the Rio Para, extends from Cabo Norte to **Ponta Curuca** (0°32'S., 47°49'W.), 183 miles to the SE. Canal do Norte and Canal do Sul, through which the two main arms of the Amazon River flow into the sea, encompass a number of islets and islands.

Ilha do Marajo, the largest in the estuary, forms the S side of Canal do Sul and the W bank of the Rio Para from its entrance for several miles.

These two rivers are connected by a number of navigable channels.

A characteristic of the Amazon River is that it has no delta of accumulated mud extending into the sea, yet the river carries an immense amount of mud in its waters.

The Amazon River and its tributaries comprise over 13,700 miles of safe river navigation. Manaus, situated more than 900 miles from the sea, can be reached by ships drawing 7.3m all year. Iquitos, Peru, nearly 2,000 miles from the sea, can be reached by ships drawing 3.6m year round and by ships drawing 7m during HW, which occurs from January to May.

Sao Antonio is nearly 1,535 miles from the sea and is situated about 697 miles up the Rio Madeira, the principal tributary of the Amazon River, from its junction with the

Amazon River, about 82 miles below Manaus. San Antonio can be reached by ships drawing 5.5m for about 9 months of the year. During the remainder of the year only 1.9m drafts can be taken.

Boats and barges can be navigated most of the year between Ciudad Bolivar, Venezuela and Manaus via the Rio Orinoco and Amazon River systems.

Winds—Weather.—In the vicinity of the Amazon River, the air is cooled by the proximity of the watercourses and lakes, coupled with the heavy and frequent rains which are accompanied often with squalls. The difference between the day and night temperatures is appreciable during the latter part of the year.

The year has two seasons, winter or the rainy season and summer or the dry season. The rainy season is between January and June and the dry season is between July and December. During winter the rain falls in torrents, sometimes for an entire week.

The level of the river and its tributaries begins to rise from the start of the rainy season and soon the rivers are joined, with large lakes which form close to their banks. As the water level rises, trees are uprooted from islands.

The winds blow between ENE and ESE during the dry season and they are considered to be the prevailing winds. These winds are moderate in July and August but fresh during the rest of the season when the gusts, known locally as "Marajos" reach great force.

This season is the best time for ascending the river. Sailboats descending the river drift with the current, all sails furled.

During the rainy season calms prevail, interrupted only by heavy squalls from the NE which backs through N to SW accompanied by torrential rains.

Tides—Currents.—The waters of the Amazon River increase in volume during 6 months of the year and decrease during the other part of the year. The snow on the Andes begins to melt during August and September, but this influence is slowly felt by the river. The river begins to rise in November and the flooding in the lower parts take place from January to May. The NE winds, which then prevail blow strongly at the river mouth, delay the discharge of the river and contribute greatly to the inundations.

The maximum rise of the river level varies from 9 to 15m leaving at times the entire basin flooded. As a result of natural causes, the water in the S tributaries of the Amazon River is high, while that of the N tributaries is low, and vice versa. In the Rio Madeira, a S tributary, the water attains maximum height in April, the difference between H and LW being about 15m.

Outside the river estuary, the ocean waters which are driven W by the prevailing winds form a NW current which usually attains rates of 2 to 4 knots. This current being at right angles to the current from the Amazon River deflects towards the N and joins with the river current, attaining greater force.

The muddy water of the river discolors the ocean waters for about 70 miles from its mouth. Its limits are well-defined by the abrupt change of color. A vessel outside the line of demarcation, where the ocean water is of a bluish-green color, has been observed to leave a wake of muddy water, in sharp contrast with the surface water.

This phenomenon occurs in depths of up to 15m and is caused by the lower layer of river water extending further seaward than the surface layer.

The tides in the vicinity of the Amazon River are subject to so many variations and irregularities that it is difficult to state precisely what course they follow. Duration, height, and strength of the current depend on the force of the wind, the volume of rain, and the random changes in current direction.

The flood current near the mouth of the Amazon River (between Cabo Norte and the mouth of the Rio Para) sets to the SSW and then sets toward the SW and WSW accordingly as it moves out from the coast, whereas the ebb current sets originally to the general current.

There are irregularities in the tides along this part of the coast. One of the more remarkable irregularities is a difference of 2 or 3 hours in the times of HW of two places in the estuary only 12 miles apart. Another remarkable anomaly is a rise of only 1.9m, 12 miles from a position where at the preceding tide 8.8m high had been observed.

During the rainy season near Ilha do Marajo, the water level rises quickly as soon as the flood tide begins. The spring rise is usually about 5m, half of this rise occurs during the first 2 hours of flood tide and the rate of the current is about 6 knots.

The rate of current between Cabo do Norte and the mouth of the Rio Araguari, about 25 miles S, varies from 8 to 10 knots.

At Cabo do Norte from January to April, the flood current attains a rate of 8 knots at springs, and the ebb current attains rates of from 2 to 4 knots. In May, the currents are of equal strength and after May, the ebb current begins to be the stronger of the two. In August and September, the flood current is weak while the ebb current attains rates of 5 to 6 knots. In October, the ebb current begins to decrease in strength and during November, the period at which the NE winds begin to blow, both currents are again of equal strength.

From this it may be concluded that the sea level is higher than the river level when the flood current is stronger than the ebb current. This occurs from December to April, a period when the winds blow strongly from the NE. The sea level is lower or at least equal to the river level when the ebb current is stronger than the flood current. This occurs from June to October, a period when the winds blow from the ESE.

In December, when the flood current begins to be stronger than the ebb current, this effect is felt as far as 120 miles above the river mouth. Normally, the influence of the tide is felt as far as Obidos, situated about 600 miles above the river mouth.

The tidal bore phenomenon, known locally as Pororoca, occurs at times in the Amazon estuary prior to spring tides. The bore consists of a wave which varies from 1.5 to 2.5m high whose crest breaks and spreads over the shallow waters of the river and its tributaries. The phenomenon is not felt in depths of more than 7m so that there is no danger to ships keeping within the main or deep channels.

The wave has a velocity of 10 to 15 knots being strongest and most dangerous from January to June, and at the equinoxes, when the wind is from the NE. It carries off everything in its course. When the wave passes, it leaves the river almost full. Afterwards, the flood current continues to attain rates of 8 to 10 knots in the vicinity of Cabo do Norte from January to April and less in August and September.

Without perceptibly raising the level of the water near Cabo do Norte, the tide reaches its greatest height, reported as 12.2m within a period of about 10 minutes. However, off Ilha do Marajo, the bore only causes the water to reach mean level, with the tide reaching maximum level with the continuation of the flood. The bore, which is felt as far as 40 miles up the Rio Araguari, is very violent. There is no bore in the Rio Para but in the Rio Guama, a tributary of the Rio Para, a bore is experienced at spring near the town of Pernambuco, situated about 25 miles above Belem. This bore raises the level of the water from 1.5 to 4.5m within a few minutes. A similar experience occurs in the Rio Guajara, another tributary of the Rio Para whose mouth lies close S of Belem. When the bore occurs, which is at the lowest tide, a roaring sound is heard at a distance of 3 to 6 miles. This noise increases in intensity as the bore approaches.

Pilotage.—Pilotage is compulsory for the Amazon River above Macapa (0°02'N., 51°03'W.). Vessels should request pilotage, via their agent, 7 days in advance. The vessel's ETA should be confirmed 48 hours, 24 hours, and 8 hours in advance through Belem (PPL).

Pilots board in the following positions:

1. About 20 miles E of Ponta do Maruim (1°13'N., 49°34'W.).
2. About 2 miles ENE of the E extremity of Ilha de Santana, in the approach to Porto de Santana (0°04'S., 51°06'W.).
3. About 7.5 miles NNW of Salinopolis Light (0°30'S., 47°23'W.).

Vessels unfamiliar with the area should use the pilot boarding position NNW of Salinopolis Light.

Caution.—The buoys and channels of the Amazon River and its approaches are subject to constant change. Lesser depths than charted may be found and buoys are moved as necessary.

Barra Norte (North Bar)

1.42 This bar is located on the approaches to Canal do Norte and is formed on its W side by the mainland and by various islands along the coast between Cabo do Norte and Ponta do Ceu and on its S side by the N edge of Banco Santa Rosa which extends N and E from Ilha Janaucu and Ilha Caviana (Ilha Caviana de Dentro). Ponta do Ceu, the SE extremity of Ilha Curua lies about 56 miles SSW of Cabo do Norte. The bar is composed of sand and mud. The land which borders the bar is low and marshy and is covered almost entirely with tall vegetation. At the edge of some islands this vegetation appears like trees, typical of marshy regions.

This part of the coast is visible at a distance of about 13 miles from a height of 7m but this distance may be increased by refraction. Refractory effects are common in this area, especially in the afternoon.

Shoals in the N part of the bar present a most varied appearance when not above the water. There are times when no difference is perceptible to the eye between these shoals and the channels. At other times, the dark shadows of the shoals are clearly defined at the sides of the channels. However, the opposite may occur when the channels become darker and the water over the shoals appears clearer. There are also times when there are slight breakers over the shoals and calm water in the channels as opposed to times when there is broken water in the channels and calm water over the shoals. These shoals in general lie in a NE and SW direction forming long and narrow ridges and parallel the trend of the channels. The NW and SE edges of these shoals are reported steep-to. The bottom throughout this area consists of mud and sand.

Ilha do Para Light is shown from a square framework tower 30m in height, 7 miles SSW of Ilha do Bailique Light. A racon is transmitted from the light.

The least depth in the approach from NE over the bar is about 9.2m. The bar is obstructed by numerous low islands and shoals, some of which dry at LW. There are deep but narrow channels between them, with strong currents attaining rates of almost 8 knots.

1.43 **Banco de Meio Norte** (1°05'N., 49°39'W.), awash, lies 12 miles ENE of **Ilho do Bailique Light** (00°59'N., 49°57'W.).

Banco Madureira, lying 8 miles E of the same light, dries to 0.3m. A large part of this shoal breaks at LW.

Banco do Meio and Banco da Barra are extremely hazardous to navigation because their sides are steep-to along most of their entire length and they are difficult to distinguish. Banco do Meio, extending from a point 9.5 miles ESE of Ilha do Bailique Light to a point 8 miles SE of the same light, dries 1.7m. Banco do Barra, close SW of Banco do Meio, dries 0.5m.

The waters E of Banco Rio Bronco, an extensive bank which dries 1.5m, lying close E of Banco do Barra, are dangerous. They are not buoyed and are entirely unfamiliar even to local pilots. All ships should avoid these waters completely.

The E side of the recommended fairway through the bar is bounded by Banco de Meio Norte, Banco de Meio, and Banco de Barra. The W side of this fairway is bounded by Banco do Tabaco Bom, Banco do Para, and Banco do Areiao. This fairway is Canal Grande do Curua.

Canal do Bailique lies between the shoals that form the W sides of the recommended fairway and the islands and the mainland W and dries completely.

Caution.—In the vicinity of Barra Norte, the banks and channels are subject to great changes; mariners should exercise extreme caution.

Canal do Norte

1.44 This channel, the approach through the N arm of the Amazon River, is entered between Ponta do Ceu and Ponta do Santarem, the N point of Ilha Janaucu. A light is shown from each point. The channel leads to the port of Macapa, a distance of 75 miles. The land on both sides of the N arm is low and covered with tall vegetation, and is encumbered with several shoals, some of which uncover partially at LW.

A 3.1m shoal lies 6.5 miles ENE of Ponta de Santarem. Shoals with a least depth of 7m lie in the channel midway between Ponto do Ceu and Ponta de Santarem.

Vessels entering the N arm may do so without a pilot up to Macapa if drawing no more than 9.1m. If deeper they require a pilot who will board at **Salinopolis** (0°36'S., 47°21'W.).

Ponta do Capinal (00°37'N., 50°22'W.), lying 16 miles W of Ponta do Santarem, is the N end of Ilha Caviana. Drying banks extend 2.75 mile NE from this point, reducing the channel width to about 4 miles.

Ilhas Pedreira (00°20'N., 50°37'W.), a group of islands subject to change and marked by a light, lie in the center of the channel, about 25 miles SW of Ponta do Capinal. The islands are tree covered. Drying banks extend about 10 miles NE of the islands. The island divides the river into two channels. The E channel is the wider of the two and is preferred by the navigator, who should avoid the shallow depths of Banco Carolina, which is marked by a lighted buoy.

There are good anchorages off the Ilha Caviana anywhere between a point 5 miles SW of Pont a do Capinal and the mouth of the **Rio Arrozal** (00°17'N., 50°29'W.). A light is shown at the mouth of the river.

1.45 From **Ponta do Pau Cavado** (00°12'N., 50°48'W.), located 15 miles WSE of the Rio Arrozal, the NW shore curves W, then SSW for 20 miles to **Macapa** (00°02'N., 51°03'W.). There are no known dangers off this shore.

Mariners should be aware that safe transit of the Amazon River requires extensive local knowledge due to frequent changes of the banks and channels and the lack of navigational aids.

To attain favorable tidal currents and maximum depths an inbound vessel with a draft greater than 8m should cross the bar 1 hour before local HW.

Although the least depth on the track in the approaches to Banco Norte and the river itself is usually 9 to 10m, the river is constantly changing and charted depths are not to be relied upon.

It was reported that the maximum draft for ships using Canal do Norte was 11m but soundings should be taken frequently due to the changing depths and shoals.

Canal do Sul

1.46 The S arm of the Amazon River should be approached through Canal do Sul, the entrance channel, which lies N of Ilha do Marajo and S of the SE part of Banco Santa Rosa, Ilha das Flechas, Ilha Mexiana, and Ilha Caviana de Fora.

From **Cabo Maguari** (00°17'N., 48°22'W.), the W entrance point of the Rio Para, the N coast of Ilha Marajo trends W for about 120 miles to Ponta Sao Joaquim, the NW point of the island. Canal do Sul is entered N of Ilha Machadinho between Ilha Puampe, about 4 miles W of Cabo Maguari, and Ilha das Flechas. A light is shown from Cabo Maguari.

The least charted depth in the Canal is 5.8m; however, it is subject to change.

Between Banco San Roque, a shallow bank extending 10 miles E of Cabo Maguari, and Ilha Puampe lie several islets and islands, of which Ilha Machadinho, marked by a light and lying about 17 miles WNW of Cabo Maguari, is the easternmost. Between these islets and islands and Ilha Marajo lies a winding channel which leads to the S arm of the river.

Ilha das Flechas lies close with the S edge of Banco Santa Rosa, which extends about 13 miles E from the islet. Banco Santa Rosa extends from the W side of Ilha das Flechas to the E side of Ilha Mexiana, about 20 miles W. This bank is shallowest about midway between the two islands. Its S limit is unknown.

Ilha Caviana de Fora and Ilha Mexiana form with Ilhas das Flechas and the bank extending E and W, the N limit of the S arm of the Amazon River. These islands are low and wooded, the N parts being flooded during heavy rains.

The channel off the S shores of Ilha Mexiana and Ilha Caviana de Fora is fairly deep and clear of dangers. A group of submerged rocks, the exact positions of which are doubtful, lie near the middle of the channel about 8 miles E of Chaves.

Chaves (00°10'S., 49°59'W.) is situated on the N shore of Ilha do Marajo opposite Ponta da Caridade, the S extremity of Ilha Caviana de Fora. Chaves is an important cattle-exporting center.

The N and S arms of the Amazon River are connected by several channels that are formed by the many islets and islands lying off the NW side of Ilha de Marajo.

Vessels can continue W in the Canal do Sul to reach Macapa by using a channel that passes N of Ilha del Pacas and W of Arquipelago Jurupari.

The area is unsurveyed and subject to change. Vessels should not attempt this passage without local knowledge.

1.47 **Macapa** (00°02'N., 51°03'W.) stands on the NW shore of the river at a place where the land is relatively high. The chief export of the port is manganese ore. An old fort on a small promontory fronts the city.

There are reportedly no berthing facilities for large vessels.

Anchorage.—Vessels anchor about 0.5 mile E of the pier head, in 11 to 12.8m. Care is necessary to avoid a 7m rocky patch about 0.6 mile E of the old fort.

Ships drawing up to 3.6m can anchor about 183m off the pier head. Care should be taken to avoid a 2.7m patch about 0.2 mile SE of the pier head. This berth should be approached with the pier head in range about 301° with a white building about 0.4 mile beyond it. Good holding ground, in 20m, was reported about 1.75 miles E of the pier head.

1.48 **Porto de Santana** (00°03'S., 51°11'W.) (World Port Index No. 12485) is located about 11 miles SW of Macapa on the N shore of the Canal de Santana. The port's main export is also manganese ore.

Tides—Currents.—Alongside the floating pier the tide runs for 60 minutes beyond the time computed from the table. In the middle of the current, the delay in the change of current is 90 minutes, depending upon the river flow.

Depths—Limitations.—The port consists of a floating pier, 247m long, with a depth of 10m alongside, and a general cargo pier, about 200m long, with a depth of 7.6m alongside. A tanker terminal and ro-ro ramp are also available, with depths alongside of 7.6 and 8.0m, respectively.

Pilotage.—Ships bound for Porto de Santana are required to take a pilot. The pilots board in the vicinity of Fazendinha. Ships bound for either Macapa or Porto de Santana should request the latest navigational information about this channel from the radio station at Belem.

Ships coming from Belem carry pilots who moor and unmoor at Porto de Santana and who pilot upriver. Pilotage is compulsory above Macapa.

Santana Light

Pilots will be flown from Belem to Porto de Santana, provided that prior arrangements have been made, where they board ships for upriver transits.

Ships neither use nor need a tug for docking or undocking but a small boat, equipped with an outboard motor, is used for receiving the first mooring line.

At the floating dock, ships berth starboard side-to when the tide is ebbing and port side-to when the tide is flooding. It is preferable to berth with some current running. The slack tide period is short. In order to berth port side-to, ships can turn around off the port between longitudes 51°11'W, and 51°12'W. Ships usually make the turn without the use of an anchor as the current helps the maneuver.

Ships can undock at any stage of the tide. A ship berthed upriver and starboard side-to the dock can swing downriver off the dock with the aid of the tide and mooring lines.

Anchorage.—Canal de Santana provides good anchorage almost anywhere, over mud bottom. There is sheltered anchorage between the mainland and Ilha de Santana. Ships usually anchor, in 46m, about 0.2 mile offshore. The anchorage off the port has adequate room for 5 ships. Temporary anchorage, in a depth of 22m, may be found about 2 miles ESE of the entrance to Canal de Santana.

Clearance to anchor off Porto de Santana must be requested from the port captain at Belem.

1.49 **Munguba** (00°55'S., 52°25'W.) is located 150 miles above Porto de Santana on the Rio Jari, about 60 miles above the mouth. The port consists of a 200m long pulp berth and a 180m long kaolin berth, each with a depth of 12m.

The minimum depth of the river is ascertained by the pilot using a hand lead while the vessel is loading. The vessel is then informed of the maximum safe departure draft. This depends upon the time of year; during the rainy season a vessel can load to a fresh water draft of 9.3m.

Pilotage is compulsory. The pilot boards at Porto de Santana, or, with 72 hours advance notice, at **Fazendinha** (00°04'S., 51°06'W.).

Anchorage, in 12m, mud, can be obtained E of the pulp berth.

The navigation aids are reported unlit and movement is by day only.

The Rio Para

1.50 The mouth of the Rio Para lies between Cabo Maguari and Ponta Curuca, about 38 miles ESE. The land on both sides of the river is low and cannot be seen from the bar. The river water is muddy for a good distance out to sea.

The banks and shoals within the Rio Para are constantly changing. Banks that formerly never reached water level have now developed into small islands covered with vegetation due to the accumulation of debris which has been carried down by the river currents. Other islands have been washed away.

Navigation within the river should be undertaken with extreme care and soundings should be taken frequently because of uncharted shoals.

It is also possible that depths of charted shoals may be less than charted.

Pilotage.—Pilotage is compulsory for the Rio Para. Vessels should request pilotage, via their agent, 7 days in advance. The vessel's ETA should be confirmed 48 hours, 24 hours, and 8 hours in advance through Belem (PPL). Pilots board in the following positions:

1. Vessels with a draft of 8m and over—About 7.5 miles NNW of Salinopolis Light (0°29.6'S., 47°23.1'W.).
2. Vessels with a draft of less than 8m—About 2.5 miles NW of Chapeau Virado (1°06'S., 48°29.7'W.).
3. Vessels arriving from the N and W, in Canal de Espadarte, about 3 miles WNW of Cabeco do Norte (0°17'S., 47°49'W.).
4. Vessels arriving from the E, in Canal de Espadarte, about 3.5 miles SSW of Cabeco do Sul (0°24.5'S., 47°46'W.).

Vessels unfamiliar with the area should use the pilot boarding position NNW of Salinopolis Light.

The pilot boat has a red hull and a mast from which a red flag with a black "P" displayed.

Pilotage is compulsory for all vessels bound for Belem.

Vessels bound for Santana, Macapa, Manaus, and Iquitos via Os Estreitos (see paragraph 1.57) and for the Rio Tocantins and

the Rio Madeira also embark a pilot at Salinopolis. Pilotage in the ports and tributaries of the Amazon River is compulsory above Belem.

Depths—Limitations.—The bar at the mouth of the river is encumbered with several banks and shoals. However, fairly deep water lies between them. These dangers can be divided into three principal groups, including those lying near the E, central, and W parts of the bar. Most of these dangers break at LW.

Baixo do Espardarte is an extensive shoal of sand lying about 7 miles N of **Ponta da Tijoca** (00°33'S., 47°53'W.).

Ponta da Tijoca, from which a light is shown, is low and ends in a flat sandy beach. Baixo do Espardarte breaks near its E part and dries at LW in its SW part.

A wreck, marked by a light and from which a racon transmits, lies on the bank about 7 miles N of Ponta da Tijoca. The position of the wreck changes due to the force of the tidal currents.

Coroa Nova, over which the sea always breaks, lies SW of Baixo do Espardarte and about 2 miles WNW of Ponta da Tijoca. The contour of the NE portion of the sand bank varies constantly. The tidal currents attain rates of 5 to 6 knots in the vicinity of Coroa Nova.

Coroa des Gaivotas, which uncovers at low tide, has its N end lying 7 miles W of Ponta da Tajoca. A beacon marks the NW side of the shoal.

Banco Piraquembaua de Fora consists of two spits, Cabeco do Norte and Cabeco do Sul. Cabeco do Norte with a least charted depth of about 7m, lies about 14 miles N of Ponta Curuca. Cabeco do Sul has a least charted depth of 5.4m. Both banks break in rough weather.

Banco Xingu (00°20'S., 47°54'W.) extends in a general NE to SW direction veering to the N. The shallowest part of the sand bank, being about 1m, lies about 12 miles NNW of Ponta da Tijoca.

Banco do Clemente, which partially dries at LW, lies about 2 miles SW of Banco Xingu and about 11.2 miles NW of Ponta da Tijoca. Bancos da Tijoca consist of three spits of hard sand, Cabeco do Sul, Cabeco do Meio, and Cabeco do Norte. Cabeco do Sul, the most extensive and shallowest, uncovers 0.2m at LW in a position about 9.2 miles NW of Ponta da Tijoca. Cabeco do Meio, with a least depth of 2.5m, breaks at LW and requires the most care as it extends the farthest into Canal do Espadarte. Cabeco do Norte, which also breaks at LW, is the deepest with least depths of about 4.5m. Banco Sao Joao, with a least charted depth of about 1.9m, lies about 18 miles WNW of Ponta da Tijoca. Several shoals lie between Banco Sao Joao and Bancos da Tijoca.

Cabeco do Joca (00°26'S., 48°48'W.), lying off the W side of Banco Sao Joao, has a least charted depth of 7.6m.

Coroa de Quiriri lies close off the S end of Banco Sao Joao and extends SW and SSW for about 22 miles. There is a depth of 1.5m at its NE end and a sand bank which dries 0.5m near its SW end. The shoal is marked by breakers over its entire length apart from a narrow gap close N of the drying sand bank.

Banco Maguari, with depths of less than 3.6m, extends E from Cabo Maguari for about 15.7 miles. Between the cape and Ponta Soure, about 29 miles farther S, Banco Maguari extends up to 6.5 miles offshore tapering off to about 0.7 mile from Ponta Soure.

The E edge of this bank off the cape is marked by breakers during strong winds. The bank is reported to be extending to the NE.

The tidal currents in the vicinity of Banco Maguari set WSW during flooding and ENE during ebbing.

Banco Monjui, composed of mud and sand, has a least charted depth of about 2.7m. The shallowest part, which is indicated by the dark muddy-colored water lying, lies about 2.2 miles E of Cabo Maguari.

There are several shoals, with depths of less than 10m, between Banco Monjui and Banco do Clemente and between Banco Monjui and Banco Xingu.

Caution.—The buoys and channels of the Rio Para and its tributaries are subject to constant change. Lesser depths than charted may be found and buoys are moved as necessary.

Canal do Espadarte

1.51 Canal do Espadarte, the principal channel leading into the Rio Para, lies between Baixo do Espadarte and Bancos da Tijoca. The breakers on these banks help to mark the channel.

The channel is about 1.5 miles wide, with depths of 12 to 33m, over fine white sand. Other channels are available but are not recommended for large ships and therefore are not described.

The MHW interval in Canal do Espadarte is 10 hours 40 minutes. The mean tidal range is about 2.5m, while the spring range about 3.1m. The flood current sets SW and attains rates of 2.5 to 3.2 knots. The ebb current set NE and attains similar rates. Between Baixo de Espadarte and Coroa das Gaivotas, the flood current tends to set a vessel away from Coroa das Gaivotas, while the ebb currents tends to set a vessel towards the shoal.

The E shore of the Rio Para is low and covered with vegetation.

From Ponta Curuca to Ponta da Tijoca, the coast trends W about 5 miles, then SW about 49 miles to Ponta do Chapeu Virado. Ponta Curuca is more elevated than the adjacent coasts. Several rivers empty into the waters along this stretch of the coast, dividing the coast into islands.

The land in the vicinity of Ponta Taipu, about 11.7 miles SW of Ponta da Tijoca, when seen from a position N of Baixo do Espadarte appears as a low island, but on a nearer approach it appears as two high elevations joining the land to the SW. A light is shown about 0.7 mile SE of Ponta Taipu. Shallow depths and dangerous rocks lie up to a distance of 2.2 miles off the shore between Ponta Taipu and Ponta do Chapeu Virado.

A light is shown close N of Ponta Maria Teresa which lies about 10 miles SW of Ponta Taipu. A light is shown from the end of a chain of rocks lying off the village of Colares, about 23 miles SW of Ponta Taipu. Colares, situated on a flat sandy shore, is sheltered from the sea by these rocks. The rocks uncover at half tide and form a natural breakwater. A small church, painted white, is located in the village.

Ilha das Pombas, about 8 miles NE of Ponta do Chapeu Virado, is covered with vegetation. The island appears attached to the mainland at first as it is separated from the shore by only a short distance. A ridge of rocks extends about 1 mile N from

Taipu Light

the island and along the shore to the E. The sea is sometimes rough near these rocks, especially during the flood tide.

A light is shown from Ponta do Chapeu Virado. A chain of dangerous rocks, some of which uncover, lie about 0.5 mile N of Ponta do Chapeu Virado.

The W shore of the Rio Para, between Cabo Maguari and Ponta de Soure, is low, wooded, and flooded during the rainy season.

Between Ponta Soure and Ponta Guarita, about 9 miles S, shoal water lies up to 1.25 miles offshore.

The city of Soure, one of the principal commercial centers of Ilha do Marajo, is situated at the N entrance of the Rio Paracuauri (Igarape Grande), the main river on this coast. A light is shown from the N extremity of Ilha dos Amores, on the S entrance of the Rio Paracuauri. Between Ponte Soure and Ponta Guarita (Ponta de Joanes), about 9 miles S, shoal water lies up to 1.25 miles offshore. A light is shown from Ponta Guarita.

Coroada Muricoca, which uncovers at LW, lies about 6 miles NE of Ponta Guarita. Coroa Seca, with a least charted depth of 1m, lies near the middle of the river about 9 miles ESE of Ponta Guarita. This shoal, which breaks at low tide, has been reported to be extending E with deep water near its edges.

Coroinha and Coroa Grande are drying shoals located about 6 miles S of Ponta Guarita. A light is shown about 1.2 miles W

Soure Light

Canal do Mosqueiro

1.52 Canal do Mosqueiro, entered between Ponta do Chapeu Virado and Ilha Tatuoca about 5 miles SSW, extends about 18 miles S to the berths at Belem.

The channel is calm, even when the wind blows constantly during September, October, and November. The bottom is sand and mud, which affords good holding ground.

Ilha Tatuoca (1°12'S., 48°30'W.), the northernmost, and Ilha das Oncas, the largest and southernmost, are part of a chain of islands skirting the coast.

These islands form the W side of Canal do Mosqueiro and extend S past the city of Belem. A light is shown from the N side of Ilha Tatuoca. Ponta do Mosqueiro, about 3 miles S of Ponta do Chapeu Virado, is on the E shore of Canal do Mosqueiro.

A large building, faced with red bricks, and a warehouse stand on the point. A wooden pier is located about 0.7 mile NNW. The village of Mosqueiro is situated close N of Ponta do Mosqueiro.

A conspicuous chimney is located within the town. Icoaraci, a small town, is located on Ponta do Pinheiro, 8.5 miles S of Mosqueiro.

The church towers at Belem become visible just S of Ponta do Pinheiro. Other conspicuous charted objects can be seen along the E shore.

There are several small piers between Ponta do Pinheiro and the town of Val-de-Caes, about 6 miles S. An aviation light and an aeronautical radiobeacon are located in the NE part of Val-de-Caes.

Ilha do Forte da Barra lies ESE of the S end of Ilha da Barra in a position about 1 mile N of Val-de-Caes and about 0.2 mile off the E shore. A light is shown from Ilha do Forte da Barra.

Depths—Limitations.—The least depth as far as the berths at Belem was 6.1m, but this depth is subject to change.

Ilha Tatuoca is surrounded by foul ground. The extent of this foul ground varies from 0.15 mile off its E side to 1.75 miles of its NW side. Rocks, some of which uncover at LW, are scattered throughout the foul ground. A lighted buoy marks the NE extremity of the foul ground, about 1 mile NE of Ilha Tatuoca.

Scattered submerged rocks fringe the E shore between Ponta do Pinheiro and Val-de-Caes.

A lighted buoy, which marks foul grounds, is moored about 0.2 mile WNW of Ponta do Pinheiro.

1.53 Ilha da Barra (1°22'S., 48°30'W.) lies near the middle of the channel. Depths of less than 5.5m extend about 1 mile N. A spit, with depths gradually increasing to 5m, extends slightly more than 1.25 miles SSW. A rock, with a depth of less than 2m, lies 0.5 mile WNW of the S extremity of the island.

Pedras da Barra, with a least depth of 0.5m, lies about 0.4 mile NNE of Ilha do Forte da Barra nearly in mid-channel between the E shore and Ilha da Barra. Pedro do Forte, a flat rock with a depth of 5.1m lies about 0.3 mile SW of Ilha do Forte da Barra. A lighted buoy is moored close W of Pedro do Forte. Pedras Val-de-Caes, with depths less than 1.8m, lie about 1 mile SSW of Ilha do Forte da Barra. A lighted buoy marks the SW side of this danger. Mariners should use maximum caution when navigating in the area of **Ilha do Cruzador** (1°22'S., 48°31'W.). There is the existence of a possible bank due to the disappearance of Cruzador Island.

Belem (1°27'S., 48°30'W.)

World Port Index No. 12490

1.54 The port of Belem is the most important commercial port on the N coast of Brazil. The port is situated on the E bank of the Rio Para about 70 miles from its mouth. Communication is maintained with all inland Amazon ports.

Winds—Weather.—The winds during the summer mornings are usually calm, or a light breeze blows from E to NE, changing gently to the N. Fresh winds from the NE and ENE normally blow on summer afternoons, lasting until sunset, followed by a calm that lasts through the night. During the rainy season from March until June, Winds are variable and sometimes accompanied by squalls.

Rain falls almost daily during the rainy season and in the dry season on an average of about 15 days, mostly in the afternoon.

Belem—Container Terminal

Tides—Currents.—The MHW interval at Belem is 11 hours 4 minutes. The spring range is about 3m and the mean range is about 2.4m. Under normal conditions, during spring tides, the flood current has a velocity of 2.6 knots and the ebb current 1.4 knots. During neap tides, the flood current has a velocity of 2.4 knots and the ebb current has a velocity of 1.1 knots.

The times of HW and the rates of the current are, however, influenced by the force and direction of the wind and by the amount of rainfall in the river basin.

Rates in excess of those stated may be experienced. The tidal currents set toward the berths in Belem; therefore, ships should let go an anchor before mooring.

Depths—Limitations.—The approach to Belem is made through the Canal do Mosquiero, previously described in paragraph 1.52.

The maneuvering room in this stretch of water is considerably more restricted than in the Rio Para. Approximately 1 mile S of Punto do Pinheiro, the channel narrows to 1 mile.

A dredged channel, 90 to 180m wide over a depth of 4.2m at LW, leads near the shore from Miramar to the berths at Belem. This channel is marked by lighted buoys. However, the charted positions of the buoys are not to be relied upon. The principal quay is about 2,296m long and is divided into the following uses:

Ocean-going vessels	1,260m
Coastal vessels	600m
Small craft	436m

The berths are numbered 1 to 13, starting from S. Berth No. 1 through Berth No. 5 are berths used for cargo handling.

The length of these berths range from 300 to 385m, with an alongside depth from 5 to 7m. The berths that are reserved for ocean-going vessels are, as follows:

Berth	Depth	**Length**
No. 6	6.7-7.5m	385m
No. 7	6.7-7.5m	385m
No. 8	8.0m	135m
No. 11	7.5-8.5m	270m
No. 12	7.5-8.5m	270m
No. 13	12.0m	125m

The remainder of the berths, except for Berth No. 9 and Berth No. 10, where mooring is not allowed, have depths alongside from 3 to 4.8m.

It has been reported that the port is silting up gradually for lack of dredging.

The maximum draft for berthing is 7.3m, fresh water, for vessels less than 160m in length. For vessels exceeding a length of 160m, the maximum draft for berthing is 6.4m, fresh water.

A new berth has been added close S of the T-shaped berth. The length of the platform is 40m, with an alongside depth of 7.9m. Vessels moor to four dolphins.

Vessels with deeper drafts operate at the anchorage of Val-de-Caes or Mina Gerais, in 7.9m, or of Icoaraci, in 9.8m.

A 142m long T-head tanker pier at Miramar, with depths of 8.8 to 9.8m, can accept ships up to 200m long with drafts of up to 7.9m. Berthing is reported to be carried out only on and during the flood tide.

Close S of this pier another T-headed berth, flanked by mooring dolphins, can accommodate vessels up to 7.9m draft.

A dredged channel (1991) leading to the oil terminal has a depth of 6.8m.

Belem

Aspect.—The city occupies little more than a clearing in the Amazon jungle. The highest point of the city is only 14m and the lower sections of the city become swampy and flooded during the rainy season.

A conspicuous water tower is located in Miramar, about 6.7 miles S of Ponta do Pinheiro.

Two chimneys are located in Curro Velho, 1.25 and 1.75 miles S, respectively, of the water tower in Miramar.

There is also a conspicuous building in Belem, 1 mile S of the S chimney in Curro Velho.

Pilotage.—Pilotage is compulsory and is available 24 hours. Vessels should request pilotage, via their agent, 7 days in advance. The vessel's ETA should be confirmed 48 hours, 24 hours, and 8 hours in advance through Belem (PPL). The pilot boards about 2.5 miles NW of Chapeau Virado (1°06'S., 48°30'W.).

The pilot boat is a red launch with a black P painted on both sides of the bow. It also flies a red flag with a black P.

Contact Information.—The pilots and port can be contacted, as follows:

Belem pilots can be contacted, as follows:

1. Telephone: 55-91-4006-6550
2. Facsimile: 55-91-4006-6550
3. E-mail: contato@belempilot.com.br

Belem port control can be contacted, as follows:

1. Telephone: 55-91-3257-0808
2. Facsimile: 55-91-3257-1693

Anchorage.—There is good anchorage from Ponta do Mosqueiro to the beginning of the dredged channel into Belem; however, the navigator should observe the restrictions with respect to restricted areas and submarine cables. Ships drawing up to 9.1m can anchor and work cargo at Icoraci, off Ponta do Pinheiro.

A prohibited anchorage lies off Miramar and Val-de-Caes, with a naval anchorage adjoining it to the N.

Ships are prohibited from anchoring in the cable areas lying off the E side of Ilha das Oncas between the S end of Ilha da Barra and the mouth of the Rio Guama.

Anchorage is prohibited in the dredged channel about 1 mile S of the oil terminal at Miramar.

Oil tankers and gas carriers bound for the tanker pier at Miramar should use the designated tanker anchorage SE of Ilha Jutuba, with depths of 6 to 7m.

Temporary anchorage may be taken between the S end of Belem Wharf and Banco de Meio, in depths of 4.9 to 11.9m.

1.55 Vila do Conde (1°33'S., 48°45'W.) has a causeway extending 450m from the shore leading to a jetty which serves an aluminum factory. The outer berth is 292m long and is used for handling bulk cargo. The inner berth is 251m long and is used for handling general cargo and aluminum ingots. The depths alongside are 12.2m at the inner berth and 18.9m at the outer berth. The maximum permissible draft is governed by the fairway depth in the Rio Para.

Vila do Conde

Passo do Goiabal

1.56 Passo do Goiabal, not named on any chart, is a route for ascending the Rio Para above Belem. It is entered between Banco do Otelo and Ilha Mandii, about 40 miles WSW of Belem.

The passage continues S of Ilha Joroca, N of Ilha Saracuruca and Ilha Tucumanduba, between Ilha Mutumura and the island NW of it, S of Ilha Chaves and Ilha Santo Antonio, and N of Ilha Paqueta.

Depths in this passage range from 6.2 to 26m. A bank extends about 3 miles E of Ilha Joroca, the easternmost of these islands which, when combined with the bank extending from Ilha de Marajo to the W of Ilha Mandii, reduces the width of the channel to about 0.5 mile.

Lights are shown from the S extremity of Ilha Joroca and from Ilha Jupatituba, 2 miles to the S. The narrowest part of the pass is about 7 miles W of this section in the strait just N of Ilha Mutumuru.

A shoal, which dries for 0.25 mile E and W and is steep-to on its N side, with shoal ground extending about 1 mile to the W, 3.5 miles to the E, and 4.5 miles to the S from the dry part, lies about 2.7 miles E of Ilha Mandii.

Several wrecks lie sunk or stranded from 2 to 7.5 miles E of Ilha Mandii.

The depths are constantly changing in the vicinity of and up to about 10 miles W of Ilha Mandii. Passo do Goiabal should not be attempted at night.

Cocal (1°44'S., 49°31'W.) is a small port located near the S extremity of Ilha Santo Antonio, about 7 miles SW of Ilha Mutumuru. Deep draft vessels can moor at the port.

Passo do Goiabal to Ilha Boiucu

1.57 West of Ilha Paqueta, the channel width increases from 2 to 4 miles and remains at this width for about 65 miles to the entrance of Estreito de Breves, then it narrows to about 0.2 mile. The depths in this part of the channel are between 7.3 to 28m. Both banks of the river are covered with dense forest. There are a number of inlets which cut the coast into numerous islands.

Curralinho (1°49'S., 49°48'W.) is located on the N bank of the Rio Para about 18 miles WSW of Cocal. A shoal, with a depth of less than 2m, extends about 0.5 mile S of the port. Curralinho is a port of call for most ships navigating the river.

Os Estreitos refers to the various channels W of Ilha de Marajo which connects the Rio Para with the main channels of the Amazon River.

There are two channels used by ships, both of which enter the main channel of the Amazon River at **Ponta do Vieria** (1°06'S., 51°12'W.).

Estreito de Boiucu is about 90 miles long and 0.2 mile to 1 mile wide. This channel has a least depth of 5.3m in Furo Grande, the narrowest part, about 17 miles above its entrance. Estreito de Breves, N of Estreito de Boiucu, is about 130 miles long and has a least depth of 7.3m. The maximum dimensions of ships using these channels are about 8.5m draft and 137m in length for Estreito de Breves and 6.7m draft and 183m in length for Estreito de Boiucu.

Breves (1°41'S., 50°29'W.) is located on the N side of Estreito de Breves, about 13 miles above its entrance and 146 miles from Belem. There is a pier 150m in length with an alongside depth of 6.7m where timber is loaded, and several smaller piers for river craft.

Sao Miguel (1°10'S., 50°29'W.), where there is a timber loading berth, stands on the NE bank of Furo dos Macacos, 30 miles N of Breves. Vessels berth alongside the bank, heading NW in a depth of 5.4m, by securing to trees. Care is required approaching the berth as there are a number of ruined piers which are covered at HW.

Ships navigating Os Estreitos should reduce speed before approaching narrow bends and sound signals to warn river traffic.

Ships can anchor, in about 12.8m, about 10 miles E of Ilha Boluca Light and 0.75 mile S of Ilha das Araras Light, if they do not desire to transit Os Estreitos at night.

Upper Reaches of the Amazon River

1.58 Ships navigating the upper reaches of the Amazon River can do so by way of the Rio Para via Passo do Goiabal and Os Estreitos.

Ships leaving Belem round Ilha Tatuoca and steer for Passo do Goiabal.

Canal de Cotejuba also leads from Belem to Passo do Goiabal but this passage is used only by local pilots.

Ships navigating the upper reaches from Canal de Santana can ascend the channel upriver which trends SW for about 103 miles to its junction with Braco de Burupa off Ponta do Jariuba. The channel follows the mainland shore and lies NW of Ilha do Para, Ilha Grande de Gurupa, and all the smaller islands except **Ilhas Aruans** (1°05'S., 51°43'W.). The N part of Ilhas Aruans lies 29 miles NE of Ponta do Jariuba.

Most ports on the Amazon River, excluding Manaus, do not have berthing facilities for accommodating the larger ships transiting the river.

1.59 From **Ponta do Vieira** (1°06'S., 51°12'W.), the channel trends SW for 33 miles to the city of Gurupa. This stretch of the channel has an average width of 1 mile.

From Ponta do Vieira the channel follows close to the S bank for about 5 miles until abreast of the light at **Floresta** (1°11'S., 51°14'W.). The channel then trends toward the N bank where it continues until the E end of Ilha Sao Salvador is abeam, when it again approaches the S shore.

When crossing from one side of the river to the other, a ship may encounter strong currents, eddies, and tide rips.

Gurupa (1°24'S., 51°39'W.) stands on a rocky point 10m high on the SE bank of the river, about 270 miles by river from Belem. The port is used mostly by river boats.

Abreast of the city, Braco do Vieira joins with Braco de Gurupu. From here Braco de Gurupa trends SW for 15 miles and is joined from the S by the Rio Xingu, the first of the large tributaries of the Amazon River. This branch then turns to the NW for 9 miles between Ilha Grande de Gurupa and Ilha Baixa Grande and joins the main section of the Amazon River off Ponta do Jariuba.

1.60 **Ponta do Jariuba** (1°24'S., 51°57'W.) is the SW extremity of Ilha Grande de Gurupa. Good anchorage, in 15 to 25m, is available 1.5 miles SSE of this point.

Ilha das Velhas lies near the N bank of the river W of Ponta do Jariuba; Ilha de Comandai lies close W of Ilha das Velhas. From here, Serra Jutai begins to be visible. This range lies to the N and W of the town of Almeirim. The town is near the W end of Ilha de Comandai and about 3 miles from Belem.

From the junction of Braco de Gurupa, the Amazon River trends WSW for about 60 miles to the W end of Ilha Jurupari, which can be passed on either side. The channel N of this island is deep but narrow and the currents are strong. This

channel is avoided by ships transiting upriver and frequented by those transiting downriver.

Serra da Velha Pobre, about 300m high, rises almost vertically from the N bank of the river abreast Ilha Jurupari, about 12 miles W of Almeirim.

From Serra da Velha Pobre to Ilha de Parauaquara, about 15 miles W, the river is wide and deep with depths up to 55m.

The navigable channel is then narrowed by islands between Ilha de Parauaquara and the city of Prainha, about 30 miles distant. The current is strong within this part of the channel.

Praina (1°48'S., 53°29'W.) stands on the N bank of the river about 414 miles from Belem. The port is used mostly by riverboats. The tidal range here is about 1m.

A light is shown from **Ponta Peregrino** (1°55'S., 53°50'W.). Ponta Peregrino is the NE point of Ilha do Gurupatuba which lies close to the N bank of the river about 23 miles WSW of Prainha.

The shoals, banks, and islands in the vicinity are constantly changing. Islands of floating objects are often formed, only to be washed away again.

Monte Alegre (2°00'S., 54°04'W.) stands on the slopes of a hill rising from the N bank of the Rio Parana de Monte Alegre, 2 miles W of the W extremity of Ilha do Gurupatuba and about 457 miles by river from Belem. Serra Erere and Serra Paituna rise about 10 miles W of Monte Alegre.

Lago Monte Alegre (Lago Grande), one of the largest lakes in the vicinity of the river, lies S of these mountain ranges.

The lake increases in size during the rainy season and sometimes unites with the river.

From Ilha Faraday, lying 1.5 miles S of Ilha do Gurupatuba, the river trends S for about 17 miles to Ilha do Curua, which may be passed on either side. A dangerous shoal surrounds the SW end of the island and must be avoided.

From the SW end of Ilha do Curua, the river trends generally W for about 39 miles to Ponta Negra, the N entrance point of the Rio Tapajos. Ponta Negra should be given a wide berth because a shoal, with depths of less than 2m extends 1 mile E from this point.

1.61 Santarem (2°25'S., 54°43'W.) (World Port Index No. 12510) stands on the S side of the mouth of the Rio Tapajos, 1 mile S of Ponta Negra, and 516 miles by river from Belem. An L-shaped wharf lies 1.25 miles SW of Ponta Negra.

Its outer face is 200m long, with a depth of about 10m alongside. Small craft can berth on the 180m long inner section, which has a depth of 6m alongside.

During low stages of the river, tidal currents are felt in the Rio Tapajos. During times of tidal influence, the water appears yellow.

Vessels can obtain anchorage with good holding ground abreast of the city, in depths of 15 to 20m.

Pilotage is compulsory. Pilots are embarked at Belem or Macapa.

From the mouth of the Rio Tapajos, the Amazon River trends NW for about 16 miles to the W end of Ilha des Marrecas, from which a bank extends 1.5 miles NNW. The channel E and N of the island is the preferred channel. From the island the river trends W, passing S of Ilho do Marimarituba and N of Ilha do Patacha. Depths in this area are likely to change rapidly.

From this point the river channel trends NW for about 35 miles to the city of Obidos, passing S of Ilha do Meio and Ilha do Mamauru. This part of the river is apparently free of dangers but the current is strong.

Between Santarem and Obidos, the river banks are low. During the rainy season these banks are almost under water except on the S side abreast of Ilha Marimarituba which forms a cliff about 45m high.

Near the S bank of the river between Ilho do Marimarituba and Obidos, lies Lago Grande de Vila Franca which is joined with the Amazon River by several openings.

The lake is said to be navigable in the greater part of its extent.

1.62 Obidos (1°55'S., 55°31'W.) (World Port Index No. 12530) stands on the N bank of the river, about 584 miles from Belem. The town stands on a cliff 20m high overlooking the river. The river at this point is narrow, with depths of 40 to 100m and the current is extremely strong.

Obidos is the farthest port upriver at which the tide is felt. An eddy, with a rate of 2 or 3 knots, runs NW along the N bank and is felt from 0.2 to 0.4 mile offshore. The port can accommodate vessels up to 7,000 dwt.

The port has a wharf that is used during the HW season by ships of considerable tonnage.

Because of the countercurrent that forms next to the wharf, it is recommended that ships moor port side-to. The length of the berth is 35m, with an alongside depth of 10m.

Vessels can anchor, in 10 to 20m, about 45m offshore. The bank is steep-to and consists of soft mud.

Porto Trombetas (1°28'S., 56°23'W.) stands on the Rio Trombetas, 60 miles above its mouth which lies 5 miles W of Obidos. Vessels of 50,000 dwt can be handled. The port exports bauxite. The largest vessel that can be accommodated is 245m long. During HW (January through July), currents may reach a speed of 2 knots.

Depths—Limitations.—The loading berth consists of a 100m long pier, four dolphins, and four mooring buoys. The allowable air draft is 13.5m (minimum) in July and 19m (maximum) in December. Draft is restricted to 11.3m from January to July and to 11m from August to December. There is a tanker berth upstream and a general cargo wharf downstream from the terminal.

Pilotage.—Pilots embark and disembark at the anchorage off Porto de Santana (paragraph 1.48). The vessel's ETA at Barra Norte is required 72 hours in advance.

Anchorage.—Vessels awaiting a berth anchor W of the mouth of the Rio Trombetas, with good holding ground. Vessels may not enter the river until permission is given because of restrictions on passing vessels leaving.

1.63 From Obidos, the river channel trends WSW for 30 miles to Ilha de Santa Rita. This island may be passed on either side. The N side has the greater depths. Silting in the S passage makes local knowledge essential for vessels navigate this channel.

The river then trends SW for about 60 miles to the town of Parintins, passing Ilha de Juruti, Ilhas do Caldeirao (Caldeiroes), and Ilha Parintins. The main channel is N of Ilha de Juruti and S of Ilhas do Caldeiroa. There is also a deep

channel N of Ilhas do Caldeiroa. Serra de Parintins, two hills about 120m high, rise on the S bank of the river E and S of Ilhas de Caldeiroa.

Parintins (2°38'S., 56°44'W.) stands on cliffs on the S side of the Amazon River about 697 miles from Belem. There is a municipal pier where vessels can berth alongside at most times of the year. Vessels should berth port side-to as there is a strong countercurrent.

From Parintins, the river trends W for 20 miles where it divides into two channels. Parana do Mocambo, the N channel, lies between the N bank of the river and Ilha do Arari and Ilha do Mocambo (Pacoval).

The S channel lies between Ilha das Oncas and the S bank of the river. The N channel is narrower but shorter and ships generally use this channel.

West of these islands, the river is about 2 miles wide and trends NW for 10 miles. The river then turns sharply trending SW for about 85 miles to the town of Itacoatiara. There are several islands and drying banks in this part of the river. The current has a rate of about 3 knots S of Ilha Grande do Serpa (Ilha do Risco) which lies about 3 miles E of Itacoatiara.

1.64 Itacoatiara (3°09'S., 58°27'W.) (World Port Index No. 12540) stands on the slope of a hill on the N bank of the river, 817 miles from Belem. Vessels lie bow to the shore on a single mooring as the current keeps them at right angles to the bank. Vessels berth in this manner in front of the clock tower square.

There is a floating pier, 62m long, owned by a private company that permits ships to moor, but this depends on the level of the river.

From Itacoatiara, the river trends S for 24 miles to the entrance of the Rio Madeira. A long this stretch of the river lies Ilha da Trindade, which can be passed on either side. The channel S of Ilha da Trindade has greater depths near the S bank of the river. The S shore of Ilha da Trindade is bordered by a shoal which extends about 1.2 miles offshore.

The channel N of Ilha da Trindade is narrower and is available only to ships of light draft as a rocky patch, with 3.7m at low river, lies about 0.8 mile N of the W extremity of that island.

From the entrance of the Rio Madeira, the Amazon River trends WNW to the confluence of the Rio Negro, the first large tributary of the Amazon River on its N bank. The port of Manaus is on the N bank of the Rio Negro near its mouth, 108 miles from Itacoatiara.

About 13 miles E of Manaus, a chain of rocks extends about 1 mile from the N bank of the Amazon River; between them is the mouth of Furo do Jacare. Close W, still in front of this chain of rocks and about 0.2 mile outward, lies Pedro do Jacare. At this point, the S side of the channel is formed by Ilha da Terra Nova. A light is shown from Pedro do Jacare.

Pedras Moronas lie S of the fairway, abreast of the above-mentioned chain of rocks, and about 1 mile NW of the W extremity of Ilha da Terra Nova. A light is shown from Pedras Moronas.

Pedras Lejes, a ledge of submerged rocks extending from the N bank of the Amazon River near its junction with the Rio Negro, lie about 8 miles E of Manaus. A lighted buoy is moored on the N side of Pedras do Anselmo, about 4 miles SE of Manaus.

Pedras Bom Jardin, submerged rocks extending about 1 mile from the N bank of the Rio Negro, lie about 3 miles E of Manaus. Pedras de Belem, a rocky shoal marked by a lighted buoy, lie about 2 miles E of Manaus, abreast of the mouth of Igarape Educandos. Igarape Educandos flows into the Rio Negro close E of Manaus.

1.65 Manaus (3°08'S., 60°01'W.) (World Port Index No. 12560) stands on high ground overlooking the Rio Negro, 8 miles from its confluence with the Amazon River and 925 miles from Belem. The river abreast of the city is 1.5 miles wide with depths up to 45m. The S bank is low and marshy. Drying mud banks line both sides of the river.

Winds—Weather.—Winds from the NE are predominant in this area. The mean daily maximum temperature reaches 33°C in September and the mean daily minimum temperature is between 23° and 24°C all through the year.

Tides—Currents.—There is practically no current near the berths but in the middle of the river the current has rates from 1 to 3 knots which varies with the seasons and periods of flood or ebb tides. The season of the greatest floods occurs during June and July while the season of the greatest ebbs occurs during November and December. The mean range of the river level is 11.5m.

Depths—Limitations.—The berthing area of the port consists mainly of two floating pontoons, connected to the shore by a floating roadway, bridges and overhead cables.

There are also small pontoons for the use of river craft. The pontoons provide a total of 1,000m of berthing, with depths of 20 to 35m. Mooring buoys for the use of ships which do not berth are moored parallel to the pontoons.

Plans call for a third pontoon above the existing ones. In addition to the floating pontoons, there is a fixed wharf and three piers which, however, can only be used during the high river season.

Petrobras Terminal lies about 6 miles downstream from Manaus and stands on the N shore of the river. Tankers up to 30,000 dwt berth starboard side-to at a 50m long pontoon and secure with an anchor and a mooring buoy ahead and two mooring buoys astern. A terminal for the discharge of aviation gas is situated 0.4 mile WSW of the oil terminal.

Pilotage.—Pilotage is compulsory. Vessels calling at Manaus are served by the Pilots of the Amazon Basin; two pilots embark near Salinopolis Light for the round trip voyage. There is also local pilotage available at the port of Manaus. Local pilots board in the following locations:

1. Off Itacoatiara
2. Off Manaus Petrobras Terminal

Contact Information.—Manaus Pilots can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-92-3664-5728
3. Facsimile: 55-92-3664-6617
4. E-mail: manauspilots@manauspilots.com.br

Manaus Port can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-92-2123-4350
3. Facsimile: 55-92-2123-4358

Anchorage.—Anchorage may be obtained anywhere off the city, in depths from 28 to 34m, mud and sand. The current in this vicinity averages 2 knots. The quarantine anchorage is located in front of Ponta do Catalao, in depths of 18 to 20m.

The best anchorage for ships waiting to moor at Copam Terminal is in depths of 20 to 40m, sand, below Ilha Marapata in mid-river abreast Paredao Agricultural School, which lies slightly below the terminal.

The Amazon River, known as the Rio Solimoes above its junction with the Rio Negro, trends WSW then WNW to the vicinity of the meridian 66°W, where the Rio Jurua flows into it from S. In this reach the Rio Solimoes connects with the Rio Japura from N and with the Rio Purus and the Rio Tefe from S.

The Rio Solimoes then trends WSW to the town of Tabatinga; 5 miles W of Tabatinga is Leticia, Columbia.

To the S of Leticia, on the opposite shore, is the mouth of the Rio Javari, which forms the Peruvian boundary.The Rio Solimoes trends WNW from here to Iquitos, Peru, which is 271 miles from Tabatinga.

The Amazon River above Tabatinga is known as the Rio Maranon.

1.66 Codajas (3°50'S., 62°05'W.) is about 164 miles from Manaus and stands on the N bank of the Rio Solimoes. The port affords good anchorage, with mud bottom, in front of the city where the current is weak. Small vessels can use the river bank for mooring.

Coari (4°07'S., 63°07'W.), located about 237 miles from Manaus and stands on the S bank of the Rio Solimoes. Vessels moor to the river bank in an area of about 198m with a depth of 7m and very little currents. There are wooden stakes on the river bank for attaching mooring lines.

Tefe (3°22'S., 46°42'W.), located about 366 miles from Manaus and stands on the S bank of the Rio Solimoes at its junction with Lago Tefe. The port affords good sheltered anchorage, in a depth of 8m, with very little current.

Fonte Boa is located on the S bank of the Rio Solimoes, about 478 miles from Manaus. The port affords good anchorage, in depths of 8 to 10m, with almost no current. Vessels can moor to the river bank.

Porto Afonso (2°44'S., 66°55'W.) is situated close below the mouth of the Rio Jutai, about 561 miles from Manaus. There are frequent severe storms, with predominating NE winds, in this area. Small vessels can moor to the river bank in depths of 3 to 5m. There is an anchorage that offers shelter from storms.

Tonantins (2°47'S., 67°47'W.) is located on the N bank of the Rio Solimoes, close to the mouth of the Rio Tonantins, about 624 miles from Manaus. Approach to the port should be made from the middle of the channel in order to allow the ship to head into the countercurrent which is formed by the eddy. The current in the middle of the channel is strong but weakens close to the river bank. The anchorage is safe and sheltered.

Anto Antonio do Ica (3°05'S., 67°57'W.), about 641 miles from Manaus, stands on the N bank of the Rio Ica nears its junction with the Rio Solimoes. The port has a safe anchorage, sheltered from the prevailing E wind, in depths of about 4 to 7m. Vessels can moor to the river bank.

Sao Paulo de Olivenca (3°27'S., 68°48'W.) on the S bank of the Rio Solimoes, about 723 miles from Manaus Anchorage, is afforded in front of the port, in a depth of 11m, mud bottom. It is possible to moor to the river bank without much difficulty.

1.67 Benjamin Constant (4°22'S., 70°02'W.) lies on the S bank of the Rio Solimoes at its junction with the lower mouth of the Rio Javari, about 870 miles from Manaus.

All ship maneuvers have to be made in the Rio Solimoes since the Rio Javari is very narrow.

At the site of the anchorage, close to the bank, wooden stakes have been installed to aid in mooring.

Caution should be exercised to avoid grounding during the LW season.

Tabatinga (4°15'S., 69°57'W.) is located on the N bank of the Rio Solimoes, about 869 miles from Manaus and near the boundaries of Columbia and Peru. The port has two wharves which are suitable for small craft. There are two anchorage areas, with depths of 8 to 10m, and very weak river current.

Leticia (4°09'S., 69°57'W.) stands on the N bank of the Rio Maranon, about 5 miles NW of Tabatinga. Anchoring is not recommended in view of the strong current fronting the port, which may attain a rate of 2.3 knots.

Iquitos (3°58'S., 73°22'W.)

World Port Index No. 12570

1.68 The port of Iquitos, about 1,146 miles from Manaus, is the capital of the Peruvian Department of Loreto, the commercial center of the region. The port stands on the N bank of the Rio Maranon between the city and a small island which lies parallel to and about 0.5 mile from it. A strong current at the port maintains a deep channel close off the city.

The river level begins to drop in mid-May at Iquitos whereas at Manaus this occurs during the end of June. At Iquitos, the range between normal low and high river is about 7.5m, but this range varies from year to year.

The port can be reached by ships drawing 4.6m year round. From June through August in the HW season, ships drawing up to 7.3m can reach the port.

Anchoring in the vicinity of the port is not recommended as there are several wrecks whose positions are not accurately known.

Vessels berth at a floating metal pontoon dock, 240m in length, which can accommodate two ocean-going vessels at one time.

Care is required while maneuvering along the pier so as not to break the lines, as the eddies and currents are strong.

At times the ship is pushed against the pier and at other times the ship is set away from the pier. Bow lines should be secured as soon as possible and the bow should not be allowed to swing away from the pier. The current alongside the pier attains a rate of about 1 to 2 knots.

It is stated that vessels drawing up to 4.3m can reach Cuidad de Yurimaguas, on the Rio Huallaga, a tributary of the Rio Maranon, 354 miles above Iquitos, without difficulty.

Tributaries of the Amazon River

1.69 The principal tributaries on the N bank of the Amazon River in Brazil are the Rio Negro and its tributary of the Rio Branco, the Rio Japura, and the Rio Ica.

The principal tributaries on the S bank are the Rio Tocantins, the Rio Xingu, the Rio Tapajos, the Rio Madeira, the Rio Purus, and the tributaries of the Rio Acre, the Rio Tefe, the Rio Jurua, and the Rio Javari.

Pilots for the Rio Tocantins, the Rio Madeira, and the Rio Purus can be best obtained at Belem; pilots for the other tributaries of the Amazon River can be best obtained at Manaus.

The Rio Tocantins is about 1,600 miles long, flows N through Brazil, and discharges its waters by a mouth about 10 miles wide into the Rio Para, about 40 miles WSW of Belem.

Although the Rio Tocantins is considered one of the tributaries of the Amazon River, the river does not, strictly speaking, belong to the Amazon River system. The principal tributary of the Rio Tocantins is the Rio Araguaia, which rises in about latitude 18°S.

To enter the Rio Tocantins, a ship can pass on either side of Banco do Otelo, a large drying sand bank, the NE extremity of which lies about 9 miles E of Mandii Light. The channel between Ilha Mandii and Banco do Otelo should not be attempted at night.

The Rio Tocantins is navigable by small craft for about 120 miles above Cameta. The land is low and wooded. Its general appearance is so uniform that it is difficult to distinguish one part from another. Local knowledge is necessary for safe navigation.

Anchorage can be taken, in about 14m, about 0.2 mile off Cameta.

Cameta (2°15'S., 49°30'W.) (World Port Index No. 12500) stands on the W bank of the Rio Tocantins, about 90 miles from Belem. The town is built on the river bank and is an important trade center. The tidal range is about 3m; the current attains a rate of about 2.5 knots.

1.70 The **Rio Xingu** (1°32'S., 51°52'W.) is about 1,200 miles long and can be navigated for about 105 miles above its mouth to Cachoeiras de Itamaraca. It can be navigated by vessels with drafts of up to 2.5m during the HW season, from February to July.

The Rio Tapajas flows into the Amazon River near Santarem. The river is navigable for about 170 miles above the city to the first falls.

At low and middle periods of the river level, the tidal currents are felt. These currents can be seen by the presence of yellow water in the river, which is normally clear.

Fordlandia (3°40'S., 55°30'W.) is located on the E bank of the Rio Tapajos, about 98 miles from the river mouth. There is a small pier, with depths of 3.7m at LW and 9m at HW. The port is used mainly for the export of rubber and lumber.

1.71 The **Rio Madeira** (3°23'S., 58°46'W.) is the most important tributary of the Amazon River. It is near the W end of Ilha da Trindade.

The river rises in the S part of Bolivia and has a total length of about 2,000 miles. A number of tributaries branch out from the Rio Madeira.

Porto Velho (8°46'S., 63°54'W.) stands on the E bank of the Rio Madeira, about 611 miles from its mouth. The port can be reached by vessels with drafts up to 6.1m at HW and 2.1m at LW. The range of the river is about 12m and the current has a velocity of 4 to 6 knots.

Above Porto Velho, a stretch of the river is impassable due to rapids, but above the rapids, its tributaries the Rio Mamore and the Rio Guapore, which forms the boundary between Bolivia and Brazil, are navigable by river craft for a distance of 400 miles.

1.72 The Rio Negro enters the Amazon River near Manaus, about 917 miles from Belem.

The river is navigable by boats up to the town of **Santa Isabel** (00°25'S., 65°01'W.), 423 miles from Manaus.

Off Manaus, the river is about 2 miles wide. Above Manaus the river widens forming Baia de Boiucu and then narrows again about 60 miles farther, off Ponta da Tatuquara.

Navigation along the river banks is not possible, especially at low river, due to extensive shoals and sand flats which are often awash and between which the fairway winds.

Along most of the stretch from Manaus to Santa Isabel the river banks are difficult to distinguish due to the presence of the great number of islands.

The river bed is rocky near Santa Isabel and during the dry season there may be one or two passes with depths of not more than 1m. The river level begins to rise about 2 months later than that of the Amazon River and has a range of between 6 and 8m.

1.73 The Rio Branco is the largest and most important tributary of the Rio Negro and joins it 193 miles above Manaus. It is formed by the confluence of five rivers, all of which rise near the Venezuelan and Guyanian borders. It has a range of 8m near its mouth and 6m in its upper reaches.

The current averages 2 knots. It is navigable by vessels up to 3.6m draft for a distance of 200 miles.

Boa Vista (2°49'N., 60°40'W.) is the principal town on the river. The river banks are low for the greater part of the lower reaches from its mouth with small lakes in the neighboring forests, even during the dry season. In the upper reaches, the riverbanks are higher.

The Rio Purus rises in Peru and enters the Rio Solimoes from the SW about 117 miles from Manaus. The river is navigable year round for a distance of 715 miles by vessels with drafts of up to 2.7m. The range of the river varies from 10 to 17m. The current varies from 2 to 6 knots.

The Rio Acre, the main tributary of the Rio Purus, is navigable at high river as far as the town of **Xapuri** (10°39'S., 68°31'W.), about 350 miles above its mouth and near the boundary with Bolivia.

The Rio Japura enters the N bank of the Rio Solimoes from WNW. The Rio Japura is navigable during the dry season by small craft drawing up to 1m.

During the rainy season, river craft can ascend for about 400 miles to Vila Bittencourt.

Vila Bittencourt (1°27'S., 69°25'W.), the farthest upriver port in Brazil, stands on the N bank of the Rio Japura near the boundary with Colombia.

The Rio Jurua rises in Peru and enters the S bank of the Rio Solimoes, about 511 miles from Manaus. The river is navigable year round as far as the mouth of the Rio Tarauaca for about 1,198 miles from its junction with the Rio Solimoes. During the rainy season, the Rio Jurua is navigable 1,030 miles farther to the mouth of the Rio Breu.

Cruzeiro do Sul (7°39'S., 72°37'W.), one of the leading towns of Territorio do Acre, is situated on the Rio Jurua, about 686 miles from the mouth of the Rio Tarauaca.

The Rio Tarauaca is navigable during the rainy season as far as the city of Tarauaca, situated on the W bank.

1.74 The Rio Ica (Rio Putumayo) enters the N bank of the Rio Solimoes, about 640 miles from Manaus.

The river is navigable by small craft drawing up to 1.5m as far as **Puerto Leguizamo, Colombia** (00°12'S., 74°46'W.).

The Rio Ica is one of the most important tributaries of the Amazon River due to the mineral and vegetable products found in its vicinity. The river is about 900 miles long and has several tributaries, some of which are navigable. The river rises from March to July and falls from August to February. The current runs from 1 to 3 knots in its lowest part and from 3 to 7 knots in its upper part.

The Rio Javari (Rio Yavari) enters the S bank of the Rio Solimoes near Benjamin Constant. The greater part of this river forms the boundary between Brazil and Peru. The Rio Javari is tortuous but the river is navigable by small craft during the rainy season.

The Rio Napo rises in Ecuador on the E slope of Volcan Cotopaxi and enters on the N bank of the Rio Maranon, about 42 miles below Iquitos. The river is sluggish, with depths of about 1.2m, and is navigable by river craft of light draft as far as its junction with the Rio Coca, about 523 miles above its mouth. The Rio Napo is swift above its junction with the Rio Coca where the river bed changes from shifting sand to rock.

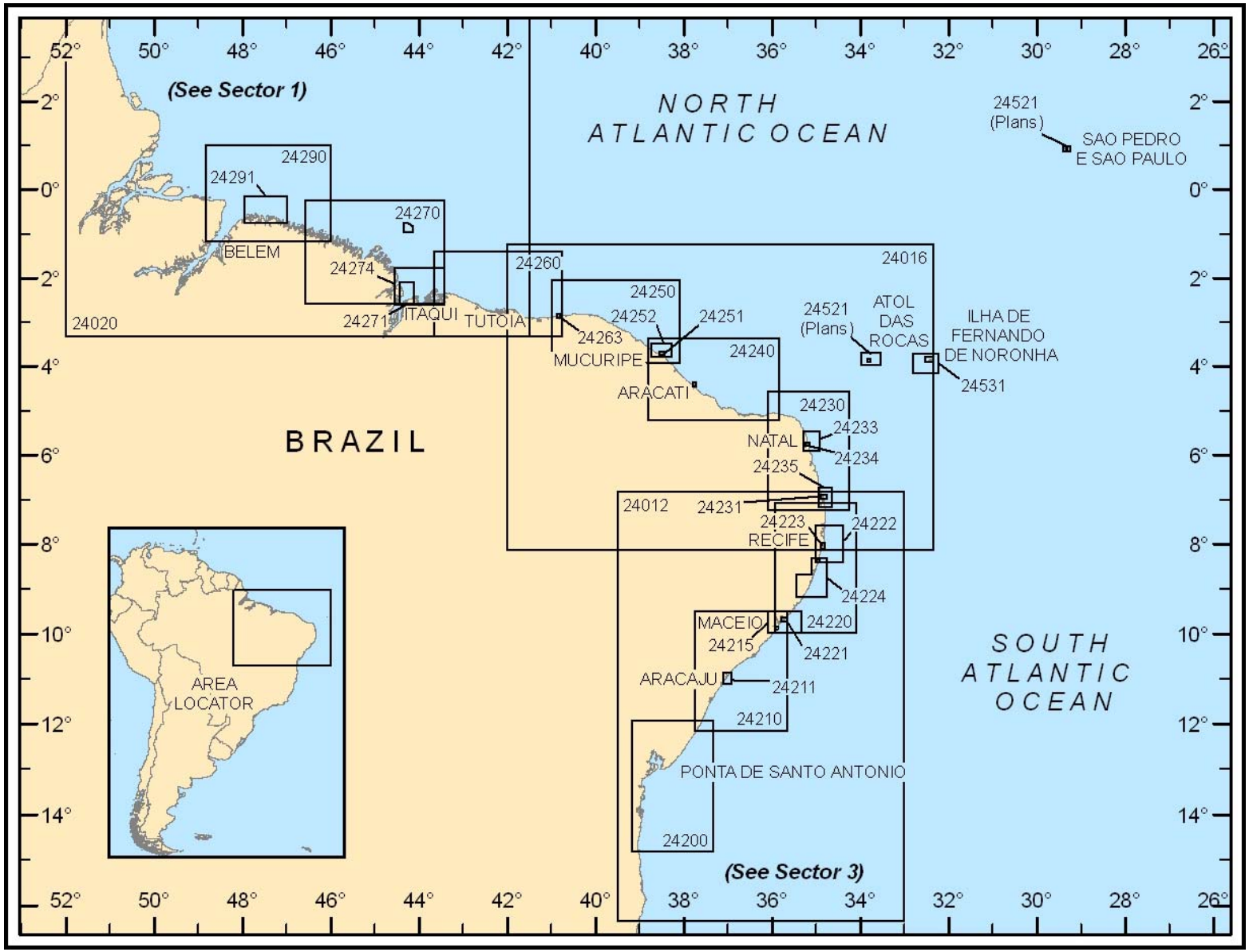
The Rio Pastaza rises in the central part of Ecuador and enters on the N bank of the Rio Maranon in approximate position 4°53'S, 76°20'W. The river is navigable by small river craft for about 180 miles from its mouth during the dry season and for about 300 miles during the rainy season. The Rio Pastaza is obstructed by sand banks and snags; its rise and fall are rapid and uncertain.

1.75 The Rio Morona rises in Ecuador on the E slope of the main chain of the Andes and enters the Rio Maranon near the town of **Borja** (4°26'S., 77°33'W.). The river is navigable by small river craft for about 300 miles during the rainy season. Canoes can ascend many of its branches. The Rio Morona flows through a fertile region; gold washing takes place on its banks.

The Rio Ucayali rises in the S part of Peru and enters the S bank of the Rio Maranon in about longitude 73°30'W. The river is navigable by coasters as far as its junction with the Rio Apurimac, about 800 miles above its mouth.

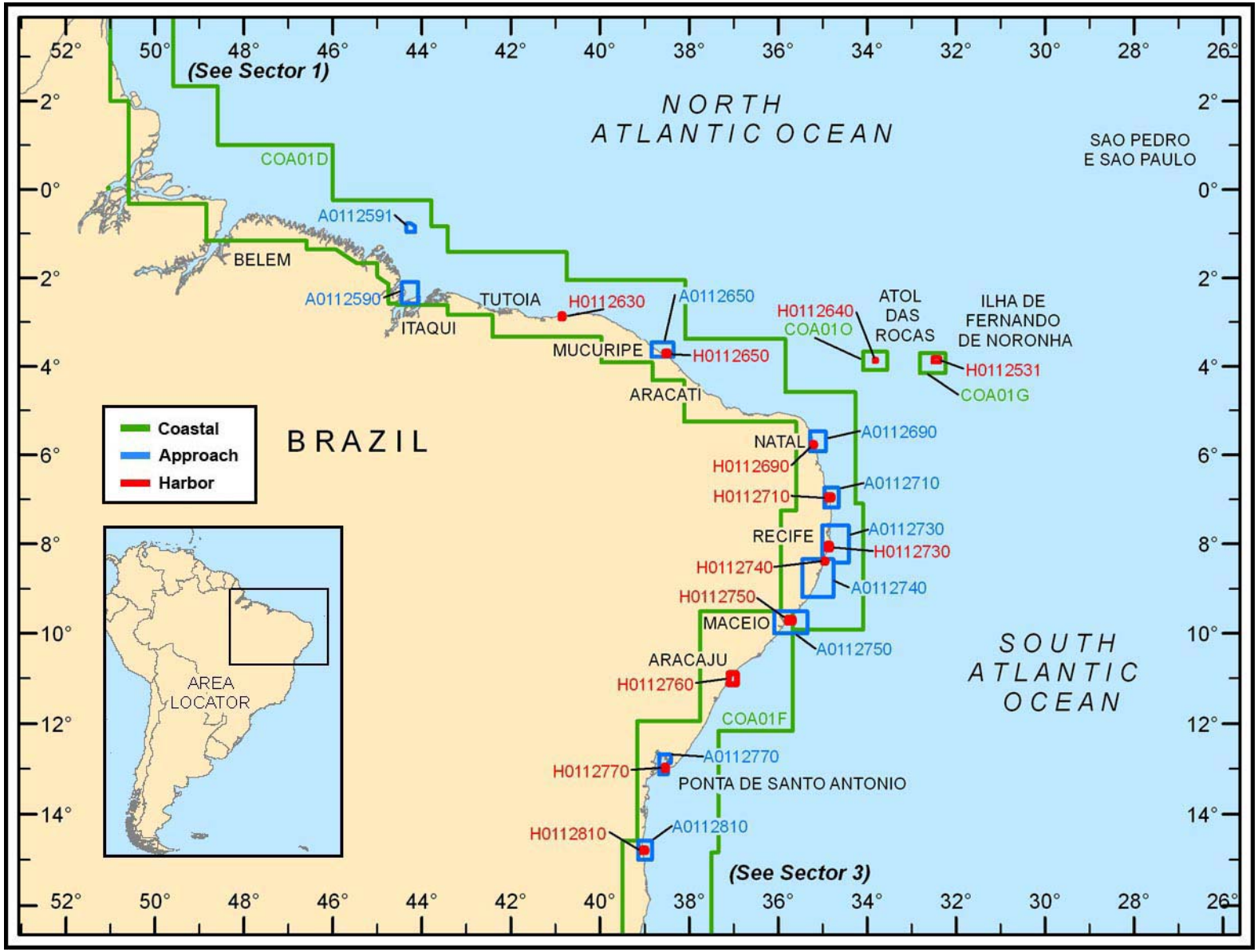
Pucallpa (8°22'S., 74°32'W.) stands on the W bank of the Rio Ucayali, about 533 miles from Iquitos. The town maintains regular river service with ships of 3,000 dwt. There is a wooden wharf at which ships can berth at any level of the river. The controlling depths at high and low river are about 9m and 2.7m, respectively.

The Rio Huallaga rises in the mountains of Peru and enters the S bank of the Rio Maranon in about latitude 5°S. The river is navigable by river boats as far as Yurimaguas, about 96 miles from its mouth, and by launches as far as Chasuto, about 181 miles from its mouth.



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

SECTOR **2** — CHART INFORMATION



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SECTOR 2 — DNC LIBRARY INFORMATION

SECTOR 2

NORTH COAST OF BRAZIL—PONTA CURUCA TO PONTA DE SANTO ANTONIO

Plan.—This sector describes the N coast of Brazil from Ponta Curuca to Cabo Calcanhar and the NE coast from Cabo Calcanhar to Ponta de Santo Antonio. The N coast sequence is from W to E and the NE coast sequence is from N to S.

Penedos de Sao Pedro e Sao Paulo, Arquipelago de Fernando de Noronha, and Atol das Rocas are also described in this sector in the above order.

General Remarks

2.1 Winds—Weather.—Along the stretch of coast NE of Salvador, the direction of the trade winds varies an average of 045° during the contrary monsoons. They are E during the months of February, March, and October, ENE during November and December; and ESE from April to September.

Other winds and weather of a local nature are discussed in sequence along with related geographical features.

The year has two seasons, the rainy season and the dry season. The rainy season is between January and May. The dry season is between June and December.

The prevailing winds are from the NE.Weak and short-lived winds blow from S and W during the rainy season.

At times, there are heavy rains from the NW and SW during February, March and April.

In the dry season, winds are from the ENE. At times, there are fresh N winds during the day, which weaken at night. There is some rain even during the dry season.

In the afternoon there is a sea breeze and at night there is a land breeze.

Tides—Currents.—The tidal currents off the whole of this coast are very regular, with their rates increasing progressively to the W. The current in both directions follows the trend of the coast, and are stronger close inshore and in shallow water, but in general their influence is not felt more than 6 to 8 miles offshore.

In the vicinity of **Cabo Calcanhar** (5°10'S., 35°29'W.), the rate of the current never exceeds 1 knot, but between Ilhas de Sao Joao and Ilha de Santana, there are usually rates from 2 to 3 knots, and on a few occasions 4 to 5 knots.

Off the coast between Ponta da Atalaia and Ilhas de Sao Joao, the tidal currents are sometimes felt as much as 20 miles offshore. The SW current generally runs SW near the coast and WSW or W some distance from it. Near the land, it has a mean rate of 2.5 knots at springs and 1.75 knots at neaps, but the rate diminishes as the distance offshore increases. The NE current runs ENE close inshore at a rate of 1.75 knots at springs and 1 knot at neaps, and trends N with diminishing strength in proportion to the distance offshore.

The difference between the rate of the SW current and that of the NE current is the result of a general set W from 18 to 24 miles a day during the greater part of the year; however, during the months of March, April, and May, the set may sometimes be E at the same rate.

Aspect.—The coast from Ponta Curuca to Ilha de Santana, about 275 miles ESE, is low, formed by sandhills 45 to 75m high, and indented heavily with bights.

The indentations are so numerous along this stretch of the coast that they may be difficult to distinguish from one another.

The coast consists of several sandhills which are also similar in appearance and which are interspersed with reddish cliffs and clumps of mangroves.

This part of the coast is imperfectly surveyed and should be approached with caution and not within the 20m curve.

Several rivers flow into the sea along this section of the coast. The silt carried out by these rivers forms shoals which extend, in places, as far as 20 miles from their mouths.

These shoals, taking the name of what ever geographic feature is closest, form an extensive coastal bank along this entire coast. Constant soundings should be taken when in this vicinity.

Caution.—The coastal bank contains most dangers along this part of the coast. However, depths of less than 18.3m are charted outside the 20m curve.

The 20m curve lies as far as 13 miles offshore, except between Ilhas de Sao Joao and Ilha Mangunca, where it lies as far as about 32 miles.

2.2 Banco Hylas (0°18'S., 47°18'W.) is an extensive shoal with a bottom of rock in places. The middle of the bank lies about 18 miles N of Salinopolis Light. The minimum depth on the bank is 11.2m.

Banco Buckle (0°17'S., 47°00'W.), with a least depth of 7.5m, is charted about 30 miles NE of Salinopolis Light.

Recife Manoel Luis (0°52'S., 44°16'W.) is a dangerous group of drying rocks, surrounded by shoals, on a bank with depths of less than 10m, lying 48 miles NNE of Ilha Mangunca. The sea breaks over these rocks at LW. It is almost impossible to see them unless they are passed nearby.

The depths and nature of the bottom near Recife Manoel Luis are so variable that soundings give no indication of nearness to this danger.

Changes in depths and in the position of banks and shoals have been observed for a long period of time along this stretch of the coast, not only close to shore, but also well offshore.

Ponta Curuca to Ilha de Santana

2.3 Ponta Curuca (0°33'S., 47°49'W.) is located on the N extremity of Ilha de Curuca. The point is conspicuous because it is the highest point of land in the area. A light is shown from the W side of Ilha de Cajutuba, about 3 miles ESE of Ponta Curca.

Ponta do Algodoal (0°35'S., 47°35'W.), the N extremity of Ilha do Algodoal, and from which a light is shown, lies about 13 miles E of Ponta Curuca. The point is distinguished by a small hummock with a notch in it and by its sandy beach and prominent sand dunes. When seen from offshore, the point

looks like a nipple; when seen from the E the point looks like an island.

Baia de Salinas is entered between Ilha do Marco and Ponta da Atalaia, about 6 miles to the E. The bay affords shelter to small craft entering on the tide.

Salinopolis Light

The town of Salinopolis is located on a wooded plain on the E side of the bay.

Salinopolis (0°37'S., 47°21'W.) is the base station for the Rio Para pilots. The town stands on a red cliff. The land slopes downward to the W of the town to a mass of tall trees.

Vessels approaching the pilot station will first sight the light, which stands in a town, then four radio towers, and then a white church tower. Deep draft ships approaching the pilot station from the N can anchor with the light bearing 175°, distant 4.5 miles, in depths of 10 to 14m, mud.

Salinopolis provides pilotage for the Amazon River (see paragraph 1.41), the Rio Para (see paragraph 1.50), and Belem (see paragraph 1.54).

Ponta da Atalaia (0°36'S., 47°19'W.), located about 3 miles ENE of Salinopolis Light, is the most conspicuous and easily recognizable point in the area. It is formed by sandy terrain with marks of red earth. A high lookout mast stands on the point near the ruins of a lighthouse.

When approaching from the E, the point, when initially sighted, gives the impression of being an island. From the same direction, Monte Piraucu, a small hill lying 8 miles S of the point, can be seen in clear weather rising from the surrounding land.

Ponta da Atalaia to the Rio Gurupi

2.4 The coast from Ponta da Atalaia trends ESE for about 43 miles to the N end of Ilha Boiucucanga. This part of the coast is fringed by several islands, between which are bays, formed generally of river estuaries. The entire coast is bordered by a sandbank which extends as far as 4 miles N from the islands.

Ponta Boiucucanga (0°48'S., 46°38'W.) is the NE extremity of the island of the same name. The point is higher and more conspicuous than any in the area. A light is shown 0.3 mile SSE of the point.

Baia do Caete is entered between Ilha Boiucucanga and Ilha Camarauacu, about 13 miles to the ESE. Ilha Camarauacu is surrounded by sandy beaches which are visible at a distance of about 8 miles. Ships drawing up to 2m and with local knowledge can reach the town of Braganca, located on the W bank of the Rio Caete, about 10 miles above its mouth.

The coast from Ilha Camarauacu trends ESE for about 25 miles to the estuary of the Rio Gurupi.

The entire coast is bordered by a sand bank extending as far as 6 miles N from the islands which fringe it. These islands form several narrow and shallow channels which afford shelter from offshore winds.

Baia do Guaperoba lies between Ilha Camarauacu and Ilha do Apeu, about 10 miles to the E. The SE part of the bay is the deepest, but local knowledge is essential as there are many shoals within the bay.

The **Rio Gurupi** (1°04'S., 46°02'W.), about 389 miles long, flows into Baia do Gurupi, about 10 miles SE of Apeu Light, which is located on Cabo Gurupi. Sand banks obstruct the estuary and extend about 8 miles N from the mouth of the river. The river is navigable by small craft, with local knowledge and at high water, as far as Viseu, located about 20 miles above its mouth. During the rainy season, small craft can ascend the river to its source.

The Rio Gurupi to Baia de Sao Marcos

2.5 The coast from the estuary of the Rio Gurupi trends ESE for about 70 miles to Ilhas de Sao Joao. Sand banks, which break during onshore winds, extend as far as 10 miles N from the islands which fringe this part of the coast. These islands form sheltered channels for small craft but should only be approached with local knowledge.

Monte Piracoaua, small but prominent, as it is the only hill along this stretch of the coast, stands about 36 miles SE of the light on Cabo Gurupi.

Tides off this section of the coast are semi-diurnal. They have great amplitude and can reach 7m during the spring tides close to the equinoxes.

During January, February, July, and August, the current is from the W with a rate of 1.6 to 2 knots. During the rest of the year, the current is from the WNW with a rate of 1 to 2 knots.

Baia de Turiacu (1°30'S., 45°15'W.) forms the estuary of several small rivers and is encumbered with sand banks. A

narrow and sinuous channel that has frequent variations gives access to the town of Turiacu, on the W bank of the Rio Turiacu.

The channel is very dangerous and can only be entered by small vessels with local knowledge.

Ilhas de Sao Joao (1°19'S., 44°56'W.) consists of a group of seven low islands, separated from each other by narrow channels, located about 18 miles NE of Baia de Turiacu.

Ilha Maiau, the northernmost and largest of the group, is covered with sand dunes and shows a light on its N side. Ilha dos Lencois is the easternmost of the group and consists solely of white sand dunes. The other islands of the group are Ilh a do Guara, Ilha Urumaru, Ilha Mirinzal, Ilha do Porto do Meio, and Ilha Aracaja. There are numerous drying sandbanks between the islands and the coast. Depths of less than 10m extend up to 12 miles NE of Ilha Maiau and Ilha Lencois.

Anchorage.—Anchorage, sheltered from all except E winds, may be obtained by ships with a draft of up to 5m in fine sand in the bay SE of the islands, close S of the SW point of Ilha Lencois. The bay is obstructed by sand banks beyond this anchorage. The tidal current in the anchorage runs ENE and WSW at rates of up to 3 knots, changing direction at HW and LW.

2.6 The coast from Ilhas de Sao Joao trends SE for about 60 miles to Ponta Itacolomi. Several shoals lie within and near the 32m curve along this part of the coast. The coastline is fringed by several islands, between which are bays, formed generally of river estuaries. Drying sand banks, marked by breakers around the edges, lie up to 10 miles off the coast.

Ilha Mangunca (1°36'S., 44°39'W.) is located about 24 miles SE of Ilha Lencois. The island is wooded and shows a light from its E side. Close W of its S point, there is anchorage, sheltered from all winds, in depths of about 8m, sand, accessible to vessels with local knowledge.

Ponta de Itacolomi (2°09'S., 44°28'W.) is formed by high reddish cliffs covered with scrub. Morro Itacolomi rises to an height of 69m, 1.5 miles SE of the point, and is visible up to 20 miles in clear weather.

Ponta Pirajuba (2°13'S., 44°24'W.) is a rocky steep point with red cliffs that are visible a good distance offshore. A light is shown from the point, 5 miles SE of Ponta Itacolomi.

Baia de Sao Marcos

2.7 **Baia de Sao Marcos** (2°21'S., 44°17'W.) is entered between Ponta Itacolomi and the NE extremity of Ilha do Maranhao (Ilha de Sao Luis). This bay is the deepest of all along the N coast of Brazil. The bay is much encumbered by sandbanks, through which, however, there are channels which can be used by deep draft vessels.

Winds—Weather.—The year has two seasons, the rainy season and dry season. The rainy season is January to May and the dry season from June to December.

Visibility is usually good in the bay. The occurrence of fog is very rare; however, some mist may occur, which brings a slight reduction in visibility.

Heavy, but short, rain storms are common during the rainy season.

The predominant wind is from the E most of the year, with the exception of January and April (from N), March and October (from SE), and August (from SW). The average wind force in this area is 2 to 5 on the Beaufort scale.

Tides—Currents.—In Baia de Sao Marcos, the current is quite strong and can reach 6 knots between the banks. The maximum tidal velocities occur 3 to 4 hours after HW and 2 to 3 hours after LW.

Strong eddies provoked by tidal currents are observed NE of Banco dos Almas and close to the port of Itaqui.

2.8 **Ponta Pirarema** (2°20'S., 44°22'W.) is located about 12 miles SSE of Ponta Itacolomi and consists of high red cliffs.

On the cliffs S of the point is a very remarkable red patch which is most visible from seaward when bearing more than 270°. A drying reef extends 0.5 mile NE from the point.

Ponta de Sao Raimundo lies 3.5 miles SSW of Ponta Pirarema and Ponta Tatinga lies 1.5 miles farther SW. Between these two points there is a very conspicuous white sand hill. Also conspicuous is a small hill on Ponta Tatinga.

Alcantara, built on a hill, is situated about 1.7 miles W of Ponta Tatinga and a light is shown close S of Alcantara.

Morro Aracagi (2°27'S., 44°09'W.), 51m high, rises on the N side of Ilha de Sao Luis and is the first land sighted when approaching from the NE. A light is shown from the W side of Morro Aracagi.

Ponta de Sao Marcos (2°29'S., 44°18'W.), about 9 miles WSW of Morro Aracagi, marks a sharp turn of the shore at the NW extremity of Ilha de Sao Luis. Extensive shoals extend NE of the point to a distance of almost 4 miles. A light is shown from a conspicuous fort which stands on the point. A dangerous wreck lies about 0.7 mile WNW of the point.

Ponta da Areia, low and sandy, lies about 2 miles SW of Ponta de Sao Marcos. The point is fronted by a sand bank, with depths of less than 1.8m, which lies up to 1.3 miles offshore.

Ilha do Medo lies about 3 miles WSW of Ponta da Areia. Rocks, above and below-water, extend about 0.6 mile NE of the island. Canal do Boqueirao lies between the S side of Ilha do Medo and the shoals which extend from Ilha de Sao Luis.

The canal should not be attempted without a pilot. A light is shown from the island.

2.9 **Ponta da Madeira** (2°34'S., 44°23'W.), the W extremity of Ilha de Sao Luis, lies about 3 miles SSW of the S side of Ilha do Medo. A disused lighthouse stands on the point.

Ponta da Madeira Iron Ore Terminal (2°34'S., 44°23'W.) is situated at the end of Ponta da Madeira.

Depths—Limitations.—A berthing quay, lying N to S and about 250m long, with three dolphins at each end, is connected to the shore by a jetty.

It is protected by two stone breakwaters which project, respectively, 1,050m NW and 312m SW from the shore at either end of the berth. A light is shown from the end of each breakwater.

Four berths are designed to accommodate vessels up 420,000 dwt, with drafts up to 23m. Berth 1 can accommodate vessels up to 365m in length, 66m beam, and 23m draft. Berth 2 can accommodate vessels up to 280m in length, 50m beam, and 18m draft. Berth 3 can accommodate vessels up to 365m in length, 65m beam, and 21m draft. Berth 4 can accommodate

Aracagi Light

vessels up to 365m in length, 66m beam, and 23m draft. A project is underway (2010/11) to dredge and allow for a depth of 25m alongside.

The breakwaters are designed to divert the tidal currents to run parallel to the quay at a maximum speed of 3 knots, which is the limiting condition for berthing vessels over 100,000 dwt.

Mooring maneuvers should be carried out against the current.

Pilotage.—Pilotage is compulsory and reported available 24 hours. Vessels should send their ETA 15 days (or on leaving previous port, if nearer) and 8 days in advance, stating:

1. DWT in tropical waters.
2. LOA.
3. Beam.
4. Maximum draft in tropical waters.
5. Arrival draft and expected departure draft.
6. Cargo plan and loading sequence.
7. Air draft.
8. Deballasting time.
9. Water requirements.
10. Gas-free condition.
11. Details of mooring lines.
12. Master's name.

Vessels should send a message 48 hours in advance (with request for pilot and anchorage instructions) and 24 hours in advance (with gas-free condition and any amendments to previous messages) through Sao Luis (PPB). Contact the terminal on VHF 4 hours prior to ETA to confirm the pilotage request.

Pilots board, as follows:

1. Vessels with a draft of 11m or less—about 4 miles WNW of Ponta do Sao Marcos Light.
2. Vessels with a draft of over 11m or over 100,000 dwt—2 miles NNE of Lighted Buoy No. 19 and Lighted Buoy No. 24.

Contact Information.—See paragraph 2.11.

Directions.—With Morro Itacolomi bearing 270°, distant about 17 miles or with Pirajuba Light bearing 257°, distant 14 miles, Morro Aracagi Light will bear about 175°.

Steer a course of 212° to pass between Banco do Meio and Banco das Almas, in depths of 25 to 35m. This channel is most frequently used for entering Baia de Sao Marcos and is laid down on the chart.

Vessels bound for Porto de Itaqui continue on the 212° course until Isla do Medo Light bears 139°, then change course to 180° which leads to the anchorage and pilot boarding area W of Ponta do Madeira.

The channel E of Banco do Meio is not recommended and should not be attempted for entering Baia de Sao Marcos.

Caution.—All along Baia de Sao Marcos there are strong ebb and flood tidal currents. These currents, which may reach 6 knots, have been causing the loss of anchors of anchored vessels, therefore, creating great risk of running aground on the innumerable sand banks and shoals which exist in the bay.

Banco das Almas, an extensive shoal with depths of 3.6 to 9.1m, sand and shells, lies with its N extremity about 12 miles E of Ponta de Itacolomi. A 11m patch lies about 2 miles E of the NE extremity of Banco das Almas.

Banco do Meio, a bank of fine sand 13 miles long, with depths of less than 10m, lies in the middle of Baia de do Maranhao, about 10 miles NW of Ilha de Sao Luis. The NW edge is steep-to and should be given a wide berth.

A dangerous wreck lies on the SW end of the bank. The bank, which has a least depth of 2.1m, breaks at LW.

Ships should not approach Baia de Sao Marcos between Banco do Meio and the N side of Ilha de Sao Luis as several unmarked shoals lie within this area.

Banco da Cerca, a sand bank 4 miles long, lies about 2.2 miles NW of Ponta da Areia. It has a least known depth of 0.2m located near the middle of the shoal, but there are reports that rocky heads exist elsewhere on the bank.

The sea is reported to break over the whole length of this shoal at LW. The tidal currents near the shoal attains a rate of 5 knots at times.

Banco de Sao Macos, a sandbank that uncovers at LW, lies from 1 to 3.5 miles NE of Ponta de Sao Marcos.

Banco das Almas and Banco do Meio are reported to be extending to the NE. Several reefs and shoals lie between Banco de Cerca and Ilha do Medo.

Pedra do Severino, 1.3 miles NNE of Ilha do Medo Light, has a depth of 2.4m. Extensive shoals with rocks extend up to 1.5 miles NE of Ilha do Medo with a minimum depth of 1.4m.

A sunken wreck, marked by a light, lies 2.5 miles W of Ilha do Medo. Cabeco Mearim, an extensive shoal with rocks, lies 0.75 mile SSW of the point of Ilha do Medo. The shoal has a depth of 4.4m and is marked by a buoy.

The NE edge of a shoal with a least depth of 2.5m lies about 3.2 miles SW of the light on Ilha do Medo.

Ilha de Guarapira, marked by a light, lies just over 0.5 mile SSE of Ponta da Madeira Light. It lies on a rocky shoal with depths of 3.4 to 10m. The NNW, NE. and SE ends are marked by lighted buoys. A depth of 7.7m lies just over 0.5 mile WSW of Ilha de Guarapira Light.

2.10 Sao Luis (2°32'S., 44°17'W.) (World Port Index No. 12590) has silted up and has ceased to be important as a port after the construction of the port of Itaqui.

The port of Sao Luis is used mainly by fishing boats and pleasure craft. The port has a few piers that allows mooring, but only at flood tide, to ships of 2.5 to 3.5m draft. The quarantine anchorage is WNW of Ponta da Areia.

2.11 Itaqui (2°34'S., 44°22'W.) (World Port Index No. 12585) is located about 6 miles WSW of Sao Luis. The wharf at Itaqui is 1,190m long, with alongside depths of 9.5 to 18m. In addition there are two tanker berths, the largest with depths alongside of 19m.

Cargo vessels may moor day or night, depending on the tide; however, vessels with a draft greater than 7m may maneuver only at or near slack water. Vessels that are bound for the oil berths may only berth on the rising tide during the day. Berthing should commence 1 hour before HW.

Itaqui

Pilotage.—Pilotage is compulsory and should be arranged through the agent giving 24 hours, 12 hours, and 6 hours notice of ETA.

See paragraph 2.9 for pilot boarding locations.

Contact Information.—Itaqui pilots can be contacted, as follows:

1. VHF: VHF channels 14 and 16
2. Telephone: 55-98-3223-8586
   55-98-3223-8587
   55-98-3223-8588
3. E-mail: plantao@pratimar.com.br

Itaqui Terminal Control can be contacted, as follows:

1. VHF: VHF channel 6
2. Telephone: 55-98-3217-3271
3. Facsimile: 55-98-3210-3251

Ponta da Madeira Terminal can be contacted, as follows:

1. VHF: VHF channels 12, 13 and 16
2. Telephone: 55-98-3222-2816
3. Telex: 38-984572 CVRD BR
   38-984573 CVRD BR

Anchorage.—There are three designated outer anchorage areas. Anchorage No. 1 is for partially-loaded vessels bound for Ponta da Madeira Terminal, with drafts greater than 11m and/or over 100,000 gt; vessels in litigation; or vessels over 80,000 gt with a draft greater than 11m awaiting major repairs. Anchorage No. 2 and Anchorage No. 3 are for vessels with drafts over 20m awaiting the tide.

Caution should be exercised due to the possible existence of submarine cables W of this area.

There are five anchorage areas, designated No. 4 to No. 8, in Baie de Sao Marcos. Anchorage No. 7 is for vessels of less than 80,000 dwt or 11m draft. Anchorage No. 8 is for vessels with a draft of less than 11m when in quarantine or when loading or unloading combustibles and explosives; permission must be obtained from the Captain of the Port before using this anchorage.

2.12 Porto da Alumar (2°40'S., 44°22'W.) is a new bulk terminal located about 5 miles S of Itaqui.

The approach channel is entered 3 miles S of Itaqui. It leads SSE for 1.2 miles and then S for 1.8 miles until it reaches a turning area off the wharf. The channel and the turning area are dredged to 7m. Range lights lead through the channel entrance. The channel limits are marked by lighted buoys.

The wharf is 251m long and has depths alongside of about 13m. Vessels with a maximum length of 225m and a beam of 32.3m can be accommodated.

The wharf is equipped for loading aluminum and for unloading bulk cargo such as bauxite and coal.

Pilotage.—Pilotage is compulsory. Pilots are picked up in the same places as the pilots for the Ponta da Madeira Iron Ore Terminal.

The ETA should be given 15 days in advance, or on departure from a previous port, and confirmed 5 days, 48 hours, and 24 hours before arrival.

The 48-hour message should include the vessel's ETA, cargo tonnage, arrival draft, ballast tonnage, and deballasting time.

Anchorage instructions are requested 4 hours in advance.

Contact Information.—Porto da Alumar can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-98-3218-1392
   55-98-3218-1866
3. Facsimile: 55-98-3218-1461

Anchorage Area D (2°38.0'S., 44°22.7'W.) can be used by a single vessel waiting to berth at Porto da Alumar.

Caution.—It has been reported (1994) that the banks and drying banks on the W side of the channel in the approaches to Porto da Alumar are extending E into the channel.

Baia de Sao Jose

2.13 This bay, encumbered almost entirely by sand banks, occupies the E part of Baia do Maranhao. The entrance to the bay is obstructed by Coroa Grande.

Coroa Grande, an extensive shoal consisting of several ridges with depths of less than 1.8m in places, extends about 18 miles NE and 11 miles N from the NE extremity of Ilha de Sao do Maranhao.

The sea occasionally breaks over some of the ridges at LW. Coroa Grande was reported to be extending to the N and should be given a wide berth.

Ilha de Santana to Tutoia

2.14 Ilha de Santana (2°18'S., 43°41'W.) is low and covered with mangroves. The island is surrounded by reefs on which the sea breaks but the breakers are seldom seen until the land is well in sight. A light is shown from the NE side.

Between the NE point of Ilha de Santana and Ponta dos Mangues Secos, 12 miles to the SE, there is an extensive bay known as Baia do Tubarao.

The entrance to the bay is obstructed by Banco Imperial (Recifes de Santana), which is largely unsurveyed.

Depths are reported uneven for about 13 miles N of Banco Imperial. There are numerous banks in the area with depths of less than 20m. The shallowest, with a depth of 11.8m, lies 11.5 miles NNE of Isla de Santana Light. There is also a 9.8m patch 13.5 miles ENE of the light.

There is a spacious and secure anchorage, in depths from 9 to 13m, 2 miles W of Ponta dos Mangues Secos. The best approach to this anchorage is by way of a somewhat intricate channel which passes 1 mile SE of Banco Cesar and then 1 mile N and 2 miles W of Ponta dos Mangues Secos.

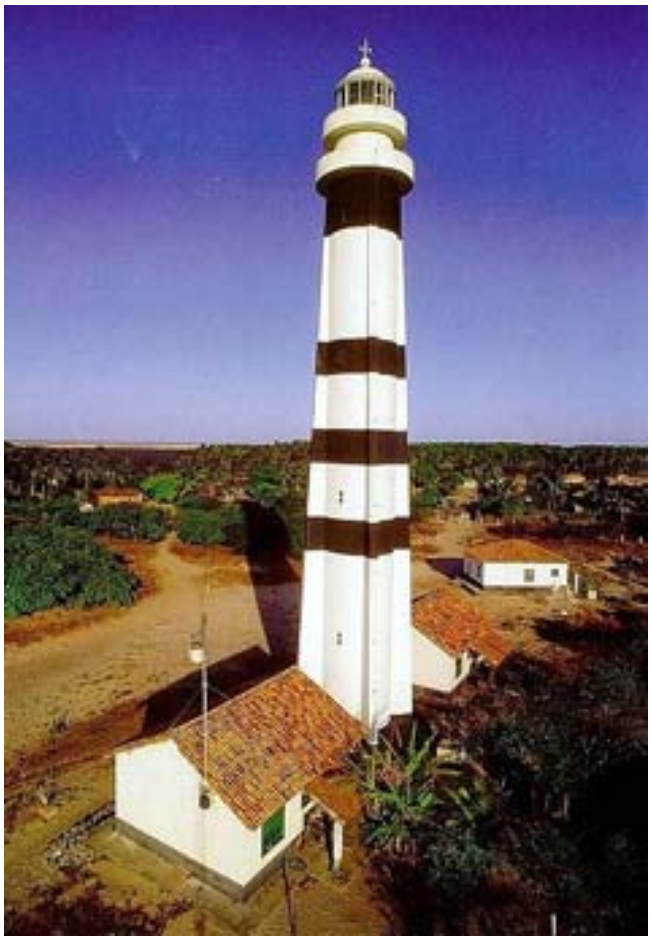
The channel has a minimum depth of 6m but local knowledge is essential. Tidal currents in this channel can attain a speed of 3 to 4 knots.

2.15 Ponta dos Mangues Verdes (2°20'S., 43°22'W.) is covered with vegetation and lies 8 miles E of Ponta dos Mangues Secos. Prominent white sand dunes, extending to the E, begin at this point. From this point to Tutoia, 65 miles to the ESE, the coast is fringed by banks and reefs, with depths of less than 10m, to distances up to 9 miles offshore.

As far as the mouth of the Rio das Preguicas, depths of over 20m are to be found 18 miles offshore, but then to Tutoia there are several banks with depths from 16.7 to 19.3m lying up to 25 miles offshore. The banks and reefs in this area can best be seen on the chart.

The Rio das Preguicas is located about 40 miles ESE of Ponta dos Mangues Verdes.

A light is reported to be shown from the W side of the mouth of the river. The river is entered by a winding channel between two sand banks, which extends up to 1.5 miles off the river entrance and on which the sea breaks. At HWS, vessels drawing up to 4.5m can enter the river and reach the inner anchorage.



Preguicas Light

Anchorage.—The outer anchorage, situated about 4 miles N of the light, has depths of 7m, sand and mud, good holding ground. The inner anchorage, located ENE of the light, has depths of 5.5m, mud. Local pilots are available to assist ships between the outer and inner anchorage.

Between the mouth of the Rio das Preguicas and Barra de Tutoia, the entrance of the W branch of the Rio Parnaiba, about 28 miles to the ESE, the coast consists of white sandhills and clumps of trees. Mato de Sao Cosme, lying about 11 miles SE of the mouth of the Rio das Preguicas, is the most prominent of these clumps, and visible for about 13 miles offshore. Tutoia Light is situated about 11 miles E of Mato de Sao Cosme.

2.16 Tutoia (2°47'S., 42°17'W.) (World Port Index No. 12600) consists of an anchorage, sheltered from seaward by sand banks, where ships of medium draft load and unload from lighters. The port lies on the N side of the Rio Comum and W of the lighthouse on Ponta do Andreza.

Winds—Weather.—The port of Tutoia is exceptionally well sheltered from the prevailing winds in the area, which are almost always from the E.

Tides—Currents.—The mean tidal range is 2.9m at springs and 1.5m at neaps. The currents across the bar attain rates up to 4 knots and set NE during the ebb tide and SW during the flood tide.

Depths—Limitations.—There are three entrance channels to the river. Canal das Gaivotes is the W channel and Canal Velho is the center channel. The E channel is unnamed. The depths in these channels vary and whichever one has the best depths in it is used.

The channel is buoyed in accordance with the IALA Maritime Buoyage System (Region B); due to the frequent changes the position of the channel buoys are not charted and local knowledge is essential. The approach to Canal das Gaviotas is marked by a lighted buoy.

Pilotage.—Pilotage is compulsory and indispensable for safe navigation due to the frequent changes of the shoals, depths, and direction of the channels.

Pilots board ships near Tutoia Lighted Buoy. Pilots should have at least 12 hours advance notice. Ships will not be taken in or out at night.

Anchorage.—Ships awaiting a pilot may anchor, in 10m, about 6 miles NE of Barra de Tutoia Light.

The usual anchorage is in 10.9 to 14.0m, about 1.2 miles NNE of Ponta da Andreza Light.

Vessels can anchor, in 5.5 to 7.5m, about 1 mile N of the N extremity of Ilha Coroata, about 2 miles ENE of Ponta da Andreza Light.

A least depth of 4.9m lies on the inner bar N of this anchorage.

The Rio Parnaiba—Delta

2.17 This river rises in Serra de Tabatinga, about 450 miles inland. It flows into the sea through three main tributaries, the Rio Santa Rosa, the Rio Canarias, and the Rio Igaracu.

These tributaries again divide into several others of less importance. The mouths of these tributaries form a delta which extends from Barra de Tutoia to Ponta Atalaia, 40 miles E.

The delta, low and wooded, has a uniform appearance, except for some sand hills, when seen from the offing. Outside the delta, the water is muddy and the bottom is composed of sand and ooze.

Ships should approach this part of the coast with caution due to the uniform aspect of the land, the heavy sea, the prevailing strong westerly current, and the dense fogs which often occur in this vicinity.

The ports of Tutoia, Luis Correia, and Parnaiba have the only river entrances of any navigational importance, as the other entrances are obstructed by sand banks.

The greater part of the delta is fringed by a chain of reefs which extend about 2 miles from the shore. Off Ponta da Pedra do Sal, about 35 miles E of Barra de Tutoia, part of this chain dries, forming a group of rocks named Recifes da Pedra do Sal. These rocks are about 1 to 2m high. A 10.3m patch lies 9 miles NNE of Ponta da Pedra do Sal.

A stranded wreck lies on Barra das Canarias, about 7 miles NW of Ponta da Pedra do Sol and a dangerous wreck has been reported to lie about 22 miles NNE of Barra de Tutoia.

A light is shown from Ponta da Pedra do Sol. An aeronautical radiobeacon is located about 6 miles S of Ponta da Pedra do Sol Light.

A light is shown from the W entrance point of the Rio das Canarias.

2.18 The **Rio Igaracu** (2°52'S., 41°40'W.), the easternmost tributary of the Rio Parnaiba, flows in a NE direction for about 17 miles and forms Barra do Igaracu at its mouth.

The river is entered about 6 miles SE of Ponta da Pedro do Sal Light. A channel leads to the harbor between a detached mole extending NNE and the long arm of an L-shaped breakwater to the E, projecting 1.5 miles NNE from **Ponta da Atalaia** (2°52'S., 41°39'W.), the S entrance point of the harbor. Berths on the W side of the breakwater, 0.4 mile SW of its elbow, were under construction. The least depth in the channel is 0.3m.

Luis Correia (2°53'S., 41°40'W.) is a city located on the SE side of the Rio Igaracu. Pilotage is compulsory. All cargo is worked from lighters at the anchorage, which is in front of the city, in depths from 2 to 4m.

From August to December, the winds usually are strong, which makes the entrance difficult, and sometimes makes the bar impassable.

Tidal currents attain rates from 4 to 5 knots over the bar. Outside the bar the outgoing tide sets N.

Pedras Malhadinhas are two rocky shoals with depths of less than 5.5m and a minimum depth of 5.2m which lies 2 to 2.5 miles N of Ponta da Atalaia. A similar group with a minimum depth of 5.4m lies about 3.7 miles NNW of the same point.

An isolated shoal with a depth of 4.6m lies midway between these two groups.

Parnaiba (2°54'S., 41°47'W.) (World Port Index No. 12620) is located on the SE side of the Rio Igaracu, 10 miles above its mouth. The port has a wharf with a depth of 1.1 alongside.

Small craft and lighters move cargo from the port to Tutoia and Luis Correia for overseas export.

Luis Correia to Camocim

2.19 The coast trends E from Luis Correia for about 48 miles to Ponta do Trapia, the W entrance point of the bay at the mouth of the Rio Coreau. The coast is low and sandy, with scattered inland patches of vegetation. This part of the coast is fringed with sand banks and reefs.

A light is shown from Ponta de Itaque, 6 miles E of Punta da Atalaia.

Several small rivers flow into the sea along this stretch of the coast, with the Rio Coreau the only one of importance to shipping.

Ponta das Almas (2°54'S., 41°16'W.) lies 24 miles E of Luis Correia and shows a light. The mouth of the Rio Timonha lies immediately S of Ponta dos Almas and is encumbered by sand banks. Small vessels can anchor within the sand banks, in depths of 5 to 7m, good holding ground.

Banco do Mergulho (2°36'S., 41°22'W.), a bank of coral with a depth of 7.2m, lies 19 miles NNW of Ponta das Almas

Light. A detached 9.4m patch lies 6 miles WNW of the shallowest part of the bank. A 15.7m patch lies 30 miles NNW of the light; between it and Banco do Mergulho there are depths of less than 15m.

Pedra Tourao, a rock with a depth of 1.2m, lies 3.5 miles offshore and 8 miles ENE of Ponta das Almas Light.

2.20 Camocim (2°54'S., 40°50'W.) (World Port Index No. 12630), 28 miles W of Ponta das Almas, lies on the W bank of the mouth of the Rio Coreau. The flood and ebb currents over the bar average about 3 knots.

The approach to the river mouth is encumbered by sandbanks through which there is a channel navigable by vessels of 4m at HW. A lighted buoy marks the approach to the channel leading into the river. The buoy is moored about 2 miles NE of the light on Ponta do Trapia.

From June to December, strong winds from between ENE and ESE raise a heavy sea on the bar, occasionally rendering it impassable.

At neaps, the limiting vessel dimensions are a length of 75m, a beam of 15m, and a draft of 4m.

At springs, the limiting vessel dimensions are a length of 100m, a beam of 15m, and draft of 4.5m.

Pilotage.—Pilotage is compulsory and necessary due to the shifting of the sand banks. A pilot, which must be requested 24 hours in advance, boards in the vicinity of Camocim Entrance Lighted Buoy. Vessels awaiting a pilot can anchor, in 8m, near the buoy.

Vessels load cargo at an anchorage, abreast the town, in a depth of 6.4m. The port has two small piers for vessels to moor.

Caution.—Banco Revesso, a drying bank on the E side of the entrance channel, was extending to the NW, with the depths on the E side of the bar over the entrance channel being less than charted.

Camocim to Fortaleza

2.21 The coast from Camocim, backed by sand hills of uniform height, trends ENE for about 22 miles to Ponta de Jericoaco area. Serra Tiaia stands about midway between the two above points and about 14 miles inland and can be seen for a distance of 30 miles offshore.

Ponta de Jericoacoara (2°47'S., 40°30'W.) rises to a remarkable saddle-shaped hill. The E and higher part appears as an island from offshore. There is a prominent white house on the W slope of this hill and a fishing village at the foot of the slope. A light is shown from the point, which should be given a berth of at least 1 mile.

Anchorage.—There is sheltered anchorage about 2 miles W of Ponta de Jericoacoara, in depths of 6 to 8m, sand and mud, good holding ground. The anchorage, sheltered from the prevailing winds, which blow from between NE and SE, and also from the W current.

From Ponta de Jericoacoara to Ponta de Itapage, a wooded point 31 miles to the E, the coast is low and sandy.

Deep-draft vessels should not approach within 30 miles of this coast as less water than charted has been reported.

The **Rio Acarau** (2°50'S., 40°08'W.) lies about 8 miles W of Ponta de Itapage. Shifting sand banks, which extend about 2 miles offshore, obstruct the entrance. Small craft with a draft of 2.4m can enter the river at HWS but may touch bottom in places.

A wreck buoy is moored about 4 miles N of the river entrance. The channel into the river is marked by stakes. The village of Acarau is situated on the E side of the river about 4 miles above its mouth.

Vessels may anchor, in about 4m, within the mouth of the river.

2.22 Ponta de Itapage (2°51'S., 40°00'W.) is a wooded point located about 9 miles E of the mouth of the Rio Acarau. A light is shown about 4 miles ESE of the point.

The coast from Ponta de Itapage trends ESE for about 42 miles to Ponta Mundau.

The coast is backed by sand hills covered with vegetation and can be seen from 12 to 14 miles offshore as far along the coast as Ponta dos Patos, about 21 miles ESE of Ponta de Itapage. Several fishing villages are situated along the coastline.

The coast between Ponta de Itapage and Ponta dos Patos is fringed by the E part of Banco Acarau. The coast between Ponta dos Patos and Ponta Mundau is fringed by sand banks and reefs which extend about 0.5 mile offshore. Fishing stakes can be found along this part of the coast.

Ponta Mundau (3°11'S., 39°23'W.), formed by dunes covered with low vegetation, has a prominent grove of palms on it.

Morro das Melancias is a saddle-shaped hill and is visible for about 20 miles in clear weather.

The W summit is covered with vegetation and is a dark color; the E summit is sandy and whitish. A light is shown from Ponta Mundau.

Anchorage.—Anchorage may be taken 1.5 to 2 miles W of Ponta Mundau, in a depth of 7m, sand. The reefs which extend about 0.5 mile N and W from Ponta Mund au must be given a wide berth when approaching the anchorage. Anchorage can also be taken about 4 miles NE of the point, in depths of 10 to 11m, sand, protected from W, SW, and S winds.

Lighted production platforms stand 21 and 27 miles ENE and 32 and 34 miles E of Ponta Mundau Light. The platforms are connected to each other by a submarine pipeline, which continues on to Fortaleza.

Caution.—A dangerous wreck lies about 3 miles W of the first platform.

2.23 Ponta Aguda (3°21'S., 39°07'W.), 18 miles SE of Ponta Mundau, is low and sandy. There are some cliffs with reddish patches W of the point. The village of Lagoinha is located about 1 mile W of the point.

Ponta Paracuru (3°24'S., 39°00'W.), marked by a light, is very conspicuous and lies about 7 miles ESE of Ponta Aguda. It can be identified by a conical wooded hill which rises 2 miles inland and is visible from nearly 18 miles offshore. The mouth of the Rio Curu, with several villages in its vicinity, lies about 5 miles WSW of the point. There is anchorage for small craft under the shelter of Ponta Paracuru and the mouth of the Rio Curu.

An L-shaped pier extends about 0.3 mile NW from the W side of the point. Lights are shown from the pier head.

Pecem Terminal (3°32'S, 38°48'W) consists of a pier which extends 1 mile NE from the shore, with two finger piers providing berths extending NW from the outer part. The berths are protected from the NE and SE by an L-shaped breakwater.

Mucuripe

Depths—Limitations.—Pier No. 1, to the SW, is 350m in length with a berth on each side and can handle vessels up to 125,000 gt for the handling of bulk ore, steel products, general cargo and containers. Pier No. 2, to the NE is 380m in length, and has a berth on each side for tankers up to 175,000 dwt and 16.5m draft. This pier is used for the oil terminal. The head of each pier is marked by a light. Pier No. 3 extends 700m along the inshore side of the breakwater.

Pilotage.—Pilotage is compulsory for all vessels. Pilots may be requested through the agent 24 hours prior to arrival. The pilot boards 2 miles N of the breakwater.

Contact Information.—The port may be contacted, as follows:

1. VHF: VHF channels 13 and 16
2. Telephone: 55-85-3219-7555
3. Facsimile: 55-85-3219-7555
4. E-mail: secom@cpce.mar.mil.br

Anchorage.—Vessels can anchor 1 mile WNW of the lighted buoy, in 17m.

Directions.—The port may be approached directly from the NNE to the lighted buoy (3°28'9S, 38°48'5W). The berths are approached directly in a least depth of 15.2m. It is reported that numerous small fishing canoes and sailboats work in the area near the port.

2.24 Ponta Pecem (3°33'S., 38°49'W.), about 13 miles SE of Ponta Paracuru, is a prominent landmark because of Morros Tres Irmaos, which can be seen from 20 miles offshore. The point is marked by a light; the pier and breakwater extend NE.

Pico Da Rajada (3°54'S., 38°44'W.), located in the Serra de Marnaguape, about 16 miles SW of Fortaleza, is 920m high. It is the first point sighted in the area, due to its height.

Ponta de Mucuripe (3°42'S., 38°28'W.), the E entrance point of Enseada de Mucuripe, projects about 1 mile seaward from the general trend of the coast. The point is formed by a chain of sand hills which rises to a height of 72m. Ponta de Mucuripe Light is shown 1 mile S of the point. An auxiliary light is shown from the old light structure close on the N end in the event that Ponta de Mucuripe Light is not operating.

Molhe de Mucuripe, the breakwater which shelters the harbor and Enseada de Mucuripe, extends about 1 mile WNW from the point. A light is shown from the seaward end.

Caution.—A restricted area, used for rocket firings, is established between Ponta Pecem and Ponta de Mucuripe. It extends from close offshore to approximately 35 miles NNE and 50 miles NE of the coast.

Mucuripe (3°43'S., 38°29'W.)

World Port Index No. 12650

2.25 The port of Mucuripe is situated in Enseada de Mucuripe and is sheltered by Molhe de Mucuripe, which extends from Ponta de Mucuripe. It consists of a small harbor protected by a jetty and is situated just N of the city of Fortaleza; E of this lies two jetties that are about 260m long.

Winds—Weather.—The port is exposed to winds from the W and N. The prevailing winds are from the E and SE. The strong winds that commonly blow in the area will at times cause some difficulty in the maneuver and mooring of vessels.

Tides—Currents.—The tidal range is 1.9m at springs and 0.9m at neaps. During flood tide, the current runs close to the coast and in the proximity of the wharf takes a SE direction with a velocity of 1 knot. During ebb tide, it has a WNW direction, at a rate of 0.5 knot.

Depths—Limitations.—The approach channel leads across the bar in a SE direction from a position about 0.5 mile W of the head of the breakwater for a distance of about 1 mile and then in a general E and ENE direction to the N extension of the wharf. The channel is marked by lighted buoys. The maximum size of vessel for entry is a length of 210m, a beam of 40m, and a draft of 10m.

Recife da Velha, with a minimum depth of 3.3m; Pedras do Justin, with a minimum depth of 7.1m; and Recife do Meireles, with a minimum depth of 1.5m, lie up to 1.75 miles offshore, N

of the old port area. Pedras do Justin and Recife do Meireles are marked by buoys.

A total of 1,055m of berthing space is available at the quay, with depths of 10.3m alongside to the N and 3 to 5m alongside to the S. Vessels up to 190m in length and 10m draft can be accommodated.

Mucripe Oil Terminal lies about 0.5 mile NW from the end of the wharf. A 90m long berth has a depth alongside of 10m and can handle vessels of 50,000 dwt, with a maximum length of 180m and a draft of 10m. Night berthing is reported to be possible.

Mucuripe Oil Terminal

Vessels with a draft of 8m or greater or larger than 4,000 gt must be accompanied by a tug. Vessels with drafts of 9.1m or less can berth at any state of the tide.

Aspect.—The old port of Fortaleza, which borders the city, is no longer in use. It stands on a plateau 20 to 30m high, extending 5 miles W from Ponta de Mucuripe along the shore, and is prominent from the offing.

A vessel approaching the port, when 15 or 16 miles away, will sight Mucuripe Light, a conspicuous white round masonry tower with black bands, located on a 62m high hill, 1.25 miles S of Ponta de Mucuripe.

The conspicuous white silos on the wharf and the conspicuous twin gray towers of the cathedral standing 3.5 miles WSW of Ponta de Mucuripe will be sighted at about the same time.

Ponta de Mucuripe, on which there is an abandoned lighthouse, will be seen when closer to the city. Television towers lie 1.25 and 3 miles, respectively, SW of Ponta de Mucuripe.

Pilotage.—Pilotage is compulsory and should be ordered through the agent or Fortaleza (PPP) 2 hours in advance. Pilots board from a red motor launch marked "Pilots," as follows:

1. Vessels with a draft less than 9m—at the anchorage in position 3°41.7S, 38°29.9W.
2. Vessels with a draft of 9m and over—in position 3°39.5S, 38°29.2W

Vessels can anchor within 0.3 mile of either position while awaiting pilot.

Contact Information.—Mucuripe pilots can be contacted, as follows:

Mucuripe Light

1. VHF: VHF channels 13 and 16
2. Telephone: 55-85-3242-4638
3. Facsimile: 55-85-3242-4636
4. E-mail: cemapi@cearapilots.com.br

Anchorage.—There are designated anchorage areas within Enseada de Mucuripe which are best shown on the chart. The charted anchorage areas are used, as follows:

1. Anchorage Area 1—Vessels with a draft greater than 7m.
2. Anchorage Area 2—Vessels greater than 2,000 gross tons, including LASH vessels, with a draft of up to 7m. LASH vessels have priority for anchoring.
3. Anchorage Area 3—Vessels of 200 to 2,000 gross tons.
4. Anchorage Area 4—Harbor support craft.
5. Anchorage Area 5—Fishing boats and motor boats.
6. Anchorage Area 6—Non-powered fishing vessels.
7. Anchorage Area 7—Vessels with a draft greater than 9m.

Depending on vessel size and description, Anchorage Area 1 and Anchorage Area 2 are also designated Quarantine and Explosives Anchorage Areas.

Caution.—Vessels coming from the E, and being overtaken by a very strong E or ENE wind, should make allowance, for the combined effect of wind and current could set them onto the breakwaters.

Many small fishing craft may be found, during daylight, in the vicinity of the port and up to 20 miles from it.

A dangerous wreck, best seen on the chart, lies along the outer edge of the entrance fairway.

Fortaleza to Ponta do Pontal

2.26 The coast from Ponta de Mucuripe trends SE for about 61 miles to Ponta Maceio, the W entrance point of the Rio Jaguaribe. The coast is a succession of sand hills, which attain heights of about 91m. There is little vegetation along this part of the coast.

Morro Pacoti (3°52'S., 38°23'W.), 40m high, marks the E entrance of the Rio Pacoti, about 8 miles SSE of Ponta de Mucuripe. Recife da Cacoeira lies up to 1.5 miles offshore, 2 miles ESE of the mouth of the Rio Pacoti. The sea breaks over the reef at LW during a fresh breeze.

Cabo Iguape (3°56'S., 38°17'W.), about 18 miles SE of Ponta de Mucuripe, is 120m high and somewhat salient. The cape can be seen about 23 miles offshore. Reefs, which break, fringe the cape and extend a short distance from it. The 20m curve lies about 13 miles off Cabo Iguape. A small bay, bordered by steep cliffs, lies W of the cape.

A gunnery firing area has been established about 4 miles NE of Cabo Iguape.

The **Rio Choro** (4°06'S., 38°09'W.) flows into the sea about 12 miles SE of Cabo Iguape. Small crafts, with drafts up to 2m, enter at HW and anchor, in 2.4m, within the bar.

Local knowledge is essential for safe navigation as access to the river's mouth is difficult due to the rocks and shifting sand banks. The bar can seldom be crossed from January to July.

A dangerous wreck lies about 4 miles ESE of the mouth of the Rio Choro.

Morro Cascavel (4°08'S., 38°16'W.) and **Morro Azul** (4°31'S., 38°06'W.), both about 180m high, are isolated conical feature which can be useful in identifying this stretch of coast. The hills rise 7.5 miles WSW and 24.5 miles S of the mouth of the Rio Choro, respectively.

The Rio Pirangi flows into the sea about 26 miles SE of the mouth of the Rio Choro. Small craft drawing 2m enter at HW and anchor, in 3m, within the bar. Local knowledge is essential for safe navigation as access across the bar is dangerous.

Ponta Maceio (4°25'S., 37°46'W.), on which there are reddish cliffs, lies 1.5 miles NNW of the W entrance point of the Rio Jaguaribe. There are two sand hills within the mouth of the river on its E side which appear as islets when seen for a distance offshore. A dangerous wreck lies 9.5 miles NNE of Ponta Maceio in 7.5m of water. A light is shown 0.5 mile S of the point.

2.27 **Aracati** (4°34'S., 37°46'W.) (World Port Index No. 12660), is a small port, located on the E bank of the Rio Jaguaribe, about 9 miles from the mouth of the river. Pilotage is compulsory. Small vessels drawing 3m can normally cross the bar during HWS although the bottom has been touched at this draft.

Maceio Light

Small vessels can anchor, in 4m, abreast the town of Fortinho, about 3 miles inside the mouth of the river.

Larger vessels can obtain anchorage, in depths of 7 to 9m, sand and mud, with shelter from S, SW, and W winds, with the light on Ponta Macelo bearing 242°, distant 3.5 miles. This anchorage is very exposed to the strong winds from between ENE and ESE, which blow from June to December.

The coast from the mouth of the Rio Jaguaribe trends SE for about 21 miles to Ponta Grossa. This part of the coast is formed by sandhills and low hills, covered with vegetation. Banco do Retiro, with depths of less than 5.5m, borders this stretch of the coast and lies up to 5 miles offshore.

Off this stretch of coast depth of less than 10m extend up to 10 miles offshore. There is an 8.9m shoal 13 miles NNE of Ponta Grossa.

Morro do Mandioca (4°34'S., 37°40'W.), about 10 miles SSE of the mouth of the Rio Jaguaribe, is conical in shape and appears dark due to the vegetation. The hill can be seen from about 20 miles offshore in clear weather.

Another hill, Morro Urubu, similar in appearance, stands about 2 miles NW of Morro do Mandioca. A village is situated at the foot of this hill.

The village houses stand out against the dark background of the hill.

A large sandal with two conical peaks stands about 5 miles SE of Morro do Mandioca. This sandal can be seen about 17 miles offshore.

2.28 **Ponta Grossa** (4°38'S., 37°30'W.), about 100m high, is steep and salient; it stands out well against the land in its vicinity. The point can be seen about 21 miles offshore.

A hillock, when bearing about 240°, opens out near the base of Ponta Grossa.

Rocks, some of which dry, lie as far as about 2 miles from the point.

Enseada do Retiro-Grande lies close W of Ponta Grossa. A ship entering the cove should give Ponta Grossa a berth of about 3 miles and should steer 215° for a hill within the SW shore of the cove. Banco do Retiro should be avoided.

The coast from Ponta Grossa trends ESE for about 12 miles to Ponta Cajuais, then SSE for about 17 miles to the mouth of the Rio Mossoro.

Between Ponta Grossa and Ponta Cajuais, the coast appears as two steps, the lower step being reddish and the upper gray.

A light is reported to stand about 2 miles inland from Ponta Cajuais.

Between Ponta Cajuais and the mouth of the Rio Mossoro, the coast is higher than the preceding stretch. Banco dos Cajuais, which dries in places, borders this stretch of the coast and has depths of less than 5.5m up to 7 miles offshore.

Morro do Tibau (4°50'S., 37°17'W.), about 10 miles SSE of Ponta Cajuais, is a prominent reddish hill which can be seen for about 19 miles offshore.

Caution.—A group of tanker mooring buoys is situated 16 miles N of Ponta Cajuais.

2.29 Ponta do Pontal (4°56'S., 37°09'W.) is the E entrance point of Rio Mossoro. The river, about 180 miles long, rises in Serra dos Cariris-Velhos. It is navigable for small craft for about 12 miles above its mouth.

The mouth of the river is obstructed by sand banks which dry in places at LW and extend about 1.5 miles offshore. Recifes do Joao da Cunha, which seldom dries, lies about 17 miles NE of the mouth of the river. This group of rocks is about 2 miles in extent. The sea breaks heavily over them with a NE wind, but from February to May there are seldom any breakers which mark them.

The approach to the mouth of the river and the channel within the bar are marked by buoys, some of which are lighted. The buoys are moved as necessary to conform with the changes in the channel due to the shifting sand banks. A light is shown from Ponta Upanema, about 3 miles E of Ponta do Pontal.

Four dangerous wrecks lie between 3 and 6 miles N of the light on Ponta Upanema.

2.30 Salineiro Terminal (4°49'S., 37°03'W.), also known as Porto-Ilha, a salt storage island, with a walkway and conveyor bridge, leads about 0.2 mile SSE to a slowing platform and bridge shiploader. It is located on the NW side of the above-mentioned channel.

The terminal is reported to carry a stock of 100,000 tons of salt.

Winds—Weather.—From January to June, winds blow from the NE with occasional calms. From July to October, winds blow strongly from the E, being strongest in August.

The rainy season is from January to May. From January to May, the sea is comparatively calm, becoming moderate until August; from August to December, the sea is heavy.

Tides—Currents.—In the vicinity of the terminal, the current has a rate of 0.8 knots at springs in a WSW direction about 4 hours before HW, and in a NE direction about 3 hours after HW.

In the vicinity of Recifes do Joao da Cunha and the anchorage, the flood current sets SW at a rate of up to 1 knot, while the ebb current sets NE at a rate of up to 1.5 knots.

Depths—Limitations.—A buoyed channel, with a least depth of 11m and a width varying between 400 and 1,000m, is entered about 2.2 miles ENE of the shallowest part of Recifes do Joao da Cunha. The 9.2 mile long channel passes S of these reefs and leads to a point about 1 mile SW of the terminal. The area between this point and the terminal is a maneuvering basin and has a least depth of 11m.

On the SW side of the artificial island there is a quay 195m long, with a depth of 6m alongside. This berth, used for the discharge of salt, can accommodate three barges.

Bulk carriers moor against three dolphins, with a span of 166m, with an alongside depth of 14m. Vessels berth port side-to. No night navigation is permitted.

The maximum dimensions of a vessel that can be accommodated are 35,000 dwt, a length of 180m, a beam of 22m, and a draft of 11m.

Aspect.—The stockpile of salt at the terminal appears as a large white mound and can be detected on radar at ranges of over 24 miles.

Pilotage.—Pilotage, which is available during daylight hours only, is compulsory from the pilot anchorage to the terminal or any point within the port area, for vessels greater than 2,000 gt. Vessels should send their ETA at the pilot boarding position through their agent. The pilot boarding position is best seen on the chart. Vessels should establish contact with the terminal 10 hours in advance.

Regulations.—A tug must be present during the mooring of all vessels. Vessels larger than 10,000 dwt must employ two tugs. Mooring is not attempted when wind speed is greater than 25 knots.

Contact Information.—Salineiro Terminal pilots can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-84-3332-2404
3. Facsimile: 55-84-3332-2404

Anchorage.—Large vessels awaiting a pilot or berth should anchor, in depths of 11 to 12m, about 3 miles ENE of the shallowest part of Recifes do Jao da Cunha.

The inner anchorage, known as Foundeabdouro do Lamarao de Dentro is situated 2 miles NW of Ponta Upanema and has a depth of 5.5m, sand. It is used to transship salt from lighters and should not be approached without local knowledge.

Areia Branca (4°57'S., 37°08'W.) stands on the E bank of Rio Mossoro, 2 miles above its mouth. There are no alongside berths for ocean-going vessels,; all cargo is worked to and from lighters, usually at the anchorage and Salineiro Terminal.

Caution.—A 6m shoal was reported to lie about 11 miles ENE of the shallowest part of Recifes do Jao da Cunha.

Ponta do Pontal to Cabo Calcanhar

2.31 The coast from Ponta do Pontal trends E for about 17 miles to Ponta do Mel then SE for about 14 miles to Pontal do Alagamar.

Ponta do Cristovao (Ponta Redonda) (4°55'S., 36°58'W.), about 10 miles E of Ponta Upanema, is an oblong-shaped barren sandal. The point was reported to give good radar returns. A village is located near the point.

Ponta do Mel (4°57'S., 36°53'W.), 5 miles ESE of Ponta do Cristovao, has prominent reddish cliffs about 90m high that are visible at a distance of about 20 miles. The cliffs stand out against the sand hills in the vicinity. From the N, Ponta do Mel appears as two points, the E of which appears broader. A light is shown 1 mile S of the point.

Ponta do Alagamar (5°06'S., 36°41'W.) is a low sandy point lying 15 miles SE of Punta do Mel and is the E entrance

Ponta do Mel Light

point of the Rio Acu. A light is shown about 2 miles E of the point.

A conspicuous water tower with obstruction lights is situated about 1.2 miles E of the point.

The **Rio Acu** (Rio Piranhas) (5°06'S., 36°41'W.) is the main branch of the Rio Piranhas which rises in Serra dos Cariris Velhos.

The mouth of the Rio Acu is obstructed by shifting sand banks, which dry in places, and extend up to 2.5 miles offshore.

Between the sand banks, there are two bars, a N bar and a S bar, with a channel leading over each.

The N bar channel is recommended as it is deeper and buoyed. This bar affords access at HW for drafts up to 2.8m.

A dangerous wreck, marked on its N side by a lighted buoy, lies about 5.7 miles NW of Alagamar Light.

Pilotage is compulsory and vessels anchor in Fondeadouro do Lagamar, 5.5 miles NNW of Alagamar Light, in depths of 8.8 to 9.4m, fine sand. A second wreck lies about 4 miles NNW of the light.

Macau (5°07'S., 36°38'W.) is located about 3 miles above the mouth of the Rio Acu. The principal export is salt which is loaded at the anchorage.

2.32 The coast trends E for about 71 miles from Pontal do Alagamar to Cabo Calcanhar. Several rivers of no importance to navigation flow into the sea along this stretch of the coast.

Ponta do Tubarao (5°04'S., 36°30'W.), about 11 miles E of Pontal do Alagamar, is formed by sandhills. This point appears to be higher than it actually is from the offing.

A prominent cone-shaped hill stands about 1 mile S of Ponta do Tubarao. This hill stands out from the hills to the W because of its lighter color. A small lighthouse stands on the W side of the point.

A lighted offshore platform stands about 5 miles WNW of Ponta do Tubarao. A submarine pipeline extends in a SE direction from the platform to the shore.

Morro Mangue Seco (5°09'S., 36°25'W.), about 7 miles SE of Ponta do Tubarao, can be seen from about 21 miles offshore in clear weather.

Urca do Tubarao (4°51'S., 36°27'W.), the W extremity of which lies about 13 miles N of Ponta do Tubarao, is composed of sand and coral heads having least depths of 4m. The reef seldom breaks but swells are formed during moderate winds.

2.33 Guamare Oil Terminal (4°52'4S, 36°22'4W) is an offshore CBM situated in an oil and gas field N of Ponta Galinhos.

Tides—Currents.—A 3 knot current can be expected at the berth.

Depths—Limitations.—The berth is a CBM and can handle vessels up to 116,000 dwt. The maximum draft allowed is 15m at HW. Vessels generally berth during daylight hours only.

Pilotage.—Pilots board in the anchorage area. The ETA should be given 72 hours, 48 hours and 24 hours prior to arrival.

Anchorage.—Vessels can anchor within a 1 mile radius of position 4°51'S, 36°23'W, in 17m, good holding ground.

Directions.—The terminal and anchorage lie about 6.5 miles WNW of Agulha Light (4°52.5'S, 36°16.2'W) and should be approached from between N and NNE.

Caution.—Urca do Tubarao, a 4.1m shoal, lies 4 miles W of the anchorage. A dangerous wreck lies 29 miles WNW of Agulha Light.

2.34 Ponta de Galinhos (5°05'S., 36°18'W.), from which a light is shown, lies about 13 miles E of Ponta do Tubarao. The point marks the E entrance of the Rio Guamare. The village of Guamare is situated on the W side of the river close within its mouth.

A dangerous sunken wreck lies in 5°03'S, 36°16'W, position approximate, about 2.5 miles NNE of Ponta de Galinhos. A drying patch lies 1.5 miles NW of the point.

A shoal with depths ranging from 7.8 to 10m lies 11 miles NNW of Ponta de Galinhos.

Numerous lighted oil platforms and submarine pipelines exist in an area between 7 and 15 miles N of Ponta de Galinhos. An offshore oil berth with six mooring buoys, marked by a lighted buoy, lies about 11 miles NNW of Ponta de Galinhos.

Caution—Attention is called to the fact that in many cases the pipelines are not buried; charted depths may be decreased up to 2m. Vessels should not anchor or trawl in the vicinity of the pipelines.

Ponta de Santo Alberto lies about 17 miles E of Ponta de Galinhos. Coconut trees, which are the easternmost growth of trees in this vicinity and visible from 12 to 15 miles offshore, mark the point.

A light is shown from Ponta Caicara, about 2 miles W of Pont a de Santo Alberto. The village of Caicara is situated near Ponta Caicara. A church is located in the village.

Ponta de Galinhos Light

2.35 Ponta dos Tres Irmaos (5°03'S., 35°59'W.), about 2 miles E of Ponta de Santo Alberto, consists of four cliffs which are bordered by dark rocks.

Ponta Santo Cristo, about 23 miles E of Ponta dos Tres Irmaos, is a narrow promontory about 1 mile long.

A village is situated close SSW of Ponta Santo Cristo and a church is situated in the village.

Ilha de Cima, a hill, stands about 6 miles W of Ponta Santo Cristo. The land in the vicinity is low which makes the hill appear as an island from the offing.

The prominent cliffs of Sao Jose lie about 2 miles E of Ponta Santo Cristo. The W part of the cliffs consists of reddish clay. The E part changes to whitish clay.

Morro Branco (5°09'S., 35°32'W.), about 60m high, stands about 5 miles ESE of Ponta Santo Cristo. This barren hill, composed of white sand, is a good landmark as it is the highest point of land on this part of the coast. Morro Branco can be seen about 18 miles offshore.

Caution.—Several reefs with heads less than 3.6m, shoals which dry at LW, and dangerous wrecks, lie within the 18.3m curve between Ponta do Tubarao and Cabo Calcanhar. The reefs and shoals are steep-to. The bottom is composed of white sand, coral, and gravel.

In general, the water over the shoals is green and this color is distinctive from the color of the water outside them.

The current is strong and sets WNW and NW. The tidal rise over the shoals is about 3.1m at springs and 1.8m at neaps.

Ships without a pilot on board should avoid these dangers by navigating well outside the 20m curve.

Cabo Calcanhar to Natal

2.36 Cabo Calcanhar (5°10'S., 35°29'W.), from which a light is shown, is the extreme NE point of Brazil; a racon is located at the light The point is formed by sand dunes of very little height. In clear weather, the lighthouse can be seen for a distance of 38 miles. A continuous radio signal and a differential GPS beacon are reported to be located at this location.

Cabo Calcanhar Light

At Cabo Calcanhar, the aspects of the coast changes. To the SE of the cape there are large coconut groves and a number of towns and villages.

A number of elevations of land stand out and are visible 10 to 20 miles offshore.

Cidade de Touros (5°12'S., 35°28'W.) stands on low ground at the head of Enseada de Touros, 3 miles SE of Cabo Calcanhar.

The town church and the dark colored cliffs lying about 0.2 mile NW of the town are prominent by day and the street lights of the town are prominent at night.

Anchorage for small craft can be obtained off the town, in a depth of 3.5m, mud.

Ponta da Gameleira (5°13'S., 35°25'W.) lies 5.5 miles SE of Cabo Calcanhar and is formed by sand hills. It is the first land sighted by vessels coming from the N.

A light, the structure of which has been reported to be difficult to see during the day, is shown from the point.

Baixo do Rio do Fogo lies about 4 miles E of Ponta da Gameleira. The shoal has a depth of 0.2m, over which the sea breaks. A light is shown from the center of the shoal. A wreck lies 1.5 miles NW of the light.

2.37 Risca do Zumbi (5°11'S., 35°11'W.), a rock with a depth of 5m, lies 10 miles ENE of Baixo do Rio do Fogo.

Depths of 11.9m and 10.4m lie 3 miles S and 5 miles SSW, respectively, of this rock.

Ponta do Caconho, 12 miles SE of Cabo Calcanhar, consists of light-colored sand hills which are slightly higher than the coast to the NW. The point is surrounded by several submerged rocks.

Baixo da Teresa Panca, marked by a light, and Baixo de Maracajau lie up to 4 miles E of Ponta do Caconho.

Canal de Sao Roque is about 23 miles long and has a minimum depth of 4.2m. Its width is restricted to 1 mile abreast Baixo do Teresa Panca. This channel is used mainly by local vessels of shallow draft. It should not be attempted without local knowledge and good visibility.

Pilotage for Canal de Sao Roque may be obtained at Recife and Areia Branca or at other ports in the vicinity.

Cabo de Sao Roque (5°29'S., 35°16'W.) is a white sandy point, about 55m high, with vegetation on its summit. A light is shown from a position about 0.6 mile S of the cape. The cape is reported to be a good radar target.

Rocks, with depths of less than 2m, on which the sea occasionally breaks, lie 1 mile E of the cape.

Between Cabo de Sao Roque and Punta de Santa Rita, 13 miles SSE, the coast has no remarkable features. It is backed by hills from 35 to 60m high, which are sparsely wooded, and has several villages and coconut groves along it.

Caution.—Shoal patches, with depths of 11.2m and 13.3m, lie about 13 miles ESE of Cabo de Sao Roque. A shoal with a depth of 8.9m lies 14.5 miles ENE of Cabo Calcanhar, another shoal with a depth of 22m lies approximately 33 miles NNE of the same point.

Natal (5°47'S., 35°12'W.)

World Port Index No. 12690

2.38 The port of Natal is situated at the mouth of the Rio Pontengi. The river, about 100 miles long, rises in the Serra do Angico and flows into the sea through an opening in the barrier reef. The barrier reef forms a natural breakwater for the port.

Winds—Weather.—The prevailing winds most of the year are from the ENE to SE.

Tides—Currents.—The flood current attains rates up to 1.5 knots. The ebb current attains rates up to 4.5 knots. The greater rates occur during the rainy season and have been observed between Baixinha and Banco das Velhas.

Natal

Aerial view of Natal

When offshore, due allowance should be made for the currents which set very strongly onshore at times, especially during SE winds, when the current is N. During NE winds, the current is S.

Depths—Limitations.—The maximum safe draft for entering the port is 7.3m at HW and 5.5m at LW. Other limiting dimensions are a maximum length of 180m and a maximum beam of 26m.

The port is entered through a gap, about 0.1 mile wide, in the barrier reef, which forms a natural breakwater trending N to S, abreast the mouth of the river.

The channel is led between lighted buoys, and the fairway is marked No.1, moored at 0.2 mile NE of Cabeca de Negro reef. The channel has a least depth of 8.7m with an average width of 90m, sand and mud bottom.

The main commercial wharf is 540m long, with depths alongside of 11.5m. An oil terminal, located about 0.1 mile N of the main wharf, can handle tankers with a maximum length of 158.5m, a maximum beam of 21m, and a maximum draft of 7m. Night berthing is possible.

It has been recommended that berthing be done port side-to on the ebb tide, while unberthing be done on the flood tide.

A naval base, which has an L-shape jetty projecting 50m NE, has depths of 5m alongside and is about 2 miles upstream from the main wharf.

A prominent cable-stayed bridge, with a vertical clearance of 55m spans the river 0.5 mile from the river mouth.

Aspect.—The coast near the mouth of the Rio Potengi is low and has few prominent features. Natal Light, near Ponta Mae Luiza, is a good landmark. Morro do Pinto, about 3 miles S of the river mouth is another. The hill can be seen from a distance of about 23 miles.

An old fort stands on the reef 0.3 mile S of the reef's N extremity. A conspicuous water tower and a conspicuous church stand 1.5 and 1.75 miles, respectively, S of the fort. Another conspicuous church situated 0.75 miles SW.

A prominent television tower stands about 2 miles SSW of Natal Light and a conspicuous water tower is situated near the coast, about 5 miles S of Morro do Pinto.

Pilotage.—Pilotage is compulsory and it is requested that a minimum of 2 hours notice be given prior to arrival. Pilots will board from a red painted launch with a black "P" on each bow. Pilots meet incoming vessels in the vicinity of position 5°44.8'S, 35°10.5W. Pilotage is available 24 hours, although it has been reported that pilots will board vessels only between the hours of 0800 and 1800.

The vessel's ETA should be advised 48 hours and 24 hours in advance.

Regulations.—The maximum speed permitted in the Rio Potengi is 8 knots. The port is open to tankers during daylight hours only.

Contact Information.—Natal pilots can be contacted, as follows:

1. VHF: VHF channels 6, 8, 10, 11, 12, 13, and 16
2. Telephone: 55-84-3222-1613
3. Facsimile: 55-84-3211-8483
4. E-mail: practicagemnatal@ig.com.br

Anchorage.—There are two outer anchorages.

The anchorage area in position 5°45.2'S, 35°10.5'W is designated for vessels awaiting pilots or a berth. This anchorage is also used by vessels in transit, but with a 24-hour prior request for approval made to the Port Captain.

The quarantine anchorage area lies 0.5 mile ESE of Forte dos Reis Magos.

Vessels are prohibited to anchor S of the designated area where submarine cables exist in the vicinity of Praia do Meio.

Caution.—In the area where access channel pass, between the bar and the entrance to Gamboa Manimbu (5°45.5'S., 35°12.5W.) one vessel is allowed to make the passage at a time, vessels are not to meet end on or by pass each other.

Off-lying Islands and Rocks

2.39 Penedos de Sao Pedro e Sao Paulo (0°55'N., 29°21'W.), a group of islets and rocks, also known as St. Paul's Rocks and lying about 520 miles NE of Cabo de Sao Roque, belongs to Brazil. Charles Darwin visited the rocks during his voyage aboard the HMS Beagle. The highest rock is about 19m high and is visible from 8 to 9 miles. The rocks sometimes appear as sails.

The upper part of the larger rocks are whitened by guano. A light stands about 0.1 mile SSW of the highest rock.

Natal Light

A manned research station is located on the largest islet in the group.

The bank on which the group lies is steep-to and is reported to extend 0.5 mile W. A depth of 9.1m, rock, lies about 0.2 mile W of the light.

Penedos de Sao Pedro e Sao Paulo lie within the N limit of the equatorial current which sets W. The current near this group generally sets WNW with rates of 1 knot to 2 knots.

Currents setting in other directions are not infrequent, especially from February to July.

A ship should approach the vicinity of these rocks with caution as there is nothing to indicate the approach to them.

The current must be taken into account. Southeast winds prevail from June to December while NE winds prevail from January to May.

In good weather, landing can be made in a cove, which is entered from NW, between the two largest rocks. The cove is about 45m wide at its entrance, 91m long, and has depths of 9.1 to 12.8m. The cove provides excellent shelter for boats.

Caution.—Since this region is an active geologic formation and is subject to seismic shocks, ships passing in the vicinity may be subject to what appears to be grounding. Such incidents are caused by shock waves from seismic disturbances.

An obstruction is reported to lie about 10 miles SW of the rocks.

2.40 Arquipelago de Fernando de Noronha (3°52'S., 32°26'W.) lies about 200 miles ENE of Cabo Calcanhar and is of volcanic origin. The group consists of Ilha de Fernando de Noronha, five smaller islands, and a number of islets and rocks.

Courtesy of John Vergari

Penedos de Sao Pedro e Sao Paulo Light and research station

Fernando de Noronha Light

Ilha de Fernando de Noronha (3°52'S., 32°26'W.), when seen from the offing, appears rugged and mountainous. The island is covered with vegetation. Pico, 323m high, is the highest peak on the island. This barren and rugged mountain stands on the NW side of the island and can be seen in clear weather more than 30 miles. The island gives good radar returns from NE up to 20 miles.

Much of the island is national park land and tourism is now the main source of income.

Ponta de Santo Antonio, the NE extremity of the island, is a narrow peninsula about 0.3 mile long. Morro de Santo Antonio, 104m high, stands about 1 mile SW of the point.

Two radio towers are located on this part of the island. A dangerous rock lies 0.4 mile SW of Ponta de Santo Antonio.

Baia de Santo Antonio indents the N portion of the island on the W side of Ponta de Santo Antonio. A fort is located on the S shore of the bay. The fort has a signal station.

Morro do Frances, 198m high, stands about 1 mile S of Ponta de Santo Antonio. Pontinha, the E extremity of the island, lies about 0.5 mile ESE of Morro do Frances. Between Morro do Frances, Morro de Santo Antonio, and Pico is a plateau on which a village is situated. The prominent buildings of a former prison comprise a large part of the village.

Morro do Espinhaco, 223m high, stands on the SE part of the island about 1 mile SSE of Pico. An airport is located between Morro do Espinhaco, Pico, and the hills in the SW part of the island.

An aeronautical radiobeacon is located near the SE corner of the airport. An aviation light is shown from Morro do Pico.

Ponta da Sapata, the SW extremity of the island, a narrow peninsula about 0.5 mile long. There is a natural tunnel on the peninsula.

Alto da Bandeira, 193m high and marked by a light, stands less than 1 mile E of the point. A rock, awash, lies 0.3 mile W of Ponta da Sapata.

Other rocks, awash, have been reported to lie 0.4 and 0.8 mile S of Ponta da Sapata.

Ilha Rata (3°49'S., 32°23'W.), the largest of the smaller islands, lies about 1 mile NE of Ponta de Santo Antonio. A narrow channel with a depth of 5.2m lies between Ilha Rata and Ilha do Meio, close SW. The channels between the other islands of the group are foul.

A light is shown near the center of Ilha Rata. Ilha Rata should be given a wide berth to allow for the strong currents in the vicinity.

Fernando de Noronha is fringed by reefs, most of which extend less than 0.3 mile from the shore. Several dangerous rocks lie as far as 2 miles off the E, S, and SW sides of the island.

A 7.3m shoal, position doubtful, was reported to lie outside the 20m curve about 0.6 mile NNW of Pico.

Tides—Currents.—Arquipelago de Fernand o de Noronha and Atol das Rocas lie within the equatorial current which sets W. Currents setting in other directions are not infrequent. The westerly currents, experienced in these areas, attain rates of up to 2 knots. Occasionally these rates are exceeded.

Anchorage.—Anchorage can be taken in Baia de Santo Antonio. The best anchorage is in 14.6 to 24.0m, sand, about 0.5 mile offshore with Pico bearing 214° and the fort on the S shore of the bay bearing 163°.

The anchorage is sheltered from the prevailing SE and E winds. During NE winds, ships anchor closer inshore, in 10.9 to 20m. During N or NW winds, the anchorage is unsafe.

The usual landing place is on a beach, abreast the village, in Baia de Santo Antonio. Landing is made by means of a raft with a raised platform which works with guides around a hawser secured to a buoy. Years ago, the raft and hawser were not seen.

There is a L-shaped mole in position 3°50'S, 32°24'W. Landing is difficult as there is a surf on the beach. A wreck lies near the beach.

Landing can also be made on the NW side of Fernando de Noronha in Enseada do Carreiro de Pedro, about 2 miles ENE of Ponta da Sapata.

Landing on the S side of Fernando de Noronha is seldom possible. Only with favorable weather conditions can landing be made in Baia do Sueste. This bay lies about 2.2 miles WSW of Pontinha.

Landing can be made on Praia do Leao, about 2 miles E of Alto da Bandeira, providing the weather conditions are favorable. A wreck lies near Praia do Leao.

There is a good landing place in a cove on the SW side of Ilha Rata.

The area surrounding Ilha de Fernando de Noronha constitutes the Fernando de Noronha Marine National Park.

Anchorage, hunting and fishing and any disturbance of the environment are prohibited in this area.

2.41 Atol das Rocas (3°52'N., 33°49'W.). a coral atoll about 127 miles NE of Cabo Calcanhar, is 1.75 miles from E to W and 1.5 miles from N to S. The atoll dries about 1.8m. Ilha do Farol and Ilha do Cemiterio lie on its W side. Ilha do Farol is the N and larger of the two. At LW, the islets are joined together with the reefs.

A light is shown from Ilha do Farol. The lighthouse and the breakers over the reefs make it possible to identify the atoll.

The remains of several wrecks lie scattered on the reefs.

The 10 and 20m curves lie as far as 0.3 and 0.75 mile, respectively, around the atoll. Several rocks, with less than 5.5m, lie inside the 20m curve, off the W, NW, and NE sides.

A bank, with depths of 16.5 to 46m, extends about 13 miles ENE and E from Atoll das Rocas. The currents attain rates of about 1.5 to 2 knots in the anchorage.

A landing place for boats is located at the SW end of Ilha do Farol. A boat passage leads between a gap in the reefs, about 15m wide on the NW side of the atoll, and the landing place. The reefs open out to form a pool and the sea is calm here. A submerged rock lies in the middle of the passage.

Boats should pass S of this rock even though it can be passed over at higher water.

When passage through the entrance can not be made because of the lowest tides, a boat can moor on a reef N of the entrance but care must be taken to avoid a drying rock which lies close W of this landing.

Another boat passage leads through a narrow gap in the N part of the reef, but this passage can only be used in good weather. At HW a boat can reach the landing place in Ilha do Farol but at LW it has to beach on the shore of a small lake within the atoll. The dangers can be avoided as the water is clear.

Atol das Rocas is an established conservation area. It is prohibited to anchor, disembark, dive, hunt, fish, dispose of garbage, or any other alteration to the environment, within the boundaries of the prohibited area.

Natal to Cabedelo

2.42 Between Natal and Cape Bacopari, about 40 miles SSE, the coast is marked by isolated conical hills. The shore line consists of white sandy beaches.

From Cabo Bacopari to Ponta das Trincheiras, about 19 miles to the S, the coast is formed by a continuous line of white sand dunes covered by intervals of bushes.

From Ponta das Trincheiras to Ponta de Lucena, about 14 miles SSE, the coast is intersected by small rivers.

Ponta da Tabatinga (6°03'S., 35°06'W.), about 18 miles SSE of Natal, is of a reddish color and marked by a light. The hills inland are covered with vegetation. A summit 127m high rises 2 miles SSW of Ponta da Tabatinga.

Ponta dos Moleques (6°15'S., 35°03'W.), a cliff having a flat top and devoid of vegetation, is located about 11 miles SSE of Ponta da Tabatinga. Ponta da Cancela, a point which resembles a cask standing on end, and is visible 18 miles offshore, is situated 1 mile NNW of Ponta dos Moleques.

Anchorage may be obtained by vessels with local knowledge about 2 miles NW of Ponta dos Moleques, in depths of 8 to 10m, soft mud, sheltered from the S.

Cabo Bacopari (6°22'S., 35°00'W.) is located 8.5 miles SSE of Ponta dos Moleques and shows a light. Baia Formosa lies close NW of the cape and appears as an extensive inlet.

2.43 Morro do Chapeu (6°23'S., 35°01'W.), a low mushroom-shaped hill, rises from the coast 1.5 miles S of the cape.

Outeiros dos Porcos, two remarkable knolls close to each other, lie about 3 miles S of Cab o Bacopari.

Vessels can anchor in Baia Formosa, about 0.4 mile off the village of Formosa, in depths of 7 to 9m, soft mud, sheltered from S and SE winds.

Traicao Light

Ponta da Trincheira lies 19 miles SSE of Cabo Bacopari. Baia de Traicao indents the coast NNW of the point. A reef that uncovers lies close E of the point, and shows a light from the N end. The town of Traicao, which has two churches, the W of which stands on the summit of a hill, lies on the S shore of Baia de Traicao.

Anchorage may be obtained in the bay, in a depth of 6m, but local knowledge is necessary.

Ponta de Lucena (6°54'S., 34°51'W.) is located 13.5 miles SSE of Ponta da Trincheira and is densely covered with a coconut grove. The point is not easily distinguished from the offing. A village with a conspicuous church is located W of the point. A light is shown from the point. About 2 miles to the E and NE of the point, the sea breaks over reefs and rocks. A wreck is visible S of the reefs.

Ponta de Santo Antonio, lying 4 miles S of Ponta de Lucena, rises to a hill. A conspicuous church lies on this hill, about 2 miles WNW of the point.

Baixo de Lucena extends up to 2.5 miles offshore between Ponte de Lucena and Ponta de Santo Antonio. Seas break over these shoals. A buoy marks the SE limit of these shoals.

2.44 The **Rio Paraiba** (6°58'2"S., 34°51'W.) rises in the Jabitaca Mountains and discharges between Ponta de Santo Antonio and Ponta de Mato, about 2 miles to the E. The town of Cabedelo stands to the W of Ponta de Mato.

The Rio Paraiba is divided just within its mouth, into two forks by Ilha da Restinga. The E fork, Cabedelo Channel, leads to the berths at Cabedelo. The W fork is known as Canal do Porto Velho. The two channels reunite at Ponta do Galego, the S extremity of the island.

Extensive breakers indicate the entrance to the river. They are caused by the shoals extending E from Ponta de Lucena and by the shoals fronting the river mouth.

Pedra Seca (6°57'S., 34°49'W.), a reef from which a light is shown, lies S of the river entrance in a position about 0.7 mile NE of Ponta de Mato. From seaward it looks like a small boat under sail.

A shoal bank, contiguous with the reef and with depths of less than 2m, extends 0.7 mile NW from the light.

Cabedelo (6°58'S., 34°50'W.)

World Port Index No. 12710

2.45 Winds—Weather.—During the summer winds are generally from the NE and E. During the winter, they are from E to SW and are stronger than in the summer.

Tides—Currents.—The spring range is about 2.2m and the neap range is about 1m.

During the winter months of the SE trades, the currents set to the N or NW. During the summer months of the NE trades, the currents set to the S or SW. During SW winds, the current attains a rate of 5 to 6 knots at spring tides.

Depths—Limitations.—A single quay, 600m long with depths alongside of 11m, is located in the port. Vessels up to 200m in length and 9m draft can be accommodated.

Pedra Nova is a rocky shoal with less than 1.8m. It lies on the N side of the entrance, about 2 miles NNW of Ponta de Mato.

Banco do Tabuleiro, with a least depth of 1.2m, lies close S of the channel entrance. A lighted buoy marks its N extremity.

Coroa da Sororoca, having depths of less than 3m, extends up to 0.7 mile N and 1 mile NE of Ponta de Mato. Shoals extend about 1.25 miles N and 1 mile E from this point.

A detached 4.5m patch lies E of the entrance of the bar channel in a position about 0.7 mile N of the above lighthouse.

A detached 4m patch lies W of this patch. It is marked by a lighted buoy.

Banco da Restinga extends N and NNE from Ilha da Resinga. A lighted buoy marks the N extremity of this shoal.

A 5m patch lies close off the S end of the quay.

Aspect.—The river is approached through a gap in the barrier reef about 2 miles wide. Within this gap, the channel leading to the mouth of the river is narrowed by submerged rocks and sand banks.

Ponta de Mato is covered with a dense growth of coconut palms and is the NE extremity of a spit, running N to S, that is about 0.7 mile wide from E to W. A breakwater, marked by a light at its extremity, projects 0.1 mile N from Ponta do Molhe, the NW extremity of the spit. Two silver-colored tanks lie close E of the root of the breakwater.

A ruined fort lies close SE of the root of the breakwater. A conspicuous water tower stands about 1 mile SSE of the ruined fort. An obstruction light is shown from building close NE of the water tower.

The light tower on Pedra Seca frequently is obscured by numerous small craft in the vicinity.

Pilotage.—Pilotage is compulsory and is available 24 hours. Pilots should be requested 24 hours in advance. Pilots board about 2 miles NNE of Pedra Seca from a red launch with the letter “P” on each bow.

Regulations.—Vessels should send their ETA to their agent 48 hours in advance for berthing and cargo information.

Contact Information.—Cabedelo pilots can be contacted, as follows:

1. VHF: VHF channels 14 and 16
2. Telephone: 55-83-3228-1801
3. Facsimile: 55-83-3228-1801

Cabedelo port can be contacted, as follows:

1. Telephone: 55-83-3250-3000
2. Facsimile: 55-83-3250-3001
3. E-mail: presidencia@docaspb.com.br

Anchorage.—Vessels awaiting pilot or tide anchor, in 10 to 11m, about 2 miles NNE of Pedra Seca Light. The inner anchorage, for vessels over 5,000 gt, lies about 0.5 mile SW of the head of the Ponta do Mol, in depths of 6 to 8m; swinging room is limited by the proximity of the 5m depth contour.

The quarantine anchorage, also designated for vessels of less than 5,000 gt, is 0.2 mile S of the S end of the quay, in depths of 5 to 6m, mud.

Caution.—A dangerous wreck, with a depth of 7m, lies 7 miles SSE of Ponta de Mato.

Cabedelo to Recife

2.46 From Cabedelo to Cabo Branco the coast consists of sandy beaches backed by low ground covered with bushes.

Cabo Branco (7°09'S., 34°48'W.), located about 12 miles S of Pedra Seca Light, is a pronounced projection of the coast, rising in sheer cliffs to a dark-colored and level summit; it is visible at a distance of about 14 miles and is a good landmark.

A light is seen from the cape. A conspicuous yellow building is situated about 1 mile W of the light; a prominent yellow convent stands on the top of a hill about 1.2 miles S of the light.

Between Cabo Branco and Ponta de Pedras, about 30 miles to the S, the coast is mainly sandy beaches interrupted by perpendicular red cliffs. Reefs and rocks lie up to 3 miles offshore.

Ponta Tambaba is made up of brightly colored cliffs that slope steeply to the shore and is located 10.5 miles S of Cabo Branco. Barreiras de Tambaba, S of the point, are conspicuous red cliffs and the highest land in the vicinity.

Ponta Pitimbu (7°28'S., 34°48'W.), about 9 miles S of Ponta Tambaba, is a salient point covered with vegetation. The village of Pitimbu is located close S of the point.

Cabo Branco Light

Pitimbu Light is shown from the N end of a reef 0.5 mile E of Ponta Pitimbu.

Between Ponta dos Coqueiros, a salient point located about 3 miles S of Pitimbu, and Ponta de Pedras, the coast is slightly indented and intersected by the Rio Goiana and the Rio Megao. The village of Taquara is located about 2 miles W of Ponta dos Coqueiros.

Ponta de Pedras (7°38'S., 34°48'W.), from which a light is shown, is wooded and prominent. A village with a church lies close S of the point. The coastal reef extends about 2 miles seaward from the point.

Between Ponta de Pedras and Olinda, about 24 miles to the S, the coast is deeply indented. Ilha de Itamaraca, a large island, lies in the middle of this indenture.

Ilha de Itamaraca appears like a part of the coast from offshore.

Pilar, a village with a church, is located on the seaward side of the island, about 8 miles S of Ponta de Pedras. An old fort stands on the SE extremity of the island.

Ponta de Pedras Light

2.47 Barra de Catuama (7°43'S., 34°48'W.) is a passage through the barrier reef and shoals, which gives access to the Rio Catauma, the Rio Carrapicho, and Canal de Santa Cruz.

The entrance to all of which lie within 1 mile to the W of **Ponta do Funil** (7°41'S., 34°50'W.). The barrier reef on both sides of the entrance is submerged, and the entrance is narrowed by shoals lying off both ends of the reef.

Within the entrance a narrow channel with a minimum depth of 2.5m in the fairway leads to an anchorage off the mouth of the Rio Catauma, which has a depth of 9m.

The bar should not be approached without the aid of local knowledge. Pilotage is mandatory.

Anchorage is afforded, in depths of 13 to 14m, about 4 miles ESE of Ponta do Funil.

Barra da Ilha, the S entrance to Canal de Santa Cruz, is formed by a break in the barrier reef, 2 miles E of the SE extremity of Ilha thade Itamaraca.

The minimum depth over the bar was 2.5m, and within the bar the depth increases to 7.m, where vessels anchor off the old fort. The bar should not be approached without the aid of local knowledge.

Ponta de Janga is a low, salient point covered with palm trees. The village of Pau Amarelo and an old fort lie to the N of the point. Barra do Pau Amarelo lies close offshore from the point.

Ponta de Olinda Light

Ponta de Olinda (8°01'S., 34°51'W.), located 6 miles S of Ponta de Janga, rises to Morro do Serapiao, a hill from which a light is shown. The town of Olinda, located on the point and hill, is prominent from offshore. A vessel approaching the point will first sight Nossa Senhora do Monte church, close N of the town.

Close N of Ponta de Olinda two breakwaters parallel the coast about 0.3 mile to seaward. One is L-shaped and projects

from the coast to the E and then turns NNE. The other is detached and extends NNE from close inshore from the head of the first. Development works on a partly-submerged breakwater were reported in the vicinity.

Baixos de Olinda, which fringes Ponta de Olinda, consists of two lines of reefs, the outer of which Baixo Itabaiacus, also known as Baixo Olinda de Fora, lies about 1 mile offshore.

The sea breaks on the inner reefs only and then mainly during strong winds. The S extremity of Baixo Itabaiacus is marked by a lighted buoy.

Recife (8°03'S., 34°52'W.)

World Port Index No. 12730

2.48 The harbor entrance is located about 2 miles SSW of Ponta de Olinda. The harbor is formed by the barrier reef and three breakwaters. The harbor is one of the largest and busiest on the NE coast of Brazil.

Port of Recife
http://www.portodorecife.pe.gov.br

Winds—Weather.—During the summer months, the winds are generally from the E and NE. During the winter, from March to August, the winds are from E to SW and blow with much more force.

Tides—Currents.—The tidal range at springs is 2.1m and at neaps is 0.3m. High winds from seaward cause an additional rise up to 0.3m.

The tidal currents within the harbor attain velocities of 1 to 2 knots at springs; the ebb current is always the stronger.

Depths—Limitations.—Canal de Olinda and Canal do Sul are the two approaches to the port of Recife.

Canal de Olinda, the N approach to the port, should not be used by vessels having a draft of more than 4.5m. A 4.3m patch lies 0.2 mile E of the N end of the detached breakwater.

Canal do Sul, the S approach to the port, is the main access route to Recife. It lies S and W of the breakwater built on Banco Ingles. Canal do Sul has charted depths of about 7.3 to 12.8m. Vessels drawing over 9m regularly use the port.

The channel W of the detached breakwater has a minimum depth of 10m over a width of 0.15 mile at high tide. The harbor entrance has maintained depths of 10.2m between the breakwaters; however less water due to silting may be present. A depth of 6.7m is maintained in the entrance channel. A submarine pipeline lies in the vicinity of the N part of the harbor.

The harbor has about 2.5 miles of quays. Berths are numbered from N to S. The depths alongside vary from 3 to 10m. There are facilities for ro-ro, containers, tankers, and grain.

Vessels drawing over 8.8m must use tugs. Vessels are required to use their own fenders.

Banco Victor Pisani lies with its least depth of 7.5m about 1.3 miles E of the head of the S breakwater. The bank is the S limit of depths of less than 9.1m which lie to the S of Baixo Itabaicus.

A dangerous wreck lies close to the SE edge of Banco Victor Pisani. A lighted buoy is moored close E of the wreck.

A shoal, with a least depth of 7m, lies about 1.7 miles E of Recife Lighted Tower.

Banco Ingles, with a least depth of 3.2m, lies with its center about 0.5 mile ESE of the head of the S breakwater. The bank, with depths of less than 5.5m, is about 0.5 mile long, N and S, and about 0.3 mile wide. With SE winds the sea breaks heavily on Banco Ingles.

A breakwater leads across Banco Ingles. Lights are shown from the N and SSW ends of the breakwater. A lighted buoy is moored off the W side of the middle of the breakwater.

Banco Ituba, with a least depth of 6.8m, sand and coral, lies about 2.7 miles SSE of the head of the S breakwater. The minimum depths are over the S side of the bank.

Banco Tacis, with depths of 2.2 to 5.5m, lies with its N edge about 1.2 miles S of Recife Lighted Tower. The bank extends about 1 mile S and joins Banco dos Afogados. Banco Tacis, with its outer edge about 0.7 mile offshore, parallels the reef which fringes the shore.

Banco dos Afogados is a continuation of Banco Tacis to the S; it has least depths of less than 1.4m and lies with its outer edge nearly 1 mile offshore in a position about 3.2 miles S of Recife Lighted Tower.

Cabeca de Coco, a rock which breaks at LW, lies about 0.9 mile NNE of the head of the N breakwater.

Baixo Salgadinho, a shoal with a least depth of 0.8m, lies about 0.5 mile NNE of the head of the N breakwater. Shoals with depths of 2.2 to 4.4m lie from 1.25 to 1.5 miles NE of the head of the same breakwater.

A 5.5m patch lies about 1 mile SSE of Recife Lighted Tower.

Sunken rocks, with depths of less than 1.8m, extend about 91m ESE from the head of the N breakwater. Scattered patches, with depths of 9.1 to 11m, lie outside the 11m curve; the chart is the best guide for locating these.

Aspect.—The best landmarks for a vessel approaching from the N are Morro do Serapiao, with Olinda Lighted Tower standing on it. Two gray chimneys lie 1.5 and 2 miles SW, respectively, of the Olinda Lighted Tower. Three conspicuous radio towers lie 3 miles SW of Olinda Lighted Tower.

For a vessel approaching from the S, the best landmarks are the lighthouse on Cabo de Santo Agostinho, situated 18 miles SW of the harbor entrance, and Serra Selada, a saddle-shaped mountain 310m high, located 16 miles WSW of Cabo de Santo Agostinho.

A conspicuous church with twin steeples and a conspicuous gray chimney lie 6 miles and 3 miles, respectively, SW of the harbor entrance.

The harbor entrance lies between two breakwaters. On the W side, Mohle de Olinda, 0.2 mile long, extends NW to the shore.

On the E side, the barrier reef and the breakwater which extends it stretch 2 miles SSW, enclosing the harbor. A masonry wall has been built on top of the barrier reef.

Lights are shown from the seaward end of each breakwater. A lighthouse lies about 0.6 mile SSW of the end of the E breakwater, but is difficult to distinguish during daylight hours if white-hulled vessels are tied up at the quays.

A detached breakwater, lying in a general N to S direction, has been built about 0.5 mile E of the harbor entrance. Lights are shown from each end of the breakwater.

Pilotage.—Pilotage is compulsory for vessels of 200 tons and over; it is available 24 hours. Pilots board from a red launch with a black "P" on each bow.

Vessels await pilots S of Banco Ingles breakwater. Vessels can await pilots either 1 mile SSE or 0.5 mile NE of the detached breakwater.

Vessels drawing less than 7.6m may enter and leave port any time of the day.

Vessels with a greater draft should arrive at the pilot boarding position in daylight about 1 hour before HW so they can enter the harbor and moor during slack water.

Permission may be granted for ships up to 9.4m draft to sail at night during HW.

Regulations.—Vessels should send their ETA, via the agent, 48 hours and 4 hours in advance.

Vessels should establish VHF contact with the pilot association when within range.

Contact Information.—Recife pilots can be contacted, as follows:

1. VHF: VHF channels 9, 10, 13, and 16
2. Telephone: 55-81-3424-5010
   55-81-3424-4963
3. E-mail: perpilot@terasystem.com.br

Recife port can be contacted, as follows:

1. Telephone: 55-81-3419-1900
2. Facsimile: 55-81-3224-2848
3. E-mail: portodorecife@fisepe.pe.gov.br

Anchorage.—Ships anchor, in depths of 9.1 to 12m, 0.3 mile S of the S end of Banco Ingles Breakwater, sand, with good holding ground. Vessels can also anchor between Banco Ingles Breakwater and South Breakwater, in depths of 9 to 10m.

Anchorage is prohibited in the cable areas indicated on the charts.

Caution.—A shoal, with a depth of 7m, lies 0.3 mile E of the S end of the detached breakwater.

Mariners are warned that the channels within the port of Recife are subject to frequent change and shallower depths may exist.

It is reported a scend may be experienced by vessels within the harbor.

Recife to Maceio

2.49 Between Recife and Cabo de Santo Agostinho, about 19 miles to the SSW, the coast is low and covered with palm groves. Above-water and sunken reefs and rocks fringe and parallel this part of the coast to distances of 2 miles offshore.

Nossa Senhora dos Prazeres (8°09'S., 34°56'W.), a church with two towers, is located about 7 miles SSW of Recife Lighted Tower. The church is about 2 miles inland of the coast and prominent from offshore.

Barra das Jangadas, about 12 miles SSW of Recife Lighted Tower, is the common entrance to the Rio Jaboatao and the Rio Pirapama. The rivers are narrow with strong currents and are of little importance to navigation.

Ponta das Pedras Pretas (8°18'S., 34°56'W.), about 4 miles S of Barra das Jangadas, is fringed by black rocks which are very conspicuous from offshore. A rocky shoal extends for nearly 1 mile E from Punta das Pedras Pretas.

Isolated shoals, one with a depth of 5.5m, lie up to 2 miles off the coast between Ponta das Pedras Pretas and Cabo de Santo Agostinho.

Cabo de Santo Agostinho (8°21'S., 34°56'W.), from which a light is shown, is a rugged projecting promontory of moderate height and is located about 19 miles SSW of the entrance to Recife. The cape is a good landmark and in clear weather is visible about 24 miles. A church stands close to the light and an old fort is located on the S side of the cape. A dangerous wreck is charted close E of the cape.

From Cabo de Santo Agostinho to Ponta dos Ilhetas, about 28 miles to the SSW, the coast continues low and sandy and is covered with vegetation.

2.50 Suape (8°24'S., 34°58'W.), situated 3 miles S of Cabo de Santo Agostinho, is protected by a breakwater. The breakwater extends 0.5 mile ESE from the coast, then turns ENE and NNE for 0.5 mile and 0.4 mile, respectively. LPG-1 Pier can accommodate vessels up to 190m in length and 45,000 dwt, with depths alongside of 14m. LPG-2 Pier can accommodate vessels up to 270m in length and 90,000 dwt, with depths alongside of 14.5m. Both these LPG piers can handle vessels on each side. LPG-3A Pier and LPG-3B Pier can each accommodate vessels up to 170,000 dwt. The CMU Pier has a least depth alongside of 10m, is fitted with ro-ro facilities, and can accommodate vessels of 40,000 dwt.

Suape Harbor

The inner harbor quay has depths alongside of 15.5m and can accommodate vessels up to 80,000 dwt. A shipyard is in operation in the N part of the inner harbor.

The largest vessel handled at this port was 266m in length, with a draft of 14.5m. The approach channel has a width of 390m and reported depths of 16.5m. The turning basin is 600m in diameter, with a depth of 16m. The inner harbor is accessed through a 300m gap in the breakwaters.

Pilotage.—Pilotage is compulsory. Pilots, who come from Recife, board 0.3 mile N of the breakwater head and should be

ordered, via the agent, 24 hours in advance. There is no night pilotage for LPG vessels.

Regulations.—Vessels should send their ETA, via the agent 72 hours, 48 hours and 24 hours in advance.

Contact Information.—Suape pilots can be contacted, as follows:

1. VHF: VHF channels 13 and 16
2. Telephone: 55-81-3424-5010
   55-81-3424-4963
3. Facsimile: 55-81-3424-5010
4. E-mail: perpilot@terasystem.com.br

Suape port can be contacted, as follows:

1. Telephone: 55-81-3527-5000
2. Facsimile: 55-81-3527-5066
3. E-mail: suape@suape.pe.gov.br

Anchorage.—Anchorage is available 1 mile NE of the breakwater head, in depths of 15 to 17m, sand, but is very exposed.

Caution.—A rock, with a depth of 11.5m and marked by a lighted buoy, lies about 0.3 mile E of the head of the breakwater.

2.51 Pontal do Cupe, about 7 miles SSW of Cabo de Santo Agostinho, is a small salient point surrounded by a reef. A village marks the point. The town of Porto de Galinhas is located near the shore about 3 miles SSW of Pontal do Cupe.

Pedra Selada (8°25'S., 35°12'W.), 311m high, is part of the prominent Serra Selada range, and is located 16 miles WSW of Cabo de Santo Agostinho. In clear weather it is visible for better than 20 miles.

It is saddle-shaped and is an excellent landmark, being the first land to be sight be a vessel approaching from the E. However, it is frequently covered by haze, especially in the morning, when the land breeze is blowing.

Ilha de Santo Aleixo (8°37'S., 35°02'W.) is located about 10 miles SSW of Pontal do Cupe. The seaward side of the island is low and almost barren. Two hills, the higher one being 23m high, mark the S side of the island.

A submerged reef extends to the SW from the SE side of the island for a distance of about 0.5 mile and is marked by several above-water rocks on which the sea always breaks.

A rocky shelf off the W extremity of the island is separated from the coastal reef by a channel with a depth of 5.5m.

Anchorage.—Small vessels can anchor, in 6 to 7m, mud, off the beach on the W side of the island. Larger vessels can anchor, in 10 to 12m, adjacent to the sunken ledge of reefs off the S side of the island. Local knowledge is required when anchoring in this area.

The **Rio Formoso** (8°42'S., 35°05'W.) discharges about 6 miles SSW of Ilha de Santo Aleixo. A conspicuous church stands on the N side of the river mouth. Local knowledge is required for small vessels to enter the river.

Ponta Tamandare, lying 3.5 miles SSW of the entrance to the Rio Formoso, is low and sandy. A light is shown from the point.

2.52 **Baia de Tamandare** (8°46'S., 35°06'W.) is entered between Ponta Tamandare and Ponta das Ilhetas, 2.25 miles to the SSW. The village of Tamandare stands on the beach on the N side of the bay.

A light is shown from Forte de Santo Inacio located near the village. The bay can be identified by the fort with the lighted tower and the buildings of a school.

The barrier reef, which generally dries in the vicinity of the bay, has three gaps in it.

Barra de Tamandare, the main entrance, is about 0.5 mile wide and has a minimum depth of 7.6m in the fairway, but depths of less than 5m extend up to 0.15 mile from either side.

This entrance is obstructed by Baixa Grande, with a least depth of 3.4m and Baixinha, a group of shoals with a least depth of less than 2m. Two ledges with depths of 3.5 and 4.0m lie in mid-channel S of Baixinha.

The barrier reef on the N side of this entrance terminates in Ilha do Barra, a coral formation which occasionally covers.

Anchorage may be obtained, close to the beach, off a pier at the N end of the bay, in depths of 6 to 7m, dark mud and sand, good holding ground. This anchorage is well sheltered except during SE winds which raise a sea inside the bay.

2.53 From Baia de Tamandare to Porto de Pedras, about 25 miles SSW of the bay, the shoreline is low and sandy. Hills commence to rise a few miles inland. Between the hills, the valley in which the Rio Una flows can be identified from offshore. The coastal reef, uncovered and broken in places, parallels this coast to a distance of about 0.7 mile to 2.5 miles offshore. Sand banks and foul ground lie between the reef and the coast.

The Rio Una discharges into the sea about 3 miles SSW of Ponta das Ilhetas. Caixao do Una, a break in the coastal reef about 2 miles wide, lies off the mouth of the Rio Una. This bar has a depth of 9.8m and leads to a small anchorage to the N, which has a depth of 7.4 to 9.0m, mud.

The anchorage affords some shelter from NE winds to small vessels. Local knowledge is essential.

From Ponta de Gravata, 2 miles S of the Rio Una, to Pontal do Antunes, about 7 miles further SSW, the coast is uniform. A village stands on the coast about 2 miles SSW of Ponta de Gravata. The Rio Persinunga discharges about 1 mile SSW of the village. A church stands about 0.5 mile S of the mouth of the river.

Barra Grande (8°59'S., 35°11'W.), a break in the coastal reef about 150m wide, has depths of 5.8m in the center of the channel. There are two anchorages for small craft, one to the N of the bar and one to the S. Local knowledge is essential.

About 3 miles SW of Barra Grande and near the shore, the town of Maragogi can be seen. A church stands about 3 miles SSW of the town and is prominent from offshore.

2.54 **Porto de Pedras** (9°09'S., 35°18'W.) is located on the S bank of the Rio Manguaba, near its mouth, 9.5 miles SW of Maragogi. A light is shown from high ground on the S bank of the river mouth, close to a prominent church.

Anchorage for small craft is afforded, in 3.6m, between the extremity of the barrier reef and the inner line of reefs which restrict the port area. Local knowledge is required. From Porto de Pedros to Ponta Verde, 39 miles to the SW, the shoreline is mostly low and sandy.

The Serra Mariquita, a low range of hills, rises about 18 miles W of Porto de Pedras. The coastal reef and the rocky shelf, which fronts it, continue to parallel the coast and lie at

distances of less than about 1 mile to nearly 2 miles from the shore. The reef is uncovered and broken in many places.

Barra do Camaragibe (9°20'S., 35°24'W.), nearly 1 mile wide between sunken reefs, lies off the mouth of the Rio Camaragibe, 12.5 miles SW of Porto de Pedras. Depths inside the bar range from 6 to 7.9m. A reef encumbers the N part of the harbor.

Sheltered anchorage is afforded small craft with local knowledge.

Ponta do Prego (9°32'S., 35°35'W.), low, prominent, and covered with trees, is located about 17 miles SW of Barra do Camaragibe. A village stands near the shore about 1 mile W of the point. A depth of 8.8m lies about 3 miles SE of Ponta do Prego.

Maceio

Ponta Verde (9°40'S., 35°41'W.), the NE point of Porto de Maceio, is a prominent low salient point with some conspicuous buildings. A light is shown from Recife da Pont a Verde, the reef which extends from and encircles the point to a distance of about 0.7 mile. The sea breaks over the reefs in the vicinity of Ponta Verde.

Maceio (9°40'S., 35°44'W.)

World Port Index No. 12750

2.55 The port of Maceio lies in an open bay on the SW side of Ponta Verde. It is the only port for large vessels between Recife and Salvador. The city of Maceio and the town of Jaragua front the wide beach of the bay which comprises the harbor. Maceio Light stands on a high hill, about 0.7 mile N of Jaragua.

Port of Maceio

http://www.portodemaceio.com.br

Winds—Weather.—During the summer months, the prevailing winds are from the NE during the day and from NW at night. At this time of the year the bay is generally calm and considered safe. During the winter months the wind is generally from the SE and SW and heavy swells enter the bay.

Maceio

Tides—Currents.—The maximum range of tides is reported to be 2.6m.

Off Maceio, the Brazil Current has been observed setting parallel with the coast at a rate of 3 knots. During the winter months the head of the breakwater should be given a wide berth because the waters of the lagoons discharge into the W part of the bay and then set to the E. Throughout the year the coastal current sets to the SW.

Depths—Limitations.—In the middle of the bay W of the head of the breakwater there are depths of 9.1m, decreasing to

the N to 5.5m about 0.3 mile from the shore. A least depth of 9.1m is found in the harbor area N of the breakwater.

Baixio do Peixe-Pau, nearly 0.5 mile in extent and with a least depth of 3.6m, lies with its SW edge about 0.7 mile SSW of the elbow of the breakwater. The sea breaks over this danger with strong S winds.

Rocky patches, with a least depth of 5.9m, lie about 1.2 miles ESE of the elbow of the breakwater. A patch, with a depth of 8m lies about 1 mile SE of the elbow. Another rocky patch, with a least depth of 6.7m, lies about 1 mile SW of the same position. Enseada de Pajucara, lying between Ponta Verde and the breakwater 2 miles to the SW, is completely obstructed by reefs.

A breakwater extends about 0.5 mile SSW from the W point of Enseada de Pajacura, along the W side of the reefs, and then turns WNW for 0.4 mile.

On the W side of the inshore part of the breakwater there is a reclaimed area 0.2 mile wide, on which there are molasses storage tanks and sugar warehouses.

The outer leg of the breakwater is quayed on its inner side. The general cargo berth located on the inner side of the breakwater is 400m long, with a depth of 10m alongside.

The sugar and molasses berth is parallel to, and 0.2 mile NE of, the general cargo berth. The berth is 250m long and with a depth of 10m alongside.

The tanker berth extends WNW from the sugar and molasses berth. It has depths alongside of 10.6m.

Braskem Terminal

Braskem Terminal (Maceio Maritime Terminal), an L-shaped chemical pier, projects about 0.6 mile SE from the shoreline, about 1.7 miles WSW of the general cargo berth.

A detached breakwater, 0.2 mile long, lies close seaward of the pier head and parallel with the coast.

A berth, on the inshore side of the pier head has a depth of 8.8m alongside. A vessel with a length of 132m and a draft of 7.8m can berth alongside.

Aspect.—The most conspicuous object in the port is a silo situated 0.6 mile N of the root of the breakwater. It appears on the horizon when Ponta de Prego is abaft of abeam.

A large shed and a tower marked with red obstruction lights, lie 0.3 mile and 1.5 miles NW, respectively of the root of the breakwater. A prominent water tower lies 4 miles SW of the root of the breakwater. A tank farm lies at the root of the chemical pier.

Pilotage.—Pilotage is compulsory for all foreign vessels and is available 24 hours. Berthing of tankers is restricted to daylight hours only. Vessels should send their ETA 24 hours in advance.

If the ETA falls on a Saturday or Sunday, messages must arrive by the preceding Friday. Requests for a pilot, together with the vessel's ETA, should be forwarded at least 12 hours in advance to the vessel's agent through Olinda (PPO) or Salvador (PPA). The pilot boards about 0.4 mile SW of Baixo do Peixe-Pau Lighted Buoy.

Regulations.—Vessels should send their ETA 72 hours, 48 hours, and 24 hours in advance.

The maximum vessel speed permitted between the pilot pickup point and the port is 6 knots.

Contact Information—Vessels can contact Maceio pilots, as follows:

1.	VHF:	VHF channels 12, 14, and 16
2.	Telephone:	55-82-3311-8017 55-82-3311-8014
3.	Facsimile:	55-82-3311-8016 55-82-3326-2175
4.	E-mail:	maceiopilots@maceiopilots.com.br

Anchorage.—Vessels less than 3,000 gt can anchor, in 6 to 7m, about 0.5 mile WNW to W of the head of the breakwater.

Vessels greater than 3,000 gt can anchor in charted depths of 9.2 to 14.5m in an area, best seen on the chart, lying SW of the head of the breakwater.

Vessels awaiting the pilot can anchor, in 13m, W of Baixo do Peixe-Pau Lighted Buoy.

Vessels waiting to use Braskem Terminal anchor in an area, best seen on the chart, lying about 2 miles SE of the head of the terminal pier, in charted depths of 14.9 to 16.8m.

Caution.—Fishing vessel concentrations may be encountered up to 20 miles from the coast.

Maceio to Aracaju

2.56 From Maceio to the mouth of the **Rio Sao Francisco do Norte** (10°31'S., 36°23'W.), about 64 miles to the SW, the shoreline for the most part, continues low and sandy. The coast is marked by red cliffs and hills in several places.

Along this stretch of coast the coastal reef, above-water and sunken, parallels the shore to distances of 2.5 miles offshore in places. Sunken rocks fringe various parts of the coast to a distance of 1 mile, and depths of less than 3.6m lie as far as 6 miles offshore.

Porto Frances (9°46'S., 35°50'W.), located on the coast about 10 miles SW of Maceio Light, is marked by white sand dunes. The coastal reef off Porto Frances uncovers and skirts the coast at a distance of about 0.5 mile. The coast between here and the mouth of the Rio Sao Miguel rises to high hills and is covered with vegetation.

Barra de Sao Miguel lies off the mouth of the Rio Sao Miguel, located about 6 miles SW of Porto Frances. A light is shown from the S side of the river mouth. A reef, the N extremity of which dries occasionally, begins 1 mile E of the S entrance point of the Rio Sao Miguel and extends SW for 2 miles.

Small vessels, with local knowledge, may obtain anchorage between the reef and the coast, in depths of 3 to 4m, and also inside the reef off the river mouth near Cidade de Santana, which stands on the N bank of the river close to its mouth.

From the mouth of the Rio Sao Miguel to Pontal de Coruripe, about 22 miles SW, high red cliffs dominate the N part of the coast. Further SW, the coast becomes lower and several lakes are formed.

Lajes dos Baixos, a sunken rocky ledge, lies about 1 mile from the shore. Depths of 9.1m and less lie to a distance of 2.5 miles off shore and depths of 20.1m and less lie about 6 miles from this coast.

Pontal de Coruripe (10°10'S., 36°08'W.), from which a light is shown, forms into a small bay open to the SW. The village of Coruripe stands on the point.

Pontal do Peba (10°22'S., 36°17'W.), about 15 miles SW of Pontal de Coruripe, is conspicuous from offshore because vegetation ceases in the vicinity of the point.

The village of Peba stands on the point, which is fringed by numerous uncovered reefs for a distance of 1 mile. An open anchorage for small craft lies N of the reefs.

Sergipe Terminal (Terminal Maritimo Inacio Barbosa) (10°51'S., 36°55'W.) is a T-shaped pier situated 1.5 miles SE of Sergipe Light. The terminal is associated with the Port of Aracaju and has a berth 330m in length which can accommodate vessels up to 30,000 dwt.

2.57 The mouth of the **Rio Sao Francisco do Norte** (10°31'S., 36°23'W.) is located about 12 miles SW of Pontal do Peba. The river is one of the largest and most torrential in Brazil. From its source in the mountains, the river flows about 1,700 miles to the sea. Small vessels navigate the river for about 150 miles above its mouth to the village of Piranhas.

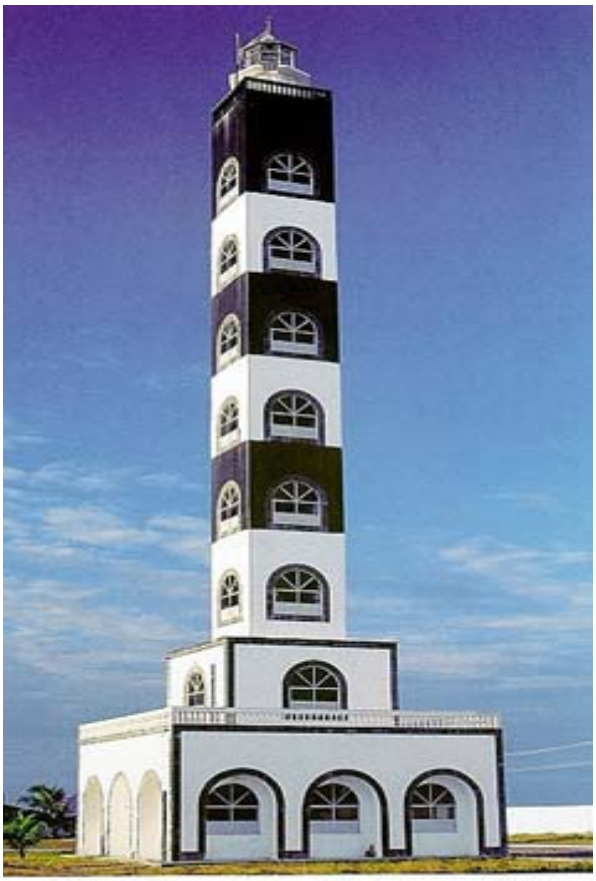
The channel leading into the river lies between sand banks which extend 2 miles off both entrance points and on which the sea always breaks. Vessels with local knowledge can cross the bar. There were charted depths of 1.5 to 2.4m on the bar. Both the sand banks and the bar are subject to continual change, especially during the high river season.

Anchorage may be obtained S of the bar, in a depth of about 9m. The anchorage is exposed to prevailing winds.

Pilots for the river are embarked at Maceio. Previous notice of a vessel's expected time of arrival should be sent to Penedo, the principal town on the river.

A drying wreck lies on the edge of a sandspit, about 2 miles SSW of Ponta Cabeco, the S entrance point of the river.

From the mouth of the Rio Sao Francisco do Norte to the mouth of the Rio Sergipe, the entrance to Porto de Aracaju, 46 miles to the SW, the coast is formed by Praia de Santa Isabel, a white sandy beach backed by hills covered with vegetation.



Sergipe Light

A lighted platform stands about 17 miles SW of Rio Sao Francisco do Norte Light. Depths of 6.3 and 5.1m lie 2.5 miles E and 2 miles ESE, respectively, of the platform. A depth of 5.5m was reported to lie 1.5 miles E of the platform.

Sailing craft should use caution along this part of coast because of the strong prevailing winds and currents, which tend to set them on shore. The current sets to the S with velocity of 1.5 to 3 knots.

Aracaju (10°55'S., 37°03'W.)

World Port Index No. 12760

2.58 Aracaju stands 3 miles within the mouth of the Rio Sergipe, which is navigable as far as Cidade de Riachuelo, 20 miles up river.

Winds—Weather.—From September to February, the winds are from the N quadrants and from the S quadrants from March to August. The S winds send in a heavy sea and make crossing the bar difficult if not impossible.

Tides—Currents.—The spring range is 1.9m; the neap range is 0.9m. During ebb tide, the current reaches a maximum velocity of about 2 knots.

Off the mouth of the river, the flood current sets S and the ebb current sets N. During the ebb, the sea on the bar is generally higher than during the flood.

Depths—Limitations.—The mouth of the Rio Sergipe is 0.75 mile wide between its entrance points, but is obstructed by sand banks, leaving only a narrow channel on the S side. This channel does not change position but its width varies, and should never be entered without local knowledge.

Banco Norte and Banco Sul, on which the sea always breaks, extend 2 miles SE and 1.5 miles ESE from the N and S entrance points of the river, respectively.

The channel is approached across a bar between the extremities of these two sand banks. Depths over the bar are subject to frequent changes and the buoys are moved as necessary. There is a depth of 3m at the bar.

There is a concrete wharf, 96m long, with depths alongside of 6 to 7m.

There is a dolphin berth for tankers, with four mooring buoys close S, on the W bank of the river.

Carmopolis Offshore Loading Berth (11°02'S., 37°01'W.) is located about 4.5 miles SSE Aracaju Light. Six mooring buoys are situated around the terminal. A berthing master is provided to assist ships berthing; ships are normally berthed during daylight hours. There are no tugs. The berth can accommodate a ship of 115,000 dwt. Ships can load to a draft of 15m. A ship waiting to berth should anchor 1.5 miles SE of the berth, in a depth of 24m, mud and fine sand.

Guaricema Offshore Loading Berth (11°09'S., 37°04'W.), consisting of six offshore platforms and a berth between four mooring buoys connected to shore by a submerged pipeline, lies 6 miles E of the Rio Vaza-Barris. Each platform has a tower with an orange daymark indicated by a number in black, also a fixed red light and a flashing white light is shown from the tower

Aspect.—The city can be identified by Morro do Urubu, over 90m high, and by a conspicuous twin towered church standing on a hill 1 mile S of Morro do Urubu.

Prominent objects at the mouth of the river include the Aracaju Light and a flare stack close NW.

Pilotage.—Pilotage is compulsory. Pilotage is available during daylight hours for berthing and 24 hours for unberthing. Vessels should send their ETA 48 hours and 24 hours in advance. The pilot boards about 2.75 miles ESE of Aracaju Light, as seen on the chart.

In bad weather, vessels are directed across the bar by signals made by the pilot from their boat and repeated by the signal station. The signal station is located about 0.7 mile S of Aracaju Light.

Contact Information.—Aracaju pilots can be contacted, as follows:

1. Telephone: 55-79-3211-5699
2. Facsimile: 55-79-3211-5699
3. E-mail: apes@infonet.com.br

Anchorage.—In calm weather, vessels can anchor NE of the bar, in depths of 7 to 12m, fine sand and mud.

Within the river, sheltered anchorage is afforded in depths of 10 to 12m off the city. Ships should not anchor S of the channel across the bar due to submarine oil pipelines.

Caution.—Carmopolis Onshore Oil Terminal is located 3 miles SW of Aracaju Light (10°58'S., 37°02'W.). Submarine oil pipelines are laid to groups of offshore oil platforms situated 6 miles ENE, 9 miles E, and 10 miles S of the oil terminal.

Aracaju Light

Ships should not anchor, and are advised to avoid navigating within the area between a line joining these two groups of platforms.

Aracaju to Ponta Itapuazinho

2.59 Barra de Sao Cristovao (11°11'S., 37°08'W.), located at the mouth of the Rio Vaza-Barris (Yasa or Vasa) and identified by the Morro dos Tres Irmaos, lies 15 miles SW of Pontal do Propria. The river entrance is obstructed by sand banks, but small craft with local knowledge can navigate the narrow channel. The N entrance point is marked by a light.

Strong winds raise a sea over the bar and sandbanks off the mouth of the river. The anchorage off the bar has little shelter and poor holding ground. The current off the river entrance sets S during flood tide.

Barra da Estancia (11°27'S., 37°21'W.) is located about 21 miles SSW of Barra de Sao Christoavo, and is part of the common mouth of the Rio Real and the Rio Piaui. A light is shown from a point of land close to the N side of the bar.

Some houses stand on shore on the S side of the river's entrance near the extremity of Mangue Seco.

Breakers on the bar and sand banks which obstruct the river mouth, are visible at a distance of about 4 miles.

A narrow channel, navigable by ships with drafts of 3m, leads across the bar. The channel across the bar is reported to be marked by unlighted buoys.

Pilot service is available from Aracaju. Pilots navigate the river as far as Crasto, 32 miles from the bar.

2.60 The **Rio Itapicuru** (11°44'S., 37°31'W.) is located about 20 miles SSW of the mouth of the Rio Real. The mouth of the river is obstructed by sandbanks on which the sea almost always breaks.

The town of Conde, with a conspicuous church, lies on the S bank of the river, about 9 miles within its entrance. Small craft with local knowledge use the river.

The Rio Itariri and the Rio Inhambupe discharge about 15 and 23 miles SSW, respectively, of the mouth of the Rio Itapicuru.

Between the mouths of these two rivers, low hills, 2 to 3 miles inland, are visible 15 to 20 miles offshore. A light is shown from the mouth of the Rio Itariri.

Outeiro Pelador, a prominent hill, is located about 19 miles SW of the mouth of the Rio Inhambupe.

Large patches of white sand on the hill are conspicuous and can be seen up to 18 miles offshore.

Ponta Acu da Torre (12°34'S., 38°00'W.), 17 miles SW of Outeiro Pelador, is a low point where the coast turns and trends SW to Ponta Itapua. Garcia d'Avila Light is shown from the point.

Monte Gordo, a large hill, rises prominently 5.5 miles SW of Ponta Acu da Torre.

The Rio Jacuipe and the Rio Joanes discharge 11 and 24 miles, respectively, SW of Ponta Acu da Torre. Between the mouths of these rivers a series of small tree-covered hills back the low shore. A lighted tower and a conspicuous chimney stand 7.5 miles SW of the Rio Jacuipe.

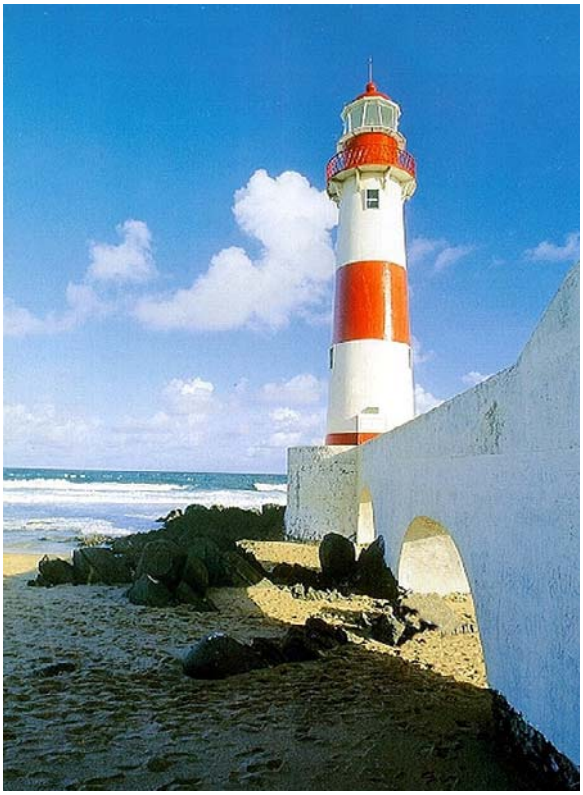
Ponta Itapua (12°57'S., 38°22'W.), from which a light is shown, is located about 7 miles SW of the mouth of the Rio Joanes. A conspicuous building, illuminated at night, is located close NW of the light on the point. An aviation light is shown from a position 1 mile inland of the coast and nearly 4.5 miles NE of Itapua Light.

Ponta Itapuazinho (13°01'S., 38°29'W.) is located about 8 miles WSW of Ponta Itapua. From here to Ponta de Santo Antonio, nearly 4 miles to W, the coast is rocky and reef fringed.

Sunken rocks extend about 0.2 mile from the shore in many places, namely around Ponta Itapuazinho and just to the W of Ponta do Concelho, located about 1 mile to the W of Ponta Itapuazinho.

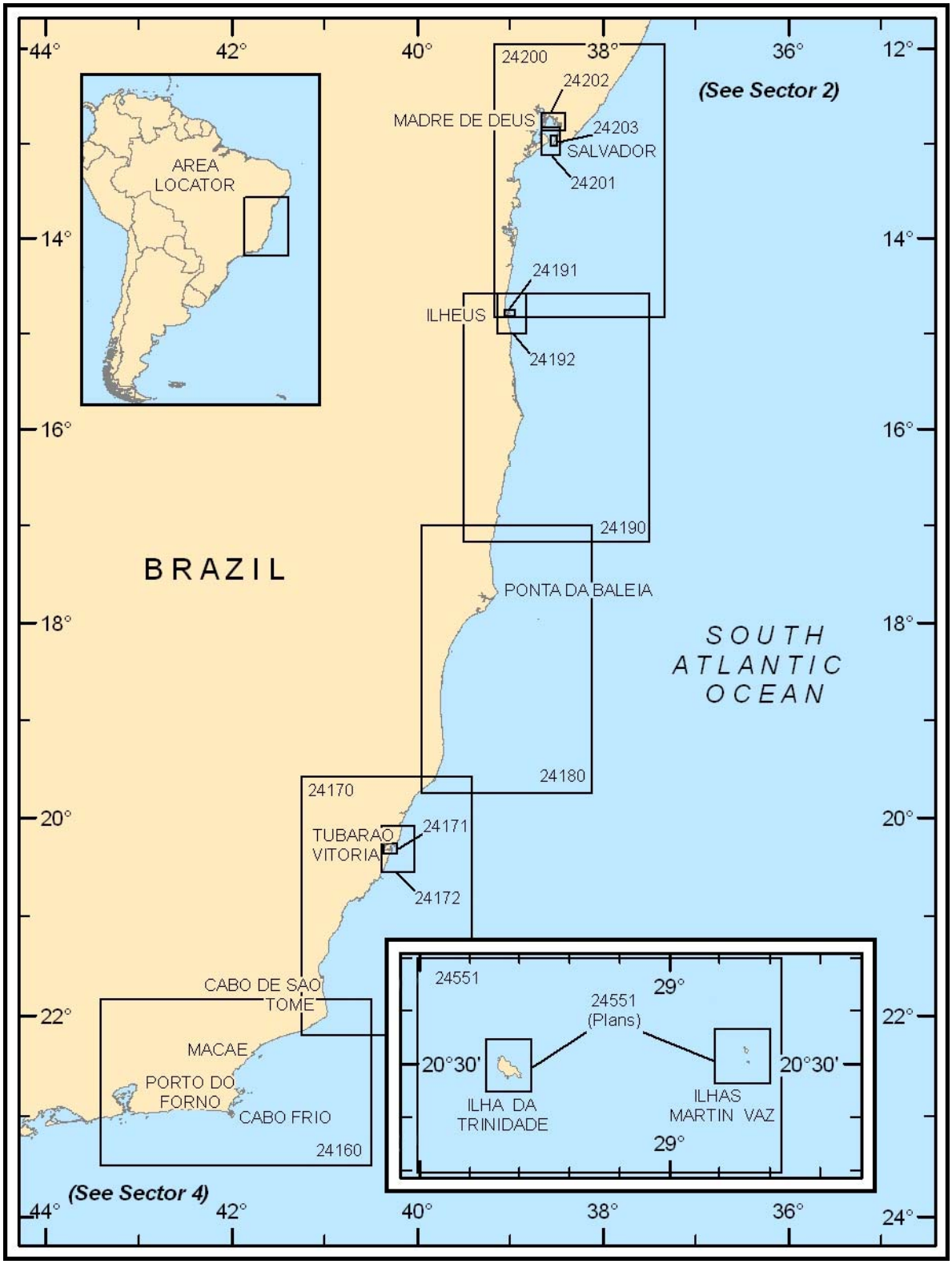
A submarine pipeline is laid in a position 1.25 miles S of a point 1.25 miles W of Ponta Italpuazinho. Anchorage is prohibited.

Ponta de Santo Antonio (13°01'S., 38°32'W.) is described in paragraph 3.2.



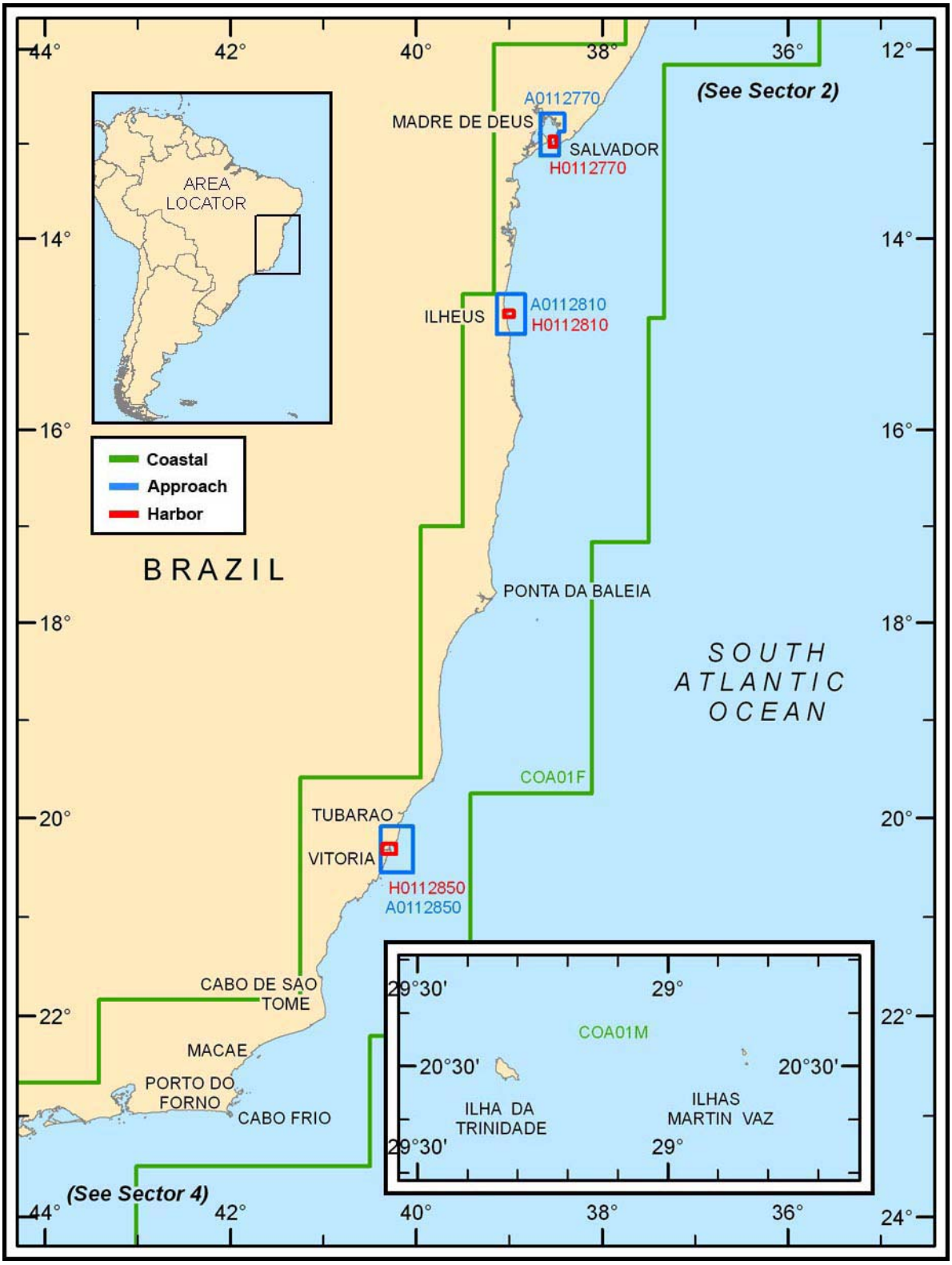
Ponta Itapua Light

Rio Joanes Light



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

SECTOR **3** — CHART INFORMATION



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SECTOR 3 — DNC LIBRARY INFORMATION

SECTOR 3

EAST COAST OF BRAZIL—PONTA DE SANTO ANTONIO TO CABO FRIO

Plan.—This sector describes the E coast of Brazil, from Ponta de Santo Antonio to Cabo Frio and the outlying islands of Ilha da Trindade and Ilhas Martin Vaz. Included in this sector are the ports of Salvador, Vitoria, Tubarao, Ilheus, Camamu, Seguro, and numerous river ports of lesser importance. The description is from N to S.

General Remarks

3.1 Winds—Weather.—Inside Baia de Todos os Santos, the winds are usually from the NE in the summer and from the SE in the winter. August is the month of S storms which are called Cambueiros. From April to August, winds blow from the E and SE; in September the NE winds begin, accompanied by thunderstorms. March and April are calm. Bad weather does not last very long and is usually followed by a calm or winds from the E.

The winds from the S usually subside during full moon and new moon; they sometimes blow for two or three days in succession causing the waters of the interior of the bay to surge so much that this condition lasts after the wind has ceased to blow and this usually occurs during ebb tide. Winds from the S may cause a considerable sea in the bay.

From September to March, the NE winds are sometimes strong between periods of light winds or calms. From March to September NE winds are rare; during this period, SE and SW winds prevail. They are generally stronger than the NE winds. The arrival of the SW winds, which are not the strongest, is indicated by a calm that follows rather strong NE winds; the shorter the period of calm the greater the intensity of the SW winds. From March to September, SE and SW storms are preceded by a sharp rise in temperature, a great calm, and a calm sea.

Winds from the NE or N cause hazy condition with resultant reduced visibility.

Ponta de Santo Antonio to Ponta Corumbau

3.2 Ponta de Santo Antonio (13°01'S., 38°32'W.) is the SW point of the mainland coast which lies on the E side of the entrance of the Port of Salvador and Baia de Todos os Santos.

In the vicinity of the point, the land, covered with trees, is higher than that to the W and is visible for about 30 miles. A light is shown from the old fort of Santo Antonio da Barra, which stands on the extremity of Ponta de Santo Antonio.

Numerous tall buildings stand near the lighthouse making it difficult to discern. Two conspicuous television masts are situated about 2 miles ENE of Ponta de Santo Antonio.

Banco de San Antonio, with depths of less than 11m, lies about 0.3 mile S of Ponta de Santo Antonio and extends 4.5 miles S. It is composed of red sand and coral and is steep-to

The sea sometimes breaks on the bank during S winds. The shoal has a minimum depth of 2.8m.

Fort of Santo Antonio da Barra

Due to its narrowness and the strong currents through it, the channel N of the bank should only be used with local knowledge.

A wreck lies on the W side of the shoal about 2.7 miles S of the light.

Other dangerous wrecks lie about 2.7 miles SE and 0.2 mile WNW of the same light.

Ponta de Santa Maria, on which there is an old fort, lies 0.4 mile N of Ponta de Santo Antonio.

Pedra de Gamboa, a rock with a depth of less than 3m, lies on the W edge of Banco da Gamboa, 1.75 miles NNE of Ponto de Santo Antonio. Pedra Tira Pomba, a rocky ledge with a least depth of 0.7m, lies 0.2 mile SW of the S breakwater in the harbor of Salvador.

Salvador (12°58'S., 38°31'W.)

World Port Index No. 12770

3.3 The port of Salvador, on the E side of and just within the entrance of the Baia de Todos os Santos, is located about 3 miles NNE of Ponta de Santo Antonio. Salvador is the fourth largest city in Brazil.

The port is limited by the E-W line which passes through the Santo Antonio Light, bridging the coast of the island of Itaparica, and from there turning to enter the bay through the same E-W line which connects the mainland and that towards the coast N as far as the parallel of 12°50'S, and then from there going E towards the mainland.

Winds—Weather.—Winds are usually from the NE in the summer and from the SE in the winter. August is the month of storms from the S, which are called Cambueiros.

Salvador Harbor

Salvador Terminal

Bad weather generally lasts only a few hours and is followed by a calm or winds from the E. Winds from the S may cause a considerable sea in Baia de Todos os Santos.

Tides—Currents.—The MHW interval is 2 hours 54 minutes. The spring range was 2.2m and the neap range was 0.9m.

The flood current runs about 5 hours to the NNE; the ebb current runs 7 hours to the SSW.

The velocity of the tidal currents is about 1.5 knots, increasing to between 2 and 3 knots during spring tides.

Tidal currents in the anchorage N of Banco da Panela run NNE and SSW; their rate, especially that of the SSW current, is considerable.

To the W of Banco da Panela, the ebb current is reported to attain rates of 3 to 4 knots.

Depths—Limitations.—Banco da Panela, a rocky bank with a least depth of 4.4m, lies W of the S entrance to the harbor, about 2.5 miles N of Ponta de Santo Antonio. Its position can best be seen on the chart. This bank is about 1 mile long and between 0.25 and 0.5 mile wide. The shallower part of the bank has extended W.

Between the shoal and the S breakwater, 0.6 mile E, there is a channel with a least depth of 7.9m.

A detached shoal, with a depth of 9.1m, lies 0.3 mile NNW of the head of the S breakwater.

Entrance to the inner harbor can be made to the N or S of the detached N breakwater. The N entrance is used mainly by large vessels. There are least depths of 11 and 8.1m in the N and S entrances, respectively.

If the vessel's draft is over 8.5m the N entrance shall be used, with berthing and unberthing take place 1 hour before HW until 1 hour after HW. The anchor is used for berthing. Cargo and container vessels berth at anytime.

The main berthing area for ships is the quays bordering the E side of the harbor. The quays have a total length of 2,073m.

Vessels with a draft of up to 10m can be accommodated along 1,086m of quayage.

The tanker quays, at the N end of the harbor, have been converted to handle containers. They can accommodate vessels up to 210m in length and 10m draft.

An L-shaped breakwater is SW of the inner part of the main breakwater.

Aspect.—The harbor is protected from the SW by a breakwater which extends 0.5 mile NNW from the coast, 2.5 miles NNE of Ponta de Santo Antonio. A cylindrical fort is situated within this breakwater, 0.2 mile SE of its head.

A detached breakwater lies with its SW end 0.25 mile ENE of the head of the S breakwater and extends 0.7 mile NE.

One of the most prominent landmarks in the vicinity of the entrance is a tower, 70m high, situated on a hill on the S end of Ilha de Itaparica.

To the N of the harbor are many cottages with red roofs. A fort stands on Ponta de Monte Serrat.

The conspicuous white church of Nosso Senhor do Bonfim, with a large tower at either corner of a southwest-facing facade, is situated about 0.7 mile ENE of Ponta de Monte Serrat.

Gas being burned at a refinery at **Mataripe** (12°42'S., 38°35'W.), 13.5 miles NNE of Ponta de Monte Serrat, shows up well at night.

A white square elevator, with an iron roof, stands abreast of the S end of the inner harbor.

The customshouse, close N of the elevator, is a conspicuous white building with a red roof and circular open front supported on pillars.

Pilotage.—Pilotage is compulsory for all foreign vessels and is available day and night. Pilots board the vessel from a launch

SW of Banco da Panela. Advance notice should be given 48 hours and 24 hours prior to arrival.

Contact Information.—Salvador pilots can be contacted, as follows:

1. VHF: VHF channels 10, 11, and 16
2. Telephone: 55-71-3241-8984
   55-71-3264-2929
   55-71-3241-8891
3. Facsimile: 55-71-3241-5901
4. E-mail: diretoria@salvadorpilots.com.br

Salvador port can be contacted, as follows:

1. Telephone: 55-71-3320-1100
2. Facsimile: 55-71-3242-1703
3. E-mail: portosalvador@codeba.com.br

Anchorage.—Vessels anchor in one of three areas, as follows:

1. Anchorage No. 1 in 12°56.1'S, 38°32.0'W for vessels with drafts less than 10m, refueling, or transferring crew.
2. Anchorage No. 2 in 12°57.3'S, 38°32.6'W for vessels with drafts less than 10m.
3. Anchorage No. 3 in 12°57.4'S, 38°34.1'W for vessels with drafts greater than 10m.

Care should be taken not to obstruct the passage of vessels transiting the N entrance to the harbor.

Vessels proceeding to ports in the N part of the bay can anchor about 0.6 mile SW of Ponta de Monte Serrat, in depths of 23 to 25m, mud.

Anchoring is prohibited in a area about 0.4 mile NNE of the N head of the detached breakwater.

Baia de Todas os Santos

3.4 Baie de Todas os Santos is entered between Ponta de Santo Antonio and the E coast of Ilha de Itaparica, 5 miles to the WNW. The main channel leading to the entrance of the bay lies W of Banco de Santo Antonio. The channel at the entrance is about 2.5 miles wide between Ponta de Santo Antonio and Pedra do Baixo Grande. The N part of the bay is known as Reconcavo and contains a number of islands, rivers, and good anchorages.

Caution should be exercised at night and during poor visibility when navigating the bay N of Salvador as there are oil drilling structures in the area.

The structures show flashing lights, but disused structures are unmarked and at times submerged. They are temporary structures that are not charted. Submarine cables and pipelines are seen on the chart.

Depths in the bay are irregular and reach 60m about 3 miles E of Ponta de Itaparica. Charted depths in the middle of the bay approaches to the entrance of the marked channels which lead to Baia de Aratu and Porto de Madras de Deus, range from 14.6 to 35m, with depths of 50m and 53m lying about 2.7 miles W of Ponta de Monte Serrat.

Ponta da Sapoca (12°50'S., 38°29'W.) lies 6.5 miles NNE of Ponta de Monte Serrat. A pier supporting a conveyor system extends 0.5 mile W from the point. At the head of the pier is Terminal da Usiba, comprising a wharf 70m long with flanking dolphins and five mooring buoys. One ship up to 170m in length, 25m in width, and with a draft up to 10m can berth at the terminal. A smaller pier, with a light at its head, extends SW from the shore 0.3 mile S of Ponta de Sapoca.

A detached island quay, marked by a light at each end, stands close N of this pier.

Pilotage is compulsory. Pilots will board at the anchorage SW of Ponta de Monte Serrat.

Baia do Aratu is entered 8.5 miles NNE of Ponta de Monte Serrat through a deep, but narrow and tortuous channel which forms the lower part of the Rio Cotegipe and is about 2 miles long. The greater part of the bay has depths of over 5m and there are depths of over about 10m in the vicinity of the entrance. There is a naval base in Baia do Aratu.

Ponta da Mangueira (12°47'S., 38°29'W.) is on the N side of the Rio Cotegipe, about 1.5 miles ENE of Ponta da Areia. A T-shaped jetty, with flanking dolphins, projects S from the point.

The jetty can accommodate ships up to 15,000 gt, with a maximum length of 170m,a maximum beam of 25m, and a maximum draft of 10.3m.

3.5 **Porto de Aratu** (12°47'S., 38°30'W.) (World Port Index No. 12772), situated N of the entrance to Baia do Aratu, consists of four jetties projecting from Ponta do Marinho and Ponta Joao Pereira, N of Ponta da Areia. The maximum size vessel that can enter the port is 100,000 dwt.

Solid Bulk Terminal 2 has two berths. The N berth is 186m long, with depths alongside of 9m. The S berth is 203m long, with depths alongside of 11m. Vessels up to 100,000 dwt can be accommodated at both berths.

Solid Bulk Terminal 1 has a single berth, 210m long, with an alongside depth of 7m, and can accommodate vessels up to 100,000 dwt.

Liquid Bulk Terminal has two berths. The N berth is 100m long, with alongside depths of 10.9m; the S berth is 70m long, with alongside depths of 11m. The N berth can accommodate vessels up to 40,000 dwt.

Gas Products Terminal consists of a pier for handling of liquefied gas and has one mooring berth. The berth is 70m long, with a depth of 10.9m alongside.

Porto de Aratu

Pilotage is compulsory for Porto de Aratu and Baia do Aratu. Pilots are requested at least 5 hours in advance, specifying the time of the vessel's entry. Pilots will board at the anchorage

SW of Ponta de Monte Serrat (12°56'S., 38°31'W.). Pilotage is provided from Salvador.

The channel leading from S to the entrance to Baia do Aratu, Porto de Aratu, and the fairway of the Rio Cotegipe are marked by lighted buoys. The channel is about 0.3 mile long, 0.1 mile wide, and has a minimum depth of 18m. The maneuvering basin has a depth of 12m. A light is shown from Ponta de Areia, the S entrance point of Baia do Aratu.

Aratu port can be contacted, as follows:

1. Telephone: 55-71-3602-5711
2. Facsimile: 55-71-3602-5705
3. E-mail: portoaratu@codeba.com.br

3.6 **Ilha do Frade** (12°47'S., 38°38'W.) lies 7 miles W of Ponta de Areia. A light is shown from the S extremity of the island. Ilha Madre de Deus lies 0.5 mile N of Ilha do Frade.

Porto de Madre de Deus (12°45'S., 38°37'W.) (World Port Index No. 12775), located at the SW extremity of Ilha Madre de Deus and about 0.3 mile N of the N end of Ilha do Frade.

Depths—Limitations.—The port is approached through a channel marked by lighted beacons. The channel, about 0.1 mile wide at its narrowest part, has a minimum depth of 10.8m near Buoy No. 7.

The port consists of a T-shaped petroleum jetty and a J-shaped jetty extending SW from **Ponta Mirim** (12°45'S., 38°37'W.). The outer jetty can handle tankers up to 150,000 dwt. There are six berths at the two jetties, with depths alongside, as follows:

1. Berth PP1—13.0m.
2. Berth PP2—13.0m.
3. Berth PP3—10.5m.
4. Berth PP4—22.0m.
5. Berth PS1—7.8m.
6. Berth PS1—8.3m.

Vessels are berthed day or night, stemming the tidal current, which is reported to attain a rate of 4 knots. Berthing at Berth P1 is done 6 hours either side of HW.

Berthing at Berth P3 is done on the flood current. Vessels berth port side-to at Berth P1, Berth P2, Berth P4, and Berth S1 and starboard side-to at Berth P3 and Berth S2.

A jetty projects W from the coast about 0.2 mile N of Ponta Mirim and has a depth of 3.3m alongside the head.

The Bahia Regasification Terminal, accommodating LNG vessels, consists of two berths. One berth is occupied by the floating storage and regasification unit Golar Winter. The terminal is situated 2.3 miles W of the S extremity of Ilha do Frade.

Pilotage.—Pilotage is compulsory. Pilots board SW of Ponta Monte Serrat (12°56'S., 38°31'W.). Pilotage is provided from Salvador.

Regulations.—The following regulations were issued by the Brazilian Port Authority for the approach to Porto de Madre de Deus:

1. Vessels must not meet and pass nor overtake while in the approach channel areas between Beacon Nos. 1, 2, 5, and 6, and between Beacon Nos. 11, 13, 14, and 16.
2. Inbound vessels shall yield to outbound vessels.
3. Anchoring is prohibited, except in an emergency, within the vicinity of the oil terminal.

Caution.—The existence of unlighted buoyage markers within the approaches indicates the position of underwater pipelines.

Bahia Regasification Terminal (12°49'S., 38°41'W.) is located 2.3 miles W of the S extremity of Ilha do Frade. The terminal, accommodating LNG vessels, consists of two berths. One berth is permanently occupied by the floating storage and regasification unit Golar Winter.

3.7 The **Rio Paraguacu** (12°50'S., 38°48'W.), which enters the bay 9 miles W of the S end of Ilha do Frade, is navigable from its mouth for about 22 miles to the town of Cachoeira, located in the W part of Reconcavo. Sao Rogue do Paraguacu, from which ore is shipped, and Maragogipe, with a pier where ships with drafts up to 4.5m can berth, are ports located on the Rio Paraguacu below Cachoeira.

Canal de Itaparica, which separates Ilha de Itaparica from the mainland to the W, is entered between **Ponta Itaparica** (12°53'S., 38°41'W.) and Ilha do Medo, 1.75 miles NW. This channel should not be attempted without local knowledge.

A prohibited area exists close N and W of Ponta Itaparica and a restricted area, in which anchoring and fishing are not permitted and vessels should not navigate without authority, extends about 0.5 mile offshore for a distance of 2 miles S from the point.

The Rio Jaguaribe flows into the W side of Canal de Itaparica close to its S end and has depths of 3.5m up to 22 miles above its mouth.

3.8 Between Ponta Garcia, the S entrance point of Canal de Itaparica, and the W entrance point of the Rio Una, 6 miles SW, the coast forms a low sandy bay which is fringed by shoals to a distance of 2 to 3 miles.

Morro de Sao Paulo (13°22'S., 38°55'W.), the N extremity of Ilha de Tinhare, marks the SE side of the entrance of the Rio Una. It is a conspicuous mount, which falls abruptly onto the sea, on the N and W sides. When seen from a distance it shows two peaks; the S peak has a hillside with a smooth descending slope and the N peak hillsides have a more pronounced descending slope. Next to the N side, there is a masonry tower from which a light is shown. It is the most visible bearing for the mariner coming from the S.

Anchorage.—The mouth of the Rio Una, W of Morre de Sao Paulo, affords easy access to an anchorage known as Portalo which provides shelter from E through SW winds.

Anchorage may be obtained, in 6 to 8m, in front of a village about 0.5 mile SW of the light.

3.9 The **Rio Una** (13°23'S., 38°56'W.) empties W of Morre de Sao Paulo.

Banco Joao Goncalves, in the W part of the river mouth, restricts the width of the entrance over the bar and anchorage to about 0.7 mile. The sea breaks over this extensive sand bank and the S part is partially dry.

The E side of the channel just within Morre de Sao Paulo is steep-to, but 0.5 mile S a bank begins and borders the S shore to a distance of about 0.1 to 0.2 mile. In the SW part of the river mouth the channel trends to the N and is about 0.5 mile wide between the bank and the low W point of the mainland. The minimum depth in the channel is about 10m.

Morre de Sao Paulo Light

Ilha de Tinhare (13°29'S., 38°58'W.) and Ilha de Boipeba form the coast for about 18 miles S of Monte de Sao Paulo. Channels and rivers separate the islands from each other and from the mainland. Small craft navigate these waters.

Ponta de Castelhanos, the SE extremity of Ilha de Boipeba, is fringed with reefs and rocks, which extend out 1 mile from the point. A wreck, partially submerged, lies stranded about 1 mile NE of Ponta Castelhanos.

Ilha Quiepe (13°50'S., 38°56'W.), a small reef-fringed island about 0.25 mile in extent, lies on the N side of the entrance of Porto de Camamu. The island is flat, covered by coconut trees, and can be seen as far as 13 miles away, making it an excellent bearing for navigation. Two houses are located on the N side of the island.

3.10 Porto de Camamu (13°52'S., 38°56'W.) (World Port Index No. 12780) is the common mouth of the Rio Camamu and the Rio Marau. The port lies between Ilha Quiepe and Ponta Muta, about 2.5 miles S of Ilha Quiepe. The port is privately owned and is used exclusively to export barium ore.

Winds—Weather.—Prevailing winds are NE from September through February, S from March to August, and E during August.

Tides—Currents.—Tidal heights above chart datum are 2.1m at MHWS and 1.6m at MHWN. The spring range is 2m and the neap range in 1m.

The ebb current, increased by the waters from the rivers which flow into the bay, is much stronger than the flood. The average velocity of the ebb is 1.5 to 2 knots and it sets toward Ilha Quiepe and the reefs in the vicinity of the island.

Current velocities of up to 5 knots at ebb and 3 knots at flood have been recorded.

Depths—Limitations.—There is a least charted depth of 9.1m in the recommended approach about 2.2 miles ESE of Ilha Quiepe Light.

A least depth of 7.6m is charted in the approach to the buoyed channel entrance. Least depth in the buoyed channel is charted at 7.2m. It was reported the maximum safe draft for entering the port was 8.5m.

The ore berth is located on the E side of Ilha Grande de Camamu. It consists of a T-headed pier with a face about 80m in length. There is a least depth of 5m alongside the face.

Mooring buoys are situated N and S of the pier. Vessels moor starboard side-to the pier head.

Pilotage.—Pilotage is compulsory. Pilots for the port of Camamu are available at Salvador.

Anchorage.—Vessels anchor, in 15m, sandy bottom, about 0.7 mile W of Ponta Muta.

This anchorage lies between Pedras Paragonas de Baixo and Pedras Guaraiubas. Vessels may also anchor, in 12.8 to 14.6m, about 0.2 mile NW of Ponta do Gaviao, located nearly 3 miles SW of Ponta Muta.

3.11 From Ponta Muta to the Port of Ilheus, a distance of about 55 miles, the coastline trends almost due S and is free of dangers. The N end of this stretch of coast is low and sandy, with some patches of palm trees. The S end is high in places with bluff points and sheer cliffs.

Cabo Tromba Grande (14°16'S., 38°59'W.) is a conspicuous cliff of black rocks and is located about 25 miles S of Ponta Muta. The prominent summits of Serra Grande lie to the SSW of the cape.

Ponta Trombinha, about 1 mile N of Cabo Tromba Grande, is equally bold but less elevated than the cape. The point marks the N side of the entrance of the Rio das Contas.

Sand banks lie on the N side of the entrance to the river. Contas Islet lies close N of Ponta Trombinha and shows a light.

The **Rio das Contas** (14°16'S., 39°00'W.), which is about 250 miles long, has depths of 2m and an average width of about 137m as far as Cachoeira do Funil, about 12 miles from its mouth. The currents in the river are rapid, especially after heavy rains.

Within the entrance, the S bank is high and wooded. Cidade de Contas stands on the S bank 1 mile SW of Ponta Trombinha. In the river mouth, the ebb current attains a rate of from 3 to 4 knots.

When the sea is calm there is little difficulty in entering the Rio das Contas, but fresh onshore winds cause breakers across the mouth of the river during the ebb tide.

Anchorage is afforded near the entrance of the river, in 14 to 17m, with Cabo Trombe Grande bearing 185°, distance 2 miles.

3.12 Ponta da Serra Grande (14°28'S., 39°01'W.) is the E extremity of the Serra Grande, a chain of mountain ranges which rises to the W of the point. From offshore, the mountains appear as cliffs running in a N and S direction for a distance of 10 miles. Depths of 20m lie about 1 mile off the point.

From Ponta de Serra Grande, the low sandy shore continues S for about 18 miles to the mouth of the Rio Almada. High land backs the greater part of this section of the coast. A wide valley lies between the Serra Grande and the hills to the S, which rise to the N of the Rio Cachoeira, the river which empties into the sea at Ilheus.

The village of Itaipe lies on the N side of the mouth of the Rio Almada. Sand banks, about 0.2 mile offshore, encumber the entrance of the river.

Ilheus (Malhado) (14°47'S., 39°01'W.)

World Port Index No. 12810

3.13 The port of Ilheus consists of Porto do Malhado, a breakwater with berthing on its W side and projecting NE and N from Ponta do Malhado, and Porto do Rio Cachoeira, the original port of Ilheus, on the N bank of the river, 0.5 mile within its mouth and used only by fishing boats.

Port of Ilheus
http://www.codeba.com.br/portoilheus.php

Winds—Weather.—The prevailing winds are reported to be from the SE.

Tides—Currents.—Tidal heights above chart datum are MHWS 1.9m, MHWN 1.4m. The spring range is 1.7m and the mean range is 1.4m.

Velocities of the tidal currents are about 1 knot during the flood and 2 knots during the ebb.

Depths—Limitations.—The artificial basin is formed by a breakwater 1,922m long. The first leg, aligned NE to SW, is 650m long, followed by a curved section that is 162m long, leading to the last section, aligned N to S, 1,110m long.

It was reported that the breakwater was being extended, with underwater work in progress for about 365m N from its head.

The maneuvering basin is 560m wide, with a depth of about 10m. The approach channel is 1,000m long with a depth of about 10m.

The docking facilities consist of a quay 432m long, dredged to a depth of 9m, situated along the W side of the breakwater.

A 70m long wooden T-shaped pier, with a depth of 7m alongside and used to transfer liquefied petroleum gas, lies at the root of the breakwater.

Porto do Rio Cachoeira consists of six piers which extend from the N bank of the river W of the N end of Morro de Sao Sebastiao. All have depths of at least 4.1m alongside.

Aspect.—Morro de Sao Sebastiao, a high hill, forms the W entrance point to the Rio Cachoeira. A monument stands on its S extremity known as Ponta Maria Augusta. A church, with a conspicuous dome and towers, stands 0.4 mile N of Ponta Maria Augusta. A prominent church, painted gray, stands on a hill, 0.35 mile farther N.

Morro Pernambuco, a peninsula 30m high and covered with vegetation, forms the E entrance point of the Rio Cachoeira. A ruined fort and cross stand near the NW extremity of the peninsula. A light is shown from the summit of Morro Pernambuco.

Lights are shown from the breakwater head at Malhado and from Ilheu Grande.

Pilotage.—Pilotage is compulsory for the following vessels:

1. All foreign vessels.
2. Tankers.
3. Vessels carrying dangerous cargo.

Aerial view of Ilheus

Ilheus

The pilot must be requested, via the agent, 4 hours in advance. Pilots board in position 14°45'S, 39°01'W for the Malhado Pier and about 0.6 mile NNE of Morra Pernambuca for the piers in the Rio Cachoeira.

Contact Information.—Ilheus pilots can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-73-3634-4455
3. Facsimile: 55-73-3634-4478
4. E-mail: ilheusmarine@maxnet.com.br

Ilheus port can be contacted, as follows:

1. Telephone: 55-73-3231-1200
2. Facsimile: 55-73-3231-3318
3. E-mail: codebil@codeba.com.br

Anchorage.—Vessels awaiting a pilot for Porto de Malhado should anchor 0.2 to 0.3 mile NNE of the breakwater head, in depths of 10 to 12m, sand.

Vessels working cargo into lighters may anchor W of the breakwater in depths of more than 8m where the sea is usually calm. Vessels waiting to berth at the piers at Porto do Rio Cachoeiro may anchor temporarily in the river off the piers, sheltered from all winds, in depths of 6 to 8m, mud.

Anchorage is forbidden along the 100m stretch of the wharf and in the access channel.

A quarantine anchorage has been established 1 mile NNE of the breakwater head.

Caution.—Less water than charted was reported within the 10m depth contour in the approaches to and in the maneuvering basin at Ilheus.

The area at the head of the harbor, SE of the small breakwater, is being reclaimed.

A chain of islets and reefs, nearly 2 miles long, parallels the coast at a distance of 1 to 2 miles. Ilheu Grande is the largest and northernmost of the group. The island is always exposed and equipped with a light. It lies about 1.2 miles NE of Ponto do Malhado and is visible about 15 miles.

Ilheuzinho, a group of uncovered rocks, lies about 137m SE of Ilheu Grande. Itaipins Reef, part of which uncovers, lies 0.75 mile SSE of Ilheu Grande. Ilhote de Itapitanga lies nearly 1.25 miles S of Ilheu Grande. Parcel dos Sororocas extends about 0.6 mile SSE from Ilhote de Itapitanga. The reef never uncovers, but breaks with a small sea.

Laje do Rapa, a group of three rocks which uncover at LW and on which the sea always breaks, lies nearly 0.5 mile N of Morro Pernambuco. Coroa do Rapa, a drying sand bank marked by breakers, extends to the E from the beach to the vicinity of Laje do Rapa.

Vessels are cautioned not to use the channel between Recifes Itaipios and the N extremity of the foul ground extending N from Ilhote de Itapitanga.

Ilheus to Belmonte

3.14 The coast from Ilheus to Belmonte, 65 miles S, is high along the N part to Barra do Una, then S it continues low to Barra de Belmonte.

The coast is backed by mountain ranges, which rise from 15 to 18 miles inland and are normally visible up to 30 miles offshore. The highest range is Serra Panemosa, 620m high, and fairly isolated from the outer mountains. It has an undulating summit and is easily identified as the best landmark near this part of the coast.

The coast is clear of dangers except for some coral reefs which extend 1 mile offshore in places along its N part.

Olivenca (14°58'S., 39°01'W.), a small village about 10 miles S of Ilheus, is situated on the summit of a hill near the shore. The village and a church are conspicuous from offshore.

Ponta Itapua (14°59'S., 38°59'W.), a low salient point covered with trees, is located about 3 miles SSE of Olivenca.

The mouth of the Rio Aquipe lies about 6 miles S of the point. Conspicuous white cliffs stand on the S bank of the river and are visible from offshore.

The **Rio Una** (15°15'S., 39°00'W.) lies about 11 miles S of the mouth of the Rio Aquipe. The village of Pedras stands about 2 miles SSW of the mouth of the river on its W bank. About 3 miles S of the Rio Una, the Rio Doce empties into the sea.

A submerged obstruction, with a depth of 27m, lies about 8.5 miles SE of the mouth of the Rio Una.

3.15 Barra das Canavieiras (15°43'S., 38°54'W.) lies at the entrance of the common mouth of several rivers, the most important of which is the Rio Pardo.

The town of Canavieiras is situated on the N bank of the Rio Pardo, about 3 miles within the entrance.

The land in the vicinity of the bar is very low, but a white church tower in the town provides a landmark from offshore.

The town has four piers with depths of 3.1m at the pier heads.

Pilotage is available. The bar should only be approached when using the services of a pilot.

Anchorage is afforded, in 10 to 11.9m, mud, about 4 miles ESE of the church tower.

3.16 The coast SSE of Barra das Canavieiras to Belmonte, a distance of about 9 miles, is low, wooded, and broken by the entrances of a lagoon. Small villages mark this section of the coast. With the exception of the Morros de Comandatuba, visible to the NW, the country is void of high land, being flat and marshy.

Barra de Belmonte (15°50'S., 38°52'W.), 8 miles SSE of Barra de Canavieiras, is the mouth of the Rio Belmonte (Jequitinhonha), which runs a course of about 300 miles. The only means of identifying the river entrance is Belmonte Light, on the S side of the river.

The bar should only be approached with local knowledge or with local available pilots. On the spring tides the depth of the access channel is about 2m. The sand banks close to the bar vary in position at times.

After prolonged rains, which usually occur from November to March, the outflow of the river is considerably increased, causing strong currents over the bar. During these periods, discolored water can be seen up to 10 miles offshore.

Belmonte (15°51'S., 38°53'W.) is located on the S bank of the Rio Belmonte a little more than 1 mile from the bar. A light stands on the S bank of the bar. It is not visible from offshore because it is surrounded by dense and close coconut groves.

There is a wharf, 450m long, with depths of from 3.6 to 5m alongside.

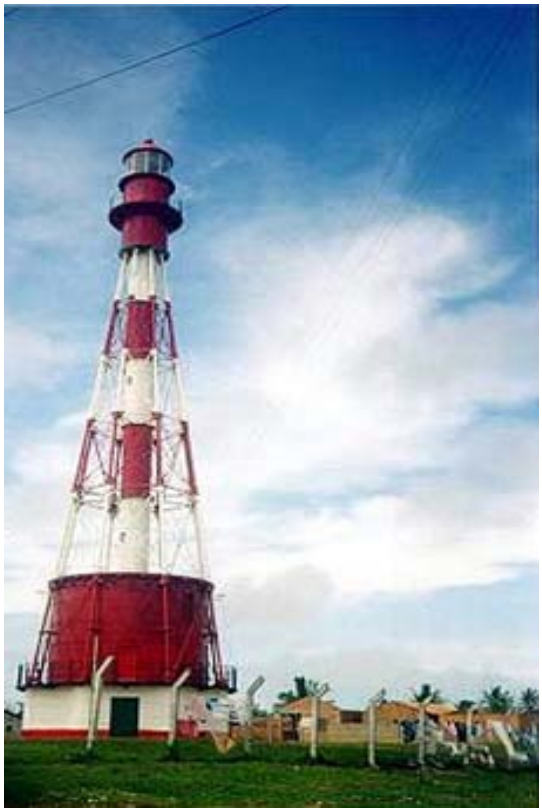
Anchorage may be obtained outside the reef and shoals, in 10m, mud, with Belmonte Light bearing 245°, distance 4 miles.

After crossing the bar, anchorage may be had in the deeper water inside the chain of shoals, but local knowledge is essential.

Belmonte to Porto Seguro

3.17 From the mouth of the Rio Belmonte, the coast continues in a S direction to Porto Seguro, a distance of 36 miles.

This part of the coast is rather low with some small hills inland a few miles from the coastline.



Belmonte Light

Morro Dois Irmaos, a mountain with twin peaks, rises about 20 miles inland and can be seen in clear weather.

Ponta Araripe (16°10'S., 38°57'W.), marked by a light, lies 18 miles S of Barra de Belmonte. Recife de Arajipe is a drying reef which extends up to 3.5 miles E of the point.

Ponta San Antonio, the S entrance point of the Rio San Antonio, lies 3 miles SSW of Ponta Arajipe.

A dangerous underwater rock lies about 15 miles ESE of Ponta San Antonio.

Baio de Cabralia is entered between Ponta de Santo Antonio and Ponta de Coroa Vermelha, 7.5 miles SSW.

The shore of the bay is of moderate height and is backed by wooded hills, 30 to 35m high. The valley of the Rio Joao de Tiba, the mouth of which lies 4.5 miles SW of Ponta de Santo Antonio, is very prominent from seaward. The town of Santa Cruz, with its prominent church, stands on the S side of the river.

The sandy beach forming the shore of Baia de Cabralia is interrupted by two lines of reefs, separated by a small gap, extending 2 miles NNE from the mouth of the Rio Joao de Tiba.

These reefs dry and form a natural breakwater. A number of reefs and rocks lie to the SSE of Baia de Cabralia and can best be located by the chart.

Anchorage is afforded in the N part of Baia Cabralia, 0.5 mile ESE of the N end of the two lines of reefs extending from the mouth of the Rio Joao de Tiba.

The anchorage has depths of 7m, mud, good holding ground.

Vessels may also anchor in the S part of the bay, 0.7 mile N of Ponta da Coroa Vermelha, in depths of about 7m, fine sand and mud. Small craft can anchor closer inshore towards the point.

A vessel should anchor in the N part of the bay during winds from between N and E, and in the S part during SE winds. The sea is never heavy in either part of the bay, even during SE winds.

3.18 The **Rio Joao de Tiba** (16°17'S., 39°02'W.) can be reached by small craft with local knowledge via a channel about 91m wide, on the W side of the two lines of reefs extending NNE from its mouth. Pedra Baixnha, a rock with a depth of 1m, lies off the entrance to this channel, 0.2 mile NE of the end of the reefs.

Ponta Grande (16°22'S., 39°01'W.) is located 2.5 miles S of Ponta da Coroa Vermelha. The point is low and inconspicuous and marks the N end of Baia de Porto Seguro.

Between the two points, extensive reefs and rocks border the low shore. A shoal, with a depth of 8.5m, lies 2.5 miles E of Ponta Grande.

Baia de Porto Seguro (16°26'S., 39°03'W.) lies between Ponta Grande and the mouth of the Rio Buranhem, about 5.7 miles to the SW. A ridge of hills, with red cliffs and coconut palms, lies parallel with the coast about 1 mile inland and is broken by the marshy valley of the Rio Buranhem.

The valley and the church of Nossa Senhora da Pena, which stands on the N side of the river, are reported as conspicuous landmarks. Porto Seguro Light stands close NE of the church.

Recifes de Fora, nearly 3 miles long and about 1.5 miles wide, lies with its outer edge about 6 miles ENE of Porto Seguro Light. For about 2 miles of its length this coral reef uncovers and the sea always breaks over it. Several shoal patches, with depths of 6.2 to 8.1m, lie within 2.5 miles S and SSW of Recifes de Fora.

The Rio Buranhem can be entered through a channel 0.1 mile wide and a depth of 3.6m at HWS. The channel lies between the N extremity of the chain of reefs and the coast.

Pilotage is available and vessels are boarded on the outside of the bar. Their services should be requested by wire prior to arrival.

A dangerous wreck, with its superstructure visible, is situated about 5 miles SE of Porto Seguro Light.

Anchorage is afforded, in depths from 8 to 9m, sand and mud, good holding ground, in a position about 1 mile ESE of the church of Nossa Senhora da Pena. The anchorage is unsheltered from NE to SE winds.

Vessels also anchor farther offshore, in depths of about 10 to 11.9m, about 2 miles ESE of Porto Seguro Light.

Porto Seguro (16°27'S., 39°04'W.) (World Port Index No. 12820) is situated on the N bank of the Rio Buranhem, just within the rivers entrance. That part of town which stands on low ground is hidden by coconut palms, the higher part of town is visible from offshore. The port is used mostly by coastal steamers.

Porto Seguro to Porto de Caravelas

3.19 From the mouth of the Rio Buranhem to Ponta Itaquena, 11 miles to the S, the coast has no salient features. A

short distance S of the river mouth, hills rise from the coast. One mile S of the river mouth, the church of Nossa Senhora da Ajuda stands on one of the hills and is conspicuous from seaward.

Barreiras Vermelhas de Porto Seguro (16°30'S., 39°04'W.), a line of red cliffs, 3.5 miles S of Porto Seguro, rise sheer from the sea to heights of 40 to 50m on the S side of the mouth of the Rio Taipe. They extend 3 miles S and are interrupted near the middle by the Rio Pitinga and can be seen from 25 to 30 miles offshore.

Red cliffs reappear 1.5 miles S of Barreiras de Porto Seguro, but they are lower and less prominent and decrease in height near Ponta Itaquena. The village of Trancoso stands between the two sets of cliffs.

Ponta Juacema (16°45'S., 39°08'W.), 10 miles SSW of Trancoso, rises in white cliffs, which appear as steps on the S slope of a hill.

Ponta Juricuara, about 2 miles farther S, is red in color. Recife Juacema, with a depth of 1m, sand and coral, lies 0.5 mile S of Ponta Juacema.

Recifes de Pitiacu, with depths of less than 0.6m, lie 1 to 2 miles ESE of Ponta Juricuara. There are depths of from 7 to 8m between these reefs and the coast.

The channel between Recifes Pitiacu and Recife Juacema is about 0.7 mile wide and has depths of 6.4m.

Anchorage may be obtained close N of Ponta Itaquena, in a depth of 10m, good holding ground, but should not be attempted without local knowledge as there are reefs close off the point.

The area W of Recife Juacema and Recifes Pitiacu is clear of dangers and affords good anchorage to small vessels. It is well sheltered from all winds and access is easy.

Temporary anchorage may be taken in good weather, about 0.7 mile SE of Ponta Juacema, in depths of from 9 to 10m, mud, with good holding ground.

During fresh winds a vessel should anchor W of Recifes Pitiacu, passing either N or S of these reefs.

3.20 Ponta de Corumbau (16°52'S., 39°07'W.) is low and sandy, and covers to a great extent at HW. A light is shown from the point.

To the N of the point the coast is low and covered with vegetation as far as Barra do Graminua, 4.5 miles NW. Reefs and shoals extend 2 miles from N of the point.

Monte Pascoal (16°53'S., 39°24'W.), which is prominent, rises to an elevation of 535m nearly 18 miles W of Ponta Corumbau, and forms part of a range trending parallel with the coast. When seen from NE or E, it appears isolated with a rounded and somewhat conical summit, but from SE it appears to be joined to other hills.

To the SW of Monte Pascoal there is Joao do Leao peak, with a greater altitude and more outstanding because of its cylindrical formation.

Recifes Itacolomis (16°54'S., 39°04'W.) are a group of reefs lying on a extensive sandy shoal which extends nearly 6 miles E from Ponta Corumbau. The reefs dry near the center of the shoal. The shoal is steep-to on the seaward side, rising abruptly from depths of over 20m, and soundings give little indication of its proximity.

Passing vessels are advised to keep in depths of over 30m which will give the shoal a berth of at least 6 miles.

Canal dos Itacolomis, between Recifes Itacolomis and Ponta Corumbau, is narrow and tortuous with depths of from 5 to 7m. The most favorable time for passing through it is at LW when the reefs uncover, but it should not be attempted without local knowledge.

Anchorage may be obtained by vessels with local knowledge between the S part of Recifes Itacolomis and the coast SW of Ponta Corumbau, in a depth of 9m, sand and mud.

This anchorage is sheltered from all winds except from the S, and the holding ground is good.

3.21 Ponta Mato Grosso (16°57'S., 39°10'W.), nearly 5 miles SW of Ponta Corumbau, may be identified by its conspicuous high red cliffs. Barreira do Cai, 3.5 miles S of Ponta Mato Grosso, is a high extensive whitish cliff and makes a good landmark for Canal dos Itacolomis.

Barreiras de Taua, 2.5 miles S of Barreira do Cai, are smaller than the latter and reddish in color. The village of Cumuraxatiba is a small settlement. A white church and the chimney of a factory can be seen from the sea.

A chain of detached reefs extends S from Ponta Corumbau for 8.5 miles and lie up to three miles offshore. Several of these reefs dry, including Recifes Patachos, the southernmost of the chain. A shoal, with a depth of 7.3m, lies 11 miles SE of Ponta Corumbau.

Numerous shoals, with depths of less than 20m, lie up to 35 miles offshore between Ponta Cumuruxatiba and Ponta Guaratibas, 20 miles S. Vessels on passage off this coast are advised to keep in depths of over 30m.

Pilotage is available and vessels are boarded outside the reefs. There is a small pier used by coastal vessels.

Anchorage may be obtained by small vessels with local knowledge in a cove on the N side of Ponta Cumuruxatiba, with the chain of reefs off the point. It offers good shelter even during fresh NE winds. The cove is entered through a break in the reefs with a depth of about 15m. The anchorage in its N part has a depth of about 5m, and from about 2.5 to 3m in is S part.

A beacon stands close within the edge of the reef on the N side of the entrance. Some of the shoals in the S part of the cove are marked by wooded perches.

3.22 Barra do Prado (17°22'S., 39°13'W.) lies about 16 miles S of Ponta Cumuraxatiba at the mouth of the Rio Jucurucu. The bar has a dangerous approach even in good weather. Small boats navigate the river for a distance of 18 miles above its mouth. The town of Prado stands near the coast within the entrance to the river.

Anchorage may be taken with the town of Prado bearing 234°, distant 2.3 miles, in depths of 8 to 10m, sand and mud. This anchorage is sheltered from all winds except N, NE, or E.

Barreiras do Prado, a series of uninterrupted conspicuous red cliffs, begin 3 miles SSW of Ponta Cumuruxatiba and mark the coast for a distance of 9 miles to the S to within 2.5 miles of the town of Prado. The cliffs are the best landmarks along this stretch of the coast. A light is shown from a position on the coast about 11 miles S of Ponta Cumuraxatiba and 3 miles N of Prado.

Recifes do Prado, about 0.7 miles in extent, lie about 4 miles ESE of the church in Prado. These sand and coral dangers uncover at LW and depths of 10.9m surround the reefs about 0.5 mile off their outer edge.

From Barra do Prado to Ponta Guaratibas, 4.5 miles SSE, the coast consists of a low beach, covered with vegetation of a uniform height.

Recifes de Guaratibas (17°26'S., 39°08'W.), two drying reefs, lie on a bank with depths of less than 3m, 3.5 miles ENE of Ponta Guaratibas. A channel, with depths of over 5m, exists between the bank and the coast, but should only be used with local knowledge. Recifes das Timbibas, an extensive group of drying reefs, lies 7 to 12.5 miles ESE of Ponta Guaratibas.

From Ponta Guaratibas to Barra de Alcobaca, 8 miles to the SE, the coast is covered with vegetation and is visible about 12 miles offshore. The only landmark is the town of Alcobaca, which is fairly prominent from offshore. A light is shown 2 miles N of the church in Alcobaca.

Ponta da Baleia (17°41'S., 39°08'W.), lying 8.5 miles SSW of Barra de Alobaca, is the most salient point on this coast and is covered with vegetation. Ponta da Baleia Light is situated near the point. Caravelas Aero Light is situated 6.5 miles WNW of Ponta da Baleia.

Between Ponta da Baleia and Ponta do Catoeiro, 12.5 miles SW, the coast consists of a low beach backed by scattered coconut palms. There are two prominent groups of palms SW of the mouth of the Rio Caravelas. Ponta do Catoeiro is not easily distinguished from seaward, but shows a light.

Parcel das Paredes (17°49'S., 38°57'W.), an extensive shoal of coral and sand, parts of which are above-water, lies from 6.5 to 19 miles SE of Ponta da Baleia, its N extremity in Pedra Lixa.

The reef is an excellent fishing area, and also provides good shelter for fishing craft under the lee of its W side. The fishermen mark the dangers and channels in this vicinity with perches.

A number of other reefs are reported to surround Parcel das Paredes.

The surrounding area is dangerous for navigation due to uncharted shoals. A light is shown from Coroa Vermelha, a coral reef which uncovers at LW, 16 miles SW of Parcel das Paredes.

3.23 Porto de Caravelas (17°44'S., 39°16'W.) lies 6 miles upstream from the mouth of the Rio Caravelas. There is a concrete wharf in the port, 90m long, with a depth of 4m alongside. There are also two piers at Ponta da Areia, 2 miles E of Caravelas, both of which can accommodate vessels drawing up to 2.6m. Local fishermen are used as pilots. The port has no commercial value and is used mainly by fishermen.

Arquipelago dos Abrolhos

3.24 Arquipelago dos Abrolhos (17°58'S., 38°42'W.), a group of five islands of coral formation, lies 30 miles SE of Ponta da Baleia. The islands lie in about a 1.25 square mile area and are mostly free of vegetation.

Ilha de Santa Barbara, the largest of the group, is 0.75 mile long E and W, and about 0.1 mile wide. A lighthouse and two radio towers situated on the summit of the island make excellent landmarks. The W part of the island is the larger and a group of buildings are seen near its end. A coral reef, which dries, extends 91m NW from the W end of the island. Ilha Guarita lies 0.25 mile NNW of the E end of Ilha de Santa Barbara.

Ilha Redonda and Ilha Siriba, which are linked by a drying coral reef on which there is a narrow ridge of sand, lie W and SW of the W end of Ilha de Santa Barbara. Ilha Redonda has a small group of coconut palms on a sand spit at the SE end of the island. Ilha Siriba is high on its E end and then slopes down to a beach at its W end and is covered with palm trees.

Ilha Sueste (17°59'S., 38°42'W.), 1 mile SSW of the E end of Ilha de Santa Barbara, is about 15m high with clumps of trees near its center and is surrounded by a drying coral reef on which the sea usually breaks.

Arquipelago dos Abrolhos is surrounded by dangers and many uncharted shoals exist in its vicinity. Extreme caution must be used when navigating in this area. The only approach to these islands, which is comparatively clear of dangers, is from the SW.

Tidal currents are regular except when influenced by the force and direction of the wind with average rates of from 1 to 1.5 knots. In the channel between the islands, they follow the direction of the channel and attain a rate of 3 knots.

Anchorage may be obtained, in depths of 10 to 12m, sand and shells, with Abrolhos Light bearing about 042°, distance 0.4 mile. Vessels of light draft with local knowledge anchor N of Santa Barbara during S winds, in depths of 10 to 12m, with the light bearing about 145°, distance about 0.6 mile. This anchorage is recommended only to small craft.

3.25 Parcel dos Abrolhos (17°59'S., 38°39'W.), a series of drying coral reefs, between which there are narrow shallow channels, lies about 3 miles E of the light on Ilha de Santa Barbara.

The reefs cover about 7 miles in a N to S direction and about 3 miles E to W.

A spit, with less than 10m, extends 12 miles NNW from the N extremity of the drying reefs and numerous detached shoals with similar depths, extend up to 7 miles SE of the reefs and terminates in Recife Calafornia, a shoal with a depth of 5.9m, located 12 miles SE of Ilha de Santa Barbara Light.

A wreck lies in the middle part of Parcel dos Abrolhos. Banco Caladas, with a depth of 9.2m, lies about 15.5 miles NNE of the wreck.

The limits of Parcel dos Abrolhos are not well defined and shoals are constantly being reported outside the charted limits. Vessels should pass at least 15 miles to the E of Ilha de Santa Barbara Light.

Fishing is extensively carried on in this area. Ships passing SE of Parcel dos Abrolhos often encounter fishing fleets, which are comprised of one or two larger vessels tending numerous rowboats. At night the rowboats exhibit a torch on the near approach of other ships.

Canal dos Abrolhos separates Arquipelago dos Abrolhos and Parcel dos Abrolhos from Parcel dos Paredes. The channel is about 10 miles wide, but there are numerous dangers. It was reported that a depth of only 5.5m could be carried through it.

The channel should only be used by ships with drafts under 5m. Large ships should not navigate the channel without local knowledge.

Abrolhos Light

Off-lying Islands and Banks

3.26 The banks which extend into the S Atlantic from the E coast of Brazil, between the parallels of 16°S and 21°S, form two main groups.

The N group extends 220 miles E from the coast between Ponta Corumbau and Arquipelago dos Abrolhos, and the S group, which terminates in Ilhas Martin Vaz, extends 660 miles E from the coast in the vicinity of Baia de Espiritu Santo. Depths of over 1,000m approach the coast within 120 miles between the two groups.

3.27 North group.—Sulfer Bank lies 84 to 120 miles E of Ponta Corumbau. Two seamounts, with their surrounding shoals, rise out of depths in excess of 2,000m. Banco Minerva, with a least depth of 13m, is composed of coral tinted with sulfur. Banco Rodger, located ESE of Banco Minerva, has a least depth of 44m, although a depth of 12m, existence doubtful, has been reported on the bank.

Hotspur Bank (17°50'S., 35°55'W.) lies 160 miles E of Arquipelago dos Abrolhos and has a minimum depth of 23m.

3.28 South group—Eclaireur Bank (Sylvia Bank) (20°19'S., 37°46'W.) lies 150 miles E of **Baia de Espiritu Santo** (20°19'S., 40°16'W.) and has a minimum depth of 77m.

Depths of 38m and 37m lie 12 miles N and 20 miles SSW, respectively, of this bank. A depth of 2.4m has been reported (1994) to lie approximately 20 miles E of this bank.

Vitoria Bank is an extensive area, with depths of less than 183m, lying from 110 to 175 miles E of Baia de Espiritu Santo. It has a minimum depth of 33m located in position 20°40'S, 37°43'W; shoals, with depths of 27m and 34m, lie 26 miles WNW and 2 miles, respectively, NE of Vitoria Bank.

Congress Bank, with a least reported depth of 37m, lies 32 miles NE.

Montagu Bank, lying 200 miles E of Baia de Espiritu Santo, has a minimum depth of 58m. An isolated shoal, with a depth of 53m, was reported to lie 15 miles ENE of Montagu Bank.

Jaseur Bank has a minimum reported (1960) depth of 11m and lies in position 20°30'S, 36°10'W. An isolated bank, with a minimum depth of 30m, lies 20 miles ESE of the E extremity of Jaseur Bank.

Davis Bank, with a least charted reported (1965) depth of 20m, lies 50 miles E of Jaseur Bank.

Dogaressa Bank, with known depths of 54m and 110m, lies 60 miles ESE of Davis Bank.

3.29 Ilha da Trindade (20°30'S., 29°20'W.), about 3 miles long NW to SE and up to 2 miles wide, lies approximately 600 miles off the E coast of Brazil. The island is mountainous and of volcanic origin.

Pico Desejado, the highest, rises to a height of about 600m near the center of the island, and can be seen 40 miles away in clear weather.

The island is fringed by several reefs and rocky ledges, on which the sea breaks heavily.

These dangers extend up to 0.2 mile from the shore. There are a few beaches on which landings are possible providing the winds are favorable. Prevailing winds are E and NE

A light is occasionally shown from Ponta do Valado, about 1.25 miles SE of the NW extremity of the island.

A lighted range, at the head of Ensenada dos Portugueses, on the NE side of the island, serves as a range for the anchorage in the bay.

At the SE end of the island there is a natural tunnel which lies under the E slope of Morro do Paredao. When the sea is calm, an islet can be seen by looking through the S entrance of the tunnel.

Pico Monumento, a remarkable peak in the form of a slightly inclined cylinder, rises from the W coast of the island about 1 mile SSW of Ponta Crista de Gallo, the N extremity of the island.

Anchorage.—The usual anchorage is in Enseada dos Portugueses where a small settlement is located. Due to the many dangers to navigation, approach to the anchorage should be done only during daylight hours.

Vessels anchor on the range about 0.2 mile off the beach, in depths of 16 to 17m. Smaller vessels can anchor, in 9m, on the same range, about 0.1 mile from the beach.

Vessels can anchor, in 49m, about 0.5 mile NNE of **Ponta das Tartarugas** (20°31'S., 29°18'W.).

Enseada do Principle affords anchorage off the S side of the island, 0.2 mile W of Laje do Paredao, in a depth of 22m. Pedra do Meio, on which the sea breaks, lies near the middle of the bay and should be given a wide berth.

Anchoring, except for Brazilian naval vessels, is prohibited within the 50m depth curve around Ilha da Trindade.

Anchorage can be obtained in Enseada da Cachoeira, in 31m, about 0.5 mile SSE of Ponta da Cachoeira.

3.30 Ilhas Martin Vaz (20°30'S., 28°51'W.) consists of four small barren islands of volcanic origin lying about 26 miles E of Ilha da Trindade.

Ilha Martin Vaz, the largest of the group, is rocky and steep rising to an irregular plateau with several peaks.

The highest peak reaches an elevation of 175m and lies near the NW end of the island. The shores of the island are strewn with boulders and are usually surfbound.

Many years ago, a British party effected a landing on the W side of the island about 0.1 mile from its N extremity.

Ilha do Norte, 75m high, lies 0.2 mile NNW of the N end of Ilha Martin Vaz. A flat rock about 0.6m high lies off its S extremity and similar rocks extend S for nearly 137m.

Ilote Angulha is a flat circular rock, 60m high, lying 200m off the NW extremity of Ilha Martin Vaz. There is a sharp pinnacle at its S end.

Ilha do Sul is a rocky pinnacle, lying 1 mile S of Ilha Martin Vaz. There is a depth of 35m, 0.75 mile NW of Ilha do Sul, the bottom is rocky and visible, with depths decreasing gradually toward the island. A submerged rock has been reported to lie 1 mile SW of Ilha do Sul.

Laje Valhalla, a flat-topped submerged rock with a probable depth of less than 4m, lies about 1.7 miles W of the N extremity of Ilha Martin Vaz. Depths of 9.1m have been reported close off the rock.

Anchorage can be taken, in 53m, sand, with the S end of Ilha Martin Vaz bearing 064°, distance 1.2 miles. The bottom, which was generally sandy, was found to shelve gradually NE toward the above-mentioned bank.

Ponta do Catoeiro to the Rio Doce

3.31 From Ponta do Catoeiro to Barra de Nova Vicosa, 4.5 miles to the WSW, the coast has denser and more uniform vegetation than to the N of the point. The coast continues to have a similar aspect as far as the mouth of the Rio Mucuri, 22 miles SW of Ponta do Catoeiro.

Barra de Nova Vicosa (17°54'S., 39°21'W.), 1 mile wide, is the mouth of the Rio Peruipe, which trends N for 1.5 miles from its mouth to its junction with the channel leading to the Rio Caravelas and then turns W.

Vila de Nova Vicosa stands on the S bank of the Rio Peruipe, 3 miles above its mouth. The entrance of Nova Vicosa is subject to major changes.

Only mariners with extensive local knowledge should attempt sailing through it.

A conspicuous chimney stands in the town and is the best landmark as the coast is without any prominent features. Approaching from the S the chimney is visible off the mouth of the Rio Mucuri.

Sand banks extend 2 miles SE from the mouth of the Rio Peruipe and between them is a channel by which vessels of up to 4m draft, and with local knowledge, can enter the river at HW. Banco do Cascalho, extending from the NE entrance point, dries up to 0.75 mile offshore.

Several detached drying sand banks, the outermost of which is Coroa do Bagre, extend up to 1.5 miles ESE from the SW entrance point. A buoy marks the approach to the channel between the sand banks and is moored 2.5 miles SE of the mouth of the river. A pilot may be obtained at Caravelas.

The offshore tidal currents set N and S, with a velocity of 1.5 knots. The ebb current, which sets to the S, is slightly stronger due to the discharge of the Rio Peruipe.

Between the entrance buoy and Pontal do Sul, the ebb current sets to the W toward the dangers lying on the W side of the entrance and the flood current sets to the E toward Banco do Cascalho.

At spring tides, the velocities of the currents reach 4 to 5 knots.

Anchorage may be obtained within the river mouth, 0.75 mile N of Pontal do Sul, in depths of about 6m.

Caution is necessary when approaching and entering the river. The winds have little or no effect on the tidal currents in the entrance.

3.32 The **Rio Mucuri** (18°06'S., 39°34'W.) lies about 15.5 miles SW of Barra de Nova Vicosa. The entrance to the river can easily be identified by a group of houses comprising the village of Mucuri, which stands on the N shore of the river's mouth. A large house with a yellow roof is prominent and is visible for about 7 miles offshore.

The bar at the mouth of the river has a reported depth of about 1m. Small craft can navigate the river for a distance of 105 miles.

Anchorage is afforded 1 to 1.5 miles ESE of the bar, in depths of 5.5 to 7m, sand, good holding ground.

Barreira das Velhas, 10 to 14 miles SSW of the Rio Mucuri, are reddish cliffs about 30m high and conspicuous between the adjacent sandy shores.

Ponta Lencois is 1 mile S of the cliffs and is named because of its white cliffs which resemble a row of white houses.

3.33 The **Rio Sao Mateus** (18°37'S., 39°44'W.) is located about 17 miles SSW of Ponta Lencois. The entrance to the river can be identified when approaching from the N by an isolated group of palms which have the appearance of an islet.

When approaching from the E or S the large white sand dunes which mark the coast about 2 miles S of the river mouth aid in its identification.

These dunes are observed before the houses in the village of Corceicao da Barra, which is located on an islet on the N side of the river mouth.

Access to the mouth of the river is dangerous because of the breakers, the fronting shoal, and the rough sea which often runs there. The bar has a depth of 2.5m at high water springs. A light is shown close S of the village.

Pilotage is compulsory. Pilots board seaward of the shoals off the mouth of the river.

The town of Sao Mateus is located 12 miles above the mouth of the river and can be reached by small craft. The town has a pier 25m long with depths of 3.6m at its head.

Barra Seca (19°05'S., 39°43'W.) is located about 30 miles S of Barra do Sao Mateus. A lighted platform and mooring buoys stand 4 miles E of Barra Seca.

A submarine pipeline lies in a NW direction between the platform and the coast. Navigation within 500m of the facilities is prohibited.

The Rio Doce

3.34 The **Rio Doce** (19°38'S., 39°49'W.), whose mouth lies 64 miles S of the Rio San Mateus, is about 390 miles long and navigated by shallow draft vessels as far as **Cidade de Colatina** (19°32'S., 40°37'W.), 62 miles above its mouth. Small craft can navigate an extra 63 miles to Vila de Figueira.

The mouth of the river can be identified by its breakers and by three small hills rising a few miles to the NW of it. A conspicuous building stands about 3 miles N of the mouth. At times the approach to the river is indicated by large areas of reddish-colored river water. A light is shown near the W entrance point of the river.

Sand banks and shoals, which dry in places, front the mouth of the river and extend 3 miles SE from the E entrance point; they are continually shifting. There are heavy breakers over these dangers.

The sea breaks up to 2 miles seaward of them, especially during SE and SW winds.

Lagoa Parda Terminal (Regencia Terminal) (19°41'S., 39°50'W.) consists of a submarine pipeline extending 2 miles from the coast 1.5 miles WSW of Rio Doce Light. The seaward end of the pipeline is equipped with a CBM and a special lighted buoy.

The mooring buoys can accommodate tankers up to 30,000 gt and a maximum draft of 13m.

The terminal should be contacted on either 4125 kHz or VHF channel 16 when about 40 miles from the terminal. The mooring master boards about 1 mile SE of the berth.

The Rio Doce can be entered by small craft with local knowledge drawing less than 1.5m.

The most favorable conditions for entering are during N winds, as the entrance is difficult with winds from other directions.

Small vessels, with local knowledge, can anchor within the mouth of the river off Vila de Regencia, in a depth of 3.7m, but should moor head and stern as the swinging room is restricted.

Terminal da Aracruz

3.35 Terminal da Aracruz (19°51'S., 40°03'W.), also known as Barra do Riacho or Portocel, is situated near the mouth of the Rio Riacho, about 17 miles SW of Rio Doce Light.

The approach is made by a marked access channel with depths of 12 to 13.5m. The terminal is protected by breakwaters. It has a pier 700m long, with a depth of 11.8m alongside; the maximum beam allowed is 35m. The maneuvering basin has a diameter of 460m with a depth of 11.8m. Terminal restrictions are given in the accompanying table titled Terminal de Aracruz—Restrictions.

Pilotage is compulsory. Pilots are requested from Vitoria and board vessels about 1 mile E of the harbor entrance. A minimum of two tugs are required for all vessel movements.

The port is used for the export of cellulose from the nearby Aracruz Plant, which is prominent from seaward.

A power station, which gives a good radar response and has been identified visually from distances of up to 20 miles, is located 2 miles SW of the river mouth.

Terminal de Aracruz—Restrictions	
Maximum length	214m
Maximum arrival draft	9.1m plus height of tide
Maximum departure draft	11.2m plus height of tide.

A submarine pipeline extends seaward for 0.6 mile from the elbow of the S breakwater. A light is shown close NW of the entrance and at the head of each breakwater.

Contact Information.—Terminal da Aracruz can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-27-3270-4432
3. Facsimile: 55-27-3270-4433
4. E-mail: nucleooperacional@portocel.com.br

3.36 From the mouth of the Rio Riacho to **Baia do Espirito Santo** (20°18'S., 40°16'W.), a distance of 29 miles, the coast trends SW and then SSW toward the bay.

The sandy shore becomes higher and is broken by numerous small reddish cliffs. Reefs extend about 1 mile offshore in places.

Serra dos Aimores, a mountain range, backs and roughly parallels this stretch of coast. The first summits of the range, visible from seaward, have the appearance of a series of small, conical, and slightly flattened hills.

Serra do Cavalo (19°54'S., 40°21'W, with.) a wavy summit with three peaks, is located 34 miles WSW of the mouth of the Rio Doce. Morro do Feijao, a moderately-high mountain with remarkable reddish cliffs on its summit, is located about 16 miles NNW of Serra do Cavalo.

Monte Mestre Alvares (20°10'S., 40°19'W.) lies about 16 miles S of Serra do Cavalo and 9 miles NNW of Baia do Espirito Santo. Isolated and densely wooded, it is visible for nearly 60 miles and is the most conspicuous peak on this part of the coast.

Barra de Santa Cruz (19°57'S., 40°08'W.), 24 miles SW of the mouth of the Rio Doce, is the common mouth of the Rio Piraque-Acu and the Rio Piraque-Mirim, which unite 1.5 miles to the W.

It can be identified by the adjacent mountains and by Vila de Santa Cruz, which stands on the S side of the river entrance, but is only visible from NE. A school building stands on the N side of the river entrance. Pontal de Tacipeba, the N entrance point of the river, is low and sandy.

Ponta de Santa Cruz, the S entrance point, is prominent because of its wooded cliffs. A dangerous submerged reef

extends 1.5 miles from the latter point. There are reefs and shifting sand banks with the river mouth.

Anchorage can be obtained off Vila de Santa Cruz, in depths of from 6 to 8m, with good shelter from wind and swell. The entrance to the river is dangerous and should not be attempted without local knowledge.

3.37 Barra do Almeida (20°03'S., 40°11'W.), the entrance of the Rio Reis Magos, lies between Ponta dos Frecheiros and Ponta Capuba, 2 miles to the SSW.

Ponta Capuba can be easily identified by its red cliffs and in the city of Nova Almeida, there is an old convent with a visible church.

The village of Nova Almeida is situated on the S bank of the mouth of the river. Small craft navigate the river for up to 18 miles from the mouth.

Santa Luzia Light

Shoals completely obstruct the mouth of the river which can be approached only by small craft at HW.

Barra do Rio Jacareipe lies about 6 miles S of Barra do Almeida. The white houses in the town of Jacareipe, situated on the S bank of the river mouth, stand out against the dark wooded hill on which they are built.

Baixo do Carapebus (20°15'S., 40°10'W.) is a rocky shoal with a reported (1991) depth of 4.5m.

Baia do Espirito Santo

3.38 Baia do Espirito Santo (20°18'S., 40°16'W.) indents the coast to a distance of 2.5 miles to the W and NW.

The entrance to the bay is about 2.5 miles wide between Ponta do Tubarao, the NE entrance point, and Ponta de Santa Luzia, the SE entrance point.

A light is shown from Ponta de Santa Luzia. Morro Moreno is 197m high and stands about 0.5 mile W of Ponta de Santa Luzia Light.

The bay contains the ports of Vitoria and Tubarao, together with Praia Mole, a new port developed on reclaimed land S of Tubarao.

The N part of the bay is shallow and a mass of breakers during SE winds.

Two islands, Ilha do Boi and Ilha do Frade, and several small islets lie in the SW part of the bay, N of the entrance of the estuary which leads to the port of Vitoria.

The W shore of the S side of the bay is formed by Ilha do Espiritu Santo, a large island separated from the mainland by the Rio de Passagem, a narrow shallow channel which is the smaller outlet from a lagoon formed by the Rio de Santa Maria to the W of the island.

The main outlet from the lagoon is Estuario de Santa Maria, a channel which passes S of the island and forms the harbor of Vitoria. The Rio de Santa Marie is navigable for nearly 33 miles to Cidade de Cachoeira de Santa Leopolinha.

The S part of the bay, near the approach channel to Vitoria, contains a number of reefs and rocks which are marked by beacons and buoys and can be seen on the chart.

There is a mandatory Ship Reporting System for the ports of Vitoria and Tubarao. Information on this system may be found in paragraph 3.39 in Vitoria—Regulations.

Vitoria (20°19'S., 40°20'W.)

World Port Index No. 12850

3.39 The port of Vitoria is approached through the estuary of the Rio Santa Maria, 4 miles long, which is entered between Ponta do Tagano and Ilha do Boi, 0.5 mile NNW.

The channel passes between Ilha do Espiritu Santo and the mainland, both of which have a number of off-lying islets. Hills rise from both sides of the channel.

Port of Vitoria
http://www.portodevitoria.com.br

Winds—Weather.—The prevailing winds are from the SE. The port area is protected from all winds.

Tides—Currents.—The tidal range at springs is 1.4m and the range at neaps is 0.6m. The maximum draft is 11m at HW and 9.7m at LW.

The velocity of the tidal current varies from 2 to 3 knots, but at times it reaches 5 knots. Abreast the port, the tidal currents were observed to have a velocity of 4 knots at springs. About 0.2 mile E of Pedras das Argolas the ebb current sets NE toward the wharf and the flood current sets WSW.

Entrance to Vitoria

Vitoria

Companhia Portnaria Vila Velha (CPVV)

Depths—Limitations.—All sailing is to take place on a rising tide. Vessels up to 205m long can enter the port day or night, although for vessels between 182m and 205m long, tugs are required. Vessels from 205m to 242m long can enter the port during daylight hours only, weather permitting.

Vessels of over 200m long must be assisted by three tugs, two of which must be at least 1,000 horsepower and the other of at least 400 horsepower.

The maximum draft for the port is 10.5m at HW and 9.7m at LW. The maximum speed in the channel is 5 knots. Vessels may only leave port on the flood tide.

The access channel, 3.5 miles long, is only 120m wide, except abreast Ilha das Bombas, where it is only 75m wide.

Overhead cables, with vertical clearances of 56m, span the river at two points. A bridge, with a vertical clearance of 58m, crosses the river 0.5 mile W of Ponta do Tagano.

The commercial quay, a marginal wharf with a length of 770m, parallels the N side of the estuary at Vitoria. The wharf consists of four berths. Vessel limitations at each berth are, as follows:

1. Berth No. 1 accommodates vessels with a maximum length of 182m, with depths alongside up to 10.5m.
2. Berth No. 2 accommodates vessels with a maximum length of 197m, with depths alongside up to 10.5m.
3. Berth No. 3 accommodates vessels with a maximum length of 211m, with depths alongside of 9.1m.
4. Berth No. 4 accommodates vessels with a maximum length of 123m, with depths alongside of 6m.

It is reported (2014) that dredging is underway at the commercial wharf, with a planned final depth of 12.5m.

Capuaba, on the S side of the channel abreast Vitoria, has three wharves, one ro-ro and two container. All wharves can accept vessels up to 148m in length and up to 10.6m draft.

Frannel Oil Terminal, located on the S part of Espirito Santo Island, can accommodate vessels up to 162m long with an arrival draft up to 8.2m.

Paul Terminal, handling pig iron, can accommodate vessels up to 74,000 tons, with a maximum length of 242m and has depths alongside of 10.6m.

Vitoria

Companhia Portuaria Vila Velha (CPVV), an L-shaped jetty 300m in length, is marked by lights at both ends; the jetty has an alongside depth of 10.5m and is situated on the W side of the port where the Rio Aribiri enters the Rio Santa Maria.

Aspect.—The following landmarks are visible to the mariner coming from the N:

1. The mountains located on the N of Baia do Espirito Santo, visible at a great distance, among which Mestre Alvares stands out.
2. Closer to the bay appear the mountains of Frade Leopardo, Moreno and Penha, the latter with the convent of Our Lady of Penha on its summit.
3. Ponta do Tubarao, along with the installations of the terminals of Praia Mole and Tubarao, where there is a reservoir and a chimney very visible.
4. Ponta do Santa Luzia with its lighthouse.
5. Ilha dos Pacotes with its beacon.

When approaching the bar the mariner should navigate outside the 20m contour.

The following landmarks are visible to the mariner coming from the S:

1. Ihla Escalvada, with its lighthouse.
2. To the NW, the city of Guarapari, with its many buildings.
3. To the N, in the interior, several mountains.
4. The coves of Guarapari and Perocao.

Morro Moreno, 194m high, an excellent mark for identifying the entrance to the bay, rises 0.5 mile W of Ponta de Santa Ouzia.

Morro da Penha, 155m high, on the summit of which there is a ruined convent which is marked by a red obstruction light, is surmounted by an illuminated cross, which is floodlit from 2000 until 2300, 1.25 miles WSW of Ponta de Santa Luzia. An old fort stands 0.3 mile N.

Pilotage.—Pilotage is compulsory for vessels over 200 gt and is available 24 hours. The approximate time of arrival should be sent to the pilot office at least 1 hour in advance. The pilot station is located on Ilha dos Praticos, close E of Ponta do Tagano.

Pilots board ships from a red launch with a black “P” on either side and meet ships about 0.7 mile E of Ponta de Santa Luzia.

Regulations.—A vessel reporting system, which is mandatory, is in operation in Vitoria and Tubarao. Vessels must report to Control Post (call sign: PWG 77), as follows:

1. Inbound vessels—When crossing a line between Santa Luzia Light and the Praia Mole.
2. When anchoring.
3. When leaving an anchorage.
4. When changing the berth.
5. Outbound vessels—Immediately before leaving the berth.

The report must include the following information:

1. Vessel name.
2. International call sign.
3. Flag.
4. Port of origin (inbound vessels) or port of destination (outbound vessels).
5. Type of vessel.
6. Anchorage or berth (inbound vessels) or estimated date of arrival at destination (outbound vessels).
7. Estimated date of departure and cruising speed (outbound vessels).

Isla Escalvad14a Light

Vessels changing berth or anchorage must report the following information:

1. Vessel name.
2. International call sign.
3. Previous position.
4. Present position.

All communications must be made in Portuguese or English. All times are given in Universal Coordinated Time (UTC). Foreign vessels should utilize the pilot to aid in providing the information to Control Post.

If communications cannot be established with Control Post, the vessel should contact the Harbor master of Vitoria-Tubarao by the quickest and most convenient means possible, with the following information:

1. Vessel's name.
2. Date and time of event.
3. Reason why communication has not been made.

Contact Information.—Vitoria pilots can be contacted, as follows:

1. VHF: VHF channels 10, 12, 13, 14, and 16
2. Telephone: 55-27-3200-3898
3. Facsimile: 55-27-3224-3866
4. E-mail: praticagem@praticagem.org.br

Anchorage.—Vessels bound for the port of Vitoria and awaiting a pilot anchor in Anchorage No. 1, about 1 mile ESE of Ponta de Santa Luzia, in a depth of about 20m. Vessels bound for the Praia Mole terminals in Porto de Tubarao anchor in Anchorage No. 2, centered 5 miles E of Ponta de Santa Luzia, in depths of 18 to 34m. Vessels bound for the iron ore terminal in Porto de Tubarao anchor in Anchorage No. 3, centered 6.5 miles SE of Ponta de Santa Luzia, in depths of 30 to 35m. Vessels requiring inspection by the naval, health, police, or maritime authorities anchor in Anchorage No. 4, centered 2.5 miles ENE of Ponta de Santa Luzia, in depths of 20 to 28m.

Within the port of Vitoria, anchorage may be obtained between Recife de Sao Joao and Pedras dos Argolas, in depths of 6 to 11m, mud. This anchorage is restricted to a width of about 0.1 mile.

Tubarao (20°17'S., 40°15'W.)

World Port Index No. 12855

3.40 The port of Tubarao is located on the W side of the S extremity of Ponta do Tubarao, the NE entrance point of the Baia do Espirito Santo. The port of Tubarao has become the largest iron ore port in the world, with an annual export of 80 million tons.

Tides—Currents.—The characteristic semi-diurnal tide predominates in the port and since it is an artificial port and relatively open, there are no appreciable currents to be noted.

Tubarao

Depths—Limitations.—The channel to the buoyed approach channel to the port lies about 1.5 miles ESE of Ponta de Santa Luzia. The channel is 2 miles long, with a width of 280m, and is dredged to a depth of about 25m.

The maneuvering area for berthing and unberthing has a width of 150m along the length of the quay. The maneuvering basin has a diameter of 500m and a depth of 17m.

The port consists of a breakwater, with a tanker berth on its inner side, and two ore loading piers, 0.1 mile and 0.3 mile, respectively, NW of, and parallel to it.

Praia Mole

Pier 2, with a berth for vessels up to 350m in length, can accommodate ships up to 365,000 dwt and has a depth of 24m alongside.

Pier 1, has berths on the N and S faces. The N berth has depths alongside of 18m and can accommodate vessels up to 320m in length and 200,00 dwt. The S berth has depths alongside of 17m and can accommodate vessels up to 280m in length and 125,000 dwt.

The tanker berth has a depth of 13.9m alongside, but can only accommodate a vessel 160m long, with a maximum draft of 7.9m.

Silting was reported between the smaller ore berth and the tanker pier.

Praia Mole, comprising a coal and steel terminal, is approached through a dredged channel which had a reported limiting draft of 14m.

The coal terminal, lying on the S side of the harbor immediately N of the jetty, is 730m long.

Berth No. 1, which can handle vessels of 15,000 to 250,000 dwt, is 330m long, with a depth of 17m alongside.

Berth No. 2 is 400m long, with a depth of about 18m alongside. Berth No. 2 will be able to handle vessels of up to 250,000 dwt after it is dredged to 21m; however, the present depth is 18m.

The steel products terminal, lying on the N side of the terminal, fronts an area used for handling and storage located on reclaimed land just S of Ponta do Tubarao.

The quay, which is 638m long, can accommodate vessels of 15,000 to 70,000 dwt and has a depth alongside of 14.5m.

The SE breakwater has been extended about 0.2 mile to the WSW.

Lights are shown from the head of each breakwater and from the elbow of the SE breakwater.

Pilotage.—Pilotage is compulsory for vessels over 200 gt. Pilots board about 0.5 mile SSE of the entrance buoys.

Regulations.—A mandatory vessel reporting system is in operation in Vitoria and Tubarao. For further information, see paragraph 3.39 in Vitoria—Regulations.

Contact Information.—See contact information listed under Vitoria in paragraph 3.39.

Anchorage.—See anchorages listed under Vitoria in paragraph 3.39.

Caution.—A moderate speed is reported to affect the berths at Praia Mole. Depths in the approach channel and harbor are subject to silting and may be less than reported.

Vitoria to Cabo de Sao Tome

3.41 The coast between Ponta de Santa Luzia and Cabo de Sao Tome, 110 miles to the SW, is backed by mountainous country containing peaks which rise to heights of over 900m within 25 miles of the sea, and are remarkable for their pyramidal shape. These mountains are prominent in clear weather, but are frequently obscured as the low land between them and the coast is often covered with fog or haze. They are usually most clearly seen about sunrise.

Ilha dos Pacotes (20°21'S., 40°15'W.), a small low island bare of vegetation, from which a light is shown, lies nearly 2 miles SSE of Ponta de Santa Luzia. A reef, part of which uncovers, extends about 0.3 mile SW of the island. Breakers mark this danger.

Ilha das Garcas, an islet, lies about 0.7 mile offshore and 3 miles SW of Ilha dos Pacotes. A small islet lies close on its SW side.

Ilhas Jucu (20°25'S., 40°19'W.), several small islets close together, lie about 0.5 mile ENE of Ponta Jucu. The islets are always visible above water. The Rio Jucu enters the sea on the N side of Ponta Jucu and the village of Jucu stands on the S bank of the river near the point. A conspicuous white water tower stands 1.25 miles WSW of Punta Jucu.

Ponta da Fruta lies about 6 miles SSW of Ponta da Jucu and is identified by a conspicuous white church, which stands on a hillock above the point. Between Ponta Jucu and Ponta da Fruta, reefs extend up to 1 mile off the coast.

Laje Canopus, an islet, lies about 0.3 mile SSE of Ponta da Fruta and sunken rocks, over which the sea breaks, lie about 0.3 mile SSW of the islet.

Baixo do Una (20°33'S., 40°21'W.), a rocky shoal with a depth of 5.8m, lies about 2 miles SSE of Punta da Fruta. The sea occasionally breaks over this shoal. Another rocky shoal, with a depth of 8.4m, lies about 2.5 miles S of the point.

Ponta da Setiba (20°39'S., 40°26'W.), about 8 miles SSW of Ponta do Fruta, is marked by a 64m high hill, with sparse vegetation on its upper side.

Tres Ilhas, a group of three islands, lie about 2 miles offshore in a position 3.5 miles ENE of Ponta de Setiba. The islands and other islets of less importance comprise an archipelago. A channel about 1 mile wide lies between the coast and the archipelago.

Ilhas Rasas (20°41'S., 40°22'W.) lie about 4.5 miles SE of Ponta de Setiba and consist of two rocky islets with a height of 2m. Submerged rocks lie as far as 0.3 mile SE of the islets.

Ilha Escalvada, a sandy islet, lies 2.5 miles WSW of Ilhas Rasas and shows a light. The islet is visible for a distance of 7 miles.

Ships should avoid passing between Ilhas Rasas and Ilha Escalvada due to a wreck at a depth of 13.7m. A rock, with a

Ilhas Rasas Light

depth of 9.2m, lies 4.5 miles WSW of the islet and 2 miles offshore.

3.42 The **Rio Guarapari** (20°40'S., 40°30'W.) empties into the SW part of Enseada de Guarapari and can easily be identified by its S entrance point which rises to a 21m hillock with a reddish cliff; this cliff is the first of its kind sighted when proceeding from N. A conspicuous church stands on the summit of the hillock.

The town of Guarapari stands on the S bank of the river near its mouth, but is of little importance. The village of Muquicaba stands on the N bank opposite the town.

Vessels with local knowledge can anchor in the W part of Enseada de Guarapari, close E and on the N side of the river mouth, or 0.5 mile E of the church above the S entrance point. These berths have depths of from 9 to 10m, mud, and are sheltered from N winds.

Vessels drawing up to 4.5m can cross the bar at HWS and anchor off the town, in depths of 6.5 to 7.7m. Swinging space is restricted, so vessels must moor head and stern.

Within the river mouth, a wharf about 76m long has a depth of less than 10m alongside. Private individual pilotage service is available.

From the Rio Guarapari to Ponta dos Castelhanos, about 13 miles to the SW, the coast consists alternately of small beaches and red cliffs. The cliffs are visible for about 10 miles.

Morro Urubu, 3.5 miles from the coast, is the most prominent hill and a good landmark.

The only settlements on this part of the coast is the village of Meaipe, about 4.5 miles SSW of Guarapari, and the small village of Ubu, about 3 miles NE of Ponta dos Castelhanos.

Between Guarapari and Ponta dos Castelhanos, reefs and sunken rocks lie and extend as far as 1 mile offshore. Depths of less than 20m lie as far as 11 miles ENE, 10 miles E, and 13.5 miles ESE, respectively, of Ponta dos Castelhanos.

3.43 Ponta do Ubu Ore Terminal (20°47'S., 40°35'W.) is located about 9 miles SW of the mouth of the Rio Guarapari. When approaching the terminal, the main characteristics points are Escalvada Island, the mounts of Sela Grande and Urubu, and the lighthouses on Ponta do Ubu and Ponta dos Castelhano.

Depths—Limitations.—The terminal consists of a breakwater extending about 0.4 mile E and then 0.2 mile NNE from the shore. A jetty, 313m long, projects NNE from the breakwater, parallel to, and 183m inshore of its outer leg.

Ponta do Ubu Ore Terminal

The W face of the jetty has 308m available for berthing, with a depth of 18.2m alongside. The E face has 240m available for berthing, with a depth of 15.2m alongside.

The jetty is approached through a channel about 0.1 mile wide. The channel is maintained at a depth of 18m. Range lights, in line bearing 270°, lead through the center of the dredged channel. Silting has been reported on the S side of the channel and NNE of the pier head.

A light is shown from a white pyramidal tower standing on the shore 0.5 mile N of the root of the breakwater. A conspicuous radio mast stands about 0.8 mile N of the root of the breakwater. Lights are shown from the head of the breakwater and the head of the jetty.

A reef, about 0.2 mile in extent, with depths of less than 2m, lies with its center 0.5 mile SSE of the elbow of the breakwater. Patches, with depths of 9.7m, lie 0.75 mile SE and ESE of the elbow of the breakwater. Barra de Maimba, with a least depth of 5.4m, lies 0.8 mile NNE of the breakwater.

The West Berth can accommodate vessels up to 309m in length with a draft of 16.8m plus the height of the tide. The East Berth can accommodate vessels up to 241m in length with a draft of 13m plus the height of the tide.

The cargo-handling equipment on both sides of the jetty limits a vessel's vertical clearance to 18.5m.

Pilotage.—Pilotage is compulsory and is available during daylight hours only. Pilots are provided from Vitoria-Tubarao. Vessels wait for the pilot in the anchorage area. Pilots board about 0.7 mile NE of the entrance to the dredged channel.

Regulations.—Vessels should send their ETA in advance, as follows:

a. 15 days, or when leaving the previous port, if later.

b. 5 days, with cargo tonnage required and whether vessel is an ore/bulk/oil carrier or an ore/oil carrier.

c. 72 hours and 48 hours, with arrival draft, ballast tonnage carried, and deballasting time.

d. 24 hours, with details of inert system.

Contact Information.—Ponta do Ubu terminal can be contacted, as follows:

1. VHF: VHF channels 13 and 16
2. Telephone: 55-27-3361-9330
3. Facsimile: 55-27-3361-9474
4. E-mail: borloth@samarco.com.br

Anchorage.—There are four designated anchorages, as follows:

1. Anchorage A (20°46.5'S., 40°32.7'W.)—Depths of 20 to 26m; for vessels awaiting a pilot, health inspectors, or the maritime police.
2. Anchorage B (20°46'S., 40°31.7'W.)—Depths of 23 to 26m; for platforms, special vessels, and vessels under repair.
3. Anchorage C (20°47'S., 40°32.7'W.)—Depths of 25 to 27m; for warships and submarines.
4. Anchorage D (20°48'S., 40°29'W.)—Depths of 17 to 25m; for vessels carrying inflammables, dangerous cargoes, or explosives.

Vessels should also request anchoring, berthing, and cargo-loading instructions 4 hours in advance or when within VHF range.

3.44 Baia de Benevente (20°53'S., 40°42'W.) is an indentation in the coast between Ponta dos Castelhanos and Ilha do Frances, which lies about 8.7 miles SW of the point. The N part of the bay indents the coast for about 2 miles and the Rio Benevente empties into the N part of the bay.

The town of Anchieta stands on the E bank of the river near its mouth. The town church is a prominent landmark.

Depths in the bay range from 5.5 to 9.1m. Depths of less than 20.1m lie as far as 18.5 miles E of Ilha do Frances.

Baixo da Tiagem, a dangerous rocky shelf which dries in places, extends 1.25 miles from Ponta dos Castelhanos. Baixo Grande, a rock with a least depth of 0.9m, lies 2.5 miles SW. The passage between this danger and Baixo da Tiagem has a depth of 4m, but should not be used without local knowledge.

The bar at the mouth of the river breaks with strong S winds and has a depth of 1.3m at LWS. The river is navigable by small craft with local knowledge for about 13 miles.

Anchorage may be obtained in the bay, in depths of 9 to 15m, sand and mud bottom. Vessels are cautioned to keep clear of a dangerous wreck 3.5 miles WSW of Ponta dos Castlehanos.

Morro Aga, Ilha do Frances Light, and the church at Anchieta are good landmarks for clearing the dangers in the approach to the anchorage.

Ships approaching from the NE should pass S of Baixo Grande.

The Rio Piuma discharges about 4.5 miles SW of the mouth of the Rio Benevente and can only be navigated by small boats.

Ilhotas de Piuma, a group of three islets, lies close off the entrance to the river.

The village of Piuma stands on the S bank of the mouth of the river. A sheltered anchorage for small craft lies about 0.2 mile W of the southernmost of Ilhotas de Piuma.

Ilha do Frances (20°55'S., 40°45'W.), from which a light is shown, lies nearly 2 miles offshore. The island is connected to the shore by a tongue-shaped sand bank which has depths of less than 3m.

Anchorage may be obtained with Ilha do Frances Light bearing 200°, distant 1.25 miles, in a depth of 9m.

A conspicuous water tower stands 2.5 miles WNW of Ilha do Frances.

3.45 Ilha Branca (21°00'S., 40°47'W.), from which a light is shown, lies about 1 mile E of the mouth of the Rio Itapemirim. Rocks, which uncover, lie close to the NE and SW points of the island.

The town of Itapemirim stands on the S bank of the river, about 3 miles within the entrance.

The position of the bar is subject to change. Depth over the bar was reported to be about 1m at HW. A pilot is available upon request by radio. The town of Itapemirim has a small pier, with depths of 1 to 2m alongside.

The mouth of the Rio Itabapoana is located about 20 miles SSW of the entrance of the Rio Itapemirim. Prominent red cliffs and wooded hills mark the coast between the two rivers. Villages on some of the hills are visible about 10 miles from offshore. A conspicuous house stands on Ponta do Siri, about 8 miles SSW of the Rio Itapemirim. The red cliffs are prominent between Ponta do Siri and Ponta do Cacurucaia, 2.5 miles SW of Ponta do Siri.

Ilha das Andorinhas (21°10'S., 40°53'W.) lies about 0.5 mile offshore SE of Ponta do Cacurucaia. A stranded wreck lies close to shore about 0.5 mile W of Ilha das Andorinhas.

3.46 The **Rio Itabapoana** (21°18'S., 40°58'W.) is navigable by small craft for about 35 miles from its entrance. The town of Itabapoana stands on the S bank of the river near its mouth. A light is shown from the S entrance point of the river.

The bar can be crossed at HW by small craft with drafts of 1.6m. Local knowledge is essential for approaching and entering the river. Reefs, which dry in places, lie as much as 2 miles E of the river mouth. The sea breaks continuously over the largest and most seaward of them.

Vessels can anchor about 1 mile offshore, either N or S of the reefs, according to the direction of the wind, in depths of 7 to 8m.

Ponta do Roteiro, marked by a light, lies 3.5 miles S of the mouth of the Rio Itabapoana and can be identified by its low red cliffs. Ponta do Cacador is located 2.5 miles SSW of Ponta do Retiro. Reefs extend about 1 mile offshore between the two points. A stranded wreck lies on the reefs about 0.7 mile NE of Ponta do Cacador.

Between the mouths of the Rio Itabapoana and the Rio Paraiba do Sul, 19 miles to the S, depths of less than 10m lie as far as 4.5 miles offshore. Depths of less than 20m lie as far as 25 miles E of the mouth of the Rio Paraiba do Sul.

3.47 The **Rio Paraiba do Sul** (21°37'S., 41°01'W.), about 467 miles long, empties by way of three channels at its mouth.

Ilha do Lima and Ilha da Convivencia lie in the mouth of the river.

Gargau Channel, the northernmost channel, lies between the W side of Ilha do Lima and the mainland. It is accessible from the S part of Saco de Gargau and is navigable by small craft.

The middle channel, between Ilha do Lima and Ilha da Convivencia, follows a winding course in the midst of islets

and shoals. Small boats navigate this channel when prohibited from using the principal entrance.

The main channel has a width of 0.2 mile between the S extremity of Ilha da Convivencia and the mainland coast. The main channel, which leads across the bar, is narrowed by sand banks; the position of the bar is subject to change.

There is no interest to ocean navigation and its bar can only be approached by small vessels with through knowledge of the area. The bar should not be attempted without local knowledge. Bar signals are displayed from a mast on the S side of the river entrance. The bar has depths of 2.2 to 2.4m at HWS.

The town of Sao Joao da Barra stands on the S bank, about 2.5 within its entrance. A light is shown from the S entrance.

Sao Joao Light

Anchorage is afforded in Saco de Gargau, in a depth of about 10m.

From the mouth of the Rio Paraiba do Sul to Barra do Acu Light, 23 miles to the S, the coast is low and sandy.

Porto do Acu (21°52'S., 41°00'W.) lies about 9 miles N of Barra do Acu. A new port still under construction, it consists of an artificial basin protected by breakwaters and close N, a T-shaped pier with an operational ore terminal.

Cabo de Sao Tome to Ponta Imbetiba

3.48 Cabo de Sao Tome (22°00'S., 40°59'W.) is formed by a gradual change in direction of the coast, from S to WSW. The light towers and the radiobeacon tower are the only landmarks visible from seaward. From a distance of 3 miles, the low sweeping cape resembles a long line of breakers.

Acu Light is shown from the E side of the cape, about 6 miles NE of Cabo de Sao Tome Light, which is shown from the SW side of the cape.

Banco de Sao Tome, with depths of less 11m, extends 15 miles E from Cabo de Sao Tome Light. Depths of less than 5.5m extend 6.25 miles offshore on the inner part of the bank.

Sao Tome Light

Depths of less than 18m extend 17 miles E of Acu Light. Submerged wrecks, with depths of 1.7m, lie up to 6.7 miles E of Cabo de Sao Tome Light.

The sea breaks heavily over the bank during S winds and the bank is subject to continual change. The sea breaks over the W end of the bank during fresh NE winds. The sea in this area is always discolored.

Canal de Sao Tome, between the S side of the cape and the inner end of the bank is navigable by vessels drawing up to 4m, but is not safe during S winds.

Anchorage may be obtained by small craft during N winds about 0.3 mile SE of Cabo de Sao Tome Light, in depths of about 5m, mud.

During strong head winds, a vessel may find it advantageous to give the cape a wide berth, as it has been ascertained that the strength of the current often increases as the depth decreases towards the shore.

Pampo Oil Field (Campos Basin) (22°30'S., 40°30'W.) lies about 40 miles SE of Cabo de Sao Tome and is surrounded by a restricted area best seen on the chart. Numerous platforms, submarine pipelines, mooring buoys, floating storage and/or production vessels, and other support vessels are located in this oil field. Vessels should not navigate in the restricted area. Tankers should send their ETA in the oil field to their agent in Macae when departing their last port of call. When 10 miles from their destination, tankers should contact their destination terminal on VHF channel 16 or on 4125 kHz, stating their ETA and requesting instructions from the mooring master. The mooring master will advise vessels of the date, time, and location of boarding.

From Cabo de Sao Tome to Ponta Imbetiba, about 50 miles to the WSW, the coast is extremely low and sandy with scattered patches of vegetation. Pico do Frade, about 20 miles NW of Ponta Imbitiba, is very prominent, but it is frequently obscured by clouds.

Barra do Furado (22°06'S., 41°08'W.), about 5 miles SW of Cabo de Sao Tome Light, has several houses and great palms around it. Canal Ubatuba, about 10 miles WSW of Barra do Furado, connects the sea with Lagoa Feia. The Rio Macae empties into Enseada de Macae about 1 mile NNW of Ponta Imbetiba.

3.49 Ilhas de Santana (22°25'S., 41°42'W.), a group of five islets, lie about 4 miles ESE of Ponta Imbetiba. Ilha de Santana, near the middle of the group shows a light and is the largest islet of the group.

The passage between the islets and the mainland to the NW is obstructed by a bank with a depth of less than 8.m.

Pedra do Hermes, a rock with a least depth of 2.2m, lies 4 miles N of the light on Ilhas de Sonata. The sea does not break over this rock. Numerous rocks, with depths between 7m and 10m, lie between 1 and 3 miles ENE of Pedra do Hermes.

Rocks, with depths of 5m and 6.2m, lie about 0.8 mile and 1.5 miles SW, respectively, of Pedra do Hermes.

Anchorage may be obtained off a sandy beach on the NW side of Ilha de Santana, in a depth of 12m, mud. Vessels should anchor 0.7 mile off the beach to avoid the submerged ledge which lies out side the line joining the entrance points.

This anchorage is open to NE and SW winds, which do not raise much sea. A vessel approaching the anchorage should pass SW of the islets which is clear of danger on that side.

Ilha dos Papagaios, from which a light is shown, lies about 0.5 mile ENE of Ponta Imbetiba. The islet is 22m high and wooded.

Pedra dos Moleques, a rock awash lies a little more than 0.5 mile E of Ilha dos Papagaios. The rock has the appearance of a buoy and can only be seen from a short distance. A reef, with three heads that have depths of 1m, extends 91m S from Pedra dos Moleques.

Pedra da Mula, with depths of less than 1m, lies 0.75 mile ESE and is marked by a lighted buoy on its S side. The sea breaks over the rock and it uncovers at LWS. The passage between Ilha dos Papagaios and Pedra da Mula should not be attempted.

Caution.—A lighted tanker mooring buoy lies about 3.2 miles ENE of the S extremity of Ilha de Santana.

Submerged gas and oil pipelines in the area may best be seen on the chart.

3.50 Baia de Imbetiba (22°23'S., 41°46'W.) is entered between Ponta Imbetiba and Ponta do Forte, 0.6 mile to the N.

A prominent house is reported to stand on the summit of Ponta Imbetiba.

A ruined wharf on Ponta Imbetiba cannot be approached owing to submerged obstructions. There are depths of 4.7m between this point and Ponta do Forte.

The Rio Macae can be entered by ships with drafts to 2.7m, but local knowledge is required. The river is navigable by small craft for about 30 miles.

At times, the outflow from the river discolors the sea for some distance from its mouth, giving the appearance of sandy shoals.

Rocks and a depth of 0.4m exist close S of the N entrance point of the river.

3.51 Macae (22°22'S., 41°46'W.) stands on a plain on the S bank of the river near its mouth. There is an offshore oilfield supply base located in Baia de Imbetiba. Three piers, protected by a breakwater, can handle vessels up to a draft of 5.7m. The approach channel W of Ilha dos Papagaios is marked by lighted buoys.

Macae Light

Anchorage may be obtained 0.25 mile N of Ponta do Forte, in a depth of 4m, sand. Anchorage for larger vessels may be obtained 0.8 mile NE of Ilha dos Papagaios Light, in a depth of 8.2m.

Caution.—Pedra dos Moleques, a rock awash, with a below water rock close S, lies about 0.5 mile E of Ilha dos Papagaios.

Pedra da Mula, with a depth of 1m, lies 1.25 miles E of Ponta de Imbetiba. Breakers occur over this rock when there is any sea running. The S side of Pedra da Mula is marked by a lighted buoy.

Ponta Imbetiba to Cabo Frio

3.52 The coast between Ponta Imbetiba and Cabo dos Buzios, about 22 miles to the SSW, is indented about 9 miles to the W by a large bay.

This coast, for the most part, is regular, low, sandy, and broken in a few places, namely in the vicinity of Ponta Itapebucu, Cabo dos Buzios, and Barra de Sao Joao, located about midway between the point and cape. Sunken rocks and reefs fringe a great part of the coast and in places they extend about 1 mile offshore.

Sunken and above-water rocks lie as far as 3.5 miles offshore in places.

Numerous islets also lie off this part of the coast. The chart is the best guide for locating these islets and dangers.

Between Ponta Imbetiba and Cabo dos Buzios, several hills and mountains are prominent from offshore. The most conspicuous is Monte Grande (Pico de Sao Joao), with its slightly flattened summit, located about 4 miles inland. The mountain is isolated and visible about 40 miles. It is the principal landmark for this part of the coast.

Pedra do Amorim and Pedra Alta, two rocks with depths of 9.8m and 9.5m, respectively, lie 1.5 and 3 miles ESE, respectively, of **Ponta dos Ostras** (22°32'S., 41°56'W.).

Small vessels, drawing up to 4m with local knowledge, can anchor in the mouth of the Rio Ostras with good shelter.

3.53 Barra de Sao Joao (22°36'S., 41°59'W.), 5 miles SW of Ponta dos Ostras, has depths from 3.5 to 4m over the bar and similar depths within the mouth of the river. The town of Sao Joao da Barra stands near the mouth of the river. Ilha de Trinta Reis lies nearly 0.5 mile E of the river mouth. There are two other islets off and to the S of the river mouth.

Anchorage may be obtained 0.5 mile SSW of Ilha de Trinta Reis, in depths of from about 8 to 10m, sand and mud.

Ilha Branca (22°43'S., 41°53'W.), from which a light is shown, lies about 10 miles SSE of Barra de Sao Joao and is close N of Cabo Buzios. Ilha Raza lies 4 miles WSW of Ilha Branca. Numerous above-water rocks and sunken reefs and rocks, some of which uncover, lie near Ilha Raza.

Caution.—Shoal patches, with depths of 15.8m and 17.6m, lie 0.9 mile NNW and ENE, respectively, from the light on Ilha Branca.

3.54 Cabo Buzios (22°45'S., 41°52'W.) is the extremity of a peninsula which is much indented and extends 3.5 miles NE from a low isthmus 0.5 mile wide. Enseada de Buzios is entered between Ponta da Matadeira and Ponta da Cruz. The village of Buzios, with a church, stands on the E shore of the bay.

Anchorage may be obtained in Enseada de Buzios about 0.3 mile WSW of Ponta da Matadeira, in depth of about 11m, sheltered from all except NE winds. Vessels are advised to approach this berth passing N of Ilha Branca giving the island a berth of at least 0.5 mile.

Ilha Ancora (22°46'S., 41°47'W.) lies 4.75 miles ESE of Cabo Buzios and is visible at a distance of more than 20 miles. Ilha Gravata lies about 2 miles W of Ilha Ancora. Two islets named Filhote lie about 0.5 miles SSW of Ilha Gravata.

The islands and islets are steep-to and depths greater than 37m lie between them and in mid-channel between Ilha Gravata and the coast. A shoal patch, with a depth of 17.6m, lies 1 mile NE of Ilha Gravata.

3.55 Ponta Emerencia (22°49'S., 41°56'W.), bold and prominent, is located about 5.5 miles SW of Cabo Buzios.

Two islets lie within 0.5 mile ESE of the point, and two above-water rocks lie E of the islets.

A 6-mile long chain of islands and islets lies in a NE to SW direction about 1 to 3 miles off the coast between Ponta Emerencia and Ponta Lajinha. Commencing at the NE end of the chain, Ilha do Breu lies about 2.5 miles SE of Ponta Emerencia. Continuing to the SW are Ilha de Pargos; Ilha dos Capoes; Ilha Comprida, which is the largest; Ilha Redonda; Ilha dos Irmaos; and Ilha dos Papagaios.

The larger islands are covered with trees, but are difficult to distinguish as they blend with coastal features, which are similar in aspect.

The islands and islets are all steep-to, except for Ilha Comprida, where sunken rocks lie about 0.2 mile E of its NE end. Depths greater than 20m lie to within 0.25 mile of the seaward side of the chain islands.

Canal de Papagaios (22°51'S., 41°57'W.), the channel between the above chain of islands and the mainland, is clear of dangers with the exception of Laje do Pero, a rock with a depth of less than 2m, lying close E of Ponta do Pero. There is always smooth water in this channel, even during fresh winds, and there is good anchorage under the lee of the islands.

The coast SW of Ponta do Pero to Ponta Lajinha, on the E side of Barra Nova de Cabo Frio, is high and bold. A light is shown from Ponta Lajinha. An aeronautical radiobeacon transmits from a position near Pedro de Aldeia, 6.75 miles NW of Ponta Lajinha.

3.56 Barra Nova de Cabo Frios (22°53'S., 42°00'W.) lies in the mouth of the Rio Italpuru which drains the large Lagoa de Araruama. The lagoon extends nearly parallel with the coast for 21 miles W of Cabo Frio.

The Rio Itajuru is narrow and sinuous. Vessels drawing up to 4m can enter at HW. The bar should only be approached with the service of a pilot.

Anchorage is afforded within the river mouth to small craft, but swinging room is restricted. Anchorage is also afforded close off the bar, in depths of 14 to 18m. This anchorage is exposed to winds from SE to SW.

Cabo Frio (23°01'S., 42°00'W.) marked by a light, stands on the S extremity of Ilha do Cabo Frio. The area near the point is notable for its sheer cliffs.

Cabo Frio Light

Enseada do Cabo Frio lies between Ilha do Cabo Frio and the mainland coast. An extensive sand bank separates the inlet into two parts. The N part is the larger of the two and affords good anchorage.

Enseada do Forno and Enseada dos Anjos indent the mainland coast off the W side of the N part of Enseada do Cabo Frio.

The NE entrance to the bay is clear, wide, and deep. Boqueirao, the narrow SW entrance to the bay, lies between the W extremity of Ilha do Cabo Frio and the mainland coast; it is spanned by an overhead cable.

The town of Arraial do Cabo is situated on the W shore of Enseada dos Anjos.

The sand bank which divides the inlet extends ENE from the mainland to about the middle of the NW side of Ilha do Cabo Frio. With NE winds, the sea breaks heavily on the sand bank.

A narrow channel, with a minimum depth of 3.5m, leads over the E end of the sand bank, but local knowledge is essential to its use.

3.57 Porto do Forno (22°58'S., 42°01'W.) (World Port Index No. 12910) lies along the N shore of Enseada dos Anjos and is a shipping point for the area's alkali and salt production.

Depths—Limitations.— The port consists of a quay 200m long which can accommodate two vessels up to 120m in length.

To the E of the quay is a pier, with three dolphins off its W side, extending about 0.1 mile S from the shore. A light is shown from the pier head. The depth alongside the dolphins was reported to be about 10m.

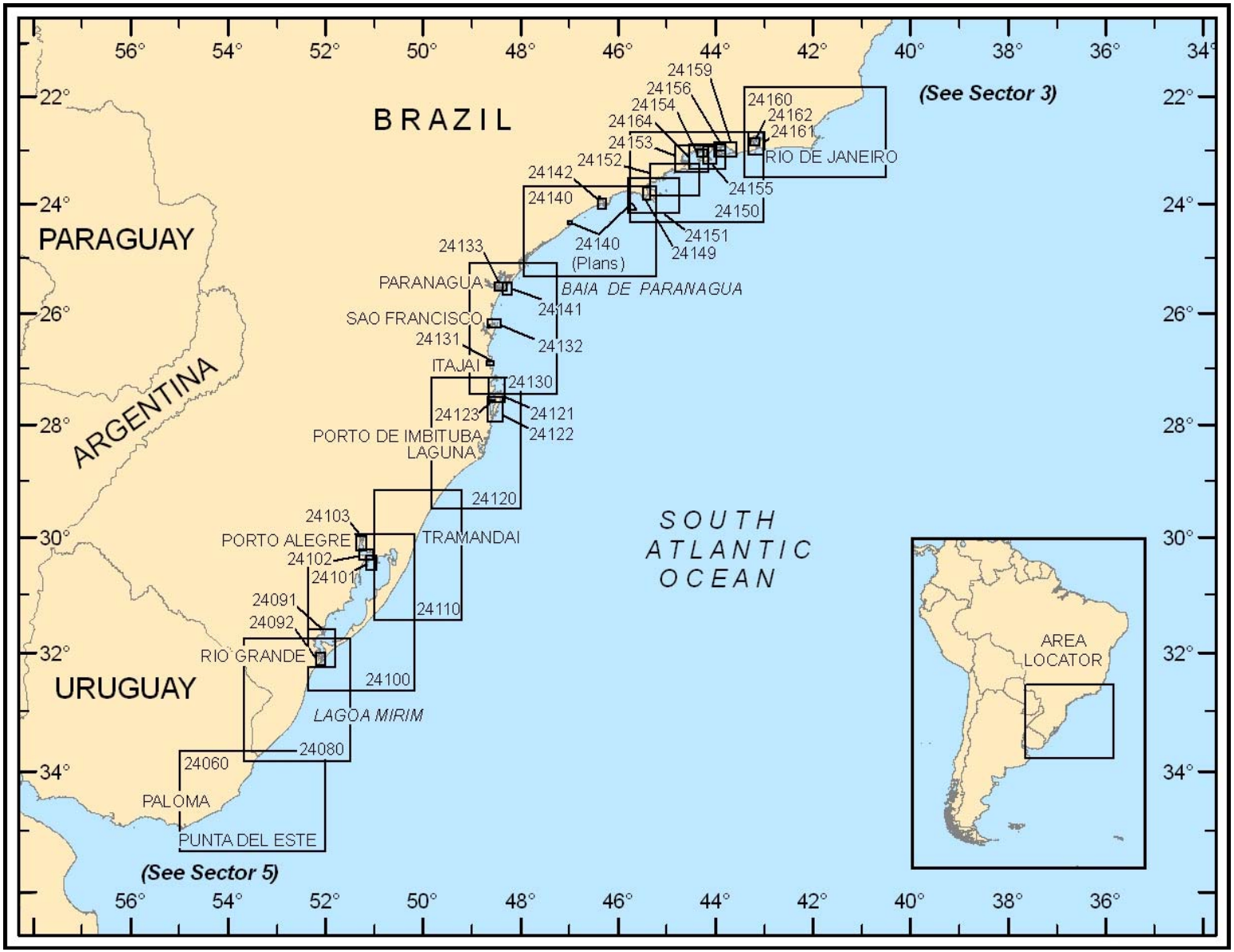
Aspect.—A conspicuous tank is situated about 0.1 mile NNW of the pier and a conspicuous chimney stands about 1.2 miles NW of the pier.

Pilotage.—Pilotage is compulsory. Pilots should be requested through Rio de Janeiro by radio at least 24 hours to arrival.

Anchorage.—There is anchorage, in a depth of 16.5m, 0.2 mile ESE of Ponta do Forte.

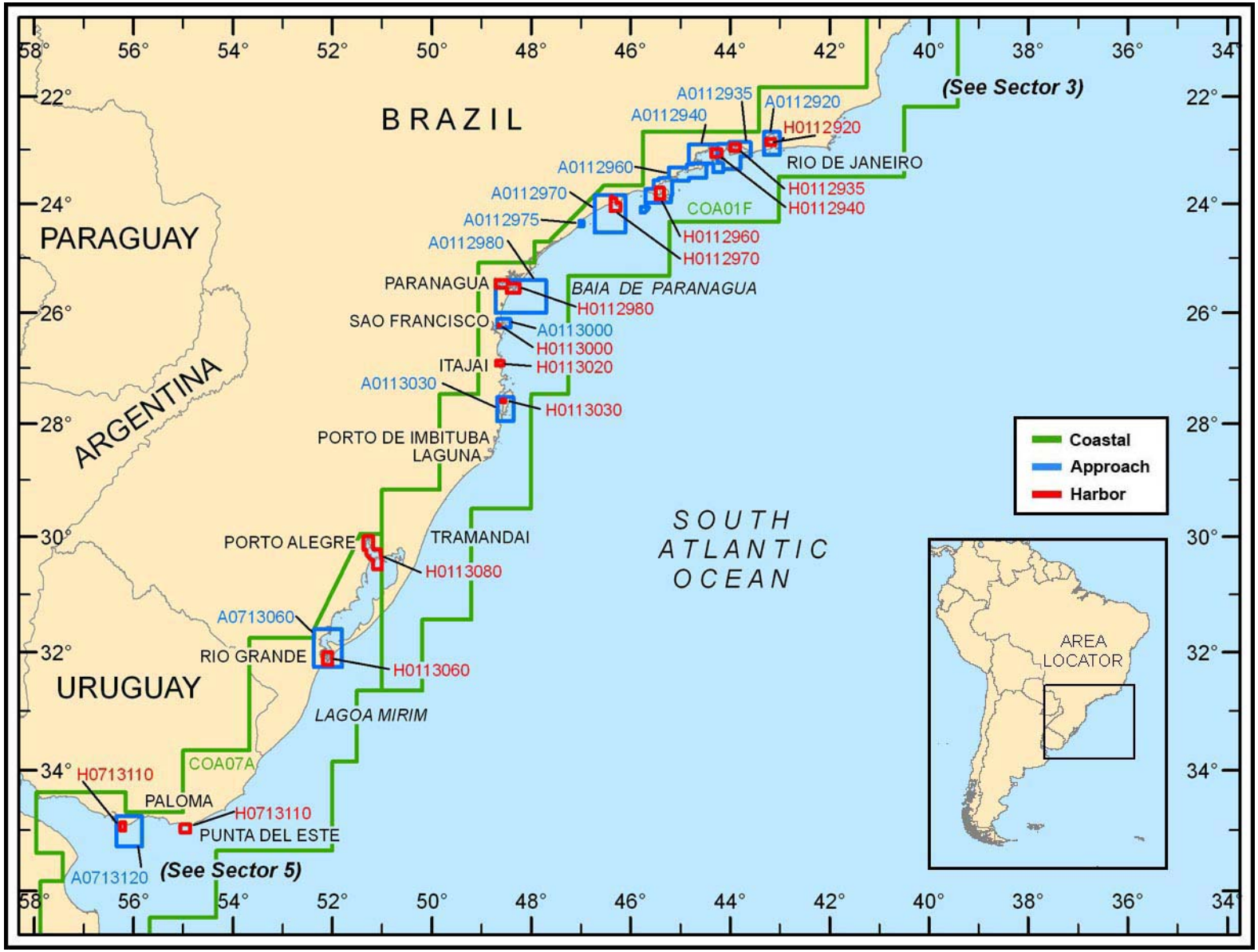
In the S part of Enseada do Cabo Frio, anchorage is afforded in a cove on the W end of Ilha do Cabo Frio, close within the Boqueirao entrance, in depths of 6 to 9m.

This anchorage is reported to be exposed to winds from the NE and SW. With strong NE winds, it is advisable to moor, with an open hawse-hole to the E.



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

SECTOR **4** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 01 and 07 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 4 — DNC LIBRARY INFORMATION

SECTOR 4

SOUTH COAST OF BRAZIL AND EAST COAST OF URUGUAY—CABO FRIO TO PUNTA DEL ESTE

Plan.—This sector describes the E coast of Brazil from Cabo Frio to Punta del Este, the N entrance to the Rio de la Plata in Uruguay. The descriptive sequence is from N to S.

General Remarks

4.1 Winds—Weather.—In Baia de Guanabara local winds which vary from NE depending on the location, blow during the night and part of the morning. They descend from the mountains near the coast and spread up to 6 to 9 miles from the coast. They subside in the morning and are followed by a period of calm which lasts until about noon.

The sea breeze then begins and subsides at sunset. It is reported to be weak when it enters the bay, but immediately becomes stronger.

The regularity of the variation of these breezes ceases only in the event of bad weather. In this event usually from June to October, the winds blow from the SW or S. During this period SE winds usually cause a confused sea breaking in Enseada de Botafogo and Enseada de Flamengo.

Strong thunderstorms form in the interior of the bay on very hot days during January, February, and March, and generally when the sea breeze either lags or does not blow. They are accompanied by short but violent winds and heavy rains.

These thunderstorms are even stronger when clouds gather over Serra dos Orgaos, N of the bay, with winds from N, but this rarely occurs.

During bad weather, it will clear if the wind shifts from SW to N, passing through E. If the contrary occurs, the weather will continue to be bad.

In the morning during May, June, and July there is generally dense fog which disappears in the late morning.

The winds in Canal de Santa Catarina generally follow the direction of the channel. They are seldom strong, although the short choppy seas are dangerous for small boats.

From March to September, cold fronts accompanied by very strong winds from S to WSW move through the area; they carry continuous precipitation which can last up to 6 days.

During October, the winds shift to E and N, and the following six months are the hottest of the year. During this season, there are frequent storms from N around by E to W.

Winds from SE are accompanied by heavy rain. In general, the heaviest rain fall in August and September, but some years these months are dry.

During August at dawn, the area is frequently covered by a dense fog which fades away about noon.

Aspect.—This part of the coast of Brazil is dominated by Serra do Mar, which extends almost uninterrupted to near the S boundary of Brazil.

The mountains which make up Serra do Mar in most places consist of several ranges lying parallel with the coast, with the highest ranges being farthest from the coast.

North of latitude 30°S, the mountainous terrain reaches the sea in many places, cutting into segments and pockets the fringe of lowland that fronts the foot of the mountains.

South of latitude 30°S, where Serra do Mar abruptly turns W, the coast consists of hilly uplands fronted by a broad area of sand dunes, lagoons, and swamps.

The offshore approaches are fronted by islands, islets, and rocks, most of which are separated by wide and clear channels.

Cabo Frio to Baia de Guanabara

4.2 Cabo Frio (23°01'S., 42°00'W.), the S extremity of Ilha do Cabo Frio, ends S in the narrow Focinho do Cabo. The island, covered with vegetation, is visible in clear weather for about 4 miles. The area near the point is notable for its sheer cliffs. When seen from the SW, the island appears as an undulating plateau with three peaks, of which the middle peak is the highest. A disused lighthouse, 390m high and is usually cloud covered, stands on the middle peak.

Cabo Frio Light is shown very close to the N of Focinho do Cabo. Good radar returns have been reported from Cabo Frio, distant of about 26 miles.

Caution.—A rock, with a depth of 3.3m, lies close S of Fochinho do Cabo.

Between Cabo Frio and Baia de Guanabara, about 63 miles to the W, the coast is low and consists of a uniformed barren sandy beach as far as Ponta Negra. The mountains of the interior gradually close the coast toward the entrance of Baia de Guanabara where they rise from the sea in almost sheer granite cliffs. The mountains within the E part of this coast are far inland and cannot be identified from seaward.

A measured mile is situated about 12.5 miles W of Ilha do Cabo Frio. It is marked by two pairs of beacons aligned on a bearing of 092°. The towers, visible at 4 miles, are made of brick and concrete with the front one being white with a black stripe and the rear one being black with a white stripe.

Ilhas dos Franceses, about 3 miles NW of Cabo Frio and 0.1 mile offshore, consist of two rocky islets, the highest of which is 44m high.

Ponta de Saquarema (22°56'S., 42°30'W.), about 28 miles W of Cabo Frio, is a small hill surrounded by a convent. This convent is conspicuous and visible 6 miles. Laje de Itauna is a group of above-water rocks lying up to 0.5 mile off Ponta de Saquarema and should be given a wide berth.

Ponta Negra (22°58'S., 42°41'W.), about 11 miles W of Ponta de Saquarema, is the extremity of a spur of the mountains projecting about 1 mile from the coast. This dark bluff forms the W limits of Praia de Macambaba and is easily recognized. Radar returns from the point have been reported up to 18 miles. Laje Ponta Negra, a rock with a depth of 1.3m, lies about 0.5 miles S of the point and the sea breaks almost continuously on it. A light is shown from Ponta Negra.

Rio de Janerio—Christ Statue on Pico do Corcovado

Ilhas Maricas (23°01'S., 42°55'W.) consist of two islets and lies 13 miles WSW of Ponta Negra. Two above-water rocks, on which the sea breaks heavily, lie close off the N extremity of the N islet.

Two small rocks lie close off the S end of the S islet. A light is shown from the N islet.

A rock, with a depth of 14m, lies 1.5 miles NE of the N islet. Good radar returns from the islets have been reported up to 12 miles.

Baia de Guanabara

4.3 Baia de Guanabara (22°57'S., 43°08'W.) is one of the finest and best-sheltered natural harbors in the world. It is about 16 miles long, gradually widening from about 1 mile at the entrance to 15 miles at the head.

It contains many islands and islets, and is surrounded by high wooded mountains which slope gently to its shores.

The shores of the bay are sandy beaches, separated by slightly projecting points covered with vegetation. Several rivers empty into the head of the bay.

The bay is approached between Ponta de Itaipu, about 20 miles W of Ponta Negra, and Ponta do Arpoador, about 8 miles farther to the W. The entrance to the bay lies between Ponta de Santa Cruz, about 6 miles WNW of Ponta de Itaipu and Ponta de Sao Joao, about 0.9 mile to the W.

Porto do Rio de Janeiro occupies the S and W parts of the bay. Ilha do Governador, the principal oil terminal, is in the N part of the bay and Niteroi, a shipbuilding center, occupies most of the E part of the bay.

Winds—Weather.—In Baia de Guanabara, local winds blow with great regularity. The regularity of the variation of these winds ceases only in the event of bad weather. In this event, usually from June to October, the winds blow from the SW or S.

During this period, SE winds cause a confused breaking sea in Enseada de Botafogo and Enseada de Flamengo. Strong thunderstorms form in the interior of the bay on very hot days from January to March, and generally when the sea breeze either lags or does not blow. They are accompanied by short, but violent, winds and heavy rains.

During bad weather, it will clear if the wind shifts from SW to N passing through E. If the contrary occurs, the weather will continue to be bad. In the morning during May, June, and July there is generally a dense fog which disappears around 1000.

Tides—Currents.—Close to Cabo Frio, with winds from the S, the current tends to the N; with winds from the NE, the current usually tends to the W. A counter current, which forms in this area and can be felt up to 10 miles W of the cape, tends to move vessels closer to shore.

In the vicinity of Baie de Guanabara, from October to March, when the wind is from the NE, the current tends to the

W; from March to October, when the wind blows from the SE, the current tends to the N.

Aspect.—The entrance of Baia de Guanabara can be identified by several prominent mountains in its immediate vicinity.

On the E side, **Falso Pao de Acucar** (22°58'S., 43°02'W.) rises from the sea in almost sheer granite cliffs and is the most conspicuous. On the W side, Pao de Acucar is prominent. The peak, 395m high, has the shape of a sugarloaf and is so named. A large pavilion stands on the summit and is lighted until about 2200.

Pico do Corcovado, about 3 miles W of Pao de Acucar, is conspicuous by the lighted statue of Christ on its summit, although it is frequently obstructed by clouds and haze.

Pedra da Gavea, about 5 miles SW of Pico do Corcovado, resembles a square sail. It is visible for about 50 miles in all directions and cannot be mistaken for any other peak in the vicinity. At night the loom of the lights of Rio de Janeiro can be seen for great distances, especially when there are clouds over the city reflecting it.

Directions.—The islands in the approach to Baia de Guanabara are steep-to, and may be approached safely. The passage between Ilha Rasa and Ilha do Pai is the widest, and is the one generally used by vessels approaching from the E.

Ships entering or leaving over the bar have preference of maneuvering over other ships and small craft navigating outside the channel. Loaded vessels have priority when passing through the dredged channel.

Vessels whose draft does not exceed 13.4m should enter the port via the channel E of Ilha de Cotunduba. Mariners should take care to avoid the 10.3m shoal 0.2 mile N of the island, and the sandy shoal which extends 1.5 miles S from Ponta de Santa Cruz.

Vessels whose draft exceeds 13.4m should use the channel dredged to 17m, entered 1 mile E of Ponta de Capacabana.

This route passes between Ponta do Leme and Ilha de Cotunduba; between Ilha Laje and Ponta de Santa Cruz; up the E side of the quarantine anchorage, and then to the Alte Tamandare Tanker Terminal.

Request for pilotage service may be made either to the Harbor Pilots Working Cooperative (Pilot Station), which can be contacted on VHF channels 16 and 12.

For tankers larger than 100,000 dwt, pilots usually board vessels outside the main channel entrance. This will occur if weather conditions permit and in daylight only.

In certain cases and at the discretion of the pilot according to the prevailing conditions ships will use this channel with a draft up to 12.5m.

4.4 **Ilha Rasa** (23°04'S., 43°09'W.), about 7 miles S of the entrance of Baia de Guanabara, is covered with vegetation and shows a light. A radiobeacon and a DGPS station are located the light.

Ilha Redonda lies about 3 miles W of Ilha Rasa, and is conical in shape. Filhote de Redonda lies 183m S of the SW side of Ilha Redonda.

Laje da Redonda, about 1 mile to the SW, is a rocky ledge with one head about 1.5m high.

Ilha Rasa Light

Ilhas Cagarras, about 3 miles N of Ilha Redonda, consists of seven islets. Ilha Comprida is the largest of the group. Ilha de Palmas shows a light.

Sunken rocks extend 183m S of the E end of Ilha de Palmas. Ilha do Pai and Ilha da Mae lie on the NE side of the approach to Baia de Guanabara, close W of Ponta de Itaipu. A shoal patch, with a depth of 20m, lies 0.2 mile S of Ilha do Pai.

Vessels approaching the entrance to Baia de Guanabara should keep a sharp lookout for small craft and fishing vessels.

Rio de Janeiro (22°54'S., 43°10'W.)

World Port Index No. 12920

4.5 Rio de Janeiro is part of the leading commercial center and the largest port complex in Brazil.

The port, which occupies the S and W parts of Baia de Guanabara, lies between Ponta de Santa Cruz and Ponta da Armacao, about 4 miles to the N, on the E side, and Ponta de Sao Joao and Caju, about 5 miles to the NW, on the W side.

Port of Rio de Janeiro

http://www.portosrio.gov.br

Tides—Currents.—The tidal currents off the berths at Rio de Janeiro are weak, but SE of Ilha Fiscal they attain a velocity of 1.5 knots at springs. The ebb runs much stronger than the flood, especially after heavy rains. It generally follows a SSE direction to Ilha das Cobras where it divides into two branches. One branch passes through the anchorage E of the island awhile the other passes through the channel W of the island, where it attains great speed.

On the arrival of cold fronts in winter and when the S wind freshens, a "holding in" of the waters of the bay has been observed; this could cause a lengthening of the flood slack water. The tides in Rio de Janeiro are diurnal, but they are non-uniform. The tidal range is 1.1m at springs and 0.5m at neaps.

Depths—Limitations.—The main channel is swept to 17m. The channel to the container terminal and ore docks is 10m deep. The channel to Gamboa Quay and Sao Cristovao Quay varies from 6 to 12m deep. The channel to Caju Quay is 5.8m deep.

The Presidente Costa E Silva Bridge crosses Baia Guanabara between the NW entrance point of the commercial harbor and Ilha de Moncangue of Niteroi. Passage under the main span is restricted to vessels of more than 50,000 dwt or with a draft greater than 12.2m.

The main span of the bridge, between Pier 100 and Pier 101, has a vertical clearance of 60m above mean sea level and a horizontal clearance of 269m.

A racon is located in the middle of the central span.

Other vessels should pass under the span adjacent to the main span, as follows:

1. Southbound vessels—between Pier 99 and Pier 100.
2. Northbound vessels—between Pier 101 and Pier 102.

The two adjacent spans have a vertical clearance of 60m above mean sea level and a horizontal clearance of 170.5m.

There are about 4 miles of quayage in the commercial harbor of Rio de Janeiro. Ships usually moor and unmoor at any hour except when an unexpected event arises, such as breakdown and inclement weather.

Maua Pier is 811m long, with alongside depths of 9.5 to 11m. The pier had 20 berths and is used mainly for passenger ships. It is located about 0.2 mile W of Ilha das Cobras. Extensive works are underway at this pier as well as the adjacent areas; all part of the Porto Maravilha Project in preparation for the 2016 Olympic Games.

Gamboa Quay, containing Warehouse 1 to Warehouse 18, extends W from the root of Maua Pier for 3,150m and has alongside depths of 7 to 11m.

Sao Cristovao Quay, containing two warehouses, extends NNW from the W end of Gamboa Quay for a distance of 1,525m. There are depths of 6.0 to 9.5m alongside.

Caju Quay has one active berth for ro-ro vessels and extends NE from the N end of Sao Cristovao Quay to the container terminal.

The container terminal, which has four berths, is 1,100m long, with alongside depths of 10.0 to 12.6m.

The tanker berth in the commercial harbor, which lies 0.2 mile NW of Maua Pier, consists of four mooring buoys, in depths of 10 to 12m. The seaward end of the pipeline is marked by a lighted buoy.

Pilotage.—Pilotage is compulsory for all foreign vessels and all vessels carrying petroleum, propane, or explosives. Pilotage is available 24 hours.

Vessels should send an ETA, via the agent, 72 hours, 48 hours, and 24 hours in advance. The pilot should be confirmed, via the agent or the pilot's association, 12 hours and 3.5 hours in advance.

The pilot boat displays a red flag with a black "P." Pilots board, as follows:

1. Vessels approaching from the E—about 1.5 mile SW of Ilha do Pai, by request.
2. Vessels approaching from the S or entering the dredged channel—about 2 miles SSE of Ilha de Cotunduba.
3. Vessels entering the Santa Cruz channel with a draft less than 12.5m—about 0.3 mile SW of Ponta de Santa Cruz.

Vessels of over 10m draft usually embark a pilot at the outer station. Pilots will not bring a vessel to the quarantine anchorage at night if its draft exceeds 11m.

Regulations.—Vessels with a draft of 13.4m or more must use the 17m dredged channel, which begins in the vicinity of Ponta de Copacabana. There is a speed limit of 8 knots in the channel, reducing to 5 knots in the harbor between Ilha da Boa Viagem and Ilha do Manuel Joao. The limit is 6 knots in the approach channels S to the berths located S of the bridge.

A vessel reporting system, which is mandatory for vessels 20 gt and over, is in operation in Rio de Janeiro. Vessels must report to Control Post (PWZ 88), as follows:

1. When entering Baia Guanabara—on the Lage-Santa Cruz alignment.
2. When leaving the port of Rio de Janeiro—passing abeam of Ilha Fiscal.
3. When changing berth or anchorage.

The report must include the following information:

1. Vessel name.
2. Flag.
3. International call sign.
4. Type of vessel.
5. Type of cargo (general, bulk, containers, chemicals, etc.).
6. Port of origin (inbound vessels) or port of destination (outbound vessels).
7. Anchorage or berth (inbound vessels) or estimated date of arrival at destination (outbound vessels).
8. Estimated date of departure (inbound vessels) or cruising speed (outbound vessels).

Vessels changing berth or anchorage must report the following information:

1. Vessel name.
2. Flag.
3. International call sign.
4. Present position.
5. Intended position.
6. Type of cargo on board.

All communications must be made in Portuguese or English, with the pilot assisting in the reporting for foreign vessels. All times are given in Universal Coordinated Time (UTC). Foreign vessels should utilize the pilot to aid in providing the information to Control Post.

If communications cannot be established with Control Post, the vessel should contact the Captain of the Port of Rio de

Courtesy of Jorge Andrade

Rio de Janeiro Harbor

Janiero, by the quickest and most convenient means possible, with the following information:

1. Vessel name.
2. Date and time of event.
3. Reason why communication has not been made.

Signals.—Storm and weather signals are shown from the signal stations about 0.1 mile W of Ponta de Copacabana and near the middle of Ilha dos Cobras. Another signal station is on the S end of Ilha do Mocangue in the approach to Niteroi. The signals are, as follows:

1. A white flag—Good weather.
2. A blue flag—Threatening or bad weather.
3. A white and blue flag—Unsettled weather.

When these flags are displayed alone, it also signifies that the temperature will remain stable.

A black pendant, displayed above or below the flag, indicates that the temperature will rise or fall, respectively. Should a large rise or fall in temperature be expected, the pendant will be replaced by a white flag with a red or black rectangular center, respectively.

At night, the following signals are exhibited at the meteorological observatory and on a building in Cidade do Rio de Janeiro:

1. A white light—good weather.
2. A blue light—threatening or bad weather.
3. A red light—unsettled weather, with or without rain.

Contact Information.—The Rio de Janeiro pilots can be contacted, as follows:

1. VHF: VHF channels 12 and 16
2. Telephone: 55-21-2516-1336
3. Facsimile: 55-21-2233-9738
4. E-mail: assessoria@riopilots.com.br

Rio de Janeiro Port Authority can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-21-2533-4522
3. Facsimile: 55-21-2233-2064
4. E-mail: suprio@portosrio.gov.br

Anchorage.—Vessels which have to anchor outside the harbor due to congestion at the inner anchoring grounds, or which are constrained by their draft, shall anchor 2 miles N of Ilha Rasa, in a depth of about 32m.

Vessels that use this anchoring area must communicate with the harbormaster's office as soon as they reach the area. They may communicate by VHF radio or by fax, or their agent can report in person to the Division of Naval Police, as part of clearance, and at the State Offices at any time, including weekends.

Vessels may not anchor in the aforementioned anchorage without informing the harbormaster's office. A vessel's stay is limited to 48 hours.

This anchorage area is subject to strong S winds and ground swell.

Vessels awaiting quarantine officials should anchor in the quarantine anchorage, 0.8 mile W of Ponta da Armacao, on the Niteroi side of the bay.

The anchorage area situated 0.3 mile SSW of Ponta de Gragoata has a depth of 12 to 20m and is for platforms for submarine prospecting and similar vessels.

For anchorage in Baia Guanabara, vessels must use a local pilot and have permission and clearance. Inner anchorages can be best seen on the chart.

Caution.—Numerous submarine cables from many directions land between Ponta de Copacabana and Ponta do Leme, at the city of Rio de Janeiro. Any vessels anchoring outside the bar of Baia Guanabara must use the anchorage 2 miles N of Ilha Rasa.

Baia de Guanabara—North Part

4.6 **Niteroi** (22°53'S., 43°07'W.) (World Port Index No. 12930) stands on the opposite side of Baia de Guanabara, across from Rio de Janeiro. The port is situated in Enseada de Sao Lourenco and can be approached either by passing between Ponta do Toque-Toque and Ilha do Mocangue Grande, or between the latter island and Ilha do Viana.

The vertical clearance of the bridge between Pier 126 and Pier 130 is 19m.

Enseada de Sao Lourenco is entered by a narrow channel, with a least depth of 5.4m, between Ilha Caju and Ponta da Areia, 183m to the SW.

The maneuvering basin in the channel of Niteroi is 430m long, 250m wide, and has a depth of 6m.

The quay at Niteroi, which is about 450m long from the S shore of Enseada de Sao Lourenco, has a depth of 5m alongside near its center and at least 2m elsewhere. A floating dock is moored at the E end of the quay.

A pier, with a light shown from its head, extends 100m W and SW from the W extremity of Ilha da Conceicao.

An L-shaped pier projects W, then about 450m N from the NW extremity of Ilha do Mocangue, with a second pier projecting 300m N from its root. A wreck, with a depth of 8.3m, lies close N of this pier head. A third pier is reported to project about 100m NW from the NE extremity of lha do Mocangue. A light is exhibited from the head of each pier.

Pilotage is compulsory; pilots board at the quarantine anchorage. Before entering the port vessels must clear with port authorities at the quarantine anchorage.

4.7 The bay N of Rio de Janeiro is generally shallow and foul. The main channel, swept to a depth of 17m and described in paragraph 4.5, leads from the quarantine anchorage to about 1 mile E of Ilha d'Agua, about 0.7 mile off the E side of Ilha do Governador.

There are several maritime terminals for the loading and discharging of oil in the N part of Baia de Guanabara.

The principal terminals are, as follows:

1. Almirante Tamandare Terminals 1 and 2, about 0.5 mile ENE of Ponta da Ribeira and 0.8 mile NE of Ilha d'Agua, respectively.
2. The terminals at Ponta da Ribeira.
3. The terminals near Ponta da Cousa, Ilha Comprida, and Ilha Redonda, ENE of Ilha Comprida.

Almirante Tamandare Terminal 1 has a length of 320m and can accommodate two tankers up to 135,000 gt, one on each side, in depths of at least 17m. The maximum draft permitted is 15.8m.

Almirante Tamandare Terminal 2, of similar construction to Terminal 1, can accommodate vessels up to 35,000 dwt with a maximum draft of 10.4m.

The other terminals can accommodate tankers with lengths up to 200m and drafts up to 9.0m.

There are numerous oil pipelines in the N part of the bay and can best be seen on the charts. Vessels are cautioned not to anchor in the vicinity of these pipelines.

Caution.—When using the applicable navigation chart, do not use objects on both sides of the channel concurrently to fix the vessel's position. The two sides of the bay were surveyed independently and may not exactly match.

Baia de Guanabara to Baia de Sepetiba

4.8 Between Ponta do Arpoador and Cabo da Gavea, about 6 miles to the WSW, the coast is backed by the continuation of the mountains that surround Rio de Janeiro.

Ponta dos Dois Irmaos, about midway along this stretch, is high and steep and rises to Pico Dois Irmaos, about 0.5 mile inland.

Cabo da Gavea (23°01'S., 43°18'W.) is the SW extremity of a rocky promontory. Pico da Tijuca, a conspicuous peak, stands about 4 miles N of the cape. A dangerous rock, with a depth of 2.5m, lies about 0.2 mile offshore and nearly 0.75 mile WSW off the cape.

Ilhas Tijucas, consisting of three islets and several rocks whose least known depth is 2m, and are located about 1 mile S and SE of Cabo da Gavea.

Mariners are advised to navigate in depths no lower than the 20m curve when transiting this area.

A channel runs between the islets and the coast. Vessels using this channel should keep near Cabo da Gavea, which is steep-to.

4.9 **Pontal de Sernambitiba** (23°02'S., 43°28'W.), a low islet joined to the coast by a drying sand ridge, is located almost 10 miles W of Cabo da Gavea. Ilha Urupira lies 2.5 miles SW of Pontal de Sernambitiba, and between it and the mainland is Ilha das Pecas.

Ponta de Guaratiba (23°05'S., 43°34'W.) is the SW extremity of a promontory which is about 1 mile wide. It rises to a conical peak, 354m high, and is the SW end of a chain of mountains surrounding Rio de Janeiro. A small low islet lies close W of Ponta de Guaratiba.

Ilha Rasa da Guaratiba, close S of Ponta de Guaratiba, is 32m high and covered with low vegetation. An above-water rock lies about 0.1 mile WSW of the island. The passage between the island and the coast is obstructed by submerged rocks. A light is shown from the island.

Laje da Marambaia (23°07'S., 43°51'W.), about 15 miles W of Ponta de Guaratiba and 2.75 miles offshore, is 18m high and barren. From the S this steep-to rocky islet appears cone shaped. A light is shown from Laje da Marambaia. A shoal

with a depth of 7.3m and one with a depth of 7.6m lie 0.8 mile and 1 mile W, respectively, of the light.

Restinga de Marambaia, a tongue of land which extends nearly 25 miles W from the foot of Morro de Guaratiba, is separated from the mainland at its E end by a narrow channel. It is mostly sandy with some low vegetation.

Ilha de Marambaia, which forms the W end of this peninsula, rises to a height of 641m.

Areas prohibited to anchoring or fishing are located along the S coast of Restinga da Marambaia.

Baia de Sepetiba

4.10 Baia de Sepetiba, N of Restinga de Marambaia, is about 20 miles long and up to 8 miles wide. The W part of the bay has numerous islands and rocks, with deep water and good anchorage between them. The E part of the bay, with fewer islets and dangers, is shallower, but does not afford good anchorage. The N shore of the bay is low and intersected by several rivers and drainage canals navigable by small craft.

The bay, approached W of Ilha do Marambaia, is entered between **Ponta do Sino** (23°05'S., 44°01'W.) and Ponta do Bispo, about 6 miles to the NNW.

Guaiba Island Terminal (23°01'S., 44°02'W.)

World Port Index No. 12935

4.11 Guaiba Island Terminal (Terminal da Ilha Guaiba) consisting of a 470m long deep-water pier, is situated off the SE end of Ilha Guaiba, about 7 miles due N of the bay entrance. The terminal serves as an iron ore export facility.

Tides—Currents.—The current runs about 2 knots at times off the pier. A heavy swell sometimes runs into the bay and it may be necessary for a vessel to leave the berth and anchor off it.

Depths—Limitations.—A channel, marked by lighted buoys and dredged to 22.5m, leads in a 328°30' direction for nearly 5 miles from a position about 3 miles SW of Ponta do Sino.

The channel then turns to the E and leads in a 069° direction for about 5 miles to a position abreast the ore pier off the S side of Ilha Guaiba. Range lights and a racon mark the two legs of the channel. The distance from the entrance at the bar to the port is 14 miles. The dredged depth of 22.5m is carried as far as the maneuvering basin in front of the quay, which has a least depth of 20.4m.

The South Berth (Outer Berth) has a depth of 22.5m alongside; the North Berth (Inner Berth) has a depth of 19m alongside. A mooring dolphin at the W end of the pier provides an overall mooring length of 470m alongside the S berth. Vessels up to 21.6m draft and 350,000 dwt can be accommodated. There is an air draft restriction at both berths of 19m.

Pilotage.—Pilotage is compulsory and is provided by Rio de Janeiro. The pilot boards about 1.5 miles NE of Ponta de Castelhanos, the extreme E part of Ilha Grande.

Regulations.—Vessels should send their ETA 6 days, 48 hours, and 24 hours in advance, with any changes sent at least 8 hours in advance, through either Rio de Janeiro or directly to the terminal when within VHF range.

Vessels should request anchoring and berthing instructions 4 hours in advance or when within VHF range.

Anchorage.—Anchorage can be taken in the vicinity of the pilot boarding area, in a depth of 23m, sand and shell. Ships should not proceed beyond this point unless a pilot is aboard and instructions for mooring have been received.

Large ships can anchor about 2 miles NE of Ponta dos Castelhanos or about 3 miles NW of Ponta do Sino while awaiting berth to load ore.

Caution.—Less water than charted has been reported on the 328.5° entrance channel.

4.12 **Ilha Guaibinha** (22°59'S., 44°02'W.) lies about 0.5 mile N of Ilha Guaiba. Anchorage is afforded in the middle of the channel between the two islands, in depths of 13 to 14m.

A shoal, with depths of less than 5.5m, extends about 0.7 mile E and 1.25 miles NE from Ilha Guaibinha.

Laje Preta de Fora, above-water and showing a light, lies at the NE end of this shoal.

Ilha Jurubaiba (22°58'S., 43°57'W.) lies 5 miles NE of Ilha Guaiba and shows a light from its W side. A light is shown from Laje do Cabrito, a submerged rock located 3 miles W of Ilha Jurubaiba. The island is flat and elongated in a E to W direction, 32m high with rocky slopes.

Ilha de Jaguanum (23°00'S., 43°56'W.) lies about 2 miles NE of Ponta Mangona, the N extremity of Ilha da Marambaia.

The island shows two elevations of the same altitude separated by a depression. It is covered by intense vegetation, with rocky slopes.

Anchorage is afforded off the NW side of Ilha de Jaguanum, in a depth of about 9.1m. The best anchorage for small craft is NE of the island, in depths of 10 to 20m, but care should be taken to keep clear of the spit extending NW from Ilha Bonita.

4.13 **Ilha de Itacuruca** (22°57'S., 43°53'W.), the largest and highest island in Baia de Sepetiba, lies about 2 miles NE of Ilha de Jaguanum, and is separated from the coast by Canal de Itacuruca on its N side.

The island is flat on its N part and high on the S part, with dense vegetation, rocky slopes with beaches, and many isolated houses which is the village of Itacuruca that stands near the mainland near the W entrance to the canal.

A pier in the village can accommodate vessels of up to 3m draft. The canal has a minimum depth of 4.6m in the fairway.

Anchorage may be obtained 183m S of the pier at Itacuruca, in depths of 7 to 8m, mud, with good shelter from all except W and SW winds. The E part of Baia de Sepetiba is shallower than the W part and there are fewer islets and dangers in it.

The NE part of the bay is low and backed by mangroves and it is broken by the mouths of several rivers and canals which are navigable by small craft.

The villages of Sepetiba and Pedra stand on this part of the bay. Anchorage may be obtained by small vessels about 1 mile off Sepetiba, in a depth of 4m, mud.

Caution.—Several mooring buoys are located in Canal de Itacuruca.

4.14 Porto de Sepetiba (22°56'S., 43°50'W.) consists of three main terminals. Coal and aluminum are imported and iron ore is exported. Containers are also handled.

Depths—Limitations.—An L-shaped jetty, with a berthing length of 540m, extending S from the S point of Ilha da Madeira, is the largest pier. The N face of the pier can accommodate two vessels of 45,000 dwt. The S face of the pier can accommodate two vessels of up to 130,000 dwt.

The Mineral Terminal, a T-head pier, extends S from the shore close E of the main pier. It can accommodate vessels up to 230,000 dwt, with a length of 315m and a draft of 17m.

Inshore of the main pier is the container terminal, with depths alongside of about 14m.

The approach channel to the Mineral Terminal (TPS) was reported (2004) dredged to 17.1m; the approaches to the S side of the TECAR Jetty and the container terminal have been dredged to a depth of 13.4m.

Pilotage.—Pilotage is compulsory and is provided by Rio de Janeiro. The pilot boards about 1.5 miles NE of Ponta de Castelhanos, the extreme E part of Ilha Grande.

Regulations.—Vessels should send their ETA 6 days, 48 hours, and 24 hours in advance, with any changes sent at least 8 hours in advance, through either Rio de Janeiro or directly to the terminal when within VHF range.

Vessels should request anchoring and berthing instructions 4 hours in advance or when within VHF range.

An alternative fairway channel, passing S of Ilha do Martins and marked by lighted buoys and a lighted beacon, is used by outgoing vessels after unloading at Sepetiba.

Caution.—The buoyed channel passing W and N of Ilha do Martins is now known as Secondary Channel. Main Channel, formerly the alternative channel for departures, is also buoyed and passes S of Ilha do Martins.

It is reported (2015) that changes to the approach channel buoyage have been recently effected.

Information about aids to navigation and depths in the approach channels and the turning basin should be obtained from the local authorities.

Ilha Grande

4.15 Ilha Grande (23°09'S., 44°13'W.), lying in the entrance of Baia da Ilha Grande, is about 16 miles long and 7 miles wide. The island is mountainous and covered with thick vegetation to the water's edge.

Pedra d'Agua, the summit of the island, is 1,035m high; Pico da Papagaio, about 2 miles ESE, is 982m high and resembles a parrot's beak.

Ponta de Castelhanos, the E extremity of the island, shows a light.

The S coast of Ilha Grande is formed by several bays and coves, two of which are located between Ponta de Lopes Mendes and Ponta da Andorinha, 2.5 and 6 miles WSW, respectively, of Ponta de Castelhanos. The buildings of a penal colony stand on the W side of the bay.

Ponta dos Meros (23°14'S., 44°21'W.) is the SW extremity of Ilha Grande. Ilha dos Meros lies 1 mile NW of the point and rocks awash lie 0.25 mile NE of the island.

Baia da Ilha Grande

4.16 The entrance to Baia de Ilha Grande lies between Ilha de Marambaia and **Ponta de Juatinga** (23°18'S., 44°30'W.), 30 miles to the WSW. The bay is extensive and its shores are deeply indented.

The two channels of Grande Island Bay are easily recognized by the elevations of Marambaia Island, on the E bank, and from Juatinga point, on the W bank, and Grande Island is between them, also with outstanding mountains.

Approaching the E and W channels does not present any difficulty up to the places of pilot boarding and disembarkation; however, navigation in the vicinity of Marabbaia spit has restrictions which are best shown on the chart.

There are numerous islands, islets, and rocks throughout the bay. There are good anchorage areas in most parts of the bay.

Caution.—The government of Brazil has established restricted areas throughout Baia da Ilha Grande and Baia da Ribeira. These areas encircle the twenty nine islands, islets, and rocks within the bays from the HW line to 1,000m offshore. Entry into these restricted areas is prohibited except for educational purposes.

Baia da Ilha Grande—East Part

4.17 The E part of the bay, lying W of Baia de Sepetiba, is formed by the NE side of Ilha Grande and the coast to the N and is entered between Ilha da Marambaia and **Ponta de Castelhanos** (23°10'S., 44°06'W.).

The bays and coves on the NE coast of Ilha Grande afford excellent anchorage, but those on the mainland coast are generally exposed to winds from SE through SW, and to the swells caused by these winds.

Enseada das Palmas (23°08'S., 44°07'W.) lies 2.5 miles NW of Ponta de Castelhanos. The bay is separated into two small coves by Pontinha.

Anchorage can be obtained in the SE part of the bay in depths of about 11m, and small craft may anchor off the head of the S cove, in a depth of about 7m.

Ilha Pau a Pino is located about 3 miles N of Enseada das Palmas and rises sheer from the sea. The island has little vegetation, but shows a light. A rocky ledge extends about 0.2 mile SW from the island.

Enseada do Abraao (23°08'S., 44°09'W.) lies about 2 miles NW of Enseada das Palmas. On the W shore of the bay are the large buildings of a disused quarantine station and a small landing pier.

Abraao, a small fishing village, stands at the head of the bay. Vessels drawing up to 3m can berth at the pier at HW.

Anchorage may be obtained in any part of the bay according to draft. It is the best anchorage in the E part of Baia de Ilha Grande, and is sheltered from all winds.

Enseada da Estrela is located about 2 miles WNW of Enseada do Abraao.

Anchorage is available in all parts of the bay over a bottom of sand and mud, but the swell sometimes runs into it.

Saco do Ceu, a landlocked cove, lies in the NW corner of the bay. Small craft can anchor in Saco do Ceu, in depths of 6 to

9m. A depth of 2.2m exists near the middle of the entrance to the cove, about 183m N of the S entrance point.

Ilha de Macacos (23°05'S., 44°14'W.) is separated from Ilha Grande by a narrow passage which is encumbered with rocks and can be used by small boats at HW.

Ponta Maria Albardo is the N extremity of the island and a shoal patch, with a depth of 13.1m, lies 0.3 mile N.

Baia de Ilha Grande—North Shore

4.18 **Baia de Mangaratiba** (22°58'S., 44°04'W.) is entered between Ponta do Bispo and Ponta da Cruz, about 0.5 mile WSW. This shallow bay is exposed to the sea, which breaks heavily on its NW shore. The town of Mangaratiba stands on the E side of the bay and has a small concrete pier.

Laje de Mangaratiba, low, dark-colored, and steep-to, lies in the approach to Baia de Mangaratiba, and shows a light.

Between Laje de Mangaratiba and Ponta do Leme, about 10 miles to the WSW, the coast is fringed by off-lying islets and indented by small bays, which can best be seen on the chart.

TEBIG Oil Terminal (23°04'S., 44°14'W.), a concrete pier extending 1,280m from Ponta do Leme, has a berthing length of 570m. It accommodates tankers from 350,000 to 500,000 dwt, in depths of 30m on the S side of the pier and 36m on the N side of the pier.

Vessels approach the terminal through a channel marked by lighted buoys. The channel, which is 9.2 miles long, 0.2 mile wide, and has a least depth of 25m, begins about 3 miles N of the W extremity of Ilha Grande.

Pilotage.—Pilotage for the channel and berths is compulsory. The arrival time of vessel should be sent 72 hours in advance and should be confirmed 48 hours and 24 hours before arrival. Pilots embark either 2 miles WSW of Ponta Acaia, the extreme W point of Ilha Grande or 1.5 miles NE of Ponta de Castelhanos, the extreme E point of Ilha Grande. Vessels can be berthed day or night.

Ilha Grande—Northwest Coast

4.19 The NW coast of Ilha Grande trends generally NE from **Ponta Acaia** (23°10'S., 44°23'W.) to the N extremity of the island.

Enseada de Aracatiba (23°09'S., 44°20'W.) is entered between Ponta Grande, 2.5 miles ENE of Ponta Acaia, and Ilha Longa, 1 mile NE and close offshore. Anchorage is available in the bay, with good shelter, about 0.4 mile S of the W end of Ilha Longa, in a depth of 21m, mud.

Enseada de Sitio Forte is entered between Ponta Grossa de Sitio Forte, about 2 miles NE of Ilha Longa, and Ponta Aripeba, about 1 mile farther E. The head of the bay is formed by a small cove, the W side of which is foul.

Anchorage, sheltered from all winds, and the best on this coast, may be obtained in the bay. A good berth is situated 1 mile SSE of Ponta Grossa de Sitio Forte, in a depth of 17m, mud.

Saco do Bananal (23°06'S., 44°15'W.) is entered between Ponta Aripeba and Ponta do Bananal, about 1 miles to the NE.

Laje Matariz de Fora, a rock with a depth of 5.3m, lies almost midway between the entrance points of the bay. Laje Matariz de Dentro, a rock with a depth of 0.5m, lies 183m SE of the above danger.

Baia da Ilha Grande—Central Part

4.20 The central part of the bay is formed by the NW side of Ilha Grande and the much indented coast to the N. Numerous islands, islets, and dangers encumber this part of the bay. The principal inlets on the mainland are Baia de Jacuacanga, Porto de Angra dos Reis, and Baia da Ribeira.

The smaller islets and dangers in this area can best be seen on the chart.

Ilha da Gipoia (Ilha da Jiboia) (23°03'S., 44°22'W.), about 8 miles N of Ponta Acaia, is the largest and highest island fronting the principal inlets on the mainland.

The coves on the N and E banks offer the best anchorage for recreational boats, with depths from 3 to 10m, sheltered from the S and SW winds; however, the ones on the E bank are restricted. There is a submarine pipeline between their points.

Ilha de Porcos Grande, about 2 miles E of the SE side of Ilha da Gipoia, is the largest of a group of three islets, and is covered with dark vegetation. Ilha de Porcos Pequena, the smallest, lies about 183m S of Ilha de Porcos Grande, and Ilha de Porcos Pequenos lies 0.15 mile off its N side.

Laje Preta (23°03'S., 44°18'W.) lies about 0.2 mile NE of Ilha de Porcos Pequena. It is dark in color with sparse vegetation and shows a light. Laje do Miguel, a rock with a depth of 7.6m, lies abot 0.3 mile NW of Laje Preta.

Ilha Saracura (23°03'S., 44°16'W.), about 2 miles ESE of Laje Preta, lies on the E side of the approach to Baia de Jacuacanga. It is rather low and shows little vegetation. A light is shown from its W side.

Shoals extend ENE from Ilha Saracura, with a least depth of 6.2m lying 0.35 mile NE of the island. A passage between these shoals and Ponta de Leste, 1 mile ENE, is marked on its E side by a buoy moored 0.25 mile W of the point.

Laje de Saracura, a rock with a depth of 7.2m, lies 0.4 mile SW of Ilha Saracura. A 10.6m patch lies 0.4 mile W of the island, while an 11.7m patch lies 0.6 mile S of the island.

Laje dos Homens (23°02'S., 44°18'W.), a cluster of low and bare black rocks, lies about 2 miles WNW of Ilha Saracura, and shows a light.

Baia de Jacuacanga

4.21 **Baia de Jacuacanga** (23°02'S., 44°15'W.) is entered between **Ponta de Leste** (23°03'S., 44°15'W.) and Ponta do Peregrino, about 3 miles to the NW. Several islets, rocks, and shoals lie in the bay. A monument stands at an elevation of 70m about 0.2 mile NE of Ponta de Leste. Submarine pipelines are laid on the E side of the bay.

The SE side of the bay is exposed to SW winds but is comparatively free from dangers. The only dangers lying more than 0.5 mile offshore are Laje das Duas Irmas, situated 1 mile NW of Ponta de Leste and marked on its N side by a lighted buoy, and Laje do Bernardo, about 0.7 mile NNW of the same point.

The NW side of the bay is fringed to a distance of about 1 mile by islets and dangers, which include Ilhas das Duas Irmas, two islets lying 0.75 mile and 1 mile, respectively, SSE of

Ponta do Peregrino and Lajes Brancas, a prominent group of whitish-colored bare rocks lying almost 0.75 mile ESE of the same point.

Lajes Pretas, a group of dark-colored, bare, above-water and drying rocks lie 1 mile E of the point. Laje Grande, a group of black above-water rocks, showing a light, lying about 2 miles ENE of the point.

In the N corner of the bay, a modern shipyard with four dry docks and 600m of quayage for vessels drawing up to 7m, stands near the town of Boa Vista.

Anchorage is available in most parts of Baia de Jacuacanga, but the whole of the E part is exposed to SW winds. The best Anchorage for small craft are Enseada da Mombaca and Enseada de Camorim, situated on the W side of the bay.

Caution.—Anchorage is prohibited in the charted pipeline area.

4.22 Angra dos Reis (23°01'S., 44°19'W.) (World Port Index No. 12940) is entered between Ponta da Cidade and Ponta do Calafate, about 2 miles to the W. The town is located on the NW side of the bay. A conspicuous yellow silo stands on the wharf at the town. The buildings of a school stand at the head of Enseada Batista das Neves, about 0.7 mile NE of Ponta do Calafate.

Tides—Currents.—The tidal currents in Porto de Angra dos Reis are very weak.

Depths—Limitations.—The main pier extends 0.3 mile SE from the town. It has 345m of berthing space, with an average depth of 7.5m alongside. This wharf is being extended 150m to the SE. A small pier in Enseada Batista das Neves can berth vessels drawing up to 3m.

Pilotage.—Pilotage is compulsory and is provided by Rio de Janeiro. The pilot boards about 2 miles WSW of Ponta Acaia, the extreme W point of Ilha Grande.

Anchorage.—Anchorage can be taken, in 7.8m, mud, with the conspicuous silo on the pier bearing about 280°, distant 0.4 mile. This anchorage is sheltered from all winds except from the SW, which raises a sea and causes a strong set toward the head of the harbor.

An outer anchorage lies with the silo bearing 015°, distance 1.25 miles, in a depth of 12m.

4.23 Parcel da Ilha do Calombo (23°02'S., 44°19'W.), a submerged reef with one drying head, lies about 0.1 mile W of the S end of Ilha do Calombo. The island has low vegetation and is surrounded by rocks. A light is shown from Parcel da Ilha do Calombo.

A 3.8m patch, marked by a buoy on its W side, lies about 0.15 mile S of Parcel da Ilha do Calombo. A shoal patch, with a depth of 2.5m and a lighted buoy moored close W, lies 0.3 mile N of the N end of Ilha do Calombo.

Ilha do Maia is located on the W side of the harbor, about 0.25 mile ESE of Ponta do Calafate. Ilha Francisco lies 0.75 mile NE of Ilha do Maia. A building stands on the highest point of the island.

Laje das Enchovas, with a least depth of 2.8m and marked close NE by a buoy, lies about 0.2 mile NE of Ilha Francisco.

The numerous other dangers in the harbor can best be seen on the chart.

Baia da Ribeira

4.24 Baia da Ribeira (23°00'S., 44°23'W.) is entered between Ponta da Maresia, the W extremity of Ilha da Gipoia, and Ponta do Coqueirao, on the mainland about 3 miles to the WNW.

The bay, extending about 8 miles NE, is thickly studded with islands and outlying sunken rocks extending from both sides. These dangers narrow the bay to about 1 mile in the center. Some of these dangers are marked by beacons and buoys and can best be seen on the chart.

The principal inlets in the bay are Enseada da Japuiba, on the E side; Enseada do Ariro, at the head; and Enseada de Bracuhy, on the NW side.

Vessels entering the bay should proceed with caution and should not attempt to enter any of its inlets without local knowledge.

Canal da Gipoia (23°02'S., 44°21'W.) leads N of Ilha da Gipoia and is one of the approaches to Baia de Ribeira. It has a least width of 0.4 mile and general depths of 12.8m, with the exception of a 7.3m patch in mid-channel. A rocky patch, with a depth of 3.2m, lies about 0.7 mile ESE of Ponta do Adolfo.

A submarine cable is laid across the channel and is marked by lighted beacons on each side of the channel. A light is shown from Laje da Figueira at the NW end of the canal.

Baia da Ilha Grande—West Part

4.25 The W part of the bay lies between Ponta de Juatinga, its SW entrance and Ponta da Coqueirao, about 17 miles to the NNE.

Ponta de Juatinga (23°18'S., 44°30'W.), which shows a light, is the S extremity of a high peninsula about 0.6 mile long. Morro Cairucu, about 5 miles W of Ponta de Juatinga, has twin peaks. Radar returns of 21 miles from Ponta de Juatinga have been reported.

Enseada do Pouso is entered between Ponta da Mesa, 2.5 miles NW of Ponta de Juatinga, and **Ponta Cajaiba** (23°13'S., 44°33'W.), 2.5 miles further NNW. The bay is clear of dangers, but is open to all except SW winds.

Anchorage may be obtained near the middle of the bay, 1.25 miles WNW of Ponta da Mesa, in a depth of about 17m, mud.

Baia de Mamangua (23°14'S., 44°36'W.) and Enseada de Parati Mirim have a common entrance between Ponta Cajaiba and Ilha do Algodao, about 2 miles to the NW.

Baia de Mamangua, the SE inlet, is 4.5 miles long and lies between two mountain ranges; it affords little shelter from SW winds which blow through a gap in the mountains. Enseada de Parati Mirim, the NW inlet, is landlocked and sheltered.

Baia de Parati is entered between **Ponta Grossa de Parati** (23°11'S., 44°39'W.) and Ilha do Araujo, about 3 miles to the NW. The bay is encumbered with numerous islets and shoals, but is accessible to small craft. The town of Parati stands near the head of the bay.

There is a small wooden pier in town which can accommodate vessels with drafts up to 2.4m at HW.

A channel, with depths of over 5m, follows the SE shore of Baia de Parati, passing SE of Ilha de Bexiga, located 3.25 miles SW of Ponta Grossa de Parati, and the chain of islets and rocks which extends 1.25 miles NE from this islet.

Laje de Tapera, with a depth of 4.6m, encroaches on the SE side of this channel, 2.5 miles SW of Ponta Grossa de Parati, and is marked on its NE side by a black buoy.

The channel may be entered passing either side of Ilha de Mantimento. The remainder of Baia de Parati has depths of less than 5m.

Anchorage is available for small craft SW of Ilha da Bexiga, in depths of from 5 to 6m, mud, and sheltered from all winds.

Ilha Rapada (23°10'S., 44°40'W.), 48m high, rocky with low vegetation, and surrounded by submerged and drying rocks. The island lies in the entrance to Baia de Parati, about 2 miles NW of Ponta Grossa de Parati. The island shows a light.

Paracel dos Meros, an outlying drying shoal marked by a buoy, lies 7 miles ENE of Ilha Rapada.

From the vicinity of Ilha do Araujo, the shore of Baia de Ilha Grande trends N for 6 miles and then E for 13 miles to Ponta do Coqueirao, and is fringed by numerous islets and submerged rocks lying up to 2 miles offshore.

Vessels should not proceed within 3 miles of this shore without local knowledge.

Anchorage is available to vessels with local knowledge off the NW side of **Ilha Sandri** (23°03'S., 44°30'W.), in depths of 8 to 12m, mud, good shelter from swells.

Ponta de Juatinga to Ilha de Sao Sebastiao

4.26 Between Ponta de Juatinga and Ponta Negra, about 7 miles to the SW, the coast is mountainous. Between Ponta Negra and Ponta da Trindade, about 7 miles farther W, the coast is indented and forms several inlets all opening to the S.

Between Ponta da Trindade and Ponta da Cruz, about 7 miles to the W, there is a small inlet entered between Ponta do Comburi and Ponta Brava.

Parcel do Camburi, which has a depth of 10m, lies about 3 miles SW of Ponta da Trindade. During heavy SW seas, the shoal breaks at times.

Enseada de Picinguaba and Enseada de Ubatumirim, both of which are opened to the SW and afford no shelter, lie within 6 miles to the W of Ponta da Cruz. Numerous islets and dangers lie within 2 miles of these bays.

Caution.—A dangerous wreck lies 0.5 mile W of Ponta Negra.

4.27 Ilha das Couves (23°25'S., 44°51'W.) lies about 2 miles SSW of Ponta da Cruz. Ilha Comprida lies about 0.3 mile N of Ilha das Couves and has depths of 10.4m in the fairway between the two islets.

Ilha Rapada (23°26'S., 44°54'W.) lies about 2 miles W of Ilha das Couves.

Parcel da Rapada, a rock with a depth of 10.3m, lies about 0.2 mile S of Ilha Rapada.

Parcel Grande da Rapada, with a depth of 14.6m, and Parcel do Meio, with a depth of 14m, lie about 2 miles SE and 1.75 miles ESE, respectively, of Ilha Rapada. Laje Grande, with two above-water rocks, lies about 2 miles WNW of Ilha Rapada.

Enseada de Ubatuba (23°26'S., 45°03'W.) lies about 7 miles W of Ilha Rapada, and is entered between Ponta Grossa and Ponta de Respingador.

The town of Ubatuba lies at the head of the bay and is of little importance commercially.

A small T-headed pier, with a berthing length of 20m and a depth of 3.7m alongside, is situated about 2 miles WNW of Ponta Grossa, which shows a light.

Laje Patieiros, with a depth of 4.3m, lies about 0.1 mile N of Ponta Grossa. The sea nearly always breaks over this shoal.

Anchorage is available on the S side of Baia de Ubatuba, in a depth of 6.4m, mud, 0.5 mile W of Ponta Surutuya, which lies 1.25 miles NW of Ponta Grossa.

4.28 Ilha Anchieta (Ilha dos Porcos) (23°32'S., 45°04'W.), about 5 miles SSW of Ponta Grossa, is separated from the mainland by a channel 0.3 mile wide. The island is completely covered with trees, but is hard to distinguish against the high mainland. Ilha das Palmas lies about 1 miles off the E side of Ilha Anchieta.

Enseada das Palmas is entered between the NW extremity of Ilha Anchieta and Ponta Norte, 1 mile to the E. The bay affords anchorage, in depths of 5 to 7.5m, with shelter from all winds except from those between NE and E. A prison stands on the S shore of the bay.

Between Ponta Espaia and **Ponta Grossa** (23°35'S., 45°13'W.), 8 miles to the WSW, the coast is formed by Enseada do Flamengo, Enseada da Fortaleza, and Ensea da do Mar Virado, three bays which afford temporary anchorage.

Small craft can anchor in Enseada do Flamengo, in a depth of 6m, with good shelter in the NW part of the bay.

Between Ponta Aguda and Ponta Massaguacu, 3 and 9 miles WSW, respectively, of Ponta Grossa, there is a bay, the E part of which is shallow. Ilha do Tamandua is 1 mile W of Ponta Aguda. The passage between it and the mainland is obstructed by rocks, awash.

Enseada de Caraguatatuba (23°40'S., 45°23'W.) is entered between Ponta Martim de Sa, 1 mile W of Ponta Massaguassa (Ponta Massaguacu), and Ponta Arpoar, 5.5 miles S. It is filled by a bank of sand with depths of less than 5.5m.

Caraguatatuba (23°37'S., 45°25'W.), a fruit-exporting center, is situated at the N corner of the bay. A light is shown from Ponta Massaguassa; a tower stands on a hill located about 0.1 mile N of Ponta Martim de Sa.

Ilha do Mar Virado (23°34'S., 45°10'W.) lies about 3 miles ENE of Ponta Grossa. Between the N end of the island and the mainland, a number of islets and dangers restrict passage between the two.

4.29 Ilha da Vitoria (23°45'S., 45°01'W.) lies about 11 miles SSE of Ilha dos Porcos and shows a light from its E side.

Ilha dos Pescadores and Ilhote das Cabras lie off the N end of Ilha da Vitoria.

Ilha dos Buzios (23°48'S., 45°08'W.) lies about 6 miles WSW of Ilha da Vitoria and Ilha Sumitica lies about 0.7 mile SW of the S extremity of Ilha dos Buzios. An above-water rock and a rock, awash, lie midway between the two islands.

Ilha de Sao Sebastiao

4.30 Ilha de Sao Sebastiao (23°50'S., 45°20'W.), mountainous and wooded, is separated from the mainland by Canal de Sao Sebastiao. Pico do Sao Sebastiao, its summit, stands on the SW part of the island. In clear weather the island can be seen for about 45 miles.

A light, with a racon, is shown from Ponta do Boi, the S extremity of the island; a light is also shown from Ponta Pirabura, about 2 miles NE of Ponta do Boi.

Baia de Castelhanos, on the E side of the island, is exposed to SE sea and winds. Saco do Sombrio is on the S extremity of Baia de Castelhanos, and affords complete sheltered anchorage to small craft, in depths of 10 to 20m.

Anchorage can also be taken in the S part of Baia de Castelhanos, in depths of about 20m mud, and sheltered to all winds except NE and E winds.

Caution.—Dense fog has been reported in the vicinity of Ilha de Sao Sebastiao.

Canal de Sao Sebastiao

4.31 Canal de Sao Sebastiao (23°48'S., 45°24'W.) lies between the mainland and the W coast of Ilha de Sao Sebastiao. The canal is entered from the N between **Ponta das Canas** (23°44'S., 45°21'W.), and Ponta do Arpoar, 3 miles to the W, and from the S between Ponta da Sela, the W extremity of Ilha de Sao Sebastiao, and **Ponta Toque-Toque** (23°50'S., 45°31'W.).

Winds—Weather.—The winds during the day blow nearly always from N, NE, or SSW following the direction of the canal, but are frequently interrupted by calms. At night, the land wind is variable.

Tides—Currents.—The tidal currents are irregular and follow the general direction of the winds, and almost always proceeding them. They have a velocity of 1 to 2 knots, and sometimes with strong winds, reach a velocity of 3 to 4 knots.

The height of the tide in the port varies from 0.2m at LW and 1.5m at HW, having a average level of 0.7m. The tide runs either N into the channel or S with characteristics of permanent flowing as if it was a river following the orientation as given by the channel.

The current attains considerable speeds which might impair maneuvering of vessels in the channel, especially at times of entrance of a cold front when winds attain a significant force.

Depths—Limitations.—The channel to the port of Sao Sebastiao is 12.3 miles long. South Bar Channel is dredged to 24m, although depths of 19m have been reported. It is 300m wide at its narrowest part, allowing entrance and sailing of vessels drawing up to 23m. North Bar Channel has a depth of 18m and is 550m wide at its narrowest part, allowing entrance and sailing of vessels drawing up to 10m.

A shoal, with a depth of less than 9m, extends 1.5 miles N from Ponta das Canas.

A shoal of sand and mud, with depths of less than 5.5m, extends about 2 miles E from Ponta Arpoar. It then gradually closes the coast to the S and ends at Ponta Araca, about 1 mile S of Sao Sebastiao. A depth of 9.4m was reported about 3 miles NE of Sao Sebastiao Light.

Laje dos Moleques, showing a light, is a cluster of low and bare rocks resembling parts of a sunken wreck, and lies about 0.6 mile SW of Ponta Araca and 0.2 mile offshore.

Vessels must keep in mid-channel as it was reported that less water than charted was found about 0.2 mile S of Laje dos Moleques.

Pilotage.—Pilotage, which is available 24 hours, is compulsory for the following vessels:

1. Foreign vessels, tankers, gas carriers, and all vessels transporting explosives.
2. All vessels over 500 gt bound for Terminal Maritimo Almirante Barroso.

Pilots board, as follows:

Vessels should send their ETA and request for pilotage 48 hours and 24 hours in advance. Vessels should also establish VHF contact with the pilot station to confirm their ETA 3 hours prior to arrival.

1. North approach—1.5 miles NNW of Ponta das Canas.
2. South approach—1.5 miles WSW of Ponta da Sela.

Contact Information.—Sao Sebastiao pilots can be contacted, as follows:

1. VHF: VHF channel 16, 10 and 13
2. Telephone: 55-12-3892-1332
3. Facsimile: 55-12-3452-1762
4. E-mail: praticagem@uol.com.br

4.32 Sao Sebastiao (23°48'S., 45°24'W.) (World Port Index No. 12960) has an L-shaped pier situated on the SE side of the town The outer commercial quay has a length of 150m, with a depth of 8.2m alongside. The inner berth is 90m long with a depth alongside of 5m. Tug assistance is required in mooring at all berths.

Terminal Maritimo Almirante Barroso (23°48'S., 45°23'W.) is located on the W edge of the channel between the shore and the island. Safe access for large tankers is possible through the S entrance, but smaller tankers with drafts of 7.6m or less may enter through the N channel entrance.

The head of the T-shaped jetty is 1,690m from the shore. The N arm is 395m long and can accommodate a vessel of 150,000 dwt at the outside berth. The maximum permitted drafts alongside are 13m at the inside berth and 19m at the outside. The S arm is 510m long and can accommodate vessels up to 300,000 dwt at the outside berth. The maximum permitted drafts are 18m at the inside berth and 23m at the outside berth.

Regulations.—Vessels should send their ETA 48 hours and 24 hours in advance through Rio de Janiero and establish VHF contact with the terminal when within range.

Contact Information.—Terminal Maritimo Almirante Barroso can be contacted, as follows:

1. VHF: VHF channel 14
2. Telephone: 55-12-3891-4113
3. Facsimile: 55-12-3891-4210

Anchorage.—There are designated anchorage areas within Canal de Sao Sebastiao which are best shown on the chart.

A prohibited anchorage area exists 0.25 mile S of Ilhabela extending to the opposite shore. This is a submarine cable area and is marked by blue lights on each shore.

Ilha de Sao Sebastiao to Baia de Santos

4.33 Between Ponta Toque-Toque and Ponta Munduba, the E entrance point of Baia de Santos, 44 miles to the WSW, the coast forms a wide bay, the shores of which consists of sandy beaches separated by small rocky points. Serra do Mar continues to back the coast, but presents no prominent features.

Ilha das Couves (23°48'S., 45°43'W.) lies 11.5 miles WNW of Ponta Toque-Toque. As Ilhas, two islets, lie about 0.5 mile NE of Ilha das Couves.

The passage between As Ilhas and Ilha das Couves is foul. Baixo Pequeno and Baixo Grande, each with a least depth of 2.4m, lie 0.4 mile S and 0.9 mile SW of Ilha das Couves. Ilha do Gatos lies about 1 miles E of Ilha das Couves.

Anchorage, sheltered from S and SE winds, is available for small craft N of As Ilhas, in a depth of 11m. Breakers have been reported over Baixo Grande.

Ilha Montao de Trigo (23°52'S., 45°47'W.) lies 4.5 miles SW of Ilha das Couves and is 298m high, conical, and wooded up to its summit.

Arquipelago de Alcatrazes (24°06'S., 45°42'W.) lies with Ilha Alcatrazes, the largest of the group, 18 miles S of Ilha das Couves. The island is rocky with little vegetation and rises to a height of 316m.

Ilha da Sapata lies nearly 2 miles ENE of Ilha de Alcatrazas, with two islets and a shoal with a depth of 2.3m in between.

Ilha do Porto, with a small islet close WNW, lies about 0.4 mile NW of Ilha de Alcatrazas. The island shows a light.

Ilha do Paredao is the larger of two islets about 2 miles NNW of Ilha do Porto. A 7.6m shoal patch lies about 0.4 mile SW of Ilha de Alcatrazes.

These islands lie at the center of a firing exercise area, the size of which is about 12 miles in radius. Anchoring and fishing are prohibited.

4.34 Laje de Santos (24°19'S., 46°11'W.), about 30 miles WSW of Ilha de Alcatrazas, is a whitish rocky islet. A group of rocks lie about 1 mile SE of Laje de Santos. A light is shown from the islet.

Pedra do Corvo (23°51'S., 46°08'W.), about 19 miles W of Ilha Montao de Trigo, is the NE extremity of Ilha de Santo Amaro, which forms the E side of Porto de Santos, and the E entrance of Canal de Bertioga.

The canal is narrow and navigable by small craft in depths up to 3.m. The canal should not be attempted without local knowledge. A light is shown from Pedra do Corvo.

The E coast of Ilha de Santo Amaro, between Pedra do Corvo and Ponta Santo Amaro, about 9 miles SSW, has several islets and dangers lying within 1 mile.

Ilha dos Arvoredos, lies about 7 miles SSW of Pedra do Corvo. The island shows good radar returns up to 20 miles. A tower resembling a rocket stands on the island, however, it is reported (2012) that this tower is obscured by trees.

Ilha da Moela (24°03'S., 46°16'W.) shows a light and is located about 7 miles SW of Ilha dos Arvoredos. The island is a good radar target, distant 19 miles.

Ilha da Moela makes an excellent reference for vessels bound for the port of Santos from the SE.

Baia de Santos

4.35 Baia de Santos (24°0'S., 46°21'W.) is entered between Ponta Munduba and Ponta Itaipu, about 6 miles to the W, and recedes about 5 miles N to Ilha de Sao Vicente.

The E part of Ilha de Sao Vicente is separated from Ilha de Santo Amaro by a narrow buoyed channel which leads to Porto de Santos. There are general depths of 13 to 14.6m in the entrance to the bay and 7 to 10m in its N part.

Ilha da Moela Light

Ilha da Moela from SE

Santos (23°57'S., 46°18'W.)

World Port Index No. 12970

4.36 Santos consists of the navigable estuary between Ilha de Santo Amaro and Ilha do Sao Vicente and forms a semi-circle around the city.

The port serves the nearby city of Sao Paulo and is the largest port in South America.

The approach channel, marked by buoys and ranges, is about 5 miles in length and is entered 2.25 miles SW of Ponta Grossa. The harbor channel is entered between Ponta da Praia to the N and Ponta de Fortaleza to the S.

Port of Santos

http://www.portodesantos.com

Winds—Weather.—The prevailing winds are from NE and E, but sometimes they are from NW and SW. This latter wind

causes a rough sea in Baia de Santos. During the summer, the prevailing winds are from the S and during winter from the N. During the winter rainy season, heavy mist is common in the morning.

Tides—Currents.—The tidal currents are strong, especially the ebb tide, which sometimes exceeds 3 knots. North winds decrease and SW winds increase the height of the tide. The range of the tide is 1.1m at springs and 0.3m at neaps.

Depths—Limitations.—The seaward limit of the port of Santos is the parallel of 24°02'S.

The approach channel has been dredged (2012) to a depth of 13.5m. It was reported that silting may be present in the channel and harbor and that depths may be less than charted.

A continuous line of quays front the E and N side of the port for a distance of 5 miles starting about 0.7 mile NE of Ponta da Praia.

The Estuario Wharf (Berths 25 to 35) has alongside depths of 9 to 12m and a length of 1,980m. A submerged mole, with a depth of 11.4m, lies between Berth 28 and Berth 29.

The Dow Chemical Terminal consists of a quay 265m long, which can handle chemical and petroleum vessels up to 45,000 dwt and 11m draft.

The Macuco Wharf (Berths 12A to 27) is 3,017m long with alongside depths of 8 to 11m. Grain is handled at Berth 13 and Berth 26.

The Paqueta Wharf (Berths 1 to 12) is 2,071m long with alongside depths of 5 to 7m. Grain is handled at Berth 1. An underwater sill protrudes 1.2m from Berth 6.

The Saboo Wharf is 990m long and has an alongside depth of up to 12m. Containers and ro-ro vessels are handled. The maximum vessel length accommodated is 200m.

The Alamoa Wharf is 980m long, with alongside depths of 10 to 12m. It handles bulk petroleum liquids. The maximum vessel length allowed is 250m.

The bulk fertilizer quay is located across from Paqueta Wharf. The maximum vessel length accommodated is 265m.

A container and ro-ro terminal is located across from the Estuario Wharf. the terminal can accommodate five vessels simultaneously. The total length is 1,200m.

The Barnabe Quay is 301m long, with an alongside depth of 10m. It handles petroleum by-products and is located across from the Paqueta Quay. The maximum vessel length is 215m.

The Usiminas Wharf (formerly the Cosipa Wharf), with a total of five berths, is 1,070m long with a maximum permitted draft of 9.4m. Berths 1 and 2, each 200m long with maximum permitted drafts of 9m, are on opposite sides of the E pier. Berths 3 and 4 have a combined length of 344m and can accommodate vessels up to 9m draft. Berth 5, located on the W pier is for discharging vessels only. It is 303m in length and can accommodate vessels up to 9.4m draft. They are located at the N end of Canal de Picaquera and can handle two vessels at the same time.

The Vale Fertilizer Quay (formerly the Ultrafertil Quay) is L-shaped and 164m long, with an alongside depth of 10m. It is located close E of Usiminas Wharf and can handle vessels up to 67,000 dwt.

A buoyed channel, 100m wide, leads from the harbor channel to the turning basin abreast the wharf at the Alemoa Refinery.

Canal de Piacaguera, a 60m wide channel, leads N through the Rio Piacaguera from the Alemoa turning basin to a wharf which serves a fertilizer plant and a steel mill. A turning basin is located off the wharf. Vessels over 205m in length or with a beam greater than 29m cannot use Canal de Piacaguera.

The channel has reported dredged depths of about 10m.

The limiting draft for vessels with a length of greater than 185m is 9m at HW and 8.3m at LW. The limiting draft for vessels with a length of greater than 195m is 8.7m at HW and 8m at LW.

Vessels may transit the canal only during daylight hours and must be assisted by tugs.

A dangerous wreck is reported to lie close N of Ponta dos Limoes.

A rock, marked by a buoy and with a depth of 8.5m, lies close to the dredged channel abreast of Berth 14.

A shoal, with less than 1.8m and marked on its SE side by a buoy, lies close to the dredged channel WSW of the W extremity of Ilha Barnabe.

Water pipelines and submarine cables are laid in the vicinity of the approach and harbor and can best be seen on the chart.

Overhead cables, with a vertical clearance of 81m, cross the harbor channel 1 mile N of the container terminal.

Aspect.—Ponta Munduba and Ponta Itaipu, the entrance points of Baia de Santos, are both high and covered with dark-colored vegetation. Ponta dos Limoes, 3 miles NW of Ponta Munduba, rises to high land and can be identified at a distance.

A light is shown from Ilha das Palmas, about 1 mile SSW of Ponta dos Limoes.

Monte Serrat (23°56'S., 46°20'W.), lying almost 3.5 miles NNW of Ponta dos Limoes, attains a height of 165m. A church and a large building stand on its summit, while a conspicuous pipeline runs in a NE direction from the summit. A church, standing at a height of 208m, 1.75 miles SW of Monte Serrat is also prominent.

Aerial view of Santos

Two pairs of range lights and a sector light indicate the approach and entrance to the harbor. The outer pair, in line bearing 021.5°, leads into the dredged channel. The middle is a sector light. The inner pair is in line, bearing 094°, but has been reported to be difficult to distinguish.

Santos

Pilotage.—Pilotage is compulsory for the following vessels when entering the Santos Fairway area and the Santos inner anchorage:

1. All foreign vessels.
2. All vessels carrying dangerous cargo.
3. All Brazilian vessels over 2,000 dwt.

Pilotage is also required for shifting berths or changing anchorage positions.

Vessels should send their ETA 2 hours in advance; this message should also include the vessel's draft and the pilotage request.

The pilot boards about 0.6 mile W of Ilha das Palmas. Deep-draft vessels are boarded either 0.9 mile W of Ponta Grossa or as directed by the pilot station.

The pilot boat flies a red flag with a black "P" on it. In bad weather, the pilot will direct vessels from the pilot boat to a sheltered position in order to board vessel.

The ship must not proceed N of the pilot station until a pilot has been embarked. The pilot station and pilot boat are equipped with VHF radiotelephone.

Regulations.—A vessel reporting system, which is mandatory for vessels 20 gross tons and over, is in operation in Santos. Vessels must report to Control Post (PWS 88), as follows:

1. When anchoring.
2. When leaving an anchorage.
3. Inbound vessels—When abreast of Ilha das Palmas.
4. Outbound vessels—Immediately before leaving the berth.

The report must include the following information:

1. Vessel name.
2. International call sign.
3. Flag.
4. Port of origin (inbound vessels) or port of destination (outbound vessels).
5. Type of vessel.
6. Anchorage or berth (inbound vessels) or estimated date of arrival at destination (outbound vessels).
7. Estimated date of departure and cruising speed (outbound vessels).

Vessels changing berth or anchorage must report the following information:

1. Vessel name.
2. International call sign.
3. Previous position.
4. Present position.

All communications must be made in Portuguese or English. All times are given in Universal Coordinated Time (UTC). Foreign vessels should utilize the pilot to aid in providing the information to Control Post.

If communications cannot be established with Control Post, the vessel should contact the Captain of the Port of the State of Sao Paulo by the quickest and most convenient means possible, with the following information:

1. Vessel's name.
2. Date and time of event.
3. Reason why communication has not been made.

The Inspectorate has decided that, in view of the possibility of the transmission by mosquito carriers of yellow fever and certain types of malaria non-existent in Brazil, vessels having Santos as the first Brazilian port of call, and having called during the voyage at the ports mentioned below, will be interdicted prior to entering the Santos Estuary, in order that an inspection may be carried out at an opportune moment to eliminate such mosquito carriers if they should be found onboard.

The characteristics of the Santos, in the interior of an estuary reached through a narrow channel, where mosquitoes may easily reach land on either side, makes such inspection necessary before the entrance of vessels, therefore, an official detailed to carry out this job will accompany the pilot when he boards the vessel at the bar.

Vessels arriving from such ports will no longer be granted free pratique requested by radio. This will be given on the occasion of the regular Sanitary Visit against presentation by the Captain of the document supplied by the official proving that the inspection was carried out.

Non-compliance with these regulations will be considered as infraction of the law and subject to legal penalties.

Vessels arriving from the following ports will be subject to the above-mentioned inspection at the bar:

1. Ports of Mexico and the United States situated in the Gulf of Mexico.
2. Ports of the Antilles.
3. Ports of Central America.
4. Ports of Colombia, Venezuela, and the Guianas.
5. Ports of intertropical Africa.

Contact Information.—Santos pilots can be contacted, as follows:

1. VHF: VHF channels 11 and 16
2. Telephone: 55-13-3269-4050
   55-13-3269-4051
3. Facsimile: 55-13-3261-1990
4. E-mail: secretaria@santospilots.com.br

Santos port captain can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-13-3221-3454 (extension 210)
3. Facsimile: 55-13-3222-3188
4. E-mail: 33-0@@cpsp.mar.mil.br

Anchorage.—Designated anchorage areas and requirements for using them are shown on the chart.

Caution.—Anchorage is prohibited outside the designated areas or in the dredged channel. In addition, vessels are advised to avoid the submarine cables laid across the S approach to Baia de Santos.

The maximum speed permitted in the harbor is reported to be 6 knots.

The harbor and entrance channel require continuous dredging due to silting and the depths may be less than stated, especially in the turning basins.

Baia de Santos to Baia de Paranagua

4.37 Between Ponta de Itaipu, the W entrance of Baia de Santos, and the mouth of Rio Itanhaem, about 23 miles to the WSW, the coast is generally low.

It is backed by a range of mountains from 5 to 12 miles inland. Some hills, appearing as islands from a distance, stand between the mountain range and the coast.

The **Rio Itanhaem** (24°11'S., 46°48'W.) can be entered by small craft at HW, but local knowledge is necessary.

The town of Conceicao de Itanhaem stands on a hill on the N side of the mouth of the river.

Between the mouth of the Rio Itanhaem and the mouth of the Rio Peruibe, about 14 miles SW, the coast continues low and sandy. From the mouth of the Rio Peruibe to Ponta Paranapua Guassu, about 4 miles to the S, the coast is steep.

Ilha de Peruibe (24°22'S., 46°59'W.) lies about 2 miles SSE of the mouth of the Rio Peruibe and 1 mile offshore. Ilha do Guarau lies about 1 mile S of Ilha de Peruibe. A stranded wreck lies about 0.3 mile N of this islet. A number of islets and rocks lie N and S of Ilha do Guarau Light.

4.38 Laje de Conceicao (24°14'S., 46°41'W.), a bare above-water rock, lies about 6 miles ESE of the mouth of the Rio Itanhaem. The islet shows a light. Laje Pedro Segundo, with a least depth of 1.7m, lies about 8 miles ESE of Laje de Conceicao. The sea breaks on this steep-to shoal during bad weather.

Parcel da Conceicao (24°18'S., 46°47'W.), with a least depth of 4m, lies about 6 miles SW of Laje de Conceicao. The sea breaks over this rocky shoal during fresh onshore winds.

Parcel das Reis, with a depth of 13.1m, lies about 8 miles SE of Laje de Conceicao.

Ilha Queimada Grande (24°30'S., 46°40'W.), almost barren, lies about 15 miles S of Laje de Conceicao. The rounded summit, which is in its SW part, appears to have twin peaks when seen from E or S. Parcel de Sueste, a 2.3m patch, lies close SE of the islet.

The islet shows a light from its N extremity. Good radar returns have been reported from the islet at 17 miles.

Ilha Queimada Pequena (24°23'S., 46°48'W.) lies about 10 miles NW of Ilha Queimada Grande. This conical islet is visible for about 20 miles.

Laje Noite Escura, with a depth of 11m, lies about 0.5 mile S of the islet. Parcel do Una, with a depth of 5.8m, lies about 16 miles SW of the islet.

Between **Ponta do Una** (24°25'S., 47°01'W.) and Barra de Icapara, about 27 miles to the SW, the Rio Comprido and the Rio Ribeira de Iguape empty into the sea. Ponta da Jurea lies midway between these two rivers. Barra de Icapara, entered 3 miles SW of the Rio Ribeira de Iguape, is narrowed by two sand banks on which the sea nearly always breaks.

Small craft with local knowledge can cross the bar in good weather. A dangerous wreck lies about 10 miles E of Barra de Icapara.

Between Barra de Icapara and Barra de Cananeia, about 34 miles to the SW, the coast is formed by Ilha Comprida.

This low island, separated from the mainland by Mar Pequeno, is covered with mangroves on its NW and central part. It has a greatest width of about 3 miles and is visible a short distance.

Mar Pequeno, navigable by vessels with drafts up to 3m, has sharp bends and an average width of 0.4 mile. It is encumbered by many islets and sand banks, which are covered with mangroves.

About 12 miles NNE of Barra de Cananeia, Mar Pequeno divides into two arms. Mar do Cubatao, the W arm, leads SW into Baia do Trapande; Ilha de Cananeia is formed between these two arms.

Iguape (24°42'S., 47°33'W.) is situated on the NW shore of Mar Pequeno, about 7 miles W of Barra de Icapara. A church in the town, with two tall towers, is prominent from seaward.

On the W side of the town is Canal Valo-Grande, an artificial channel leading N to join the Rio Ribeira de Iguape.

There are two piers for small craft at the town. Pilots can be obtained at Cananeia at the SW end of Mar Pequeno.

4.39 Ilha de Bom Abrigo (25°07'S., 47°52'W.) lies 4 miles SSE of Barra de Cananeia and is saddle-shaped and wooded. A small rugged islet, 130m high with some vegetation, lies 0.25 mile to the SE, with an above-water rock and a rock awash close to it. Ilha de Bom Abrigo shows a light.

Pilotage can be obtained at Cananeia. If previous notice is given, they will board vessels at the anchorage off Ilha de Bom Abrigo.

Barra de Ararapia lies about 16 miles SW of Ilha de Bom Abrigo Light. Small craft should enter only during good weather and with local knowledge. Ilha do Castilho, 7 miles ENE of Barra de Ararapira, has two summits and resembles a castle at a distance. Ilha Figueira lies about 7 miles SW of Ilha Castilho and is steep, rocky, and almost bare.

Anchorage is available, with good shelter, about 0.2 mile off the NW side of Ilha de Bom Abrigo, in depths of 6 to 9m, sand, but care must be taken to avoid a shoal, with a depth of 4.8m, located 0.3 mile NW of Ilha de Bom Abrigo Light.

The bar at Barra de Cananeia is bounded by banks which extend from the S end of Ilha Comprida and from the coast 3 miles S, but these can be seen as the sea always breaks over their extremities. The entrance is narrow, but vessels drawing up to 2.5m can enter in calm weather.

The banks at the bar are subject to frequent change and the entrance should not be attempted without up-to-date local knowledge. Within the bar, depths increase to about 18m.

Baia de Paranagua

4.40 Baia de Paranagua (25°29'S., 48°30'W.) is entered between Ponta Inacio Dias and Pontal do Sul, about 10 miles to

the SW. The bay extends to the N and W, and contains many islands and islets.

Baia das Laranjeiras, the N branch of the bay, is entered about 7 miles W of Ponta Inacio Dias and is almost entirely obstructed by mud banks. It should not be entered without local knowledge.

The W branch of the bay extends about 21 miles from Pontal do Sul. Porto de Paranagua and Porto de Antonina lie on the S side of the W branch about 15 and 26 miles, respectively, from the entrance to Canal da Galheta.

Ilha do Mel (25°31'S., 48°20'W.) lies in the middle of the entrance of the bay and divides it into two channels. The island consists of two parts connected by a narrow isthmus. The N part is low and the SE part hilly.

Canal Norte and Canal Sueste cross Barra de Paranagua and lead N of Ilha do Mel.

Tides—Currents.—Seaward of the bar, the tidal currents sets NE and SE at velocities of 1 to 2 knots.

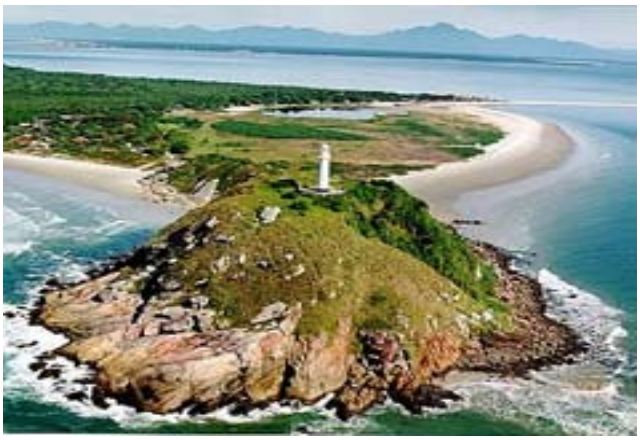
With strong E winds, the SW current runs from 2 to 3 hours longer than the NE current, and attains a velocity of about 3 knots.

In Canal Norte, the flood current sets to the NW and the ebb sets SE, at a rate of 2 knots. With S to SE winds or spring tides, the ebb can reach a rate of about 5 knots.

In Canal Sueste, the flood current sets WNW at a rate of 1 knot to 2 knots, and the ebb sets S at a velocity of 2 knots. With S or SE winds or spring tides, the flood can attain 3 knots and the ebb 4 knots.

4.41 Banco do Superagui (25°29'S., 48°14'W.), with depths of less than 5.5m and on which the sea breaks, extends about 2 miles SW from Ponta Inacio Dias. Then its S edge, which forms the N side of Canal Norte, extends W to the S extremity of Ilha das Pecas.

Ilhas das Palmas, consisting of two islets, lie about 1 mile NNE of Ponta das Conchas, the E extremity of Ilha do Mel.



Ponta das Conchas Light

A number of rocks and shoals lie to the W and N of Ilhas das Palmas and can best be seen on the chart.

Banco dos Ciganos, with depths less than 5.5m, and Banco das Palmas, with depths of less then 1.8m, lie on the S side of Canal Norte. The sea almost always breaks over the bank when there is a breeze.

In the entrance of Canal Sueste, two wrecks lie on the W side of the channel. The northernmost wreck lies about 2 miles SE of Ponta do Joaquim and is marked by a buoy. The second wreck lies about 0.3 mile SE of the buoy.

A dangerous wreck, marked by a buoy, lies 0.75 mile WSW of Ilhas das Palmas.

Banco da Galheta, on the S side of Ilha do Mel, is a circular shaped sand bank on which the sea breaks.

Canal da Galheta, the deep buoyed channel to Porto de Paranagua, passes through the NE part of Banco da Galheta.

Depths—Limitations.—Canal da Galheta has been dredged to a depth of 11.5m. Inshore of Ilha da Galheta the channel was dredged (2003) to a depth of 12m. It is reported (2014) dredging is in progress in Canal da Galheta.

The channel is 200m wide from seaward to 0.75 mile wide SE of Ilha da Galheta, then 150m wide to Porto de Paranagua, with a widening to 250m at the bend N of Rasa de Cotinga.

The seaward end of the channel is marked by buoys moored about 4 miles SE of Ilha de Galheta.

Canal da Galheta is subject to silting and depths may be less than stated.

Two channels, Canal Sueste and Canal Norte, are located NE of Canal da Galheta. Both channels give access to the entrance of the bay where they merge together between Ponta das Pecas and Ponta do Bicho.

Neither Canal Sueste or Canal Norte should be used by deep draft vessels when a heavy sea is running nor should they be attempted without a pilot.

Canal Sueste is about 20 miles long with depths of 10 to 20m. The approach is made between Ilha do Mel and Ilhas das Palmas. A buoy marks its seaward entrance.

Canal Norte passes between Banco Superagui to the N and Banco dos Ciganos and Banco das Palmas to the S. This channel is unmarked and should not be attempted without local knowledge.

Pilotage.—Pilotage is compulsory. Pilots board vessels 5.5 miles SE of Ilha da Galheta. A pilot should be requested 24 hours, and confirmed 3 hours, before a ship's ETA. A pilot is always on duty at the old pilot station at Ponta das Conchas in case of emergency. The pilot station can be contacted on VHF channels 6 and 16.

Regulations.—Ships of less than 20m in length and sailing ships must not interfere with the movement of other ships within the narrow channel of Canal de Galheta.

Vessels engaged in fishing must not interfere with any other ship navigating in Canal de Galheta or its access.

Ships are forbidden to cross the channel or its access if such crossing interferes with the safe passage of another ship within the channel or its access.

Ships should not overtake in the channel and ships should avoid anchoring in the channel. Vessels proceeding with the tidal current have the right of way.

Entry and exit of Canal de Galheta will be permitted at all stages of the tide during daylight hours only. Tug assistance in the channel is mandatory for all vessels drawing more than 9.4m.

4.42 Porto de Paranagua (25°30'S., 48°31'W.) (World Port Index No. 12980) lies in the W part of the bay about 12 miles WNW of Ponta das Conchas. Vessels arriving, approach the bar and embark a pilot at the waiting buoy. The distance from the bar to the docks is 18 miles.

Tides—Currents.—At spring tides, the flood current attains a velocity of 0.75 knot, the ebb a velocity of 2.4 knots. At neap tides, the flood and ebb currents attain a velocity of about 0.75 knot.

Depths—Limitations.—Two channels enter the harbor. The N channel, used by coasters and fishing craft. The SE channel, known as Galheta Canal, has a depth of 11.5m, is 4,500m long and 150m wide, and is used by ocean-going vessels. The maximum official draft for crossing the bar is 9.5m during spring tide and 8.8m during neap tide.

Vessels can enter at any time, except those vessels with a draft over 10.7m. The maneuvering basin is 700m wide and 8.5 to 11.9m deep.

The commercial wharf has about 2,850m of mooring space, with depths alongside of 8.5 to 11.9m. The tanker pier, with a 200m long berth on the outer face with a depth alongside of 11.6m, and a 190m long berth on the inner face with a depth alongside of 10.1m, is located about 0.5 mile W of the W end of the main quay.

Two private berths, one extending WNW from the tanker pier and the other a pier extending from the shore close W of the tanker terminal, are located in the port.

The container terminal is situated at the E end of the commercial wharf.

Vessels up to 123,000 dwt, with a maximum length of 272m and a maximum draft of 11.3m, can be accommodated.

Pilotage.—Pilotage is compulsory and is available 24 hours. Pilots should be requested 24 hours and 3 hours in advance. Pilots board about 1.6 mile SE of Canal de Galheta. Pilotage is also provided for Porto de Antonina.

Contact Information.—Paranagua pilots can be contacted, as follows:

1. VHF: VHF channels 12, 14, and 16
2. Telephone: 55-41-3423-1332
3. Facsimile: 55-41-3423-1404
4. E-mail: praticagem@paranaguapilots.com.br

The Paranagua port captain can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-41-3422-3033
3. Facsimile: 55-41-3420-1566
4. E-mail: secom@cppr.mar.mil.br

Anchorage.—Anchorage in the outer roads is available, in depths of 15 to 20m, and in the inner roads, in a depth of 14m.

Other designated areas have been established off Porto de Paranagua and are best seen on the chart.

Caution.—Vessels should obtain updated local information on depths in channels and basins due to the accumulation of sand.

The dredged approach channels are not safe for navigation when there are high winds.

4.43 Porto de Antonina (25°26'S., 48°42'W.) (World Port Index No. 12990), is situated in an inlet at the head of the W branch of Baia de Paranagua, 10 miles WNW of Porto de Paranagua. It is reached through a narrow channel between sand banks which extend from both shores of the bay.

The channel is not well marked and is only used during the day at HW. The allowable draft for the port is 5.5m.

There are two concrete piers. The larger pier, which is privately owned, has 200m of berthage, with a depth of 4.2m on its E side and 5.5m on its W side. The maximum length for ships using the port is about 149m.

Pilotage is compulsory. Pilots board vessels either at Barra de Paranagua or Porto de Paranagua. There is no anchorage space at Antonina. Vessels wait at Paranagua anchorage for a berth at Antonina.

Baia de Paranagua to the Rio Sao Francisco do Sul

4.44 Between Pontal do Sul and Baia de Guaratuba, about 20 miles SSW, the coast is low and backed by Serra do Prata.

A conspicuous water tower stands on the coast, 10 miles SW of Pontal do Sul, and a similar tower stands on Ponta de Matinhos, 2.5 miles N of the entrance to Baia de Guaratuba.

At the entrance of Paranagua Bay, there are many banks and submerged and uncovered rocks in depths of less than 10m.

Navigation in this area should only be attempted through Galheta Channel.

Galheta Channel was dredged on Galheta Bank; the depths out of its banks are less than 5m.

Ilhas Currais (25°44'S., 48°22'W.), a chain of islets, lie about 10 miles S of Pontal do Sul. The highest islet is covered with vegetation.

Ilhas Itacolomis, a group of four rocks, lie about 7 miles SSW of Ilhas Currais and 7 miles offshore. A reef extends about 0.5 mile NW from Ilhas Itacolomis, and depths of less than 11m extend about 0.5 mile S from the islets.

Baia de Guaratuba (25°52'S., 48°34'W.), entered N of Ponta de Caieira, is about 8 miles long and 3 miles wide.

There are several islets in the bay and a number of rivers empty into it. The village of Guaratuba stands on the S shore of the bay about 0.5 mile within its entrance.

Ilha Caioba lies close off the N side of the entrance and shows a light. A radio masts, marked by white lights, stand 0.5 mile NW and about 3 miles SW of the light on Ilha Caioba.

The entrance bar is obstructed by sand banks, between which are formed narrow channels, which should not be attempted without local knowledge. During bad weather, the sea breaks over the bar.

Pilotage.—Pilotage is compulsory for Baia de Guaratuba; it can be obtained off Barra de Paranagua, but must be requested in advance.

Between Ponta de Caieira and the entrance to the Rio Sao Francisco do Sul, about 18 miles to the S, the coast is low, but backed by a mountain range some distance inland.

A conspicuous monument stands on the summit of Ponta Brigituba, about 2 miles S of Ponta Caieira.

The Rio Sao Francisco do Sul

4.45 The **Rio Sao Francisco do Sul** (26°10'S, 48°35'W.) flows into the sea by two mouths situated 19 and 37 miles,

Ilha Caioba

respectively, S of Baia de Guaratuba, and separated by Ilha de Sao Francisco.

The N entrance leads to Porto de Sao Francisco do Sul on the NW side of the island. The S entrance is almost entirely obstructed by sand banks, on which the sea breaks violently.

About 8 miles upriver, the S channel is obstructed by causeway carrying a railroad from the mainland to the island.

Ilha de Sao Francisco do Sul, about 18 miles in length, is generally low, with large areas of swamps and mangroves. Cabo Joao Dias, the N extremity of the island, rises to Morro Joao Dias, about 0.6 mile to the S.

Morro Pao de Acucar, the highest land in this vicinity, stands on the NW side of the island. A conspicuous cross stands on the summit of this mountain.

The E coast of Ilha de Sao Francisco is low, and the only features distinguishable from seaward are some low hills, known as Morretes, about 11 miles S of Cabo Joao Dias and close inland.

Ilhas Tamboretes, a group of low islands, lie about 3 miles off the E coast, and 13 miles S of Cabo Joao Dias.

Winds—Weather.—From March to September, the land breezes blow from SW to WSW. During the rest of the year, it blows between WNW and NW. At times, strong winds will raise a sea over the bar.

Tides—Currents.—At springs, the river current can attain velocities of 3 to 4 knots, and is only overcome by the full strength of the incoming tidal current. During fresh NE or SE winds, especially the latter, there is a strong onshore current.

4.46 Arquipelago das Gracas, a group of islets and above-water rocks, lie about 2 miles ESE of Cabo Joao Dias. Ilha da Paz, the largest of the group, shows a light from its summit.

Banco Joao Dias, a sandy shoal, with a least depth of 3.6m, lies about 0.8 mile NE of Cabo Joao Dias. Banco da Galharada is a drying sand bank extending NE from the W entrance of the Rio Sao Francisco do Sul.

Terminal Maritimo de Sao Francisco do Sul (TEFRAN) (26°14'S., 48°25'W.) is a lighted mooring buoy connected to the shore by two submarine pipelines lying about 5 miles SE of Cabo Joao Dias. Vessels should send their ETA, via the agent, 72 hours in advance. Contact should be established on VHF at least 2 hours in advance. The updated ETA should be sent as necessary. Anchoring is prohibited in the vicinity of the pipelines. The terminal can accommodate tankers up to 200,000 dwt, with a maximum draft of 17m. Berthing is done during daylight hours only. The mooring master boards about 3 miles E of the mooring buoy.

The TEFRAN Control Center can be contacted, as follows:

1. VHF: VHF channel 14
2. Telephone: 55-47-3451-5256
3. Facsimile: 55-47-3451-5211

4.47 The entrance of the Rio Sao Francisco do Sul is approached either by Canal Norte or Canal Sul. Canal Norte passes over the bar N of Banco Joao Dias, and Canal Sul leads between Banco Joao Dias and Cabo Joao Dias.

Depths—Limitations.—Canal Norte is used by small coastal vessels and fishermen, as the depth over the bar is 4.1m. Canal Sul is used by larger vessels with a HW draft of 7m and 5.5m at any phase of the tide.

In Canal Sul, less water than charted has been reported (1994) between Buoy No. 4 and Buoy No. 1.

Within the bar there are depths of 11 to 30m to Porto de Sao Francisco do Sul. It was reported that the channel across the bar was dredged to 11m. Submarine pipelines, which are best shown on the chart, lie across the entrance to the Rio Sao Francisco Do Sol.

Pilotage.—Pilotage is compulsory. Pilots should be requested 4 hours in advance for inbound vessels and 2 hours in advance for departing vessels. The pilot station is on Ilha da Velha, close SW of Ilha da Paz. Vessels are boarded 2.5 mile SE of the entrance of Canal Sul, in response to whistle or siren signals. Pilots occasionally board vessels from their own canoes, which must be hoisted aboard.

In bad weather, the pilot may board inside the bar W of Ponta do Sumidouro.

Regulations.—Vessels should send their ETA 24 hours and 12 hours in advance.

Contact Information.—Sao Francisco do Sul pilots can be contacted, as follows:

1. VHF: VHF channels 11 and 16
2. Telephone: 55-47-3444-5292
3. Facsimile: 55-47-3444-5389
4. E-mail:operacional@praticagemsaofrancisco.com.br

4.48 **Sao Francisco do Sul** (26°15'S., 48°38'W.) (World Port Index No. 13000) port lies on the NW side of Ilha de Sao Francisco do Sul and extends about 1 mile SSW of Ponta do Rabo Azedo. It is fronted by numerous shoals and dangers which can best be seen on the chart.

Port of Sao Francisco do Sul

http://www.apsfs.sc.gov.br

Depths—Limitations.—The access channel is 150m wide, with a least depth of 11m. Night navigation is only allowed for vessels with a draft up to 8.5m or a length of less than 50m. During daylight hours vessels with lengths of 245 to 260m and a draft of 12.8m can be accommodated. The maximum allowed draft decreases as length increases.

The main wharf extends 750m SE from Ponta de Cruz. There are depths of about 10 to 20m alongside. Close NE of this wharf is a rock at a depth of 6.8m. The quay at the head of the basin is 150m long with a depth of 5.6 to 9.3m alongside.

The container terminal, close SW of the main wharf, consists of a single berth that can accommodate vessels up to 225m long and 10.5m draft.

Two piers stand near the point about 0.4 mile SSW of Ponta da Cruz. The S pier is about 61m long, with a depth of 5.5m alongside. A customs pier lies close S of the piers.

Sao Francisco Pier

Anchorage.—There is an anchorage, in depths of 12.8 to 15.8m, close to the pilot boarding place. Caution is necessary as a shoal patch with a depth of 7.9m lies 0.25 mile SW of that position.

There are six designated anchorages, as follows:

1. No. 1—Vessels drawing up to 7.8m and up to 215m in length, centered on position 26°14.2'S, 48°39.0'W
2. No. 2—Small vessels, yachts and sailing vessels, centered on position 26°14.7'S, 48°38.6'W.
3. No. 3—Vessels over 150m in length and 8m draft, centered on position 26°12.5'S, 48°37.7'W.
4. No. 4—Vessels less than 8m draft, centered in position 26°12.6'S, 48°37.0'W.
5. No. 5 and no. 6—Vessels with a draft over 10m, centered in positions 26°11.0'S, 48°35.0'W and 26°10.4'S, 48°34.0'W, respectively.

There are three designated outer anchorages, as follows:

1. No. 7—Vessels of less than 16m draft awaiting entrance to Baia da Babitonga, in ballast or awaiting repairs, centered in position 26°11.0'S, 48°26.0'W
2. No. 8—Loaded vessels with a draft between 16 and 18m, centered in position 26°12.6'S, 48°25.2'W.
3. No. 9—Vessels carrying explosives, dangerous goods, or under quarantine, centered in position 26°9.0'S, 48°25.1'W.

Regulations.—The following regulations are in effect in the port:

1. The maximum speed near the port is 8 knots.
2. Anchored vessels must report place, date, and time of anchorage or mooring to harbormaster's office of the port.
3. Anchored vessels must keep engines ready and the necessary crew for maneuvering.
4. Use of tugs is mandatory.
5. Vessels are prohibited from overtaking other vessels or crossing lanes in the marked channel of the bar.
6. Vessel size restrictions are 260m in length, 40m in width, and a draft of 9.39m, including adjustment for tides.
7. Disabled vessels may only remain at anchor for a limited time. Vessels must have tug made fast and ready for tow.

Caution.—Southern right whales are protected by law and frequent this coastal region between May and November. Vessels are advised to keep a good lookout to avoid whales.

4.49 Joinville (26°19'S., 48°51'W.) lies about 13 miles SW of Sao Francisco do Sul, on the S bank of the Rio Cachoeira.

The channel leading to the port is marked by beacons and buoys, some of which are lighted. Vessels drawing less than 2m can reach the port.

The Rio Sao Francisco do Sul to Porto de Itajai

4.50 Between the Rio Araquari, the S channel of the Rio Sao Francisco do Sul, and Porto de Itajai, about 28 miles to the S, the coast is high and backed by mountains, some of which are near the coast and can be seen for about 45 miles.

Morro Bau, with a flat summit, is the highest of these mountains and stands about 16 miles WNW of Itajai. It can be seen from about 20 miles offshore.

Several islets and submerged rocks lie on the shoal area extending E from the mouth of the Rio Araquari. Ilha dos Lobos and Ilha Tipitinga lie about 4 and 2.5 miles SE of the mouth of the river.

Enseada de Itapocoroi (26°47'S., 48°37'W.), entered W of Ponta do Vigia, affords anchorage, in about 8m, sand and mud, but care must be used as the holding ground is poor.

The village of Itapocoroia is situated on the SE shore of the bay. A light is shown 1 mile SE of Ponta do Vigia from Ponta do Varrido.

Ilhas Itacolomis, about 4 miles NNW of Ponta do Vigia, consists of two islets. A shoal, with a depth of 1.2m, extends about 183m SSE from the islets.

Ilha Feia (26°45'S., 48°38'W.), about 2 miles SSW of Ilhas Itacolomis, is 75m high. A reef, with some drying heads, extends about 0.3 mile E of the islet.

Between Ponta do Vigia and Ponta Negra, about 3 miles to the S, the coast rises to a chain of mountains, the highest of which is Morro do Gravata. Good radar returns have been reported from Ponta Negra at about 10 miles.

Between Ponta Negra and Ponta Cabecudas, 6 miles S, the coast is formed by Praia de Itajai, a sandy beach at the S end of which is the mouth of the Rio Itajai-Acu.

Itajai (26°55'S., 48°38'W.)

World Port Index No. 13020

4.51 Itajai lies about 2 miles within the mouth of the Rio Itajai-Acu, and is entered between the heads of two moles

which lie 1 mile NW of Ponta das Cabecudas, which is a good radar target for better than 20 miles.

Port of Itajai

http://www.portoitajai.com.br

Winds—Weather.—From March until September, the prevailing winds are from SW to WSW. During the rest of the year, they are from WNW to NW.

Tides—Currents.—The range of the tide is 0.9m at springs and 0.2m at neaps. The ebb current normally attains a velocity of 2.5 knots, but after heavy rains the current may attain a velocity up to 5 knots.

Depths—Limitations.—The N and S moles, which extend about 0.5 mile offshore, are about 183m apart, but the navigable channel between them is less than 91m wide. The bar across the entrance is formed by a shoal extending to the S and E from the head of the N mole. The depth at the bar is 10m.

Itajai Harbor Entrance

The access channel has a width of 100m, with a depth of about 12.7m.

The maneuvering basin, 750m long and 400m wide, has a depth of 12.6m. The maximum allowed length of a vessel to enter the port is 286m.

Numerous quays are situated on both sides of the river, with the largest being the container terminal, 900m long, with an alongside depth of 12.5m.

There are terminals for passengers, containers, and general cargo with depths alongside of 6.5 to 12.5m.

Itajai Pier

There are two tanker berths.

Vessels can enter or sail at any stage of the tide with a maximum draft of 10m. Tanker movements can be made in daylight hours only.

There is a speed limit of 5 knots reported in the access channel.

Aspect.—The buildings of the city, a white church with two towers, and a water tower and hospital near the church are all conspicuous and visible from seaward. Another water tower, standing about 1 miles NW of the harbor, is also conspicuous.

Pilotage.—Pilotage is compulsory. Pilots should be requested through the agent and require 6 hours notice prior to arrival. Pilots board vessels from a red launch.

The boarding area lies about 2.5 miles ENE of Ponta das Cabecudas Light (26°56'S., 48°37'W.). Vessels moor and unmoor during daylight hours only.

Regulations.—The following regulations are in effect in the port:

1. Vessels larger than 235m long are only allowed access to the commercial quay during daylight hours.
2. The petroleum and chemical terminals can only be accessed at HW. The maximum permitted draft at the petroleum terminal is 6.25m; the maximum permitted draft at the chemical terminal is 5.94m.
3. Vessels maneuvering in the canal and anchoring grounds must use international sound signals.
4. Vessels should moor port side-to. If the vessel is moored starboard side-to, mooring lines must be doubled, with extra stern lines.

Contact Information.—Itajai pilots can be contacted, as follows:

1. VHF: VHF channels 12, 14, and 16
2. Telephone: 55-47-3247-3200
3. Facsimile: 55-47-3247-3212
4. E-mail: manobras@itajaipraticos.com.br

Anchorage.—Small vessels or vessels with suitable drafts may anchor in Enseada das Cabecudas, in a depth of about 7m, mud and sand. The quarantine anchorage is situated E and SE of Ponta das Cabecudas.

Anchorage is prohibited in the channel or the turning basin, except when required for maneuvering requirements, to avoid close quarter situation or emergency.

Caution.—Pedra de Santa Teresa, a rock with a depth of 4m and marked by a buoy, lies about 0.3 mile NW of Ponta das Cabecudas.

Porto de Itajai to Ilha de Santa Catarina

4.52 Between Ponta das Cabecudas and Ponta de Bombas, about 16 miles to the SE, the coast continues high and backed by mountains inland. Along this part there are several points which form bays open to the NW.

Enseada de Camboriu (26°59'S., 48°36'W.), about 4 miles SSE of Ponta das Cabecudas, is entered W of Ponta das Laranjeiras. The bay is open to the NE, but sheltered from all other winds. A river, with a narrow and obstructed bar, empties into the SE part of the bay. A small village stands near the mouth of the river.

A submerged rocky ledge extends about 0.2 mile E from Ponta das Laranjeiras.

A dangerous group of rocks, with a depth of 1m, lies about 0.6 mile W of the same point; with a calm sea and the wind blowing off the land there are rarely breakers reported over these rocks.

A dangerous wreck lies 4 miles SSE of Ponta das Laranjeiras.

Anchorage is available in Enseada de Camboriu, about 0.3 mile off the SE shore of the bay, with the village church bearing 170°, distant about 0.7 mile, in depths of from 8 to 9m.

The anchorage consists of sand and mud with good holding ground, but it is exposed to winds between N and ENE.

Enseada de Porto Belo, about 8 miles S of Ponta das Laranjeiras, is entered between **Ponta da Ilhota** (27°05'S., 48°35'W.) and Ponta de Porto Belo, 0.7 miles to the ESE.

Ilha Joao da Cunha lies about 3 miles SW of Ponta de Porto Belo and forms a natural breakwater for a small cove. The village of Porto Belo stands on the S shore of this cove.

Anchorage may be obtained about 0.7 mile NNW of the N extremity of Ilha Joao da Cunha, in depths of 11 to 13m, mud and gravel. This anchorage is exposed to winds from between N and NNE. There is an anchorage for small vessels midway between the SW end of the island and Ponta do Vieira, about 0.6 mile to the SW, in a depth of 5.5m, sand and mud.

4.53 Ponta de Bombas (27°9'S., 48°28'W.), about 3 miles SE of Ponta de Porto Belo, is the E extremity of a peninsula which separates Enseada de Porto Belo from Baia das Tijucas.

Ponta Zimbros, about 5 miles SSW of Ponta de Bombas, is the S extremity of the peninsula.

Baia das Tijucas is entered between Ponta Zimbros and Ponta de Ganchos, about 0.7 miles SSW.

The Rio Tijucas empties into the W part of the bay, and the village of Tijucas stands on the N entrance of the river. Depths of less than 5.5m lie within about 2 miles of the W shore of the bay.

Enseada de Ganchos, the S part of Baia de Tijucas is indented by several coves off which small vessels can anchor, in depths of 5 to 6m, soft mud.

Catarina Light

A vessel approaching these anchorages should take care to avoid the dangers off Ponta de Ganchos. Morro de Ganchos, about 3 miles SW of Ponta de Ganchos, is a good landmark.

4.54 Ilha da Gale (27°11'S., 48°24'W.), rocky and covered with vegetation, lies about 4 miles SE of Ponta de Bombas. Two islets lie close off the NE end of the island. A light is shown from Ilha da Gale.

Pedra Nocetti, with a depth of 10m, lies about 2 miles SE of Ilha da Gale. Ilhado Amendoim lies about 3 miles WSW of Ilha da Gale.

Pedra das Cinzas, with a depth of 10m, and Pedra da Iris, with a depth of 4m, lie about 2 miles and 0.5 mile, respectively, ENE of Ilha do Amendoim.

Calhau de Sao Pedro (27°15'S., 48°25'W.), two bare above-water rocks near the center of a submerged reef about 0.5 mile long, lies about 4 miles S of Ilha da Gale. Some heads on this reef dry. A light is shown near the E end of Calhau de Sao Pedro.

Ilha dos Arvoredos (27°17'S., 48°22'W.) quite high and covered with vegetation, lies about 5 miles SSE of Ilha da Gale. The island is the best mark in the approach to Canal de Santa Catarina. A light is shown from the S end of Ilha do Arvoredo.

Two above-water rocks lie about 0.4 mile ENE of the S end of the island. A light is shown from the SE extremity of the island.

Anchorage is available about 0.1 mile off the SW side of the island in Baia Mansa, in a depth of about 12m.

Ihla Deserta lies almost 1.5 miles E of Ilha do Arvoredo. It is covered with dark vegetation and has some above-water rocks up to 0.1 mile off its N and S ends.

Ilha de Santa Catarina

4.55 Ilha de Santa Catarina (27°37'S., 48°30'W.) is separated from the mainland by the narrow Canal de Santa Catarina, is about 29 miles long. The island is prominent from the E, although the mountains on the mainland are higher.

Lagoa da Conceicao, about 8 miles long, lies close to and parallel with the E side of the island, and forms a large

Ilha dos Arvoredos Light

depression which is conspicuous from seaward. Its entrance, maintained by dredging, lies about 12 miles S of the N extremity of the island.

A number of islands, islets, rocks, and shoals lie close off the E coast of the island and can best be seen on the chart.

Ilhas das Tres Irmas (27°50'S., 48°31'W.) lies from 1.5 to 3 miles E of Ponta do Frade, the S extremity of Ilha de Santa Catarina. Ilha Irma de Fora is the furthest E and the highest; a 7m shoal patch lies 1 mile S of this island.

Ilhas dos Moleques do Sul (27°51'S., 48°26'W.) consist of three whitish islets lying about 1 mile E of Ilha Irma de Fora.

They are prominent and their sides appear steep when seen from the SE. Laje Moleques do Sul is an above-water rock lying 0.6 mile SW of the islets; a 6.6m shoal patch lies about 1.1 mile WNW of Laje Moleques do Sul.

Canal de Santa Catarina

4.56 **Canal de Santa Catarina** (27°32'S., 48°34'W.), lying between Ilha de Santa Catarina and the mainland, is about 0.2 mile wide at its narrowest part at Florianopolis. Two bridges span the channel W of Florianopolis. Numerous sand banks and mud flats narrow the channel throughout its length. The N and S parts are named Canal Norte and Canal Sul, respectively.

Tides—Currents.—The tidal currents in Canal de Santa Catarina are fairly regular. They enter from N and S at the same time and meet off Florianopolis.

The strength of the tidal currents seldom exceeds 0.5 knot, but near spring tides it sometimes attains velocities of 1.5 to 5 knots. The tidal currents are somewhat influenced by the winds.

4.57 Approaching Canal de Santa Catarina from the N, vessels usually pass between Ponta do Rapa and Ilha do Arvoredo, but passage between Ilha do Arvoredo and Calhau de Sao Pedro is also free of dangers.

Ilha Anhatomirim, showing a light, and close off the mainland, should then be identified, and after passing about midway between it and Ponta Grossa, the NW extremity of Ilha de Santa Catarina, alter course for the entrance of the marked channel to Florianopolis.

Numerous islets, rocks, and shoals lay on both sides off the marked channel and can best be seen on the chart. Local knowledge is required.

Pilotage.—There is no pilotage service.

Anchorage.—A vessel drawing up to 6m can easily reach a position about 1 mile NE of Ilha Anhatomirim and anchor there in a depth of about 7m.

With NE winds, vessels anchor, in 5.8 to 7m, soft mud, about 1 mile N of Ilha Ratao Grande.

Vessels awaiting the tide usually anchor in this position.

4.58 Canal Sul is entered between **Ponta dos Naufragados** (27°50'S., 48°34'W.), the SW extremity of Ilha de Santa Catarina, and Ilha de Aracatuba, about 0.3 mile to the SSW. A partly marked narrow and winding channel leads through the numerous sand banks and shoals to Florianopolis.

Vessels drawing up to 3m at LW and 4.3m at HW, can reach the anchorage off Florianopolis, but local knowledge is essential.

Numerous islets, rock, and shoals lie between Ponta dos Naufragados and Florianopolis and are seen on the chart.

4.59 **Banco dos Naufragados** (27°51'S., 48°33'W.), with a least depth of 1.8m, and on which the sea nearly always breaks, lies in the SE entrance to Canal Sul, about 0.45 mile S of Ponta do Frade. There is a clear passage on either side of this danger.

Pilotage.—There is no pilotage service.

Anchorage.—Vessels awaiting the tide can anchor about 0.4 mile WNW of Ponta dos Naufragados, in a depth of 14m. The bottom is hard sand; therefore, a long scope of chain should be used.

There is a more sheltered anchorage about 0.5 mile SE of Ilha dos Cardos, in depths from 7 to 8m, sand.

The anchorage affords shelter from E winds only, therefore, caution is necessary during strong winds from any direction, as space is restricted by sand banks and shoals.

4.60 **Porto de Florianopolis** (27°36'S., 48°33'W.) (World Port Index No. 13030) lies on both sides of Canal de Santa Catarina at its narrowest part, which is spanned by two bridges.

The N bridge has a vertical clearance of 28m; the S bridge has a vertical clearance of 17m.

Depths of 5.5 to 22m lie between the S end of the marked channel and the N bridge, and 5.5 to 30m between Laje Tipitinga and the S bridge.

Three piers on the W side of the channel can accommodate vessels of up to 3.6m drafts; one pier is for vessels with drafts up to 1.8m. The berths on the E side of the channel are used only by fishing vessels and small craft.

There is a tanker berth at mooring buoys off Ponta do Leal, 1 mile NNW of the N bridge.

Anchorage.—Vessels can anchor on the E side of the channel, 0.3 mile S of the S bridge, in a depth of 7m, mud.

Caution is necessary, as there are depths of less than 3m only 183m E of this anchorage. There is anchorage 0.5 mile N of the E end of the N bridge, in depths from 5 to 8m, mud.

Ilha de Santa Catarina to Cabo de Santa Marta Grande

4.61 Between Ilha de Santa Catarina and Cabo de Santa Marta Grande, about 50 miles SSW, the coast is high, wooded, and indented. During clear weather, the mountains in the interior can be seen from about 36 miles offshore.

Ilha de Coral (27°56'S., 48°33'W.) lies about 6 miles SSE of Ponta dos Naufragados, and is high and wooded. The island shows a light, and when seen from the N or S, appears to be rounded. Two detached patches lie about 0.6 mile SSW of the island.

Ponta de Galeao lies 6 miles SSW of Ilha do Coral. A reef on which the sea always breaks extends N from the point.

Enseada de Imbituba (28°13'S., 48°39'W.) is entered between Ponta de Imbituba, 19 miles SSW of Ilha do Coral, and Ponta do Catalao, 1.5 miles to the NW. Lights are shown from both points. Porto de Imbituba is in the S part of the bay and is protected by a breakwater.

There are two conspicuous TV towers on a hill 2.5 miles W of Ponta de Imbituba; a prominent tower stands in the town. All of these towers show obstruction lights. Good radar returns have been reported from Ponta de Imbituba.

Pedras do Aracaju, with a least depth of 6.9m, and Pedras de Imbituba, with a least depth of 8.7m, lie about 0.8 and 1.1 miles, respectively, N of Ponta de Imbituba.

4.62 Porto de Imbituba (28°14'S., 48°40'W.) (World Port Index No. 13040), a coal-shipping port, lies on the SW side of the bay. The port consists of an artificial basin open to the NNW and protected by a breakwater on its E side which projects about 850m NNW from Ponta de Imbituba.

There are no major restrictions with regard to length of vessel. Depth at the entrance of the port is 12m. The maneuvering basin inside the port is 315m wide with a depth of 10m. A light is shown from the breakwater head.

Depths—Limitations.—Berths No.1 and No. 2 are each 310m long with 9.5m depths alongside, and are used for the shipment of coal and general cargo.

Berth No. 3 is 245m long, with depths of 9.6m alongside, is used for bulk and general cargo. Berth No. 4, the ro-ro berth, has a depth of 7.5m alongside.

Ponta do Catalao Light

There are two entrance channels. The N channel has a depth 10m; the S channel has a depth of 12m.

The maneuvering basin inside the port is 315m wide, with a depth of 10m. The largest vessel to enter the port was 200m in length with a draft of 9.5m.

It was reported (2012) that a new wharf is under construction and dredging is planned for the approaches and berths.

Pilotage.—Pilotage is compulsory. Pilots board vessels at the anchorage off the port in response to two long blasts. The pilot should be given notice at least 24 hours before arrival and confirmation 12 hours before arrival. Pilots board vessels 0.9 mile E of Ponta do Cataloa.

Contact Information.—Imbituba pilots can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-48-3255-1334
3. Facsimile: 55-48-3255-1534
4. E-mail: imbpilot@terra.com.br

Imbituba port can be contacted, as follows:

1. Telephone: 55-48-3255-0257
2. Facsimile: 55-48-3255-0080
3. E-mail: docas@cdiport.com.br

Anchorage.—Vessels anchor off the port about 0.7 mile E of Ponta do Catalao, in a depth of 12.7m, but it is exposed to winds from between NE and E. During these winds, small vessels can anchor off Ilha de Santana de Fora.

4.63 Between Ponta de Imbituba and Porto de Laguna, about 16 miles SSW, the coast is low and separates the sea from three lagoons which lie parallel to the coast and about 1 mile inland.

Ilhas das Araras (28°19'S., 48°39'W.), lies about 5 miles S of Ponta de Imbituba and 2.75 miles offshore. The island has a light and rises in sheer cliffs and is covered with vegetation.

Ilha Tacami lies about 3 miles SE of Ilha das Araras and consists of a rounded mass of rock. A small reef, with some above-water heads, extends SW from the islet. Close NE of the islet the sea breaks. A 14.5m patch lies about 0.7 mile N of Ilha Tacami.

Ilha dos Lobos (28°27'S., 48°42'W.) lies about 4 miles NE of Barra de Laguna and 2 miles offshore. A light is shown from the island.

4.64 Porto de Laguna (28°30'S., 48°47'W.) (World Port Index No. 13050), accessed via Barra de Laguna, is entered between two breakwaters situated 0.2 mile N of Ponta do Tamborete. The entrance between the two breakwaters is about 137m wide. The port is situated about 1 mile W of the breakwater entrance. The port is mostly used for fishing vessels.

Winds—Weather.—Southeast and S winds prevail during the winter; NE winds prevail the rest of the year.

Tides—Currents.—Tidal currents generally have a velocity of 1 knot to 1.5 knots, but sometimes attain a velocity of 2 to 3 knots.

Depths—Limitations.—The depths in the entrance are constantly changing. Inside the bar, the depths decrease during N winds, and increase during S winds. The entrance is impracticable during strong SE winds.

There are heavy breakers over the shoal extending from the head of the S breakwater. Local knowledge is essential.

The main wharf is 300m long with depths from 3 to 5m alongside.

There is also a 500m long wharf at the town, on the E side of the channel, 1 mile NW of the main wharf which can accommodate vessels up to 2.5m drafts.

Aspect.—Morro da Gloria stands on the N side of the entrance, about 2 miles WNW of Ponta do Tamborete. A conspicuous monument stands on its summit and is a good landmark in the approach. The monument is floodlit at night.

Anchorage.—Vessels can anchor, in about 5.5m, 0.25 mile N of the N breakwater. Within the port, only small vessels of less than 100 gt can anchor.

4.65 Cabo de Santa Marta Grande (28°36'S., 48°49'W.), about 8 miles SSW of Barra de Laguna, is conspicuous and easy to identify. It is the ends of a range of mountains which back the coast to the N. The cape is dark and its summit has some white patches which resemble houses at a distance.

From 10 to 12 miles NE, the cape appears as an island sloping SE and ending in low sandy ground. Good radar returns have been reported from the cape up to 22 miles distant. A light is shown from the cape and a racon transmits from the light. A DGPS station is also located at the light.

Cabo de Santa Marta Grande Light

Cabo de Santa Marta Grande to Porto do Rio Grande

4.66 Between Cabo de Santa Marta Grande and Porto do Rio Grande, about 275 miles SW, the coast consists of a low white sandy beach, with a few small sand hills with tufts of vegetation.

The current along this coast sets to the S, attaining a velocity of about 1.7 knots during NE winds. It is doubtful whether the wind influences the current to any great extent along this coast. It is possible, however, that after prolonged S or SW winds, the S current slows or even ceases.

With SE winds, the sea becomes rough and the current always sets toward the coast.

4.67 Pedra do Campo Bom (28°45'S., 49°00'W.), with a depth of less than 1.8m, lies about 12 miles SW of Cabo de Santa Marta Grande and 3 miles offshore. When the wind is fresh, the sea breaks. A similar rock lies 1 mile farther SW.

The **Rio Ararangua** (28°55'S., 49°20'W.), which flows into the sea 34 miles SW of Cabo de Santa Marta Grande, can be entered by small craft drawing up to 3m, with the help of local knowledge. A light is shown from Morros dos Conventos, about 2 miles SW of the entrance of the Rio Ararangua.

Torres (29°20'S., 49°44'W.) is a small town lying 32 miles SW of the Rio Ararangua. It is near the mouth of the Rio Mambituba. Entrance to the river should not be attempted without local knowledge. A light is shown on the coast near the S end of the town.

Anchorage may be obtained by small vessels in the river near the town.

Capao da Canoa (29°46'S., 50°01'W.) lies 29 miles SSW of Torres and shows a light. Prominent water tanks stand N and S of the light. A small pier projects from the coast about 2 miles S of the light.

Caution.—A dangerous sunken wreck lies about 27 miles ENE of Torres.

Recife das Torres, awash and on which the sea always breaks, lies about 1 mile SE of Torres. A stranded wreck lies on the NE part of the reef.

4.68 Tramandai (29°59'S., 50°08'W.) (World Port Index No. 13055), with the neighboring town of Imbe, is located about 14 miles SSW of Capao da Canoa and appears as one from offshore. A church and several prominent water towers

are good landmarks. Three prominent water towers stand on the coast within six miles SSW of Capao da Canoa Light.

Barra de Tramandai, which separates the towns of Tramandai and Imbe and gives access to a lagoon, can be entered by small craft with local knowledge.

A light is shown 2 miles S of Barra Tramandai. A lighted buoy, moored about 2 miles ESE of the light, marks the seaward end of a submerged pipeline. A dangerous wreck lies about 2 miles NNW of the lighted buoy.

Tramandai Light

4.69 Tramandai Maritime Terminal (Almirante Soares Dutra) (30°01'S., 50°06'W.) is situated about 3 miles S of Tramandai and consists of two lighted mooring buoys for tankers. Buoy No. 2 is situated about 0.5 mile SE of Buoy No. 1. Buoy No. 2 permits the mooring of tankers up to 200,000 dwt, with drafts up to 18m. Buoy No. 1 permits the mooring of tankers up to 105,000 dwt, with drafts up to 16m.

Berthing is carried out by a mooring master who boards vessels 2 miles E of the SBMs. Vessels waiting for a mooring master should anchor, as follows:

1. Vessels with a draft of 15m or less—1.5 miles NE of Buoy No. 1, in a depth of 20m.
2. Vessels with a draft of over 15m— 2 to 2.5 miles NE of Buoy No. 2, in a depth of 24m

Berthing is only carried out by day, but vessels may unberth at any time. Sea pilots are not required.

Vessels should send their ETA direct to the Petrobas Radio Station and Rio de Janeiro Radio, 72 and 48 hours prior to arrival and be confirmed at least 24 hours in advance.

Contact Information.—Tramandai Maritime Terminal control can be contacted, as follows:

1.	VHF:	VHF channels 9, 11, 14 and 16
2.	Telephone:	55-51-9951-9079 (SBM 1)
		55-51-9913-4812 (SBM 2)
3.	Facsimile:	55-51-3684-9528
4.	E-mail:	prog_tars@petrobras.com.br

Caution.—There are submarine oil pipelines between Tramandai Light and the monobuoys of the maritime terminal of Tramandai. A restricted area, best seen on the chart, has been established around the terminal, buoys and pipelines.

4.70 Between Barra de Tramandai and Porto do Rio Grande, about 167 miles to the SW, the coast consists of extensive areas of undulating sand, covered with low vegetation which decreases toward its SW end.

Inland, there are several scattered dunes also covered with low vegetation. Several towns and villages stand along this coast, but they are only visible in clear weather from about 3 to 4 miles offshore.

Solidao Light

Cidreira (30°10'S., 50°12'W.), a small village, lies about 11 miles SSW of Tramandai. A light is shown from the village.

A conspicuous water tank stands about 6 miles NNE of the light. A second water tank stands 6 miles SSW of the light.

Banco da Berta, with depths of less than 15.8m, extends about 4 miles offshore, about 20 miles SSW of Cidreira.

A wreck lies stranded on the coast about 19 miles SSW of Cidreira. A second stranded wreck lies about 7 miles farther SSW.

Solidao (30°42'S., 50°29'W.), showing a light, lies about 36 miles SSW of Cidreira. A light is shown at Mostardas, about 39 miles SSW of Solidao. Another light, with a racon, is shown at Conceicao, about 42 miles farther SW.

Numerous shoals, with depths of less than 20.1m, lie within 25 miles of the coast between Mostardas and the entrance of Porto do Rio Grande. Banco Minuano, with a depth of 13.7m, lies about 21 miles ENE of Barra do Rio Grande and 10.25 miles offshore.

Parcel do Carpinteiro, with a depth of 14.1m, lies about 16 miles ESE of Barra do Rio Grande and 13 miles SSW of Banco Minuano.

A dangerous wreck is reported to lie lies about 2 miles W of Banco Minuano.

Caution.—Surveys of years ago indicate that the shoreline between Mostardas and Barra do Rio Grande lies approximately 3 miles W of its charted position. Mariners are advised to use caution when navigating in this area.

Rio Grande (32°03'S., 52°05'W.)

World Port Index No. 13060

4.71 Rio Grande lies about 9 miles N of Barra do Rio Grande, which is the entrance to the channel. This channel is the outlet of Lagoa dos Patos and Lagoa Mirim.

The former extends NE for about 130 miles, and the latter extends SW for about 1 miles; the two are connected by the Rio Sao Goncalo.

This channel also leads to Porto de Pelotas on the Rio Sao Goncalo, about 20 miles NNW of Rio Grande, and Porto Alegre on the Rio Guaiba, at the N end of Lagoa dos Patos.

Port of Rio Grande

http://www.portoriogrande.com.br

Tides—Currents.—The tidal currents in Barra do Rio Grande are greatly influenced by the wind and should always be considered when entering or passing between the breakwaters.

During NE winds, the ebb current sometimes attains a velocity of 5 knots and the flood current a velocity of 3 knots.

After prolonged SW winds, which raise the water level in the lagoons, the ebb current is particularly strong.

Aerial view of Rio Grande

Because of these strong tidal currents, a single screw vessel may sometimes have difficulty rounding the breakwaters.

Vessels may be drawn toward Banco da Barra or the breakwaters, depending on whether it is a flood current or an ebb current.

Rio Grande Container Terminal

Depths—Limitations.—Barra do Rio Grande, the entrance of the channel, is protected on each side by a breakwater extending about 2 miles S from the coast. The heads of the two breakwaters are about 0.5 mile apart and lie E and W of each other.

A submerged extension extends about 70m from the head of the E breakwater and about 200m from the head of the W breakwater. A light is shown from the head of each breakwater.

A dangerous wreck lies sunk about 137m E of the head of the E breakwater. A wreck, which is dangerous to navigation, lies about 0.7 mile SSE of the E breakwater.

Banco da Barra, a sandy shoal with a least depth of 4.5m, lies about 1 mile SSW of the E breakwater.

The access channel to Porto do Rio Grande is 9 miles long and varies in width from about 0.1 to 0.3 mile.

At the bar, in the vicinity of the breakwater, the water depth varies from 8 to 12.2m.

A DGPS station is in operation in the port.

The maximum size of a vessel entering the port is 270m in length and a draft of 12.2m.

Vessels carrying dangerous cargo are prohibited from using the channel at night.

There is a maximum speed of 8 knots for vessels in the access channel. In Porto Velho and Porto Novo, the maximum speed is 5 knots.

From the breakwater to the Porto Novo access channel the channel is marked by buoys and water depth varies from 9 to 17m. The port is divided into three major areas.

Porto Novo is formed by a 1.5 mile long channel located between the E end of the peninsula on which the city of Rio Grande stands, and a low, sandy islet which has been reclaimed from part of an extensive sand bank about 0.1 to 0.3 mile E of the city.

Porto Velho lies along the N side of this peninsula and is approached through Porto Novo.

Superporto is located on the left side of the approach to Rio Grande, between the entrance breakwaters and the entrance to **Saco da Mangueira** (32°03'S., 52°05'W.).

The access channel to Superporto is dredged (2001) to 13.8m between Buoy No. 1 and Buoy No. 2 and Cotrijul Terminal.

The Porto Velho Wharf has a length of 640m and a depth of 4.5m. It is used by fishing vessels and lighters.

Porto Novo is 1,952m long, with a depth of 9.4m alongside. Vessels with a draft greater than 7.9m have trouble approaching the piers due to silting.

Porto Novo

The Super Porto General Cargo Terminal is 300m long, with a depth of 12.2m alongside. It handles containers.

The Cotrijui Terminal is about 200m long, with a depth of 12.2m alongside. It is T-shaped and handles grain. It can accommodate a vessel of 80,000 dwt.

The Petrobras Terminal is 318m long, with a depth of 10.0m alongside. It handles petroleum products.

The Luch Singer Terminal is 130m long with a depth of 11m alongside. It is T-shaped and handles fertilizer. It can accommodate vessels up to 60,000 dwt.

The fertilizer terminal is 360m long, with a depth of 12.2m alongside.

Aspect.—A round tower, 67m high at Porto Novo, is the most conspicuous object in the area. Also visible is the cathedral, with two towers, and a conspicuous silo, 0.3 mile ENE and 1 mile E, respectively, of the round tower. A conspicuous tower stands on the coast, 2.75 miles WNW of the entrance. The silo at the grain terminal, 0.5 mile N of the head of the W breakwater, is easily identified from seaward.

The former pilot lookout, a white square masonry tower with a mast and yards, stands close S of Banco de Barra Light; it is about half the height of the light but larger in bulk.

Pilotage.—Pilotage is compulsory for all Brazilian vessels over 500 gross tons, all foreign vessels, and all vessels carrying dangerous cargo. Pilotage is available 24 hours. Pilots board

about 5 miles SE of the dredged channel; the pilot boat is red with a black "P" on either bow.

Vessels should send their ETA 24 hours in advance, with a confirmation sent 12 hours in advance. The pilot should be requested, via the agent, 4 hours in advance.

When anchored and awaiting the pilot, vessels should report their name, last port of call, and time of anchoring.

Should weather conditions prevent the pilot from boarding, vessels will be guided by the pilot boat into the marked channel where, once inside the breakwaters, the pilot will board.

Contact Information.—Rio Grande pilots can be contacted, as follows:

1. VHF: VHF channels 9, 14, and 16
2. Telephone: 55-53-3232-4233
   55-53-3232-4740
   55-53-3232-4868
3. Facsimile: 55-53-3232-4758
4. E-mail: rgpilots@rgpilots.com.br

The Rio Grande port captain can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-53-3233-6119

Anchorage.—There are various designated anchorage and prohibited anchorage areas between Barra do Rio Grande and Porto Novo; ships should anchor only as directed by the port authorities.

Caution.—It should be noted that the water in the port may vary in the course of a few hours, from completely fresh to nearly the density of sea water, depending on the direction of the wind.

It is prudent to reckon safe draft for entry and loading as if in fresh water.

It has been reported that the strong SW current at the breakwaters causes the channel buoys to be set to the SW.

Piracy and armed robberies have been reported in the area of Rio Grande.

An overhead power cable crosses the channel in the vicinity of Ponta dos Pescadores. It has a minimum vertical clearance of 70m.

Lagoa dos Patos

4.72 Lagoa dos Patos, the largest lake in Brazil, extends about 130 miles NE from Porto do Rio Grande and is separated from the sea by a peninsula from 6 to 20 miles wide.

Numerous rivers empty into the lake, the largest being the Rio Guaiba at its NE end and the Rio Sao Goncalo at its SW end.

Except for the dredged channels at each end, Lagoa dos Patos has general depths of 5.5 to 7.3m.

Winds—Weather.—Northeast and SE winds cause a lowering of the water level on the E shore of Lagoa dos Patos and swells on the W shore. NW and SW winds cause an increase of the water level on the E shore and a lowering on the W shore.

Southwest winds, which usually accompany cold fronts in winter, are violent and long lasting. They cause damming on Barra do Rio Grande, which raises the entire level of Lagoa dos Patos. This may even occur some days before the SW wind reaches the Rio Grande.

Northeast winds, which usually occur in spring and at the beginning of autumn, cause an outflow through Barra do Rio Grande and lower the level of the lake.

Tides—Currents.—The currents in the lake follow the direction of the wind and, during strong winds, may attain a velocity of 2 knots in the dredged channels in the SW part of the lake. During S and SW winds, a current in the dredged channels may drive vessels toward the N shore.

Between Sao Jose do Norte and Ponta da Feitoria, about 20 miles N, an intricate channel leads through the shallow SW part of the lake. This channel has a project depth of 6m over a width of 80m; however, at times depths are less. It is marked by beacons and buoys, most of which are lighted.

Between Ponta da Feitoria and Ponta de Itapua, the E entrance of the Rio Guaiba, about 94 miles NE, the fairway lies near the E shore of the lake. It is marked by lights and lighted buoys.

Between Ponta de Itapua and Porto Alegre, about 22 miles NNW, another intricate channel leads up the Rio Guaiba. This channel has a project depth of 6m; however, at times depths are less. It is marked by beacons and buoys, some of which are lighted.

Navigation in Canal da Feitoria at night is prohibited for merchant vessels carrying dangerous cargo.

Pilotage.—Pilotage is compulsory and is available only during daylight hours. Pilots can be obtained at the Rio Grande.

Contact Information.—Lagoa pilots can be contacted, as follows:

1. VHF: VHF channel 16
2. Telephone: 55-53-3231-1105
3. Facsimile: 55-53-3232-6577
4. E-mail: praticagemrg@lagoadospatos.com.br

Caution.—Due to frequent changes in the width and depths of the channels, local knowledge is required. Small craft should keep clear of larger ships in narrow channels as eddies and abnormal water effects can cause boats to collide with ships' propellers. Fish stakes, some of which are located in the channels, constitute a danger.

Porto Alegre

4.73 Porto Alegre (30°02'S., 51°14'W.) (World Port Index No. 13080) lies on the E bank of the Rio Guaiba, about 25 miles from its mouth. It is built on a rocky promontory and is reported to be about 30m high. The government palace and the cathedral stand on this summit.

Several rivers empty into the Rio Guaiba in the vicinity of the port. Some of these rivers are navigable by small craft up to 200 miles during the flood season.

Winds—Weather.—From November to April, the prevailing winds are E and SE. From May to August, the winds are variable, and from September to October, the winds are S and ESE.

Depths—Limitations.—There are three main sectors of quays in Porto Alegre. Maua Quay is 3,240m long, with alongside depths of 4 to 6m. The Cais dos Navegantes Section is 2,500m long, with alongside depths of 5 to 6m. The Cais Marcilio Dias Section is 2,260m long, with alongside depths of 4 to 5m.

There are four tanker berths in the Rio Gravatai, which discharges through the E bank close N of the N end of Cais dos Navegantes. The berths can accommodate tankers of 1,600 gt and not exceeding 5.2m in draft and 100m in length.

It is not recommended that vessels longer than 245m or with a draft of 5.2m attempt to reach Porto Alegre. A ro-ro berth, with 300m of quay, is located at the port.

The Rio Guaiba is spanned above Porto Alegre by the Getulio Vargas Bridge. The bridge has a vertical clearance of 10.1m (closed position) and 36.6m (open position).

The bridge may be opened for shipping, Monday through Friday, inclusive, during the following periods:

a. 0600 to 0700 (summer only).
b. 0900 to 1130.
c. 1330 to 1700.
d. 1930 to 2030 (summer only).

During weekends and holidays, special arrangements are required.

Vessels approaching the bridge should reduce speed and be prepared to stop immediately if circumstances require.

When vessels are approaching the bridge from opposing directions, the vessel proceeding downstream will be given priority.

Signals.—Signals associated with the operation of the bridge are summarized in the table titled **Getulio Vargas Bridge—Signals**.

Pilotage.—Pilotage is compulsory. A pilot is picked up at Rio Grande. Pilots will not take vessels through the approach channels to Porto Alegre at night. Pilotage should be requested, via the agent, 24 hours in advance.

Regulations.—Vessels of over 12 knots may leave the Rio Grande for Porto Alegre, or vice versa, not later than 1700 in summer, or 1500 in winter; those of less speed leave 1 hour earlier.

This means that vessels entering from the ocean and bound for Porto Alegre directly must enter the Rio Grande at least 3 hours before the time indicated to allow for delays in getting clearance at the Rio Grande and changing pilots.

Getulio Vargas Bridge—Signals

	Day signal	Night signal	Sound signal
To request bridge be opened	—	—	Two prolonged blasts (by vessel)
To indicate bridge may not be opened	—	—	Three prolonged blasts (by bridge operator)
To indicate an emergency at bridge	—	—	Five short and rapid blasts (by bridge operator)
To indicate bridge is closed	Red flag waved horizontally	Two red lights	—
To indicate bridge is open	Green flag waved vertically	Two green lights	—
To indicate traffic interrupted in both directions	—	One orange light	—

In summer months, vessels of 14 knots may leave at daybreak and complete the transit in the day, otherwise, vessels must anchor overnight at either end of Lagoa dos Patos.

The maximum speed in the port and terminal area is 5 knots

Anchorage.—Vessels awaiting berthing anchor 0.2 mile off the center part of Maua Quay, in a depth of 7m. Anchorage is compulsory for vessels carrying dangerous cargo and requiring inspection by the port authority, or for vessels awaiting the opening of the Getulio Vargas Bridge. Such vessels are permitted to anchor for a maximum of 6 hours; other vessels may also use the anchorage for a maximum of 12 hours. In all cases permission must be obtained from the Porto Alegre Port Authority.

Santa Clara Terminal (29°54'S., 51°22'W.) is on the Rio Jacui, about 17 miles N of Porto Alegre. Pilotage, which is compulsory, is available during daylight hours only.

4.74 Porto de Pelotas (31°47'S., 52°20'W.) (World Port Index No. 13070) is located about 20 miles NNW of the Rio Grande and 5 miles W of the mouth of the Rio Sao Goncalo.

The channel over the bar at the entrance of the Rio Sao Goncalo has been dredged to a depth of 5.5m over a width of 80m, but continual silting makes the channel shallower than the charted depth. The port is accessible to vessels with a draft of 2m.

The Rio Sao Goncalo is marked by beacons and buoys, some of which are lighted.

Porto de Pelotas

Pilotage—Pilotage is the same as Lagoa dos Patos. Pilots board at Rio Grande or Porto Alegre.

There is 500m of quayage, with a maximum depth of 5.1m alongside.

Lagoa Mirim

4.75 Lagoa Mirim extends about 97 miles SW from the SW entrance of the Rio Sao Goncalo, and is separated from the sea by a low and sandy peninsula from 10 to 30 miles wide and partially inundated.

Numerous rivers empty into the lake, with the principal one being the **Rio Jaguarao** (32°39'S., 53°11'W.). This river flows into the NW side of Lagoa Mirim and forms part of the boundary between Brazil and Uruguay.

Numerous navigational aids, some of which are lighted, are located throughout Lagoa Mirim. Local knowledge is essential in the lake.

Barra do Rio Grande to Caba Polonio

4.76 Between Barra do Rio Grande and the mouth of Arroio Chui, about 115 miles SSW, the coast is a low sandy strip, backed by the peninsula which separates Lagoa Mirim from the sea. This very low coast is inconspicuous on the radar screen, the echoes obtained usually coming from dunes located from 1 to 2 miles inland. The light structures are easily identified, and are visible up to 7 miles offshore by day.

Lights are shown from the coast at Sarita, Verga, Albardao, and Chui, about 32, 53, 68, and 115 miles, respectively, SSW of Barra do Rio Grande.

Between Barra do Rio Grande and Arroio Chui, depths of less than 18.3m lie within about 27 miles of the coast. Depths of less than 9.1m lie within about 1 to 3 miles of this coast. Vessels in this area should keep well off the coast.

Banco do Albardao, which is composed of rock covered by fine sand, with depths of less than 10m and a minimum depth of 6.6m, extends from 4 to 15 miles SSE from Verga Light.

Canal da Verga, the channel between this bank and the coast, has a minimum depth of 12m in the fairway.

Caution.—The coast of Uruguay from Arroio Chui to Punta del Este is covered by the Maritime Movement Control and

Albardao Light

Chui Light

Sarita Light

Information System. For further information, see Pub. 160, Sailing Directions (Planning Guide) Indian Ocean and South Atlantic Ocean.

4.77 Southwest of Arroio Chui, the first prominent feature is the rocky Punta Coronilla, a distance of about 13 miles.

Isla Verde, the largest of several islets, surrounded by above-water rocks and submerged rocks, lies about 2 miles ESE of Punta Coronilla.

A rock, awash, lies 0.5 mile E of these islets. A fort stands on a hill about 3 miles SW of Punta Coronilla.

Anchorage is available 0.25 mile S of Isla Verde, in a depth of 11m.

Between Punta Palmar, about 9 miles S of Punta Coronilla, and Cabo Castillo, about 21 miles farther S, the coast consists of a flat sandy beach. A light is shown from Punta Palmar.

Cabo Castillo (34°21'S., 53°46'W.) is a rocky promontory which rises to Cerro Bueno Vista, about 0.2 mile inland.

The cape is a good landmark because of its isolated position and distinctive shape. Good radar returns have been reported from the cape, distant 16 miles.

Punta del Diabolo, the NE extremity of Cabo Castillo, is a white sheer cliff, rounded in shape, with some dark-colored patches of bushes.

Punta Aguda, the E extremity of Cabo Castillo, lies 0.75 mile SSE of Punta del Diabolo.

4.78 Islas de Castillo Grande (34°21'S., 53°44'W.) consists of Isla del Marco and Isla Seca lying 1 mile ENE and about 0.3 mile N, respectively, of Punta Aguda. Depths of 9 to 15m lie between the two islets. A white, steep rocky cliff stands on the SE side of Isla del Marco and is visible 10 to 12 miles.

Anchorage.—Small vessels with local knowledge can anchor between Isla Seca and Cabo Castillo, about 0.2 mile off the cape, in depths of 3.5 to 4.5m, fine sand.

Vessels anchor in Bahia Castillo, NW of the summit of Cerro Buena Vista, nearly 0.5 mile from the cape, in a depth of 4.5m. Before anchoring, care should be taken to ascertain the nature of the bottom, as it is rocky in places.

These anchorages afford good shelter from the pamperos, but a vessel should immediately put to sea if the wind shifts to the NE, as it raises a heavy sea.

Caution.—The existence of a local magnetic anomaly has been reported in the vicinity of Cabo Castillo but this report has not been verified.

Cabo Polonio to Punta del Este

4.79 Cabo Polonio (34°24'S., 53°47'W.) is a steep rocky promontory rising to a greenish cone-shaped hill. When first seen from NE or SW, it appears as an island. A light is shown from the highest part of the cape.

Good radar returns have been reported from the cape out to a distance of about 16 miles.

Anchorage is afforded in the bay N of Cabo Polonio, in a depth of 10m, 0.6 mile NNE of Cabo Polonio Light.

During offshore winds, vessels can anchor, in a depth of 9.1m, about 0.5 mile off the beach extending N from Cabo Polonio. Vessels can also anchor about 1 mile off this beach, in depths from 9 to 15m, sand and mud.

A number of prominent mountain peaks are located to the W and N of Cabo Polonio and can best be seen on the chart.

Islas de Torres, consisting if three arid and rocky islets, lie up to 1.25 miles E of Cabo Polonio. A rocky patch, with a depth of less than 1.8m, lies about 0.3 mile W of the easternmost islet. Narrow passages lie on either side of the above patch and between the inner islets and Cabo Polonio, but they should not be used without local knowledge.

Bajo Polonio (34°26'S., 53°48'W.) is a dangerous rocky shoal, with a least depth of 3m, lying about 2 miles SW of Cabo Polonio; the sea often breaks over it.

A shoal, with a depth of 14.3m and a bottom of hard gravel, has been reported to lie 18 miles ENE of Cabo Polonio. Much discolored water was observed in the vicinity; caution is necessary as shallower depths may exist.

An explosives dumping area is centered about 4 miles ENE of Cabo Polonio.

4.80 Between Cabo Polonio and Cabo Santa Maria, about 24 miles to the SW, the coast consists of a beach, backed by sand hills. There is a heavy surf on this beach, making landings dangerous and sometimes impossible. Some huts, generally surrounded by trees, are scattered along this beach, but vegetation is very scarce.

Punta Rubia, about 5 miles NNE of Cabo Santa Maria, is the only break along this beach. It appears as an islet from seaward. A high hill with a reddish patch rises from Punta Rubia and is the only one of its color in this area.

Bajo la Pedrera, with a depth of 8.2m, lies about 0.5 mile SE of Punta Rubia.

Cabo Santa Maria (34°40'S., 54°09'W.), located 24 miles SW of Cabo Polonio, is low with a rocky reef extending about 0.15 mile to the S. A light is shown from a hillock on the cape. Good radar returns have been reported from the cape, distant 15 miles.

Anchorage is available W of Cabo Santa Maria, 0.75 mile offshore, in depths of 10.9 to 12.8m.

4.81 Banco La Plata, with depths of 18.3 to 37m, lies in the N approach to the Rio de la Plata between the meridians of about 52°30'W and 55°20'W. It extends parallel with the N coast, from 20 to 50 miles offshore, and is composed of fine sand and broken shells.

Pozos de Fango, a depression of the ocean bed with depths from 36 to 82m, lies between Banco La Plata and the coast to the N. It begins about 15 miles E of Isla de Lobos and extends about 80 miles ENE, and is about 15 miles wide at its E end.

The bottom is mud of the consistency of sticky clay, with the color varying from lead to bluish black.

Isla de Lobos Light

Bajo Speedwell (34°40'S., 54°07'W.), with a depth of 9.7m, lies about 2 miles E of Cabo Santa Maria. Banco Laplace, a dangerous sand bar, the existence of which is doubtful, was reported to lie about 2 miles S of Cabo Santa Maria.

A 10m patch lies about 10 miles E of Cabo Santa Maria; a 15m patch lies about 6 miles SE of the same cape.

4.82 **Puerto de la Paloma** (34°39'S., 54°09'W.) (World Port Index No. 13100) lies on either side of a low peninsula, joined to the coast by a narrow sandy isthmus, about 1 mile NE of Cabo Santa Maria.

Puerto Nuevo, accessible to vessels drawing up to 3m, is formed by a rubble breakwater about 0.6 mile long, projecting NW from the end of the peninsula. Rocks, awash, extend about 0.3 mile E from the E end of the peninsula.

Puerto Viejo is S of the peninsula; Puerto Nuevo is to the N of the peninsula.

Puerto Vieio, with depths of 1.2 to 3.9m, is entered between the reefs extending S from the peninsula and Isla de la Tuna, about 0.4 mile NE of Cabo Santa Maria and close offshore.

The entrance, about 0.1 mile wide, is dangerous and local knowledge is essential.

A 3m patch lies about 0.4 mile NE of the same point. A pier at the S end of Puerto Nuevo has a depth of about 5m alongside its head, which is 15m long. A light is shown from the head of the pier.

Bajo Falkland (34°38'S., 54°07'W.), a rock awash, lies about 1 miles NE of the head of the breakwater. A stranded wreck lies on this rock. A 3.6m shoal lies about 0.2 mile W of Bajo Falkland.

Bajo 18 de Julio, with a least depth of 4.2m, lies about 0.6 mile ENE of the head of the breakwater.

Punta Jose Ignacio Light

4.83 The coast between Cabo Santa Maria and Punta Jose Ignacio, about 26 miles to the WSW, is backed by sand hills, but has no conspicuous features. Gaps in these sand hills indicate Laguna de Rocha and Laguna Garzon, lying close inland.

Punta Jose Ignacio (34°51'S., 54°38'W.) extends about 1 mile from the general coastline and rises to a hill. This point has a frontage of rocks, about 0.6 mile long in an E and W direction. It is fringed by a reef which extends about 0.5 mile E and 183m S. A small cove for boats is on each side of Punta Jose Ignacio. A light is shown from the point.

A SBM for oil tankers is moored SW from Punta Jose Ignacio. The mooring buoy is located about 4 miles SW of Punta Jose Ignacio, in a depth of 18.m. Vessels should contact Punta del Este Control on VHF channel 16 when within range.

A floating hose, 270m long, painted black with orange bands and marked by a light, extends from the buoy. A prohibited area, shown on the chart, surrounds the SBM.

Only vessels under pilotage navigating to and from the oil terminal may enter this area. A berthing master, available to assist ships securing to the buoy, will board in position 34°59'S, 54°46'W.

The vessel's ETA should be signaled 48 hours in advance and be confirmed 24 hours and 12 hours before arrival. The maximum permissible draft is 16.7m.

Vessels may anchor clear of the approach buoys, but not closer than 0.5 mile.

Bajo Ladas (34°52'S., 54°38'W.), with a depth of 5.2m, lies about 1 mile S of Punta Jose Ignacio. Bajo Didy, with a depth of 0.1m, lies about 0.4 mile SE of the above point. A shoal, with a depth of 7m, lies about 3 miles SE of Punta Jose Ignacio.

A stranded wreck lies on shore about 4 miles W of Punta Jose Ignacio. An obstruction lies about 11 miles SSW of the same point.

Between Ponta Jose Ignacio and Punta del Este, about 17 miles to the WSW, the coast consists of a sandy beach, free of off-lying dangers.

A small river empties into the sea about 12 miles WSW of Punta Jose Ignacio.

Punta del Este (34°58'S., 54°57'W.) is described in paragraph 5.7.

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

SECTOR **5** — CHART INFORMATION

Additional DNC library coverage may be found in NGA DNC 07 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 5 — DNC LIBRARY INFORMATION

SECTOR 5

THE RIO DE LA PLATA, THE RIO URUGUAY, THE RIO PARANA, AND THE RIO PARAGUAY

Plan.—This sector begins with a description of the N shore of the Rio de la Plata and includes the port of Montevideo; then, the S shore is described and includes the port of Buenos Aires. The Rio Uruguay, the Rio Parana, and the Rio Paraguay are then described in that order as far N as Puerto de Salto, Porto Mendes, and Porto Cuiaba, respectively.

General Remarks

5.1 Winds—Weather.—In the basins the Rio Uruguay, the Rio Parana, and the Rio Paraguay are rather variable in speed and direction. In general, winds from between the N and S through E predominate. Gusts of gale force may also develop during thunderstorms.

The air is clear along the river to Parana and beyond. Mirage effects are frequently reported. Dust haze develops during dry spells and bad visibility occurs during heavy rainstorms.

Heavy rainfalls to the N, at the source of the river and their tributaries, cause periodic rise of water level.

Day temperatures are higher inland in summer and cooler at night.

The estuary of the Rio de la Plata has frequent and rapid changes of weather characteristic of temperate climates. Although NE winds are frequent over this region, they are not predominate at any season and wind directions might be better classified as variable most of the year.

The Rio de la Plata is subject to two regional phenomenon: Pamperos and Sudestadas.

Pamperos winds are cold squally winds from between S and W which follow the passage of a frontal trough. With a Pampero, pressure falls slowly and the wind is N for a few days with high temperature and humidity. Then the wind becomes NE, strong and gusty; the regular land and sea breezes are interrupted and conditions become very oppressive. Shortly before the arrival of the cold front, the wind may fall calm.

The onset of the SW wind is preceded by a roll of cumulus clouds followed by an extensive cumulonimbus cloud.

As the cloud arrives overhead, there is a heavy sometimes violent squall from between the W and S. After a period of severe gustiness, the main current of cold air arrives, pressure rises, and temperature falls. There is usually a short period of torrential rain with thunder and lightning.

The general gloom is intensified by clouds of dust if the squall arrives from a W point. The maximum wind speed usually occurs at the preliminary squall.

Some of the more severe squalls occur in the summer, but the S wind following the frontal passage is stronger in winter and may persist for a few days. This strong S to SW wind, with mainly clear skies, is known locally as Pampero limpio.

About 20 Pamperos a year occur in the Rio de la Plata, 12 at Buenos Aires, and 16 at Montevideo. The hazard to navigation is due to the sudden onset of the squall with gusts of 70 knots or more; a gust of 107 knots was recorded at Montevideo in July, and a Pampero gust of 96 knots from NW in January, 1925, with considerable damage on both occasions.

Between 80 and 100 cold fronts cross the Rio de la Plata each year with a sudden change of wind from N to S. The intervals between the fronts varies from 1 to 15 days, and they vary a great deal in intensity and duration. Occasionally the front passes with little evidence other than the wind change.

Another danger to navigation in this area is the strong SE wind (Sudestada) which develops when depressions from the Parana basin deepen rapidly near the coast before moving SE over the sea. Occasionally the wind reaches gale force with rough seas, rain, and bad visibility.

During one of these storms in July, 1923, the SE wind averaged 62 knots over an hour and reached 86 knots in gusts. Between 5 and 8 Sudestadas occur each year.

Sudestadas may develop during relatively high pressure with an average frequency of 3 per year at Montevideo. These SE winds may persist for a day or two to cause heavy seas and an appreciable rise the level of the Rio de la Plata.

Winds in the basins of the Rio Uruguay, the Rio Parana, and the Rio Paraguay are rather variable in speed and direction. In general, winds from between N and S through E predominate. Gusts of gale force may develop during thunderstorms.

The percentage frequency of gales reaches a maximum of 5 per cent in July and August near the coast. Most of these high winds are occasions of Pamperos and Sudestadas. The number of gales increases steadily to S and E of the sea area to reach 10 per cent in the extreme SE of the zone in summer and up to 20 per cent in winter.

Average cloud amount is rather constant at about half cover throughout the year in most of the zone. Relatively short periods of overcast skies occur during the passage of frontal troughs and long periods of almost clear skies are enjoyed during W winds in the S of the zone near the coast. Cloud amount exceeds 0.6 for most of year in the SE.

In this zone the rain is more evenly distributed throughout the year with no marked seasonal change.

Heavy showers account for most of the total, but periods of more prolonged rain are not uncommon. Amounts are higher inland along the river basins in summer due to the increase in showers over the hot land during the afternoon.

There is a gradual decrease in the annual total amount of rain from about 1,300mm near Porto Alegre to the N of the Rio de la Plata to about 650mm at Bahia Blanca to the S. The rain is evenly distributed, with no marked seasonal change.

The maximum frequency of fog occurs in winter and reaches 10 per cent along the coast from Montevideo to Porto Alegre, but in the extreme S of this zone there is more fog during October to February. Most of the fogs in the Rio de la Plata occur with light E or NE winds.

Radiation fog on clear winter nights may obscure the river banks around dawn while the central parts of the river remains free of fog; these land fogs disperse by mid-morning. The air is clear along the river to Parana and beyond.

However, mirage effects have been quite frequently reported. Dust haze develops during dry spells and bad visibility occurs during heavy rainstorms.

The variations over the sea follow the pattern of the sea surface temperature. Sharp changes in temperature occur along this coastline during sudden wind changes. Winds from the N, known locally as Sondo, are hot and oppressive in summer while S and W winds are relatively cool and bracing.

A sudden drop of 10°C is not uncommon at the onset of a Pampero, but the subsequent rise with the return to N winds is more gradual. Day temperatures are higher inland in summer and cooler at night.

There is a greater range of humidity in this zone than in the lower latitudes. Values are rather high in the N due to the prevalence of onshore winds, but further S the frequency of winds off the land brings drier air over the coastal waters and the humidity falls to 40 per cent or below during much of the day. There is the usual rise to 90 per cent or more around dawn on quiet clear nights along the coast.

Tides—Currents.—Because of the large body of water brought down by the rivers and the fact that the general movement of the water is greatly influenced by the wind, the tidal currents and currents are variable.

The normal range of the tide is small, and during light winds, the tidal currents are regular. During strong winds, the current in the outer part of estuary flows in the direction of the wind, but in the inner part the currents caused by such winds follow the normal directions of the tidal currents, according to whether the effect of the wind raises or lowers the water level.

Because of the small range of the tide, the rates of the tidal currents in the estuary are normally low. In general, the rate does not exceed 0.75 knot in the outer zone and over Banco Ortiz, but in the main channel the rate may reach 2 knots.

During strong winds, the tidal currents may attain a rate of 1.5 knots. In the outer zone, the direction of the current will be affected, but in the inner zone the direction is not usually affected.

The normal range of the tide is very small, being about 0.7m off **Cabo San Antonio** (36°18'S., 56°47'W.) and off Buenos Aires, 0.4m at Montevideo, and 0.7m at Colonia.

It is greatly influenced by the wind, which can multiply this range as much as six times. The chart datum in the Rio de la Plata is about 0.4m below MLW; at HW, during S and SE winds, the depths may be 1.2m or more greater than those charted; whereas at LW, during N or NW winds, the depths may be less than those charted.

In the area between Punta Piedras and Buenos Aires, the winds have the following effect: those from between W and NE through N, lower the water level, the greatest effect being caused by those between NW and N; those from between E and SW through S, raise the water level, those between SE and S producing the greatest effect.

Winds from between NE and E and from between SW and W have little effect.

The effect of the wind on the water level is almost immediate, both when the wind begins to blow, or changes in direction.

A wind from between N and NW, with a force of from 4 to 5, will lower the water level by 0.5m, and if such a wind should suddenly change direction to between S and SE and blow with the same force, the water level will rise 0.9m in the space of 1 hour.

During the rise or fall of the tide, winds of force 2 from NW or SE, respectively, will be sufficient to arrest the tide or even to reverse its action.

Several zones have been established in the approaches to the Rio de la Plata in which ships can discharge cargo in order to reduce their draft before proceeding to Montevideo or in Canal General. The limits of these zones are shown on the charts.

Pilotage.—Pilotage is compulsory in the estuary, except for coasting vessels. A vessel entering the estuary may proceed as far as Rada de Montevideo or Practicos Recalada Light Vessel without a pilot. Vessels bound for Uruguayan ports board pilots in the vicinity of the Km 9.35 Lighted Buoy (35°00'S., 56°14'W), or further E, as directed, for vessels with drafts exceeding 8.8m. Vessels bound for Argentinian ports board pilots at Practicos Recalada Light Vessel (35°06'S., 55°58'W.) or, in the vicinity of position 35°03'S, 55°51'W, from a pilot boat operating from Montevideo.

All vessels proceeding further into the estuary must obtain a pilot from Practicos Recalada Light Vessel, to which they are required to give 48 hours notice of the ETA; the ETA should be confirmed 24 hours in advance. The pilot boards about 1.8 miles N of Practicos Recalada Light Vessel.

Recalada pilots can be contacted on VHF channels 12, 14, and 16.

The light vessel has recently been replaced with a converted oil tanker.

The pilot conducts a vessel to the roadstead off **Puerto La Plata** (34°47'S., 57°51'W.) where he is relieved if the vessel is bound for Buenos Aires or up the rivers. Vessels with drafts exceeding 8.8m, or vessels that cannot complete the transit in 8 hours, will be required to embark two pilots (2002).

Vessels entering the Rio de la Plata must use pilots of the nationality of their port of destination, and when leaving must use pilots of the nationality of the port which they leave.

Caution.—Because of the frequent changes in the weather, the irregularities of the currents, and the lack of landmarks, vessels should exercise great caution when navigating in the estuary. In some places, the banks and shoals are steep-to and the channels are narrow so that soundings may give little warning.

When soundings show a bottom of mud only, the vessel will be in the channel, but the more this mud is mixed with sand, or the bottom becomes harder, the nearer will be the shoal depths. The bottom near the banks and shoals is generally a mixture of black mud and sand, overlying stiff clayish mud.

For the most up to date local information, it is recommended that in the Rio de la Plata and in the Rio Uruguay receive Nautical Radio Notices from Uruguay and Argentina.

The latest depths in the channels and rivers covered by this sector are promulgated in the Boletin Fluvial published by the Argentine Government.

Boletin Fluvial
http://www.sspyvn.gov.ar/boletinfluvial.html

A submarine gas pipeline crosses the Rio de la Plata, from about 3 miles W of Isla Santiago passing about 1 mile upriver

of Km 46 Lighted Buoy, and coming ashore near Muelle Platero, 3 miles W of Punto Artilleros, as best seen on the chart. Anchoring and trawling within 1,000m of the pipeline is prohibited.

Many wrecks are charted in the estuary of the Rio de la Plata, and because of the shallowness of the water, almost all of them are dangers to navigation. The majority, particularly those near the routes leading to the ports in the estuary, are marked by lighted buoys or buoys, and in some cases by both.

In addition to the wrecks mentioned above, there are many lost anchors and cables on the bottom, most of these in vicinity of the anchorages in the estuary, where they are liable to foul the anchors of subsequent arrivals.

The Rio de la Plata

5.2 The **Rio de la Plata** (35°30'S., 56°00'W.) is an extensive estuary formed by the confluence of the Rio Uruguay. It is entered between Punta del Este and Cabo San Antonio, about 140 miles SW and extends in a NNW direction for about 140 miles.

The N shore and its approach, which comprises the entire coastline of Uruguay, is comparatively high and rocky, with sheer cliffs and sand dunes.

The whole of the S shore, which is entirely Argentine, is low and uniform in character and is bordered by an extensive shallow bank.

The estuary is remarkably shallow. To the W of Banco Ingles (English Bank), located 50 miles WSW of Punta del Este, there are no depths over 10m and much of the area has depths less than 5m; the ports of Montevideo, Buenos Aires, and La Plata are reached through dredged channels.

The nature of the bottom is varied. On the banks, it is very fine hard sand, but in the deeper parts it is soft mud of a neutral tint and of a sticky nature.

The seaward limit of fresh water is in the vicinity of a line joining the mouth of the Rio Santa Lucia, 12 miles WNW of **Montevideo** (34°55'S., 56°11'W.), and Punta Piedras, 50 miles SW.

The estuary can be divided into an outer, middle, and inner zone.

The outer zone, which lies seaward of the line joining Montevideo and Punta Piedras, has three channels with depths varying from 20 to 5.5m.

The N channel follows the coast of Uruguay, passing N of Banco Ingles and Banco Arquimedes; the middle channel leads between these shoals and Banco Rouen to the S; and the S channel lies between the latter shoal and the SW shore.

The middle zone lies between the outer zone and a line joining the **Port of La Plata** (34°50'S., 57°56'W.), 80 miles W of Montevideo, and the port of Colonia, 24 miles N of it.

It has three navigable channels. The N channel follows the Uruguayan coast, passing N of Banco Oritz and has depths of 3.4 to 6.7m in the fairway. The middle channel follows the S edge of Banco Ortiz and is separated from the S channel by Banco Magdalena, Banco Chico, and other smaller banks; it has natural depths of 7.9 to 10m, but the dredged channel leading to Buenos Aires and La Plata passes through it. The S channel follows the Argentine shore and has a minimum depth of about 5.8m in the fairway.

The inner zone extends from the W limit of the middle zone to the head of the estuary, about 35 miles NW. This zone contains the two channels giving access to the port of Buenos Aires, Canal Costanero, which leads to the Rio Parana, and Canales a Martin Garcia which lead to the Rio Uruguay.

Playa Honda, with depths of less than 5.5m, extends about 30 miles SE from the head of the estuary separating the two latter routes.

In the approaches to the Rio de la Plata, discolored water, caused by the outflow of the rivers, will be found about 75 miles seaward of a line joining **Punta Espinillo** (34°50'S., 56°26'W.) and Punta Piedras, 50 miles SW.

Directions.—A good guide, when the land is not in sight, is the fact that the bed of the estuary is hard on all the banks and soft in the channels.

Making the land at the mouth of the Rio de la Plata does not present any great difficulty. The only difficulty is caused by the suddenness and frequency of the changes in weather, which is a characteristic of the climate of the estuary.

In clear weather, for a vessel approaching from N during a NE wind, the high land and islets near Cabo Castillo, and the light structures at Cabo Polonio and Cabo Santa Maria, are sufficient to identify the coast.

Banco La Plata is a large bank, with depths of 18 to 36m, which extends ENE from the N side of the estuary trending parallel with the N shore from 20 to 50 miles off it. It is composed of fine sand and broken shells.

Pozo de Fango (34°45'S., 53°30'W.) is a mud well which separates the E part of Banco de La Plata from the coastal bank. It is a marked depression in the ocean bed with depths of about 36 to 82m. Its bottom is mud with the consistency of sticky clay.

When the weather is not clear, a good parallel for making the entrance is that of **Isla de Lobos** (35°02'S., 54°53'W.).

A vessel approaching in this latitude will encounter Banco La Plata, which is about 10 miles wide in this vicinity, in about longitude 53°10'W, in depths of 22 to 36m. The mud well, in which depths are more than 36m, will then be reached.

After Pozos de Fango has been crossed on a course converging on the N shore and about 10 miles off, the nature of the bottom will change. First, mud and sandy grit will be encountered, changing over to mud and shell, and finally, sand and shell will be found. The sand, becoming quite coarse, changes color and is mixed with gravel or pebbles and colored shells as the shore is neared, while the soundings decrease somewhat regularly to 26m and 22m about 4 miles offshore.

In thick weather or when the land is not plainly visible from that distance, the depths should not be shoaled to less than 28m.

When across the mud well, steer to pass well S of Isla Lobos, the bottom being mud. This island can easily be identified, as well as Punta del Este and the coastal hills NW, and also Sierra de las Animas, nearly in the same direction.

There are no off-lying dangers at a distance of 5 miles offshore, and it is only on rare occasions that the weather is so thick that the land cannot be seen.

In poor visibility, pay attention to the soundings over Banco La Plata and the mud well and do not enter the estuary unless Isla Lobos or the land in its vicinity has been sighted.

To the W of Isla Lobos, the bottom continues to be very soft, blue mud and the decrease in the soundings indicate the approach to Isla de Flores.

Make allowance for the current according to the wind, bearing in mind that the current sets strongly towards the shore during SE winds.

A vessel entering the Rio de la Plata S of Banco Ingeles should be certain of its latitude.

The estuary should be approached either on the parallel of 35°35'S, which leads N of Banco Rouen, or on the parallel of 36°10'S, passing S of this shoal, taking into account the state of the wind and the consequent current.

East of both shoals, the bottom is sand, mixed in some places with shells; while W of them and on the meridian of Montevideo, the bottom is mud, except off Punta Piedras, where it is tufa and on Banco Ortiz, where it is sand.

West of Banco Rouen, course should be shaped for the desired port according to position because, due to the absence of marks, the depths and the nature of the bottom are the only guides.

The Rio de la Plata Estuary—North Part

5.3 The coast on the N side of the Rio de la Plata, between Punta del Este and Punta San Pedro, about 147 miles WNW, is comparatively high and rocky, with sheer cliffs and sand dunes. The N shore recedes N for a distance of about 11 miles between Punta del Este and Punta Brava, about 60 miles W.

Sierra de la Ballena (34°50'S., 55°01'W.), a range of rocky blackish hills, extends N from Punta Ballena; a large patch of white sand, which is prominent at a great distance from seaward, lies on the S slope of one of the hills about 7 miles NW of Punta del Este.

Cerro Pan de Azucar (34°48'S., 55°16'W.) and **Cerro de las Animas** (34°43'S., 55°28'W.), the highest and most prominent summits near the coast in this vicinity, rise about 18 and 22 miles NW, respectively, of Punta del Este.

The former is an almost regular cone, 423m high, and has a conspicuous cross, 32m high, on its summit. The latter is 500m high, and has a flattened summit with a slight depression in the form of a saddle. It is visible when bearing about 295°.

Montevideo, the capital of Uruguay and the largest seaport in the country, is located about 60 miles W of Punta del Este.

The N shore recedes N for a distance of about 13 miles between Punta Brava and Punta San Pedro, about 89 miles WNW.

Depths—Limitations.—Depths along the N side of the Rio de la Plata decrease gradually from about 33m about 8 miles offshore in the vicinity of **Punta del Este** (34°58'S., 54°57'W.) to 18.3m about 28 miles W, then to 9.1m about 5 miles offshore S of the port of Montevideo, then to 5.5m about 2 miles offshore in **Canal del Norte** (Paso Norte) (34°28'S., 57°52'W.).

A depth of 3.6m is available about 3 miles offshore on the N part of Banco Ortiz as far as the E approach to the port of Colonia where the depths increase to more than 5.5m within about 2 miles offshore. Canal Punta Indio affords greater depths between Montevideo and the port of Colonia.

Isla de Lobos is about 5 miles SE of Punta del Este and extends 0.5 mile S. It is rugged, barren, and 23m high. The island has been reported to be a good radar target at 14 miles. The only landing place is a small sandy cove on the N side of the island.

Shoal depths of 18.3m or less extend 1 mile E, about 2 miles NW, and more than 0.75 mile W of the island.

The E side of the island is rendered unsafe for a distance of nearly 1 mile by Bajo de Lobos, a detached reef with a large above-water rock and Bajo del Sargo, detached rocks with depths of less than 1.8m.

A wreck, partly above-water, is on the E end of Bajo de Lobos. The S side of the island is comparatively steep-to; the W side less so, and there are depths of 10.9m at 0.6 mile.

The N side has depths of less than 10.9m for a distance of 0.5 mile, with a wreck, partly above-water, about 0.2 mile offshore.

Anchorage.—Anchorage has been obtained, in a depth of 11m, about 0.5 mile from the lighthouse, with the lighthouse bearing 314°.

Canal de Lobos, the passage between Isla de Lobos and the mainland NW, is about 4 miles wide, with depths of from 18.3 to 25m in the fairway.

The bottom is mud in the middle but changes to sand, coral, and rocks near the island and to small shells close off Punta del Este. The tidal currents in the passage are stronger than those S of the island.

Caution.—An obstruction, with a depth of 5.5m, has been reported about 15 miles S of Isla de Lobos. A 17.3m shoal patch is E of this shoal.

A dangerous wreck lies 8.7 miles S of Isla de Lobos.

A shoal, with a depth of 13m, has been reported about 11 miles S of Isla de Lobos, but surveys have failed to find it.

An 11m shoal has been reported about 7 miles S of Isla de Lobos. A dangerous wreck lies close E of the shoal.

Banco Ready is a reef, with depths of 12 to 15m, about 7.2 miles W of Isla de Lobos.

A charted obstruction (position approximate) is about 18 miles WSW of Isla de Lobos.

Because other unknown dangers may exist in the vicinity of Isla de Lobos, caution is advised and soundings should be taken frequently.

Dangerous wrecks lie about 12 miles and 8 miles WNW, and 9 miles WSW of the light on Punta del Este. The latter wreck is marked with a lighted buoy.

5.4 **Isla de Flores** (34°57'S., 55°56'W.), which is a good landfall, lies about 6 miles offshore in a position about 48 miles W of Punta del Este. The island is about 1 mile long in a NE to SW direction and has maximum elevation of 17m; near the SE end it is divided into three parts by a reef with a causeway on it. A chimney on the NE end of this island is conspicuous. A light is shown from the SW and highest part of the island. A signal station stands near the light structure.

The SW part of the island is used as a quarantine station, the buildings being near its SW end; on its N side there is a pier, where vessels drawing up to 3m can berth alongside. A lifeboat is stationed at the island.

Isla de Flores Light

There is good anchorage about 0.3 mile N of the pier, in a depth of about 7.3m, mud, but the tidal currents have been observed to run at a rate of 3 knots in this position.

Vessels can also anchor in suitable depths anywhere around the island, but care must be taken to avoid the vicinity of the submarine cables indicated on the chart.

Bajo Cumberland (34°57'S., 55°57'W.), with a least depth of 5.5m, is about 0.5 mile WSW of the island.

A reef extends about 0.5 mile N from the NE end of Isla de Flores.

Canal de Buceo, the passage between Isla de Flores and the mainland NW, is much encumbered by the dangers off Punta Manso. A vessel using this passage should pass about 1.5 miles N of the island and then keep nearer to it than to the mainland.

The tidal currents in the passage are stronger and more irregular than those S of the island, and the latter route is preferable. The height of the tide is influenced by the wind.

A sunken wreck, dangerous to navigation, lies on the edge of the 20m curve about 36 miles ESE of the light on Isla de Flores. An obstruction (position approximate) lies about 6.7 miles SSW of the light on Isla de Flores.

Banco Ingles, a dangerous shoal, is 16 miles long. The N end, which is well defined, lies about 48 miles WSW of Punta del Este and about 11 miles S of Isla de Flores. The shoal is composed of black sand except for its SW part, where there are stones in a depth of 5.5m.

A ridge on the N part of the shoal is about 4 miles long in a N-S direction and has a least depth of 0.9m, over which the sea sometimes breaks.

There are depths of 10.9m and 12.8m close off the N end of Banco Ingles; the E side of the bank has a more gradual slope.

The approach to the bank is indicated by soundings. In the channel N of the bank the bottom is very soft mud and depths are more than 10.9m until W of the bank.

If a vessel anchors near Banco Ingles for too long, there may be some difficulty in breaking out the anchor because of the stiff nature of the bottom.

Lighted buoys, lying well off Banco Ingles, mark the general area of the bank. The slope of Banco Ingles is subject to change.

A dangerous wreck, marked close N by a buoy, lies 2.25 miles SSW of Practicos Recalada Light Vessel.

5.5 Banco Arquimedes (35°13'S., 56°06'W.), with a least depth of 4.5m, is a small sandy shoal lying from 16.5 to 19.2 miles SSW of Isla de Flores.

About 8 miles W of the N of it, the depths increase regularly over a bottom of mud. It should not be approached, unless in a vessel of light draft, in depth less than 9.1m.

The bank is marked by lighted buoys to the N and W; but because they are exposed to strong S winds their position is not always reliable and caution is advised.

The tidal currents in the vicinity of Banco Ingles have been observed to run in all directions, but generally more E and W than N or S; the greatest rate observed did not exceed 1.5 knots.

Banco Ortiz borders the coast E of **Punta San Pedro** (34°38'S., 57°51'W.) for about 40 miles and, with an average width of 18 miles, projects another 40 miles SE down the middle of the estuary nearly to a line of bearing between Montevideo and Punta Piedras.

The SE part of the bank is separated from Banco Piedras by a channel about 8 miles wide, with a least depth of 5.8m, forming the bar of the Rio de la Plata through which Canal Punta Indio has been dredged.

The N half of the bank has general depths of 2.1 to 3.6m; the S half is nearly a fathom deeper. The nature of the bottom is sand and mud, but there is some hard bottom and rock near the N shore between the Rio Rosario and Rocas de las Pipas.

Banco Ortiz can be approached on all sides by sounding, as the depths decrease gradually and the muddy bottom, which is found in the channels, becomes mixed with sand.

A vessel should not proceed into depths of less than about 5.5m.

Quebrada del Banco Ortiz, a channel for light draft vessels, leads across the S part of Banco Ortiz in about 34°52'S.

Lighted buoys are moored near the E and W ends of the channel. An obstruction, marked by a small white buoy, lies about 1 mile W of East Lighted Buoy.

Aeronautical radiobeacons, of use to shipping, transmit from positions about 10 miles NW and 54 miles WNW, respectively, of Punta del Este.

5.6 Canal del Norte lies parallel with the N shore of the Rio de la Plata, between it and Banco Ortiz. This channel is frequented only by coastal and other vessels of light draft, as there are depths of only 3.6m off the mouth of Arroyo Cufre and near Rocas de las Pipas when the river level is low.

A vessel proceeding from Montevideo through Canal del Norte, after passing La Panela Light and Banco Santa Lucia Lighted Buoy, should steer NW and keep about 5 miles offshore, so as to pass S of Banco Jesus Maria Lighted Buoy. Then course should be altered to pass about 1 mile SW of Banco Arazati Lighted Buoy, when the depths will decrease gradually to about 3.6m.

From a position 1.5 to 2 miles SW of the mouth of Arroyo Cufre, the channel turns W. After passing **Banco Cufre Lighted Buoy** (34°28'S., 57°10'W.), a vessel should keep near the shore and then steer to pass S of Piedras del Sauce Lighted Buoy. From Punta Artilleros Lighted Buoy, course should be shaped so as to pass S of Rocas de las Pipas and Roca Barriles, giving these rocks a wide berth, when the least depth will again be about 3.6m.

When past Roca Barriles, a vessel can close the shore to within 0.5 mile and follow it to the roadstead at the Port of Colonia, passing S of the breakwater at Puerto Franco. Punta San Pedro should be rounded at a distance of about 0.2 mile, bearing in mind that the tidal currents are set on to this point.

Vessels of less than 2.7m draft can proceed from Montevideo to Buenos Aires through Quebrada del Banco Ortiz, which leads across Banco Ortiz in an almost direct line, but vessels of greater draft must use Canal Punta Indio.

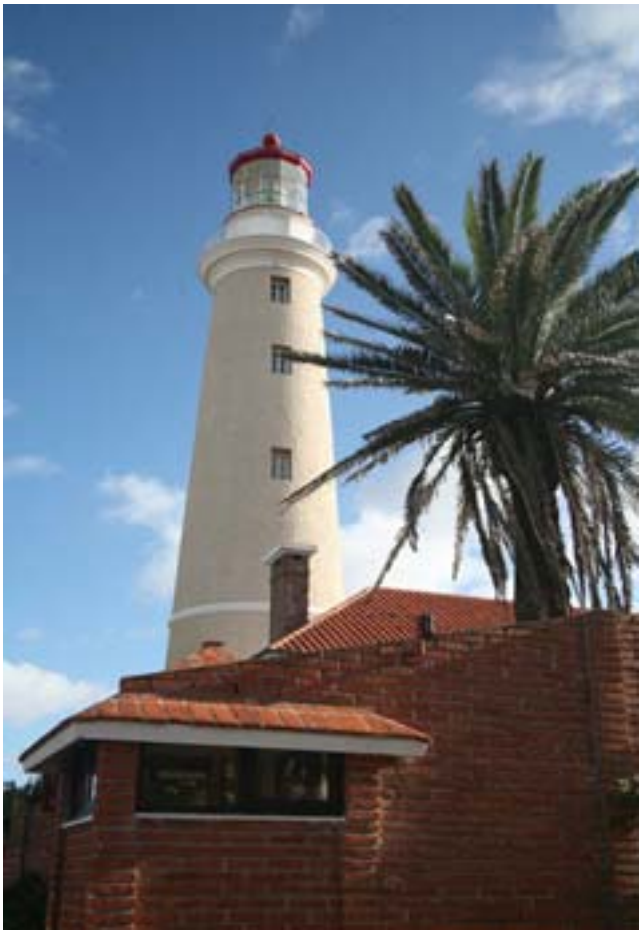
Tides—Currents.—During the rising tide, the tidal current E of Banco Ingles sets N. Between Isla de Flores and the N shore of the estuary, the tidal current sets W inclining WSW parallel with the shore; between Isla de Flores and N end of Banco Ingles, it sets W inclining WNW.

These two currents unite W of Isla de Flores and set through the outer roadstead at Montevideo in a NW direction. Over Banco Ingles and E of its ridge, the current sets between SSW and SW, sweeping W around the SW part of this shoal and then NW toward Banco Arquimedes.

Near La Panela and the N shore, the tidal current sets between NW and W. About 15 miles N of Banco Arquimedes, the currents set ENE and ESE in a contrary direction to the branch which enters S of Isla de Flores, and deflects that branch WNW of Banco Ingles. Over the S and central parts of Banco Ortiz it sets NW, and near the N shore it sets W.

During the falling tide, the current sets between ESE and SE over Banco Ortiz. Banco Ingles divides the current into two branches, one setting SE and the other SW.

Abreast Montevideo, the current sets ESE and maintains this direction in the passage between Isla de Flores and Banco Ingles. Between Isla de Flores and the N shore of the estuary, the current sets SW and then turns to join the current setting between ESE and SE, S of that island.



Punta del Este Light

Punta del Este to Montevideo

5.7 Punta del Este (34°58'S., 54°57'W.) is the S extremity of a promontory which projects about 2 miles SW from the general line of the coast and is bordered by some sand dunes. About 0.3 mile N is a dark hill, about 18m high, from which a light is shown. The promontory is fringed by above-water and sunken rocks extending as far as 183m offshore in places.

Caution.—The coast of Uruguay from Punta del Este to Colonia, including the port of Montevideo, and the Rio Uruguay N of Colonia, is covered by the Maritime Movement Control and Information System. For further information, see Pub. 160, Sailing Directions (Planning Guide) Indian Ocean and South Atlantic Ocean.

Dumping hydrocarbons by washing tanks, by pumping bilge or ballast, or any other action that discharges contaminated contents, is prohibited within the zone bounded by the following points:

a. Punta del Este.
b. 36°14S, 55°23'W.
c. 37°32S, 55°23'W.
d. Punta Rasa.

5.8 The mountains Pan de Azucar and Sierra del a Ballena are visible in clear weather NW of Punta del Este before it is sighted at 8 to 10 miles offshore.

The point has been reported to give good radar returns as far as 10 miles.

A conspicuous chimney, which is tall and light brown in color, is about 3 miles NNE of Punta del Este. There is a prominent hotel about 1 mile NE of the point.

A signal station is close N of the light structure on Punta del Este. A number of submarine cables, the routes of which are best seen on the chart, are landed nearly 1 mile NE of the point.

Banco Silvia, with a least depth of 12.5m and composed of sand and rock, lies about 2 miles SW of Punta del Este.

Bajo Nuevo, a shoal with a least depth of 6.8m, lies about 1 mile WSW of Punta del Este. The bottom near this shoal is rocky and uneven and the depths vary from 12.8 to 21.9m.

Bajo del Este, with a rock awash in its center, lies about 0.3 mile to 0.5 mile W of the S extremity of Punta del Este, and the sea always breaks over it.

A dangerous wreck lies on the W part of this reef. The narrow passage between Bajo del Este and Punta del Este has a depth of about 7.3m.

Isla de Lobos and Banco Ready, about 5 miles SE and 4.75 miles SW of Punta del Este, have already been described in paragraph 5.3. Within a distance of about 9 miles SE of Isla de Lobos, the light on Punta del Este is obscured by the summit on that island when bearing about 315°.

5.9 **Bahia de Maldonado** (34°56'S., 55°00'W.) is entered between Punta del Este and **Punta Ballena** (34°55'S., 55°03'W.), and it is exposed to SW winds which raise a heavy sea. Part of the bay is sheltered from these winds by Isla Gorriti, located 1.25 miles NW of Punta del Este and described in paragraph 5.10, but the tidal currents in the two entrances formed by the island cause much inconvenience.

A prominent building is near the root of a ruined pier about 3.2 miles NNW of Punta del Este. The cathedral of Ciudad de Maldonado, with a cupola and two square towers, stands 1 mile NE, but is screened by trees on some bearings.

Punta Ballena, which has the appearance of a whale, is the S end of a range of rocky hills, one of which has a prominent patch of white. There are some caves in the point.

There are some above-water rocks off Punta Ballena, and an underwater ledge extends 0.3 mile S from it. A detached rock, with a depth of 4.3m, lies about 0.4 mile SSW of the point and should not be approached within 0.5 mile.

Tides—Currents.—The tides in Bahia de Maldonado are affected by the wind. Fresh S winds raise the water level at times as much as 1.8m, and N winds lower it.

Generally, this action takes place before the arrival of such winds in the bay, and they can be forecast to a certain extent.

Another indication is that the temperature of the water rises during N and falls during S winds.

During a rising tide, the tidal stream usually enters the bay W of Isla Gorriti and runs out E of the island. Winds from the W cause a strong current to run E and S around **Isla Gorriti** (34°57'S., 54°58'W.), WSW of the point.

5.10 **Punta del Chileno** (34°55'S., 55°01'W.) is rocky with an underwater ledge extending 0.25 mile S.

The remainder of the shore of the bay is clear of dangers and is backed by dunes, those SE of Ciudad de Maldonado being higher than those NW of the town.

Laguna del Diario lies a short distance NE of Punta del Chileno. In times of flood, this lagoon forces a channel through the beach to the sea.

Punta del Este beyond Isla Gorriti

Isla Gorriti (34°57'S., 54°58'W.), in the SE part of Bahia de Maldonado, is low, densely wooded, and composed of sand and rock. There is a cove with a sandy beach on its W side. A bank of sand with occasional below-water rocks extends up to about 0.3 mile off the island.

There are two piers on the E side of the island situated close to each other about 0.3 mile N of the SE point of the island.

Another pier is situated at the head of a small bay on the N side of the island. The island is marked by a light on its SE point which is only visible between bearings of 097° and 357°.

Bajo Mostyn, with a least depth of 4m, is 0.3 mile E of **Gorriti Light** (34°58'S., 54°58'W.).

Bajo del Monarca, a rocky shoal with depths from 5.2 to 8.8m, lies with its shallowest part about 0.8 mile NNW of Punta Britos, the NW extremity of Isla Gorriti. It is marked on its NW side by a lighted buoy. The passage between this rock and the island should not be used.

There are depths of 4.6m and 5.2m up to about 0.3 mile N of Isla Gorriti.

Bancos los Banquitos, a group of sandy shoals with a least depth of 3m, lie up to about 0.8 mile E of the NE point of Isla Gorriti. They are marked on the NE side by a lighted buoy.

Anchorage in Bahia de Maldonado is recommended about midway between the N end of Isla Gorriti and the shore, in depths of 8 to 9m, sand over hard mud, with Punta Ballena bearing 290° and Punta Britos bearing between 199° and 232°.

This anchorage, known as Puerto de la Pastora, is protected from S winds which sometimes blow with great violence and the holding ground is very good. Because the anchor soon becomes foul, a vessel intending to remain for any length of time should moor with two anchors on a SW heading.

Anchorage is available for small craft near the entrance to Puerto de Punta del Este, 137m from the breakwater head, in a depth of 6m, hard sand.

This anchorage is sheltered from all winds except those from between W and SW, but winds from NW may raise a moderate sea.

These anchorages are used by vessels unable to berth alongside at Puerto de Punta del Este to work cargo into lighters.

Directions.—When approaching Bahia de Maldonado from E, pass on either side of Isla de Lobos, avoiding the dangers off it. Punta del Este can be easily identified by the light tower. From a position S of this island, Ciudad de Maldonado will be sighted.

Also prominent is a 50m high building and 2 water tanks lying 1 mile and 0.7 mile, respectively, NE of Punta del Este.

In addition, Monte Pan de Azucar and Sierra de las Animas, to the NW, will probably be visible.

The channel between Isla Gorriti and Punta del Este is restricted by Bajo del Este, Bajo Mostyn, and Banco los Baquitos and is dangerous due to the strong tidal currents running through it. Between the NE end of Isla Gorriti and the mainland, the depths are very uneven, but the channel NE of Bancos los Banquitos is about 0.2 mile wide, with depths of from 6.5 to 10m.

It can be used in fine weather by small craft with local knowledge. During fresh S winds, the sea breaks right across the channel. Small craft with local knowledge sometimes use the passage between Bajo del Este and Punta del Este; but the tidal streams run very strongly here, and this passage should be avoided by strangers even in good weather.

Having passed Isla de Lobos, steer W and do not bring Punta del Este Light Tower to bear more than 045° until Punta Britos bears 020°, so as to clear Banco Silvia and Bajo Nuevo. When Punta Britos has reached the above bearing, alter course N, passing NW of Bajo del Monarca Lighted Buoy, and continue until Punta Ballena bears 282°, then steer for the anchorage.

Avoid anchoring within 0.4 mile of the ruined pier N of Isla Gorriti.

5.11 Puerto de Punta del Este (34°58'S., 54°57'W.) is a seaside resort harbor with hotels and beaches on the NW side of Punta del Este. The port is approached through Bahia de Maldonado. Pilots board 1.5 miles WSW of Isla Gorriti. The port is protected by a 0.25 mile long breakwater on its W side, consist of a wooden pier with a concrete head, which has depths of 4m alongside. Depths decrease rapidly on the W side of the pier.

There are quays for small craft on both sides of the root of the pier and several mooring buoys for small craft in the harbor. The customs house, a large stone building, stands at the root of the pier.

The port is marked by a light at the head of the breakwater. There is a lifesaving station at the port.

Punta del Este Light has been reported to be hard to identify against the shore lights.

Punta Ballena to Punta Manso

5.12 Ensenada del Portrero (34°55'S., 55°08'W.) is entered between Punta Ballena and **Punta Rasa** (34°54'S., 55°13'W.), 9.5 miles W. Laguna del Sauce lies within the bay and has an outlet into it, and its vicinity is subject to inundation. The bay is clear of dangers and is easily identified by its beach of white sand.

Anchorage is recommended in the bay during offshore winds, in depths of 9 to 11m, hard sand, 0.3 mile to 1.2 miles offshore. A berth, with good shelter from strong E winds, is situated 1.25 miles NNW of Punta Ballena and 0.5 mile offshore, in depths of 9 to 13m.

Capitan Curbelo Aero Light is occasionally shown from a white square stone tower and dwelling, 15m high, 4.75 miles NW of Punta Ballena.

Punta Negra and Punta Iman lie 1 mile W, and 2.5 miles WNW, respectively, of Punta Rasa, the three points together forming a cape. They are steep and rocky with sandy coves between them, and rise to high land which is joined by Monte Pan de Azucar.

Punta Negra is marked by a light. A dangerous wreck lies 20 miles S of Punta Negra.

Montevideo Maritime Movement Control System is in operation W of the meridian of 55°30'W; vessels are required to report on crossing this meridian and when abeam of Isla de Flores.

Ensenada de Piriapolis lies between Punta Iman and Punta de los Burros, 2.5 miles NNW. The latter point is low and fringed by a reef. The shore of the bay is composed of fine compact sand. The seaside resort of **Piriapolis** (34°52'S., 55°15'W.) stands behind the S part of the bay.

A small white chapel, which is cylindrical and looks like a tank from afar, stands at an elevation of about 130m on the summit of Cerro del Ingles, 0.75 mile NE of Punta Iman; it can be seen at a distance of about 10 miles offshore. There is a large and prominent hotel in Piriapolis, 1.5 miles N of Punta Iman.

Puerto de Piriapolis is formed by a breakwater extending about 0.1 mile NW from the SE shore of the bay. On its NE side there is a wharf 35m long with a depth of 4m alongside.

Vessels drawing up to 4.3m can anchor under the shelter of this breakwater.

Caution.—High speed ferries operate between Piriapolis, Montevideo, and Buenos Aires

5.13 From Punta de los Burros, the coast trends WNW for 5.5 miles to Punta Animas which is fringed by underwater rocks to a distance of 1 mile.

Cerro Pan de Azucar and Cerro de las Animas, the highest and most prominent summits near the coast in this vicinity, are located 3.5 miles NE and 6.5 miles N, respectively, of Punta de los Burros. See paragraph 5.3 for a full description.

From Punta Animas to Punta **Piedras de Afilar** (34°48'S., 55°32'W.), 7 miles W, the coast is backed by two hills, also known as Piedras de Afilar. The N and higher of these hills is 103m high and rises 5 miles NNW of the point. The slope of the S hill forms the point itself which is fringed by steep rocks.

Arroyo Solis Grande flows into the sea 0.75 mile NW of Punta Animas. Its mouth, which is about 150m wide, is obstructed by a sand bank and can only be entered by boats.

Bajo Solis, parts of which are above water, is 4.5 miles WSW of Punta Animas and 1 to 2 miles offshore. The sea always breaks over it.

The passage between this danger and the coast has depths of 5.5m, coarse sand and mud.

Islotes las Toscas (34°49'S., 55°34'W.) are two groups of islets and rocks which dry 2 miles SSW and WSW of Punta Piedras de Afilar. The W group lies 1 mile offshore.

There are depths of 5.5m between these groups. Large numbers of gulls nest on the islets.

5.14 Punta Pedro Lopez (34°47'S., 55°38'W.), which is divided into two points and fringed by reefs, lies 6 miles W of Punta Piedras de Afilar.

Punta Piedras Negras, off which a rocky bank extends 0.75 mile, lies 5.5 miles farther W.

The mouth of Arroyo Solis Chico lies 2 miles WNW of Punta Pedro Lopez. In times of drought, it is completely closed by sand banks, but after rains, the river breaks through these banks with great force and produces a noise which can be heard in the distance.

Anchorage may be obtained during offshore winds, in depths of 4 to 5.5m, mud, in Bahia de Santa Rosa, situated close W of Punta Piedras Negras. The beach in the bay is steep-to and composed of hard sand.

Between Punta Piedras Negras and the mouth of Arroyo Carrasco, 15 miles WSW, the coast consists of Playa de Santa Rosa, an extensive beach of coarse sand backed by dunes 3 to 5m high. There are depths of 4.6m, 0.25 mile offshore.

The sea breaks heavily on the beach during winds from between the E and S; the strong currents which then prevail tend to set a vessel onshore.

Arroyo Pando flows into the sea through this beach, 6 miles WSW from **Punta Piedras Negras** (34°47'S., 55°46'W.)

Playa Carrasco, a continuation of Playa de Santa Rosa and of similar formation, extends from the mouth of Arroyo Carrasco to Punta Manso, 2.75 miles WSW. There is a conspicuous hotel NE of the point.

Carrasco Aerobeacon is shown from the control tower 21m in height, situated at this airport, 4 miles NE of Punta Manso.

Bajo Sara (Sara Bank), a rocky patch with a least depth of 2.7m, lies 3 miles SE of **Punta Manso** (34°54'S., 56°04'W.)

Bajo Bump, a rocky patch with a least depth of 0.9m, lies 2.5 miles ESE of Punta Manso. The sea seldom breaks over it.

The passage between this shoal and Bajo Sara to the S has a depth of 7m.

Rocas Las Pipas (Islotes Las Pipas) (34°54'S., 56°02'W.), a group of rocks about 3m high, lie from 1.75 to 2.25 miles E of Punta Manso.

They are surrounded by a rocky bank, with depths of 1.8 to 4.6m. Roca Mark, the easternmost of the group, is visible for about 3 miles and shows up well against the white beach.

Bajo Forest-King, which dries, lies 1.25 miles SE of Punta Manso; it rises abruptly from depths of 6.7m where the bottom is mud. There is a small shoal, with a depth of 4m, 0.2 mile SW of this danger.

Isla de la Luz, about 1.5m high, is the largest of a group of islets surrounded by rocky and uneven ground, 0.4 mile SE of Punta Manso.

Isla de Flores, Banco Ingles, Banco Arquimides, and other off-lying dangers have been discussed previously in paragraphs 5.4 and 5.5.

Punta Piedras Light

Punta Manso to Punta Santa Teresa

5.15 Punta Gorda (34°54'S., 56°05'W.), 0.75 miles W of Punta Manso, is low and rocky. It is backed by a high ridge which serves to identify it.

From Punta Gorda to Punta Brava, 4.5 miles SW, the coast forms a bay indented by a number of points and coves.

Isla de las Gaviotas lies within the bay, close S of Punta Descanso, which is located about 1 mile to the W of Punta Gorda.

The passage between this islet and Punta Descanso can be used by small craft drawing less than 1.8m.

Puerto del Buceo (34°54'S., 56°08'W.) is a small port consisting of a bay enclosed by breakwaters.

It is a yachting center and there are usually a large number of yachts at anchor. A large part of the bay is kept dredged to a depth of about 3m. The bottom is muddy sand.

There are two wharves on the inner side of the W breakwater with depths of 2.4m alongside. The yacht club, which has a tower, stands near the root of the W breakwater with a marina close by it.

Lights are shown from the heads of both breakwaters and from the tower of the yacht club.

Bajo Coquimbo, a rock, with a depth of 1.2m, is about 0.2 miles ESE of the head of the E breakwater at Puerto del Buceo. Bajo Flores, awash, is about 0.1 mile ENE of the same point.

Rocas Buen Viaje, with depths of less than 1.8m, lie 1.5 miles E of Punta Brava. It is circular in shape and is about 0.3 mile in diameter. There is an above-water rock in the middle of this reef. The passage between these rocks and the mainland has a maximum depth of 4.6m in the fairway. A wreck is stranded on these rocks.

5.16 Ensenada de la Pocitos (Playa de los Pocitos) (34°55'S., 56°09'W.) is a cove entered NE of Punta Trouville, a rocky point 1.25 miles NE of Punta Brava. Small craft drawing up to 2.7m can anchor in the cove in a fine sand bottom. A lighted radio mast is on Punta Trouville.

Punta Brava Light

Punta Brava (34°56'S., 56°10'W.), marked by a light, is low and fringed by above and below-water rocks which extend SSW from it. The rising ground within the point is covered by buildings which form part of Ciudad de Montevideo. A conspicuous hospital stands 2.75 miles N of the point. The light on the point is not easily distinguished from the S.

From Punta Brava to Punta Santa Teresa, 2.75 miles WNW, the coast is rocky but clear of dangers. A tall chimney stands on the latter point. Dique Maua (Dique Mava), a dry dock with a tower close to it, is 0.6 mile E of Punta Santa Teresa.

A spoil ground, marked by a lighted buoy, is 2.25 miles WSW of Punta Brava.

A sewer outfall, marked by lighted buoys, extends 1.5 miles S from Punta Brava. A prohibited entry area, best seen on the chart, surrounds the outfall.

Bahia de Montevideo

5.17 Bahia de Montevideo (34°54'S., 56°14'W.) is entered between Punta Santa Teresa and Punta Lobos, 2 miles W. The bay is sheltered from winds from W through N to SE.

Montevideo (34°54'S., 56°13'W.)

World Port Index No. 13120

5.18 Montevideo is the port of Ciudad de Montevideo, the capital of the Republic of Uruguay.

Winds—Weather.—The climate of Montevideo is healthful. The average temperature for the winter is about 11°C; for spring, 18°C; for summer 22°C; and for autumn 16°C. The extreme maximum is 36°C and the extreme minimum is 1°C.

The prevailing wind direction is N from April to August and E during the rest of the year. Winds of up to 60 knots can spring up suddenly from the SW, especially in the early morning hours.

Rain occurs throughout the year, with the heaviest precipitation in May and October.

Tides—Currents.—The mean HW interval at Montevideo is 4 hours 2 minutes; springs rise 1m and neaps rise 0.7m.

Winds from E, SE, and SW raise the water level in the bay; the increase is generally from 1.2 to 1.8m and occasionally 2.4m, but has been known to reach 4.4m.

Winds from the opposite quarters lower the water level, which sometimes falls as much as 1m in the Rio de la Plata.

There is at times a considerable difference in level on opposite sides of the estuary. The rise in level is less noticeable at Montevideo than farther out in the Rio de la Plata.

Tidal currents are only felt in Rada de Montevideo, where they run E on the ebb and W on the flood at a mean rate of 1 knot.

Strong S winds force much water into the bay; 3 or 4 hours after the wind has risen, the water begins to flow out of it and causes a countercurrent to run outward round Punta Sarandi.

A vessel leaving the bay on its E side after a Pampero should proceed with caution, as this wind causes a strong SE current which is felt immediately after passing Punta Sarandi.

Cross currents of up to 2 knots have been experienced in the dredged channel.

Depths—Limitations.—Rada Exterior, the outer roadstead, lies about 6 miles S of Punta Santa Teresa and has depths from 8 to 10m, soft mud.

Rada Interior lies between **Punta Lobos** (34°54'S., 56°15'W.) and Escollera Oeste, 1.25 miles E, and has depths of up to 4.6m. It has better shelter than Rada Exterior, but is still somewhat exposed.

A channel, about 5 miles long and dredged to a depth of 11m (2006), runs in a 000° direction to the breakwater heads; it is liable to silt, but the bottom is soft mud.

A dredged and buoyed channel, entered at Km 42.4 Lighted Buoy, about 20 miles SE of Punta Santa Teresa, leads to the entrance channel to Puerto de Montevideo.

The channel is marked in accordance with the IALA Maritime Buoyage System (Region B) by lighted buoys which are moored a short distance outside its edges.

A stranded wreck, marked by buoys, lies close W of the channel between Km 4 and Km 6.5. Extensive shoaling has been reported in its vicinity.

The wreck of the German warship Graf Spee, scuttled during the Second World War, lies about 4 miles W of Km 6.5 Buoy. The wreck is marked by a lighted buoy.

The dredged entrance channel leads to a dredged outer harbor from which two basins for ocean-going vessels are to the ENE, and another dredged channel leads from the outer harbor NW through the bay to the ANCAP facility.

The remainder of the bay is comparatively shallow with many charted dangers and can be used only by smaller vessels.

Puerto de Montevideo consists of Antepuerto (outer harbor), Darsena Fluvial, Darsena I (Basin No. 1), Darsena II (Basin No. 2), Zona de Cabotage, and Darsena La Teja.

Darsena La Teja is located on the N side of the bay while the other areas are all located on the S and SE sides of the bay.

There are also numerous small piers and quays on both sides of the bay. The Antepuerto and Darsenas I and II are subject to silting and are dredged periodically to a depth of 10m; the bottom is of very soft mud so that ships are in no harm from grounding.

The Antepuerto is an anchorage, protected from W by Escollera Oeste and from S by Escollera Sarandi, situated at the N end of the dredged channel by which the port is approached. It contains 16 anchor berths which are used by ships, mainly in the coal and salt trades, to work cargo from lighters. A grain transfer area lies close E of the N part of Escollera Oeste. The corners of this area are marked by buoys.

Darsena Fluvial lies at the SE end of the Antepuerto between Muelle Fluvial and Muelle A. It is subject to silting and is dredged periodically to a depth of 5m.

It is used by river craft and other vessels of light draft, including ships of the Uruguayan Navy which usually berth on Muelle Fluvial. The terminal of the ferry from Buenos Aires moors at Muelle A.

The head of Muelle Fluvial forms Muelle Escala, with a quay length of 640m and depths of 10m alongside. It is not sheltered and is used for handling containers. Vessels lying at it should pay particular attention to their moorings.

Darsena I lies E of Darsena Fluvial, between Muelles A and B. It has a total length of 1,092m and is used by foreign ships. It is dredged to a depth of 10m. The W side of Muelle A is 382m long, while the E side of the pier is 306m long. BA

Darsena II lies E of Darsena I, being separated from it by Muelle B. It has a total length of 722m and is used by foreign ships. There is a berth where tankers, including those carrying vegetable oils, can discharge at Muelle Florida at the E end of this basin. There is also a refrigerated warehouse on this quay. Depths in the basin are 10m. Muelle B is 294m long on its W side and 328m long on its E side.

Zona de Cabotage, the coaster's harbor which is dredged periodically to a depth of 5m, lies between the E end of Darsena II and the E shore of the bay, where less water than charted was reported. It is sheltered from N by Espignon F, a spur extending from the E shore of the bay, and by Dique de Cintura, a breakwater with two spurs extending S, which also shelters Darsenas I and II.

The NE part of Bahia de Montevideo is shallow and has several shoals which are marked by buoys and beacons. Its shore is fringed by numerous quays and small piers which are only accessible to vessels of light draft.

Darsena La Teja, which contains the ANCAP oil terminal and serves other industrial plants in the vicinity, lies between the mouths of Arroyo Pantanoso and Arroyo Miguelete at the N end of the bay. It is approached through a buoyed channel dredged to a depth of 6m which extends NNW from the NE corner of the Antepuerto.

The N berth is a 280m long tanker berth with, an alongside depth of 9.1m. The S berth is 249m long, with a depth of 6.7m alongside, and is used for discharging coal and cement.

Moorings have been laid S of this basin from which cables have been led over its S pier; when a S gale blows, vessels lying at this pier can attach their mooring wires to these cables thus reducing the strain on the structure of the pier.

The largest vessel that can be accommodated in Darsena La Teja has a maximum length of 241.5m, a maximum beam of 32.3m, and a maximum draft of 8.5m.

Cerro de Montevideo Light

Aspect.—Ciudad de Montevideo stands on the E shore of Bahia de Montevideo and Villa del Cerro on the W side of the bay on the slopes of Cerro de Montevideo which rises to an elevation of 140m. This hill, which is conical and prominent, is the best mark in the vicinity for making a landfall. Fortaleza General Artigas, now a military museum, stands on the summit.

Cerro de Montevideo Light, 8m high, lies on the flat roof of Fortaleza General Artigas on the summit of the hill.

The cathedral, which has three towers, one of which is lower and broader than the others, is over shadowed by two very tall buildings, one of which, Palacio Salvo, 0.3 mile E, is surmounted by a tower on top of which is a television transmitter.

Other prominent objects are two chimneys of the oil refinery in the N part of the bay, one of which burns a flare which is sometimes visible for 25 miles, and a group of six chimneys, painted red and white in bands, at the power station situated on the E shore of the bay 1.75 miles NE of Punta Sarandi (34°54'S., 56°13'W.).

A television tower, 127m high, the upper part of which is painted red and white, stands 1.75 miles E of the same point; a red obstruction light is shown from the top of the tower. The tower of the custom house, 0.3 mile NE of Punta Sarandi, is also conspicuous.

Pilotage.—Pilotage is compulsory except for vessels flying the Uruguayan flag. Pilots board from a red launch or from a tug, as follows:

Boarding Place	Position	Vessel Draft
JP1	In the channel in the vicinity of Lighted Buoy Km 9.35	Less than 7.92m
JP2	In the channel in the vicinity of Lighted Buoy Km 13.5	Equal to or greater than 7.92m but less than 10m
JP3	In the channel in the vicinity of Lighted Buoy Km 20.0	Equal to or greater than 10m but less than 14m
JP4	In the channel in the vicinity of Lighted Buoy Km 42.4	Equal to or greater than 14m

Vessels should inform the port authority through their agents of their expected time of arrival 72 hours in advance, and confirmed 24 hours advance notice. The pilot station is equipped with radiotelephone.

Montevideo is located in the SW zone of the Uruguay Vessel Traffic System which extends NE to the Brazilian border, with surveillance radar coverage reaching up to 24 miles offshore. The other two zones are Ponta del Este and La Paloma.

Regulations.—The coast of Uruguay from Punta del Este to Colonia, including the port of Montevideo, and the Rio Uruguay N of Colonia, is covered by the Maritime Movement Control and Information System. For further information, see Pub. 160, Sailing Directions (Planning Guide) Indian Ocean and South Atlantic Ocean.

The speed of vessels must not exceed 8 knots in the dredged channel, 6 knots in the **Antepuerto** (34°54'S., 56°13'W.), and 4 knots in the inner harbor. Towage is compulsory for sailing and for other vessels unable to maneuver at these speeds.

Vessels arriving must display their national flag and the quarantine flag until pratique is given.

The roadstead comprises the waters inside the line joining Punta Brava and Punta Yeguas, about 8 miles WNW.

The port comprises the waters inside the artificial harbor works.

Vessels with explosives or inflammables on board should display flag B of the International Code of Signals by day and exhibit one red light at night and if required by the port authorities, must discharge their cargo in the Antepuerto or in Rada Exterior.

Vessels arriving with damaged hulls may not enter port until after an examination by the port officials.

Vessels anchoring temporarily, and not requiring the visit of the sanitary officer, must display their national flag and their signal letters in the International Code of Signals for 4 hours during daylight; the remainder of the hours due at sunset being made up after sunrise on the following day.

During fog or thick weather, vessels must anchor in the roadstead until weather clears.

If the daytime wind speed gets over 38 knots, or 32 knots at night, the port is closed to all vessel movements.

A restricted area, best seen on the chart, is established 2 miles SE of Isla de Flores, where anchoring and fishing are prohibited.

Vessels entering Puerto de Montevideo should display the quarantine flag of the Health officer before communicating with the shore or shipping.

If from a port where contagious diseases exist, a vessel will avoid delay by anchoring off **Isla Flores** (34°57'S., 55°56'W.) before proceeding to an anchorage off Montevideo, as fumigation is carried out there before pratique is granted.

Pratique may be requested by radio, not less than 24 hours before arrival.

Signals.—All vessels passing through the channel, when at a distance of about 0.1 mile from a dredge, must stop and sound one blast on the whistle or siren, and then await the signal to proceed.

The dredge will indicate to a vessel that the passage is clear by displaying flag "P" of the International Code at the foreyard on the side on which the vessel should pass.

At night, in addition to exhibiting the lights of a vessel not under command, the dredge will exhibit the following signals at the signal yard:

1. Leave dredge to port—three red lights.
2. Leave dredge to starboard—three white lights.

Weather signals are displayed from the mast of the Meteorological Station situated on top of one of the university buildings on **Punta Sarandi** (34°54'S., 56°13'W.).

Weather information, including a forecast for the following 24 hours, is signaled from this station daily at 1600. The height of the barometer (in millimeters), the temperature, and the force of the wind are made in International Code by the station if requested. The barometer is located at a height of 25m above mean sea level.

Contact Information.—The Montevideo pilot station can be contacted, as follows:

1. VHF: VHF channels 12, 16, and 77
2. Telephone: 598-2-9151586

Montevideo pilots can be contacted, as follows:

1. VHF: VHF channel 11
2. Telephone: 598-2-9152429
3. Facsimile: 598-2-9150727
4. E-mail: monpilot@monpilot.com

Montevideo harbormaster can be contacted, as follows:

1. VHF: VHF channel 9
2. Telephone: 598-2-9161715
3. Facsimile: 598-2-9161715
4. E-mail: glaurido@anp.com.uy

Anchorages.—Outer anchorages for topping or lightening of deep draft vessels.—Alpha Zone lies in the approaches to Montevideo; it stretches 3 miles E-W and 2 miles N-S centered at 35°03'S, and 56°02'W, as seen on the chart. This area is in the vicinity of Practicos Recalada Light Vessel and is used by vessels for topping-off grain cargo to a draft up to 12.2m in brackish water.

Bravo Zone is located in the vicinity of 35°30'S, between the meridians of 56°30'W, and 56°36'W for incoming vessels with a maximum draft of 12m to await clearance and free pratique.

Charlie Zone covers in the area bound between 35°59'S to 36°05'W and 56°30'W to 56°38'W for vessels with a maximum draft of 15.25m in brackish water. This anchorage is for vessels requiring lightening operations prior to a port entry.

Delta Zone is located in 35°04'S to 35°06'S and 55°11'W to 55°16'W and used by tankers of 15m draft in salt water for lightening before entering the port of Buenos Aires, La Plata, and Campana ports. Bravo Zone and Charlie Zone are mainly used for lightening of tankers before a port entry.

A vessel navigating in Bravo Zone should report anchoring or weighing anchor in Montevideo Roads or elsewhere or within the zone, on passing the stranded wreck on the W side of the approach channel, on passing the breakwaters, on anchoring in Antepuerto, on berthing or unberthing in the basins, and on anchoring or weighing anchor in the zone.

In these zones, vessels should inform the Control Center of any accident, damage or fire, of any assistance rendered to a vessel in difficulties, the sighting of any unmarked navigational hazard, and of any significant reduction in visibility.

All vessels must obtain permission, which is valid for 15 minutes only, from the Control Center before berthing, unberthing, or anchoring.

Notices to Mariners and Weather Reports are broadcast at intervals by the Control Center. Vessels may request information at any time.

Anchorage in Rada Exterior, the outer roadstead S of a line between Punta Brava and **Punta Yeguas** (34°54'S., 56°19'W.), has depths of 8 to 10m, soft mud, and the holding ground is poor. Because of the risk of dragging, vessels should anchor well clear of other vessels.

Rada Interior, the inner roadstead, between Rada Exterior and a line between the N end of the W breakwater and Punta del Rodeo, has depths of up to 4.6m. This is a more convenient anchorage than Rada Exterior and affords better shelter. The Pampero blows with greatest force from this quarter.

Both of the above anchorages are very exposed and communication with the shore is sometimes interrupted for days. Vessels are advised, if possible, to enter the harbor.

Because the N and NW of the dredged portion of the outer harbor is used as an anchorage for vessels working cargo anchorage may be limited.

Anchorage is prohibited within 0.5 mile of the breakwater or of any lighted buoys marking the dredged channels.

Because of submarine cables, vessels are prohibited from anchoring E of a line extending due S from Punta Teresa.

Anchorage is not advised W of a line due S from Punta Sayago, because of submarine cables.

Caution.—High speed ferries operate between Piriapolis, Montevideo, and Buenos Aires.

5.19 Punta Lobos (34°54'S., 56°15'W.) is the site of a naval dockyard which includes Dique National, the largest dry dock in the port. It is 143.4m long with a 137.2m long floor, with a width of 18.6m, and can accommodate a vessel with a draft of 3.8m.

Another dry dock and two floating cranes up to 80-ton capacity is available. Divers are available.

The entrance to the dry dock is protected on its S side by a mole which extends 91m ESE from the SE side of the point.

A rocky shoal, on which there are several heads with depths of 1.2 to 1.8m, are from 0.1 to 0.3 mile E of the entrance. Its SW side is marked by a beacon.

Dique National can be approached either N or S of the above shoal. The S approach is deeper, but the bottom is hard and the current sets across it from S, especially during S winds, when the rate may exceed 2 knots. This approach is not recommended.

The N approach has a bottom of soft mud. It is marked by a 254° range. Vessels with explosives or inflammables on board are prohibited from using the dry dock.

Punta Yeguas (34°54'S., 56°19'W.) is 2.75 miles W of Punta Lobos. Punta Sayago and Punta Tigre are 0.75 mile and 1.25 miles, respectively, ENE of Punta Lobos. All these points are low and rocky and are separated by small coves.

There are many rocks in the westernmost of these coves. A freezing plant stands on Punta Sayago; there are two piers on the W side of the point.

Pedra Dellazoppa, with a depth of 1.5m, is about 0.4 mile S of Punta Tigre.

Punta Espinillo, low and rocky, is 7.5 miles NW of Punta Yeguas. A reef extends 0.3 mile W.

An aero light, 182m high, is 3 miles NW of Punta Yeguas and 0.3 mile inland. Three vertical obstruction lights are shown below the light.

Bajo La Panela (34°55'S., 56°27'W.), a group of four rocks which dry, are marked by a light. They lie 5 miles S of Punta Espinillo. A dangerous wreck, marked close N by a lighted buoy, lies about 1 mile W of the light on Bajo La Panela.

Submarine cables are laid from Punta Sayago to Punta Atalaya on the S shore of the Rio de la Plata. Others are laid from Punta Yeguas, following the line of the N shore and about 5 miles off it to Puerto de Colonia.

The Rio Santa Lucia is entered between Punta Espinillo and the coast 4 miles N. Its mouth, which is encumbered by banks, is divided into two channels by Isla Del Tigre, located 3 miles NE of the point. Small craft, with local knowledge, can use the S channel which is about 0.1 mile wide, between the island and Punta Pajonal, situated 2.75 miles NE of Punta Espinillo, which is marked by buoys and lighted buoys. The holding ground off the river mouth is good.

The approach to the S channel of the river is marked by a light 2 miles NNE of Punta Espinillo. There is a lifesaving station on the Rio Santa Lucia.

5.20 Banco Santa Lucia (34°48'S., 56°30'W.), a sand bank with depths of less than 5.5m formed by silt from the Rio Santa Lucia, extends 5 miles S from **Punta Tigre** (34°46'S., 56°34'W.). Depths of less than 1.8m extend up to 3.75 miles S from the point. The S extremity of the bank is marked by a lighted buoy.

An area where sand is dredged in the vicinity of the sand bank is marked by four buoys.

From Punta Tigre to **Punta San Gregorio** (34°41'S., 56°50'W.), a dark bluff about 30m high, on which stand several houses, 14 miles WNW, the coast consists of sandy cliffs 20 to 30m high, forming a continuation of Barranca Santa Lucia, are E of Punta Tigre.

Between this point and the mouth of Arroyo de San Mauricio, 7 miles WNW, these cliffs are known as Barrancas de San Mauricio. To the W of river mouth they are known as Barrancas de San Gregorio.

From Punta San Gregorio to Punta Jesus Maria, 4 miles WNW, the coast consists of a beach of coarse sand backed by dunes from 6 to 11m high.

Arroyo San Gregorio flows into the Rio del a Plata through this beach, 1.25 miles NW of the former point.

Banco Jesus Maria, on a sand bank with depths of less than 5.5m, extends 4 miles SSE from Punta Jesus Maria.

The minimum depth of 1.2m on the bank is 1.25 miles S of the point. The SW side of the bank is marked by a lighted buoy. A dangerous wreck with a visible mast is located 1 mile WSW of this lighted buoy.

From Punta Jesus Maria to **Punta Pavon** (34°32'S., 57°04'W.), 11 miles NW, the coast consists of a sandy beach backed by dunes from 9 to 30m high.

The mouth of the Rio San Miguel, 2 miles NW of the former point, can be easily identified at a distance of 7 or 8 miles by the trees and dark brush near it, which show up clearly against the sand hills in the vicinity.

A jetty, 600m long, on the outer end of which is a silo, projects SW from Punta Pavon.

Banco Arazati Lighted Buoy, moored 1.5 miles S of Punta Pavon, marks the edge of the coastal bank with depths of less than 5.5m extending from the point.

Between Punta Pavon and the mouth of Arroyo Cufre, a swift stream 6.5 miles NW, the coast forms Rincon de Cufre, a bay backed by remarkable high dunes which rise to an elevation of 40m.

Abreast Punta Pavon is the NW end of the relatively deep channel between the coast and the NE edge of Banco Ortiz, which joins the coast here. There is a rather exposed anchorage in the NW end of this channel, in a depth of 6.4m. Paso Norte follows the coast W to Colonia.

A lighted buoy marks the bend in Paso Norte, 1.5 miles SW of the mouth of Arroyo Cufre.

5.21 Punta Rosario (34°27'S., 57°21'W.), 9.5 miles W of Arroyo Cufre, is low, rocky, and difficult to identify. A reef extends 2 miles WSW of the point; a 1.2m shoal patch is near the end.

A lighted buoy, which also marks Paso Norte, is 1.75 miles SE of Punta Rosario.

Arroyo del Rosario flows into the Rio de la Plata on the NW side of Punta Rosario. A channel, dredged to a depth of 3m, leads to the mouth of the river and is about 46m wide.

The outer reach of this channel leads in a 049° direction for about 0.8 mile; the inner reach leads then in a 067° direction for about 0.3 mile to the river mouth. The entrance channel is marked.

The river is navigable by small craft for a distance of 15 miles; a channel has been dredged to a depth of 2.7m as far as Ciudad de Rosario, 7.5 miles from the river mouth.

5.22 Puerto Sauce (34°26'S., 57°27'W.) (World Port Index No. 13130) is on the NW side of Punta Sauce, 4.5 miles W of Punta Rosario.

It is the port for Ciudad de Rosario. Punta Sauce can easily be identified by the buildings and factory chimneys of Pueblo Juan Lacaze, which stand near it. Sand dunes, 32m high, rise 1.5 miles N of the point.

A sand bank, with depths of less than 3m and on which there are a number of above-water rocks, extends 1.5 miles S from Punta Sauce and from the coast to the E of that point.

A lighted buoy is about 1 miles SSE of the port and also marks Paso Norte.

The port is sheltered from the S by a breakwater extending 720m W from Punta Sauce. A channel, with a least depth of 3.3m, runs parallel to and about 183m N of the breakwater.

It leads to a wooden pier at its root which has a depth 4m alongside. A light marks the end of the breakwater.

Between Punta Sauce and Punta Artilleros, 4.5 miles W, the coast forms a bay. The river mouth of Arroyo Sauce enters the bay about 2 miles NW of Punta Sauce.

5.23 Punta Artilleros (34°27'S., 57°32'W.), 50m high, is fringed by drying rocks extending about 0.5 mile S. A lighted buoy is 1.25 miles S of the point and marks Paso Norte.

Ensenada de los Artilleros is entered between Punta Artilleros and a point 6 miles W. Arroyo Artilleros, a small stream, flows into its head 3.5 miles NW of the former point.

A village, which is visible from the offing, stands 3 miles W of its mouth.

Underwater rocks extend 1 mile offshore, 5 miles W of Punta Artilleros. Muelle Platero, a small pier, projects from the shore abreast of these rocks.

Punta Riachuelo (34°28'S., 57°44'W.), 9.5 miles W of Punta Artilleros, is rocky. Rocks, awash and underwater, extend about 0.1 mile W.

Rocas de las Pipas (34°29'S., 57°41'W.) consist of two groups of rocks which dry. Pipas de Afuera, the outer group, is 2.75 miles ESE of Punta Riachuelo, and Pipas de Adentro, the inner group, lie 3.5 miles E of the point. A lighted buoy is about 0.7 mile SW of Pipas de Afuera.

Roca Barriles, with a depth of 2.4m, is 2 miles WSW of Pipas de Afuera.

Arroyo Riachuelo flows into the Rio de la Plata, 0.5 mile NW of Punta Riachuelo and is navigable by ships of shallow draft. The entrance is protected on each side by a breakwater. A channel about 0.3 mile long leads in a N direction to the entrance between the breakwaters and is dredged to 4m.

A light is shown from a black tower on piles, situated on the W bank of the river 0.3 mile N of the head of the E breakwater;

a lighted buoy is at the S end of the approach channel to the river.

From Punta Negra to **Punta San Pedro** (34°28.5'S., 57°51.2'W.), the W extremity of the promontory on which stands Ciudad de Colonia, the coast is fringed by rocks with depths of less than 1.8m, extending up to 183m offshore, Punta San Pedro is high and steep on its S side.

Muelle General Rivera, a concrete pier with depths of 4.6m alongside its head, is situated 0.75 mile WNW of Punta Negra and is about 183m long. There is a ruined pier 1.25 miles farther W, 0.2 mile W of the mouth of Arroyo de la Caballada.

Caution.—Banco de las Pescadores, which is the NW extremity of Banco Ortiz, is strewn with dangerous wrecks lying within about 7 miles from the Uruguayan coast between Punta Artilleros and Rada de Colonia.

Punta Negra is 3 miles WSW of Punta Riachuelo and is rocky. A rocky shoal, with a depth of 0.9m, lies 0.25 mile WSW of the point.

Paso Norte

5.24 Paso Norte is parallel with the N shore of the Rio de la Plata, between it and Banco Ortiz. It is frequented only by coastal vessels and other craft of shallow draft as it has depths of only 3.7m off the mouth of Arroyo Cufre and near Rocas de las Pipas when the river is low.

If proceeding from Montevideo through Paso Norte, after passing **Bajio La Panela** (34°55'S., 56°27'W.) and Banco de Santa Lucia Lighted Buoy, steer NW and keep 5 miles offshore, so as to pass S of San Gregorio Lighted Buoy.

Then alter course to pass about 1 mile SW of Banco Arazati Lighted Buoy, 1.5 miles S of Punta Pavon, when the depths will decrease gradually to 3.7m.

From a position about 2 miles SW of the mouth of Arroyo Cufre, the channel turns W. After passing Banco Cufre Lighted Buoy, keep near the shore and then steer to pass S of Piedras del Sauce Lighted Buoy.

From Punta Artilleros Lighted Buoy, shape course so as to pass S of Rocas de las Pipas and Roca Barriles, giving these rocks a wide berth, when the depth will again be about 3.7m.

Punta Santa Rita (34°28'S., 57°51'W.) lies about 0.2 mile N of Punta San Pedro. Between Punta Santa Rita and Punta San Carlos, 2.5 miles NW, the coast forms a bay, the shore of which consists of a sandy beach backed by dunes.

From Punta San Carlos to **Punta Hornos** (34°26'S., 57°54'W.), 0.75 miles farther NW, the coast is low and marshy. A pier which serves Pueblo Real de San Carlos projects from the shore 1.75 miles NW of Punta Santa Rita. It has a depth of 3.7m at its head.

There are cliffs, 40 to 50m high, close behind the beach in the SE part of the bay, but they diverge from it to the NW and are 0.6 mile inland abreast of Punta San Carlos.

Punta Hornos is low and is fringed by a bank of stones, with depths of less than 1.8m, which extends 0.7 mile W from it.

5.25 **Isla Farallon** (34°29'S., 57°55'W.), marked by a light, is 3.25 miles WSW of Punta San Pedro. It is 2.7m high, rocky, and wooded, and is surrounded by a reef with depths of less than 1.8m. A group of rocks, awash, lies 0.4 mile NNE of the islet.

Banco de los Pescadores, with depths of less than 2.5m, and consisting of sand, forms the NW part of Banco Ortiz. The bank has a least depth of 1.8m, 2.5 miles SE of Punta San Pedro; a 2.1m shoal lies close within the N edge of the bank 1 mile S of the point. A lighted buoy, moored 1.5 miles WSW of Punta San Pedro, marks the NW extremity of the bank.

Isla San Gabriel (34°27'S., 57°54'W.), low and covered with brushwood, is 1.5 miles W of Punta San Pedro. It is surrounded by rocks and a reef, parts of which are awash and extend 0.3 mile W. A lighted buoy is moored 0.3 mile S of the SW extremity of the islet.

Bajo Garnet, a rock with a depth of 4.4m, is 0.5 mile S of the extremity of Isla San Gabriel. It is marked on its W side by a lighted buoy. Bajo Ruby, with a depth of 3.5m, is 0.25 mile S of the NE extremity of Isla San Gabriel.

Bajo La Laja, the E end of which dries, is about 0.6 mile W of Punta San Pedro. It is marked on its SE side and on its N side by lighted buoys.

Roca Anita, with a depth of 0.6m, is 0.5 mile W of Punta San Pedro; a buoy is moored 183m N of this rock.

Barra de Colonia, between the NW extremity of Banco de los Pescadores and Isla San Gabriel, is composed of hard sand and rock, with soft mud on either side of it. When the drying portion of Bajo La Laje is just visible, there are depths of 4.9m over this bar.

Canal San Gabriel, the channel which passes S of Isla San Gabriel, is the usual approach to Puerto de Colonia from SW. Lighted buoys mark the sides of the channel.

5.26 Islas de Hornos, extending 1.5 miles WNW from **Punta de Hornos** (34°26'S., 57°54'W.), are three low and partly wooded islets. Isla Hornos del Oeste and Isla Hornos del Medio, the two W islets, which lie on a bank with depths of less than 1.8m, are separated from Isla Hornos del Este, which lies on the coastal bank, by Canal de los Bergantines which is navigable by vessels of shallow draft with local knowledge.

Canal de las Zumacas, the channel between Punta Hornos and the E islet, and the channel between the middle and W islets, can only be used by small craft.

Piedra Chata, a rocky shoal with a depth of 1.5m, lies 0.8 mile WSW of Punta Hornos.

Islas Lopez are two bare and rocky islets 1.25 miles N of Isla San Gabriel. Isla Lopez del Oeste, 3m high, lies 0.5 mile W of Isla Lopez del Este which is 2.4m high. Numerous dangers surround these islets and extend up to 1.25 miles SE from them. Canal Lopez, a channel with a minimum depth of 3.7m in the fairway, passes between these islets.

Piedra Cerdena, with a depth of 1.2m, is almost 0.85 mile WNW of Isla Lopez Oeste. Bajo Relampago, with a depth of 1.2m, is 0.6 mile W of the same islet. Arrecife Los Muleques, some of which are awash, are 0.5 mile ESE of Isla Lopez del Este. A buoy is moored off the SE end of these reefs.

Colonia (34°28'S., 57°51'W.)

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5.27 Rada de Colonia is W of the promontory on which the Ciudad de Colonia stands. The depths in the approaches are variable, but vessels drawing less than 4.6m can usually enter.

Ciudad de Colonia is a seaside resort and the capital of the local province. It has two harbors. Puerto Franco, on the S promontory on which the town stands, is the most important and is the terminus of the ferries which run to Buenos Aires.

Puerto Commercial, the old harbor, close to Punta Santa Rita the NW extremity of the promontory, is little used except for yachts and other small craft. There is a lifesaving station at Puerto de Colonia.

Winds—Weather.—Rada Colonia is well protected from all winds except those from between SE and SW. Storms from a S point are the most dangerous and cause a current to set at a rate of 3 to 4 knots in the same direction as the wind.

Depths—Limitations.—Puerto Franco de Colonia, the main harbor of Puerto de Colonia, 0.5 mile E of Punta San Pedro, is formed by two jetties projecting S from the shore and is protected from the S by a breakwater composed of rubble. A buoy is moored about 0.1 mile NW of the W end of the breakwater. Below-water rocks lie between this buoy and the breakwater.

Muelle Transatlantico, the E of the two piers which form the harbor, has a total length of 135m. Vessels can berth on both sides of the outer section, which is 77m long and has depths of 5m alongside. The inner section, 58m long, with depths of less than 5m alongside, can only be used on its W side and is the terminal for the ferries which run to Buenos Aires.

Muelle de Cabotage, which forms the W side of the harbor, is 110m long, with depths of about 4m alongside, and can only be used on its E side.

There are ro-ro berths at the roots of both jetties. Between them is a quay with a depth of 3m alongside.

Puerto Commercial de Colonia, the old port of Puerto de Colonia, lies on the N side of the promontory on which the town stands. It is protected from the W by Escollera de Santa Rita, a breakwater projecting N from Punta Santa Rita, on the head of which is a light.

A wooden jetty projects N from the shore nearly 183m E of the breakwater, off the head of which there are depths of 2.4m.

It is equipped with a 5-ton steam crane. Construction was in progress immediately N of the breakwater head.

Aspect.—Colonia Light is shown from **Punta San Pedro** (34°29'S., 57°51'W.). A radio tower, 84m high and marked by red lights, is about 0.3 mile ENE of the light.

A conspicuous chimney, painted in red and white bands, 39m high, stands about 0.9 mile ENE of the light. A water tower, prominent from all directions, stands about 0.8 mile NE of the light, and three radio towers stand near Real de San Carlos, 2 miles N of the light. A radio mast, 190m high and marked by red lights, is 6 miles N of the light.

Pilotage.—Pilotage is compulsory in the Rio de la Plata estuary except for coasting vessels.

Vessels entering the estuary may proceed as far as Rada de Montevideo or Practicos Recalada Light Vessel without a pilot. Vessels proceeding farther must obtain a pilot from Practicos Recalada Light Vessel, to which they are required to give 48 hours notice of ETA.

Vessels must use pilots of the nationality of their port of destination and when leaving must use pilots of the nationality of the port they are departing.

Regulations.—The coast of Uruguay from Punta del Este to Colonia, including the port of Montevideo, and the Rio Uruguay N of Colonia, is covered by the Maritime Movement Control and Information System. For further information, see Pub. 160, Sailing Directions (Planning Guide) Indian Ocean and South Atlantic Ocean.

Colonia Light

Contact Information.—Colonia port can be contacted, as follows:

1. VHF: VHF channels 11, 13, and 16
2. Telephone: 598-4-522-2022
3. Facsimile: 598-4-522-2037

Anchorage.—The best anchorage in Rada de Colonia is about 0.5 mile WNW of **Punta San Pedro** (34°29'S., 57°51'W.), in a depth of 7.3m, stiff mud, with holding ground.

It is on the alignments of Farallon Light Tower, with the S extremity of Isla San Gabriel bearing about 250°, and the W extremity of Isla Lopez del Este in line with the E extremity of Isla Hornos del Medio, bearing about 319°.

If necessary, ships should moor with open hawse SW. Vessels of shallow draft can anchor nearer Ciudad de Colonia.

Coasting vessels often anchor NW of Isla San Gabriel in bad weather.

Fondeadero de Lopez is about 0.2 mile N of Isla Lopez del Este. It affords good shelter to small vessels during strong S winds, in depths of about 5.5m, mud.

Fondeadero de las Islas de Hornos affords good shelter during winds from between SE and SW.

Winds from a W direction are the strongest at this anchorage, but do not raise such a heavy sea as those from the SE and are therefore not so dangerous.

Vessels can anchor about 0.3 mile N of Isla Hornos del Medio and Isla Hornos del Oeste, in depths of from 3.4 to 5.5m, mud.

Directions.—When approaching Puerto de Colonia from SW, follow the dredged channel through Barra del Farallon and do not leave it until Colonia Light Tower bears 068°.

Then alter course to maintain this bearing which leads over the bank joining Isla Farallon to Banco Ortiz in a least depth of 4m, and passes 0.25 mile S of the reef extending from this islet and about 0.1 mile N of a stranded wreck marked by a lighted buoy.

When clear of this bank steer towards Isla San Gabriel, then alter course to the E to pass between Lighted Buoy No. 1 and Lighted Buoy No. 2, and approach the port through Canal San Gabriel.

Give **Punta San Pedro** (34°29'S., 57°51'W.) a wide berth, particularly during the S tidal current, which sets towards the point at rates of from 1 to 2.5 knots.

If approaching Colonia from the E by way of Paso Norte, having passed Roca Barriles, follow the land which can be closed to within 0.5 mile to Rada de Colonia, passing S of the breakwater at Puerto Franco de Colonia. Punta San Pedro should be rounded at a distance of at least 0.25 mile, bearing in mind that the tidal streams are stated to set onto this point.

To proceed from Colonia by the channels to the N, steer to pass midway between Islas Lopez. When about 0.4 mile NE of Isla Lopez del Oeste, shape course for the W extremity of Isla Hornos del Oeste, passing at least 183m SW of Piedra Chata.

Then alter course so as to enter the S end of Barra de San Pedro. The least depth on this route is 2.7m near Piedra Chata.

Caution.—Submarine cables, indicated on the chart, extend S and E from Punta San Pedro.

Cabo San Antonio to Buenos Aires

5.28 The S shore of the Rio de la Plata is low and uniform, being the seaward edge of the Pampas of Provincia de Buenos Aires immense and monotonous plains which extend to the Seirras Centrales, 420 miles W. Owing to the lack of landmarks, and also to the banks by which this shore is fringed, navigation near it is difficult.

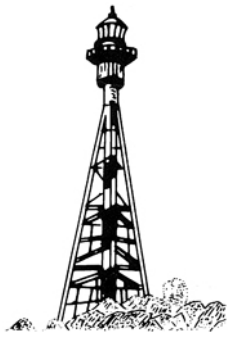
Banco Rouen lies with its shallowest part in the vicinity of position 35°45'S, 56°01'W, and 39 miles NE of Cabo San Antonio, the SW entrance point of the Rio de la Plata. This shoal has a least depth of 7.6m near its NW end. It is composed mainly of coarse sand, but there are some rocks on its shallowest part.

Off-lying shoals, with depths of 17.8 and 40m, are 68 and 105 miles ESE, respectively, of Cabo Antonio.

Cabo San Antonio (36°20'S., 56°45'W.) is the N and lower end of Medanos del Chato, a chain of sand hills visible up to about 10 miles offshore which back the coast to the S.

The part of the chain near the cape is known as Fronton del Cabo.

The NW extremity of the cape is **Punta Rasa** (36°18'S., 56°47'W.), a low and sandy tongue of land which is subject to inundation as far as the walled area surrounding the light structure and adjacent buildings, which with a neighboring plantation of trees are very prominent from seaward. A beacon



Cabo San Antonio Light

There is an anchorage for small vessels in this area. The outer berth is 0.6 mile N of Punta Rasa, chalky bottom, in 4.5m, and the inner berth is 0.4 mile W of the point, in 2m, soft mud.

Several charted banks, on which the sea breaks and with depths of less than 1.8m, are N of Punta Rasa.

Vessels should approach San Antonio Light on a course of 201° until it is distant 2 miles; a course of 250° then leads to the outer anchorage.

Tidal currents off Cabo San Antonio are affected by the wind. In calm weather the tides are regular, but during fresh winds from between E and S, the water level rises 1m or more above mean HW springs. During winds from W and NE the tide does not rise to its usual level.

In the outer anchorage of Fondeadero San Clemente, the general directions of the flood and ebb tidal currents are NW and SE, respectively. Both normally attain a rate of 1.5 knots, but may reach 4 knots during gales.

Currents off Cabo San Antonio depend greatly on the wind, running N or S at rates of 1 to 3 knots. Rates of 5 or 6 knots have been reported being caused by abnormal floods in the rivers.

Bahia Samborombon is entered between Punta Rasa and Punta Piedras, 54 miles NNW.

5.29 **Bahia San Clemente** (36°18'S., 56°47'W.) is formed by the W side of Cabo San Antonio. Arroyo San Clemente flows into the head of this small bay 1.75 miles S of Punta Rasa. The entrance to the river is used quite often as a fishing harbor.

From the mouth of Arroyo San Clemente to the mouth of the Rio de Ajo, 6 miles W, the coast increases in height gradually. The bar of the Rio de Ajo is about 2 miles in extent and almost dries, but there are depths of more than 3.7m within it. The Rio de Ajo is reported to be marked by a light off its entrance.

Pueblo General Lavalle stands on the E bank of the river 4.5 miles SSW of its mouth.

Between the mouth of the Rio de Ajo and the entrance to Canal 1, 10 miles WNW, the coast is devoid of vegetation but some distance inland there are ranches with clumps of trees which appear as islands when seen from 8 or 9 miles offshore.

Between the entrance to Canal 1 and that of Canal 9, about 12.5 miles NW, the shore is low and devoid of vegetation, but there are some fishermen's huts on it.

From the entrance to Canal 9, the shore of the bay trends NNW for 11 miles to the entrance to Canal 15.

The clumps of trees at Estancias Las Viboras, Santa Maura, and La Portena, 8 miles SW and 9 and 11 miles NW, respectively, of the former entrance are good landmarks.

From the entrance to Canal 15 to the mouth of the **Rio Salado** (35°45'S., 57°21'W.), 13.5 miles W, the coast rises gradually, with several prominent clumps of trees.

A group of sheds and buildings, forming a good landmark, are on the S bank of the Rio Salado, the entrance of which is marked by a light.

A dangerous wreck is reported to lie 17 miles SSE of the Rio Salado.

The Rio Samborombon, with a drying bar at its mouth, can be identified by a white house on the S bank and a group of willow trees on the N banks.

Clumps of trees are 3 miles NW and 6 miles N, respectively, of the mouth of the Rio Samborombon. They are both good landmarks, the latter being the most prominent mark in the bay.

Monte San Jeronimo, 7 miles SW of **Punta Piedras** (35°27'S., 57°08'W.), can be seen at a distance of 7 or 8 miles.

A windmill and a tank form a good mark. Towards Punta Piedras, the coast increases in height.

Tides—Currents.—Almost anywhere within about 4 miles of the coast the tidal current follow the general direction of the shore of Bahia Samborombon at rates of 0.25 to 1.5 knots.

Winds between W and N increase the duration of the S current and reduce the height of the tide. Winds between SE and SW increase the duration of the N current and increase the height of the tide. The configuration of the shore and the banks off it cause variations in the rate and direction of the tidal current, even in places quite close to each other.

Anchorage.—The best anchorage in Bahia Samborombon is about 5 miles offshore between the entrances to Canal 9 and the Rio Salado, in a depth of 5.5m, firm clay and sand, very good holding ground.

The swell here is not dangerous even during SE winds, but in storms from this direction there is a better berth about 8 miles offshore E of the entrance to Canal 9 in a depth of 6m.

Small craft can anchor close inshore anywhere between Cabo San Antonio and Monte San Jeronimo, as the swell is almost spent here even during E winds.

The bottom is mud nearly everywhere in the bay; it is softer close inshore than farther seaward, and is almost liquid in some places.

In a few areas, the bottom is composed of sand or of sand with shells and mud; off Monte San Jeronimo, there is rock in depths of less 3.6m.

A dangerous wreck reported to lie about 14 miles NE of the entrance to Canal 9.

5.30 Punta Piedras (35°26'S., 57°07'W.) is low and indeterminate. It is composed of tufa, a species of compact and friable sandstone, looking like hardened clay. This material, locally known as “tosca,” is found in various places on the coastal bank between this point and Puerto de Buenos Aires, 80 miles NW. A light is shown 0.7 mile W of the point.

Banco Piedras, with depths of less than 5.5m, extends 20 miles ENE from Punta Piedras. It is composed of tufa, gravel, and coarse sand.

Punta Indio (35°16'S., 57°14'W.), also low and indeterminate, lies 13 miles NNW of Punta Piedras. It can be identified by Monte Casares, a large clump of trees 1.5 mile S.

This clump is visible at a distance of about 15 miles, at which distance it resembles an island.

Close NW of Monte Casares is a smaller group of trees, in which stand the buildings of Estancia Santa Rita. A white house with a red roof can be identified easily at 15 miles. A naval air station is situated inland from the point.

From Punta Indio to Punta Atalaya, 20 miles NW, the coast is at first a uniform height and covered with scrub, but near the town of Magdalena, 3.5 miles S of the latter point, the ground rises slightly.

The mouth of Arroyo Juan Blanco, which affords shelter to coastal craft, lies 12.5 miles NW of Punta Indio. Monte de la Primevera, a dense clump of trees about 1 mile in extent, lies 2 miles W of the mouth of Arroyo Juan Blanco. It surrounds a ranch of the same name, with a red tower at its E end, which is a good landmark.

5.31 Magdalena (35°05'S., 57°31'W.) is a town which can be seen above the scattered trees in its vicinity. The two towers of the church are visible at a great distance, but are obscured by the trees on certain bearings.

Punta Atalaya (35°02'S., 57°32'W.), marked by a light, is low and covered by trees. A red brick building, with a prominent chimney visible at a distance of 10 miles, is situated near the point.

Arroyo Atalaya, 0.5 mile W of the point, can be entered by small craft drawing up to 1.5m.

From Punta Atalya to Punta Blanca, steep and covered with trees, situated 8.5 miles WNW, the coast is fringed by a bank of very hard tufa out to a depth of 3.7m. A sandy shoal, with a depth of 1.8m, lies on the coastal bank 2.5 miles N of the latter point.

A prominent factory stands on the coast 8.75 miles WNW of Punta Blanca. The entrance to Puerto La Plata lies 3.25 miles farther WNW.

Caution.—Visual estimation of the distance of a vessel off this coast may be considerably in error, due to the effects or mirage and abnormal refraction, which cause objects near the horizon to have a false elevation.

Submarine cables, which are charted, are laid from Punta Atalaya to the N shore of the Rio de la Plata, about 1 mile W of Bahia de Montevideo.

Other submarine cables, also indicated on the chart, are laid from a position on the coast about 4 miles SE of the mouth of **Canal Santiago** (34°50'S., 57°53'W.), in an E direction parallel to the coast.

Off-lying Banks

5.32 Banco Ortiz, which covers a large area with depths of less than 5.5m, extends 50 miles SE from the N shore of the Rio de la Plata between **Punta Pavon** (34°32'S., 57°03'W.) and Punta San Pedro, 40 miles WNW.

The S extremity is joined to Banco Piedras forming the bar of the Rio de la Plata, over which passes the main approach to the ports of La Plata and Buenos Aires.

El Codillo (35°08'S., 56°59'W.), with a least depth of 4.9m, lies at the SE end of Banco Ortiz, about 20 miles N of Punta Piedras. It is composed of sand and mud, with patches of hard sand in places.

Canal General, which comprises Canal Punta Indio and Canal Intermedio and is described in paragraph 5.33, is dredged through this bar.

A chain of shoals, with depths of less than 3m, lies along the SW edge of Banco Ortiz; a similar shoal of considerable extent lies 10 miles WSW of Punta Pavon. Banco de los Pescadores forms the NW extremity of the bank.

Quebrada del Banco Ortiz is a channel across the S end of Banco Ortiz, through which a depth of 4.5m can be carried.

The E and W ends of the channel are marked, as are a wreck and obstruction. This channel is used by the ferries which run between Buenos Aires and Montevideo.

Banco Magdalena, with depths of less than 3m, lies 7 miles NE of Punta Atalaya and is joined to the coastal bank in that vicinity. It is marked on its SW side by a lighted buoy.

Canal de la Magdalena, a channel used by coasting vessels, passes SW of Banco de la Magdalena. The tidal streams in it are somewhat stronger than in the main channel and can be used by vessels with a draft of less than 4.9m.

Banco Chico, with depths of less than 5.5m, lies N of Banco Magdalena and extends NW from it. It has a least depth of 2.2m near its middle. Two wrecks, with masts showing, lie on the bank.

Canal General

5.33 Canal General is the channel forming the main approach to the ports of La Plata and Buenos Aires.

The first section of the channel leads from Km 239.1 Lighted Buoy, 2 miles NW of **Practicos Recalada Light Vessel** (35°06'S., 55°59'W.), then SW for about 14 miles to Km 213, then W for about 36 miles to a bend called Vuelta El Codillo, and then NW for about 12 miles; it is called Canal Punta Indio. Practicos Recalada Light Vessel is a manned light ship and pilot station. The vessel is a red hulled re-purposed oil tanker.

At this point, in position 35°01'S, 57°11'W, the second section of the channel, called Canal Intermedio, begins and continues to Km 87 Lighted Buoy (34°49'S., 57°27'W.), which lies 15 miles NNE of Punta Atalaya and abreast the middle of Banco Chico.

Beyond the point, the channel merges into Paso Banco Chico, a natural channel passing N of the NW end of Banco Chico and then into the area of comparatively deep water which lies off the entrances to the dredged channels leading to the ports of La Plata and Buenos Aires.

Canal General is only maintained by continual dredging and the depths in it are considerably affected by meteorological conditions; no depth is therefore guaranteed in the channel, but the responsible authority endeavors to maintain a minimum depth of 8.2m at normal MLLW.

In 2010, the depths in Canal Punta Indio were maintained to approximately 10.4m. The latest information regarding depth in the channel is published fortnightly in Argentine Notices to Mariners and is also broadcast from Argentine radio stations.

Practicos Recalada Light Vessel

Pilotage is compulsory, as discussed previously in paragraph 5.1.

Canal General is marked in accordance with the Argentine system by lighted buoys. For the first 25 miles from Practicos Recalada Light Vessel, they are moored in pairs, alternately with single lighted buoys moored on the S side of the channel, spaced from 1 to 2.5 miles apart; then for the remainder of Canal Indio, they are placed in pairs only.

The lighted buoys are numbered by their distance in kilometers from Buenos Aires, starting at Km 239.1.

Canal Intermedio and Paso Banco Chico are marked by single lighted buoys, the first three of which are numbered 31, 32, and 33; thereafter, they are marked with their distance from the entrance to Darsena Norte at Buenos Aires in kilometers, starting at Km 99 and ending at Km 57, which shows a racon. There is a pair of lighted buoys at Km 60.

There are numerous uncharted lighted buoys, painted white, in the vicinity of Canal General which are used for dredging purposes.

Tides—Currents.—Some of the lighted buoys marking Canal General are fitted with rudders which cause them to swing to the tidal current and have white arrows painted on their sides which indicate the direction in which it is going.

They are also fitted with auxiliary lights that reported on their sides. When facing the buoy from its downstream side, a red light is shown on the left side of the buoy and a white light on the right side. These lights each show over a sector of 60° and are separated by two sectors of 120° in which these are obscured.

There is a tide gauge close E of Lighted Buoy No. 32, 14 miles ENE of Punta Atalaya. Tide gauges are also located at Km 99 and Km 180 in Canal Punta Indio.

Regulations.—The following are extracted from special regulations applying to Canal Punta Indio and the "Privilege Zone," which covers Canal Intermedio and Paso Banco Chico, from Practicos Recalada Light Vessel to Km 57 Lighted Buoy, off Rada de la Plata.

The Privilege Zone includes that part of Canal General of the Rio de la Plata which extends about 0.2 mile on either side of the Lighted Buoy No. 31 and Lighted Buoy No. 33 and those at Km 99 to 57, all of which are to be considered to be in mid-channel, except the pair at Km 60. Vessels navigating in this zone have the same privileges as those navigating in Canal Punta Indio.

Canal Punta Indio includes that part of the main channel of the Rio de la Plata between Practicos Recalada Light Vessel and No. 30 pair of lighted buoys, and extending about 0.1 mile outside each line of lighted buoys.

Vessels drawing more than 7.3m and outbound should enter the Privilege Zone at Km 57 Lighted Buoy and, if its draft permits, should pass S of the line of lighted buoys marking the mid-channel far as No. 30 pair of lighted buoys marking the inner end of Canal Punta Indio. Similar vessels inbound, having left No. 30 pair of lighted buoys, if their draft permits, should pass N of the line of lighted buoys.

Vessels drawing more than 7.3m navigating in the Rio de la Plata must proceed through the whole of Canal Punta Indio and the Privilege Zone, except in special circumstances.

Vessels, with drafts of 6.4 to 7.3m, must similarly follow the main channel through Canal Punta Indio and the Privilege Zone, according to the depth of the river.

Vessels drawing 5.8m and up, but less than 6.4m must follow the main channel and the Privilege Zone, but they may only use Canal Punta Indio itself between No. 19 and No. 23 pairs of lighted buoys when the depth of the river makes it advisable.

Vessels drawing less than 5.8m, navigating in the Rio de la Plata, should proceed through the Privilege Zone. They are prohibited from passing through Canal Punta Indio.

Two vessels proceeding in opposite directions in the channel should alter course to starboard in plenty of time.

Vessels proceeding in the same direction are forbidden from overtaking unless the difference in their speeds is at least 3 knots; the overtaking vessel will sound one long blast. The vessel to be overtaken will acknowledge this signal by sounding the same signal if she is about to alter course to starboard, or by two short blasts if she is about to alter course to port. This maneuver will be executed when the vessel to be overtaken complies with the request of the other vessel. The vessel to be overtaken will reduce speed as much as possible in order to lessen the time taken in passing.

Overtaking is prohibited between Lighted Buoy No. 15 and Lighted Buoy No. 23.

Should two vessels, proceeding in opposite directions, be likely to meet abreast the pair of **Lighted Buoys No. 21** (35°10'S., 57°00'W.), the outbound vessel will reduce speed in order to allow the inbound vessel to pass these lighted buoys first.

Two vessels, proceeding in opposite directions, shall, when at a distance of not less than 1 mile from one another, alter course to starboard.

The vessel having the current on her starboard bow shall pass close along the line of lighted buoys on its side in order to allow the other vessel plenty of room.

Should one of the vessels not be completely under control, she should display the appropriate signal and the other vessel should maneuver so as to facilitate her passage.

Sailing vessels, whatever their draft, can only use the channel by day and when in tow. If a sailing vessel navigating in the vicinity of the channel should have to cross it, whether to work to windward or for any other reason, she should do so without interfering with vessels navigating in the channel.

Tugs which have one or more small vessels in tow may not use the channel.

Any vessels or dredge navigating in the channel shall have right of way over any other vessel which is outside the channel or about to enter it.

Anchorage is prohibited within the channel and the Privilege Zone. Any vessel anchored in the vicinity of Canal Punta Indio or the Privilege Zone must display, by day, a black ball 0.6m in diameter visible from all directions and in a position corresponding to that of a vessel's riding light when at anchor. This signal is also obligatory for all vessels anchored in Rada Exterior del Puerto de Buenos Aires.

A vessel aground may not work its engines when another vessel is passing.

With the purpose of avoiding accidents, any vessels navigating in the channel or the Privilege Zone and obliged to heave-to on account of fog, squalls, etc., should immediately broadcast by radio an urgent signal giving name and position.

Vessels entering the channel from seaward should pass N of the light vessel, and those leaving should pass S of it.

In case of bad weather, a vessel embarking or disembarking a pilot should take up the most convenient position in order to reduce the risk of transportation.

Any vessel approaching a dredge working in the channel should proceed without altering course or speed provided that she allows the dredge sufficient time to leave the channel. No ballast, clinkers, nor generally speaking, any article that will not float, may be thrown overboard when in the channel.

These regulations should be strictly complied with, except in special circumstances, such as fog, risk of collision, fire, damage to machinery, sailing vessel in the channel, etc., when a vessel should comply with the Regulations for Preventing Collisions at sea.

Signals.—Suction dredges display flag "W" of the International Code of Signals in a conspicuous position between their masts.

Caution.—The pairs of lighted buoys described above mark the limits of the dredged channel in Canal General, but the mariner should bear in mind that its cross section is usually V-shaped and that its maximum depth does not extend for its full and entire width.

Between No. 1 and No. 20 pairs of lighted buoys, the deepest water lies S of the center line of the channel. Vessels with circulating water intakes set low in the hull, if drawing more than 7m, should have regard to the possibility of their intakes becoming choked with mud.

Navigation between Buoy No. 15 and Buoy No. 25 is hazardous because of the tendency to ground on the edge of the channel. Years ago, a ship drawing 10m grounded in this part of the channel.

It is reported that an obstruction exists near Canal Intermedio about 0.5 mile E of the KM 93 buoy.

Puerto de La Plata (34°50'S., 57°53'W.)

World Port Index No. 13770

5.34 La Plata comprises Puerto de la Plata, Ciudad de la Plata, a provincial capital 4 miles SW of the port, and the towns of Berisso and Ensenada, close E and W, respectively, of the port.

The port consists of a roadstead, an entrance protected by moles, narrow finger-like harbor areas formed by the Rio Santiago and several canals, and a turning basin.

Anchoring and berthing accommodations are available for deep-draft vessels. The port may be temporarily closed during the spring and fall seasons due to gale force winds.

The main local industry is the preparation and export of frozen meat. The port is also the site of a large oil refinery, a steel mill, and the main base and training establishment of the Argentine Navy.

Tides—Currents.—The mean HW interval at the port is 3 hours 52m. Spring tides rise 1.2m and neaps rise 1.1m.

The time of HW is regular, but the height of the mean level of HW is so affected by the winds that the vertical movement of the tide is sometimes almost negligible. Southwest winds cause the level of water to rise and NW winds lower it.

In extreme cases, such winds raise or lower the level as much as 2.4m above or below the chart datum.

The mean level of the estuary is highest in December and January, and lowest in June and July, with the difference being about 0.3m.

The mean monthly tidal range is about 1m in December and January, when it is greatest, and 0.7m in June and July, when it is least.

Depths—Limitations.—Regulations limit vessel length, beam, and draft to 215m, 30m, and 7.97m, respectively.

Access to the port is by a channel which leaves the main entrance channel to Buenos Aires 30 miles NW. This channel was reported (2014) to have depths of about 8.7m. The latest depths in the channel are promulgated in the Boletin Fluvial published by the Argentine Government.

La Plata Roads extends for 3.5 miles from the moles.

The port is made up of the Rio Santiago, Gran Dock, and the Propulsoria Berth, about 2.7 miles up the Rio Santiago, which is also known as Port Ingeniero.

The Rio Santiago is on the W side of the entrance to the Gran Dock. The quay is 372m long, with a depth of 6.1m alongside.

Four tanks for reception of liquid chemicals have been installed here. The packing plants are operating at less than capacity.

Gran Dock is used only by tankers. It has berths on both sides, each 1,274m long, with depths of 7.3 to 8.8m alongside.

A turning basin lies at the head of the dock; however, because it is only about 228m wide, large vessels are unable to use it and are turned outside the entrance channel, entering the dock stern first.

Porto Ingeniero Rocca is the site of a cold-rolling steel mill. The single berth here is 154m long, but can handle vessels up to 215m long. The berth is reached through a channel dredged to a depth of 9m through the W part of the Rio Santiago. The pier has a depth of 9m alongside.

Puerto de la Plata—Gran Dock—Santia Canal

Aspect.—Prominent objects in the vicinity of Puerto de La Plata include the semaphore tower and mast, 38m high near the root of the E mole protecting the approach channel to the port; a tower surrounded by a sphere painted orange and white, 62m high, standing 3.25 miles WSW of the semaphore tower; a hammerhead crane, 45m high, about 1.7 miles SW of the semaphore tower; and the building of the Jockey Club on Punta Lara, 7 miles WNW of the water tower.

Pilotage.—The harbor pilot takes over in Rada de La Plata, and boards about 1 mile off the end of the access channel.

Their services should be requested through the ship's agent before 1700 on the day before the ship's arrival.

The agent is responsible for transporting the pilot to the roadstead. Pilotage is compulsory.

Coming from sea or Montevideo, the Recalada or Uruguayan pilot will take the vessel to La Plata Roads where the La Plata port pilot comes aboard.

Regulations.—Vessels navigating in the entrance channel have precedence over vessels in the Rio Santiago.

Vessels longer than 60m, or with a beam wider than 9m or a draft of greater than 6.1m, may not cross or overtake in the entrance channel. Vessels getting underway from Gran Dock will not depart when another vessel is inbound.

On a flood tide, the vessel's draft must not exceed the minimum channel depth. On an ebb tide, the vessel must have an underkeel clearance of at least 0.5m.

Vessels greater than 200m long can maneuver in daylight only, with a minimum visibility of 0.8 mile and a wind speed of less than 10 knots.

Vessels over 140m long or with a draft greater than 7.3m may use the Rio Santiago in daylight hours only. Vessels with a beam of over 11m may not pass or overtake in the Rio Santiago.

Except for the following, the same port regulations as those in force at Buenos Aires apply to Puerto de La Plata:

1. Tugs are compulsory for all ocean-going vessels and for coastal vessels exceeding 300 gt.
2. Powered vessels entering the port must employ one tug as far as the **Rio Santiago** (34°51'S., 57°53'W.) and two tugs, bow and stern, beyond that.
3. Movements of vessels in the port are effected by means of two tugs, bow and stern. Vessels which can turn in Gran Dock are permitted to do so, with the aid of two tugs, without having to proceed to the turning basin.
4. Towage is not compulsory for vessels shifting berth for a short distance along a wharf.
5. Vessels of less than 300 gt are permitted to maneuver in the interior of the port with 1 tug only. Towage is not compulsory for such vessels proceeding to Dique de Cabotaje.

Signals.—Daytime tidal information is transmitted at 5 minutes past each hour on VHF channel 5.

At night, the following signals, each signal with a period of 30 seconds, are shown from the semaphore tower at the root of the E mole:

1. One long white flash denotes that the tide is rising.
2. Two short white flashes denote that the tide is falling.
3. One long red flash is shown for each meter above zero; each 10cm is indicated by one short red flash.
4. One long green flash is shown for each meter below zero; each 10cm is indicated by one short green flash.
5. One short red flash followed by one short green flash indicates zero.

The following traffic signals are displayed from the signal station:

1. A black square flag at the W yardarm—A vessel has been sighted.
2. A yellow flag at the E yardarm, at the dip—A vessel is entering; a similar flag at the W yardarm, at the dip, denotes that a vessel is leaving.
3. A red flag at the E yardarm—A vessel requires assistance.
4. A red flag at the W yardarm, at the dip—The channel is blocked.

The signals with regard to dredges at Puerto La Plata are the same as those at Buenos Aires, which is discussed in paragraph 5.36.

Contact Information.—La Plata port can be contacted, as follows:

1. Telephone: 54-221-460-0233
2. E-mail: info@laplataport.com.ar

Anchorage.—Anchorage is in Rada de La Plata, an area with depths of 5 to 10m extending up to 5 miles from the heads of the moles protecting the approach channel.

An area, indicated on the chart, in its SE part is reserved for ships of the Argentine Navy. There are berths near the heads of the moles in depths of 8.5 to 9m, very soft mud, but the holding is not good, especially during strong SW winds.

A Lightening Zone and Waiting Area for embarking and disembarking pilots have been established N of the port entrance and are best shown on the chart.

Directions.—A vessel approaching from the E, having cleared Banco Chico, should steer about 270° until the mole heads bear about 210°, and should then steer for them. It should be borne in mind that the tidal streams always set across the entrance, sometimes attaining a rate of 3.5 knots.

Caution.—Numerous wrecks and foul ground areas, best shown on the chart, are in the vicinity of the Lightening Zone.

Puerto de la Plata to Buenos Aires

5.35 Ensenada de Barrangan is entered between the mouth of Canal Santiago and **Punta Lara** (34°47'S., 58°00'W.), low and indeterminate, situated 6.5 miles WNW. The Rio Santiago, the mouth of which has been almost completely blocked by spoil dredged from the channels in Puerto de La Plata, flows into the head of the bay. It is joined by Arroyo Zanjon before it reaches the bay.

The W part of the shore of the bay is backed by a holiday resort which includes the prominent building of the Jockey Club, previously mentioned in paragraph 5.34.

From Punta Lara to Puerto de Buenos Aires, 20 miles WNW, the coast is low and covered with pasture and scrub; parts of it are subject to inundation.

Suburbs of Buenos Aires stand near the railway, 1 to 2 miles back from the coast.

Punta Colorado, low and indeterminate, is 5.5 miles WNW of Punta Lara. Punta Quilmes, a similar point, lies 5.5 miles farther WNW.

Quilmes, an important industrial suburb which extends from the railway to the coast, lies close W of Punta Quilmes.

The Communication Service for the Safety of Navigation (SECOSENA) is in effect for the Argentine waters of the Rio de la Plata and approaches, bounded on the E by 56°W and on the S by 36°30'S, and is mandatory for foreign vessels over 24m in length.

When entering the area, vessels must report the name of vessel, flag, call sign, length, breadth, draft, speed, port of departure, destination, navigational plan, and ETAs at points listed in the CONTRASE system below (see paragraph 5.36), as appropriate.

When leaving the area, vessel must report their name, flag, and call sign.

Buenos Aires (34°36'S., 58°22'W.)

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5.36 Buenos Aires is on the S bank of the Rio de la Plata, about 126 miles NW of Cabo San Antonio and about 168 miles W of Punta del Este. It consists of a roadstead, dredged channels, an elongated artificial harbor, and extensive facilities for ocean-going vessels.

Ciudad de Buenos Aires, capital of the Argentine Republic, is the largest city in the S hemisphere and the seventh largest in the world. In addition to being the political capital of the country, Buenos Aires is its industrial and cultural center.

The city stands on the NE edge of the Pampa, a vast plain which extends up to 300 miles SW, and which, in the vicinity of the city, is only 9 to 12m above sea level.

Port of Buenos Aires
http://www.puertobuenosaires.gov.ar

Tides—Currents.—The time of HW is regular, but the height of the mean level of the water is so affected by the winds that the vertical movement of the tide is sometimes almost negligible.

The flood current runs for 5 hours 20 minutes, and the ebb current runs for 7 hours 5 minutes, at rates of 1 to 2 knots. Winds from the SE cause the level of the water to rise and those from NW depress it. In extreme cases, such winds raise or lower the level as much as 2.4m above or below chart datum.

The mean level of the estuary is highest in December and January, and lowest in June and July, with the difference being about 0.3m.

The mean monthly tidal range is about 0.9m in December and January, when it is greatest, and 0.8m in June and July, when it is the least.

The tidal currents set across both Canal Norte and Canal Sur, meeting the former at an angle of 50° and the latter at an angle of 70°. They run strongly across the inner end of Canal Norte, but may hardly be felt farther seaward.

It should be noted that the flood current continues to flow after HW, and the ebb current after LW.

The only reliable guides to the direction of the current are the current indicating buoys.

Depths—Limitations.—The access channel to the port of Buenos Aires is entered between a pair of buoys at Km 37 in position 34°41'S, 57°58'W, about 20 miles ESE of the port.

A dangerous wreck, marked close S by a lighted buoy, and an obstruction lie, respectively, on the N and S sides of the channel about 0.6 mile WNW. These hazards reduced the navigable width of the channel to 100m. Overtaking in this section of the channel is prohibited.

This channel leads in a WNW direction for 13.5 miles where at Km 12, Canal Emilio Mitre (described in paragraph 5.51) branches to the NW. At Km 8.2, the channel divides again. Canal Norte, the N fork, leads in a WNW direction for 5 miles to Puerto Nuevo, the N part of Buenos Aires.

Canal Sul, the S fork, leads in a WSW direction to the S entrance of the port.

Efforts are made to keep Canal de Accesso, Canal Norte, and Canal Sur dredged to depths of 9.1m, 7.1m, and 7.6m, respectively. These depths are not constant because of silting, and they depend on constant dredging.

The actual depth depends on channel condition, stage of tide, and weather conditions.

When large passenger liners, LASH, or liquefied gas carriers are entering or leaving, it is possible that the access channel will be closed for a period of 4 hours because of the narrowness of the dredged channel.

Vessels with a draft up to 9.7m have used the main channel safely.

The harbor consists of many basins and docks. They are described from S to N, starting with the W end of Canal Sur.

Darsena Propaneros lies on the S side of Canal Sur and consists of a 356m long central pier with dolphins. It is used by liquefied gas carriers and has a depth alongside both sides of 10m. Only two vessels can use this facility at the same time.

An overhead power cable, with a vertical clearance of 59m, crosses the dredged channel close E of Darsena Propaneros.

Darsena de Inflamables lies close within the S entrance to the port and consists of seven piers for the exclusive use of tankers. The entrance is 50m wide. There is a depth of 7.6m inside the basin. Tankers discharge at the piers on the W side of the basin.

Darsena del Este lies on the N side of Canal Sur and is used for harbor service craft. It is divided into two basins. Basin No. 1, the westernmost, has depth of 7.3m at its center, but only 4.9m at its entrance. Basin No. 2 has a depth of 7.3m at its center, but only 4.3m at its entrance.

Extending E from Basin No. 2 is a 260m long mole used by tankers discharging fuel for the power plant located adjacent to this mole.

South Outer Harbor lies at the W end of Canal Sur and gives access to Dock Sud, Puerto Riachuelo, and Darsena Sud.

Dock Sud consists of two sections divided by a turning basin. It is reported to be dredged to 8.2m but is subject to silting. The N section, which is 130m wide, has a quay, 1,109m long on its E side, while the W side has a 911m long quay, with a depth of only 3.6m alongside. The S section, 90m wide, has a 1,000m long quay used for discharging sand located on its W side, and 8 jetties used for discharging petroleum products located on its E side.

When loading and the vessel draft reaches 7.1m, the vessel must shift to Porto Nuevo.

Puerto Riachuelo is located on the river which extends SW from the South Outer Harbor. The mid-channel depth is about 6.2m. There is a total of almost 4 miles of berthing space, with depths of 5.2 to 5.8m, used mainly by coasting vessels.

A vertical lift bridge, with a vertical clearance of 20.6m in the closed position and 42.6m in the open position, lies close to the mouth of the river. A fixed highway bridge, with a vertical clearance of 28m, is located close W of the lift bridge.

Darsena Sur extends NW from the South Outer Harbor and is used by various vessels, including passenger ferries, ro-ro vessels, and tankers.

The harbor authority tries to maintain a depth of 7.3m, but the area is subject to silting and depths of less than 4.3m have been reported.

The basin is 1,029m long with a minimum width of about 100m.

Puerto Madero extends N for about 3 miles from Darsena Sud and consists of four docks connected by locks. Dock 4 serves as a marina for small vessels while Docks 1, 2 and 3 are no longer in use.

Darsena Norte lies N of Puerto Madero. There are two wharfs within the basin; one 210m long and the other 221m long. The W side of the basin is 390m long, the S side is 352m long, and the N side is 326m long. There are depths of 6.4m alongside the wharfs. The basin is entered through a 100m wide passage.

Swing bridges are located across all the locks. During the week they are opened on request from 0600 to 2000. On

Saturdays, Sundays, and holidays, they can be opened by a request through the vessel's agent.

Puerto Nuevo is entered at its S end from Canal Norte via the North Outer Harbor. It consists of five basins used by ocean-going vessels and is reported to have been dredged to a depth of 10m, but is subject to silting. A sixth basin, inaccessible to ocean-going vessels and is used only by local river craft, lies NW of Puerto Nuevo and is entered from the N. Depths in the basins are subject to variation and are published in local bulletins. The facilities are, as follows:

1. Jetty No. 1, which is 100m long, separates Darsena A from the North Outer Harbor and is used mainly by river craft.
2. Darsena A, which is 365m long and 140m wide, has 869m of berthing space. The N side can accommodate 2 medium-sized vessels. The W side is reserved for use by the Argentine Navy. At the passenger terminal on the SW side of the basin, there is room for one vessel.
3. Jetty No. 2, which is 202m long, separates Darsena A from Darsena B and is used by large passenger vessels.
4. Darsena B, which is 464m long on its S side and 525m long on its N side, is 151m wide and has 1,165m of berthing space. The basin can accommodate seven vessels.
5. Jetty No. 3, which separates Darsena C from Darsena B, has a total length of 236m.
6. Darsena C, which is 495m long on its N side and 585m long on its S side, is about 175m wide, with a total berthing length of 1,284m. Grain is handled at the S side of the basin. The basin can accommodate seven vessels.
7. Jetty No. 4, which separates Darsena D from Darsena C, is 295m long and can load two grain vessels simultaneously. The jetty has a radar station (S1) on its N side about 100m from the end.
8. Darsena D, which is 495m long on its N side and 585m long on its S side, is 194m wide. The basin has a total berthing length of 1,300m. Grain is reportedly handled on the S side of the basin. Containers are handled on the N side of the basin.
9. Jetty No. 5, which separates Darsena E from Darsena D, is 523m long, of which 240m is for unloading coal for the power plant located here.
10. Darsena E has the same dimensions as Darsena D and is used to handle coal and oil for the power plant.
11. Jetty No. 6, used for the unloading of coal, is 310m long and can only accommodate one vessel.
12. Darsena F, which faces N, is very shallow and is only used by barges unloading sand.

Pilotage.—Pilotage is compulsory for all vessels over 1,000 gt. A vessel requiring a pilot should display flag “P” of the International Code of Signals at the foremasthead until a pilot arrives on board. Pilots are picked up at Puerto de la Plata.

Regulations.—Any vessel may enter the port, by day or at night, provided it complies with the regulations.

Anchorage is prohibited in the channels or within about 0.1 mile of their sides.

During thick fog, entry and departure is prohibited without special permission from the port authorities.

Vessels proceeding in opposite directions meeting in channels should alter course to starboard in plenty of time and should reduce speed while passing each other.

Vessels overtaking others are not allowed to pass them and must keep at a distance of 0.1 mile from coasters and about 0.5 mile from other vessels.

No vessel is allowed to enter the channels unless the tidal information gives a depth equal to the vessel’s draft on a rising tide, or 0.5m more than her draft on a falling tide.

A vessel drawing more than 6.7m must have a tug ahead between Km 8 and the entrance to the port in each channel and also one astern between Km 4 and the entrances.

A vessel drawing less than 6.7m must have a tug ahead between Km 5 and the entrances and also one astern between Km 1 and the entrances, in each channel.

Between Km 15 and the port, the maximum speed allowed is 8 knots; within the port the maximum speed allowed is 3 knots. Speed should be reduced as much as possible when passing dredges working in the channels.

Before shifting berth within the port, a vessel must obtain permission from the port authorities; such movements will be supervised by a port official.

Power vessels may leave the port at any time of the day or night, with previous notice having been given to port and customs authorities.

Vessels must discharge all explosives and inflammable materials before entering the docks. Except for this purpose, working cargo in the roadstead is only permitted for vessels of such draft that they cannot enter or leave the port fully laden.

The Traffic Control and Safety System (CONTRASE) is in effect for Buenos Aires. It is mandatory for foreign vessels over 24m in length, as follows:

1. If anchoring outside the port, report vessel's name, flag, and call sign with the time and location.
2. Vessels should report their ETA at destination when passing the following Reporting Points:
   a. Report along the Canal Punta Indio/Canal Intermedio using VHF channel 12:
      i. Near Practicos Recalada Light Vessel.
      ii. Near paired Lighted Buoys No. 1.
      iii. Near paired Lighted Buoys No. 5.
      iv. Near paired Lighted Buoys No 23.
      v. Near paired Lighted Buoys No. 30.
      vi. Near Km 57 Lighted Buoy.
   b. Report along the Canal de Acceso al Puerto de Buenos Aires using VHF channel 9:
      i. Near Km 37 Lighted Buoy.
      ii. Near Km 12 Lighted Buoy.
   c. Report along the Canal Emilio Mitre using VHF channel 72:
      i. Near Km 12 Lighted Buoy.
      ii. Near Km 18.5 Lighted Buoy.
      iii. Near Km 40.5 Lighted Buoy.
      iv. Near Km 56.1 Lighted Buoy.
   d. Report along the Canal Costanero using VHF channel 72.
   e. Report at the approaches to the Rio Parana Guazu and the Rio Uruguay (Barra del Farallon to Canal Principal) using VHF channel 14 or 81:
      i. Near Km 38 Lighted Buoy.
      ii. At the N end of Barra de San Pedro.
      iii. Near Punta Martin Chico.
      iv. Near Km 121.5 Lighted Buoy.

f. Upon entering Puerto de la Plata, report to La Plata Prefectura Naval (L5F) on VHF channel 9.

3. In Rada Plata pilot boarding area, report the time of arrival or departure from it on VHF channel 70. Departure time is followed by reporting of ETAs at:

a. Km 37 Lighted Buoy (vessel bound for Canal de Acceso at Puerto de Buenos Aires).

b. Km 38 Lighted Buoy (vessel bound for Barra del Farallon).

c. Km 57 Lighted Buoy (vessel bound for Paso Banco Chico).

d. At the entrance to Puerto de la Plata.

4. When entering port, report the vessel's name, call sign, and ETA at berthing place.

5. Before shifting anchorage, changing berths, or moving within the port, obtain permission, stating vessel's name, flag, call sign, and destination. Permission normally remains valid for 15 minutes.

6. Before leaving port, obtain permission, stating vessel's name, flag, call sign, length, breadth, draft, speed, destination, course, type of cargo, and whether there is a doctor on board. Permission normally remains valid for 15 minutes.

Tidal prediction broadcasts are made daily for the Rio de la Plata Exterior at 1000, 1600, and 2200. Tidal queries for other areas are also made available by contacting Hidrografia Naval.

Signals.—Tidal information is transmitted at 5 minutes past each hour on VHF channel 15.

A vessel wishing to pass a dredge must stop and sound one long blast and three short blasts on the siren or whistle.

Permission to pass will be given by a similar signal from the dredge. "Passage obstructed" will be indicated by the dredge sounding two long blasts and three short blasts, and by displaying three balls or exhibiting three vertical red lights. In this case, the vessel must anchor.

Dredges will indicate the side that a vessel should pass by displaying a red and white checkered metal flag, or by exhibiting three lights, red, green, and white, disposed vertically. Hopper barges exhibit two white lights amidships, and one red light at each end.

Traffic through the basins in Puerto Madero is governed by the following signals shown from each end of the channel:

1. A red disc by day or a red light by night indicates that entrance on that side is prohibited to all vessels.

2. A white disc by day or a green light by night indicates that passage on that side is allowed for ocean-going vessels only.

3. A disc on its side indicates only tugs or small craft may pass.

Contact Information.—Buenos Aires port can be contact as follows:

1. Telephone: 54-11-4342-1727
2. Facsimile: 54-11-4342-6836
3. E-mail: institucionales@puertobuenosaires.gov.ar

Anchorage.—Rada Exterior del Puerto de Buenos Aires lies between the lighted buoys at Km 25 and 37, and clear of the dredged channel. It has depths of 5.8 to 7.9m. The holding ground, which consists of soft mud, is not good, and vessels may drag their anchors in strong winds.

Winds from the S produce much swell. When good weather is expected, a vessel with good ground tackle may anchor with safety in a depth of 0.6m greater than its draft.

Caution.—High speed ferries operate between Buenos Aires, Montevideo, and Piriapolis through Canal Sur, Canal Acceso, Canal Intermedio, and the Montevideo Access Channel.

The Rio Uruguay and the Rio Parana

5.37 The Rio Uruguay is approached W of Puerto de Colonia and Isla de Hornos and E of Playa Honda. This route may be used as an approach to the Rio Parana, but this river has a delta and can be approached through several mouths which are W of Playa Honda, the deepest and most direct of which is Canal Emilio Mitre, which leads across the W side of Playa Honda.

Pilotage.—Pilotage is compulsory for all vessels entering the Rio de la Plata estuary except for coasting vessels. Vessels may proceed as far as Rada de Montevideo or Practicos Recalada without a pilot, but at this point must obtain a pilot to proceed farther.

A 48-hour ETA should be given to the pilot station. This pilot conducts the vessel to the roadstead off Puerto La Plata, where the pilot is relieved if the vessel is bound for Buenos Aires or up the rivers.

Vessels must use pilots of the nationality of their port of destination and, when leaving, must use pilots of the nationality of the port they are leaving.

Caution.—As in other parts of the Rio de la Plata, the height of the water level depends largely on the force and direction of the wind. Winds from the SE or S raise the level as much as 1.5m or 1.8m, and winds from the opposite directions lower it. A vessel at anchor will lie heading upriver.

5.38 From Punta Hornos to **Punta Martin Chico** (34°10'S., 58°12'W.), about 22 miles NW, the coast is slightly elevated, rising to hills 30 to 36m high.

The most distinctive features are the mouth of Arroyo San Pedro, 6 miles NNW of Punta Hornos; the mouth of the Rio San Juan, 4.5 miles farther NW; Torre Anchorena, 69m high, standing on the spit which forms the S side of the mouth of the Rio San Juan; Punta Francesca, at which there is a pier 3 miles NW of the mouth of the Rio San Juan; Punta Pereyra, 1.5 miles farther NW; and Cerros de San Juan, three peaks of the same hill, 107 to 137m high, which rise 7 miles ENE of Punta Pereyra and are the highest land around forming a useful mark for vessels navigating in this part of the estuary.

Puerto de Conchillas (34°12'S., 58°04'W.) has a pier with 3m alongside.

A series of channels, named from the S entrance at **Km 39 Buoy** (34°39'S., 57°58'W.) are Barra Farallon, Paso del Farallon, and Barra de San Pedro, leading to **Km 70 Buoy** (34°23'S., 58°00'W.).

At this point the channel divides into two. The E and main channel passes through Pozos de San Juan, Canal Nuevo, and E and N of Isla Martin Garcia in Canal Infierno, to **Buoy Km 109.5** (34°08'S., 58°19'W.), where it rejoins Canal Martin Garcia. The minimum depths in this main channel is

promulgated in the Argentine Notices to Mariners; in recent years it has ranged between 6.7 to 7.5m.

Canal Martin Garcia, the channel that branched off to the W, is used only by shallow draft vessels.

Piedra Diamante Light (34°25'S., 57°58'W.) has a tide gauge.

Regulations.—Vessels whose draft exceeds 7.9m are prohibited from entering Canales a Martin Garcia between Km 39 and Km 93.

A vessel drawing more than 7.3m is similarly prohibited, unless capable of exceeding a speed of 10 knots.

Vessels drawing more than 4.6m are prohibited from passing each other in Bara del Farallon between Km 47 and Km 51.5, in Barra de San Pedro between Km 53.5 and Km 71.3, and in Canal Nuevo between Km 84 and 86 as well as between Km 92 and Km 93.5.

In order to avoid passing, the vessel proceeding upstream should reduce speed in plenty of time, or should anchor until the other vessel has passed.

Playa Honda is an extensive bank formed by the sand and mud brought down by the Rio Uruguay and the Rio Parana and deposited over the whole of the NW part of the Rio de la Plata. Its S edge is bounded roughly by the parallel of Buenos Aires, where it has depths of 3.6 to 6.4m, and it shoals gradually up to the delta of the Rio Parana.

Ruta Playa Honda, a more direct route from Puerto de Buenos Aires to the Rio Parana and the Rio Uruguay for vessels drawing less than 2.7m, leads across Playa Honda, with a least depth that has varied from 2.6 to 3.4m in recent years, but is no longer buoyed.

5.39 Isla Martin Garcia (34°11'S., 58°15'W.) lies 2 miles WSW of Punta Martin Chico. It is a mass of granite in the form of a flattened cone, 27m high. Most of the island is wooded.

A wharf extends 60m from the SW side of the island. It has a depth of 1.4m alongside and exhibits a light.

Daytime tidal information is transmitted at 5 minutes past each hour on VHF channel 15.

Night tidal signals, shown from a mast at the signal station situated 0.3 mile NE of the wharf, are made in accordance with the system as shown below. The system is automatic and is repeated every 30 seconds:

1. River rising—one long (2.5 second) white flash.
2. River falling—two short (0.6 second) white flashes.
3. River stationary—no white signals.

The signals given for river levels are, as follows:

1. Above zero—one long red flash for every 1m, followed by one short red flash for every 0.1m.
2. Below zero—one long green flash for every 1m, followed by one short green flash for every 0.1m.
3. At zero—one short green flash, followed by one short red flash.

Canal Santo Domingo, with a least depth of 3m, branches N from Canal del Inferno off Punta Martin Chico and leads to Puerto de Carmelo. The W side of the channel is marked.

The port can also be reached by a channel with a least depth of 0.8m leading E from Canal Principal and passing N of Isla Sola.

Puerto de Carmelo has depths of about 3m alongside its commercial quays and is a yachting center.

Canal Principal leads from the junction of Canal del Este and Canal Martin Garcia at Km 109.5 to the mouth of the Rio Uruguay at Punta Gorda, 14 miles NW.

It has a general width of more than 0.5 mile and a least depth of 10.3m. It is marked by lighted buoys.

The mouths of the Rio Parana Guazu and the Rio Sauce (both described in paragraph 5.54) are on the W side of Canal Principal, 5.5 and 1.5 miles, respectively, S of **Punta Gorda** (33°55'S., 58°25'W.).

5.40 From the limit of Puerto Nuevo, the NW part of Puerto de Buenos Aires, to the mouth of the Rio Lujan, 10 miles NW, the coast is low with beaches of fine dark sand and outcrops of tufa, one of which, 19m high and known as Las Barrancas, provides the only outstanding feature of the coast.

From seaward, it presents an unbroken line of buildings formed by the suburbs of Buenos Aires, which include Vincente Lopez, Olivos, Anchorena, Las Barrancas, San Isidro, Punta Chica, and San Fernando, the last named, stands on the right bank of the Rio Lujan at its mouth.

Buenos Aires Airport is on the coast immediately NW of Puerto Nuevo.

From the mouth of the Rio Lujan to the mouth of the Rio Parana Brava, located 2 miles NW of Punta Gorda and at the head of the estuary of the Rio de la Plata, the coast is formed by the delta of the Rio Parana, which has six principal mouths, and is described later in paragraph 5.50.

The coast between the river mouths is low and fringed with scrub and reeds, but it is well wooded inland.

Canal Costanero (34°33'S., 58°25'W.), with depths of 2.4 to 3m depending on state of dredging, leads from the NW end of Puerto Neuvo to the mouth of the Rio Lujan. It is marked and is about 0.5 mile offshore. It serves small vessels in the sand and gravel trade and some yachts.

Caution.—It was reported that dredged depths were not being maintained and that depths of less than 2m existed in some areas. A partially submerged wreck lies in approximate position 34°27'S, 58°30'W.

The Rio Uruguay

5.41 Regulations.—The coast of Uruguay from Punta del Este to Colonia, including the port of Montevideo, and the Rio Uruguay N of Colonia, is covered by the Maritime Movement Control and Information System. For further information, see Pub. 160, Sailing Directions (Planning Guide) Indian Ocean and South Atlantic Ocean.

The Rio Uruguay can be divided into three parts by the conditions of navigation, the formation of its banks, and by its depths and currents, as follows:

1. The Rio Uruguay Inferior extends from Puerto Nueva Palmira, situated 2.5 miles N of Punta Gorda, to Puerto Concepcion del Uruguay, 99 miles upriver. It has a minimum depth in the fairway of 5.2m below local datum. It is considered to be accessible to ocean-going vessels and is tidal.
2. The Rio Uruguay Medio lies between Concepcion del Uruguay and Concordia, 79 miles farther upriver. From the former port to Puerto Fabrica Colon, 23 miles upriver, the minimum depth in the fairway is 3.3m below local datum.

Above Puerto Fabrica Colon, the river is only accessible to small craft with a maximum draft of 1.8m at LW.

3. The Rio Alto Uruguay (Uruguay Superior) extends from Concordia to the mouth of the **Rio Pepiri Guazu** (27°10'S., 53°50'W.), which forms the boundary between the Argentine province of Misiones and the Brazilian state of Santa Catarina.

Depths in the Rio Uruguay are subject to change. Those given above, and elsewhere in the description of the river, should be regarded as approximate. The latest information regarding depths in the river is promulgated in "Boletin Fluvial," published by the Argentine Ministry of Works.

Pilotage is compulsory in the Rio Uruguay for all ocean-going vessels without exception.

Pilots for Argentine ports can be obtained at La Plata for the upriver journey and at **Concepcion del Uruguay** (32°29'S., 58°14'W.) for the return. Pilots for Uruguayan ports can be obtained at Montevideo.

The regulations for vessels wishing to pass a dredge are the same as those for the dredged channels to Buenos Aires previously discussed in paragraph 5.36.

The river is buoyed in accordance with the Argentine System. Most of the buoys below Puerto Paysandu, and many above that port, are lighted. Argentine buoys have their distance, in kilometers, from the confluence of the Rio Parana Bravo and the Rio Uruguay, near Nueva Palmira, painted on them.

Range beacons for the passes are usually iron towers with square topmarks painted black and white. Beacons on the Uruguayan bank are wooden framework structures painted red and white.

Lights are shown at certain places.

The river is subject to periodical rises, mainly occasioned by the great rains in Brazil, where it takes its source. It should be noted that this rainfall can be very heavy in almost any month of the year.

In the Rio Alto Uruguay, the floods are caused only by the rainfall and are considerable. The river is low during the first part of the year until April, rises temporarily in June, and then rises to its highest level in September and October.

At Barra Concepcion, 297 miles above Concordia, the highest known rise is 18m. The height of the floods decreases downstream. Near Concordia, the highest known rise is 16m above local zero.

Irregularities in the river level may be produced at times by flood water from its more important tributaries.

In the Rio Uruguay Medio, the rise in the river level caused by floods is much less, and the effect of the tides and winds of the Rio de la Plata begins to be felt, but the general characteristics are the same as for the Rio Alto Uruguay.

The Rio Uruguay river levels.—From January to March, the river level at Concepcion del Uruguay is 1.2 to 1.8m. At Fabrica Colon, the level is 1.5m and at Concordia, 1.8 to 3m.

From April to June, the river level at Concepcion del Uruguay is 2.1m, Fabrica Colon, 2.7m, and at Concordia, 3.7 to 4.9m. From June to August, the river levels are slightly lower in all places.

From September to October, Concepcion del Uruguay is 2.4m, Fabrica Colon, 3m, and at Concordia 5.8m.

The greatest height recorded in recent years at Concepcion del Uruguay was 10.2m, caused by winds from SW blowing along the Uruguay Medio.

In the Rio Uruguay Inferior, the effect of the floods becomes less and the influence of the tides and winds of the Rio de la Plata is more apparent.

Except when the current in the river is very strong, the tide is felt as far upriver as Concepcion del Uruguay.

At all times, it is felt as far as Puerto de Fray Bentos, about 50 miles from the mouth of the river, though its range is only from 0.3 to 0.6m.

Fresh S or SE winds may raise the level as much as 3m; storms from these directions have caused the level to rise as much as 4.6m at the mouth of the **Rio Gualeguaychu** (33°05'S., 58°24'W.), located W of Fray Bentos.

From January to April, the level at the mouth of the Rio Gualeguaychu usually remains between 0.9 and 1.2m above zero. It is rarely lower than 0.5m above zero, and even then, soon rises again. From May to November, the level usually remains at about 2.1m above zero, the maximum and minimum levels being about 2.4m and 1.7m, respectively.

The following gives the relation between the corresponding rises in the level of the river above local datum at various places. Thus, if the rise at one place is known, then the corresponding rise at other places can be estimated. The levels thus obtained should be regarded as approximate only.

The Rio Uruguay—Comparative Levels

Fray Bentos	Concepc ion del Uruguay	Colon	Nueva	Escocia Concordia
1.5m	1.8m	2.1m	3.3m	4.5m
2.0m	3.2m	4.1m	6.8m	9.0m
2.5m	4.2m	5.1m	8.2m	0.7m
3.0m	4.6m	5.7m	8.5m	0.8m
3.5m	6.9m	8.5m	11.5m	14.2m

Gauges are at the various ports and dredged channels. These gauges are graduated in meters, indicating the height of the river level above local zero, which is the lowest level to which the river falls at each place.

Those at the dredged channels are also graduated in meters, indicating the least depth in the channel at the time.

The currents in the Rio Uruguay depend upon the tide and the height of the river level. Normally the rate does not exceed 1.75 to 2 knots, but it may reach 3.5 knots when the level is very high. The rate increases upriver. In the lower reaches, the current depends upon the tide and may run in either direction, its rate being between 0.5 and 1.75 knots.

The currents are also affected by the wind, especially in the lower reaches. Winds from SW may arrest or even change the direction of the current, especially when the river is low.

This action is increased by such winds causing a rise in the water level in the Rio de la Plata, and its effect is immediate and almost always felt.

Winds from the N, which lower the level in the Rio de la Plata, also affect the Rio Uruguay causing an increase in the rate of the current down river.

The Rio Uruguay Inferior

5.42 The Rio Uruguay Inferior is entered between **Punta Gorda** (33°55'S., 58°25'W.), a wooded bluff 26m high, and the N part of the delta of the Rio Parana 1.25 miles W. A white obelisk is on Punta Gorda.

From **Punta Chaparro** (33°49'S., 58°26'W.), 5 miles N of Punta Gorda, to Puerto de Fray Bentos, 45 miles further N, the river is 1.25 to 6 miles wide and the bottom is mud and fine sand. There are no islands, but there are extensive sand banks which dry at low river. Between them lies the main channel which is wide and deep and is buoyed throughout its length.

The Argentine or W bank is very low and covered with dense vegetation, but the Uruguayan or E bank is generally high and sandy with little vegetation.

Between Fray Bentos and **Puerto Concepcion del Uruguay** (32°29'S., 58°14'W.), the river divides into numerous branches, separated by islands which are subject to inundation and are covered with high and dense vegetation.

The "Pasos," or shallow passes, in this part of the river are few and of small extent, and are dredged from time to time.

They are well marked by lighted buoys and, since the bottom is mud or fine sand, present no danger to navigation.

Rada de Nueva Palmira comprises the reach of the Rio Uruguay lying W of the coast between Nueva Palmira and Punta Chaparro. Depths in it vary between 14m and 20m over a width of 0.5 to 0.8 miles, shoal water extending for a considerable distance off both banks.

Restinga de Palmira, a rocky ledge with a depth of 1m, is 0.2 mile off the E bank of the river; it is marked by a buoy close W and is covered by the red sector of the light on the S end of the wharf at Nuevo Palmira. The bottom of the roadstead W of this danger is rocky.

5.43 Puerto de Nueva Palmira (33°53'S., 58°25'W.) (World Port Index No. 13150) has three alongside berths. Meulle Ontur, the northernmost, consists of an L-shaped pier and a quay, with depths alongside of 4m. Muelle Norte, the center pier, is 300m long, with depths alongside of 6.4m. Muelle Sur, the S pier, is 230m long, with depths alongside of 7.3m.

After passing between Punta Chaparro and Punta Carbon, 1.25 miles SW, the river widens considerably and reaches a width of about 6 miles at **Arenal Grande** (33°41'S., 58°26'W.), a point on the E side 8.5 miles N.

Nuevo Palmira port can be contacted, as follows:

1. VHF: VHF channel 9
2. Telephone: 598-4-5446102
3. Facsimile: 598-4-5446014

Anchorage may be obtained by deep-draft vessels in Fondeadero del Arenal Grande, a pool extending N from the main channel close N of Arenal Grande where there is good holding ground. Depths in the anchorage range from 9.1 to 13.7m.

Vessels of shallow draft usually anchor near the E shore between Estancia Casa Blanca and the mouth of Arroyo La Agraciada.

For a distance of 7 miles N of the mouth of the **Rio San Salvador** (33°28'S., 58°24'W.), the E bank of the Rio Uruguay is formed by the delta of the Rio Negro. The Rio Negro is navigable by small craft, but only vessels registered in Uruguay are permitted to proceed to the interior ports of Uruguay.

Punta Laguna (33°04'S., 58°21'W.) is on the W bank of the Rio Uruguay. A channel, about 1 mile N of the point, leads into the mouth of the Rio Gualeguaychu and to the Argentine town of Puerto Gualeguaychu. Depths of 2.7m are available to the town. Permission to enter is obtained at the Coast Guard station at the river mouth.

5.44 Puerto Fray Bentos (33°07'S., 58°19'W.) (World Port Index No. 13160) is on the E bank of the Rio Uruguay, E of Punta Laguna and 126 miles from Buenos Aires. The port is a meat-packing center.

The berth for ocean-going vessels is 325m long. The outer side of the wharf, which has a berth 125m long and depths alongside of 7 to 7.9m, is used by ocean-going vessels. On the inner side of the wharf is 250m of berthing space for coasting vessels; there is a depth alongside of 4 to 6m.

Close W of this wharf is the railroad pier. The pier has a depth alongside of 7.9m and is used for the discharge of coal.

The Anglo Pier, the westernmost pier, is owned by a meat-packing company. It is 180m long at its head, with an alongside depth of 7.9m.

A bridge crosses the Rio Uruguay at Km 101.2, 3 miles above Fray Bentos. The navigable width is 201m between spans; the vertical clearance is 43m.

Between Fray Bentos and Concepcion del Uruguay, 47 miles upriver, there are numerous islands.

For the first 25 miles, as far as **Paso Roman** (32°49'S., 58°08'W.), the main channel, which is indicated on the chart, winds through these islands, but then passes between them and the E shore.

Anchorage, with good holding in a depth of 8.2m, is in mid-channel abreast the N pier at Nueva Berlin, which is on the E bank of the river 15 miles above Fray Bentos.

Anchorage can be obtained by small craft near the piers at the port or in the bay close W. Ocean-going vessels should anchor near the Argentine shore.

5.45 Puerto Concepcion del Uruguay (32°29'S., 58°14'W.) (World Port Index No. 13740), an Argentine port on the W bank of the Rio Uruguay, 173 miles above Buenos Aires, is a departmental capital and the center of a large grain-growing area.

Access to the port is by a channel 1,000m long, with a width of 60m wide and a depth of 6.1m; however, it is recommended that a maximum safe draft of 5.2m be used. The largest vessel to enter the port had a length of 220m.

There is 1,500m of quayage at the port, of which 1,100m, with a depth alongside of 5m, is for ocean-going vessels. The remaining 400m is for use by river craft. There are berths for tankers at the S end of the port.

Pilots are reported to be available here or board at Buenos Aires.

Anchorage is available in the roadstead clear of the main channel and preferably on its W side.

The Rio Uruguay Medio

5.46 The Rio Uruguay Medio is from 0.6 to 0.8 mile wide; the bottom is stones and sand, with isolated reefs in places. Both banks are low, particularly on the W or Argentine side, and there are numerous large islands. The channels in the narrowest reaches have a width of 80m and a sandy bottom.

The few reefs which exist are marked by light vessels during the low river season, but they are no longer necessary and are removed when the river reaches a level of 4m above datum.

The principal reefs are Restinga del Hervidero and Restinga de Coralito, at the passes of the same names, 12 and 2 miles, respectively, down river from **Puerto de Concordia** (31°24'S., 58°00'W.).

Puerto Fabrica Colon, 23 miles above Concepcion del Uruguay, can be reached at low river by vessels drawing up to 3.4m. From Fabrica Colon to Concordia and Salto, navigation is only possible for small vessels.

At low river, those drawing up to 2.7m can reach Concordia, and those drawing up to 1.8m can reach Salto, but by taking advantage of the frequent rises in the river level, vessels drawing up to 3m can reach both these ports.

Between Concepcion del Uruguay and Puerto Paysandu, 12 miles upriver, the channel is constricted by Paso Almiron Chico and Paso Almiron Grande located 5 and 6 miles, respectively, above the former port.

Both passes have a channel about 100m wide, with a depth of 3.4m.

5.47 **Paysandu** (32°19'S., 58°04'W.) (World Port Index No. 13170), on the E bank of the Rio Uruguay 12 miles above Concepcion del Uruguay, is an industrial town and the center of a cattle-raising district.

Navigation to Paysandu is controlled by the depth in the passes leading to it. Because river conditions vary seasonably, agents should be consulted beforehand regarding available draft at anytime.

There is a grain elevator berth, with an alongside depth of 6.1m and a length of 100m, for ocean-going vessels.

A coastal berth is also available, with a length of 300m and an alongside depth of 3.4m.

Rada de Paysandu, which has depths of 7 to 21m in the fairway, extends across the whole width of the main branch of the river abreast the port, but a bank extends about 183m from the W side at its N end.

Small craft can shelter from S gales in a small bay located between the wharves and the railway sidings close to the power station.

Between Paysandu and Puerto Colon, 6 miles upriver, the least depth is in Paso San Francisco, which lies between Isla San Francisco and the W bank a short distance below the latter port. This pass has a channel 80m wide with a minimum depth of 3m; the bottom is sand and stones.

A bridge crosses the Rio Uruguay at Km 209.5, about 3 miles N of Paysandu. The vertical clearance is 31m, with a width of 120m between the bridge piers. The navigable channel is marked by lights.

A power cable with a vertical clearance of 26m crosses the river at the S end of Paysandu.

5.48 **Colon** (32°13'S., 58°08'W.) (World Port Index No. 13730), on the W bank of the Rio Uruguay about 5 miles above Paysandu, has a three-sectioned wharf. Each section is 53m long and has a different height in order to facilitate working cargo at different river stages. There used to be a southernmost section with depths of 3.7m alongside, however, it ha beens reported (2013) this wharf has been removed.

Puerto Fabrica Colon, 5 miles above Colon and on the W bank of the Rio Uruguay, is a private port serving a large meat-packing plant.

The S wharf has a berthing length of 24m, with depths of 4.3 to 4.6m alongside.

The central wharf, which is the only one used by ocean-going vessels, is 40m long and has depths of 8.2 to 8.5m alongside.

The N wharf has a berthing depth of 10m and depths of 6.7 to 7m alongside.

Between Fabrica Colon and Puerto Concordia, 57 miles upriver, the minimum depth in the passes is 2.7m. The worst reach is at Paso Coralito, 2 miles below Concordia, where the whole river is obstructed by a series of reefs.

There is a buoyed channel through these reefs which can safely be used by day, but no vessel should attempt it by night without local knowledge.

When the river level is 5m above datum at Concordia, vessels drawing up to 3m can proceed through this pass by keeping close to the vegetation on the E bank, where the current is not felt so strongly.

Between Concordia and Puerto de Salto, 1.5 miles upriver, the channel is obstructed by a reef which extends from the W bank leaving only Paso de la Cabadalla, a narrow channel between it and the E bank. Local knowledge is essential for this channel.

Puerto Nuevo Escolia and Puerto Yerua are small ports on the W bank of the Rio Uruguay, 37 and 45 miles, respectively, above Fabrica Colon.

The Rio Alto Uruguay

5.49 **Concordia** (31°24'S., 58°02'W.), on the W bank of the Rio Uruguay, is the center of a stock-raising and agricultural region. The passenger wharf is 50m long, with a depth of 2.7m alongside. There is a 181m long wharf, with a depth of 2.1m alongside, for use by river craft.

Salto (31°23'S., 57°58'W.), the second-largest city in Uruguay, is an agricultural and stock raising center. The wharf here, 140m long, has depths of 3 to 4.3m alongside.

Navigation above Salto is by small craft only.

The Rio Parana

5.50 The Rio Parana discharges into the W side of the head of the Rio de la Plata by many mouths between the parallels of 33°53'S, and 34°27'S. Of the branches which form the delta, only the Rio Parana de las Palmas, the Rio Parana Guazu, the

Rio Sauce, and the Rio Parana Bravo are of any importance to ocean-going vessels. The delta extends to the junction of the Rio Parana de las Palmas and the Rio Parana Guazu, about 67 miles above the mouth of the former branch.

Tides—Currents.—The level of the Rio Parana undergoes a regular annual change caused by the periodic rainfall in the tropical regions of the river basin. Because of this, the level is highest in March and lowest in September.

Rises in level are also caused by the irregular rains in the more southerly regions of the river basin. These cause a rise in level from May to July and also in November and December. In general, the river is lowest in September, but it may remain low until December, or in exceptional years, until January.

In the lower reaches of the river, the level is affected by changes in level in the Rio de la Plata, the tides of which may be felt, at low river, as far as Rosario.

In the navigable part of the river, the rate of the current is generally about 2 knots at low river and 3 knots at high river, but these rates are frequently exceeded in the narrow parts.

In the Rio Parana Medio, the maximum rate of the current is 4.5 knots and the minimum rate is about 2 knots.

Depths—Limitations.—From its mouth to **Bella Vista** (32°41'S., 60°44'W.), the river has a minimum depth of 7.6m which is maintained by dredging. From Bella Vista to Parana, the limit of navigation for ocean-going vessels, the depths are similarly maintained at not less than 5.8m.

The depths given above, and elsewhere in the description of the river, are subject to continual change and must be regarded as approximate.

The Argentine Ministry of Public Works produces "Boletin Fluvial," a weekly publication which gives the depths in the main and secondary channels of the Rio Parana. Information regarding depths is also broadcast from certain Argentine radio stations.

Aspect.—The Rio Parana is marked by buoys in accordance with the Argentine system as far as Posadas, with most of the buoys below Corrientes being lighted. There are also leading beacons, lights, and tide gauges.

Pilotage.— Pilotage is compulsory for all ocean-going vessels. Pilots are obtained at Buenos Aires and at Puerto de La Plata. These pilots only conduct vessels as far as Santa Fe.

Regulations.—The regulations for vessels wishing to pass a dredge are the same as those for the dredged channels to Buenos Aires and are described in paragraph 5.36.

Caution.—Detached clumps of grass and weeds, many of considerable size, are continually floating down the river and are liable to foul the lighted buoys, which may then be capsized and their lights extinguished.

It was reported that many buoys have been destroyed by floating debris carried by flood waters and that depths in the river have been reduced by considerable silting.

Vessels lying at anchor in the river are recommended to keep their hawse pipes covered as a precaution against snakes crawling up the cables from these clumps when foul of the cable.

5.51 The **Rio Lujan** (34°26'S., 58°31'W.), the S branch of the delta of the Rio Parana, is approached from Buenos Aires via Canal Costanero, which has been described previously in paragraph 5.40. It is connected to the Rio Parana de las Palmas to the N by various channels navigable by small craft with local knowledge.

Puerto San Fernando and Puerto Tigre, on the Rio Lujan, are small-craft ports with boat building and repair facilities.

The **Rio Parana de las Palmas** (34°20'S., 58°27'W.) is the southernmost principal entrance to the Rio Parana.

Canal Emilio Mitre, the access to the Rio Parana de las Palmas for ocean-going vessels, is 140m wide and was dredged (1997) to a depth of 9.7m. This dredged channel leads from Km 12 of Canalde Acceso al Buenos Aires, across the W side of Playa Honda and into the mouth of the river. The channel is well marked.

5.52 Puerto Campana (34°09'S., 58°58'W.) (World Port Index No. 13710) is on the SW bank of the Rio Parana de las Palmas and 25 miles above that river's mouth.

The approach to the river is not usually undertaken at night, and at certain times of the year there is fog almost daily. The navigable part of the channel at the port is wide and deep and ships can maneuver easily.

Tankers up to 25,000 dwt and 200m long visit the port regularly. There are eight berths in the port having depths in fresh water 6.7 to 9m alongside. A general cargo berth is 116m long with depths of 6m alongside.

Berth H takes tankers with a draft of up to 5.8m.

Berth E is for chemical tankers with a draft of up to 8.2m.

Berth A is used by tankers with a draft of up to 6m for tank cleaning.

Berth C is for vessels up to 250m long, in a depth of 12m alongside.

Berth G is for vessels up to 100m long, in a depth of 5.5m alongside.

About 1.2 miles upstream from Campana is a new wharf, which is 185m long, with a depth of 10.6m alongside. The wharf is used for the discharge of iron ore.

Anchorage.—Ships awaiting a berth usually anchor about 1 mile downstream from the tanker berths, in depths of 12 to 21m, mud and sand.

5.53 Puerto Zarate (34°05'S., 59°02'W.) (World Port Index No. 13700), 5 miles above Puerto Campana, exports grain and frozen meat. It was reported that a new container terminal has been built at this site (2002).

The navigable channel at the port is wide and deep, with a maximum depth of 8.2m.

Berths can provide depths up to 10m by fendering off a slight distance.

Wharves used by the Argentine Navy should not be approached closer than 50m without permission.

A railroad bridge, with a vertical clearance of 49m, crosses the river at Zarate.

Puerto Atucha (33°58'S., 59°16'W.) lies 15 miles upriver from Puerto Zarate and consists of a wharf, 33m long, with a depth alongside of 12.2m, which serves an nuclear power plant.

Zanja Mercadel, a channel 3.5 miles long and with a depth of 4m, connects the Rio Parana de las Palmas with the Rio Parana Guazu and begins about 26 miles above Zarate.

5.54 The **Rio Parana Mini** (34°14'S., 58°23'W.), about 6 miles NE of the entrance to the Rio Parana de las Palmas, has a depth of 1m over the bar.

The **Rio Barca Grande** (34°10'S., 58°23'W.), 5 miles farther NNE, has a depth of 4m over the bar.

Neither is marked and both lead into the Rio Parana Guazu 11 miles above its mouth. Both are used only by shallow-draft vessels.

The **Rio Parana Guazu** (34°01'S., 58°25'W.), about 19 miles NNW of the entrance to the Rio Barca Grande, is 58 miles long and extends to the Rio Parana Bajo at Km 230. This passage is narrow and should not be used by vessels drawing more than 5.2m.

A bridge, with a vertical clearance of 50m, spans the river 1 mile SE of the junction of the Rio Parana Guazu and Pasaje Talarera. Pontoons protect the upstream side of the bridge supports. The navigable width between the pontoons is 240m.

The **Rio Sauce** (33°57'S., 58°27'W.), 4.5 miles NNW of the mouth of the Rio Parana Guazu, is 7 miles long and joins Rio Parana. This branch usually has a depth of 6m and the minimum width is about 91m.

The **Rio Parana Bravo** (33°54'S., 58°27'W.), 3 miles N of the Rio Sauce and to the W of Nueva Palmira, is 17.5 miles long and usually has depth of 10.4m.

It is the entrance most used by ocean-going vessels proceeding to the upper reaches of the Rio Parana.

5.55 Puerto Ibicuy (33°45'S., 59°11'W.) (World Port Index No. 13690) is on the E bank of the Rio Parana, about 52 miles above the mouth of the Rio Parana Guaza.

There is a tanker berth with 7.6m alongside, and other berths with depths of 5.5m alongside.

The Rio Parana Bajo is the section of the Rio Parana which extends from the junction of the Rio Parana de las Palmas with the **Rio Parana Guazu** (33°44'S., 59°11'W.) to a point about 20 miles above Puerto Rosario, 121 miles upriver.

It has least depths in the passes at low river of 7.6m which are maintained by dredging. Pilotage is compulsory. River pilots berth the vessels.

5.56 Puerto San Pedro (33°35'S., 59°49'W.) (World Port Index No. 13670), 23 miles up the Rio Parana Bajo on the SW side of the river, is a cereal exporting port.

Vessels with drafts up to 7.3m can be accommodated at two wharfs, each with a berth 75m long at its head.

It is reported that on the S side of the S wharf there is a berth 218m long and dredged to 9m.

Puerto Obligato, a former grain port no longer in use, is 11 miles above Puerto San Pedro.

5.57 Puerto Ramallo (33°29'S., 60°01'W.) (World Port Index No. 13660), on the SW river bank 14 miles above Puerto Obligato, is a grain port. The maximum permissible draft for vessels entering the port is 5.5m with a length of 150m.

The grain mole can accommodate one vessel with a maximum length of 145m. Muelle Nacional, 100m long with 3.7m alongside, handles sand barges and other river craft. The tanker berth has a depth of 7.5m alongside.Access is gained through the general channel which has a depth of 7.3m.

Water and provisions are available, and medical assistance can be had.

A column, illuminated by mercury vapor lights, is on the waterfront in the middle of the port.

The currents in the vicinity of the port are strong, and ships alongside may roll even in light winds. There are mooring buoys off the wharves to hold vessels off because of these currents and strong mooring lines should be used.

An anchorage marked at its corners is in midstream off the port.

Puerto San Nicola

Islands again divide the channel between Puerto Ramillo and Puerto San Nicolas, 11 miles upriver.

5.58 Puerto San Nicola (33°20'S., 60°14'W.) (World Port Index No. 13650), on the SW bank of the river 11 miles above Puerto Ramallo, is the port of an industrial town. The port is entered by an access channel. The maximum depth of the channel is 9.4m.

The port is divided into two parts. Embarcaderos, the oldest part of the port, lies abreast the city.

Puerto Nuevo, 1.5 miles downstream from the city, consists of a concrete mole 537m long and a grain berth that is 220m long. A 200m long coal discharge pier is located here has a depth of 7m alongside.

Puerto Buitagro is about 2 miles downstream from Puerto Nuevo. The general mole is 320m long and handles general cargo. The Somisa Wharf, used by lighters discharging coal and iron ore, consists of four dolphin wharves forming a continuous structure 100m long.

The bulk wharf, close S of the Somisa Wharf, is 680m long with a depth alongside of 7.9m. The wharf can handle four vessels of up to 22,000 dwt.

In the event of high winds, tugs can be ordered from Puerto Villa Constitucion.

An anchorage is about 3 miles down river from the port.

5.59 Puerto Villa Constitucion (33°14'S., 60°20'W.) (World Port Index No. 13640) is on the SW bank of the river, 9

miles above Puerto San Nicolas. The port is entered by an access channel. The maximum depth of the channel is 7.3m.

The Elevator Terminal, a pier projecting ESE from the shore, can berth two grain vessels simultaneously in a depth of 8.2m.

Puerto Acevedo, about 1 mile S of the port, has a 111m long mole, with a depth of 8.8m alongside, serving a large steel mill. The PASE wharf, serving an electric smelting plant, is 170m long and accommodates ore carriers up to 35,000 dwt.

A conspicuous water tower, marked by obstruction lights, lies close S of the steel mill wharf.

Anchorage for vessels waiting to berth is at Puerto Acevado, 1 mile SE of the harbor. Towage is compulsory for all movements within the harbor.

From 7 to 18 miles above Puerto Villa Constitucion, the river widens and is divided by many islands. The main channel passes between these islands and the SW bank of the river.

5.60 Puerto Rosario (32°57'S., 60°38'W.) (World Port Index No. 13630.), on the SW bank of the river, is 26 miles above Villa Constitucion. It is the principal port on the river and the second most important port in Argentina. Nearly half of the cereals in the country are shipped from here.

The port is used for grain, vegetable oils, fuel, timber, meats, etc., and there is specialized cargo-handling equipment. The channel of the river, within the limits of the port, are dredged to a minimum of 7.6m. There are two tanker berths, each 152m long, with a depth of 8.2m alongside.

The main channel in the river between Puerto Rosario and Puerto San Lorenzo, 11 miles upriver, is kept dredged to 7.6m. By way of the Rio Parana de las Palmas and Canal Emilio Mitre (paragraph 5.51), vessels can sail from port with a draft of 9m.

Puerto San Lorenzo

5.61 Puerto San Lorenzo (32°45'S., 60°44'W.) (World Port Index No. 13610) was originally a port for the export of grain only, but its trade now includes chemical products, vegetable oils, and petroleum products. It is situated on the right bank of the Rio Parana, about 16 miles N of Rosario, and 238 miles of river passage from Buenos Aires.

The port has several wharves equipped for handling grain, and four tanker berths, all of which can accommodate ocean-going vessels.

Pilotage is compulsory for all vessels.

There is an anchorage, marked by buoys, close downriver from the port, where vessels can lie while waiting to berth alongside.

5.62 Puerto San Martin (32°43'S., 60°44'W.) (World Port Index No. 13600), close upriver from San Lorenzo, has wharves for handling grain, liquid gas, vegetable oils, and general cargo. All can accommodate ocean-going vessels. The port is approached through a 75m wide channel, with a depth of 6.1m.

The Rio Parana Bajo joins the Rio Parana Medio at a point about 6 miles above Puerto San Martin.

5.63 Puerto Diamante (32°04'S., 60°39'W.) (World Port Index No. 13580.) is on the E bank of the river about 43 miles above Puerto San Martin.

Vessels drawing up to 7.6m can use the port, but the controlling depth is on the bar at Isla de los Pajaros, 28 miles down river and is subject to variation. A grain-loading wharf at the port has a depth of 7.5m alongside.

5.64 Puerto Santa Fe (31°39'S., 60°42'W.) (World Port Index No. 13560), 90 miles above Puerto Rosario, is in a rich agricultural region and exports cereals, cotton, minerals, and sugar.

Depths—Limitations.—Dock 1 has stone wharves, with 564m of frontage on the E side and 672m of frontage on the W side. It is 120m wide, has a depth of 7.3m, and can accommodate four vessels. Grain can be handled at a 240m long berth at the S side of the W end of the dock.

Dock No. 2, parallel to Dock No. 1, is no longer in use by vessels. It is also 120m wide and has a depth of 6.7m.

Derivation Channel, extending W of Dock No. 2, is 2,178m long and is used for handling inflammables.

The Coasting Wharf, 810m long with a depth of 7.3m alongside, is a continuation of the W side of Dock No. 1. It is used mainly by river craft.

Pilotage.—A harbor pilot takes over from the river pilot at the anchorage. The pilot arrives with the tug or tugs, which assist in berthing, the use of which is compulsory.

Canal Acceso, giving access to the port, is an artificial channel 40m wide and dredged to a depth of 5.5m. Ocean-going vessels may not pass any other vessel in the channel, but river craft and other small vessels may pass each other.

The maximum speed in the entrance channel is 5 knots; however, the pilot can advise on other speeds. Movement by night is possible, but usually pilots will not take a vessel out after 1500. During periods of fog, entering or departing is prohibited without special permission.

Regulations.—Within the port, passenger vessels are limited to a speed of 4.5 knots; other vessels are limited to a speed of 3.5 knots.

Signals.—Traffic through Canal Acceso is regulated by the following signals, which are displayed from signal stations at both ends of the channel by day and from the inner station only by night:

1. Free entry for ocean-going vessels is signified by a white ball by day and white flashes at night.
2. Free exit for ocean-going vessels is signified by a red cone by day and red flashes at night.
3. Free entry and exit for river craft is signified by a green cone point up by day and green flashes by night.
4. Entry and exit for river craft with precautions is signified by a yellow cone point down by day and red and green flashes by night.

Anchorage.—Vessels waiting to enter the port may anchor S of the outer entrance to Canal Acceso near Km 483, where the channel is wide enough to permit several vessels to lie at anchor and still leave a channel wide enough for navigation.

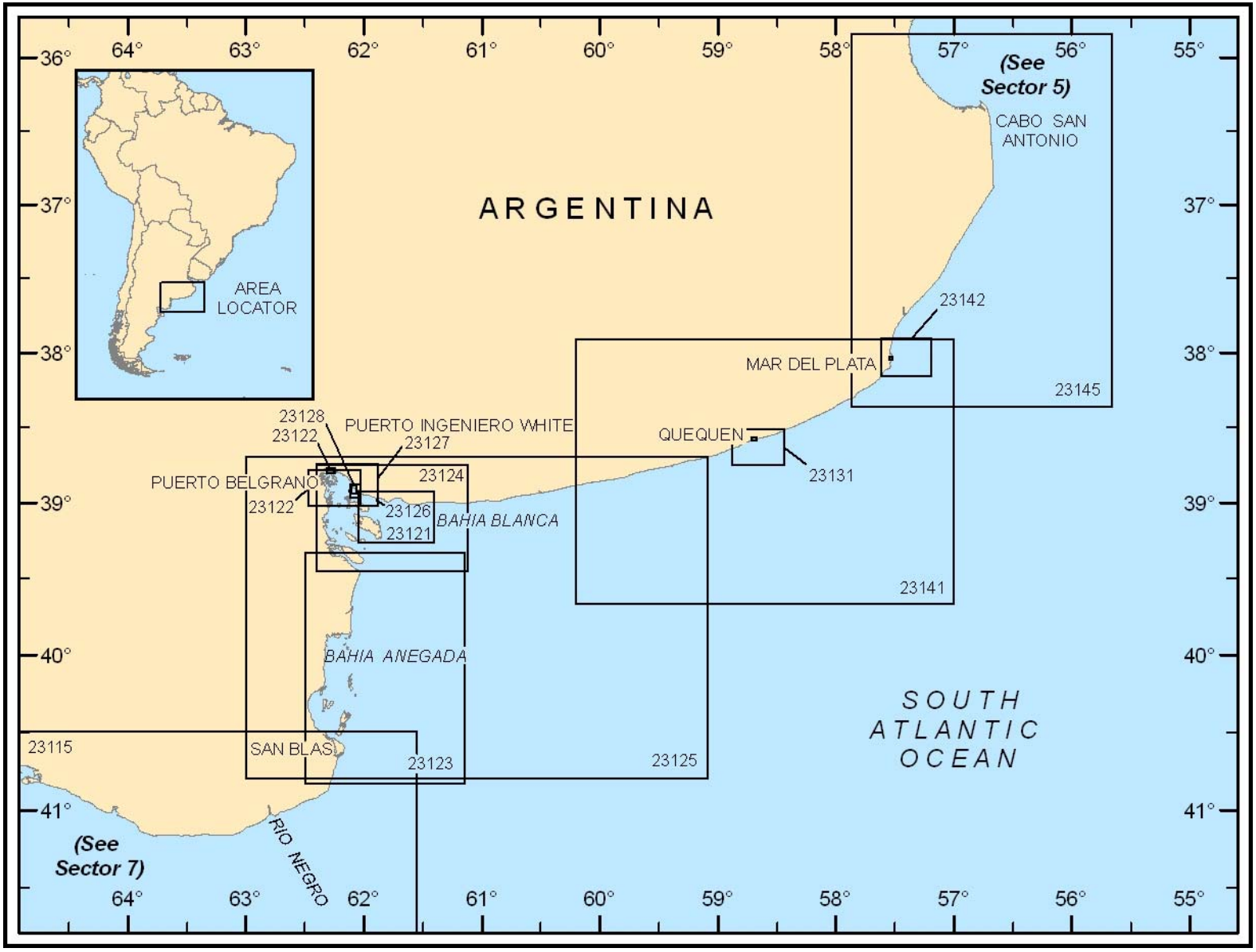
5.65 Puerto Parana (31°43'S., 60°32'W.) (World Port Index No. 13570) is obstructed by a bar with a minimum depth of 3.9m and is therefore only accessible to ocean-going vessels at periods of very high river. In the port there are wharves with depths up to 4.6m alongside.

Puerto Corrientes (27°29'S., 58°50'W.) (World Port Index No. 13370), lies about 328 miles above Puerto Parana.

About 18 miles above Puerto Corrientes, the river forks to become the Rio Paraguay and the Rio Alto Parana.

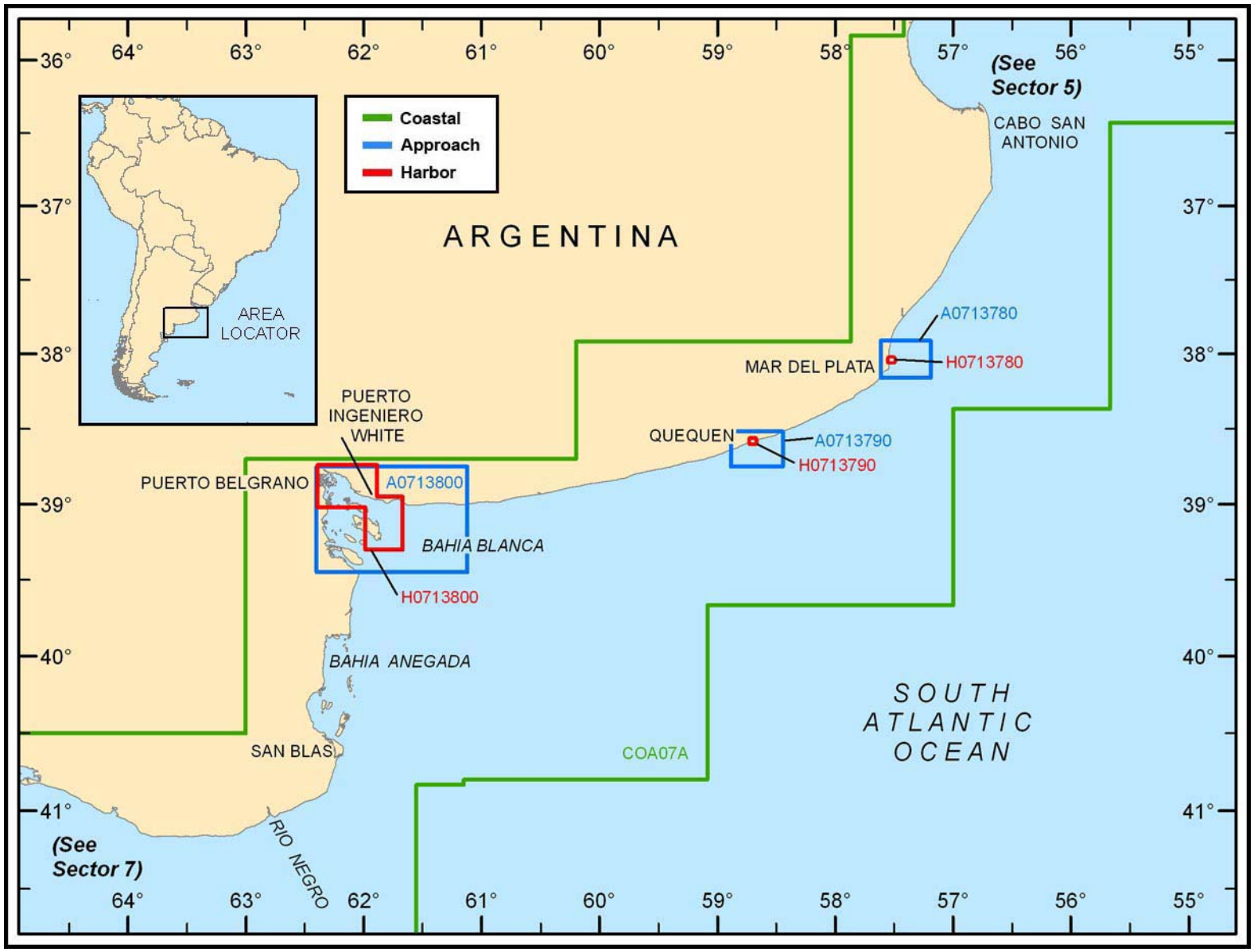
Puerto de Asuncion (25°16'S., 57°41'W.) (World Port Index No. 13250) is the capital of Paraguay.

There are some minor river ports along the Rio Alto Parana as far as the **Rapides de Apipe** (27°29'S., 56°43'W.), which are about 141 miles above Puerto Corrientes and are the limit of navigation for small vessels and tows.



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

SECTOR **6** — CHART INFORMATION



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SECTOR 6 — DNC LIBRARY INFORMATION

SECTOR 6

COAST OF ARGENTINA—CABO SAN ANTONIO TO THE RIO NEGRO

Plan.—This sector describes the coast of Argentina from **Cabo San Antonio** (36°20'S., 56°45'W.) as it trends S, then W to Bahia Blanca. The ports of Mar del Plata and Puerto Quequen, which are on this section of coast, are described.

Next described are El Rincon and Bahia Blanca, with its collective ports of Puerto Rosales, Puerto Belgrano, Ingeniero White, Puerto Nacional, and Puerto Galvan.

Finally, the coast from Bahia Blanca is described as it trends S to Punta Rasa, then SW to the **Rio Negro** (41°02'S., 62°47'W.). Bahia Anegada, Bahia Union, and the Rio Negro are ports in this last section.

General Remarks

6.1 Winds—Weather.—The wind direction along this section of Argentine coast differs from the usual NW and SW one might expect at these latitudes, in that almost 50 per cent of the winds are W. The average velocity away from shore is 15 to 17 knots, with about 11 knots near the coast. Wind velocities of 31 knots or more occur on an average of 57 days a year.

There is a mean annual temperature at Puerto Belgrano of 16°C. Mean monthly temperatures at the same place are 24°C in January and 8°C in June. The port has had a maximum of 43°C in February and 38°C or higher in other months from November to March. Extreme low temperatures of -8°C have occurred in June and August.

South of the Rio de la Plata, there are no well-marked wet and dry seasons so characteristic of tropical South America, but there are some irregular modifications in rainfall amounts at different periods.

At Puerto Belgrano, for example, the warm half of the year receives about twice as much rain as the cool half.

The average annual rainfall is 510mm. The average number of days of rainfall is 53 annually, with 3 days each in winter months and 4 to 6 days in other months.

The highest percentages of relative humidity occur in the colder months. Saturation is highest around sunrise and lowest about 1400 to 1500. The mean annual relative humidity is about 60 per cent at Puerto Belgno, with the range being from 49 per cent in December to 74 per cent in June.

Puerto Belgrano has an annual average of 24 days with fog, with 5 days in June and none in April.

The annual average number of thunderstorms at Puerto Belgrano is 16, ranging from three in December to a scattered few in June.

Tides—Currents.—Along the almost unbroken coast extending from **Cabo Corrientes** (38°01'S., 57°32'W.) to Bahia Blanca, 215 miles W, the tidal currents are very weak, though the range of the tide is about 3m.

Close inshore, between the dangerous banks of Bahia Blanca and Bahia San Blas, 100 miles S, the tidal currents run N and S at rates of 1 to 4 knots according to the wind and the age of the moon.

Between the latter banks and the mouth of the Rio Negro, 35 miles SW, the tidal currents are semidiurnal and regular, if not affected by the wind, and attain rates of 1 to 5 knots; these strong and dangerous tidal currents are scarcely felt 15 miles offshore.

Between Bahia San Blas and the entrance to Golfo San Matias, the tidal currents run NW with a rising tide and ESE with a failing tide at rates of 2 to 3 knots. Vessels crossing the mouth of the gulf should expect to experience a lateral drift and should exercise caution when approaching the land.

Within the gulf, the tidal currents are generally weak, although the tidal range is from 4.6 to 9.1m.

Between **Punta Rasa** (40°52'S., 62°19'W.) and Punta San Andres, 120 miles SSW, there is a strong N current before and during S winds. Its rate varies from 1 to 3 knots. During N winds, there is a weaker S current.

Aspect.—The SW part of the coast, which forms Golfo San Matias, is bolder and there are heights of up to 180m within 5 miles of the coast. Sierras de San Antonio, which lie 15 miles inland from the head of the gulf, rise to a height of over 500m.

This stretch of the coast includes the ports of Mar del Plata, Quequen, and the group of ports which comprise Bahia Blanca, all of which are of medium size, and the minor ports of Puerto San Blas, Rio Negro, and Puerto San Antonio, which are used only by coasting vessels and fishing craft.

Caution.—Firing danger areas exist in the vicinity of Puerto Belgrano. There is a submarine exercise area off Mar del Plata.

The following offshore dangers exist off this section of coast:

1. Depths of 12m lying 18 miles E and 15 miles ESE, respectively, from Cabo San Antonio.
2. Depths of less than 18m extending up to 20 miles offshore between Cabo San Antonio and **Mar del Plata** (38°02'S., 57°32'W.)
3. Depths of less than 9m extending up to 7 miles offshore between Punta Medanos and Mar del Plata.

Cabo San Antonio to Mar del Plata

6.2 From the NW extremity of **Cabo San Antonio** (36°20'S., 56°45'W.), which is marked by a light, to Punta Medanos, 36 miles S, the coast consists of a low light-colored sandy beach, backed by a chain of dunes covered with vegetation, which increase in height to 20 to 30m near the latter point.

A hill, with village, is 11 miles N of **Punta Medanos** (36°53'S., 56°40'W.) and is visible from 15 miles at sea.

A hill, which is a good radar target, lies 26 miles SW of Punta Medanos and a conspicuous 45m high hill, which is conical, is located 13 miles SW of Punta Medanos.

Costa Atlantida Argentina is the local name for the coast between Cabo San Antonio and Balneario Mar Chiquita, about 92 miles to the SSW. Along it there are the hotels and buildings

Punta Medanos

of a series of seaside resorts, between which are scattered clumps of scrub.

In clear weather, this coast can be seen at 8 to 10 miles. At Balnearios Santa Teresita and Mar del Tuyu, 14.5 and 17 miles S, respectively, from San Antonio Light and at Balnearios La Lucila and Mar de Ajo, 13 and 11 miles N, respectively, of Punta Medanos, there are fishing piers from 120 to 190m long.

From 5 to 10 miles ESE of the NW extremity of Cabo San Antonio, it was found during the course of survey that there was an alteration in the nature of the bottom in two different years, though the depths remained unaltered.

This change was attributed to soft oozy mud from **Banco del Tuyu** (36°16'S., 57°49'W.).

Punta Medanos (36°53'S., 56°40'W.), marked by a light, is surrounded by shoals on which two ridges stand out. A range of hills, about 30 to 60m high, trends NW from the point.

Bancos Medanos, with depths of less than 11m, extend up to 10 miles offshore in the vicinity of Punta Medanos.

The inner ridges are marked by discolored water and break with onshore winds. The outer ridges break in heavy weather.

There are channels between the ridges which can be used by small craft with local knowledge in calm weather.

Querandi Light

A depth of 6.8m was reported on the bank, 6.75 miles SE of Punta Medanos.

Querandi Light (37°28'S., 57°07'W.) is 41 miles SW of Punta Medanos.

Anchorage.—If necessary, a vessel can anchor anywhere off this coast in a convenient depth. The holding ground is generally good, with a bottom of fine sand and shells, but there is no shelter from the strongest winds.

There is a good anchorage for small vessels within Bancos Medanos.

The best berth is with Punta Medanos Light bearing 213°, distant about 2 miles, and about 0.7 miles offshore, in a depth of 7.6m. This anchorage is sheltered by the coast from winds from between the SSW and NNW, and by Bancos Medanos from winds between the ENE and SSW, but during winds from between the latter directions, there is much swell.

If proceeding to this anchorage, use the channel between the inner ridge and the coast. The N approach is preferable. If approaching from N, steer so as to keep Punta Medanos Light bearing 213°, and if approaching from S, so as to keep it bearing between 300° and 000°.

Caution.—Depths within 14 miles of the coast between Punta Medanos and Mar del Plata are very irregular; depths of less than 11m extend up to 7.5 miles offshore.

Deep-draft vessels should not approach within 18 miles off this coast; vessels drawing more than 6m should not approach within 8 miles.

6.3 Laguna Mar Chiquita (37°44'S., 57°24'W.), entered about 21 miles SW of Querandi Light, is marked by a light 2 miles to the SW. A radio mast, 1.5 miles NE of the entrance, is prominent. The outflow from the lagoon sometimes discolors the sea 7 miles seaward of the entrance.

From Mar Chiquita to Cabo Corrientes, 15 miles SSW, the coast loses its sandy nature and rises to low cliffs 6 to 9m high, which are broken by the mouths of a few streams.

Much of the land within this coast is covered by groups of trees surrounding the ranches. A conspicuous clump of trees is 2 miles SW of Mar Chiquita. From seaward, it resembles a large cone with a very wide base. The cone appears to be divided into two parts when seen from the E.

A good mark for vessels approaching from the N is a white water tower standing on a cliff about 8 miles SSW of Mar Chiquita. There is a radio mast near the tower.

Anchorage may be obtained anywhere, the holding ground being generally good. Close inshore, especially within 10 miles of Cabo Corrientes. The bottom is tufa, covered with a layer of fine sand and shells. Landing is only possible when the wind is offshore and there is no swell. There is no anchorage that would offer shelter when the most violent winds blow, that is, those from the NNE to SW.

Punta Iglesia (38°00'S., 57°32'W.), 1.25 miles NW of Cabo Corrientes, is formed by a rocky cliff about 9m high.

Between this point and Punta Gruta, 0.75 mile SSE, is Rambla Bristol, a bay with a smooth sandy beach in which there are some piers. Punta Gruta is rocky, about 15m high, and steep-to. Between it and Cabo Corrientes is a bay with a beach backed by sheer cliffs up to about 50m high.

Cabo Corrientes (38°01'S., 57°32'W.), marked by a light, rises to an elevation of 44m, and is the SE extremity of a range extending to the W. These hills decrease gradually in height toward the sea where they end in a rocky coast, which is clear of dangers.

Between Cabo Corrientes and Punta Cantera, about 3.7 miles to the S, the coast forms a bay, the N part of which is occupied by Puerto de Mar del Plata, described below. Within it are some isolated hillocks from 30 to 50m high. Rocks, awash at LW, extend 0.5 mile E from Punta Cantera.

6.4 Mar del Plata (38°02'S., 57°32'W.) (World Port Index No. 13780) is primarily a resort town, but its port also has a cereal and frozen meat export trade and timber is imported. The commercial port occupies the SW part of the area; the remaining area toward the N is reserved for the Argentina Navy and a fishing fleet center.

The Traffic Control and Safety System (CONTRASE) is in effect for Mar del Plata and is mandatory for all foreign vessels:

1. When 30 miles off, report the vessel's name, flag, call sign, length, breadth, draft, speed, port of departure, destination, and navigational plan, as well as the vessel's ETA at the points listed below:
   a. When 3 miles off the end of the S breakwater.
   b. At the waiting area.
   c. Inside the Antepuerto.
2. If anchoring outside the port, report the vessel's name, flag, and call sign with the time and location of anchoring.
3. When 3 miles off the end of the S breakwater, report with ETA at destination and ask "canal libre?" (channel clear?).
4. At the waiting area, report with ETA.
5. Inside of the Antepuerto, report "canal liberado" (channel cleared).
6. Before shifting anchorage, berth, or moving within the port, obtain permission giving the vessel's name, flag, call sign, and destination. Permission normally remains valid for 15 minutes.
7. Before leaving port, obtain permission, giving the vessel's name, flag, call sign, length, breadth, draft, speed, destination, course, type of cargo, and whether there is a doctor on board. Permission remains valid for 15 minutes.
8. On departure, the following must be done:
   a. In the Antepuerto, ask "canal libre?" (channel clear?).
   b. In the waiting area, report "canal liberado" (channel cleared).
   c. When 30 miles off, report the vessel's name, flag, and call sign.

Tides—Currents.—Within 10 miles of Mar del Plata, the tidal currents run N and S, changing direction 3 hours after low and high water by the shore. Their velocities are about 0.7 knot. During strong SW winds, a current sets NE at a rate of more than 1 knot. The average tidal range is about 0.9m.

Depths—Limitations.—The entrance has a depth of 9.1m, but this is subject to continual change. When calculating the depth in the entrance, an allowance of 0.5 to 1m should be made for the swell.

The N and S jetties constitute the shelter structure inside which, piers, bounded by the walls of wharves, have been built. The N jetty, which is straight, is oriented on a bearing of 127° and is 1,100m long; the S jetty is 2,750m long, pushing out toward the NE, extending beyond the N jetty and marking the entrance to the port.

With the rising tide and winds from NNE, one can observe powerful breakers on the S jetty.

Muelle Escollera Norte, a quay on the inner side of the N breakwater, with a berthing length of 220m and depths of 9.1m alongside, is used occasionally by cruise liners.

Vessels using this berth must moor bow to the S, laying out their starboard anchor.

A stranded wreck lies alongside the NE end of Escollera Norte.

The Commercial Basin (Ultramar Basin) has a length of 300m along its N face and 470m along its S face. Depths in the basin range from 5.5 to 8m.

The coastal basin, used by coasting vessels, lies S of the Commercial Basin and has depths up to 5.2m.

The head of the pier, between the coastal basin and commercial basin, has a length of 178m and a depth of 9m alongside.

The tanker pier, located E of the coastal basin, extends 0.14 mile NNE from the S breakwater and has a depth alongside of 6.7m. A small quay with two dolphins stands just N for the discharge of butane and propane to tanks inland.

Aspect.—The port is enclosed by two breakwaters, each marked at its end by a light.

stands near the coast about 3 miles NNW of Cabo Corrientes.

Mar del Plata

A conspicuous tower, 89m high, stands 1.5 miles S of the hospital.

A prominent gray and white building, which attains an elevation of 116m, stands 0.3 mile SSE of the tower. A conspicuous white hotel, situated about 0.7 mile SW of the light on Punta Mogotes (see paragraph 6.5), is a good mark for vessels approaching from the S.

Pilotage.—Pilotage is compulsory. Pilots board 2 miles E of Cape Corrientes. Vessels can enter or leave any time day or night. Vessels over 2,000 gt must use two tugs. Pilots should be requested through the agent 12 hours in advance.

Contact Information.—Mar del Plata pilots can be contacted, as follows:

1. Telephone: 54-11-46543164
   54-226-2420482
2. E-mail: gitan@copetel.com.ar
   gzimmer@teletel.com

Anchorage.—It is safer to lie outside in 10.9 to 12.8m if awaiting a berth in the anteport. The best anchorage bears 191° on the S breakwater light and 313° on Cape Corrientes Buoy, or even farther out.

The holding ground is good and winds can be ridden out, even with a swell.

It has been reported that the continuous SE swell during the summer months makes anchoring outside the breakwaters very dangerous.

Caution.—Care must be taken to avoid the bank extending 0.2 mile N of the S breakwater light since it is subject to silting.

Due to silting, it has been reported (2007) that vessels should use the entrance range line, in line bearing 217.5°, as a SW safety bearing. A semicanal is reported established above the NW side of the entrance range line, with a minimum depth of 9.1m and a bottom width of 70m.

A charted submarine exercise area is reported to be off Mar del Plata.

In addition, submarines operate submerged, in depths of 30 to 55m, in the area between the latitudes of Querandi Light and Quequen Light.

Mariners should proceed with caution on sighting a vessel displaying the signal NE2, which indicates the presence of a submerged submarine, or if an aircraft is observed to dive over a position near them, which has the same signification.

A smoke bomb or flare on the surface of the sea indicates that a submarine will surface in its vicinity.

Mar del Plata to Puerto Quequen

6.5 Punta Mogotes (38°06'S., 57°33'W.), 1 mile SW of Punta Cantera, marked by a light 0.5 mile N, is about 34m high, barren and sandy. The point gets its name from several sand hills nearby, some of which are peaked and higher than the others and resemble cornstalks.

Caution.—A dangerous spit of rock and sand, with depths of less than 5.5m, extends 2 miles SE of Punta Mogotes.

Banco Pescadores, with a least depth of 3m, is 2.5 miles SE of Punta Mogotes; depths less than 11m extend 1 mile farther SE. The bank is made up of tufa with an obstruction.

Punta Mogotes

Punta Mogotes Light

Ensenada Mogotes (38°07'S., 57°35'W.) is entered between Punta Mogotes and Punta Martinez de Hoz, 4.5 miles SW.

Close W of Punta Mogotes, the coast is formed by bare and shifting sand dunes, but farther W it rises in steep cliffs 20 to 30m high and partly covered with sand. This bay affords a good anchorage, in depths of 18 to 22m, when the wind is offshore and there is little swell.

The cliffs continue, with elevations of about 20m, as far as Punta San Andres, 3.5 miles SW of Punta Martinez de Hoz, where they terminate.

Between **Punta San Andres** (38°12'S., 57°40'W.) and Punta Hermengo, 10 miles WSW, the coast is rugged, sandy and barren, with a few patches of vegetation; its elevation varies from 6 to 9m, except for some isolated cliffs which are separated by gaps caused by the mouths of streams.

Four miles SW of Punta San Andres, one of these cliffs is 22m high. This coast is moderately steep-to, with depths of 9.1m about 0.5 mile offshore.

Arroyo del Durazno flows into Enseanda de Miramar 1 mile NNE of Punta Hermengo.

Miramar

6.6 Miramar (38°16'S., 57°51'W.) is a seaside resort that has two jetties; the S jetty, which is the principal jetty, has a length of 1,192m and the N jetty has a length of 551m.

Between the jetties there is a 195m wide passage with a 100m wide navigable channel.

The depth of the channel is variable, therefore is reported bi-weekly in the Argentina Notice to Mariners; advance information is broadcast through the radio notices.

A light, located 0.5 mile N of Punta Hermango, marks the town. A white church steeple rising among the red roofs of the tower, a water tower, and a concrete tank are conspicuous.

Anchorage off Miramar has good holding ground of chalk overlying tufa.

Caution is necessary when weighing anchor off this coast because the bottom of hard tufa is full of holes and liable to part the anchor cable.

From Punta Hermengo to Quequen, 44 miles WSW, the coast is at first backed by cliffs for a distance of about 1 mile, and then by a line of sand dunes which reach elevations of 30

to 40m in places. The coastline is broken by the mouths of a number of streams and there are occasional patches of bushes, but it is uniform and monotonous in appearance and only relieved by a few farm houses.

At Mar del Sur, 8 miles WSW of Punta Hermengo, there is a large and prominent yellow building with a dark-colored roof.

The sand dunes continue for 10 miles, with elevations of 15 to 25m, and are followed by a line of sheer cliffs about 5 miles long, beyond which there are more sand dunes.

Medano Miercoles (38°32'S., 58°30'W.), on the coast about 35 miles WSW of Punta Hermengo, is a sand hill, 40m high, in the form of a truncated cone which can easily be identified. From here to the mouth of the Rio Quequen Grande, 11 miles further WSW, the sand dunes vary in elevation from 20 to 30m. They are fronted by a beach consisting of hard tufa.

A shoal, with a depth of 7.3m, is 10 miles ESE of Medano Miercoles and 4.5 miles offshore.

6.7 Puerto Quequen (38°35'S., 58°42'W.) (World Port Index No. 13790) and the adjacent and larger town of Necochea are on the left and right banks, respectively, of the Rio Quequen Grande. The main trade of the port is the export of grain and vegetable oils.

Winds—Weather.—During strong winds from between the SE and SW, breakers form at the entrance and sometimes persist up to 48 hours after the wind has fallen, making it difficult and at times, impossible to enter. Because of the surge, good fenders, at least 1m thick, are often needed in the port.

Tides—Currents.—The combined effect of the S or SW winds and the greater strength of the E tidal current cause an E set along the coast.

Offshore, the currents rarely attain rates of more than 0.5 to 1 knot; during light winds they are scarcely perceptible, but close inshore they are stronger.

In the mouth of the Rio Quequen Grande, the last of the outgoing currents has been observed to attain a rate of up to 2 knots.

Depths—Limitations.—Puerto Quequen is entered through a dredged channel about 120m wide. The designed depth of the channel is 12m, but it is subject to heavy silting and cannot be relied upon; it is continually being dredged.

The following limitations are in force regarding the length and draft of vessels entering the port:

1. Length up to 175m—Draft must not exceed 8.2m.
2. Length up to 220m—Draft must not exceed 5.5m.

Vessels over 175m in length must obtain a special permit from the Maritime Prefecture before entering. The maximum vessel length admitted is 230m; vessels over 210m in length should use the channel in daylight only.

An underkeel clearance of 0.8m is recommended; this margin may be increased, depending on the height of the ground swell.

Vessels should not enter or leave the port with a ground swell in excess of 2m.

Loaded vessels should not enter the port with a ground swell in excess of 1.8m. Vessels should not enter or leave the port with wind speeds in excess of 20 knots.

When within the port, vessels should berth with their bows to seaward.

Overhead cables, with a vertical clearance of 41.8m, span the channel 1 mile above the harbor entrance.

Vessels cannot enter or sail at night. Two vessels cannot use the entrance channel simultaneously. There are no mooring buoys inside the breakwater, therefore it is safer for vessels waiting for a berth to remain outside.

Berths for ocean-going vessels have depths of up to 12m alongside.

Aspect.—A white grain elevator, over 1 mile NW of the head of the S breakwater, gives a good radar response at a distance of 20 miles. The church towers of Quequen and Necochia lie 1 mile and 2.75 miles NW, respectively, of the S breakwater head; both are visible at about 12 miles from seaward.

At night, the first lights to be sighted will be the numerous red obstruction lights shown, at elevations of about 40 to 70m, from the grain elevator and the buildings surrounding it.

Range lights lead between the breakwaters through the entrance channel.

Arroyo Claromeco Light

Pilotage.—Pilotage and the use of two tugs are compulsory for vessels over 2,000 gt. The tugs have insufficient power for anything other than work within the port.

The pilot boards in position 38°35.7'S, 58°40.0'W, about 2 miles SE of the head of the S breakwater.

Signals.—Three vertical red lights displayed from the root of the N breakwater indicate the port is closed.

Contact Information.—Puerto Quequen can be contacted, as follows:

1. Telephone: 54-2262-450006
2. E-mail: secretaria@puertoquequen.com

Anchorage.—The port authorities recommend that vessels anchor at least 5 miles offshore and do not deballast while at anchor.

Caution.—Numerous obstructions exist in an area of foul ground extending up to 3 miles offshore.

Puerto Quequen to El Rincon

6.8 From Puerto Quequen to **Punta Asuncion** (38°57'S., 60°39'W.), 94 miles WSW, the coast is formed by monotonous and featureless sand hills 15 to 24m high and similar to those E of Puerto Quequen, and is broken by several streams.

Punta Negra (38°38'S., 58°49'W.), 6.5 miles WSW and **Punta Desnudez** (38°50'S., 59°46'W.), 53 miles WSW, respectively, from Puerto Quequen are both hard to identify.

Arroyo Claromeco (38°52'S., 60°04'W.), 13 miles W of Punta Desnudez, is marked by a light 1 mile to the E, which has a signal station.

Caution.—Unexploded ordnance lies about 11 miles ESE of the light on Arroyo Claromeco.

Punta Asuncion, 30 miles W of Arroyo Claromeco Light, rises to a sand hill about 37m high, but it is difficult to identify.

Sierra de la Ventana, 75 miles NW of Punta Asuncion, rises to an elevation of about 1,240m. Near its summit is a hole resembling a window. When seen from SE, the summit appears peaked, but from S it appears rather square with a notch in the middle.

El Rincon

6.9 El Rincon is the bight formed by the sudden change in direction of the coast E and S of the head of Bahia Blanca, 75 miles W of Punta Asuncion. On the N side of this bight, W of Punta Asuncion, shoals, with depths of less than 11m, are up to 12 miles offshore as far S as the parallel of 39°12'S.

Inshore, the nature of the bottom is gray and black sand and shells, with tufa on some of the shoals.

For about 20 miles seaward of the shoals, the bottom is composed of mud, covered with a layer of fine sand. The holding ground is good everywhere. The nature of the bottom gives little indication of a vessel's position.

Currents are strong and under normal circumstances semi-diurnal, but they are much affected by the wind. Within 10 miles of the shoals, they attain rates of up to 4 knots, and between 10 and 20 miles seaward of the outer limit of the shoals, their rates are from 1.5 to 2 knots.

Off Punta Asuncion, the N tidal current divides into two branches, one running W towards Bahia Blanca and the other running E along the coast. The currents converge from the opposite directions during the S current.

On the N shore of El Rincon, from Punta Asuncion to Monte Hermoso, a rounded hill 35m high, 47 miles W of Punta Asuncion, the coast is of the same character as it is E of Punta Asuncion.

Recalada Light (39°00'S., 61°16'W.), 28 miles W of Punta Asuncion, is 67m high and has a radiobeacon and a signal station.

Rada de Monte Hermoso (38°59'S., 61°41'W.) lies 20

Recalada Light

Bahia Blanca

6.10 **Bahia Blanca** (38°47'S., 62°16'W.), a narrow arm of the sea in the NW part of El Rincon, is entered between Monte Hermoso and Punta Lobos, 17 miles SSW. It extends 40 miles NW and is obstructed by banks and shoals.

Within the bay and in order from seaward are Puerto Rosales, Puerto Belgrano, Puerto Ingeniero White, Puerto Nacional, Puerto Galvan, and Puerto Cuatereros, all of which are known collectively as Bahia Blanca.

Wind—Weather.—Prevailing winds are from the N, NW, and W. Annual rainfall averages 558mm, with March having the highest amount. Fog occurs on an average of 27 times annually.

Tides—Currents.—The flood tidal current runs for 5 hours 45 minutes; the ebb current runs for 5 hours 30 minutes. The normal rate is less than 2 knots, but this may be increased to 4 knots by the action of the wind.

The tidal currents set across the outer part of Canal Principal, and caution is necessary. In the narrow part of this channel, between the two parts of Banco del Este, the tidal currents are very strong, but here and in the inner part of the channel they follow the trend of the channel.

The greatest rates, up to 2.5 knots, are found in the vicinity of Punta Ancla. They occur about 3 hours 30 minutes after HW and LW at Puerto Belgrano.

Off Puerto Belgrano, the beginning of the flood current is stronger on the S side of the roadstead, and the beginning of the ebb current is stronger on the N side.

The water level in Bahia Blanca varies frequently from the predicted tidal level. In general, strong winds from the WNW through N to NNE lower the water level, while those from the E through S to W raise the level. With gale force winds the level may be raised or lowered as much as 1.5m.

The full effect may be experienced at any interval up to 5 hours after the start of the gale, the average interval being about 3 hours.

Depths—Limitations.—The middle of Bahia Blanca is encumbered with numerous sand banks, which include Banco del Norte, Banco Nuevo, and Banco del Medio, lying near the entrance to the bay; and Banco Largo, Banco del Oeste, Banco del Sur, Banco del Toro, Banco Redondo, and Banco Cuchillo, lying farther in. These banks are composed of very hard black sand, with fine sand and mud in the channels between them.

The outer banks have depths of 3 to 5.5m; the inner banks dry in patches. The sea sometimes breaks over the edges of these banks, but at other times there is little indication of them.

Canal Principal, the main route into Bahia Blanca, is well-marked and leads from about position 39°24'S, 61°29'W to a point abeam Buoy No. 12, where it turns NW and becomes Canal del Toro, then continuing to about 2 miles W of Puerto Rosales, where the channel becomes Canal Ingeniero White. The controlling depths in Canal Principal and Canal del Toro are 12.8m, while the controlling depth in Canal Ingeniero White is 12.2m.

Caution should be exercised as the buoys may be unlit and out of position.

Canal Auxilar, branching N from Canal Principal and passing between Banco del Norte and Banco del Oeste, has a depth of about 3.4m. It is no longer dredged and its use is not recommended except for small shallow-draft vessels.

Canal del Sur, branching W from Canal Principal and passing SW of Banco del Sur, Banco Redondo, and Banco Cuchillo, has depths of about 3.6m, but it is not recommended because it is unmarked and has not been surveyed recently.

Aspect.—Punta Tejada (38°59'S., 61°49'W.), 6 miles W of Monte Hermoso, is marked by a light.

Between Monte Hermoso and the entrance to Puerto Rosales, 18.5 miles W, the shore of Bahia Blanca consists of low sand hills which are partly covered with bushes and coarse grass.

Chica Light is 4 miles W of Punta Tejada. Tripode Beacon is 6 miles WNW of Punta Tejada. A charted degaussing range is 1.5 miles SW of Tripode Beacon and only Argentine Naval vessels may navigate vessels near the buoy marking range. Merchant ships must pass SW of the range.

Water towers stand 0.6 mile NW and 1.75 miles WNW, respectively, from Tripode Beacon.

Punta Ancla, a poorly-defined point, lies about 3 miles WNW of Tripode Beacon. Many uncharted beacons used by the Argentine Navy are also along this stretch of coast.

The most prominent hummocks W of Punta Hermoso lie 1 mile ENE of Punta Ancla Beacon. There are also some groups of trees, flag staffs, and windmills in this vicinity.

The S side of the seaward part of Bahia Blanca is formed by Isla Trinidad, which extends 14.5 miles NW from Punta Lobos, and by Isla Bermejo and Islas del Embudo NW of it. These islands are low and subject to inundation, and are difficult to identify from the offshore.

Isla Trinidad and Isla Bermejo are separated by Canal Bermejo, which is navigable by small craft with local knowledge for a distance of about 20 miles. Isla Bermejo and Islas del Embudo are separated by Arroyo Labrode; Canal del Embudo separates the latter islands from the mainland.

Recalada Light, Punta Lobos Beacon, and Sierra de la Ventana are good marks in clear weather.

Pilotage.—Pilotage is compulsory. Pilots board vessels near Lighted Buoy No. 11, 9.5 miles SW of Monte Hermoso, between 0300 and 2100.

Pilots should be requested at least 24 hours in advance. Requests for a pilot should include the vessel's name, nationality and identification signal, number of passengers and crew, the type and quantity of cargo, and information regarding the health of passengers and crew.

A vessel requiring a pilot can communicate with the Subprefectura Maritime at one of the above-mentioned ports through Bahia Blanca radio station or by radio with the pilot vessel only when away from its base. The pilot vessel, an Argentine Naval tug based at Puerto Belgrano, does not leave that port unless a vessel is expected.

Regulations.—Vessels drawing over 10.7m should not overtake or pass other vessels anywhere in the channel. Vessels drawing between 9.2 and 10.7m should not overtake other vessels between Buoy 13 and Buoy 16, or upstream of Buoy 26 in position 38°53.3'S, 62°10.9'W.

Vessels traveling with the current have the right-of-way over other vessels; if there is no current, outbound vessels have the right-of-way over inbound vessels. Speed in the channel should not exceed 12 knots.

There is a Traffic Control and Safety System (CONTRASE) in place for Bahia Blanca. It is mandatory for all foreign vessels. It operates 24 hours on VHF channel 73. The following reporting requirements are in effect:

1. When approaching Rincon Lighted Buoy on entry, vessels must report the following information:
   a. Vessel name.
   b. Flag.
   c. Call sign.
   d. Length.
   e. Breadth.
   f. Draft.
   g. Speed.
   h. Port of departure.
   i. Destination.
   j. Navigational plan.
   k. The ETA at the points listed below in paragraph 2.

   Vessels must also report any later changes to these ETAs.
2. Vessels report their ETA at their destination when reaching the following locations:
   a. Rincon Lighted Buoy
   b. Lighted Buoy No. 4.
   c. Lighted Buoy No. 11.
   d. Lighted Buoy No. 17.
   e. Lighted Buoy No. 22.
   f. Lighted Buoy No. 25.
   g. Beacon No. 2 (Canal Ingeniero White).

h. The roadstead (departing vessels may omit the roadstead report).

3. Before shifting anchorage, berth, or moving within the port, vessels must obtain permission, stating the vessel's name, flag, call sign, and destination. Permission normally remains valid for 15 minutes.

4. Before casting off on leaving port, vessels must obtain permission, stating the vessel's name, flag, call sign, length, breadth, draft, speed, destination, course, type of cargo, and whether there is a doctor on board. Permission normally remains valid for 15 minutes.

5. If anchoring outside the port, report the vessel's name, flag, and call sign with the time and location of anchoring.

Contact Information.—VTS Bahia Blanca can be contacted, as follows:

1. VHF: VHF channel 73.
2. Telephone: 54-291-457-3213
3. E-mail: vts@puertobahiablanca.com.ar

Bahia Blanca port can be contacted, as follows:

1. Telephone: 54-291-457-3213
2. Facsimile: 54-291-457-3213
3. E-mail: operaciones@puertobahiablanca.com.ar

Anchorage.—Four anchorage areas, designated Anchorage Zone A, Anchorage Zone B, Anchorage Zone C, and Anchorage Zone D, the limits of which are shown on the chart, are established for merchant vessels. Caution is necessary as foul areas and obstructions are located in the charted anchorage areas.

Anchorage Zone A lies close N of Canal Principal, the main channel, between Banco Norte and Banco Del Medio, in depths from 10.5 to 12m. Vessels should anchor keeping at least 500m away from the channel axis.

Anchorage Zone B lies close NW of Anchorage Zone A

Anchorage Zone C, lying 2.5 miles N of Anchorage Zone B, has depths of 10 to 17m, but caution must be exercised as several charted foul areas lie in this anchorage.

Anchorage Zone D lies about 2.5 miles further NW. The charted depths in Anchorage Zone D are from 10 to 17m.

Caution should be exercised to avoid anchoring or navigating in the area W of Anchorage Zone C during an artillery practice in the Rada De Monte Hermoso area; dates and time of such exercises are promulgated Argentine Coast Guard.

Controlling depths in the other anchorages are, as follows:

1. Roadstead A—9.7m.
2. Roadstead B—10.9m.
3. Roadstead C—10.5m.

It was reported (1998) that Roadstead A has been dredged to a depth of 14m.

Vessels in quarantine should anchor in the roadstead to the W of the Naval Anchorage, or off Punta Pipas Beacon.

Rada de Puerto Belgrano, the roadstead NW of the merchant ships anchorage and to the S of the port of that name, is reserved for the use of the Argentine Navy.

Vessels proceeding only to Puerto Rosales or Puerto Belgrano, or in cases of emergency, may anchor in a position 1.5 miles SSE of Punta Ciguena, provided notice is given by radio and by flag signals of their name, nationality, destination, and port of departure.

A prohibited area, the limits of which are shown on the chart, extends ESE about 9 miles from the vicinity of Punta Tejada.

The coast between Chica Light and Punta Giguena and between Puerto Rosales and a point 7.25 miles NW is a military area and landing on this stretch of coast is prohibited.

Directions.—If approaching from the E, obtain an accurate fix and then steer for the buoyed Canal Principal entrance.

Until a fix has been obtained, sound continuously and do not proceed into depths of less than 18m, as the shoals and banks are extensive and steep-to, the tidal currents are sometimes strong and affected by the wind, and the coast is low.

If bound from the S, make a landfall between Recalada Light and Monte Hermoso Beacon, thereby sighting the buoy marking the Canal Principal entrance.

If arriving at night or in thick weather and uncertain of the position, and if soundings of less than 18m are obtained, a vessel should anchor.

The best times for entering is the beginning of the flood current, because the edges of the banks are then most clearly distinguished.

By following the track indicated on the chart and being guided by the lighted buoys, no great difficulty should be experienced. It should be observed that SE winds cause a heavy sea. At such times or during fog or poor visibility, either anchor or stand off.

6.11 Puerto Rosales (38°55'S., 62°04'W.) (World Port Index No. 13800), a former grain port no longer used as such, is being converted into a fishing port which will have depths of 6.1m alongside.

Ciguena Oil Terminal (38°57'S., 62°02'W.) consists of a SBM in about 18m of water with an associated submarine pipeline and is located 1.25 miles SE of the head of the Puerto Rosales breakwater.

6.12 Puerto Belgrano (38°53'S., 62°06'W.) (World Port Index No. 13810) is primarily an Argentine Naval Base, but the drydocks can be used by merchant vessels.

The largest drydock is 234m long, 34.2m wide, and 13.1m deep. The Argentine Hydrographic Department is located here.

Depths—Limitations.—The port is approached through a channel 0.8 mile WNW of Puerto Rosales Light. The minimum width of the channel at its inner end is 75m. Significant shoaling has been reported in the channel. Mariners are advised to use caution and consult with local authorities.

The basin between Muelle B and Muelle C has depths of 3.7 to 7m alongside its quays. The inner basin, enclosed by Muelle A and Muelle B, has depths of 5.8 to 9.4m, except along the quay at its SE corner, where there are depths alongside of only 2.4 to 4.6m.

Aspect.—A signal station, a large building with a clock tower and flag staff on a hillock on the E side of the port, is a prominent landmark visible at 15 miles in clear weather.

It is reported (2013) the capsized wreck of a warship lies alongside in the harbor.

Pilotage.—Pilotage, which is compulsory, is by military pilots who take over from civilian pilots at Lighted Buoy No. 21.

Signals.—The following day signals, indicating the movement of shipping, are displayed from a mast with a yard, situated on the head of Muelle C:

Signal	Meaning
Black flag at W yardarm	Vessel in sight.
Flag "L" at the dip, at W yardarm	Vessel entering.
Flag "K" at the dip, at W yardarm	Vessel leaving.
Red flag at the dip, at W yardarm	Entry prohibited.
Red flag at E yardarm	Vessel is in need of assistance.
Black flag at the dip, at E yardarm	Departure prohibited.

The following night signals are shown from the signal station:

Signal	Meaning
One intense green light	Entry prohibited.
Two intense lights, vertically disposed, white over green	Departure prohibited.
Two intense green lights, vertically disposed	Entry and departure prohibited.

Regulations.—Except by special authority, large vessels are not allowed to enter at night. All vessels entering or leaving must, when abreast of Puerto Belgrano, display their numbers by the International Code of Signals.

The following signals are displayed at the Fleet Air base flag staff when aircraft are operating:

1. By day—Two "Y" flags.
2. By night—Vertical red, white, red lights.

Caution.—A seaplane harbor, enclosed by breakwaters, is close N of the dockyard. An area reserved for the use of seaplanes landing or maneuvering extends 1.75 miles offshore and 2.5 miles NNW of the dockyard. Passage through the area is prohibited without the permission of the Officer Commanding the Fleet Airbase through the Servicio de Puerto.

Puerto Ingeniero White and Adjacent Ports

6.13 The inner group of ports in Bahia Blanca is made up of Puerto Ingeniero White, Puerto National, and Puerto Galvan, all on the N side of the channel between 10 to 12 miles NW of Puerto Belgrano.

This inner group of ports is approached through Canal Ingeniero White, a continuation of Canal Principal, a marked channel dredged to 10m.

Rada Ingeniero White is the part of the fairway between the mouth of **Arroya Naposta** (38°47'S., 62°14'W.) and the wharf at Puerto Galvan. It was dredged to a depth of 12m.

Tidal currents in Canal Ingeniero White have rates of 1 to 3 knots and follow the trend of the channel.

Pilotage is compulsory. Harbor pilots, who require 24 hours notice, take over from channel pilots in the roadstead. Tugs are compulsory at certain berths.

6.14 Puerto Ingeniero White (38°48'S., 62°16'W.) (World Port Index No. 13820) is an important grain-exporting port, but also has facilities for handling general cargo. It can handle vessels up to 13.7m draft when dredged, but may silt.

A foul area extends 0.25 mile SE. It has been reported that Muelle de Hierro has been removed and the area dredged to 10m.

Terminal Bahia Blanca and Muelle de Servicios, each with four berths for ocean-going vessels, project SSE from the shore; both piers are equipped for loading grain. The two berths at the E face have silted up and are no longer in use.

Puerto Ingeniero White Terminal

Muelle Piedra Buena, a tanker pier, has a face 260m long and depths alongside of 12.2m.

6.15 Puerto Nacional (38°48'S., 62°17'W.) (World Port Index No. 13830), which is state-owned, is close W of Puerto Ingeniero White and used mainly for the export of fruit. The port consists of a basin with about 600m of quayage, having depths alongside up to 7.3m. Services are much the same as at Puerto Ingeniero White as described in paragraph 6.14.

A new port area on reclaimed land between Puerto Nacional and Puerto Galvan has three berths with depths alongside of 13.7m.

6.16 Puerto Galvan (38°47'S., 62°18'W.) (World Port Index No. 13840), mainly used for the import of oil, also handles grain and lies 1.5 miles W of Puerto Ingeniero White.

The main wharf, an irregularly-shaped structure which projects 0.7 mile SSE from the shore, has nine berths. The outer berths, numbered 2 through 6, have depths alongside of 3.4 to 6.3m, but the inner berths have less water.

The tanker pier, a T-shaped structure which projects SW from the root of the main pier, was dredged to a depth of 12m,

but was reported more recently to have a depth of 8.8m alongside. Lights are shown from each end of the pier.

Other services are much the same as Puerto Ingeniero White.

Puerto Galvan

Ciudad de Bahia Blanca (38°44'S., 62°16'W.) is inland, 3 miles N of Puerto Ingeniero White. It is the most important Argentine city S of Buenos Aires.

Bahia Blanca to the Rio Negro

6.17 Costa Laberinto lies SW of Isla Trinidad and extends to Punta Laberinto, 15 miles SSW of **Punta Lobos** (39°14'S., 61°52'W.). It includes Bahia Falsa, Bahia Verde, Peninsula Verde, Celeta Brightman, and various islands. It is fringed to a distance of 7 miles by numerous banks and shoals which are intersected by navigable channels.

Navigation precautions and tidal currents in this area have been discussed previously under Bahia Blanca in paragraph 6.10.

El Rincon Light (39°24'S., 62°01'W.), 62m high and equipped with a radiobeacon, is on the E end of Peninsula Verde, 11 miles S of Punta Lobos.

Bahia Falsa separates Isla Trinidad from Isla Ariadna and Isla Wood, which lie SW. It is entered between Punta Lobos and the bank extending E from Isla Ariadna, 5 miles S, and extends 15 miles NNW. This inlet affords excellent anchorage, with protection from all except SE winds, which raise a sea, but local knowledge is essential for entering it because no landmarks are visible until a vessel is within the banks which encumber the entrance.

Bahia Verde, entered between the bank extending E from Isla Ariadna and the NE extremity of Peninsula Verde, extends 10 miles WNW.

Local knowledge is essential because the entrance is encumbered by banks.

Bancos Lobos, with depths of less than 5.5m, extend 8 miles SSE from Punta Lobos. Depths are very irregular and they dry in parts.

Bancos La Paz, with depths of 1.2 to 5.5m, are from 6 to 13 miles S of Punta Lobos. Because the coast of Peninsula Verde is visible from the vicinity of these banks, they are more easily avoided than Bancos Lobos.

El Rincon Light

The E sides of all the above banks are shelving and their W sides are steep-to.

Bajos del Laberinto, which dry in places, are between the E ends of Bahia Falsa and Peninsula Verde, obstructing the entrance to Bahia Verde; they extend 6 miles ESE from **Isla Ariadna** (39°15'S., 62°01'W.).

There are two channels into Bahia Falsa. Canal del Este, between Bancos Lobos and Bancos La Paz, has a least depth of about 3.6m in the fairway.

Canal Patagonia, which is 1 mile wide, leads W of Bancos La Paz and Bancos Lobos and E of Bancos Patagonia, which fringe the coast of Peninsula Verde. It has a least depth of 9.8m in the fairway in the S part, and of about 5m at its N end, where it turns E into Canal del Este, 6 miles NE of El Rincon Light.

The entrance to Bahia Falsa is narrowed by a shoal, with a least depth of 0.6m, which forms the NW end of Bancos Lobos.

This passage is about 0.5 mile wide, with depths from 4.9 to 5.2m. A buoy marks the channel 1.75 miles WSW of Punta Lobos.

Punta Lobos Light

6.18 Caleta Brightman (39°26'S., 62°02'W.), an inlet between the S end of Peninsula Verde and Punta Laberinto, has a narrow channel with depths of 3m, but should only be entered with local knowledge.

Currents run parallel with the coast outside the entrance. Within the inlet, they attain rates of 4 to 5 knots. The water level is much affected by SE and NW winds.

If approaching this inlet, do not proceed N of 39°30'S, as the dangerous banks are N of that parallel, while the coast to the S is clear of dangers.

Anchorage may be obtained, in a depth of 6m, about 1 mile NNE of Punta Laberinto.

Vessels can also anchor near the SW coast of Peninsula Verde, in a depth of 10m, soft sandy mud.

From Punta Laberinto to the mouth of the S and main branch of the Rio Colorado, 25 miles S, the W coast of El Rincon consists of a low sandy beach, backed by a chain of sand hills, 9 to 12m high, which end at this river mouth.

The Rio Colorado flows into the sea by two branches which divide 18 miles inland. The mouth of the N branch is located 10 miles S of Punta Laberinto.

A bank of sand and mud dries up to 1 mile off this shore and the depths of it decrease gradually; the sea breaks on it heavily, making landing difficult.

Bahia Anegada, between **Isla Margarita** (39°52'S., 62°07'W.) and Punta Rubia, 50 miles to the S, is filled mostly by drying banks with channels and inlets in between which are navigable only by small craft with local knowledge. There are many low islands and islets in the bay, all with the same appearance.

6.19 Bahia Union (39°58'S., 62°08'W.), in the N part of Bahia Anegada, is entered through the banks 15 miles SSE of Isla Margarita. The entrance is 0.7 mile wide with 4.6m over the bar. Bahia Union affords good anchorage with complete protection once inside for vessels drawing up to 6m and is the base of a fishing fleet.

At the entrance of Bahia Union, the flood current runs N across the banks at about 2 knots, and the ebb currents at first run directly out of the inlet at about 2.5 to 3 knots and then turn S as it clears Banco Perro.

Winds from N decrease the rate of the flood currents and increase the rate of the ebb currents. South winds have the opposite effect.

Islote Morro Indio, N of Bahia Union Inlet, is 6m high and easily identified because the land in the vicinity is barely above sea level at HW. Three sand hills 2 miles NNW of Islote Morro Indio are good landmarks.

Directions.—If bound into Bahia Union, make for the land in the vicinity of Isla Margarita, where there are no off-lying dangers and soundings will give a good indication of the distance offshore. The beacon on Isla Margarita and the three sand hills mentioned above are all good marks, but because the tidal currents sometimes set across the channel, do not attempt to enter the channel without local knowledge.

Anchorage may be obtained with Islote Morro Indio bearing 347°, distant 0.75 miles, in a depth of 7.3m, mud and pebbles.

Sandy banks and shoals extend up to 15 miles seaward of the islands in Bahia Anegada. Some of them dry as much as about 2.4m.

At HW, very little dry land can be distinguished from seaward of these dangers. They should be given a wide berth, especially by ships bound N, because the N tidal current sets NW towards them at rates of 1 to 3 knots.

The shoals are formed in ridges, lying parallel with the coast, with depths of 2.7 to 11m; depths of 14.6 to 22m lie between the ridges. In calm weather, in addition to soundings, the only indications of these shoals are a slight rippling or an unusual smoothness and some difference in the color of the water. When there is much swell, the sea breaks over nearly all these shoals, even those with as much as 7 or 9m.

Currents off the above-mentioned dangers run NNW and SSE at rates of 1 to 2 knots; over the dangers, they run NW and SE at the same rates. Between the dangers, the current follow the directions of the channels and the rates increase from 1.5 to 3 knots.

Winds from between the SE and SW raise the water level and increase the rate and duration of the N current. Winds from between the NW and N have the opposite effect.

6.20 Puerto San Blas (40°34'S., 62°14'W.) (World Port Index No. 13860) is a small fishing village on Bahia San Blas at the S end of Bahia Anegada. The entrance to the bay and port is almost closed by extensive banks which cause tidal currents in the channels between them.

Inside the entrance there is a sheltered harbor for small vessels able to enter. The tower of a church, 12m high, is prominent.

From the entrance to Bahia San Blas to **Punta Rasa** (40°52'S., 62°18'W.), 18 miles SSW, the coast consists of a narrow sandy beach, backed by low and uniform sand hills, with sparse vegetation consisting of coarse grass and a few bushes.

The only prominent feature is Cerro de la Torre, a conical sand hill near Punta Rubia. Segunda Barranca Light, nearly midway between it and Punta Rasa, is difficult to distinguish.

Segunda Barranca Light (40°47'S., 62°16'W.) is 34m high. A radiobeacon is at the light.

Segunda Barranca Light

A bank of tufa, with irregular depths of less than 5.5m, extends up to 1.5 miles off the coast between Segunda Barranca Light and Punta Rasa. In calm weather, its edge is marked by tide rips.

Anchorage, sheltered from offshore winds, may be obtained 3 miles NE of Segunda Barranca Light.

6.21 Punta Rasa (40°52'S., 62°18'W.) rises to a rounded sandy hillock, 8m high. In its vicinity are sand hills, which change shape under the influence of strong winds.

From Punta Rasa, the coast trends WSW for 21 miles to Barranca Norte, and is visible about 11 miles offshore in clear weather. It is of uniform aspect and formed by shifting sand dunes covered with vegetation.

Barranca Norte (41°01'S., 62°41'W.), about 20m high, is prominent from the E, but is difficult to identify from any other direction because it is seen against a background of mountains.

There are no known dangers off this part of the coast and vessels can anchor anywhere off it.

From Barranca Norte to Punta Redonda, the E entrance point of the Rio Negro, 7 miles WSW, the coastal sand dunes are bare and become lower.

Rio Negro Light

Between **Punta Rubia** (40°44'S., 62°14'W.) and **Bahia Rosas** (41°09'S., 63°23'W.), 60 miles to the WSW, currents run parallel with the coast. They attain rates of 1 to 3 knots between Punta Rubia and Punta Rasa. These currents area affected in strength, and to a certain extent in direction, by strong winds.

Heavy overfalls, which can be dangerous to small craft, are likely to be encountered near the coast between Punta Rasa and the mouth of the Rio Negro, when the current sets against the wind at a certain angle.

6.22 The **Rio Negro** (41°02'S., 62°47'W.), entered between Punta Redonda and Punta Medano 1.25 miles WNW, is navigable by vessels of shallow draft with local knowledge as far as Puerto Carmen de Patagones, a fishing port, 17 miles above its mouth. Above this port, the depths become irregular and the river is navigable only by boats. The tides are felt about 25 miles above the port.

The mouth of the river is easily identified by Barranca Norte and Barranca Sur. Its banks are from 9 to 15m high. During floods, discolored water extends as much as 8 miles offshore in the vicinity of the river mouth.

6.23 Punta Redonda (41°02'S., 62°46'W.) rises to a conical sand hill, 8m high, which appears from the E to have three summits partly covered with vegetation. About 0.5 mile NW of it, the sand hills are about 15m high.

Punta Medano, the SW entrance point of the river, lies almost 1.5 miles WNW of Punta Redonda and is bare and sandy. It is inundated during floods, when the entrance appears three times its normal width. The point is steep-to on its NE side.

Rio Negro Light, 16m high, is 2.75 miles SW of Punta Medano.

Banks, which dry in parts, extend up to 1.75 miles off the coast E of Punta Redonda and join the SE end of Banco Miguel, a drying bank forming a bar across the mouth of the Rio Negro. These banks, composed of fine sand and shells, are continually changing. Their edges are nearly always indicated by broken water.

The bar can be crossed by vessels drawing less than 2.4m at HWS. A vessel entering with a greater draft is liable to be detained in the river for several weeks before being able to recross the bar.

The bar is dangerous during onshore winds, which when strong, may make passage over it impossible. With any swell, there are breakers over the whole of it and in the channel within. Smooth water is rare on this exposed coast. A shoal, composed of tufa with depths of less than 5.5m, extends up to 1.5 miles offshore, 3 miles SW of Rio Negro Light.

Less water than charted was reported in the approaches to the Rio Negro.

There are depths of about 13m about 5 miles S of Rio Negro Light.

Pilotage.—No pilots were reported available.

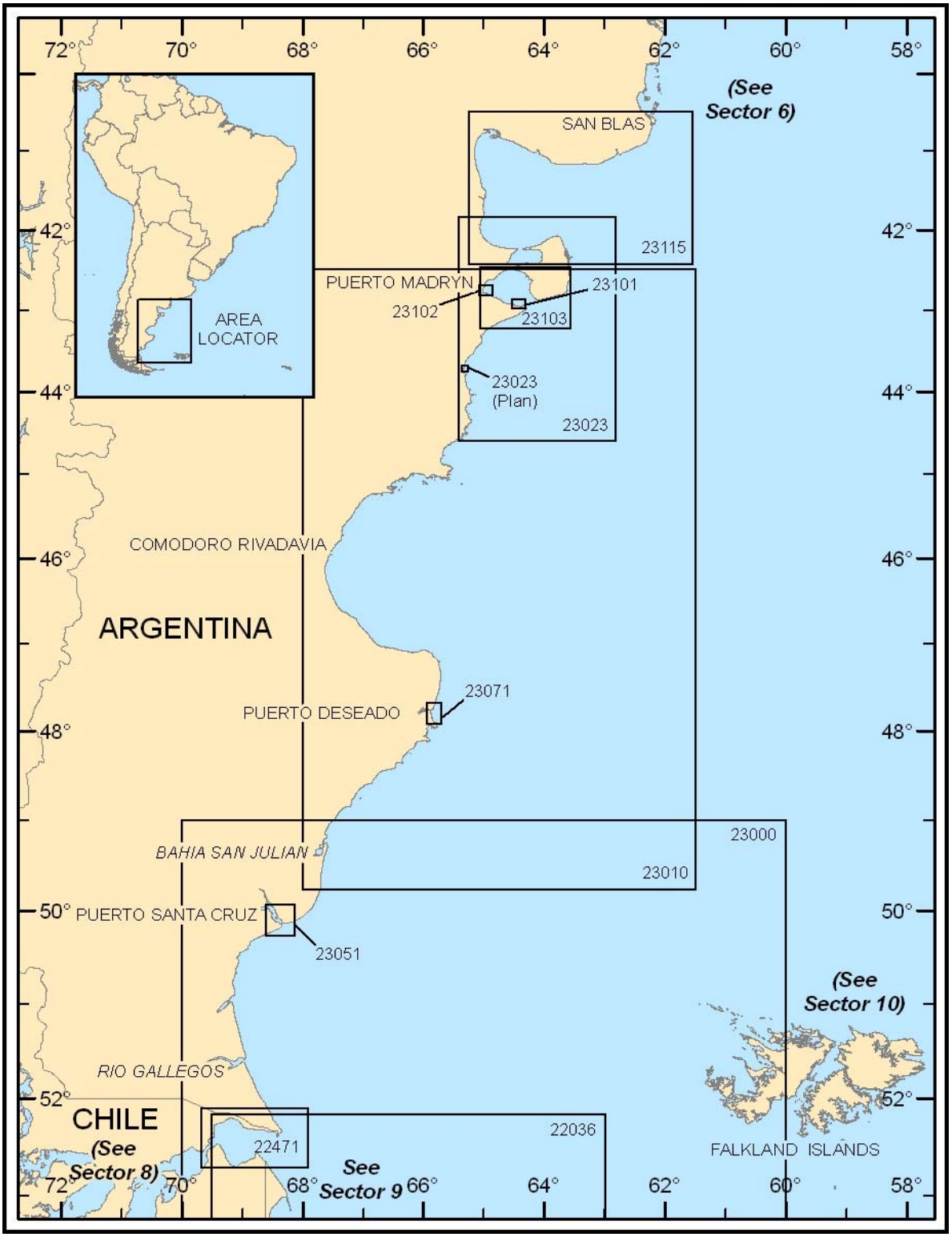
Anchorage.—Anchorage can be obtained with Rio Negro Light bearing 310°, distant 2.5 miles, in 14m, fine sand.

While this is a good anchorage with winds from the W to N, it should be vacated as soon as the winds threaten to blow strongly from E or S.

No attempt should be made to anchor in depths of less than 9m, or with the light bearing more than 000°, because the bottom is tufa and is poor holding ground. Winds from the S raise the sea and cause a NE current.

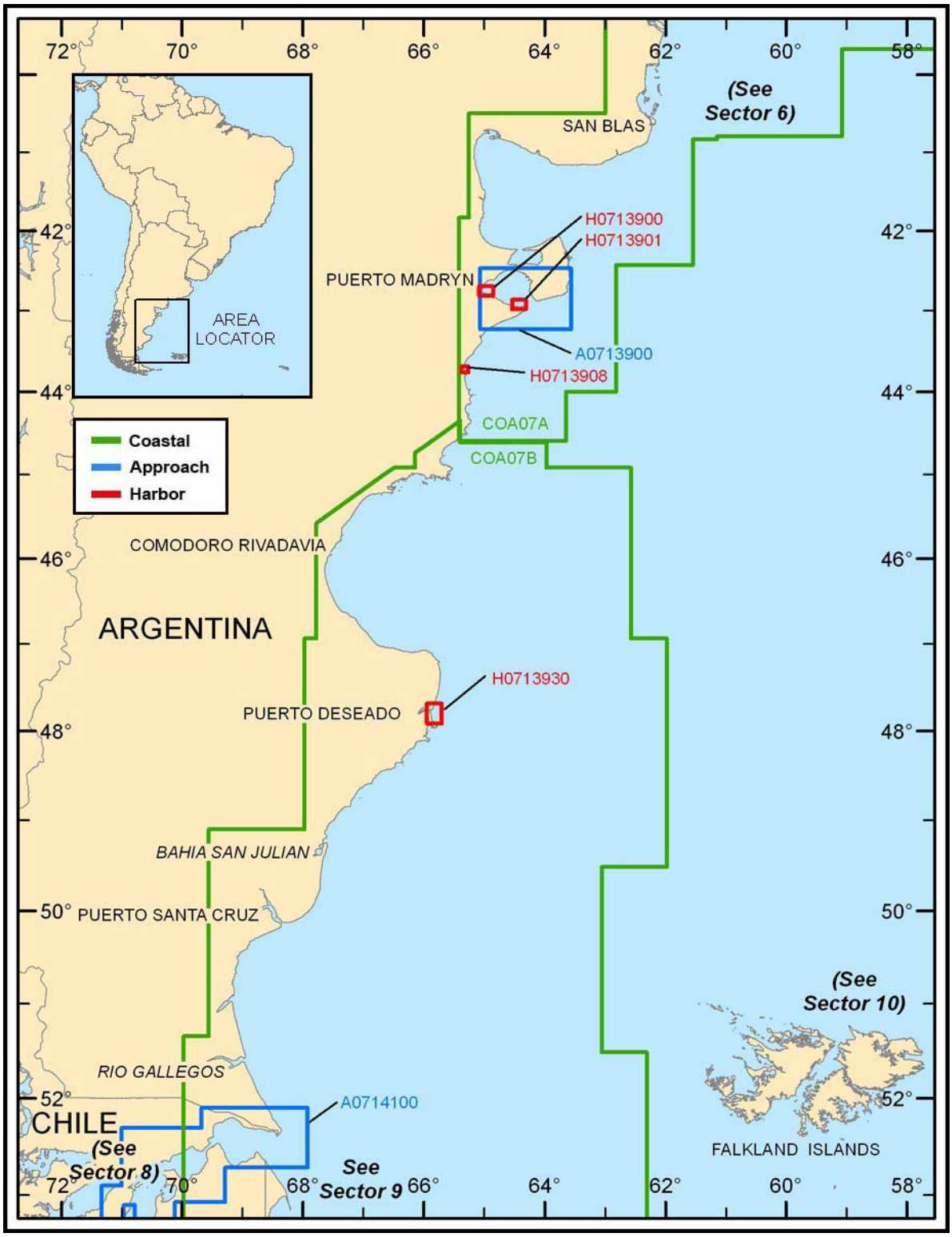
An obstruction, consisting of a lost anchor and cable, lies about 0.5 mile NNW of this anchorage.

Puerto Carmen de Patagones (40°48'S., 62°59'W.) (World Port Index No. 13870) is used almost entirely by fishing craft and other small vessels with local knowledge. There is a hospital in the town.



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

SECTOR **7** — CHART INFORMATION



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SECTOR 7 — DNC LIBRARY INFORMATION

SECTOR 7

COAST OF ARGENTINA—THE RIO NEGRO TO CABO VIRGENES

Plan.—This sector describes the coast of Argentina from the Rio Negro S to Cabo Virgenes.

General Remarks

7.1 Winds—Weather.—Between 50°W and the coast there is a decrease in the W prevalence. Wind in the 5° ocean square adjoining Argentina the annual winds are of almost equal frequency from the 8 principal compass points, except the N and NW directions which are slightly most predominant.

South of the 40th parallel to latitude 0°, some 60 to 70 per cent of the winds have a W component, while 10 to 15 per cent or more of the remaining winds are from the N, and 6 to 10 per cent or more from the S.

South of the Rio Negro valley, the prevailing wind circulation on the coast is W, but there, as over the neighboring sea, the winds may blow from any point between SW and NW. At the E entrance of the Estrecho de Magallanes, W is the most frequent direction, but it changes more to NW late in winter.

Southwest winds tend to bring fair and NW winds, cloudy weather, with snow or rain. Summer is the stormiest season of the year, as it is at some other high latitude points. For example, at Port Gallegos, N of the Strait, and at Port Madryn, much farther N, the worst weather is that of summer, with heavy gales of greater frequency and duration than even in the middle of winter.

A vessel S of latitude 40°S should keep a good lookout for icebergs and loose ice. The mean ice limit for this region trends NE from Cabo De Hornos, through latitude 50°S, longitude 52°W, as far as latitude 40°S, longitude 35°W.

However, in the spring, icebergs are met, NW of this limit, as far as latitude 45°S, longitude 60°W.

Numerous icebergs and extensive ice fields have been seen, at different times, in the space SE of the above limit.

The part of the ocean lying within the belt of W winds, as in all similar latitudes, is one of much storminess.

This is a region of passing cyclones, and it lies along the extensive slope of pressure that normally falls toward the pole; both of these circumstances contribute to the probabilities of high wind occurrence.

Along the stretch of coast lying between the S valley of the Rio de la Plata and the tip of Tierra del Fuego there is a 20° range in mean annual temperature, or from 16°C at Buenos Aires to 5°C at Isla Ano Nuevo.

The temperature change, however, between these points is far from constant. From Buenos Aires to Mar del Plata there is a drop to 13°C. There is a rise to 16°C at Puerto Belgrano (Bahia Blanca) and Patagones. There is then a rapid fall to 8°C at San Martin, approximately at 43°S latitude.

Near 48°S latitude, at Deseado, below the projection of Cabo Blanco, there is another local rise to 10°C.

At Punta Arenas, in the Estrecho De Magallanes, the mean falls to 7°C.

At the center of the gulf the current is 2 to 3 knots, heading

The highest and lowest monthly mean temperatures usually occur in January and July, though sometimes June or August has as low an average as July. Along the continental strip the January temperatures show a range from 2°C at Puerto Belgrano to 13°C at Puerto Gallegos, 11°C at Punta Arenas in the strait, and 8°C at Isla Ano Nuevo.

The winter means range from 8°C at Puerto Belgrano in June and July to 1°C at Puerto Gallegos in the same months.

At Carmen de Patagones and San Martin, the highest and lowest monthly means show a decided difference for stations that are only about 2° in latitude apart. The January mean at Carmine de Pathogens is 23°C and 15°C at San Martin while the June and July mean at the two stations is 8°C and 1°C, respectively.

Extreme temperatures of 38°C or higher occur in summer at most points along the N and middle coastlines of Argentina; as far S as Deseado, a maximum of 39°C has been recorded in January.

Golfo San Matias

7.2 Golfo San Matias (41°30'S., 64°00'W.), about 64 miles wide between Bermeja, 15 miles WSW of the mouth of the Rio Negro, and Punta Norte, recedes more than 80 miles and is very deep in its S and W parts. A heavy sea is quickly raised in the gulf by winds from any direction.

Shallows, quite often can be located by their distinctive color contrast to the usual sea blue characteristics in this gulf.

Tides—Currents.—Vessels proceeding across the entrance of Golfo San Matias may experience tidal currents setting them towards or away from the shore. Great caution is necessary.

The tidal current comes up the coast from the S and rounds Peninsula Valdes, resulting in a current which has a velocity of 2 to 4 knots. At Punta Norte, the current causes violent and dangerous overfalls.

The current divides here, with one branch heading WSW and the other branch continuing to the NNW.

On the S side of the gulf the current divides into two branches. One enters Golfo San Jose with velocities of up to 8 knots between the entrance points; the other sets along the shore with a velocity of 3 knots.

The current which sets N along the W shore of the bay diminishes in velocity until in the vicinity of Puerto San Antonio, when it increases in strength and attains a velocity of 3 knots.

The current which sets NNW from Punta Norte sets toward the N shore of the bay with variable velocities of 1.5 to 2 knots, and in front of Bahia Rosas it branches to the E and W and follows the shore in both cases. Tide rips indicate the position where the current separates and usually extends about 2 miles from the coast in a N and S direction.

The ebb current runs contrary to the flood with about the same velocity.

NW on the flood and ESE on the ebb.

Caution.—An anchorage area is located off the SW shore of the gulf in the vicinity of position 42°00'S, 65°00'W. It is used by VLCC-type vessels for lightering operations.

7.3 Punta Bermeja (41°09'S., 63°04'W.) is an excellent point to make when approaching the Rio Negro, Puerto San Blas, Golfo San Jose, or Puerto San Antonio from the S. The land is about 61m high in the vicinity of the point. A 15.2m shoal has been reported about 4.7 miles from Bermeja Point, bearing 229°; breakers extending perpendicularly to the coast have been observed.

Near the head are hummocks and irregular hills nearly covered with vegetation. At the NE part of these are two very small peaks, which show distinctly when seen from the E.

They stand nearly over two peculiar cliffs, which so resemble the Dos Hermanas, located to the W of Punta Bermeja that they are known as Falsas Hermanas.

Promontorio Belen (41°09'S., 63°51'W.) lies about 36 miles W of Punta Bermeja. Sand hills extend W from Punta Bermeja to Promontorio Belem, attaining elevations from 70 to 100m and about 150m in the vicinity of Promontorio Belen.

There is a break in these sand hills near **Bahia Rosas** (41°09'S., 63°23'W.), a slight indentation from 10 to 15 miles W of Punta Bermeja.

From Promontorio Belen to Punta Villarino, 50 miles WNW, the coast is cliffy for the first 7 miles, but then becomes low.

Caleta de los Loros, a small drying bay, is entered E of **Punta Mejillon** (41°01'S., 64°08'W.), which lies 13 miles WNW of Promontorio Belen.

From Punta Mejillon to Barranca Final, 14 miles WNW, the coast is steep. From Barranca Final to Punta Villarino, a distance of 22 miles, the land is low. A few sand hills, partially covered with grass and stunted bushes, rise about the shingle or sandy beach.

7.4 Puerto San Antonio Este (40°48'S., 64°53'W.) is sheltered from all winds, but its entrance is open to winds from the SE; for this reason vessels should not approach the entrance unless there is sufficient tide to enable them to reach the port.

Tides—Currents.—Winds have very little influence on the times and amplitudes of the tides.

Tidal currents to the S of the entrance are weak, no more than 1 knot. The maximum velocity of the current W of Banco Palisa is 1.5 knots to the NE. Current velocity increases rapidly near Banco Lobos to about 4 knots in the narrows formed by Punta Villarino and Banco Reparo.

The velocity of the flood current in the channel close NE of Punta Villarino is a maximum of 2 knots; the maximum velocity of the ebb current is 1.5 knots. The tidal range is 9m.

Depths—Limitations.—The least depth in the channel over the bar is 1.8m, but inside the depths are very irregular and vary from about 5.9m to more than 32.9m.

On each side of the entrance is a bank, partly dry at LW and steep-to at the edges.

Banco Lobos, on the E side, extends S about 5 miles from Punta Villarino, dries over 3.5 miles from the shore, and is steep-to on its W and S sides.

The sea breaks with great violence over the S part of this bank about 2 hours before LW. Banco Reparo, a large portion of which uncovers, is located on the W side of the entrance and extends about 7 miles SSW from Punta Delgado, the W entrance point to the port. Banco Palisa, which dries up to 1.5m in places, lies in the entrance between the S extremities of Bancos Lobos and Reparo.

The pier is built on the S side of the entrance, about 1.7 miles ENE of Punta Villarino. The pier is L-shaped and extends NW from the shore. The outer mooring face is 200m long, with depths alongside of 13.7m. Vessels up to 170m in length can be accommodated. The inner face is 190m long, with depths alongside of 12.2m. Extending from the pier is a floating pontoon with four berths, with depths of 7.3 to 10m alongside. All the berths on this pontoon can accommodate vessels up to 75m in length. Lights are shown from the end of the pier and from the elbow of the pier.

Aspect.—Punta Villarino is about 34m in height and is easily recognized by its bare sand dunes, which are higher than the rest of the peninsula of which the point is a part.

Cerro Direccion, with three small hummocks close together on its summit, and Cerro Fuerte Argentino, 94m high, gray, and resembling a fortification on the NW shore of the Golfo San Matias, will be seen before any of the low land can be made out.

Approaching from the S, Cerro Fuerte Argentino is seen sooner than Cerro Direccion; if from the E, the reverse is true. Cerro Nipple, 183m high and the highest land in its vicinity, is on a range of hills N of the port, with a small hummock on its summit.

Three sets of range lights are available to guide vessels into the harbor.

Pilotage.—Pilotage is compulsory and must be requested from Puerto Madryn (see paragraph 7.15) at least 48 hours in advance. Pilots board about 5.5 miles SSW of Punta Villarino.

Contact Information.—Puerto San Antonio Este can be contacted, as follows:

1. Telephone: 54-2934-492023
2. Facsimile: 54-2934-492035
3. E-mail: info@patagonia-norte.com.ar

Anchorage.—The outer anchorage is good, in depths of 9.1 to 27.4m, between the end of Banco Lobos and Cerro Fuerte Argentino, as well as to the S and E of the bank. The bottom is quite clear, either a fine sand or a soft greenish sandy mud.

The shelter is good, except with SE winds which do not often blow, and usually are not strong. A rock, with a depth of less than 1.8m, lies 2 miles offshore about 3.5 miles NE of Cerro Fuerte Argentino.

Anchorage can be taken in the inner harbor, in 9.1 or 11m, soft sand and shell bottom. The anchorage is sheltered from all winds except those from the SW and WNW.

Almost the entire inner portion of the port is filled with banks, the greater part of which are covered at HW. Some of the banks show more than 6.1m above water at low tide.

Caution.—In approaching the port, vessels should steer for Cerro Direccion, bearing 310°, in order to avoid the S extremity of Banco Lobos.

When following the outer channel, vessels should guard against the action of the tidal currents, as the flood sets W and the ebb sets E. The ebb current sometimes attains a velocity of more than 4 knots in the channel.

Local assistance is advisable due to the shifting nature of the banks.

A night approach is not recommended. Some radar sets will not receive a good return from Punta Villarino.

7.5 From Puerto San Antonio, the shore trends in a general S direction for about 78 miles. All this shore is bold, exposed, and steep-to.

From **Punta Sierra** (41°31'S., 64°59'W.), low and not easily recognized, the coast S is chiefly cliffy, but with intervals of low land. The cliffs, about 30 to 61m high and nearly perpendicular, are composed of loose earth mixed with shingle and vast quantities of fossil shells. The shore is sandy and fringed by LW rocks.

There are no known dangers more than 1 mile offshore except the rocky reef, extending about 1.5 miles off, on which stands Islote Lobos, about 6 miles NNW of Punta Sierra, and the water is deep to within a few miles of the shore.

Pico Rivadavia (41°37'S., 65°21'W.), about 518m high and the highest peak of Sierras de San Antonio, lies about 31 miles SSW of Cerro Fuerte Argentino. Pico Rivadavia is prominent and visible to 30 miles from seaward.

Punta Pozos (41°35'S., 65°00'W.), lying 4 miles S of Punta Sierra, is formed by a low islet lying close offshore. A narrow ridge of stones that dry extends about 0.1 mile E from the islet, and also connects it with the mainland to the W.

Hills, surmounted by rocky cones, stand at the angle formed by the mouth of Arroyo Salado and Punta Pozos. The mouth of Arroyo Salado is reported to give a good radar return.

7.6 **Punta Colorada** (41°42'S., 65°01'W.) lies about 7.5 miles S of Punta Pozos, and extends 0.2 mile from shore. A prominent pelletization plant stands near the head of the peninsula. A jetty projects 0.5 mile from the peninsula.

Winds—Weather.—Prevailing winds are from the W, but strong winds frequently blow parallel to the coast from the N and S. Onshore winds, mainly from the SE, also occur.

Tides—Currents.—The tidal range is 6.7m at springs and 4.5m at neaps. The currents are weak and have no effect on the approach to the port or when berthing.

Depths—Limitations.—At its head there are four berthing dolphins and six mooring buoys, and a radial loader, thereby allowing a ship to berth on six headings to wind and sea: W, NW, N, E, SE, or S.

Vessels up to 210m long can be accommodated. The depth at the berth is 12.8m.

It is recommended that the approach be made from the N. range marks are shown from the N face of the loader.

Pilotage.—Pilotage is compulsory. Harbor pilots are available and must be requested from Puerto Madryn at least 72 hours in advance.

Anchorage.—Anchorage can be taken about 1.5 and 3 miles E of the NE extremity of Colorado Point, with good holding ground of sand and mud. The anchorage is sheltered against all winds, except those from the NE to S.

7.7 **Punta Porfido** (41°46'S., 65°00'W.) lies about 4 miles S of Punta Colorada. This point should be given a berth of at least 2 miles.

Several spits extend from the coast, from close N of Punta Porfido S to **Arroyo Verde** (42°00'S., 65°05'W.).

Anchorage.—Anchorage can be taken about 0.5 mile offshore, in 11m, fine sand, with two storehouses on the beach near the mouth of Arroyo Verde bearing 315°.

In an emergency, anchorage can be taken about 1 mile offshore anywhere off the W or SW shores of the gulf, in 21.9 to 37m, stones, shells, and sand. There are extensive patches of tufa in places.

7.8 The coast from Arroyo Verde to 64°56'W is low, with a coarse sand and fine shingle beach which covers at HW. Chains of grayish yellow hills, covered with some vegetation, descend to the coast between 64°56'W and 64°40'W. The coast is cliffy from 64°40'W continuing E to Punta Quiroga, the W entrance to Golfo San Jose.

The grayish-yellow cliffs have no vegetation and in some places attain a height of 80m. There are many fissures and deep ravines along this section of coast.

There is an unexploded device located in position 41°56.5'S, 64°41.6'W which is a hazard to navigation and fishing operations. It is recommended that vessels give this hazard at least a 2 mile radius.

7.9 **Golfo San Jose** (42°14'S., 64°26'W.) is entered between Punta Quiroga and Punta Buenos Aires, bold cliffy headlands 30 to 46m high, located 4 miles to the E of Punta Quiroga. Lights are shown from both points.

Shoals extend W for a distance of 1.8 miles from Punta Buenos Aires and E for a distance of 1.4 miles from Punta Quiroga, leaving a passage between them only about 0.5 mile wide, with 3.9m patches and a 5.5m patch in mid-channel.

The passage provides access to the gulf. It runs exactly through the center of the mouth and facilitates entry with the help of radar. Soundings will confirm a vessel's position both day and night without the use of bearings. Local knowledge is essential.

When the wind opposes the tidal current, heavy rips are caused. The entrance has an unpleasant appearance owing to the rocky ledge over which the water ripples so much that a stranger would hardly think it safe to enter. The depths inside the gulf increase rapidly outside the shoal depths near the shore.

The entry points are clearly distinguished and the contours are easily detected by radar.

Tides—Currents.—In the entrance to Golfo San Jose and off the N shore of Peninsula Valdes strong tidal races are encountered. Under certain conditions the waves are so strong and so high that small vessels encountering them may suffer loss of control.

The shores of the gulf are bordered by cliffs about 50 to 60m in height. Cerro San Jose, 14 miles SE of Punta Quiroga, is 114m high and the highest point on the shores of the gulf.

7.10 **Punta Tehuelche** (42°24'S., 64°18'W.), about 1.7 miles N of Cerro San Jose, is prominent and marked by a white patch. The top of Cerro El Monticulo, about 6.5 miles E of Cerro San Jose, resembles a truncated cone.

Anchorage.—Fondeadero La Argentina, in the SW corner of Golfo San Jose, affords very good anchorage, sheltered from winds from the S and W, but it is not protected from winds from the NE quadrant, which cause a heavy sea.

Punta Tehuelche Light

Vessels anchor, in about 23.8 to 32.9m, sand, inside the line of the most salient points near the anchorage.

Fondeadero Pueyrredon, in the SE corner of the gulf, affords anchorage, in about 25.6m, fine sand bottom, about 2 miles from shore. The anchorage is good, but the sea is heavy during winds from the NW quadrant.

Fondeadero Sarmiento, situated about 12 miles E of Punta Buenos Aires, in the NE corner of the gulf, is the best anchorage. The quality of the bottom is good and the depths increase gradually from shore. The usual anchorage is in 20m, with a bottom of mud, sand, and small shells.

Fondeadero San Roman, on the N side of the gulf, about 5 miles E of Punta Buenos Aires, is sheltered from winds from the NE and NW.

From Punta Buenos Aires to Punta Norte, 29 miles ENE, there is a continuous cliff with an average height of about 61m. This coast is fringed by spits extending about 0.7 mile seaward. Punta Norte is lower than the adjacent cliffs.

Peninsula Valdes

7.11 Punta Norte (42°04'S., 63°46'W.) is the N extremity of Peninsula Valdes, which does not differ from the pampas of the mainland. The land is sparsely covered with grass and thorny stunted bushes, with long stretches of shallow wave-like depressions which give the impression of the greatest uniformity and barrenness.

Off the E coast of Peninsula Valdes, the tidal races attain a velocity of up to 8 knots, depending upon the strength of the wind and tide. Vessels should stay at least 4.5 miles off this coast. It is also advised to stay at least 25 miles off this coast to avoid the possibility of being forced into the sometimes violent rips.

A shoal, with a depth of 7.3m, lies 17 miles E of Punta Norte and a shoal, with a depth of 5.7m, was reported to lie 19 miles ESE of Punta Norte. Several shoals have been reported in the vicinity of the former shoal with violent overfalls.

From Punta Norte to Punta Cantor, about 27 miles SSE, the coast is lower than that W of Punta Norte and consists of shingle beach with a few low sand dunes; it is fronted by breakers with shallow irregular depths extending 3 miles offshore.

A group of houses, with red roofs and white fronts, are situated at Varni, about 3 miles S of Punta Norte and is visible about 8 miles.

There are numerous shoals and reefs offshore of **Punta Bajos** (42°23'S., 63°37'W.) lying N and S of the point. Some of them uncover and are dangerous.

Violent choppy seas and eddies are observed 8 miles from the coast and between the parallel of 42°12'S, and Bajos Point.

Depths of 3.1m and 4.2m lie 18 and 23 miles NE, respectively of Punta Bajos. A depth of about 4m lies about 11 miles ENE of the same point.

The entrance to **Caleta Valdes** (42°30'S., 63°36'W.) opens up between the narrow and low spit of broken stones projecting from Cantor Point toward the N, about 0.2 mile, and Cero Point, the S end of the stony spit that starts to the N of Bajos Point. The entrance is 130m wide, with depths between 4.3 and 4.9m. The speed of the tides are great during the second and third quarters of the flood and ebb tide.

The tides attain up to 4 knots in almost the entire area and up to 8 knots in the area where choppy waters are observed. During the first and last quarters of the flood and ebb tides, speeds decrease to zero during phase change time.

Tidal currents at the entrance run E and W at 4 to 6 knots.

Punta Cantor, 37m high, is the end of a chain of cliffs that extend S to Punta Hercules.

Anchorage.—Anchorage is available off the inlet and 1 mile away, in a depth of 10 to 15m, with good holding ground of sand and broken stones.

Caution.—The entrance to Caleta Valdez may change its position by as much as 1 mile after an E gale. Only vessels with local knowledge should enter Caleta Valdez.

A conspicuous wreck lies on the shore about midway between Punta Cantor and Punta Hercules.

7.12 Punta Hercules (42°37'S., 63°35'W.), 6 miles S of Punta Cantor, is a white cliff 69m high. When first seen it appears perpendicular, or rather overhanging. Close N are two

perpendicular cliffs of the same height, off which a shoal ledge of limestone extends 2 miles seaward and 3 miles along shore. Punta Hercules is reported to give a good radar return.

Punta Delgada (42°46'S., 63°38'W.), about 9.5 miles SSW of Punta Hercules, is sloping and green and 50m high. A limestone ledge extends 1.5 miles to the S and E.

During winds from the SE quadrant, vessels should avoid a close approach to this point, owing to a strong current. The current pulls parallel to the coast with speeds up to 4 knots.

From Punta Delgada, the coast trends WSW for a distance of about 25 miles to Morro Nuevo and consists of steep cliffs, 50 to 59m high, fringed by reefs for a distance of about 0.5 mile offshore. When seen from the S at a distance over 3 miles this coast has the appearance of a vertical cliff of uniform height.

The only breaks in the line of the cliff are Lobo Peak, Sayago Peak, and Bravo Peak. Lobo Peak appears to be a double peak when approached from the S.

A conspicuous wreck lies on a spit about 1.7 miles SW of Punta Delgada.

Golfo Nuevo

7.13 Golfo Nuevo (42°40'S., 64°30'W.) is entered between steep Morro Nuevo and Punta Ninfas, about 9 miles SW. The gulf is used by submarines for submerged training. It is recommended that merchant vessels avoid the area when the International Code Signal NE 2 is displayed for this exercise.

Punta Ninfas Light

Morro Nuevo (42°51'S., 64°09'W.) marked with a light, rises to an elevation of 103m and is steep-to. The land to the N of it is sandy and covered in places with grass and bushes of a yellowish-gray color.

Punta Ninfas (42°57'S., 64°20'W.) appears as a double point that is bare and yellowish-red in color. Reefs that uncover at LW extend about 0.5 mile NE of the point. The tidal currents run with a velocity of 4 or 5 knots over the reefs; with winds from the W, strong eddies are formed. It is advisable to give this point a berth of 2.5 to 3 miles.

It is reported the entrance to the gulf is easily recognized as the entrance points are well outlined. The entrance is reported to give a good radar return.

Caution is advised as the radar return from the SW entrance will probably be the SE extremity of the headland and not Punta Ninfas.

The E shore of the gulf, from Morro Nuevo NW to Cerro Cormoranes, a rounded and conspicuous 105m high hill, is uniform with high cliffs continuing a short distance beyond Cerro Cormoranes.

Puerto Piramide (42°36'S., 64°18'W.) lies between Punta Pardelas, a difficult to identify point lying 9 miles N of Cerro Cormoranes, and Punta Piramide, 2.5 miles NW of Punta Parde las Cerro Piramide, on Punta Piramide, is a pyramidal hill, 64m high, and although lower than other hills in the vicinity, is conspicuous.

Cerro Frigio, 93m high, is located about 0.5 mile NE of Cerro Piramide. The port affords shelter in all but S winds, when it is unsafe.

7.14 Piramide (42°35'S., 64°17'W.) is a small village with a post office and daily bus service to Puerto Madryn. The town caters primarily to tourists. A small mole is located at Piramide.

Two range beacons, for a measured distance course on the N shore of the gulf, in line bearing 095°, are located at Puerto Piramide. The front beacon stands on Punta Piramide; the rear beacon stands on the E shore of Puerto Piramide. The 22m high beacons are equipped with a trapezium-shaped screen with a red triangle, point up on the front beacon and point down on the rear.

Anchorage.—The best anchorage is in 11m, sand and mud, with Cerro Piramide bearing 270° and a charted lighted beacon bearing 022°. Depths closer inshore shallow rapidly and the bottom is rocky.

A measured distance marked by three pairs of range beacons is located on the N shore of Golfo Nuevo, WNW of Punta Piramide. The W and central ranges are located, with their front beacons, about 13 and 11 miles, respectively, WNW of Punta Piramides. The E range is located with the front beacon about 10 miles NW of the same point.

The distance between the E beacon and the central beacon is about 1,741m; the distance between the W beacon and the central beacons the distance is about 4,434m.

Caution.—Unexploded ordnance is situated on the bottom along the track used for the measured distance.

A whale/dolphin-avoidance corridor has been established in Golfo Nuevo due to the periodic presence of Southern Right Whales. This corridor is in effect from 1 June until 30 November every year. During this period vessels are requested to take precautions to avoid collisions with whales and dolphins and report any sightings to Puerto Madryn Prefectura Naval. The limits of this corridor are as follows:

1. North Limit—Lines joining the following positions:

a. 42°53'S, 64°10'W.
b. 42°44'S, 64°56'W.
c. 42°44'S, 65°00'W.

2. South Limit—Lines joining the following positions:
a. 42°46'S, 65°00'W.
b. 42°46'S, 64°56'W.
c. 42°55'S, 64°18'W.

Puerto Madryn (42°46'S., 65°02'W.)

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7.15 Puerto Madryn is located on the W side of Golfo Nuevo, is surrounded by a range of hills about 90m in height. The port is one of the safest and best protected natural ports in Argentina.

Puerto Madryn Home Page
http://www.appm.com.ar

Winds—Weather.—The prevailing winds blow offshore; E winds are rare and raise little sea. During the day, W winds become strong. In winter, stormy squalls can blow up in as little as 15 minutes.

Tides—Currents.—The average tidal range is over 5m.

Depths—Limitations.—Depths off the coast between Puerto Madryn and Punta Loma, 7 miles ESE, are very irregular. A bank, with depths of less than 9.1m, and a minimum depth of 3m near its extremity, extends 2 miles N from Punta Loma.

A similar bank, with a depth of 6.4m near its extremity, extends 2 miles N from Punta Este. Depths of less than 5.5m extend 1 mile NE of Punta Cuevas.

Muelle Luis Piedra Buena, a steel pier, about 457m in length, is situated at Puerto Madryn. The outer part of the pier has depths of 3.3 to 4.8m alongside. Vessels with a draft of 6.1m, have berthed at HW along the N side, but are subject to grounding at LW on the S side. An extension to the pier creates two berths for passenger vessels, accommodating ships up to 240m in length, with depths alongside of 10 to 17m.

Muelle Almirante Storni, a concrete pier about 1,100m long, extends E from the shore about 1.5 miles N of the steel pier. The pier has six berths ranging from 198 to 298m long, with depths alongside of 4.2 to 16.8m. The deepest berth is intended for loading aluminum but can be used by other vessels.

Aspect.—Puerto Madryn is surrounded by a range of hills about 90m in height. Between these hills and the shore there are sandy hills, 6 to 12m high, that are thinly covered with brush. In several places the shore is formed by white cliffs, 12 to 15m high.

Punta Cuevas and Punta Estes, on the S side of the port, with heights of 24 and 22m, respectively, are conspicuous because of their yellowish cliffs. A small red house and a mast stand on the summit of Punta Cuevas. The buildings of the naval station located about 0.3 mile SE of Punta Cuevas are conspicuous.

Punta Loma and Cerro Avanzado, 3.25 and 4.25 miles SE, respectively, of Punta Este, are also conspicuous. Cerro Avanzado is yellowish and round in shape. It is the end of a series of cliffs which advance toward the coast. A black slatted iron skeleton beacon, 15.8m high, stands on its summit.

A conspicuous sewage plant tank stands about 0.6 mile WNW of the steel pier.

Behind the town of Madryn there is a conspicuous white cliff about 136m high.

Del Norte Beacon, a red slated iron skeleton, 15.8m high, stands about 3 miles NNW of the steel pier at Puerto Madryn.

Pantalla Norte Beacon, 7.3m high, consisting of four tripods supporting a white cross on a black background, stands about 2.7 miles N of the steel pier.

Pantalla Sur Beacon, 7.3m high, consisting of four tripods supporting a white cross on a red background, stands about 2 miles NNW of the steel pier. There are several windmills about 2 miles WNW of the town.

Pilotage.—Pilotage is compulsory for all vessels. The pilot must be requested through the vessel's agents in Buenos Aires at least 72 hours in advance.

Pilots board at the anchorage 1.5 miles SSE of Muelle Luis Piedra Buena.

Contact Information.—Puerto Madryn pilots can be contacted, as follows:

1. VHF: VHF channels 9, 10, and 16
2. Telephone: 54-2965-450500
   54-2965-456700
3. E-mail: nautical@nauticalsrl.com
   atlantismarine@speedy.com.ar

Puerto Madryn can be contacted, as follows:

1. VHF: VHF channels 9, 12, 14, and 16
2. Facsimile: 54-2965-455521
3. E-mail: operaciones@appm.com.ar

Anchorage.—Anchorage can be taken, in 18m, mud, about 0.5 mile E of the head of the steel pier. A dangerous wreck lies 0.25 mile SE of the head of the pier. The anchorage is sheltered as E winds are rare and when they do blow they raise little sea, however, W winds become strong during the day and in winter stormy squalls can blow up in 15 minutes.

There is an anchorage, in 30 to 40m, 1.5 miles SSE from the head of the concrete pier and a temporary anchorage 0.75 mile NE of the head of the concrete pier.

There is also a good anchorage, in depths of about 14m, 1.25 miles E of Punta Cuevas. A large mooring buoy is moored close SW of this anchorage.

Caution.—A dangerous wreck and a stranded wreck lie 0.25 mile ESE and 0.7 mile SSE, respectively, of the head of the steel pier.

An obstruction lies about 0.4 mile S of the head of the concrete pier.

7.16 The coast from Cerro Avanzado SE to **Punta Cracker** (42°56'S., 64°33'W.) presents the aspect of a cliff of uniform height. Other hazards to navigation are best seen on the chart.

Fondeadero Cracker (42°56'S., 64°29'W.) lies between two white cliffs. Rocky ledges extend about 0.3 mile drying at LW, and are the only dangers in approaching the bay. There is a large ranch in the valley close to the E cliff.

Anchorage.—The depths here decrease very rapidly toward the shore, and it is advisable for vessels to anchor, in a depth of about 24m on the line of the charted range beacons.

This anchorage is well protected against winds from the SE and from the W, but offers no protection against winds from other directions. The bottom provides good holding.

Punta Ninfas to Punta Roja

7.17 From Punta Ninfas to Punta Leon, about 10 miles SW, the coast consists of a high, sheer cliff. There are occasional deep ravines. It is bordered by a spit, 0.1 to 0.15 mile wide, which dries. Punta Leon can be recognized by a small hillock on its top. From E, the point appears as the S end of the first land to be seen. From S, it appears as the highest part of the coast.

A sunken wreck is reported to lie about 6.5 miles SE of Punta Ninfas Light.

Bahia Engano (43°20'S., 65°00'W.) lies between Barranca Norte and Punta Castro, 8.5 miles SSW. The land is low and sandy, with many sand hummocks near the beach. The water is shallower than near the higher land.

To the S of the Rio Chubut there is a range of tableland, about 19.8m high, ending in white chalky looking cliffs. Punta Castro is the NE end of the tableland.

The shore of the bay is fringed with reefs and the 5.5m curve is about 0.3 to 1.2 miles from shore.

Chubut Light

The **Rio Chubut** (43°21'S., 65°03'W.) is very shallow, but can be entered by small craft with local knowledge. There are always breakers on the bar.

A breakwater extends about 0.4 mile ESE from the N entrance point of the river. The S breakwater is nearly covered at HW. The ebb tidal current is strong.

A group of bathing huts stands about 1.7 miles NNE of the mouth of the river. A conspicuous masonry tower, 30m high, with a red tile roof stands with the huts.

Anchorage.—Anchorage, with good holding ground, can be taken off the entrance to the river. The bottom N of the entrance is fine sand, mud and shingle with a gentle slope. To the S it consists of rock, tosca, or chalk, with some patches of sand. The anchorage is open to winds from the S, E, and NE which raise heavy seas.

After a storm passes, there will be high swells which may make a vessel roll heavily, as its head will be into the current which runs almost parallel to the coast.

A dangerous wreck lies about 5 miles NE of the entrance to the Rio Chubut.

A dangerous wreck with a mast showing lies close NE of the anchorage, about 2 miles E of the entrance to the Rio Chubut.

The climate in this area, while somewhat harsh in the winter, is dry and healthy. The prevailing winds are W and SW. Rain is rare along the coast.

7.18 From Bahia Engano to **Punta Delfin** (43°32'S., 65°11'W.), the coast is almost a straight line with an elevation of about 15m. There is a sharp rise to 177m close to the point.

A small conical, conspicuous, hummock, 160m high, with a narrow white stripe from top to bottom, stands on the tableland N of the point.

From Punta Delfin to Punta Lobos, about 16 miles SSW, the coast is high and bold.

Sharp white cliffs, with several ravines, extend from close S of Punta Delfin to close S of Punta Lobos and are visible up to 25 miles away.

Isla Escondida (43°43'S., 65°17'W.), a small island about 80m long in a E-W direction, lies 4.5 miles NNW of Punta Lobos. A spit circles the island and extends E about 150m. The island is difficult to see because of its small size and low elevation at HW. A ravine on the coast opposite the island is conspicuous.

7.19 **Punta Clara** (43°58'S., 65°14'W.), 11 miles SSE of Punta Lobos, is a rocky projection is fringed by reefs which extend 50 to 183m off the point. It is of a dark-reddish color.

A rock, with 1.2m of water, lies about 2.5 miles NW of Punta Clara. The rock is not visible at HW as it is covered with kelp. Occasionally, the sea breaks over this rock.

Bahia Janssen lies between Punta Clara and Punta Tombo, about 4 miles SE. It is divided into two parts by Punta Tapera. The N portion is Fondeadero Janssen and the S portion is Fondeadero Homero.

A reef, with a depth of 0.3m at its seaward end, extends about 0.7 mile to the NE from Punta Tapera. Except during calm seas, breakers are reported to occur on the reef. The reef is covered with kelp which is not visible at HW.

Punta Tombo (44°02'S., 65°11'W.) is about 1.5 miles in length and has an average width of about 0.2 mile. Drying reefs extend about 0.15 mile NE of the extremity of the point.

Tide rips extend about 1 mile NE of the point. Heavy overfalls, which are dangerous to small craft, occur over a 9.4m rocky shoal about 2 miles E of Punta Tombo.

From the N, the point appears to be white except for the extremity which is dark rock. From the E or S, the entire point appears dark-colored.

Islote Chato lies about 0.7 mile WNW of Punta Tombo. It is about 73m long in a NE-SW direction, 30m wide, very low, and bordered by a spit up to about 0.1 mile wide. A submerged rock, with 3m of water, lies about 0.3 mile E of this islet. The rock breaks at mean tide and tide rips have been seen around it.

Anchorage.—Anchorage can be taken, in 18m, good holding ground, either in Fondeadero Janssen or Fondeadero Homero, the former being protected from all winds except those from between NNE and SSE and the latter is protected from all winds except those from between N and SE.

7.20 Punta Atlas (44°08'S., 65°13'W.), 6 miles S of Punta Tombo, is about 20m high, sloping gently to a low rocky point. When approached from the E it appears as a rough escarpment of rock. A 4.9m rocky shoal, that often breaks, lies about 1.2 miles SSE of the point.

Anchorage.—Anchorage is available opposite the point with good holding ground, in depths of 6.7 to 7.3m, sand and broken stone.

Monte Triste (44°04'S., 65°21'W.) is 91m high and conspicuous. Monte Triste is the SE of two similar hills which appear close together when seen from NE and it appears rounded when seen from E.

Bahia Vera (44°12'S., 65°15'W.) lies between Punta Atlas and Cabo Raso, about 12 miles S. Arrecife Somoza, about 1.7 miles WSW of Punta Atlas, is the drying portion of the shoal which extends S from the N shore of the bay. It is about 0.4 mile long NE-SW and about 0.1 mile wide. The sea always breaks over it.

Anchorage.—Fondeadero Atlas, located at the N end of Bahia Vera, is W of Arrecife Somoza and provides anchorage for small vessels, in depths of 4.6 to 5.5m, poor holding ground, with a bottom of sand and shingle. Anchorage can also be taken, in 14.6m, about 2.5 miles SW of Punta Atlas.

With a strong wind from SE, a sea may be thrown into this section of the bay, over and around Arrecife Somoza, the natural breakwater, from the beginning of the last quarter flood to the end of the first quarter ebb, during which time the reef is covered. The beach, however, does not show the effects of much sea. The tidal currents set through between the reef and the shore with a velocity of about 1 knot.

Several above and below-water rocks, reefs, and islets lie up to 3 miles off of **Punta Loberia** (44°17'S., 65°16'W.), which lies 8 miles SSW of Punta Atlas. Breakers and tide rips occur frequently in this area.

Caleta Raso (44°20'S., 65°14'W.) lies between Punta Pescadero and Cabo Raso, and is protected from all winds except those from the NNW, N, NE, and E.

Anchorage.—Anchorage can be taken, in 11m, good holding ground of shingle, fine sand, and small shells, on the line of range beacons, with the light structure on Cabo Raso bearing 157°. Strong currents may be encountered while approaching the anchorage.

7.21 Cabo Raso (44°20'S., 65°14'W.), level and rather low, is rock covered with sand and shingle; there are a few rocks close to its extremity. The coast can easily be identified by radar because of the well-defined geographic features.

Bahia Cruz, about 8 miles in width between Cabo Raso and Peninsula Betbeder, is open to winds from the NE and SE and is fringed by rocks.

In this bay there are two coves, Caleta Juan Jose Paso and Puerto Larrea. The latter is a poor anchorage.

Rocas Gutierrez consist of two shoals, 5.5m and 1.8m, about 3.5 miles S of Cabo Raso. These rocks are marked by kelp and breakers. Vessels are cautioned not to pass between the rocks and the shore.

Roca Salaverria, a drying rock, lies about 5 miles E of Rocas Gutierrez.

Rocas Cordova consist of three rocky heads about 8 miles SSW of Cabo Raso. The southernmost head covers when the tide has risen 0.33 its height. Tide rips occur in this area.

Roca Oyarvide, consisting of two rocky heads, lies about 1 mile NE of Cabo San Jose. This shoal covers when the tide has risen to 0.75 its height.

Breakers occur on the rock during flood tide and seas out of the E. Breakers can be seen on a shoal that lies about 91m E of the S end of the rock.

Roca Clarizza, which lies 1.75 miles N of Cabo San Jose, covers when the tide has risen 0.75 of its height. Breakers occur to the WNW because of shoals in the area.

7.22 Monte San Jose (44°31'S., 65°17'W.), located near the SE extremity of Peninsula Betbeder, is 76m high, has a reddish color, and is steep. It is easily recognized. Cabo San Jose, the E extremity of Peninsula Betbeder, is 78m high, sheer granite rock, and conspicuous.

Roca Salaverria, two conical rocks which dry and occasionally break, lies about 7 miles SE of Cabo Raso. An 11m shoal lies about 0.5 mile N of the rock.

When the wind is opposite to the tidal current, there is a line of tide rips between Roca Salaverria and Cabo Raso.

Puerto Santa Elena (44°32'S., 65°12'W.) is about 1.7 miles wide between Cerro San Fulgencio, 63m high on its W side, and Punta Acertada, 33m high on the E. Cerro Inciarte, 83m high, and Cerro Serrano, 187m high, are conspicuous rock hills located at the head of the bay.

Arrecife Del Florido, which covers at three-quarters flood, lies about 0.7 mile W of Punta Acertada. Shoal depths of 3 to 5.5m extend about 0.2 mile WNW.

Anchorage.—Anchorage can be taken in the NW corner of the port about 0.4 mile SW of Santa Elena Light, in depths of 10 to 11.9m, sand and mud, good holding ground.

Vessels should not anchor near the shore, for when the sea is heavy, the ground swell breaks for some distance off. This anchorage is uncomfortable with winds from the S to SE.

Anchorage can also be taken in 11m, mud and gravel, about 0.5 mile N of Arrecife Del Florido. Good anchorage can also be taken, in 14.6m, mud and fine sand, a little over 0.5 mile NNE of Cerro San Fulgencio.

Puerto Concepcion (44°33'S., 65°22'W.) lies between Cerro San Fulgencio and Punta Roja, about 2 miles S.

Anchorage can be taken, in 11m, sand and shell. It is protected from winds from the NW and SW. The bay is

penetrated by the swell which sweeps round the entrance points.

Punta Roja to Cabo Dos Bahias

7.23 Bahia Camarones (44°45'S., 65°35'W.) lies between Punta Roja and Cabo Dos Bahias, a distance of 22 miles to the SSW. Its S part is extensive and affords good anchorage. The shore of the bay is rocky as far as Punta Fabian, about 10 miles SW of Punta Roja, where it changes to shingle. About 15 miles NW of Punta Fabian is Cerro Mesa, flat-topped and conspicuous when seen from the SE.

Bahia San Sebastian (44°35'S., 65°26'W.) is nearly 3 miles wide at the entrance between Punta Loberia, on the E, and Punta Guanaco, on the W.

Shoal depths lie within 0.6 mile of Punta Loberia and a 1.8m rock lies 1.25 miles, bearing 140° from Punta Guanaco.

The rock will generally break at mean tide level in winds from E, W, and S and in swells. It generally will not break in N winds and is dangerous at HW, when it can not be seen.

Punta Loberia, when seen from E or W at HW, appears as several islets. The point should be given a wide berth.

The bay is protected from winds from the NE, through N, to SW. Anchorage can be taken, in 16.5m, sand, in the N part of the bay. A 3.7m shoal lies about 4.5 miles SW of Punta Guanaco. A 9.1m shoal of stones lies 2.5 miles further SW.

7.24 Islas Blancas (44°47'S., 65°40'W.), at the head of Bahia Camarones, is a rocky island about 27m high, with two lower and smaller ones to the NE. They are covered with guano. Shoals exist in the vicinity of the islands.

A dangerous wreck lies in 11m, about 0.3 mile SE of **Punta Albatross** (44°48'S., 65°42'W.). Another obstruction, apparently a wreck, lies in 20.1m about 1 mile SSE of the point. Vessels with a draft greater than 5.5m should not approach within 1.5 miles of Punta Albatross.

Roca Hermelo, with 5.8m of water and which very seldom breaks, lies about 3 miles S of Islas Blancas. A shoal, with a depth of 7.6m, lies 0.3 mile W of the rock.

A concrete quay, 30m long, with about 5m alongside, is situated at the town of **Camarones** (44°48'S., 65°43'W.).

Tides—Currents.—In Bahia Camarones, the tidal currents set along the shore and especially off the headlands, with velocities of 1 to 3 knots. Their direction is about NNE and SSW.

Anchorage.—Good anchorage can be taken, in 11m, bottom of sand and mud, S of the town of Camarones. The stay at the anchorage is hazardous due to the waves which enter freely and cause a rolling motion. There is good holding ground 0.5 mile SE of Gaviota Point, in a depth of 8.2m, muddy sand. An area where the bottom is fouled by scrap iron is located about 0.5 mile SW of Punta Albatross.

Cabo Dos Bahias to Puerto Comodoro Rivadavia

7.25 Cabo Dos Bahias (44°55'S., 65°31'W.) is a rounded rocky conspicuous point. Its E extremity ends in a low tongue of rock without a spit. A ledge of rocks extends nearly 0.5 mile N from the cape. Isla Moreno, 1.3 mile NW of the extremity of the cape and 183m offshore, is high on its N side, rocky, and of a dark color.

The coast between Cabo Dos Bahias and Cabo de Matas, 6.75 miles SW, is high, cliffy, and broken.

Isla Arce (45°00'S., 65°29'W.), 4.5 miles SSE of Cabo Dos Bahias, is rocky but in many places is covered with grass. It is surrounded by deep water, there being 55m at a distance of 0.5 mile. A rock awash about 0.1 mile E of the N extremity of the island.

The pass, which is about 3 miles wide, between this island and Isla Leones is clear but the current is strong.

Isla Sola, about 3 miles S of Cabo Dos Bahias, is low, black, and difficult to recognize from eastward. There is no passage between this island and the mainland.

Islotes Aguilon del Norte and Aguilon del Sud are two low islets which lie about 4 miles S of Cabo Dos Bahias. Islote Aguilon del Norte is about 0.5 mile from the mainland, but there is no passage between. Islote Aguilon del Sud, when seen from NE, appears as three islets. Both these islets are yellowish in color, with their sides darkened by the action of the sea.

Bahia San Gregorio (45°01'S., 65°36'W.) is exposed to winds from the NE to SE and their accompanying seas. This bay is about 1.3 miles wide at the entrance and indents the coast about 1.5 miles.

The tidal currents off the entrance to the bay run strongly NE and WSW; the anchorage should therefore be approached with caution.

The promontory which forms the N side of the bay can easily be identified from the NE by the numerous hillocks on it. The inner port of the bay is fringed by a wide band of kelp.

Anchorage.—Anchorage can be taken, in 16m, bottom of sand, shell, and gravel, at the intersection of the lines of the range beacons, two white staffs, in range bearing 294°, situated at the W side of the bay.

The front staff has a triangular top mark and the rear staff has a rectangular board at its top and another at its middle.

Two white staffs, in range bearing 013°, are situated on the N side of the bay. The front staff has a cross topmark and stands on a spit. The rear staff has a diamond topmark and stands on a hillock.

The beacons are small and surrounded by shrubs. In the afternoon the sun can make the beacons very difficult to identify, with many large rocks reported on the bottom.

Isla Rasa (45°06'S., 65°24'W.), lying 11.5 miles SSE of Cabo Dos Bahias and marked by a light, is a gray, rocky island which is separated into two parts at HW by a very narrow channel. It is about 0.4 mile long, 137m wide, and 16.7m high.

A reef, on which there are three rocks that dry, extends about 1.7 miles SE from the SE extremity of the island.

A shoal, with a depth of 25.6m, lies 4.4 miles NNE of Isla Rasa. Tide rips have been reported on all sides of the islet.

7.26 Golfo San Jorge, between Cabo Dos Bahias and Cabo Tres Puntas, is 132 miles wide and recedes about 80 miles to the W. The N shore is generally steep and has a number of bays, islands, and shoals. On the S side of the bay there are a few small indentations that are completely open.

Isla Leones (45°03'S., 65°36'W.), off the NE point of the Golfo San Jorge, is 79m high, 2 miles long E and W, 1.5 miles wide, and is covered with brushwood. A reef, on which the sea

always breaks, lies about 0.5 mile SE of the SE extremity of Peninsula Lanaud, the SE extremity of the island. The isthmus between the island and the peninsula is covered at half tide.

A rocky bank, with a depth of 18.3m, lies a little over 1.5 miles SW of the same point. The N shore of the island is fringed by rocks and shoals that extend 0.2 mile offshore.

Isla Sud Oeste is low, rocky, and connected to the SW side of Isla Leones by a reef which is covered at half tide.

Isla Buque, also low and rocky, is located close off the W side of Isla Leones.

A rock, with a depth of 6.7m, lies about 0.5 mile WSW of the N extremity of Isla Buque.

Canal Leones, between Isla Leones and the mainland, is about 0.4 mile wide. The depths in the fairway are about 12.8 to 33m. Strong currents, with velocities of 3 to 5 knots, exist in Canal Leones and cause overfalls and eddies off the various points.

Caution.—Large quantities of kelp may be encountered in Canal Leones.

7.27 Punta San Roque (45°03'S., 65°39'W.), on the mainland about 1 mile W of Isla Leones, is 39m high and rocky with a hummock. A black rock named Cabeza Negra, covered at HW, lies about 183m SW of the point.

While the flood current is running, a vessel should give it a good berth; the set is towards the rock, at velocities of 3 to 5 knots.

Bahia Gil, between Punta San Roque and Peninsula San Antonio about 2 miles W, is about 1.2 miles wide and 1 mile long. Arrecife Bassin, in the middle of the bay, is rocky, black, about 0.2 mile long E-W, and covered at HW. The reef always breaks.

Anchorage.—The best anchorage in Bahia Gil is in 14.6m, pebbles, 0.25 mile NW of the W extremity of Arrecife Bassin.

Winds from between ESE and S are reported to send in a heavy swell.

Bahia Gil is reported to be preferable to Bahia Huevo as an anchorage, the bottom being mud, the space less limited, and the access easier.

Peninsula San Antonio, 88m high, is joined to the mainland by a gravel isthmus about 0.3 mile long and 128m wide.

A steep-to islet lies near the W side of Cabo del Sud, the S extremity of Peninsula San Antonio.

A 9.6m shoal is reported to lie about 0.3 mile WSW of Cabo del Sud.

Bahia Huevo (45°03'S., 65°43'W.) lies between Peninsula San Antonio and Isla Valdes. The latter is nearly 1 mile long, NW and SE, nearly 0.5 mile wide, and 66m high.

The bay is sheltered from all but SE through W winds and is one of the best harbors on the coast. The entrance is E of Isla Valdes. Vessels can steer by eye, as there is no hidden danger.

The entrance is about 0.2 mile wide, with general depths of 14.6 and 16.5m; about 183m from the E extremity of Isla Valdes is an 8.7m depth. South winds send a swell into the bay.

There is a small reef, which is covered at high tide, close-to and W of Cape Sur at the end of Peninsula San Antonio.

Tides—Currents.—The flood current sets through the harbor from W to E and SE, with a velocity of about 1 knot. The ebb is scarcely felt.

Los Frailes, a group of five rocks, lie about 1.2 miles WSW of Isla Valdes. Only three of the rocks show at HW, but all five show at LW. A 4.9m rocky patch lies about 0.9 mile NE of this group; it is very small and the sea does not break.

A rock, with a depth of 5m, lies about 0.8 mile W of the N extremity of Isla Valdes.

Anchorage.—The best anchorage in Bahia Huevo is in the center of the port, in about 8.2m, pebbles and fine sand, with the N extremity of Isla Valdes bearing 262° and the SE point of the same island bearing about 167°.

Due to the abrupt changes in the quality of the bottom, it is recommended that the anchorage be checked before anchoring.

7.28 Bahia Cayetano (45°02'S., 65°45'W.), 2 miles to the W of Bahia Huevo, is partially protected from S winds by Islas Cayetano, a group of reddish-color rocks which have a maximum height of 53m. The islands extend about 0.7 mile in an E-W direction.

The S entrance to the bay, between the easternmost of the Islas Cayetano and **Punta Guanacos** (45°02'S., 65°44'W.), is 0.33 mile in width and has depths of 14.6 to 20.1m. The entrance N of Islas Cayetano has a charted depth of 6.4m.

Isla Pan de Azucar, 2.25 miles SW of Islas Cayetano, is 54m high, conical, rocky, and steep. It has a cairn on its summit, an islet off its N side, two islets off its W side, and two islets off its E side. This island does not appear as a sugarloaf as its name would indicate.

The islet lying to the NW is very small and at HW only a small portion of it is visible. A reef which extends to the NW of this islet ends in a rock which uncovers.

North of the two E islets are four rocks, which at extreme LW appear as two.

Islote Spur is a pointed white rock about 0.7 mile N of Isla Pan de Azucar. A reef, marked by kelp, extends about 183m E of the rock.

Anchorage.—Vessels can anchor, in a depth of 6.4 to 8.2m, gravel, about 0.1 mile N of the E end of Catetano Island.

This anchorage is not sheltered and should only be used temporarily.

7.29 Puerto Melo (45°02'S., 65°51'W.), about 2.2 miles wide at the entrance, recedes about 2.2 miles and has a number of islands and islets in its entrance.

The W half of the bay is shallow and has many drying parts, but the E portion has depths of about 11 to 12.8m in the deepest part near the entrance. Local knowledge is essential.

A beacon stands on Punta Picachos, the S extremity of the peninsula that forms the E side of Puerto Melo. A beacon stands on the NE shore of the bay.

Tides—Currents.—Tidal currents off this part of the coast are strong and set along the shore with velocities of 2 or 3 knots.

Off the projecting points and in confined passages the strength is, of course, increased and causes heavy tide rips when opposed to the wind.

Within Puerto Melo the flood current attains a velocity of about 0.5 knot, while the ebb current is scarcely perceptible.

Anchorage.—Anchorage can be taken in the middle of the entrance to Puerto Melo, in about 11m, sand. The holding ground is good. West winds raise little sea.

7.30 Roca Racial, which shows only at very low tide and which seldom breaks, lies about 1.2 miles W of Isla Pan de Azucar.

Roca Bergara, a small drying rock which breaks at half tide, lies about 0.7 mile WNW of Roca Racial. About 0.1 mile ESE of Roca Bergara is a rock which does not uncover.

Roca Flora, which dries and which breaks at half tide, lies about 1.7 miles WSW of Isla Pan de Azucar.

Rocas San Pascual, two black rocks which seldom cover, lie nearly 4 miles W of Isla Pan De Azucar.

Islote Cangrejos, which lies about 0.7 mile N of Rocas San Pascual is a low black islet, circular in shape, about 60m in diameter and conspicuous.

A 0.4m rocky shoal, marked by kelp, lies about 1.2 miles WSW of Islote Cangrejos.

Between **Punta Castillos** (45°03'S., 65°56'W.), and Punta Tafor, about 17 miles to the W, there are various coves suitable only for small vessels. Several small islands lie W of Punta Castillos.

7.31 **Isla Tova** (45°06'S., 66°00'W.) is 50m high, covered with vegetation, and extends about 3 miles in a WNW and ESE direction. The SW shore is difficult to approach and off it are a number of islands and shoals. A cairn beacon, about 1.8m high, stands close S of Punta Norte, the NW extremity of the island. The N shore is accessible and has two anchorages.

Roca Leon Marino, about 0.7 mile NE of Punta Norte, covers at HW, is dark, and the sea always breaks.

Isla Tovita lies close E of the SE extremity of Isla Tova. It extends about 1.2 miles in a NW and SE direction and is joined to Isla Tova at LW.

A 9.1m shoal lies about 1 mile NNE of the NE extremity of Isla Tovita. Isla Este lies about 0.1 mile E of the SE extremity of Isla Tovita and is only about 0.2 mile in extent.

Isla Gaviota, low and rocky, lies about 0.2 mile N of the NW end of Isla Tovita and is about 1 mile in length in a N and S direction. A drying reef connects the two islands.

About 0.7 mile E of Isla Este is a dangerous reef which covers at HW. Between this reef and the islet is a deep channel in which the current is strong. Breakers occur E of the reef.

Rocas Medrano, which lie about 3 miles SSE of Isla Este, uncover at low tide. The sea usually breaks heavily except in a calm. Roca Pinguino, which dries about 0.3m, lies 0.25 mile N of Punta Este, the NE extremity of Isla Tova.

Anchorage.—Anchorage can be taken in Bahia Del Fondeadero, located between Isla Gaviota and the NE shore of Isla Tova, in 11m, sand, good holding ground. The anchorage is protected from all winds except from the NNW, N, and NNE, but they do not raise heavy seas. The heaviest squalls are from the SW, which batter the N shore of Golfo San Jorge and causes a heavy surf to roll S into the anchorage.

A rock, awash, lies 2.25 miles WNW of Punta Norte. A sunken rock lies about 0.2 mile E of the above rock and another sunken rock lies about 0.1 mile to the W. Kelp marks the vicinity of these rocks. A rock, with 5.9m and marked by kelp, lies about 1 mile W of the rock awash.

7.32 Islote Gran Robredo, located about 2.5 miles SW of Isla Tova, is a rock with a reef lying off its NE extremity and a small island lying close off its S extremity. Islote Pequeno Robredo lies about 1 mile WNW of Islote Gran Robredo.

About 1 mile NE of Islote Pequeno Robredo is a drying rock. About 1 mile NE of Islote Pequeno Robredo is a rock with less than 1.8m. Numerous rocks and islets lie close to the SW side of Isla Tova. A drying rock lies about 3 miles W of Islote Pequeno Robredo.

Caution.—The area in the vicinity of **Punta Tafor** (45°03'S., 66°17'W.) is reported to not agree with the chart.

Islas Lobos, located about 1.8 miles SW of Tafor Point and extending to the SW, are of a dark color and are fringed with rocks.

7.33 **Bahia Bustamante** (45°08'S., 66°24'W.) lies between Punta Ezquerra and Punta Ulloa, the E extremity of Peninsula Gravina, 6.5 miles to the SW.

The land around the bay has a number of small hills which obscure the high pampa behind, the most conspicuous of which are Tetas De Pineda, two hills lying E and W of each other in latitude 45°06'S, which can be easily recognized from S and SE; from the E they appear as a single hill.

The shore consists of rugged rock cliffs, interspersed by stony beaches.

The bay contains many islets, rocks, and shoals which are hazards to navigation.

Several conspicuous buildings are located close W of Punta Ulloa. A light is shown about 0.6 mile W of the point. A light is shown from the W shore of the bay about 3 miles WNW of the point.

Islas Viana (45°11'S., 66°24'W.), a group of islands lying 3.5 miles SE of Punta Ulloa. The N island is the largest and off its E side a reef projects about 0.4 mile to the E. The S island is the lowest and has three pointed black hillocks.

A beacon, 9m high on a black tripod, is shown from the S side of the N island. A sunken wreck lies about 0.6 mile SSE of the light structure.

Isla Cevallos, about 3 miles NNE of Islas Viana, is low, dark. and devoid of vegetation. The sea breaks heavily on it and it is difficult to recognize against the mainland.

About 0.7 mile NNW of the islet lies a rock, with a depth of less than 1.8m, located on the end of a rocky bank marked by kelp extending from the islet.

Roca Azopardo, a black and pointed rock located about 2 miles ENE of Islas Viana, uncovers at LW. The kelp on this rock is not usually visible, but the sea breaks over it except in calm weather.

Paso Sud, between Islas Viana and Peninsula Aristizabal, is the best approach to Bahia Bustamante as it is wide, clear, and straight and has depths of more than 11m. It is the only pass recommended at night.

Anchorage.—The holding ground is good everywhere in the bay, but the depths and bottom vary greatly.

The best anchorage is in about 9.1m, sand, shell and mud about 1.5 miles NW of Punta Ulloa. The anchorage is good in N and W winds which raise a slight sea. Winds from the SW and S bring in a heavy ground swell which place a strain on the anchor.

7.34 Cabo Aristizabal (45°13'S., 66°31'W.), the SE extremity of Peninsula Aristizabal, lies 5 miles SW of Punta Ulloa and appears yellowish. A light is shown from the cape.

Cabo Aristizabal Light

From Cabo Aristizabal to Isla Quintano, about 8 miles W, the coast is low. About 4.3 miles W of the cape there is a group of rocks, one of which shows above-water, extending S from the shore for a distance of nearly 1 mile. They are marked by kelp.

Isla Quintano (45°15'S., 66°42'W.), located about 8 miles W of Aristizabal Point and 1.5 miles from the coast, is low and of yellowish color; a reef, upon which are two small islets, extends 0.3 mile E from its S end.

A group of sunken rocks, which break at half tide, lies about 1 mile E of Isla Quintano and another rock, which is above-water, lies about 0.5 mile NNW of the same island. Passage N of the island is not recommended.

From Isla Quintano to Caleta Cordova, a distance of about 40 miles, the coast is cliffy.

An unmarked anchor lies about 11 miles to the S of Isla Quintano.

Bahia Solano (45°39'S., 67°16'W.) is about 10 miles wide N of Punta Novales. In the N and S parts of the bay, shoal depths of less than 5.5m extend about 2.2 miles offshore.

Falso Salamanca, located about 15 miles N of Punta Novales, is conical in shape.

When seen bearing less than 270°, it appears as a perfect cone; when bearing more than 270°, its summit begins to appear to lean to the N. When bearing more than 341°, the peak is hidden by high tableland.

Pico Salamanca, located about 9 miles N of Punta Novales, is conical in shape. About halfway up is a yellowish horizontal stripe which makes it conspicuous.

Shoal depths extend 1.5 miles off Punta Novales. Restinga Novales, the outer portion of the shoal, uncovers at half tide.

7.35 Caleta Cordova (45°46'S., 67°20'W.), entered between Punta Novales and Punta Pando, is 2 miles wide and recedes about 1 mile. The holding ground in the cove is said to be good. A disused oil terminal, marked by a beacon, is located about 0.7 mile NNE of Punta Pando. Anchorage can be obtained about 1 mile SSW of Punta Novales, in a depth of 12.8m.

Numerous structures of a petroleum facility stand on Punta Pando. On Cerro Loma Blanca, on the W side of the cove, there is a conspicuous white conical shape structure.

Southeastern storms are dangerous and vessels may have to get underway.

Caleta Olivares (45°46'S., 67°21'W.) lies between Punta Pando and Cabo San Jorge, 1.5 miles SSW. Drying reefs, bordered by kelp, fringe Cabo San Jorge to distances of up to 0.7 mile. The coasts surrounding the cove are high and sheer except to the SW, where there is a small beach.

Petrolera Caleta Cordova Terminal (45°46'S., 67°19W.), an SBM used to load oil tankers, lies about 2 miles ESE of Punta Pando in about 23m of water. Pilotage is compulsory. The terminal requires an ETA 7 days, 72 hours, 48 hours, and 24 hours prior to arrival. The terminal is located within a restricted area; instructions, regulations, and signals used when loading are obtained from the terminal.

Caleta Cordova terminal can be contacted, as follows:

1. VHF: VHF channels 9, 16, and 68
2. Telephone: 54-297-4590138

An anchorage for loading tankers is located 4 miles SE of Punta Pando. Another anchorage, in a depth of 12.8m, lies about 1 mile SE of Punta Pando, but caution is necessary when using this anchorage as overfalls occur on a bank lying about 0.5 mile ESE of the anchorage.

Caution.—Two lost anchors and cables lie about 1 and 1.5 miles SE of Cabo San Jorge. There have been many reports of lost anchors, some with lengthy cables, in the offshore anchorage area, the positions of which are indicated by foul areas on the chart.

Restinga Ali, a reef, extends from the coast 3 miles SW of Punta San Jorge (45°47'S., 67°22'W.); another reef, Restinga Sur, extends E from Punta Borja, 3.5 miles farther SW.

7.36 Puerto Comodoro Rivadavia (45°52'S., 67°28'W.) (World Port Index No. 13920) lies on the shores of an open bay roadstead between Restinga Ali and Punta Borja. Alongside berthing is only suitable for coasters; however, the port serves as a center for the oil field in the area.

Winds—Weather.—The port is open to NE and E winds with no protection. The climate is characterized by a windy season with dry weather and pleasant temperatures from

November to April. Vessels should be prepared to leave the port when fresh easterlies occur.

Puerto Comodoro Rivadavia

The winter season is also windy, but with cold and dry weather accompanied by snow. Offshore winds prevail most of the time, particularly in the summer. These winds are often strong and gusty, raising quite a sea. Strong and gusty winds out of the SW to NW will make it impossible to moor in the harbor or to the oil-loading platforms.

Tides—Currents.—The tidal currents are weak in the vicinity of the coast and run parallel to it. Outside, the currents attain a maximum velocity of 1.25 knots. The tidal range is from 2.2 to 5.9m.

Depths—Limitations.—A breakwater extends E from Punta Borja. Cargo is usually offloaded into lighters. Muelle de Ultramar, the main berth, is 216m long with reported depths alongside of 10m. A large pontoon lies sunk about 41m off the end of the breakwater. The berths alongside the town pier are mostly for coasters.

There are piers on the N side with alongside depths up to 7.1m. However, vessels up to 46m in length can go alongside a section of the wharf with a 4.5m depth, but should not stay alongside overnight.

The port should be entered at HW during daylight hours only.

There are three offshore oil-loading facilities located within the formation of three bights between the drying reefs extending offshore. The northernmost bight is between Restinga Ali and Restinga del Medio. The middle bight is between Restinga del Medio and Restinga Coronel. The southernmost bight, between Restinga Coronel and Punta Borja, is used as the landing place. The shore of the bay is composed of low cliffs of regular height and is backed by hills scored by ravines. The port is open to NE and E winds with no protection. The climate is characterized by a windy season with dry weather and pleasant temperatures from November to April.

Aspect.—The port can be identified by three hills separated by deep glens. Cerro Hermitte (45°49.6'S., 67°28.4'W.) has a beacon on its summit and a steep face on the NE. A tank is visible 25 miles offshore from another summit that lies 1.7 miles W of Cerro Hermitte.

Pilotage.—Pilotage is compulsory and 48 hour advance notice is required. Pilots come from Puerto Madryn or Puerto Deseado.

Contact Information.—Puerto Comodoro Rivadavia can be contacted, as follows:

1. VHF: VHF channels 10, 12, and 16.
2. Telephone: 54-297-4473096
3. E-mail: administracion@puertocomodororivadavia

Anchorage.—Vessels can anchor anywhere off the port, in depths of 7.3 to 11m, sand and mud, good holding ground, except within the limits of the prohibited anchorage area.

Directions.—The port can be approached directly from SW by keeping clear of Restinga Ali, Restinga Sur, Restinga del Medio, and Restinga Coronel.

Caution.—Sand waves have been reported about 2 miles ENE of the breakwater.

There are many foul berths due to the loss of anchors and the presence of cables in the vicinity of the offshore area and near the head of the oil pier.

Puerto Comodoro Rivadavia to Cabo Tres Puntas

7.37 Punta Marques (45°57'S., 67°32'W.), 50m high and easily identified by its sheer yellow cliffs, lies 6 miles SSW of Punta Borja. It is the E extremity of a rugged yellowish ridge which has a steep NE slope and rises to an elevation of 164m about 0.5 mile W of the point.

From Punta Marques to Bahia Sanguineto, 95 miles SE, a large part of the coast will afford shelter from the land winds, the holding ground being good and of mud, but the SE and E winds cause heavy seas.

Rada Tilly (45°56'S., 67°33'W.) is open to winds from the NE and SE quadrants, especially those from W which blow with considerable force. The ground swell from the SE enters the roadstead but is not severe.

Anchorage.—Anchorage can be taken about 0.7 mile N of Punta Marques, in 9.1 to 12.8m, fine sand, good holding ground.

Caleta del Fondo, a slight indentation in the coast about 2 miles in extent, lies 7 miles S of Punta Marques. A beacon stands on the N entrance point. The cove is exposed to winds from the N to S through E.

Anchorage can be taken about 1 mile SE of the beacon, in 14.6m, fine sand, good holding ground.

Caution.—An oil well head lies about 10 miles E of Punta Marques.

7.38 Caleta Olivia (46°26'S., 67°31'W.), 23 miles S of Caleta del Fondo, is formed by two reefs which enclose a well-protected beach. Tres Picos, about 8 miles NW and 5 miles inland, is conspicuous.

An SBM, at which tankers can load, is situated 1.5 miles NE of Olivia Light. Submarine pipelines are laid between the SBM and the shore. There is a depth of 42m at the SBM. Vessels up to 150,000 dwt can be accommodated.

Caleta Paula (46°28'S., 67°30'W.) lies about 2 miles S of Caleta Olivia. A pier, 453m long with an alongside depth of 9m, can accommodate ocean-going vessels up to 140m long. A second pier, 170m long, can accommodate fishing vessels or other small craft up to 70m long.

7.39 From Caleta Olivia to Punta Murphy, 15 miles SE, the coast is high, steep, and rocky.

From **Punta Murphy** (46°39'S., 67°18'W.), the W extremity of Bahia Langara, to Punta Casamayor, about 20 miles SE, the coast is steep and inaccessible. At Punta Casamayor, the land rises to steep yellow hills, known as Alturas De Espinosa, and for a distance of about 42 miles ESE, continues moderately high as far as Pan de Azucar near Cabo Tres Puntas.

There are two wrecks showing above the water in Bahia Langara and one off Punta Murphy, which is completely exposed at low tide.

Fondeadero Mazarredo (47°02'S., 66°42'W.) is open to the N and E.

Anchorage can be taken, in about 8 to 18.3m. Pico Colorado is one of two red hills on the W side of the harbor. It is the E most of the two and conspicuous, despite being lower than the nearby cliff.

Monte Loaysa, about 18 miles E of Fondeadero Mazarredo, projects above some cliffs and is conspicuous because it is sandy and has no vegetation.

Bahia Sanguineto (47°06'S., 66°06'W.) provides protection from S winds.

Between Bahia Sanguineto and Cabo Tres Puntas, 9 miles to the E, the coast is fringed by reefs and is inaccessible. The sea breaks on it heavily.

Cabo Tres Puntas to Puerto Deseado

7.40 Cabo Tres Puntas (47°06'S., 65°52'W.) may be recognized from seaward as the end of a long range of tableland trending N and S. The cape shows three distinct upright heads of a light-colored earthy cliff.

Off these heads, ledges of rock extend 0.75 mile seaward and over them the tidal currents, which run parallel to coast at rates of 1 to 2 knots, rush and ripple with violence.

Pan de Azucar, 132m in height, and conspicuous because of its conical shape, lies about 4 miles W of the cape.

From Cabo Tres Puntas to Cabo Blanco, 8 miles to the SE, the coast is low, rocky, and fringed with kelp, with tableland inshore. The whitish aspect of the coast is broken at intervals by patches of trees and vegetation.

7.41 Cabo Blanco (47°12'S., 65°45'W.) is formed by three distinct masses of rugged rock, about 44m high and whitened by guano, which are connected to the mainland by a low, narrow isthmus and appear as islands when first sighted.

On each side of the isthmus is a small cove. A pole beacon stands on the S extremity of Cabo Blanco about 0.5 mile S of the light structure.

There are numerous rocks in the vicinity of the cape. One of the rocks dries and lies about 0.4 mile NE of the light structure.

Tides—Currents.—In the vicinity of Cabo Blanco, the tidal currents set along the coast with velocities of 1 to 2 knots. Between the banks the currents are less regular and produce breakers. Around Cabo Tres Puntas, the tidal currents run along the coast with velocities of 1 to 2 knots and also cause breakers.

Cabo Blanco Light

From Cabo Blanco to Puerto Deseado, a distance of about 35 miles, the coast is low with deep water close-to.

About 4 miles SW of Punta Guzman, which is about 8 miles S of Cabo Blanco, is Falso Pico de los Rios, so called because it is sometimes confused with Pico de los Rios.

A shoal bank, with dangerous overfalls and a least depth of 10.3m, lies about 8 miles SE of Punta Guzman.

Pico de Los Rios, about 10 miles SW of Punta Guzman, is seen from seaward only when bearing between 250° and 300°.

Within 3 miles of the Rio Deseado the land becomes high and cliffy.

A shoal, with a depth of 9.1m, lies 5 miles offshore and 11 miles NE of Peninsula Foca, the N entrance point of Ria Deseado.

Aspect.—A black, triangular iron framework beacon with staff and globe top mark stands on the mainland about 2.7 miles N of Peninsula Foca. The beacon is 10.9m high; the upper section of the seaward side is faced with horizontal slats.

Roca Sorrel, which dries, lies about 2.7 miles NE of Peninsula Foca; the passage between Roca Sorrel and the coast should not be used.

Anchorage.—Caleta Cabo Blanco (Caleta Sur), on the S side of Cabo Blanco, is sheltered from winds from NE, through W, to SW.

The best anchorage is at the center of the cove, in 10m, good sand bottom with the light on Cabo Blanco bearing 031° and the beacon bearing 090°. Small vessels will find good shelter in the NE corner of the bay, close to the kelp.

Several shoal banks and reefs, with depths of as little as 0.9m and best seen on the chart, lie up to 9 miles E and SE of Cabo Blanco.

Caution.—Vessels navigating in the vicinity of the cape should make allowance for the tidal currents, as they run with considerable force.

Breakers have been reported 12 miles ESE of Cabo Blanco and extensive well-defined patches of discolored water have been seen in the vicinity.

Navigation is prohibited inside the area bound by the following points:

a. 47°45'18.5"S, 65°54'48.3"W.
b. 47°45'19.8"S, 65°54'47.2"W.
c. 47°45'20.4"S, 65°54'48.6"W.
d. 47°45'19.3"S, 65°54'49.8"W.

Puerto Deseado (47°45'S., 65°54'W.)

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7.42 Puerto Deseado is situated on the N side of the mouth of the Rio Deseado, which is 1.5 miles wide between Peninsula Foca and Restinga Chaffers.

Fish is processed and frozen here for export. Vessels moor starboard side-to using the port anchor. The best time for entering is on the ebb and sailing is on the flood. Berthing is best within the hour of high tide. In some berths, large fenders are necessary as some portions of the wharf are built on rock which projects from its face in places.

Winds—Weather.—The prevailing winds are from the SW to NW. Sudden heavy gales appear to be prevalent, rising without warning.

The SW winds generally die out during the night, but the NW winds continue to blow for days. Southeast winds are uncommon and bring strong but short-lived gales.

When strong W winds blow, there may be dust storms which impede visibility; in such cases it is advisable to keep position by radar and stand off or anchor until the visibility improves.

The amount of rainfall is low, averaging 74 days per year.

Tides—Currents.—The tidal currents set in and out of the port with regularity. At neap tides the tidal current flows from 3 to 4 knots and at spring tides from 5 to 6 knots. The interval of slack water is only about 5 minutes.

Depths—Limitations.—The least reported depth in the harbor was 7.5m. The Fiscal Wharf, a dog-leg pier, with a total length of 350m, has a depth of 8m alongside. There is also a concrete wharf, 62m long, with 8.2m alongside.

A new commercial pier has been established. It is made of reinforced concrete on metal columns and is 250m long.

The port can accommodate a vessel with a maximum length of 160m.

Aspect.—Cerros Direccion, located about 5 miles to the NW of the entrance, are about 142 and 149m high and are conspicuous.

Roca El Torreon (El Torreon) stands on the S side of the entrance. It has the appearance of an isolated tower and is easily recognized from seaward.

Cerro Clayrac, about 1.5 miles W of Roca El Torreon, is 30m high and is visible from seaward.

Two conspicuous chimneys and a steeple are located in the town of Puerto Deseado. A radio tower, 50m high, stands N of the town.

Pilotage.—Pilotage is compulsory and should be requested at least 48 hours in advance. If not already embarked, the pilot will board in the outer anchorage; in foul weather the pilot will board on the second range.

Anchorage.—Ships awaiting entry or berthing can anchor, in 15m, on the entrance range, about 1.7 miles SSE of Peninsula Foca. The recommended waiting anchorage is about 1.5 miles further to the SE.

When waiting for a short period, a vessel may use the inner anchorage which is located about 0.4 mile W of Punta Cascajo, in a depth of 11m.

Caution.—Do not confuse the portal cranes with the entrance beacons, which lead over the bar on a bearing of 283.75°. An anchor with 50m of chain has been reported to lie 1.25 miles SE of Cavendish Point.

Puerto Deseado to Puerto San Julian

7.43 From **Punta Guanacos** (47°48'S., 65°53'W.), 3 miles S of Puerto Deseado, the coast trends S for 5.5 miles and then E for nearly 4 miles to Punta Norte. This stretch of coast is closely backed by high land and is bordered by kelp. Vessels should not approach the coast closer than 3 miles.

Isla Pinguino Light

Isla Pinguino (47°55'S., 65°43'W.) is about 49m high. Its S side is steep and can be approached close-to. Between the island and the mainland are several islets and numerous rocks. Many of the rocks are submerged at all stages of the tide and the S side of the islet is marked by a light.

Two shoal patches, with rocks on them, lie about 0.3 and 0.8 mile N of Isla Pinguino. There is a rock, awash at LW, which lies about 0.4 mile NE of the N extremity of the island.

A shoal, with a depth of 7.9m, lies about 2.2 miles N of Isla Pinguino. Overfalls extend about 2 miles N from the island.

Anchorage.—Anchorage can be taken off the NW side of the island, in 11m, shells. Vessels should not remain in this anchorage at night, as NW winds are frequent and it is then difficult to leave. The anchorage should be approached with caution due to the strong tidal currents.

Vessels can anchor further N of the island with the light structure bearing 170°, distant about 2.7 miles, in 27m, pebbles and shells, good holding ground.

Care is necessary to avoid a 11.6m patch which was reported to lie about 2.2 miles N of the light.

7.44 Bahia Oso Marino (47°56'S., 65°46'W.) is 1.5 miles wide between Punta Norte and Punta Pozos, and recedes about 1.2 miles. It is one of the best anchorages on this coast. Punta Pozos is high and conspicuous. A reef extends about 0.6 mile SE. There are tide rips off the outer end of this reef.

Arrecife Mayo lies about 0.7 mile NNE of Punta Pozos. At low tide an area about 183m in extent uncovers and has the appearance of an islet surrounded by breakers. At high tide the sea seldom breaks over this reef. Two submerged rocks lie about 0.1 mile NE of the reef.

Two anchors, one with 247m and the other with 275m of chain, lie about 2 miles NE of Punta Pozos.

A shoal patch, with a depth of 7.8m, lies about 0.4 mile NE of Arrecife Mayo. Two rocks, which never break, lie 1 mile bearing 114° from Punta Norte. Between the rocks and the point there are several shoal patches.

At the N side of Isla Chata, the largest island between Isla Pinguino and Punta Norte, there is a wreck which is entirely uncovered at LW.

The best anchorage is in 12.8m, sand and mud, about halfway between Arrecife Mayo and Punta Azoparado, to the W.

The anchorage for small vessels is in 6m, close S of the line of Punta Pozos and Punta Azoparado.

With a fresh breeze from the N, it is advisable to anchor closer to Punta Norte. The anchorage is good, but is exposed to all but W winds and is subject to heavy seas.

Tides—Currents.—The tidal currents off the entrance are rapid and form strong tide rips even in a calm, while in a breeze they are very dangerous for vessels of any size. The flood sets to the NNE and has been observed to attain a velocity of 3 knots against a strong N wind.

The ebb sets nearly in the opposite direction with about the same velocity. Off Isla Pinguino the N current ceases about 4 hours after HW by the shore. The tidal currents set strongly onto Punta Pozos.

7.45 Bahia de los Nodales (48°01'S., 65°52'W.) is about 10 miles wide between Punta Pozos and Punta Medanosa and recedes about 5 miles.

With the exception of the NW portion of the bay, the shores are fouled by reefs and rocks.

These dangers project in places to about 1 mile off the N shore and 2.75 miles off the W and S shores. Many of the shallow patches are marked by kelp.

Punta Lobos, on the bay's N shore, is high with rock towers and is conspicuous. Between Punta Lobos and Punta Medanos Negros, about 3.7 miles SW, the shore of the bay recedes and forms an inner bay.

Arrecife Burgos, which is composed of a group of shoal patches, lies about 1.7 miles ESE of Punta Medanos Negros. Isla Guano lies on this reef. Shoal patches, with depths of less than 3.7m, lie up to 0.75 mile SE of the reef.

Reefs, on which Isla Schwars lies, extend 4 miles NE of Punta Medanosa; the N group is named Arrecife Schwars.

Tides—Currents.—Inside the bay, the tidal currents run weak, but in the vicinity of Punta Lobos and N of Arrecife Schwars, as well as between the islands and rocks which compose it, the currents run with considerable force and produce breakers.

7.46 Punta Medanosa (48°06'S., 65°55'W.), the S point of Bahia de los Nodales, is high and surrounded by dangerous rocks and reefs; on the shores to the S are many wrecks which may indicate that the current here sets toward the shore.

Isla Liebres (48°06'S., 65°54'W.) is a rocky islet lying close off the NE point of Punta Medanosa. Isla Shag, a whitish bare rock about 7m high, lies about 1 mile E of Punta Medanosa.

About 1 mile SW of the islet are three black above-water rocks.

The coast from Punta Medanosa to Cabo Guardian, a distance of about 22 miles to the SW, is foul and is for the greater part fringed with kelp. In places the foul ground extends offshore for distances of about 3 miles.

Bahia Desvelos (48°19'S., 66°16'W.) is about 7 miles wide between Cabo Guardian on the S and Islote Cabo, a reddish rock, 6m high, on the N. A reef, on which there are several rocks above-water, extends about 1 mile offshore at the center of the head of the bay.

Anchorage.—Anchorage can be taken, in 18 to 21.9m, fine sand bottom, with Cabo Guardian Light bearing 225° and the rocks on the reef at the head of the bay bearing 320°. During SW winds, the sea sets in from SE.

7.47 Cabo Guardian (48°21'S., 66°20'W.), 10m high, is of a reddish color and surrounded by reefs and rocks for a distance of about 3 miles to the E and 4.5 miles to the SE.

The shoal area around the cape is marked by kelp and usually breaks at low tide. Survival equipment is stowed at the light structure, a black square metal framework tower, 36m high, located on the SE side of the cape.

Roca Bellaco (48°30'S., 66°11'W.) dries about 0.6m. It is of blackish color, pointed in form and about 32m in extent. At low tide and during ordinary weather, the rock has been seen from a distance of 10 miles. Tide rips extend SE of this rock; during strong winds tide rips also extend to the NW.

Frequent calms are experienced in this area and during such times the sea does not break over the rock at high tide. It is recommended that vessels pass E of this rock.

An area, with a depth of 10m, lies 5.25 miles W of Roca Bellaco and the existence of lesser depths is possible.

7.48 Bahia Laura (48°23'S., 66°25'W.) is 5 miles wide between Cabo Guardian and Punta Mercedes. On the NE extremity of Punta Mercedes is a remarkable flat-topped rock of reddish color named Morro Campana. To the N of Morro Campana shoals extend off the W shore of the bay to a distance of about 0.7 mile.

Reefs which lie from 2.75 to 3.5 miles ESE of Morro Campagna are marked by kelp; the sea almost always breaks over them.

Anchorage can be taken in the NW part of the bay, in depths of more than 9.1m. Temporary anchorage can be taken, in 16m, sand and shell, about 0.4 mile E of Morro Campana.

From Punta Mercedes to Cabo Vigia, a distance of 20 miles, the land increases in height and the coast is safer, but shoals which seldom break and which are sometimes marked by kelp, extend about 3 miles E of Cabo Vigia, a low round point.

In advancing S, the land still rises until it attains a height of over 183m, and is then remarkable for its horizontal outline.

Isla Chato and Isla Parajo, about 11 miles SW of Cabo Vigia, though low, are too near the land to be dangerous to vessels that keep a fair offing.

About 9 miles SSW of Isla Chato and off the high tableland of Cabo Danoso, a dangerous reef, which breaks at LW and is marked by kelp, projects 3 miles SE from the shore, but does not appear to be steep-to; then about 29 miles to Port San Julia there are no known dangers.

7.49 Roca Santa Cruz (48°48'S., 66°14'W.), a rocky shoal with a least depth of 4m, lies 18.5 miles S of Roca Bellaco. The shoal extends about 39.6m in a NW to SE direction, and about 19.8m in a NE-SW direction.

It is steep-to on its W side, but there are depths of less than 18.3m as far as 183m E. Tide rips have been observed close SW of the shoals; its position may also be indicated by herds of seals, which are usually to be found in its vicinity.

Tidal currents in the vicinity of this shoal run NE and SW, varying between 0.5 and 3 knots.

Cabo Danoso (48°50'S., 67°13'W.) is low and composed of shingle. Within it rises a tableland with some detached hills, which appear conical from some directions. A light is shown 2 miles N of the cape.

A radio tower, 110m high, painted in wide white and orange stripes, stands 17 miles SW of Cabo Danoso. Lights are not shown from the tower.

Cabo Curioso (49°11'S., 67°36'W.), 25 miles SSW of Cabo Danoso, is formed by stratified cliffs, of which the lower layers are darker in color than the upper layers. A light is shown from the cape. A reef fringes the cape and extends about 0.3 mile offshore.

Puerto San Julian (49°19'S., 67°42'W.)

World Port Index No. 13940

7.50 Puerto San Julian is a deep entrance of the sea opening up between Cape Curioso and Desengano Point, terminated by a wide sound which is almost completely dry at low tide.

Tides—Currents.—The port is well buoyed, however, vessels must wait for high tide to enter. The current can reach a speed of 3 knots and can cause a ship at anchor to drift towards the shore. It changes direction about 2 hours after HW and LW. At a position 2 miles E of Banco Ferreyra, this change occurs 1 hour after HW and LW.

Cabo Danoso Light

In the port the change occurs at about the same time that the tide changes. In the vicinity of the quay, the flood current runs from 30 minutes after LW until 15 minutes after HW.

The ebb runs parallel to the quay from 30 minutes after HW to 30 minutes after LW. There is no current at the quay from 10 to 30 minutes after HW.

Overfalls occur, especially at spring tides, in the vicinity of Punta Pena and on a reef NE of the town.

Depths—Limitations.—Banco Ferreyra, a part of which dries 3.3m, is composed of gravel and lies in the middle of the entrance. A channel exists on either side of the bank.

The channel on the N side has a depth of 1.2m. The channel from the bank up to the town is narrowed in places by shoals and banks and has a least depth of 3.6m.

There is a concrete quay, about 62m long, with dolphins which stand off each end. Depths of about 6.2m are available.

This natural port can accommodate ships with a maximum draft of 9.1m.

Aspect.—Punta Desengano, about 30m high, is of a clear gray color. A rocky spit extends about 0.7 mile NE from the point and ends in several drying rocks.

Monte Wood and Monte Sholl, both with flat summits about 4 miles NNW of San Julian and the radio tower at San Julian,

Cabo Curioso Light

are conspicuous. The 95m high radio tower has white and international orange stripes.

Range lights and range beacons lead through the channels and up to the town.

Pilotage.—Pilotage is compulsory and must be requested at least 48 hours in advance as they must travel from Buenos Aires. Vessels from N may arrange to board pilots off Puerto Madryn.

Contact Information.—Puerto San Julian can be contacted, as follows:

1. VHF: VHF channels 10, 12, and 16.
2. Telephone: 54-2962-452612
3. Facsimile: 54-2962-452069

Anchorage.—The anchorage for large vessels is E of San Julian, in 7m, sand bottom, with Pueblo Beacon, located at the S part of the town, bearing 293° distance 0.3 mile. The current sometimes attains a velocity of 3 knots at this anchorage.

Vessels should not anchor off the lighter pier, W of Punta Pena, due to the strong tidal currents and eddies in that vicinity.

A wreck, hazardous to vessels anchoring E of San Julian, lies sunk about 0.4 mile 048° from Pueblo Beacon.

Caution.—Foul ground, consisting of an anchor and a fathom of chain, lies about 1.8 miles 126° from Cabo Curioso.

Puerto San Julian to Puerto Santa Cruz

7.51 South of Puerto San Julian the coast is low, covered by scrubby bushes, and fronted by a shingle beach.

About 10 or 12 miles S of the port a small flat hill is seen over the low coastal hills.

About 15 miles to the S of Punta Desengano the character of the coast changes with a range of steep white clay cliffs, the average height about 96m. They rise like a wall from the sea, which at HW nearly washes their base, but at LW uncovers a large extent of shingle and mud beach.

Some short rocky ledges, which break at half tide, lie off several parts of this range, but none of them extends more than 1.5 miles from the shore. In latitude 49°58'S, the range of steep white cliffs begins gradually to diminish in height, and 9 miles farther S ends in Punta Norte, 23m high, on the N side of the entrance to Puerto Santa Cruz.

Anchorage.—All this stretch of coast is clear and offers good anchorage during offshore winds, at 1 to 2 miles from the beach, in 16 to 20m, good holding ground.

A shoal, which breaks, is reported to extend from the coast about 18 miles SSW of **Cabo San Francisco de Paula** (49°45'S., 67°43'W.).

A triangular iron framework beacon, with staff and ball topmark, stands almost 2 miles ENE of Punta Norte. The upper section of this beacon is crossed by horizontal slats.

Puerto Santa Cruz (50°01'S., 68°31'W.)

World Port Index No. 13950

7.52 Puerto Santa Cruz is the estuary which receives the waters of the Rio Santa Cruz and the Rio Chico. It is about 16 miles long, NW to SE, and about 1 mile wide at the entrance, but broadens to a width of 2.5 to 3.5 miles inside.

Tides—Currents.—South winds increase and N winds decrease the range of tide; a range of 13.7m has been recorded at Punta Reparo.

The rise of the tide is very rapid during the first 3 hours, during which time it attains 70 per cent of the total rise. A similar phenomenon is observed during the ebb.

Outside the bar, the general direction of the tidal currents are NE on the flood tide and SW to S on the ebb tide. The ebb current from the entrance of the estuary runs SE over the bar.

In Canal Norte, the flood current sets NW toward the N shore, but nearer the entrance it sets towards the S shore.

In Canal Sur, the flood current runs N from 1.5 to 5 knots while the ebb current sets to the S at 1.25 to 4 knots.

In the entrance, the flood current can attain a rate of 6.4 knots, which is reached 3 hours before the time of HW at Punta Quilla. The ebb current can attain a rate of 6.8 knots, 3 hours after HW at Punta Quilla.

The best time for incoming vessels to cross the bar is about 1 hour before HW at Santa Cruz, which is about the time of HW at Punta Quilla. Thus they arrive off the town well after HW and ensure a good ebb tide for anchoring.

Departing vessels should cross the bar about 30 minutes before the time of HW at Punta Quiila.

Heavy tide rips occur at the junction of Canal Norte and Canal Sur.

It has been reported that one can feel the effect of the ebb tide as far as 20 miles off the port, which produces a drift of 3° to 5° to the shore.

Depths—Limitations.—About 4 to 5 miles E of Punta Entrada, a bar composed of mud and gravel obstructs the entrance to the river at low tide.

At LW, a part of the bank dries 0.6 to 1.8m, and at extreme LW other portions of the bank dry. Strong NE and SE winds cause heavy breakers on the bar.

Two ranges lead over the bar. However, considerable shoaling has taken place recently and they are no longer safe. The port authority or local pilots should be contacted for the latest information.

Punta Santa Cruz Light

A quay is located at Punta Quilla about 2.2 miles within the entrance. The quay is 158m long and has dolphins off each end extending the length of the outer berth to 258m.

Vessels of 27,000 dwt, with drafts up to 9.5m, can be handled. The quay face is reported to be on an alignment of 307° to 127°. The tidal current runs parallel to the quay face. The outer berth has depths of 10.3 to 11m alongside and the inner berth 8 to 9m. A catwalk connects the quay to the shore.

Vessels must use caution when entering due to the changing bar.

Aspect.—The entrance to Puerto Santa Cruz lies between Punta Cascajo, on the N and Punta Entrada, on the S, and is easily recognized. From Punta Norte, the cliffs gradually diminish in height until, at Punta Cascajo, they are only 9.1m high.

The E shore of the port is low, but the W shore from Monte Entrada to Morro Weddell is bordered by cliffs 108 to 126m high.

It has been reported that vessels entering the port by the S entrance should keep to the E of the range line when entering the bar.

Monte Entrada stands about 0.7 mile S of Punta Entrada, and the shoreline to the S of it is bordered by cliffs which reach a height of 153m.

When seen from the N, Monte Entrada appears as a conical peak; from the S it appears flat, falling sharply to the low land of the point; and from the SE it is confused with the cliffs.

A monument, consisting of a masonry tower surmounted with a cross, stands about 1 mile NW of Monte Entrada.

A 43m high, triangular radio tower with white and international orange stripes, 6m wide, stands at the town of Santa Cruz.

Pilotage.—Pilotage is compulsory for foreign vessels. Pilots should be requested 48 hours in advance. Vessels from the N can arrange to embark pilots at Puerto Madryn.

Anchorage.—Vessels waiting for favorable tide can anchor outside the bar, in depths of 12 to 15m, E of Monte Entrada and, in 15 to 18m, ESE of Monte Entrada. Generally, the better holding ground is found nearer to the bar.

Anchorage can be taken between Puntas Entrada and Quilla and N of a line between the two points, in 18.3 to 21.9m. This anchorage has good holding ground and is protected from S winds. Plenty of chain should be used.

The anchorage off the town is in 9.1 to 10.9m, with good holding ground of sand, mud, and gravel.

Caution.—A wreck is located about 1 mile E of Punta Entrada Light, close NE of the 303° entrance range. Dangerous wrecks lie about 2 miles and 6 miles ESE of Santa Cruz Light.

Caution is necessary when entering because the flood current sets strongly toward the shore. The banks in the entrance are subject to change.

Puerto Santa Cruz to Puerto Gallegos

7.53 Between Puerto Santa Cruz and Ria Coig, 58 miles to the SW, the coast consists of a succession of cliffs and low beaches. It is fronted by a ledge of rocks, which at half tide are either dry or shown by a line of breakers. They extend in some places 3 miles from the shore. This coast should not be approached within 5 miles.

A radio mast, 75m high, stands about 23 miles WSW of Santa Cruz Light and about 5 miles inland.

Ria Coig (50°57'S., 69°08'W.) is conspicuous, as it is the only part of the coast between Puerto Santa Cruz and Cabo Buen Tiempo which has the appearance of an islet.

It is a shoal basin, about 5 miles wide at HW, between Punta Norte and Punta Sur and is filled with drying banks. There is a narrow winding channel leading from the bar at the entrance with a least depth of 0.9m.

A shoal, with a least depth of 1.8m, lies 3.5 miles ESE of Punta Norte.

Anchorage can be taken, in 11m, with Punta Estancia, which is located about 3 miles SW of Punta Norte, bearing 305° distance 7 miles.

Cabo Buen Tiempo Light

From Ria Coig to Cabo Buen Tiempo, the coast is similar to that N of the inlet, but with fewer rocky ledges, and good anchorage may be obtained 3 to 6 miles offshore, in depths of 9 to 25.6m, mud, with the water shoaling gradually to the shore.

The beach is of shingle to HW mark, and then of hard clay to just beyond the LW limit, where a green muddy bottom begins. The outer edge of the clay is bounded by a ledge of rocks on which the sea breaks, which extends for some distance parallel with the coast.

Monte Tigre, a 111m high hill with a distinctive summit, stands on the shore about 22 miles S of Ria Coig and is conspicuous.

7.54 **Cabo Buen Tiempo** (51°33'S., 68°57'W.) is the S extremity of the long range of clay cliffs, 91 to 122m high, that extends from Ria Coig. The interior is formed by several open plains of undulating country, covered with grass and plants, but entirely destitute of trees.

From a distance, with the low land to the S below the horizon, the cape has been mistaken for Cabo Virgenes at the entrance of Estrecho de Magallanes, notwithstanding the difference of more than 45 miles in the latitude of the two headlands. In fine weather, Los Frailes and Los Conventos will assist in identifying the coast.

Cabo Buen Tiempo is reported to give a good radar return; the cape is marked by a light.

Caution.—An anchor, with 192m of chain, lies about 5 miles NE of the light.

From Cabo Buen Tiempo, the coast trends S for a distance of about 3 miles to the mouth of the Rio Gallegos. South of the cape the cliffs, which border the shore, decrease in height and end in a 27m elevation; from there a low tongue of gravel, with some stunted vegetation on it, extends about 0.6 mile SW and forms Punta Bustamante, 32m high, the N entrance point of Puerto Gallegos.

Puerto Gallegos (Rio Gallegos) (51°37'S., 68°58'W.)

World Port Index No. 13960

7.55 Puerto Gallegos (Rio Gallegos), which is located inside the mouth of the river, is entered between Punta Bustamante and Punta Loyola, 1.75 miles to the S. Punta Loyola is low.

For a distance of 3 miles W of Punta Bustamante, the N shore of the port is a line of cliffs which terminates in a cone 53m high. To the W of the cone the N shore is low.

The S shore of the port is formed by low lands of gravel formations. To the W of Gallegos the shore is low, but the N shore is high.

Southwest of Punta Loyola and from 10 to 15 miles back from the coast there is a series of hills of volcanic origin which form three groups of hills named Los Frailes, Los Conventos, and Colinas del Norte, which are good landmarks for approaching the port.

Winds—Weather.—The climate is cold but healthy. It is dry in summer and damp, with occasional snow flurries in the spring, autumn, and winter. The temperature in the latter seasons varies from 0° to 16°C. There are constant winds from SW and W.

Tides—Currents.—The tides are not greatly affected by the winds. The tidal currents run with velocities of 2 to 8 knots. In Canal Norte, when the banks are covered, the tidal currents set across the channel, but in Canal Sur they set directly through.

The tidal range has been reported to be as large as 12m during springs.

Depths—Limitations.—Extensive changes have occurred to the depths from W of Punta Loyola to the town. Mariners are advised to use extreme caution when in this area.

Canal Norte, with a least depth of 2m, is the channel presently in use to enter the harbor.

A large T-shaped coal and oil jetty is located on Punta Loyola. The jetty is 420m long and 20m wide.

Vessels up to 224m in length and a draft of up to 13.3m may berth alongside at certain stages of the tide, although there is only 6.1m of water normally alongside.

All the piers in the town dry or nearly dry at LW and the bottom alongside is sandy mud with pebbles.

Small vessels lie alongside, aground, to work cargo. Larger vessels remain at the anchorage.

Aspect.—A cylindrical, checked tank, on a tripod, elevation 49.3m, stands on a hill about 2 miles S of the charted position of Poblacion Beacon, the E beacon in the port. A tank stands at a hospital about 0.9 mile bearing 242° from the beacon.

A black tank stands about 1.5 miles WNW of the beacon. A conspicuous chimney stands by a refrigeration plant about 0.5 mile SSW of the beacon. A radio tower, 60m high, with white and orange stripes 6m wide, stands in the town.

Pilotage.—Pilotage is compulsory. Vessels should request pilots and send their ETA 5 days in advance. The pilot is normally embarked offshore at Puerto Deseado.

Contact Information.—Puerto Gallegos can be contacted, as follows:

1. VHF: VHF channels 10, 12, and 16.
2. Telephone: 54-2966-422352
3. Facsimile: 54-2966-429013

Anchorage.—A good anchorage for awaiting tide is in about 10m on the range line for Canal Sur, with Banco Light bearing 288°. This anchorage is sheltered from W and SW winds. Vessels awaiting the tide to enter Canal Norte can anchor 5 miles E of Cabo Buen Tiempo, in a depth of about 5.5m, sand, good holding ground, and sheltered from offshore winds.

Numerous anchors and lengths of chain have been lost inside and outside the harbor.

Puerto Gallegos to Cabo Virgenes

7.56 From Puerto Gallegos to Cabo Virgenes, the coast trends SE for about 48 miles and at first is formed by a low shelving shore, invisible at a few miles seaward. After this low shore the cliffs again begin, and continue to Cabo Virgenes, with only three breaks.

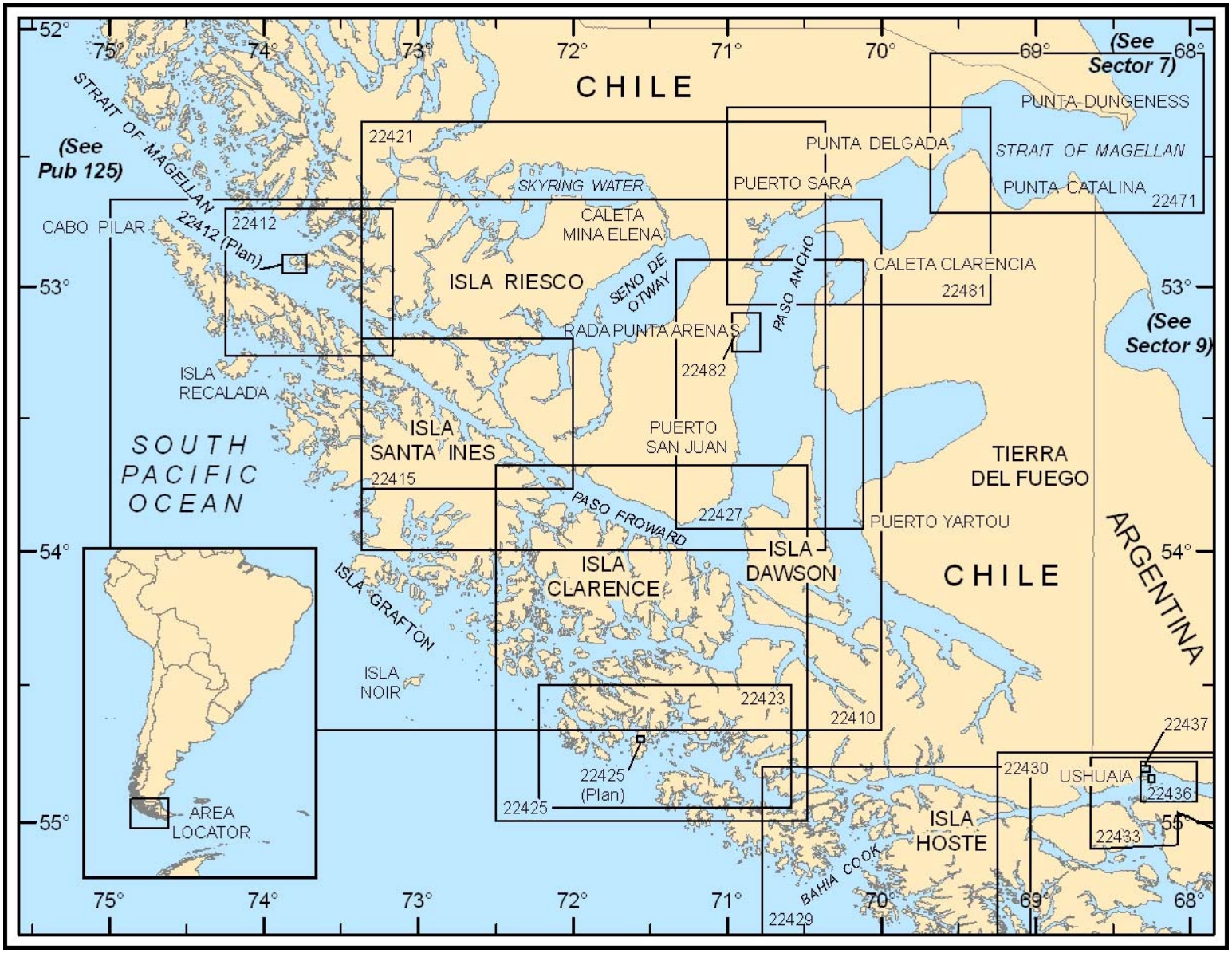
Anchorage.—There is good anchorage along the whole coast between Puerto Gallegos and Cabo Virgenes, 2 to 5 miles from the shore, but the bottom is of boulders of stones.

An anchorage, sheltered from winds between S and NW, can be taken, in depths of 14 to 16m, about 2 miles from the coast, with Cabo Virgenes bearing 197°.

Caution should be observed in approaching this anchorage on account of reported off-lying rocks.

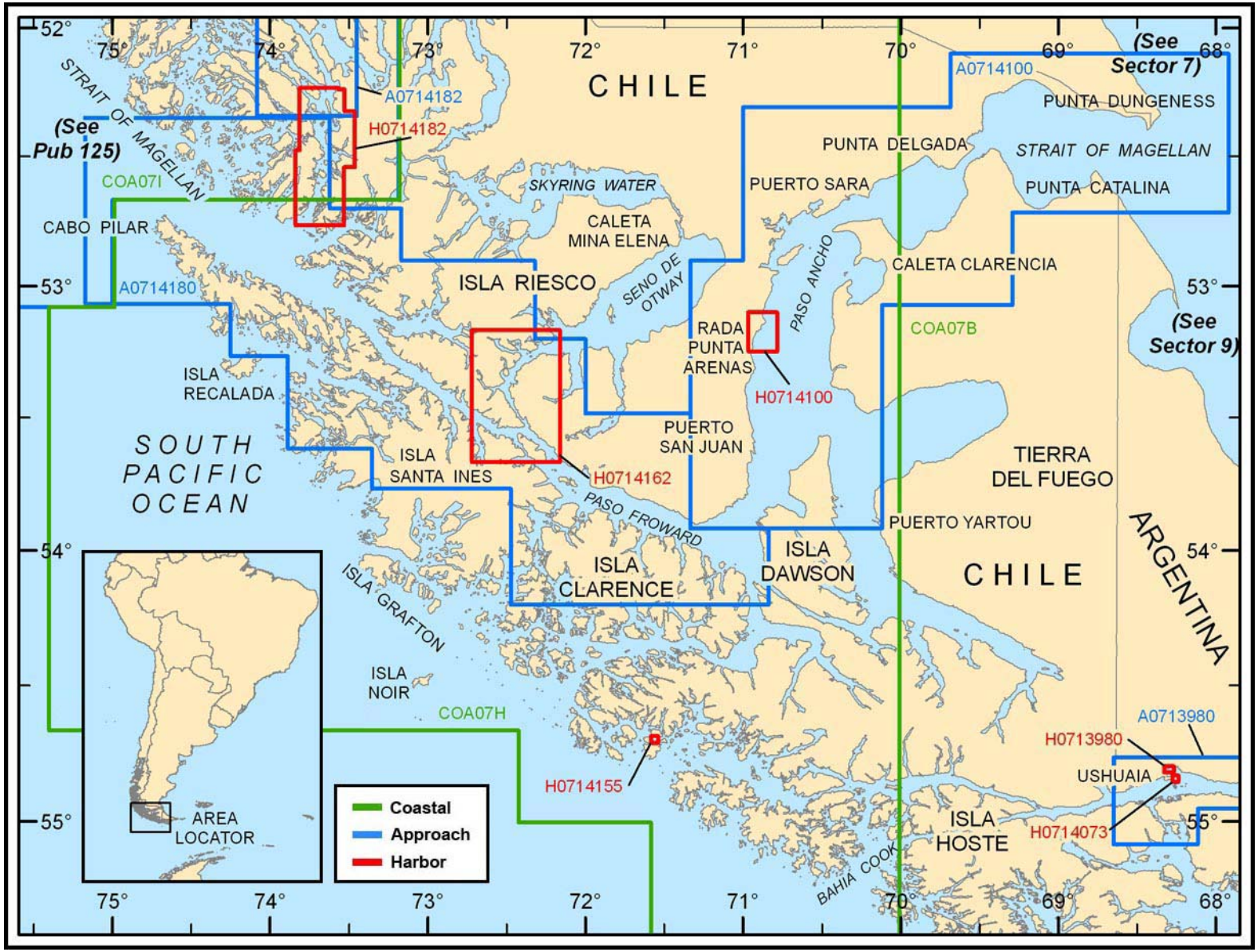
A shoal, the position and existence of which is doubtful, was reported to lie with a depth of 3.7m about 7 miles E of **Condor Cliff** (52°17'S., 68°24'W.).

Caution.—Throughout the area S of the Rio Gallegos, numerous flares at oil wells may be seen; these are constantly changing.



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

SECTOR **8** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 07 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 8 — DNC LIBRARY INFORMATION

SECTOR 8

ESTRECHO DE MAGALLANES

Plan.—This sector describes the Estrecho de Magallanes (Strait of Magellan), from its E entrance between Punta Dungeness and Cabo Espiritu Santo, W to its W entrance between Cabo Victoria and Cabo Pilar, 28 miles SSE. The distance between the E and W entrances of the strait, through the various channels, is 310 miles.

Bays and anchorages are described in the order in which they are approached from E to W.

General Remarks

8.1 Winds—Weather.—In the vicinity of the E entrance to Estrecho de Magallanes some 60 to 70 per cent of the winds have a W component, while 10 to 15 per cent or more are from the N and 6 to 10 per cent or more are from the S. The mean velocity in this area is 15 knots.

In this area gales of Beaufort force 8 (34 knots) and higher have been reported on 7 per cent of the observations for the year, and there is little change in expectancy from winter to summer. The gale winds are variable, covering all points between S through W to NE. In summer and autumn, those from SW and W are the most common.

Sustained gales are found in that part of Estrecho de Magallanes immediately W of Cabo Froward and in the larger expanses of water between the cape and Cabo Virgenes. In general gales here are less steady in direction than those of the open ocean.

At the Pacific entrance to Estrecho de Magallanes, the prevailing winds are NW and frequently stormy. Easterly winds usually bring fair weather but are infrequent.

At Los Evangelistas more than 50 per cent of the winds are from W and NW, while nearly 30 per cent are from S and SW.

The mean wind velocity is 16 to 17 knots it has been reported to attain a speed of 100 knots.

After a strong blow from NW a sudden shift to W with increased intensity, squalls and rain is likely, accompanied in coastal waters by a high cross sea. Then they may shift to S and moderate. But here the S winds are rather uncommon and like the still rarer E winds, are accompanied by rising pressure and fine weather. North gales gives ample warning of their approach through light winds, an overcast sky, exceptionally good visibility, and a falling barometer.

When passing through the strait, an entire change in the features of the country and probably in the weather will be experienced in its various parts.

From its E entrance to Cabo Porpesse, 100 miles WSW, the land is comparatively low and covered with grass, but no trees are visible.

All over this E portion of the strait the most remarkable difference takes place in the appearance of the land according to the conditions of the light in which it is seen.

In the vicinity of Cabo Porpesse, the land becomes wooded and its elevation gradually increases.

The forest becomes more dense and the mountains more lofty as Cabo Froward is approached. These characteristics continue as far as the E part of Paso Largo.

From here, though the mountains still border the strait, the trees become smaller, until towards the W entrance of the strait the shores are bare and rocky, only the ravines showing a stunted, though dense, vegetation.

East of Cabo Froward, the land is comparatively level compared to that W of the cape where there are steep mountains, bare on the upper parts, but covered with thick moss or dense forest on the lower slopes.

The passage through Estrecho de Magallanes is safe, but vigilance and caution are necessary. The difficulties and dangers in navigating the strait in either direction are the same that are experienced in narrow channels and close harbors of the same latitude elsewhere.

If the weather is thick, as is likely to be the case for most periods, the passage is rendered more difficult because of incomplete surveys, the lack of aids to navigation, the distance between anchorages, the lack of good anchorages, the strong currents, and in some cases the narrow limit for maneuvering.

The difference in the duration of daylight in summer and winter forms an important consideration. In December, there is daylight from 0230 until 2030, while in June, daylight will be limited from 0800 to 1600.

For some, night is preferred to daylight for navigating Primera Angostura and Segunda Angostura, as the lights are more discernible than the beacons and other marks on land.

Paso Tortuoso is navigated day and night by all regular trading vessels. Without local knowledge there is some risk in passing through this part of the strait because of the strong tidal currents and the probability of thick weather, either in the form of snow or rain.

Anchorage should be found before nightfall, but large vessels bound W, with good radar, can safely remain underway in Paso Anchor during night and await daylight for the passage of Paso Tortuoso.

Violent and unpredictable squalls are frequent all over the strait. Sustained gales are seldom encountered except in the widest entrances and passages.

In many of the countless narrow passages, the wind follows the run of the passage and has only two possible directions. It may be reversed abruptly when there has been a large shift of wind direction over the open sea.

The most dangerous winds are the violent and unpredictable squalls. The occurrence of one or more of these in succession from the same direction is no indication that the next will not be from some widely different direction. Moreover, of two possible anchorages a few miles apart, the more open may be less subject to these squalls.

These squalls depend largely, if not entirely, on the existence of strong winds or gales at sea or at a height of several thousand meters over land.

As these winds strike the rugged mountains of the archipelagos, they set up eddies of varying size and intensity. In a sheltered inlet, even where the general slope of the ground is fairly regular, the wind often changes greatly in speed and direction from minute to minute; such changes are generally due to circular eddies of distant origin.

The strong high level winds may disappear for a few days when an anticyclone forms, and there is little respite from the violent squalls, but near the W entrance the return to normal weather may be quite sudden.

During the strongest squalls, which occur most often W of Cabo Froward and near the main coastline adjoining the stormiest region at sea, the wind almost certainly exceeds 100 knots. The squalls may not last more than a few minutes, but for a time visibility may become very poor in rain, sleet, or snow, and it may suddenly become dark, even though the sun has been shining brightly.

In the E part of the region, the WSW or SW winds blow with great force and commonly exceed 50 knots. These winds blow from mid-September to the end of March, reaching their greatest force in October and November.

They commence in the early hours of the morning and reach their maximum strength between 1400 and 1600, then decreasing gradually as the sun goes down.

Working cargo with ships at anchor in Rada de Punta Arenas often has to be suspended during daylight hours and carried out during the night.

Sea fog is not frequent in this area, but the lowest clouds often lie about 91m above sea level and sometimes have their bases on the sea surface; the identification of nearby landmarks may become difficult. Even when the cloud base is over about 152m, there may be rain squalls, drizzle, and at times thick snow, often associated with masses of cloud so dense as to cause semi-darkness in the middle of the day, with visibility practically nil.

It is a noticeable feature of this area that the worst conditions may be replaced in the course of a few minutes by a cloudless sky and exceptionally good visibility at all levels, mountain peaks becoming clearly visible at a distance of 100 miles or more. Such a change is nearly always coincident with the arrival of drier and cooler air from higher latitudes.

Tides—Currents.—The character of the tides in the Atlantic Ocean and the Pacific Ocean differ considerably.

As Estrecho De Magallanes forms a narrow channel linking the two oceans, strong tidal currents run through the strait, reaching a rate of 8 knots in the narrows at springs. Inland, the tidal currents vary in strength; details will be found in the appropriate parts of the sector.

The directions in which the tidal current is running is important, especially when navigating the E part of Estrecho de Magallanes. The charts show the rate of the current at ordinary springs and its direction at different anchorages.

The tides are fairly regular, with two in 24 hours, except in certain bays, where slight variations may be met due to local factors. Between Punta Dungeness and Primera Angostura the range of the tide is great, being as much as 12m at springs.

The range quickly is reported to decrease towards a SW direction. In Segunda Angostura, the range is 6m, while at Rada de Punta Arenas, the range is only 2m.

It should be noted that the W and E currents continue to run in the channel for 3 hours after HW and LW, respectively; there are however, some exceptions to this rule.

The wind in the wide parts of the strait and between the narrows seems to have some effect on these times, especially at neaps; but for practical purposes 3 hours may be taken.

The great range of the tide means that a large volume of water is periodically transferred from the ocean to the strait and vice-versa. This movement causes the strong current in this area; the narrower the channel, the stronger the current. Thus, at the entrance to the strait, the strength of the tidal current is from 2 to 4 knots; in Primera Angostura it reaches 6 to 8 knots, decreasing as the narrows trend SW.

It should be the aim of vessels proceeding W through the strait to arrive off the approach to Primera Angostura on the last of the E current, so as to gain the full force of the W current through the narrows as soon as it begins.

Conversely, vessels proceeding E should approach the W entrance to Segunda Angostura as the E current is starting.

Through both Primera Angostura and Segunda Angostura, the current runs straight, but at each entrance, the pent-up water seeks to spread out, and consequently causes a strong set toward the banks on either side after leaving the narrows, with a corresponding in draft at the other end.

Thus, a vessel going with the current should endeavor to stay in the axis or suffer a set toward the N or S shore. Care must be taken when approaching Primera Angostura as the E current sets towards Banco Orange to S of the channel. Very little set will be found from Punta Gracia into Paso Real.

Strong tide rips will be seen in many places where no dangers exist, especially the W end of Primera Angostura, off Cabo San Vicente, in Bahia Lee, between Isla Isabel and Isla Santa Magdalena, and on both sides of Banco Walker.

Mariners are advised that tidal currents significantly stronger than predicted have been reported in Primera Angostura. Also, subsurface countercurrents which may affect the navigation of deep-draft vessels have been reported in Bahia Posesion (52°16'S., 69°11'W.).

Pilotage.—Pilotage is obligatory for all vessels when entering and leaving ports and/or sailing in internal Chilean waterways. Chilean vessels are exempt when the Master has the “Sea Pilot Exemption for route navigation” qualification.

It has been reported that pilotage has two designations:

1. “Port Pilotage” is performed by the harbor pilots.
2. “Sea Pilotage” is performed in the waterways and fjords.

In the Strait of Magellan, pilotage is compulsory for all vessels. There is an exception for those vessels traveling between Felix and Punta Arenas which are crossing the strait from ocean to ocean and have not and/or will not make calls to ports in internal waters. Even with this exemption, it is highly recommended for cruise ships and vessels carrying flammable cargo to utilize pilot services.

It has been reported that Chilean pilots are available with 72 hours notice for vessels making the E to W passage of Estrecho de Magallanes. However, VLCCs must send ETA 7 days, 72 hours, 24 hours, and 12 hours prior to arrival at the pilot station off Bahia Posesion, where they embark. The pilot boat is equipped with VHF channel 16 and 2182 kHz.

Westbound vessels normally embark pilots off Bahia Posesion; by special arrangement and subject to weather conditions, pilots may be embarked off Punta Delgada.

It has been reported that on the W end of the strait, depending upon the weather, pilots will disembark at Bahia Felix in good weather or Isla Shelter in bad weather.

The pilots are only required to take vessels to Punta Arenas, should pilots be retained on board and are unable to disembarked at Laitec, on **Chiloe Island** (43°20'S., 73°35'W.).

Pilots for eastbound vessels board about 4 miles S of Laitec.

Navigational advice for the area of Estrecho de Magallanes, between Banco Triton and the E entrance, can be requested from Punta Delgada or Punta Arenas radio stations.

Regulations.—The annual traffic is now well over 1,500 ships, composed of all types such as cargo vessels, ore carriers, large tankers, and LPG carriers.

Vessels with drafts of up to 13.7m are authorized to transit the strait. Vessels over 13.7m and up to 21.3m must obtain a special clearance from the Chilean Coast Guard and Merchant Marine Bureau.

The least charted depths, 28m on the main route, lie between the W end of Primera Angostura and Banco Triton.

The channel is 1 mile wide between the 20m depth contours in this area; many adjacent dangers are unmarked.

The Chilean Navy issues the necessary provisions regulating the passage. They stipulate that transit of Primera Angostura be done in daylight, under good visibility, and under the supervision of a pilot. It has been reported that the transit may be done in daylight or darkness under any visibility conditions.

By reason of the growing increase of maritime traffic, the sizes attained by certain ships, especially VLCC, and in order to increase the safety of navigation, especially in confined passages, the Chilean authorities have taken certain measures concerning, at present, the Primera and Segunda Angostura, and the Paso Tortuoso.

Ships with lengths over 200m will have priority when transiting the narrows. The Chilean Maritime Authority will notify all traffic in the area when such vessels are present.

Argentine authorities state that all vessels passing through Argentine territorial waters, to enter or leave Estrecho de Magallanes, are required to call Trinidad Naval Radio Station, situated at Cabo Virgenes Light, on VHF channels 16 and 67, giving the following information:

1. Call sign.
2. Nationality.
3. Cargo.
4. Port of origin.
5. Destination.
6. Other information that may be requested.

Weather forecasts are provided on request.

All vessels taking the Primera Angostura and Segunda Angostura must inform the maritime authorities at Punta Arenas of their ETA at the entrance to Estrecho de Magallanes 12 hours in advance, giving the following additional information:

1. Vessel name and call sign.
2. ETA at the mouth of the strait.
3. Length.
4. Maximum draft.
5. Gross registered tons.
6. Port of destination.
7. ETA at pilot station or waiting area.

Vessels 20 miles from entering the Straits must contact Punta Dungeness Light or Cabo Espiritu Santo Light and request instructions.

When 1 hour from entering the straits, vessels shall broadcast a securite message in English and Spanish; then, when abeam of the Traffic Control Stations at Islotes Evangelistas, Bahia Felix, or Punta Dungeness Light, advise the station of their entry or departure.

Vessels transiting Paso Tortuoso must send their planned ETA abeam Crosstide Light to the Maritime Traffic Control Station. In addition, 1 hour prior to, and every 15 minutes during, the passage through Paso Tortuoso, vessels shall broadcast on VHF channel 16 the vessel name, crossing direction, position, and ETA abeam Crosstide Light. This message should be given in English and Spanish

Vessels must maintain constant watch on VHF channel 16 and 2182 kHz during passage. Vessels must inform the Maritime Authority in Punta Arenas when entering or leaving Estrecho de Magallanes, when passing Punta Dungeness Light, Punta Anxious Light, and Isla Tamar or Cabo Pilar, as appropriate.

During the passage, vessels must report their position and speed every 4 hours if not carrying a pilot, or at 0800 and 2000 if carrying a pilot. This position report (CHILREP) is sent to the Maritime Authority and should include the following information:

1. Vessel name and call sign.
2. Date and local time.
3. Position.
4. Course.
5. Speed.
6. Remarks, if any.

To enable the Maritime Authority in Punta Arenas to control traffic in Primera and Segunda Angostura and to check the suitability of vessels intending to transit the narrows, Traffic Control Waiting Areas have been established at Cabo Posesion, Bahia Felipe, and Punta Arenas.

Vessels without a pilot must anchor in these areas for the local maritime authority to check vessel's certificate of safety, suitability for navigation, and its equipment. This check takes place on a vessel's first transit and every 12 months thereafter.

It is recommended to wait for high tide in Bahia de Santiago in order to navigate in the proximity of the Banco Satelite, and of the Banco Triton, it's understood that any vessel (except with special restrictions for VLCC-type vessels, hereafter indicated) can navigate in these waters at any moment of the tide, but they must take all possible precautions due to the violent currents which occur in the Primera Angostura and Segunda Angostura, the shoals which dot the strait, especially to the SW of Primera Angostura, and the difficulties of maneuvering a VLCC.

The vessels of this type must not enter into the strait having a draft in excess of 21.3m without prior authorization by the Direccion General del Territorio Maritimoy Marina Mercante (General Department of the Maritime Territory and Merchant Marine), which will establish the safety measures to be observed.

These vessels also must pass Primera Angostura and Segunda Angostura only during daytime, must not navigate to the approaches of the Banco Satelite and of the Banco Triton unless around the time of high tide at Bahia de Santiago, and must be maneuvered by a captain or by a pilot having extensive experience.

Station	Type of Report	Frequencies and Times
Evangelistas Island	CBF 59 (Forecast for W section)	A3 on 2738 at 0245, 0845, 1445, and 2040
		A3 on 6395 at 0240, 0840, 1440, and 2040
Punta Dungeness	CBF 67 (Forecast for E section)	A3 on 2738 at 0545, 1145, 1745, and 2345
		A3 on 6395 at 0540, 1400, 1740, and 2340
Magallanes	CCM (Forecast for area from Isla San Pedro to 0'S)	A1 on 464, 2067.5, 4256, and 8510 at 1400 and 2200
	Synopsis for Isla San Pedro and Diego Ramirez	A1 on 2067.5, 4256, and 85100 at 0255, 0555, 1155, 1455, 1755, 2055, and 2355
	Reports from meteorological observation stations	A3 on 4390 and 8773 at 1330 and 2130
	Navigation warnings	A1 on 464, 2067.5, 4256, and 8510 at 1430 and 2215

Great importance is attached to Radio Services; the stations listed in the accompanying table provide a constant flow of weather forecasts and regional Notices to Mariners. All transmissions are in Spanish. All times are in UT (GMT).

Broadcasts are given 1 hour earlier during the period of Daylight Savings Time. In Chile, Daylight Savings Time commences the Saturday before the second Saturday in October and ends the Saturday before the second Sunday in March.

Vessels requiring radar assistance while in the area between **Banco Triton** (52°37'S., 69°55'W.) and the E approach to Estrecho de Magallanes should report in as follows:

For vessels that are bound E, report to Magallanes on VHF channel 16, when abeam of Punta Arenas.

When 20 miles from **Punta Baxa** (52°35'S., 69°36'W.), report to Punta Delgada on VHF channels 11, or 13, or 68.

The stations at Magallanes and Punta Delgada will apply information concerning marine traffic, positions of oil platforms, navigational warnings, weather, tides, and the status of the pilot and anchorage waiting areas.

Contact Information.—Pilots for Estrecho de Magallanes can be contacted, as follows:

1. Telephone: 56-32-220-8451
   56-32-223-4254 (Channel Pilots)
2. Facsimile: 56-32-220-8497
   56-32-223-4254 (Channel Pilots)
3. E-mail: jofpilotaje@directemar.cl
   apacag1@gmail.com (Channel Pilots)

The Chilean Maritime Authority can be contacted, as follows:

1. Facsimile: 56-32-220-8662
2. E-mail: mrccchile@directemar.cl
   cbvradio@directemar.cl

Directions.—Vessels with a draft of more than 13.7m should pass well S of the S end of Banco Sarmiento, at least 20 miles SE of Punta Dungeness, and approach the coast S of Cabo Espiritu Santa on a course of 270°.

When about 9 miles from Punta Dungeness, the recommended route and pilot embarkation point are best seen on the chart up to the E approach to Premera Angostura.

When 7 miles E of Cerro Direction Light, alter course to 228° and keep in the middle of the channel, passing 1.2 miles off Punta Delgada Light and the same distance off Punta Mendez Light.

When the latter light is abeam, alter course to 212° to pass 1.25 miles off Bajo Satelite Light and then pass through a position bearing 157°, 1.5 miles from that light.

When approaching or leaving the narrows, care must be taken against the strong sets toward the shoals on each side of the channel.

From a position bearing 157°, 1.5 miles from Bajo Satelite Light, steer 247° to pass through the unmarked channel, about 0.75 mile wide, between the 20m depth contours, giving due regard to tidal currents.

On reaching a position 112.5° about 1.7 miles from Banco Triton Light, alter course towards Segunda Angostura, with Punta Mendez Light astern bearing 060° and Segunda Angostura Light ahead bearing 240°, to a position bearing 104°, 7 miles from Cabo Gregorio.

Vessels of lesser draft should conform to the above directions. Eastbound vessels should follow the reverse track.

When approaching Primera Angostura from the SW, the first land visible S of the narrows will be Cerro Dixon.

Care should be taken when entering Primera Angostura from the SW, as the ebb current sets strongly on to Bajo Satelite.

Caution.—Oil and gas production platforms, along with their associated underwater pipelines, lie in the entrance to the Estrecho de Magallanes S of Banco Sarmiento and are best seen on the chart.

East Entrance to Primera Angostura

8.2 Cabo Virgenes (Cape Virgins) (52°20'S., 68°21'W.), which is 41m high, is the best land fall for vessels making Estrecho de Magallanes (Strait of Magellan) from the N or E, and is usually the first land seen.

Cabo Virgenes Light

In clear weather the cape is visible from a distance of 25 miles. Several houses and a lighthouse stand on the cape.

Vessels approaching from the N may obtain temporary anchorage, in a depth of 12.5m, with Cabo Virgenes Light bearing 202°, 2 miles distant. It is reported that the cape can be picked up on radar at about 29 miles.

Shoal water, marked with kelp, lies within the 10m curve and extends about 2 miles E and 5 miles SE of Cabo Virgenes.

Roca Virgen (52°20'S., 68°20'W.), awash, is located on this shoal, about 0.8 mile ESE of Cabo Virgenes.

The E approach to Estrecho de Magallanes should be made with care. The variability of the direction and the velocity of the tidal currents make steering along an intended track uncertain in the approach.

Reports have been made of vessels striking bottom outside the limits of the dangers charted E of Cabo Virgenes, but there is no evidence, as the accidents occurred at night and no bearings could be given.

8.3 **Roca Cleopatra** (52°16'S., 68°12'W.), with a depth of 3.7m, is charted in a position 7 miles ENE of Cabo Virgenes. Its existence is doubtful.

An area of discolored water was reported to lie about 7 miles E of Cabo Virgenes.

Banco Sarmiento, contained within a 20m curve, extends about 20 miles SE from Cabo Virgenes. Deep-draft vessels should give this bank a wide berth due to the possibility of shoaling.

Roca Nassau (52°22'S., 68°16'W.), a small pinnacle with a depth of 0.9m, lies 3.75 miles ESE of Cabo Virgenes Light, near the N extremity of Banco Sarmiento. Except in gales, the rock does not break until LW.

An isolated 20m patch lies 1.25 miles E of the S extremity of Banco Sarmiento.

8.4 From Cabo Virgenes, the coast trends SSW 5 miles to Punta Dungeness, then trends in a general WNW direction about 20 miles to Cabo Posession.

Punta Dungeness (52°24'S., 68°26'W.), the N entrance point of the strait, is the extremity of a low spit of gravel and sand which projects 3.5 miles S from the foot of a low range of hills, between Cabo Virgenes and Monte Dinero. The spit has a shingle beach on each side.

Above the HW mark, it is covered with long coarse grass and a thick undergrowth of scrub, forming a network with the long kelp which is blown up by the heavy gales and dried in the summer sun.

From the quantity of kelp which covers the spit, as well as from the large pieces of wreckage found, sometimes as much as 1 mile from either beach, it seems evident that at times the sea must break over its whole extent.

A light situated on Punta Dungeness is shown from a round metal tower, 25m high. There is a signal station connected by telephone to Punta Arenas. The light is equipped with a radiobeacon and racon.

Tides—Currents.—The spring range of tide at Punta Dungeness is 9.1m; the mean range is 7.2m.

From Punta Dungeness, the coast trends WNW 5.75 miles to Punta Wreck. Cerro Cliff, 82m high, is located 1.75 miles ENE of Punta Wreck and Monte Dinero, 85m high, rises 1.25 miles NW of the same point. A beacon, marking the border between Argentina and Chile, is located on Monte Dinero.

Punta Daniel lies 8.25 miles WNW of Punta Wreck, then the coast trends 6.75 miles farther WNW to Cabo Posesion.

Cabo Posesion (Cape Possession) is a bold sheer headland, 112m high. The land NE of the cape is so much lower that, from a distance of 15 miles E, the cape appears as an island.

A light is shown from a square masonry tower, 11m high, situated 0.6 mile WNW of the summit of the cape.

Along this section of the coast, the 20m curve lies 183m off Punta Dungeness, 1 mile S of Punta Wreck, 2 miles S of Punta Daniel, and about 0.6 mile S of Cabo Posesion.

There are isolated patches, with depths of less than 20m, charted along this coast. Bajo Wallis (Wallis Shoal), with a least depth of 2m and consisting of sand, lies 2.5 miles offshore about midway between Punta Wreck and Punta Daniel. It is joined to the coast by a ridge, with depths of less than 6m, which vessels should not attempt to cross.

Anchorage.—There is a convenient anchorage on either side of Punta Dungeness; the bottom is stiff mud which, on the E, has a thin layer of stones.

The anchorage on the E side of the spit is the better during strong WSW winds; there is no sea here until the wind draws S of SW, though the squalls over the spit are heavy.

The best berth is in a depth of 18m, with Punta Dungeness Light bearing 240° at a distance of 2 miles and with Cabo Virgenes Light bearing 019°. The anchorage extends 1 mile farther E in more shallow water, about 12m.

The anchorage in the bay on the W side of the spit is preferred if there is no strong W wind, as the curve of the bay enables a vessel to anchor well under the N shore, and consequently out of the strength of the tidal currents.

A large vessel should not pass N of a line joining Monte Dinero and Punta Dungeness Light. There is anchorage in 22m, with Punta Dungeness Light bearing 115°, distant 2 miles.

Anchorage may be taken farther N of this position according to draft. Submarine pipelines are laid in these waters and can best be seen on the chart.

Anchorage is prohibited within 1 mile of either side of the gas pipelines which cross the entrance between Punta Dungeness and Cabo Espiritu Santo. Vessels should also keep clear of the several gas production platforms situated within 4 miles of Punta Dungeness.

Caution.—It is reported (2010) numerous oil platforms in the E entrance to the Strait of Magellan can make visual identification of aids to navigation difficult during periods of darkness.

8.5 Bahia Posesion (Possession Bay) (52°16'S., 69°11'W.) is entered between Cabo Posesion and an unnamed point 20 miles SW. Cerro Direccion, 67m high, is located 2.25 miles N of the W entrance point of the bay. This hill and another S of it appear as islands when approached from the E.

A light is shown from a metal tower, 17m high, from the summit of Cerro Direccion; a racon is situated at the light. Lighted offshore oil production platforms, situated from 4.5 miles WSW to 14 miles SSW of Cabo Posesion, may best be seen on the chart.

Monte Aymond (52°09'S., 69°29'W.), 261m high, rises 12 miles N of Cerro Direccion. There are four sharp rocky summits 2 miles WNW of it. This hill is an excellent mark when approaching Primera Angostura from the E, and it is also visible for some distance SW.

Vessels anchor in Bahia Posesion, in a depth of about 22m, with Cabo Posesion Light bearing 103° and Cerro Direccion Light bearing about 245°.

The pilot transfer area, with a least charted depth of 28m, is located 2.5 miles SW of Cabo Posesion. An area for the transfer of pilots underway is located 4 miles farther SW.

A Traffic Control Waiting Area is established 3 miles SSE of Cabo Posesion. The spring range of tide in this anchorage is 10.2m; the mean range is 8.3m.

Anchoring is prohibited between the meridians of 68°43'W and 69°08'W, except in the designated anchorage areas.

Banco Narrow, in the W part of Bahia Posesion, lies 6 to 10 miles ENE of Cerro Direccion. It has a least depth of about 5m. The tidal current runs strongly across this bank. A light is shown from the W end of the bank, about 7 miles ENE of Cerro Direccion.

Banco Plumper, midway between Banco Narrow and the coast to the W, consists of fine sand and dries. There is a channel 0.5 mile wide, with a least depth of 11m, between the two banks.

8.6 Cabo Espiritu Santo (52°40'S., 68°36'W.), the S entrance point of the E entrance to Estrecho de Magallanes, is a steep white cliff about 58m high. It is the seaward end of a range of hills extending SW across Tierra del Fuego. The cape is not easily distinguished except from the strait.

When seen from seaward, it appears as other cliffs in the vicinity, although it is the highest. The cliffs end 3 miles NW of the cape and the land is much lower.

The spring range of tide at Cabo Espiritu Santo is 11.9m; the mean range is 9.3m.

Two lights are shown at Cabo Espiritu Santo. One is shown from a white round tower at an elevation of 63m, about 1.2 miles SE of the cape. The other is shown at an elevation of 49m from a yellow metal tower with black bands about 0.5 mile further SE.

It was reported that Cabo Espiritu Santo could be picked up on radar at approximately 37 miles.

A coastal bank, which dries, extends 1 mile from the cape, while 2.5 miles further N, it extends 1.5 miles offshore.

A shoal, with a depth of about 8.5m, lies about 8 miles NNE of the cape.

8.7 From Cabo Espiritu Santo, the coast trends NNW, 9 miles to Punta Catalina, which is similar in appearance to Punta Dungeness.

Punta Catalina is the extremity of a low spit of sand and gravel that appears low at HW, but with a change of level at LW, the appearance must not be forgotten when taking bearings. A shoal, with a depths of 10.2m, lies 5 miles E of Punta Catalina. The spring rise in tide at Punta Catalina is 9m.

Bahia Lomas (Lomas Bay) (52°33'S., 69°00'W.), entered between Punta Catalina and Cabo Orange, 23 miles W, is almost entirely filled by drying banks consisting of fine dark sand. Two lighted offshore oil production platforms, standing close together, lie 4.5 miles WNW of Punta Catalina.

Banco Lomas extends 3 miles WNW from Punta Catalina and from 4 to 6 miles off the SE shore of the bay, with depths of less than 5m; it is predominantly filled with a sand bank.

Banco Orange extends up to 11 miles off the SW shore of the bay with depths of less than 5m. The NW edge of the bank extends 9 miles NE from Punta Anegada. This edge of the bank is steep-to, due to the strength of the tidal current through the narrows.

Cabo Orange (52°28'S., 69°23'W.), 2 miles SE of Punta Anegada, is a sharp-pointed conical hill, 57m high; it is unmistakable. As the cape is approached from the E, a remarkable white patch will be seen on its E side.

A light is shown from a green metal, tripod structure standing on the N edge of Banco Orange, 3.5 miles NNE of Cabo Orange.

Numerous lighted platforms and submarine pipelines are located between Bahia Lomas and Bahia Posesion.

Primera Angostura

8.8 Primera Angostura (First Narrows) (52°30'S., 69°35'W.) is entered between Punta Delgada and Punta Anegada, a low point 4 miles E. It extends 8 miles SW, with a least width of 2 miles, and with depths of 53 to 80m. The shores are steep and cliffy, but not high. A light is shown close S of Punta Anegada.

Punta Delgada (52°27'S., 69°33'W.), on the NW side of the entrance, may be distinguished by its lighthouse and the settlement in its vicinity.

A light, shown from a round metal tower, 12m high, is situated on the point. There is a prominent flare situated near the light tower. When approaching from the E, the flare obscures the flashes of the light.

Punta Delgada Light

Two range beacons, in line bearing 288°, are situated 0.4 mile N of Punta Delgada; Punta Malvinas lies close N of the beacons.

Banco Direccion, an extensive sand bank, extends NE from Punta Malvinas along the W side of the approach to Primera Angostura for a distance of about 7 miles. It shoals quickly within the 20m curve.

Anchorage for small vessels may be obtained, in depths of 5 to 6m, stiff clay, 0.3 mile offshore between Punta Malvinas and Punta Delgada. The approach to the anchorage should be made with the range beacons bearing 288°, and anchor when Punta Delgada bears 224°. The depths shoal suddenly from 55 to 5m. There is a 2m patch close N of the range line.

A car ferry run between Punta Delgada and Punta Espora at HW, 4.25 miles SW of Punta Anegada.

There is a pilot station near Punta Delgada Light.

8.9 Morro Nunez (52°29'S., 69°36'W.), on the NW shore, 2.5 miles SW of Punta Delgada, is a prominent triangular cliff, 35m high. Punta Satelite lies 4 miles SW of Morro Nunez.

Punta Barranca, 1.5 miles WSW of Punta Satelite, lies on the N side of the SW entrance to Primera Angostura. It can be identified by its low cliffs, the only ones in the vicinity.

Bajo Satelite (Satellite Patch), marked by a light, is contained within the 5m depth contour and extends 3 miles SW from Punta Satelite. A 6.5m shoal lies in the channel, 1.25 miles SSW of Punta Satelite; there are depths of less than 5m between it and the point.

Bajo Satelite is usually marked by kelp, but when the tidal current and wind are strong, the kelp is run under from half-flood to half-ebb.

It is considered unlikely that the 0.5m patch is marked by kelp.

8.10 From **Punta Anegada** (52°27'S., 69°26'W.), the SE shore of the narrows trend in a SW direction 7 miles to Punta Mendez, 31m high, the most salient point on this coast. Punta Baxa lies on the E side of the SW entrance to Primera Angostura, 3.5 miles SSW of Punta Mendez.

A light is situated on Punta Mendez.

Cerro Angulo, 37m high, rises 2 miles SSW of Punta Anegada. It is prominent and has the same conical appearance as Cabo Orange.

Cerro Dixon, 70m high, is located 3.5 miles ESE of Punta Baxa; it is not visible until open S of the point. The hill can be identified from the W by its two rounded hillocks, the S of which is higher, darker, and half the width of the N hillock.

Between Punta Anegada and Punta Espora, 4 miles SW, there is a shallow bay which affords the only anchorage on the SE side of Primera Angostura, where a small vessel can lie out of the main strength of the tidal current.

A 4.7m patch lies 0.75 miles offshore, 1.5 miles WSW of Punta Anegada. A similar patch lies the same distance offshore, 1.5 miles NE of Punta Espora.

A patch of rock, marked by kelp, with a depth of less than 2m, lies in the bay 2.5 miles NE of Punta Espora, about 0.3 mile offshore.

Puerto Progresso (52°29'S., 69°28'W.), a small harbor that can accommodate vessels up to 500 gt under favorable tidal conditions, is located 2 miles SW of Punta Anegada.

Two beacons are situated near the harbor and when in line, bearing 158°, lead to a slipway where there are some oil tanks. A light is shown 1.5 miles NE of Punta Espora.

The settlement stands 0.6 mile E of the harbor near the shore. There is a prominent house 0.75 mile to the S.

Roca San Vicente (52°34'S., 69°38'W.), with a depth less than 2m, lies 1.3 miles NW of Punta Baxa. A shoal, with a depth of 3.2m, lies 1 mile W of Punta Baxa.

Primera Angostura to Segunda Angostura

8.11 From **Punta Barranca** (52°33'S., 69°42'W.), the coast recedes NW about 6 miles and forms Bahia Santiago; then the coast extends about 17 miles SW to Cabo Gregorio, the N entrance point of Segunda Angostura.

Sierra Gregorio trends parallel to and within 5 miles of the shore N of Cabo Gregorio, attaining an elevation of 360m. Hombro de Gregorio, the W shoulder of the range, is located 8 miles NW of Cabo Gregorio. During thick weather, it will appear frequently through the mist.

There is a sand hill about 1 mile N of Cabo Gregorio, 60m high; Cerro Mogote, 6.25 miles WNW of the cape, attains an elevation of 78m. From a position E of **Banco Triton** (52°37'S., 69°55'W.), these two hills and Cabo Gregorio appear as islands.

Cerro Sutlej (52°23'S., 69°45'W.), 152m high, rises 9 miles WNW of Punta Delgada. It becomes clear of the range at the back, forming a good mark when a vessel is abreast of Banco Triton. In some conditions of visibility Cerro Util, 12 miles W of Punta Barranca, will be seen as a small double hill close to shore over Punta Valle, the W entrance point of Bahia Santiago.

From Punta Barranca to Cabo Gregorio, the 20m curve is irregularly shaped, but lies as much as 6.25 miles offshore in the vicinity of Banco Triton.

Banco Triton (52°37'S., 69°55'W.), with a least depth of 5.5m and marked by a lighted buoy, lies 9 miles WSW of Punta Barranca. The bank is composed of sand.

Tidal currents run strongly over the bank and usually form ripples near its shallowest part. The bank is reported to be extending S.

8.12 Bahia Santiago (52°32'S., 69°52'W.) is entered between Punta Barranca and Punta Valle, 11.5 miles WSW. Banco Barranca extends from the shore W of Bajo Satelite and occupies the NE part of the bay. The depths over the bank vary from 5 to 9m. A detached 8.5m shoal lies 4 miles E of Punta Valle.

Anchorage, in depths of 10 to 20m, may be obtained in Bahia Santiago.

During E winds, the best anchorage is off the SW end of Banco Barranca, 4.5 miles E of Punta Valle, where the kelp forms a breakwater leaving calm water on the lee side.

During W winds, the best anchorages are closer to Punta Valle or in Bahia Gregorio, 10 miles SW.

Bahia Gregorio (52°37'S., 70°08'W.) lies between Punta Valle and Cabo Gregorio, 8.75 miles SW. Cabo Gregorio is sandy and ends in a small cliff, 4m high.

Although the cape is free of dangers, it should be given a wide berth as the tidal current sweeps round it at rates of 4 to 5 knots towards the shoals to the SW. A radio mast stands 1 mile N of the cape.

Banco Tribuna has a least depth of 6.7m located 3.5 miles E of Cabo Gregorio. There is a narrow bank, with a least depth of 19.7m, 4 miles ESE of the shallowest part of Banco Tribuna.

8.13 Puerto Sara (52°38'S., 70°12'W.) (World Port Index No. 14090), 1.75 miles NNE of Cabo Gregorio, has an oil terminal from which crude oil is exported.

A pier, about 400m long, extends SE, but has been reported in a bad state of repair; berthing alongside its head was impracticable. Near its root there is a cold storage plant and a group of houses.

A pipeline is laid from the root of the pier in a SE direction to a number of mooring buoys which lie about 0.2 mile SE of the head of the pier, in depths of about 25 to 28m.

Vessels are berthed at the beginning of HW slack in daylight hours only. Tankers up to 75,000 gt and 14.9m draft can be accommodated.

Pilotage is compulsory; the pilots come from Punta Arenas. The boarding place is about 1 mile SE of the oil terminal.

Vessels approaching Puerto Sara from the E should pass S of Banco Tribuna and not steer for Puerto Sara until the range lights align on bearing 334°.

The port anchor should be let go when from the bow of the vessel the lighted beacons 0.5 mile N of Cabo Gregorio are in range bearing 265°, veer 220m of chain, then let go the starboard anchor, securing to the berth heading 230°.

Tugs are available to assist in berthing and to run all moorings to the buoys.

It should be noted that the holding ground where the port anchor is let go is good, but the starboard anchor is let go on rock and pebbles. Care must be taken not to drag or foul this anchor.

Anchorage is available off Puerto Sara, in Bahia Gregorio, in a depth of 20m, with the light on the pier bearing 240°, distant 1.5 miles.

The tidal currents in the anchorage area have a rate of 2 to 3 knots and the tidal range is about 5.5m at springs.

8.14 The S shore, between Punta Baxa, the SE entrance to Primera Angostura, and Punta San Isidro, the NE entrance to Segunda Angostura, is low and fringed by a chain of low hills with few landmarks. Cerro Negro rises near the coast 5 miles S of Punta Baxa.

Cerro Doble Pico is located 8.25 miles S of Punta San Isidro, and Pico Gap, 291m high, lies 21 miles SE of the same point.

Bahia Felipe occupies all of this S shore. There are several anchorages in the bay, but they are exposed to the prevailing winds.

An extensive bank of irregular shape, with depths of 8.3 to 19.3m, about 4 miles N to S and a similar distance E-W, lies in the SW approach to Primera Angostura, SE of the recommended track.

The 20m curve lies up to 4.5 miles offshore in Bahia Felipe, but the water N of Punta San Isidro is steep-to, with a depth of 76m charted about 0.3 mile NE of the point.

Arrecife Barnacle (52°45'S., 70°02'W.) has a least depth of 5m which is located 2 to 4 miles E of Punta San Isidro. This is the only rocky ledge between the two narrows.

Anchorage.—In the NE part of Bahia Felipe, anchorage sheltered from SE winds may be obtained, in 9.5m, with Punta Baxa bearing 021°, 3.5 miles, or farther S in 12m, with the point bearing 024° and Cerro Negro bearing 090°. When leaving this latter berth for the W with a W current, steer for Hombro de Gregorio until well out in the strait to avoid being set onto the shoal at the head of the bay.

A Traffic Control Waiting Area is established in Bahia Felipe, about 5 miles ESE of Punta San Isidro.

Good anchorage may also be obtained in the W part of Bahia Felipe, well sheltered from SW winds, midway between Punta San Isidro and Punta Piedra, 11.5 miles ESE.

This anchorage should be approached with Cerro Doble Pico bearing 210°, which leads over the E end of Arrecife Barnacle; the anchor should be let go when **Cerro Cono** (52°40'S., 70°23'W.), on the N shore of Segunda Angostura, bears 290°, in a depth of 25m, sand and shells.

Another good berth, nearer to Punta San Isodro, is in a depth of 20m, with the point bearing 298° at a distance of 1.25 miles. Care is necessary when using this anchorage, as the shallow coastal bank extending E from the point is steep-to and the W current runs over it strongly.

Segunda Angostura

8.15 Segunda Angostura (Second Narrows) is about 12 miles long, NE-SW, and 4 to 6 miles wide. The narrows are entered from the E between **Cabo Gregorio** (52°39'S., 70°13'W.) and Punta San Isidro, 5.75 miles SSE.

Cerro Cono, 6.5 miles W of Cabo Gregorio, is a distinctive hill, 41m high. A light on its summit is shown from a round tower, 10m high.

Punta Gracia (52°44'S., 70°32'W.), 6.25 miles WSW of Cerro Cono, is the N entrance point of the W end of Segunda Angostura. It is a cliffy point, 53m high.

The N shore recedes between Cabo Gregorio and Punta Gracia and is bordered by a bank with shoal water extending out about 0.5 mile from a line joining the cape and the point.

These shoals consist of a drying sand bank, 1.3 miles long, with its E end 1.5 miles WSW of the cape, while 6 miles WSW of the cape is Bajo Halfway, 1.25 miles long, with a least depth of 5.5m on it. East of Punta Gracia, the bank extends about 1 mile off the shore and is steep-to.

8.16 The S shore of Segunda Angostura is higher than the N shore; it is cliffy and steep-to.

From **Punta San Isidro** (52°44'S., 70°08'W.), the shore trends WSW 7.5 miles to Cabo San Simon which is 68m high, then curves gradually WSW 4.5 miles to Cabo San Vicente, 56m high, the S entrance point of the W end of Segunda Angostura.

Cerro Agudo, 6 miles WSW of Punta San Isidro, appears as a remarkable conical peak which makes a good mark until Cabo San Simon is raised. Promontorio Sweepstakes, on the coast 4.25 miles W of Cerro Agudo, 50m high, is a good landmark for anchoring in Bahia Gregorio.

Segunda Angostura Light (52°44'S., 70°11'W.), 2 miles W of Punta San Isidro, is shown from an octagonal concrete tower, 6m high. The lighthouse is equipped with a racon.

Directions.—From a position 7.5 miles ESE of Cabo Gregorio, steer 257° to pass 2 miles N of Segunda Angostura Light. When Cabo San Vicente Light bears 180°, steer 215° to a position 1.75 miles W of Cabo San Vicente Light, then steer 182° to enter Paso Nuevo. Vessels bound E steer reciprocal courses.

Segunda Angostura to Paso Ancho

8.17 From **Punta Gracia** (52°44'S., 70°32'W.) to Punta Gente, about 18 miles SSE on the E shore, both the E and W sides of the strait are indented with bays.

From Segunda Angostura, there are three routes leading S to Paso Ancho. Paso Nuevo, E of Isla Marta and Isla Magdalena, is the recommended and most generally used route.

The others are Paso Reina, the middle route; and the channel through Paso Real and Paso Pelicano, between Isla Isabel and the W shore. The last mentioned channel is available to vessels with a draft up to 5.5m.

Bahia Whitsand (52°43'S., 70°36'W.) is entered between Punta Gracia and Punta Low, 6 miles WSW. It is sheltered from all winds N of SW and is free from the influence of the tidal currents.

Good anchorage may be obtained, in a depth of 10.7m, mud, with Punta Gracia bearing 082° and Punta Silvestre, the NE extremity of Isla Isabel, bearing 171°.Ensenada Oazy is entered from the NE corner of Bahia Whitsand, between Punta Shepherd on the E and Punta John, 1 mile W.

The entrance is about 1 mile wide, but it narrows quickly and is unsuitable for an anchorage.

Kelp extends 0.3 mile offshore between Punta Gracia and Ensenada Oazy.

8.18 Puerto Zenteno is entered between Punta Perno and Punta Puno, 1.25 miles SSW and 2.75 miles SSW, respectively, of Punta Low. It widens within the entrance, and is completely sheltered, but during W winds a sea rises quickly and is dangerous for boats. No vessel without local knowledge should enter this bay.

A detached shoal, with a depth of 7.7m and surrounded by kelp, lies in the approach to Puerto Zenteno, 1.5 miles SE of Punta Perno.

An isolated 6.2m shoal, also surrounded by kelp, lies 1.5 miles ESE of Punta Zenteno, a point 0.6 mile SE of Punta Puno.

Puerto Zenteno is almost entirely filled with a shallow bank. The entrance lies between Punta Puno and Isla Plaid, 25 mile to the N. The navigable channel lies between a rock, awash, 183m SSW of Isla Plaid, and Punta Puno which is a steep-to sand spit. The channel is 183m wide with depths of 10m.

Islote Pitcher lies on the N side of the channel, about 0.5 mile W of Punta Puno.

Laguna Cabeza del Mar, a large shallow lake 7 miles W of Punta Zenteno, may be reached by passing through Puerto Zenteno, Canal Tortuoso, and Laguna Baja.

Anchorage may be obtained outside the entrance to Puerto Zenteno, in depths of 11 to 13m, about 1 mile SE of Punta Zenteno.

Isla Isabel (52°52'S., 70°42'W.) lies 5 miles SE of Puerto Zenteno; it extends 7.5 miles in a NE to SW direction and is 2 miles wide. Ranges of hills extend in ridges along its length.

The greatest elevation, 54m, is near the SW end. Punta Silvestre, the NE extremity of the island, is very low and steep-to. It is composed of sand, shells, and shingle.

A bank, with a least depth of 3.7m, extends 1 mile WSW from a position 1 mile S of Punta Tern, the SE extremity.

8.19 Paso Real lies between Isla Isabel and the mainland to the W. Paso Pelicano is the S portion of Paso Real between Cabo Thorax and the mainland to the SW.

Bajo del Medio (52°48'S., 70°40'W.), with a least depth of 4.5m, lies in the N entrance to Paso Real, 2.75 miles ESE of Punta Zenteno; it is joined to the NW extremity of Isla Isabel by a bank with a least depth of 4.5m. A shoal, with a depth of 2.7m, lies 1.75 miles WNW of Punta Silvestre.

Punta Ana, a low sandy point, is located 2 miles SW of Punta Zenteno. Dangers covered by kelp, which is usually visible, lie up to 2 miles E and 1.5 miles SE of the point.

Punta Rosa (52°51'S., 70°48'W.) is located 2.75 miles SSW of Punta Ana. The 5m curve lies 0.25 mile E of Punta Rosa and the 10m curve lies about 1 mile E of the same point.

Paso Pelicano is entered from the N between Punta Rosa and Punta Hook, 2.5 miles SE on Isla Isabel. Its S entrance is

between Cabo Thorax, on Isla Isabel, and Cabo Porpesse, 1.5 miles S. A light is shown from Cabo Thorax.

Tidal currents in Paso Real run at a rate of 1 knot. In Paso Pelicano their rates are from 1.5 to 2 knots.

Anchorage for a vessel of moderate draft may be obtained, in a depth of 13m, on the E side of Paso Real, with the N extremity of Isla Isabel bearing 123° and Punta Gracia bearing 035°. Attention should be given to the shoal water about 0.5 miles NE and 0.5 mile W of the anchorage.

Vessels may also anchor N of Isla Isabel, with Punta Silvestre bearing 154° and Punta Gracia bearing 029°, in a depth of 18m.

8.20 Cabo Negro Gas Terminal (52°56'S., 70°48'W.), consisting of a 36m long T-shaped concrete jetty, with a depth of 14m alongside, stands 0.4 mile WNW of Cabo Porpesse. It can accommodate vessels up to 96,000 dwt, with a maximum length of 241m and a maximum draft of 12.8m. A mooring buoy, dolphins, and mooring posts lie off the head of the jetty.

The port limits of the terminal are the parallel of Cabo Thorax and the meridian joining Cabo Thorax and Cabo Porpesse.

Pilots will berth and unberth vessels at slack water. Berthing is only carried out in daylight during slack water. Lights in range bearing 270°, lead to the pier head.

Anchoring within about 0.1 mile of the head of the jetty or range line is prohibited. The terminal should only be approached from the S through Paso Pelicano.

There is anchorage NW of the jetty, 0.25 mile offshore, in depths of 10m, sand, but during prevailing winds from the W to N, Bahia Laredo is preferable.

Directions.—A vessel of moderate size, proceeding through Paso Real and Paso Pelicano, can pass S of Bajo del Medio, keeping at a distance of not less than 0.5 mile off the NW side of Isla Isabel, until the point 1.25 miles N of Cabo Thorax is abeam, then steer course 190° until the light on Cabo Thorax bears 060°. The S entrance to Paso Pelicano will now be open and a course of 122° should be made good to clear the shoal water SSE of Isla Isabel and the bank, with depths of less than 9m, that extends 1 mile E from Cabo Porpesse.

Care should be exercised to pass E of the shoal patches off the NW extremity of Isla Isabel.

When the wind and current are opposed to each other a race ensues, which is dangerous for boats, in Paso Pelicano S of Cabo Thorax.

8.21 Banco Marta (52°49'S., 70°33'W.), steep-to and marked by kelp, and with a least depth of 3m, lies with its N end 3.5 miles S of Segunda Angostura and 3 miles ENE of Punta Silvestre. The bank extends about 5.2 miles SSW from this position and has an average width of about 0.7 mile.

Isla Marta, lying near the middle of Banco Marta, rises in sheer cliffs to an height of 18m. It has a flat summit, and slopes slightly to the E. A reef, which dries, extends 0.25 mile NE from the island.

Isla Magdalena (52°55'S., 70°35'W.), 1 mile long NE to SW, lies 4 miles S of Isla Marta. It is 34m high at its W end, where it rises vertically from the sea.

Shoal water extends about 1 mile NE from the NE extremity of the island. The edge of this shoal is usually well-marked by kelp and tide rips.

A below-water rock, whose position is doubtful, is reported to lie 1 mile N of the light tower situated near the center of the island. A 6.5m shoal lies 1.75 miles ESE of the light tower. Other dangers, best seen on the chart, lie up to 2.8 miles ENE of the light tower.

8.22 Paso Reina (52°53'S., 70°40'W.) lies between the islands and bank described above and the SE coast of Isla Isabel.

There is a navigable width of about 0.7 mile between the shoals to the SE and the coastal bank extending off the SE coast of Isla Isabel.

Banco Walker, with depths of less than 20m, extends for 5 miles in a NE to SW direction in the approach to Paso Pelicano from E. The shallowest part of the bank, with a charted depth of 6.3m, lies 5 miles ENE of Cabo Porpesse.

In Paso Reina, the tidal rates are between 2 and 3 knots; between Isla Magdalena and Banco Walker, they run at rates of 3 to 5 knots.

Anchorage.—Anchorage in Paso Reina may be obtained out of the strength of the tidal current, with Punta Silvestre bearing 023°, distant 1.25 miles, in a depth of 14m, coarse sand and shell.

Directions.—Follow the suggested course for Segunda Angostura and when the light on Cabo San Vicente bears 130°, steer for the N extremity of Isla Isabel which shows as a bluff, bearing 236°. When Punta Silvestre is in line with Punta Alfredo, 2.25 miles SSW, bearing 218°, steer to keep in the middle of the channel between the banks which extend off Isla Isabel and the shoals off Banco Marta and Banco Walker.

Caution.—It is possible that rocks exist between Isla Marta and Isla Magdalena, and between Isla Magdalena and Banco Walker therefore, the passage between the islands, and between Isla Magdalena and the bank should not be used.

Paso Nuevo is the best and most frequently used of the three routes from Segunda Angostura to Paso Ancho. It lies E of Isla Marta and Isla Magdalena, and its E shore extends from Cabo San Vicente to Punta Gente, 14 miles S.

8.23 Bahia Lee (52°50'S., 70°20'W.) is formed between Cabo San Vicente and Punta Zegers.

Cerro Spiteful is located close to the NE shore of the bay, 4.25 miles E of cape.

Banco Nuevo, with depths of 0 to 10m, extends about 5 miles S from a position 1.5 miles SSE of the light on Cabo San Vicente. The bank lies close E of the 20m curve and is reported to be extending to the NE.

Tidal currents, with rates up to 6 knots, have been experienced in the N end of Paso Nuevo at the time of HW.

The flood current sets E onto Banco Nuevo and the ebb sets W out of Bahia Lee. Heavy overfalls occur S of Cabo San Vicente when strong W and NW winds meet the ebb current.

Anchorage, which should only be used in an emergency and never at night, may be obtained, in a depth of 15 to 20m, 1.5 miles ESE of Cabo San Vicente.

Although the anchorage is fairly sheltered from N and NW winds, these winds may suddenly shift to SW, or SW gales may spring up from calms without warning.

Anchoring is prohibited in a 1-mile wide band stretching between Punta Zegers W to Cabo Porpesse, and passing S of Isla Magdalena, due to the presence of a submerged gas pipeline.

Bahia Gente Grande (52°59'S., 70°13'W.) is entered between Punta Zegers and Punta Paulo, 3.5 miles S. Its shores are low and bordered by shallow banks.

Cerro Doble Pico, previously described in paragraph 8.14, lying 0.75 miles ENE of Punta Zegers, is a good mark.

Banco Middleton, with depths of 2 to 4m, extends about 0.8 mile SSE of Punta Zegers. The 5m curve lies up to 0.75 mile off the shore along the N side of the bay and in places about the same distance off the SE and SW shores of the bay.

Isla Contramaestre (52°57'S., 70°21'W.), in the entrance to Bahia Gente Grande, lies 2 to 3.5 miles SW of Punta Zegers. Banco Almeida, with a depth of 5m, lies near the middle of the N entrance to the bay, 0.9 mile N of the N extremity of Isla Contramaestre.

Banco Serpiente, which partially dries on its W end and has a least depth of 3m on its E end, extends 1.25 miles E of the same point. The bank was reported extending E and SE.

Banco Middleton, with depths from 2 to 5m, extends 1 mile SE from Punta Zegers.

Banco Perez, with a minimum depth of 4.4m on its N edge, lies on the SE side of the S entrance channel, 1 mile NNE of Punta Paulo. The bank is marked by kelp.

Directions.—There are two entrances to Bahia Gente Grande.

The passage N of Isla Contramaestre is wider, but is not recommended except for small vessels with shallow draft. The passage is shallow, the rate and direction of the tidal current is irregular, but usually sets across the channel, and Banco Almeida lies in the middle.

The channel S of the island has a least depth of 10m and a least navigable width of 0.4 mile.

To enter Bahia Gente Grande by the S channel, make good a course of 055° to pass midway between the two lighted buoys situated about 1 mile and 1.25 miles, respectively, NNW of Punta Paulo. As soon as the light on Isla Contramaestre bears 267°, alter course to 087° keeping that light astern, passing N of Banco Perez Lighted Buoy until Punta Zegers is in range with Cabo San Vicente bearing 328°. Then steer as desired for selected berth.

8.24 Caleta Percy (52°53'S., 70°14'W.) is a small cove N of Punta Vergara, about 2 miles within the N entrance point of Bahia Gente Grande.

On the S side of the cove there is a pier 160m in length, with a depth of 2.7m at its outer end. About 0.2 mile N, there is another pier of the same length. A light is occasionally shown from the head of each pier.

Submarine pipelines extend about 1 mile SE from a position on shore 0.25 mile NNE of the S pier head. A berth for tankers up to 10,000 gt, in a depth of 11m, is situated at the seaward end of the pipelines, where there are four mooring buoys.

The maximum draft that can be accommodated here is about 9.1m. The maximum length handled is 122m. Except for vessels using the berth, anchoring is prohibited within 0.6 mile and on the range line in the approach to it.

Pilots and Customs Officers are available, but a reliable advance notice of ETA must be sent from the vessel.

Berthing at the tanker berth or piers should be done, if possible, at early dawn when the winds are moderate; this is considered practical in winds up to force 6 or 7.

With SW winds, the sea runs into the cove, making the S pier unusable.

This port is normally used for local shipments only. Berthing is done during daylight hours only.

The port limits of the terminal are the parallel of 52°55.7'S and the meridians of 70°14'W and 70°18'W.

Caleta Clarencia (52°54'S., 70°08'W.), which forms the NE extremity of Bahia Gente Grande, lies 6 miles ENE of Punta Zegers. It is exposed to the prevailing SW wind.

A submarine pipeline extends about 0.7 mile SSE from a position on shore near the oil tanks. Mooring buoys at the seaward end of the pipeline will accommodate a tanker up to 75,000 gt, with a draft of 11m.

However, the entrance to Bahia Gente Grande has a limiting draft of 10m and vessels may be required to complete loading at Puerto Sara. The maximum vessel length that can be accommodated is 250m.

A berthing pilot must be used by vessels that are using this berth. Vessels lie on a 255° heading with both anchors out and with mooring lines to the buoys, about 120m in length.

Anchorage.—Anchorage may be taken, in depths of 9 to 12m, about 1.75 miles NE of Punta Searle, which is located in the SW part of Bahia Gente Grande, about 4 miles S of Punta Paulo.

8.25 Caleta Hobbs (53°03'S., 70°20'W.), formed between Punta Searle and Punta Hobbs, 2 miles SE, lies in the extreme SW corner of Bahia Gente Grande. The general depths within Caleta Hobbs are 1 to 4.5m. There are some buildings situated on the shore of a small bight close W of Caleta Hobbs.

From Punta Paulo, the shore of the S approach to Bahia Gente Grande trends 4.5 miles SSW to **Punta Gente** (53°00'S., 70°25'W.), a point, 22m high. Cerro Huemul rises to 28m, 1.75 miles NE of Punta Gente.

Tidal currents along this shore are strong and the vicinity of Punta Gente should be avoided.

Paso Ancho

8.26 Paso Ancho is that part of Estrecho de Magallanes that lies between Punta Gente and Bahia Laredo on the N, and the entrance to Paso del Hambre about 40 miles S.

Cabo Negro (52°57'S., 70°48'W.), a dark cliff, 40m high, is located about 0.9 mile SSW of Cabo Porpesse.

Bahia Laredo is entered between Cabo Negro and a point 2.5 miles SSW. Foul ground lies off the S entrance point of the bay, and the 5m curve lies about 1 miles NNW of the same point. A 4.2m patch lies about 1 mile S of Cabo Negro.

A jetty extends 120m SE from the coast about 1.2 miles SW of Cabo Negro. There is a depth of 4.5m alongside the jetty head.

There is good anchorage in Bahia Laredo, in depths of 10 to 12m, sand and mud, SW of Cabo Negro.

Tidal currents in the bay are of no consequence inside Bahia Laredo. South of the bay they are hardly felt, but N they are strong. Between Cabo Negro and Isla Contramaestre on the E shore, is the W limit of strong tidal currents in the strait.

Small vessels can obtain anchorage in Caleta Chabunco, off the mouth of Estero Chabunco, about 4.2 miles S of Cabo Negro.

A beacon, 16m high, is situated on a hill about 2 miles SSW of the mouth of Estero Chabunco.

8.27 The mouth of the Estero Rio Seco, about 3 miles S of Estero Chabunco, can be identified by buildings which can be seen at a considerable distance.

There is a cold storage plant, with two chimneys in line bearing 285°, and a pier, 100m long, with a depth of 3m at its head, situated close NE of the E chimney; it is used by local craft for loading chilled meat.

There is anchorage here, in a depth of 22m, with the two chimneys in line and the beacon bearing 355°. This berth is convenient for vessels working cargo and is free of kelp.

Bahia Catalina lies between the mouth of the Estero Rio Seco and **Punta Arenas** (Punta Arenosa) (53°08'S., 70°51'W.), 4 miles S. There is a prominent white patch on the cliffs, 2.5 miles NNE of Punta Arenas. When seen from the N, in some light conditions, it resembles a ship under sail.

Tres Puentes, a large refrigeration plant, is situated about 0.7 NNW of Punta Arenas. There are two small piers situated here. The obstruction lights of the four radio towers are more noticeable than the lights of the town.

There are two conspicuous aircraft hangars situated 0.3 mile NW of Punta Arenas; a similar hangar is situated 0.3 mile WNW of the same point.

Muelle Mardones, an L-shaped pier, is situated about 0.3 mile NW of Punta Arenosa. The pier has a depth of about 20m along its outer face and has a lighted beacon near the end. A designated anchorage lies about 0.7 mile NE of the Muelle Mardones pier. The bay is very open and only protected from W winds. The holding ground in this area is reported to be poor.

Punta Arenas is a projection of low land, consisting of sand and gravel covered with grass and bushes. The point sticks out about 1 mile from the general run of the coast.

The point is steep-to on its NE side, but on the SSE side a sandbank, with depths less than 5.5m, extends 1 mile offshore. This sandbank is said to be extending seaward.

Punta del Rio, the N entrance to Rada de Puntas Arenas, is located about 2 miles SSW of Punta Arenas, close N of the mouth of the Rio Las Minas.

Rada de Punta Arenas (53°10'S., 70°54'W.)

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8.28 Rada de Puntas Arenas is an open roadstead situated about 1 mile SW of Punta del Rio. It is the first port of entry for Estrecho de Magallanes, and consists of the city, berthing, and anchoring facilities and two tanker berths. The city of Punta Arenas, which backs the roadstead, is a modern city with all amenities. It is the capital of the province of Magallanes.

Winds—Weather.—The predominant winds are from the NW and, although it blows on occasion with great violence, it does not lift the sea. They are dangerous only to small vessels.

The "Panteonero," a local wind which comes up in the spring or summer, is a WNW wind reaching a force of 12 on the Beaufort Scale.

On occasions winds blow from the SW, but without much intensity. However, they cause the tides to rise and occur as tempest in Punta Arenas.

Rada de Punta Arenas
http://www.australport.co.cl

There are sporadic E winds that are dangerous, as the bay is open in this direction. These winds have damaged smaller ships and caused larger vessels to drag anchor.

When winds occur from the E or SW, ships moored at the pier should leave and anchor in the bay in case the tide should rise.

The most favorable months are those of winter, when the winds diminish in intensity and there are frequent calm days.

On the contrary, spring and summer present strong winds from the W, blowing for long periods of time; calm days are scarce.

Tides—Currents.—The spring range is 1.4m, while the neap range is 0.6m.

The current of the flood tide flows from the NE to SW, contrary to the ebb current. Without other factors, the change in direction of the current is produced by the tides. Currents have a maximum speed of 1 knot.

With strong W winds, the current constantly flows toward the E without any effect from the tidal currents.

Depths—Limitations.—Muelle Prat is the primary pier in the port; it has 542m of berthing. The limiting dimensions at the berths are, as follows:

1. Berth 1N can accommodate a vessel with a maximum length of 176m and a maximum draft of 9m. Berth 1S can accommodate a vessel with a maximum length of 176m and a maximum draft of 8.9m.
2. Berth 2N can accommodate a vessel with a maximum length of 151m and a maximum draft of 5.2m. Berth 2S can accommodate a vessel with a maximum length of 151m and a maximum draft of 5.2m.
3. Berth 3N and Berth 3S are both reported to accommodate a maximum draft of 1.8m.
4. The Inshore Berth is for small craft only.

Shoaling in the vicinity is continuous and dredging in the berths alongside is in progress.

In calm weather, vessels up to 165m in length can moor stern-to the head of Muelle Prat, riding to the starboard anchor on seven shackles of cable.

Vessels berth with bows to shore due to shoal patches about 40m off each side of the pier.

Mooring at the pier is somewhat dangerous due to the influence of the wind, the currents, and the state of the tide. Prior knowledge of these factors is required in order to consider their effect.

It is not recommended that vessels over 1,000 gt moor at the pier in winds above force 4.

Muelle Santos Mardones lies 0.3 mile NW of Punta Arenosa. The pier is L-shaped, and has a berthing face 336m long. Vessels with a maximum length of 230m and a maximum draft of 14m can be accommodated.

Aspect.—In order to facilitate mooring at night, there are two pairs of leading beacons on each side of the pier; the beacons are 50m apart, enabling vessels to make a safe approach. Both pairs of beacons are aligned bearing 334°, the ones on the N side of the pier have green lights and the ones on the S side red lights. Request for lighting these beacons should be coordinated via VHF with "EMPORCHI."

A yellow square building and a square white building with a flat roof are situated 0.5 mile and 0.45 mile N and NNW, respectively, from the head of Muelle Prat.

Don Bosco Church, about 0.9 mile NNE of the pier head, is conspicuous. There are two radio masts, marked by obstruction lights, situated 0.3 mile NNE of the pier whose lights are seen from seaward above all the lights of the city.

A television mast, showing an obstruction light, situated on Monte Fenton, 4.75 miles WNW of the head of Muelle Prat, is prominent and may be seen at night at a distance of 30 miles.

A brown oil tank is situated on shore at the head of the pipeline; two radio towers are situated about 0.2 mile NW of the oil tank.

Pilotage.—Pilotage is compulsory for anchoring in the bay and for mooring to the pier or mooring buoys. The request for a pilot and the vessel's ETA should be sent by radio 5 days in advance and then daily at 0800. Port pilots embark about 1 mile off the end of Muelle Prat. If there are strong winds or heavy seas, vessels are advised to have a gangway lowered halfway, with a jumping ladder on the end.

Signals.—Weather signals are shown between the two radio masts N of the pier and also on the Maritime Governor's offices at the root of the pier. Signals are listed in the accompanying table

Day signal	Night signal	Meaning
Black ball	One green light	Variable weather
Flag "M"	One red light	Bad weather
Flag "R"	Two red lights	Storm

When the variable signal is hoisted, moorings must be checked and reinforced. With bad weather, they are again checked and all small boat movement ceases. With storm signals, the port is closed to all movement and work.

Contact Information.—Punta Arenas port can be contacted, as follows:

1. VHF: VHF channels 16, 9, and 14
2. Telephone: 56-61-2201100
   56-61-2201105
3. Facsimile: 56-61-2201196

Anchorage.—Rada de Punta Arenas affords anchorage protected from prevailing W winds, but is exposed to the E. Pilots take vessels to one of the several designated anchorage berths off Muelle Prat. Vessels should be ready to quit the anchorage in the event of bad weather from the E, or on orders from the Captain of the Port.

Anchorage is prohibited within an area extending about 0.2 mile E and W of the pier and about 0.3 mile S of the pier head, best seen on the chart.

Vessels must inform authorities of Punta Arenas of their arrival 24 hours in advance and request anchorage at the berth.

The anchorage berths are given in the accompanying table.

Berth	Bearing and distance from Muelle Prat
Berth A	175° and 0.55 mile
Berth B	132° and 0.55 mile
Berth C	099° and 0.7 mile
Berth E	131° and 1 mile
Berth F	110° and 1.1 miles
Berth G	093° and 1.2 miles

Directions.—When approaching from the N, keep well E of Punta Arenas (Arenosa).

Observe the Traffic Separation Scheme in the approaches to the port, which is best seen on the chart.

Rio los Ciervos Oil Terminal is situated 1.75 miles SW of Muelle Prat. A submerged pipeline extends 0.3 mile SE from shore and several mooring buoys situated at the seaward end of the pipeline form an oil berth. There are charted depths of 12.8 to 14.6m in the area of the buoys.

It is recommended that vessels should moor at slack water in winds less than 10 knots.

In winds from the N or NE, force 3 or more, and flood current (flowing S), mooring should not be attempted. On land there is a leading line that indicates the direction of the pipeline; it should be used to avoid dropping the anchor on it or anchoring the vessel above it.

Also, there are two fixed range lights, the lighting of which should be requested when mooring to the buoys at night. A pilot from Punta Arenas must be aboard for berthing.

8.29 From Rada de Punta Arenas, the W shore of Paso Ancho extends 12 miles S to **Punta Santa Maria** (53°21'S., 70°57'W.), an easily-recognized point with a high cliff and two patches bare of trees.

Caleta Agua Fresca, an open bay, is entered S of Punta Santa Maria. Between Caleta Agua Fresca and Punta Carrer as, about 11 miles S, the shore is bold; Punta Carreras is a low point. The N side of the bay is quite foul and should not be penetrated in that direction beyond the point where soundings indicate depths of 11 to 14m.

On the S side. the depths decrease gradually toward the back of the bay; there is a small valley through which runs a stream.

Anchorage may be taken anywhere between Rada de Punta Arenas and Punta Santa Maria, in depths of 18 to 22m, sand and shell over clay, 0.75 mile offshore.

Paso Ancho

8.30 The E shore extends from **Punta Gente** (53°00'S., 70°25'W.) to Cabo Monmouth, 22 miles S. It is free of all dangers outside the 20m curve, which lies about 1 mile off this

coast. The only break is at Bahia Porvenir, about 19 miles S of Punta Gente.

Bahia Porvenir (53°18'S., 70°22'W.) is entered between Punta Palo and a point about 0.5 mile SSE. It is suitable for small vessels with local knowledge up to 45m in length and with a maximum draft of 2m. The pier lies at the head of the bay. Since the improvement of the roads, the importance of the port is declining.

Pilotage for vessels entering Bahia Porvenir is reported to be compulsory.

A wreck, with a depth of 1.3m, lies 0.2 mile SW of Punta Palo. Less water than charted has been reported in the bay.

Cabo Monmouth (53°22'S., 70°26'W.), 3 miles S of Bahia Porvenir, is low; the land rises gradually from it. The cape is prominent only from the N, when it shows up as the end of the land.

Cabo Boqueron (53°29'S., 70°12'W.) is a precipitous headland formed by the abrupt termination of high land extending ENE. Cabo Boqueron is located 10 miles SE of Cabo Monmouth.

Inlets and Passages Southeast of Paso Ancho

8.31 The inlets and channels SE and S of Paso Ancho are entered through Paso Boqueron, which lies between Cabo Boqueron and Punta Arska, the N extremity of Isla Dawson, which lies 0.5 mile SW of Cabo Boqueron.

Bahia Inutil (Bahia Useless) (53°30'S., 69°45'W.) is entered between Cabo Boqueron and Cabo Nose, 16 miles S. The bay recedes about 32 miles to the E. It has no sheltered anchorage and is exposed to W and SW winds which raise a heavy sea.

The N shore is high and cliffy, but declines as the head of the bay is approached. The S shore is also high, but is lower than the N shore. The head of the bay is low with lagoons.

Caleta Esperanza, Caleta Discordia, and Caleta Josefina lie on the N shore of the bay 8.5, 14, and 21 miles, respectively, ENE of Cabo Boqueron and a landing can be effected at each.

In fine weather, small vessels can anchor at **Caleta Discordia** (53°23'S., 69°50'W.), 0.15 mile offshore in a depth of 8m, sand. A shoal bank extends 1 mile S from shore at Caleta Esperanza and was reported to be extending farther S. Between Caleta Josefina and Puerto Nuevo a shoal bank extends 2.3 miles S.

A vessel should not approach the shores of the bay within a distance of 4 miles unless bound for one of the coves.

Puerto Nuevo, in the NE end of the bay, 14 miles E of Caleta Discordia, has a jetty 200m long with a depth of 3m at its head. Anchorage may be taken 1.5 miles offshore, in a depth of 10m, sand and stones, with the head of the pier bearing 355°, but the holding ground is poor. There are several rocks lying near the pier and boats should approach with care.

8.32 **Cabo Nose** (53°45'S., 70°08'W.), the S entrance point of Bahia Inutil, is the end of a range of hills covered with vegetation. It is clear of dangers. Pico Nose, 9 miles SSE of the cape, rise to an elevation of 832m.

Punta Cameron, the most salient point in the bay, projects from the S shore 9 miles NE of Cabo Nose. The land rises to a height of 148m, 1.75 miles SSE of the point. Caleta MacKlelland lies 9.5 miles E of Punta Cameron.

Small vessels may anchor off the cove, 0.2 mile from shore, in a depth of 6m, sand, good holding ground.

Canal Whiteside is a broad channel that separates Isla Dawson from Tierra de Fuego, and extends from its N entrance between Punta Arska and Cabo Nose to the entrance of Seno Almirantazgo, about 40 miles SSE of Punta Arska. The fairway is deep and clear of dangers. The W side can be safely approached within 0.25 mile, but shoals extend up to 1.5 miles offshore on the E side.

8.33 **Puerto Yartou** (53°53'S., 70°08'W.), 8.5 miles S of Cabo Nose, is formed between Punta Chown on the N and Punta Yartou, 1.5 miles farther S.

A chain of islets extends 2 miles NW from Punta Yartou; a rocky shoal with a depth of 4.9m lies at the NW extremity of these islets. A rock awash lies about 0.3 mile NW of the W islet.

Puerto Yartou is open to W and NW winds which cause a heavy swell. The bottom is generally rocky, with sand and shell in places.

Anchorage, in a depth of 15m, may be obtained 0.5 mile S of Punta Crown.

Two pyramids, each 2m high, stand 6.75 miles SSW of Punta Yartou. These beacons indicate the parallel of 54°S.

Puerto Arturo is located on the N side of **Punta Carukinca** (54°04'S., 70°04'W.), a low point located 10.5 miles SSE of Punta Yartou. The port is open to winds between the N and W, which cause a heavy swell.

Isla Carukinca lies 0.75 mile S of Punta Carukinca. Shoal water, with a depth of 10m, extends from Isla Carukinca SE to a point of land about 0.9 mile distant. The islet is steep-to, except for a smaller islet lose W of Isla Carukinca.

8.34 **Punta Kelp** (53°48'S., 70°24'W.), the most salient point on the W side of the channel, lies 14 miles SSE of Punta Arska.

Isla Offing, 2 miles SSE of Punta Kelp, is a small islet, 44m high, covered with vegetation. It is good mark for identifying Bahia Willes and Bahia Harris. A light is shown from the N end of the island.

Bahia Willes (53°49'S., 70°26'W.) is entered between Punta Kelp and Punta Tern, 2 miles SSW. Good anchorage may be obtained in the bay, in a depth of 27m, mud and shells, best seen on chart.

Bahia Harris lies W of Punta Tern and affords good anchorage at the head of the bay, in depths of from 33 to 40m, rock and mud, 183m S of an L-shaped pier, with an oil tank bearing 334° and a water tank bearing 258°.

Punta Arbolada (53°52'S., 70°24'W.) is located 1.75 miles SSE of Punta Tern, and Punta Huinche lies 0.5 mile farther SSE.

Bahia Fox is entered WSW of Punta Huinche. A shoal, with a depth of 5.9m, whose existence is doubtful, lies 0.4 mile SE of Punta Huinche.

The Rio Fox, the largest river on Isla Dawson, has formed an extensive sand bank that extends nearly 0.4 mile offshore at the head of the bay. A hill that rises to a height of 178m is located 0.25 mile NW of Punta Huinche.

Large vessels may obtain anchorage, in a depth of 20m, sand and shells, with the hill NW of Punta Huinche bearing 028°

and the mouth of the Rio Fox bearing 311°. Less water than shown on the chart was reported in Bahia Fox.

Bahia No Entres, a small cove 6.5 miles S of Bahia Fox, is about 0.6 mile wide and recedes about 0.7 mile. A shallow rocky bank, covered in part by sand and mud, extends 0.25 mile from the head of the bay.

Vessels with local knowledge may obtain anchorage, in depths of 25m, just within a line joining the two entrance points.

8.35 Isla Wickham (54°06'S., 70°23'W.) lies with its N extremity 3.5 miles S of Bahia No Entres. It is about 8 miles long E to W and is about 7 miles wide N to S. The island rises to a height of 790m, 2.25 miles S of its N extremity.

In its S part are remarkable sharp-pointed hill, 704m high, can be seen in clear weather from Puerto del Hambre, about 36 miles NNW.

Canal Meskem, N of Isla Wickham, has a least width of 0.2 mile abreast Isla Tell, 6 miles W of the N extremity of Isla Wickham. The fairway passes N of Isla Tell, and is deep and free of dangers, except for a patch of kelp 0.3 mile N of the N extremity of Isla Wickham which should be given a wide berth. A rock, which dries, lies close off the N shore NE of Punta Huapi, a point located 2 miles SW of the channel's N entrance point.

Puerto Meskem (54°03'S., 70°25'W.), on the N side of Canal Meskem, is entered 1.5 miles W of Punta Huapi. Punta Cannon, the S entrance point of the cove, lies 1.75 miles SW of Punta Huapi. A prominent islet, covered with vegetation, lies 0.4 mile NE of Punta Cannon.

A rock, which covers at HW, lies about 0.2 mile S of the islet and is marked by a beacon.

There is good anchorage in Puerto Meskem, in a depth of 29m, firm mud, with the islet bearing 133°. The anchorage is sheltered from NW to NE winds.

Little protection is afforded from SE to SW winds, and although strong winds blow from the SW, no sea is raised.

Vessels should not attempt passage between the kelp-obstructed channel that lies between Punta Cannon and the islet NE.

8.36 Seno Owen (Fiordo Owen) (54°00'S., 70°34'W.), about 8 miles long in a NW to SE direction, is 2 miles wide. It has moderate depths over a mud bottom. The head of the inlet is narrow and shoal, the depths decreasing gradually.

Seno Owen is entered NW of Isla Wickham, where Canal Meskem and Canal Anica unite. Several islets and dangers encumber the entrance. Shoals extend about 2 miles NW from the islands and there is much kelp in the bay.

Vessels with local knowledge can obtain anchorage anywhere in Seno Owen, clear of the kelp and shoals in moderate depths, mud bottom.

Seno Brenton (54°09'S., 70°25'W.) located between Isla Wickham and the S part of Isla Dawson. It extends about 9 miles W where it joins Canal Anica off the W side of Isla Wickham. Islas Tuckers are several islets that lie in the SE entrance to Seno Brenton; there is a beacon on the largest islet.

Puerto Choisel (54°07'S., 70°33'W.) located at the NW end of Seno Brenton on the W side, 11 miles from the beacon on Islas Tuckers. The outer part of the cove affords anchorage to vessels with local knowledge, in a depth of 20m, mud and sand. The anchorage is protected from NW to NE winds, but is exposed to S and SW winds which are accompanied by violent squalls.

Vessels should moor with their anchors laid out in the direction of the prevailing wind.

There are two prominent islets that lie in the approach to Puerto Choisel. Punta Mahay is the N entrance point of the cove.

Canal Anica (54°05'S., 70°30'W.) is a continuation of Seno Brenton that extends NNW from Punta Mahay. It has a least navigable width of 0.5 mile and the fairway is deep and clear of dangers. There is a rock, awash, marked by kelp, about 0.8 mile NE of Punta Mahay, and there are islets and foul ground about 2 miles NNE of the same point.

Vessels may anchor anywhere in Canal Anica, which has a bottom of mud and sand.

8.37 Seno Almirantazgo (54°18'S., 69°30'W.), 23 miles S of Bahia Inutil, has not been fully surveyed. The bay is entered between Punta Carukinca and Cabo Rowlett, 11 miles S. It extends 43 miles SE into the island of Tierra del Fuego.

The N side of the bay has a straight shoreline, but the S side has three deep inlets from W to E, named Bahia Brookes, Bahia Ainsworth, and Bahia Parry. The sound end in Bahia Azopardo.

Bahia Brookes (54°20'S., 69°50'W.) is entered 7 miles ESE of Cabo Rowlett. It extends 19 miles SSE and there are several coves on its W side where small vessels with local knowledge can obtain anchorage.

Isla Alta, which is wooded, lies in the entrance to Bahia Brookes, 4.5 miles ESE of Cabo Rowlett. Punta Esperanza lies 2 miles S of Isla Alta.

Caleta Gomez, an anchorage, is entered 1.5 miles SW of Punta Esperanza. Other anchorages are Puerto Hernandez and Caleta Palma which lie 4.5 and 6.5 miles SSE, respectively, of Punta Esperanza. The depths in these anchorages are from 16 to 24m.

Bahia Guerroro, at the head of the bay, is liable to be encumbered by icebergs and is not recommended.

Islotes Corkhill, a group of four islets, lie near the middle of Seno Almirantazgo, 18 miles from the entrance. Vessels can pass either side of this group, but not through it.

Bahia Ainsworth (54°22'S., 69°35'W.) opens SSE of Islotes Corkhill. It lies 11 miles E of Bahia Brookes. This bay is filled with icebergs from a large glacier which extends from the mountains at the head of the bay. There is a reduced anchorage on the W shore, 3 miles inside the mouth, in a depth of 25m.

Puerto Toto is about 5 miles ESE of the E entrance to Bahia Ainsworth. It appears to be free of dangers and is deep. The cove is covered by kelp, with only a small channel near the N coast. The cove is entered around a low point of red land on the W side; do not round this point until the houses at the head of the cove are clearly seen.

Bahia Parry is entered E of Punta Morro, about 9 miles SE of Puerto Toto. There is anchorage for small vessels with local knowledge in a cove on the S side of Punta Morro, in a depth of 25m.

Anchorage, protected from SW through NW winds, may be taken, in a depth of 24m.

Caleta La Paciencia (54°25'S., 69°04'W.) lies on the N side of Seno Almirantazgo, 5 miles NNE of Punta Morro. There are the remains of a jetty and the ruins of a sawmill. Anchorage may be obtained, in 12m, SE of the jetty.

Isla Tres Mogotes lies near the middle of the bay, 4 miles E of Punta Morro. A beacon is situated in the middle of the N side of the island. Vessels can pass either side of the island.

Bahia Azopardo (54°28'S., 69°00'W.) forms the head of Seno Almirantazgo, 2.5 miles ESE of Isla Tres Mogotes. There is a disused sawmill and a ruined jetty, 200m long with a depth of 5m at its head.

Anchorage.—The anchorage, known as Caleta Benavente, is in a depth of 20m with the jetty bearing 200°, distant about 0.3 mile.

Paso del Hambre

8.38 Paso del Hambre (Famine Reach) (53°44'S., 70°50'W.) is the continuation of the strait S of Paso Ancho and extends about 19 miles SSW. It is entered between **Punta Carreras** (53°35'S., 70°55'W.) and Cabo Valentin, the NW extremity of Isla Dawson, 14.5 miles E.

Isla Dawson (53°55'S., 70°33'W.), on the E side of Paso del Hambre, is divided into two parts by an isthmus between Bahia Lomos and Seno Owen. The N part of the island is of moderate elevation with gentle slopes.

Cerro Graves, 449m high, is located in this part, 11 miles SSW of Cabo Valentin. The S part of the island is mountainous and of wild aspect, with deep wooded valleys. It attains an elevation of 944m, 29 miles SSW of Cabo Valentin.

Cabo Valentin (53°34'S., 70°31'W.), the NW extremity of Isla Dawson, is low with a small hummock, 61m high, nearby.

A bank, with depths of 2.7 to 5.5m, extends 2.5 miles N of the cape. The tidal currents run strongly over this bank causing overfalls in a contrary wind which are dangerous to boats.

Punta Stubenrauch lies 10 miles SSW of Cabo Valentin. Two rocks lie 1.25 miles SW of Punta Stubenrauch. They are steep-to on their W side and are about 3m high.

Bahia Lomos (53°50'S., 70°42'W.), entered 5 miles S of Punta Stubenrauch, has not been surveyed. It is sufficiently sheltered from SW, but is exposed to W and NW winds.

From the W entrance point of Bahia Lomos, the shore trends W for about 3 miles to Punta Joaquin. Bahia Amigo, which is open and unsheltered, is entered about 1 mile S of Punta Joaquin.

Cabo San Antonio (53°53'S., 70°54'W.), 2 miles SW of Bahia Amigo, is the W extremity of Isla Dawson. There are a number of islets lying SSW of Cabo San Antonio; Puerto San Antonio is formed by the channel between these islets and Isla Dawson to the NE. The channel is barely 0.3 mile wide. There are several small islets and rocks in it, especially at the NW end. Although Puerto San Antonio appears to be sheltered, it is subject to violent squalls and is not recommended.

Puerto Valdes is entered N of Punta Valdes, which lies 2.5 miles SSE of Cabo San Antonio. From the apparent violence of the frequent squalls, it is not advisable to enter the port.

From Punta Valdes, the coast of Isla Dawson trends SSE to **Punta Zig Zag** (54°04'S., 70°53'W.), 8.5 miles distant. It forms the E entrance to Canal Magdalena. Punta Cono lies 3.5 miles SSE of Punta Zig Zag.

Punta Cono forms the N entrance point of the W end of Canal Gabriel.

8.39 Bahia Carreras (53°36'S., 70°56'W.) is entered between Punta Carreras, which is low, and a prominent bluff 1.5 miles S.

Arrecife Georgia extends 1.25 miles SE of Punta Carreras, with depths of less than 9m. It dries in places up to 0.325 mile from the point, and is marked by kelp at its seaward end.

Anchorage, though confined, may be obtained about 0.3 mile SW of Punta Carreras, 183m offshore, in a depth of 25m, mud and sand. Care should be taken to anchor as soon as that depth is obtained.

Punta Santa Ana (53°38'S., 70°55'W.), 2.5 miles S of Punta Carreras, is the extremity of a narrow promontory which projects SE. A light shown from a square concrete tower, 5m high, situated 0.2 mile WNW of the point.

8.40 Puerto San Juan de la Posesion (Puerto del Hambre) (53°38'S., 70°56'W.) is entered between Punta Santa Ana and Punta San Juan, 1.5 miles SW. The bay recedes 1.5 miles from the entrance, but shoal depths extend more than halfway from its head. A stream flows into the head of the bay and the Rio San Juan flows into the bay close N of Punta San Juan. It is fronted by a bar which dries.

A shoal area lies between 0.2 mile and 0.6 mile SE of Punta Santa Ana. There is a depth of 9m at its N end.

Anchorage.—Vessels anchor in the middle of the bay, in a depth of 15m, stiff clay, occasionally overlaid by sand, bearing 232°, about 0.5 mile from the lighthouse.

Bahia Voces is entered 3 miles SSW of Punta Santa Ana. From Bahia Voces S to Punta Arbol, about 5 miles, the coast is cliffy and depths are too great for anchoring.

Anchorage may be obtained, in depths of 13 to 16m, off the mouth of a river which flows into the head of the bay.

Cabo San Isidro (53°47'S., 70°58'W.), 2 miles S of Punta Arbol, has a low, but conspicuous rounded hillock at its extremity. The cape is covered with trees and forms a ridge which extends NNW about 3 miles to Monte Tarn, 818m high, the most conspicuous mountain in the vicinity. A light is shown from a cylindrical tower on Cabo San Isidro.

A rocky shoal, covered with kelp, extends 0.2 mile off the cape, and has a rock, awash, at HW at its outer end.

A shoal, with a depth of about 20m, lies 2 miles SSW of the cape.

Caleta Aguila (53°58'S., 70°59'W.) is entered between Cabo San Isidro and a point 0.7 mile SW. A small reef, with an islet, extends 183m SE from the SW entrance point.

Anchorage for small vessels may be obtained at the head of the bay, in depths of 18 to 22m, sand and stone. Squalls at times are violent, but the holding ground is good.

From Caleta Aguila to Punta Glascott, 5.5 miles SW, there are several small bays which offer protection, in depths of 13 to 22m, for vessels with local knowledge.

Bahia San Nicolas (53°51'S., 71°06'W.) is entered close NE of Punta Glascott. A small wooded islet, 7m high, lies in the middle of the bay 0.4 mile SE of the mouth of a river that flows into the head of the bay.

Anchorage.—The best anchorage for a large vessel is midway between Punta Glascott and the wooded islet in a

depth of 20m, mud or clay. Small vessels can anchor closer inshore.

Punta Glascott (53°51'S., 71°06'W.) is the extremity of a range of mountains with several sharp peaks extending NW into the interior. The most prominent summit is Pico Nodoles, 766m high, about 2.2 miles WNW of the point.

Inlets and Passages South of Paso Froward

8.41 The inlets and passages S of the E entrance to Paso Froward are entered W of **Punta Zig Zag** (54°04'S., 70°53'W.), on the SW coast of Isla Dawson.

The passages S of Isla Dawson will be discussed and then the canals and passages that lead S into Tierra del Fuego.

Canal Gabriel is entered from Canal Magdalena and is the NW part of the channel which separates the S side of Isla Dawson from Tierra del Fuego. It is merely a ravine of slate formation and extends precisely in the direction of the strata, with almost parallel shores about 25 miles long.

The channel is 0.5 to 1.5 miles wide, except in the narrows where it is about 183m wide, with a least depth of 10.9m.

Tidal currents in the channel have been estimated to run at a rate of 4 to 5 knots.

The SE end of Canal Gabriel, which is known as Canal Cascada, divides, with one part leading N into Seno Almirantazgo, and the other opening into Bahia Fitton. Seno Almirantazgo has been previously described in paragraph 8.37.

Bahia Fitton may be entered through Canal Cascada, or from N through Canal Whiteside, passing between Cabo Rowlett and **Cabo Expectacion** (54°14'S., 70°12'W.), 4 miles WNW, then SW of Punta Carda, which lies 5.75 miles SSW of Cabo Rowlett. Bahia Fitton extends about 7 miles SE and divides into two arms.

Good anchorage, sheltered from prevailing winds, may be obtained in the cove on the S side of the bay, 3 miles S of Punta Carda. Foul ground extends 0.3 mile offshore and 1.25 miles N of Punta Carda, and a rock, marked by kelp with a depth of less than 2m, lies 1.5 miles NW of the point.

Canal Magdalena

8.42 Canal Magdalena extends S from Estrecho de Magallanes to Canal Cockburn. It is entered between **Punta Anxious** (54°07'S., 70°55'W.) and the NE part of Isla Capitan Aracena, 2 miles W. Precipitous mountains rise from both shores, especially on the E side.

Punta Anxious is a low, narrow tongue of land, with deep water close inshore. A group of islets lie close NW of Punta Anxious. The W, and largest islet, is marked by a light tower.

The W entrance of the channel is backed by a steep mountain 1,158m high, which has a remarkable lump on its summit.

There is a large white patch on the mountain which can be seen at a great distance. Monte Hurt, 1,064m high, rises at the head of Seno Peje, 6.5 miles SSE of Punta Anxious.

Seno Peje, a sound which is deep and whose shore is steep-to, extends 3.5 miles SE from its entrance, which lies between Punta Anxious and Punta Peje, 2.5 miles SSW.

There is a small islet 0.25 mile NW from Punta Peje and numerous rocks lie between the two.

Islote Jumbo lies 2.25 miles S of Punta Peje, 0.3 mile offshore. Three smaller islets and a number of rocks lie between Islote Jumbo and the E shore.

8.43 **Fiordo Keats** (54°18'S., 70°43'W.), on the E side of the channel, is entered between a point 5.25 miles SSE of Punta Peje and Punta Ernesto, 5 miles farther S. An islet lies 1.75 miles ESE of the N entrance point, and rocks fringe the coast NW and SE of the islet. A rock, with a depth of less than 2m, lies in mid-channel 3 miles SE of the islet.

Fiordo Keats extends 32 miles ESE; about halfway along it divides into two branches, with Seno Contra Almirante Martinez leading SSW and Fiordo Agostini leading SE.

The coasts are mountainous and the waters are apparently deep, presenting no difficulty in navigation, with the exception of the submerged rock located in the middle of the fjord to the SE about 4 miles from Punta Antonio.

Pilotage is compulsory for vessels entering Fiordo Keats. The request for pilots should be sent to Punta Arenas in advance, where they can be embarked.

Fiordo Agostini is entered between **Punta Final** (54°24'S., 70°32'W.) and Punta Elsa, 1.5 miles NE. The fjord runs between the mountains from which numerous glaciers descend and is renowned for its beauty. About 10 miles SE from the entrance it divides into two arms at Punta Divide, with Seno Hyatt to N and Seno Serrano to S.

A group of islets, surrounded by reefs, lies off the S side of Fiordo Agostini, 3 miles WNW of Punta Divide.

Seno Hyatt, the N arm of Fiordo Agostini, is 7 miles long; near its head are two bays. The N bay is deep, but it is unsafe to approach the glacier nearer than 0.5 mile due to the high waves produced by the falling ice. In the S bay there is a smaller glacier. The S bay has a bar with a depth of 4m. There is good anchorage in a cove halfway along the N shore of Seno Hyatt, in a depth of 35m, sand.

Seno Contra Almirante Martinez, the SSW arm of Fiordo Keats, is entered W of Punta Final, and extends for a distance of 16 miles. This inlet has not been fully surveyed, but it would appear to have a deep even bottom free of dangers. The head of the inlet divides into two arms.

Due to the abundance of kelp and the rocky bottom, it is not recommended to anchor in the SE arm. The S arm has an average depth of 30 to 40m. The E coast is fringed with kelp and a large number of rocks. The coastline throughout is lined with numerous waterfalls.

Anchorage may be obtained in the middle of Caleta Escandallo, 6 miles within the entrance of Seno Contra Almirante Martinez, on the W side, in a depth of 33m, hard mud. The anchorage is with the N entrance point of the cove bearing 299°, about 0.3 mile. The anchorage is sheltered from all winds.

Punta Queta (54°20'S., 70°43'W.) is located on the S shore of Fiordo Keats, 5.5 miles E of Punta Ernesto.

Bahia Queta, entered E of Punta Queta, affords anchorage, in a depth of 15m, sand, 0.2 mile S of the E entrance point. The bay has not been surveyed.

The E side of Canal Magdalena continues SW from Punta Ernesto to **Punta Pajarito** (54°21'S., 70°54'W.), 1.5 miles distant and marked by a light, then in a general S direction for 5.5 miles to Punta Gruesa.

This coast is deep and free of dangers. Two glaciers descend from Monte Sarmiento, which rises to a height of 2,234m, 4 miles E of Punta Gruesa.

8.44 Monte Sarmiento (54°27'S., 70°50'W.) rises from a broad base; when seen from the N, the two peaks of its summit appears much like the crater of a volcano, but from the W the two peaks are in line and the volcanic resemblance ceases. It is the most remarkable mountain in the strait. It is covered with perpetual snow and is nearly always enveloped in cloud.

During E winds, when the sky is cloudless and with a low temperature, it can be seen clearly from Punta Arenas, 77 miles N.

Monte Buckland (54°27'S., 70°10'W.), about 21 miles E of Monte Sarmiento, is a pyramidal shaped block, 2,042m high, that is covered with snow. Between these mountains the summit is occupied by an extensive glacier.

Seno Magallanes (54°29'S., 70°54'W.), entered between Punta Gruesa and Punta Entrada, 1 mile SW, provides good anchorage for small vessels on its W shore, 3.25 miles S of the entrance. Its coasts are high and steep and its waters deep and safe. Due to its orientation, winds from the N or S are boxed in and gain great intensity, but do not stir up swells. The depth in the anchorage is 27m, hard mud.

From Seno Magallanes, the E coast of Canal Magdalena turns WNW for a distance of 5 miles to **Punta Piramide** (54°26'S., 71°07'W.), the S entrance point of the E entrance to Canal Cockburn. The point is marked by a light.

There is anchorage in Puerto Imprevisto, a cove located 3.75 miles W of Seno Magallanes, for medium-sized vessels, in depths of 17 to 30m, mud, rock, and shells, in the middle of the cove. It is surrounded by high and steep hills that protect it from all winds, except from the N.

The harbor is reported as safe. However, there is kelp near the coast and at the entrance, but they do not appear to indicate dangers. There is a watering place in the inner bay but the coast is foul and full of kelp.

8.45 Puerto Hope (54°08'S., 71°00'W.) is a cove on the W shore of Canal Magdalena opposite Punta Anxious. A rock, marked by kelp and with a depth of less than 1.8m, lies nearly in the middle of the outer part of the cove. Kelp extends N from this rock to the shore.

Anchorage.—Vessels up to 80m long can obtain emergency anchorage 0.2 mile ESE of the rock, in a depth of 20m, sand.

Ensenada Stokes is entered N of **Punta Chubascosa** (54°10'S., 70°58'W.), about 2 miles S of Puerto Hope.

Islotes Rees, three low wooded islets, lie in the entrance to the bay which extends 4.5 miles SSW.

Due to its deep water and violent squalls which descend from the high land surrounding it, no anchorages are recommended.

Bahia Morris (54°15'S., 71°00'W.), 5 miles S of Punta Chubasosa, is 1.5 miles wide at its entrance and recedes about 2 miles to the W. It is the best anchorage in Canals Magdalena and Cockburn. Islotes Entrada, 3m high, lie 1 mile S of the N entrance point. A 14.6m patch lies about 0.3 mile N of the islands. Kelp extends from the patch to the islets. An isolated islet, 14m high, lies 0.7 mile W of the islets.

Bajo Norte, with a depth of 8.8m, lies 0.5 mile ENE of the N entrance to Bahia Morris.

Bajo Sur, which dries and is marked by kelp, lies about 0.5 mile E of Punta Ariadne, the S entrance point of Bahia Morris.

The kelp attached to both Bajo Norte and Bajo Sur is usually submerged by the tidal currents, and is only visible at slack water.

Anchorage.—The recommended anchorage in Bahia Morris is in depths of 31 to 36m, mud and clay, in a position about 0.7 mile WSW of the N entrance point.

Small vessels can anchor in the basin at the head of the bay, in depths of 11 to 35m. Squalls are frequent and violent, but the holding ground is good.

Vessels entering the bay should pass between Bajo Norte and Islotes Entrada, keeping about 0.5 mile N of the islets to clear the 14.6m patch which lies in this passage. The passages W of the shoals can not be recommended.

8.46 Islote Cenaria (54°18'S., 70°56'W.), 9m high and marked by a light, lies 2.5 miles SE of Punta Ariadne near the middle of Canal Magdalena. A reef extends SW from the islet; a 5m shoal, with deep water all around, lies about 1.7 miles SE of the islet.

Vessels navigating Canal Magdalena should pass E of Islote Cenaria. The islet should be given a safe berth of 0.5 mile. The islet is marked by a light.

Isla Laberinto lies 1.5 miles SW of Islote Cenaria, on the W side of Canal Magdalena. Isla Jane lies 1.25 miles farther SW.

There are various rocks and islets between these two islands. Bahia Drew is a small bay entered W of these two islands. It is encumbered by numerous rocks and islets.

Small craft with local knowledge can enter the bay either N of Isla Laberinto or S of Isla Jane.

Bahia Transicion (54°20'S., 71°06'W.) is entered between two points 2.5 miles SW of Isla Jane. It extends about 4 miles NW and would appear to be deep and clear of dangers. It has not been surveyed.

Cabo Pena, 2.5 miles S of Bahia Transicion, is surrounded by kelp.

Cabo Turn (54°24'S., 71°07'W.), low and fronted by kelp, lies 1.25 miles SSW of Cabo Pena. This cape forms the N entrance point of Canal Cockburn, which is discussed in Pub. 125, Sailing Directions (Enroute) West Coast of South America.

A shoal, with a least depth of 10m and surrounded by eddies, lies 1.5 miles E of Cabo Turn.

Cabo Froward to Western Entrance

8.47 A vessel proceeding W through Estrecho de Magallanes, after rounding Cabo Froward, may expect adverse gales, heavy squalls, thick weather, and an absence of good anchorages due to their depths.

None of the harbors in the region can be considered good, although there are two or three suitable for large vessels.

Between Paso Largo, 60 miles WNW of Cabo Froward, and Cabo Pilar, at the W entrance of the strait, there are many harbors on each side of the strait. Some are difficult to access, others are so deep as to be of little use as an anchorage; and in

others the squalls frequently blow with such violence and from different directions as to make the anchorage untenable.

Usually the anchorage space is restricted and the bottom uneven and rocky. At other times pebbles and stones predominate. In each case the holding ground is poor. It is wise to anchor at the deepest point of the anchorage, where there is no shoal or reef nearby.

Whenever kelp is seen, the bottom is probably rocky with no mud, and more uneven than usual.

The most open anchorages, which appear to be least protected from the prevailing winds, often prove to have the best holding ground, and best suited to ride out heavy squalls.

Paso Froward

8.48 Paso Froward is the continuation of the strait from Paso del Hambre to Paso Ingles which is entered S of Cabo Gallant. Paso Froward extends WSW from Punta Glascott to Cabo Froward, a distance of 7 miles, then WNW about 28 miles to Cabo Gallant.

The N shore of the pass is bound by Peninsula de Brunswick,; the S shore is bound by Isla Capitan Aracena, Isla Clarence, and Isla Cayetano, in that order from E to W.

Cabo Froward (53°54'S., 71°18'W.), the S extremity of the continent, lies nearly in the center of Estrecho de Magallanes. The cape rises abruptly to an elevation of 360m. Monte Victoria, located 2.5 miles NNW of the cape, rises to a height of 877m.

A light is shown from a white concrete tower, 2.7m high, situated on the cape. Cruz de los Mares, a prominent white metal cross 24m high, stands on the summit of Cabo Froward.

From Cabo Froward to Cabo Holland, 16 miles WNW, the shore is high and steep-to. The only anchorages along this coast are Bahia Snug and Bahia Woods.

Bahia Snug (53°51'S., 71°26'W.), about 5 miles WNW of Cabo Froward, affords an excellent berth although the anchorage is open. Islote Lambert, 12m high, and the rocks located NNW of the islet, provide shelter from any sea that may get up. There is ample room and no squalls are experienced.

The best berth for anchoring is with Islote Lambert bearing 259°, 0.2 mile distant, in a depth of 14m, mud. There is space, with good holding ground, farther E. The islet is a good guide for anchoring, but the outer edge of the shore bank is steep-to.

The ebb current, running E, is strong at the anchorage during W winds.

From Bahia Snug to Bahia Woods, a distance of about 7 miles WNW, the shore is straight and steep-to.

Bahia Woods is a cove at the SE end of **Cabo Holland** (53°49'S., 71°38'W.), a bold, high, conspicuous headland.

Foul ground extends 183m S and SE of the E extremity of Cabo Holland. Roca Esk, which dries, lies on the SE edge of the foul ground.

The Rio San Jose flows into the strait about 1 mile ENE of Cabo Holland. A rock, which dries, lies 0.25 mile E of the cape on the edge of the bank extending from the mouth of the river.

Anchorage may be taken, in 15 to 20m, with Cabo Holland bearing 320°, at a distance of 0.3 to 0.5 mile.

Anchorage for smaller vessels may be taken, in depths of 11 to 14m, with the cape bearing 315°, distant about 0.2 mile, or in 30m with the cape bearing 250°, 0.14 mile distant.

Tidal currents off Cabo Holland are often strong, and there is an eddy E of the point.

Bahia Andres, 5 miles WNW of Bahia Wood, affords anchorage at the NW end of Cabo Holland, but it is exposed to the prevailing winds and should only be used in fine weather.

8.49 **Cabo Coventry** (53°45'S., 71°51'W.), 2.75 miles NW of Bahia Andres, is 81m high. Monte de Tres Picos is a detached mountain rising to a height of 1,127m, 5.75 miles NW of Cabo Coventry. There is a depth of 31m about 2 miles S of Cabo Coventry.

Bahia Cordes (53°43'S., 71°54'W.) is entered between Punta West and Islote Mussel, 0.65 mile E. The islet is joined to the E shore by a chain of above and below-water rocks. The entrance can be identified by Monte de Tres Picos and Islote Mussel, which is a bright green-colored islet, 8m high.

Anchorage.—Temporary anchorage can be taken, in 13m, with Islote Mussel bearing 056° and Punta West bearing 311°.

Bahia Fortescue (53°41'S., 72°00'W.) is entered between Punta Peterel, 2 miles NW of Bahia Cordes, and Punta Sur West, 1.5 miles W. It is one of the best anchorages in the strait. The bay is spacious, sheltered, easy of access, and has moderate depths. A light, shown from a 5m high white pillar that is difficult to see from seaward, is exhibited close NE of Punta Sur West.

Isla Wigwam, 12m high, lies at the head of the bay. Islote Cross, close S of the island, is 2.1m high.

A shoal, composed of rocks and shells with a depth of 11m, lies 0.8 mile E of Bahia Fortescue Light.

The best anchorage in the bay is with Islote Cross bearing between 334° and 053°, distant about 0.1 to 0.2 mile, in depths of 10 to 15m. It is recommended not to anchor close to the W shore as the squalls are more uncertain in their direction and the holding ground is not as good.

Care is necessary when entering Bahia Fortescue during springs, as the W tidal current sets strongly toward Cabo Gallant, and the tidal current running E sets directly toward and around Punta Peterel.

Caleta Gallant is a sheltered basin entered E of Isla Wigwam. It is entered by a narrow channel with a depth of 5m and affords an excellent anchorage to small vessels with local knowledge, in a depth of 6m, mud.

Cabo Gallant (53°42'S., 72°02'W.), a massive steep-to cape, 25m high, is located about 0.3 mile WSW of Punta Sur West and is very prominent from the E.

8.50 From Canal Magdalena, the S shore of Paso Froward, which extends WNW about 45 miles to Cabo Edgeworth, is irregularly shaped and much indented by numerous channels and bays.

Caleta Beaubasin (54°05'S., 71°03'W.), entered 1.5 miles NW of the NE extremity of Isla Capitan Aracena, may be recognized by Islote Periagua, a small, rocky islet 1.25 miles NNW of the entrance, and by the mountain 2.5 miles SSW of the inlet. The entrance is narrow with a least depth of 5m. Inside there are depths of 9m. The cove provides anchorage for small vessels entering or leaving Canal Magdalena.

Isla Peak and Isla Harrison lie 3 miles WNW and 5.5 miles W, respectively, of the entrance to Caleta Beaubasin. These islands lie in the entrance to Bahia Inman and Ensenada Staples. Two islets lie at the head of Bahia Inman, 4.5 miles S of Isla Peak.

Anchorage may be obtained N of these islets, in a depth of 29m, mud. Ensenada Staples lies 2 miles W of Bahia Inman. It should only be entered by vessels with local knowledge, as it has not been surveyed.

Seno Lyell is entered W of a point 5.5 mile NW of Punta Crown, the N extremity of Isla Harrison. Islotes Dos Hermanos, two prominent islets, lie in the middle of the entrance to the bay.

Puerto Kempe, on the W side of Seno Lyell, 2 miles SSW of Islotes Dos Hermanos, is difficult of access but affords anchorage to vessels with local knowledge. It can be easily recognized by the waterfall at its head.

8.51 **Punta Hetterley** (53°57'S., 71°26'W.) is the W entrance point to Seno Lyell. Punta Olvido lies 3 miles W of Punta Hetterley, on the W side of Ensenada Petite.

Seno Pedro, entered 6 miles W of Punta Hetterley, is the N part of Canal Acwalisnan, which separates Isla Capitan Aracena from Isla Clarence.

Canal Acwalisnan, with a depth of 9m in the narrows, leads into Seno Dyneley. A rock, awash, lies in the middle of the channel, 7 miles within the entrance to Seno Pedro.

Bahia Bell is entered W of Punta Taylor, 6 miles WNW of Canal Acwalisnan.

Caleta Bradley, on the W side of Bahia Bell, is a convenient anchorage to a vessel with local knowledge. It bears WSW of Punta Taylor and may be recognized by a small, round, green hill forming the N point of the cove. The anchorage is in 31m.

8.52 **Monte Pond** (53°52'S., 71°55'W.), 766m high, is a conspicuous double-peaked hill, located 1.75 miles S of Cabo Inglefield, the N extremity of Isla Clarence. One of the summits is visible from the E as soon as it opens Cabo Froward.

Bahia Simon, entered between Cabo Inglefield and Punta Elvira, 4 miles WNW, separates the E side of Isla Cayetano from Isla Clarence. It extends 6 miles SSW and is studded with islands, islets, and rocks. Isla Castellano, 199m high, lies in the middle of the outer part of the bay.

Isla Burgess, at the head of Bahia Simon, has a narrow channel on either side, giving access to the head of Canal de San Miguel. This canal leads 5 miles WNW along the S side of Isla Cayetano into Canal Barbara. The channel W of Isla Cayetano is preferred to the channel E of the island.

Puerto Langara, 3.25 miles S of Punta Elvira, on the E coast of Isla Cayetano, trends in a NW direction.

Anchorage for small vessels with local knowledge may be taken, in 14m, at the head of the inlet or, in a depth of 9m, in a cove on the N side of the inlet.

Canal Barbara (53°50'S., 72°11'W.) is entered between Isla Cayetano and Cabo Edgeworth, about 2 miles NW. It separates Isla Cayetano from Isla Santa Ines and leads S to Canal Cockburn. For further details, see Pub. 125, Sailing Directions (Enroute) West Coast of South America.

Paso Ingles

8.53 Paso Ingles is a continuation of the strait between Cabo Gallant and **Punta Arauz** (53°32'S., 72°21'W.), about 15 miles NW.

The weather in this part is unstable due to two air masses of different characteristics meeting, one from the main strait and the other coming from the NNW down Canal Jeronimo. Violent squalls with heavy rain and low clouds may reduce visibility to zero.

The tidal currents increase as the channel narrows and attain a rate of 2 knots. These, combined with the winds, tend to set a vessel S onto Isla Carlos III. Therefore, special care must be taken at night and during heavy squalls.

Regulations.—The following regulations apply to vessels transiting Paso Ingles and Paso Tortuoso:

1. One hour before approaching Cabo Crosstide (53°34'S., 72°25'W.), vessels must report their position on VHF channel 16 and 2182 kHz and continue reporting at 15-minute intervals.
2. Vessels should navigate, whenever possible, on the starboard side of the centerline of the channel.
3. Vessels over 200m long and all VLCCs have the right-of-way. The passage of these vessels will be transmitted by the Maritime Authority.
4. Navigation lights should be shown at all times.

8.54 The coast between Cabo Gallant and Canal Jeronimo, 15 miles NW, is backed by towering mountains. Monte Cross, 736m high, located 1.75 miles NNW of Cabo Gallant, is the most prominent. A large portion of the coast is fringed with kelp and should not be approached closer than 0.3 mile.

From Cabo Gallant, the coast trends in a NW direction about 8 miles to **Punta Pasaje** (53°38'S., 72°12'W.). A shoal, with a depth of 4.5m and marked by kelp, lies about 0.3 WSW of the point. A rock, with a depth of 3.7m, lies 0.25 mile SSE of the point.

Bahia Isabel is entered N of Punta Pasaje. The bay extends on either side of a stream that flows out at its head.

Anchorage may be obtained, in depths of 24 to 29m, 0.75 mile NNW of Punta Pasaje. It is a good anchorage in E winds, but is exposed to winds from the W.

The dangers off Punta Pasaje are reported to project farther into the strait than charted. The point should be given a wide berth.

Punta York (53°35'S., 72°17'W.) is located 4.5 miles NW of Punta Pasaje; shoals and kelp extend 0.5 mile ESE of the point.

Bahia Albuquerque is located on the SE of Punta York and is encumbered by the shoal described above. There is a 3.5m shoal spot marked by kelp near the head of the bay.

Rada York is situated off the mouth of the Rio Batchelor, 1.25 miles NNW of Punta York.

A rock, awash and marked by kelp, lies about 0.5 mile SSE of the river mouth, 183m offshore.

As the tidal currents run strongly through Paso Tortuoso and Canal Jeronimo, a vessel lying in this roadstead, even during light winds, will sheer uncomfortably. It is exposed to the prevailing W winds and is subject to violent squalls coming from W.

Rocas Craster, with a depth of 6m, lie 0.7 mile W of the mouth of the Rio Batchelor. They consist of two steep-to rocks, about 0.1 mile apart.

Islote Cohorn (53°33'S., 72°20'W.), 6m high, lies on a coastal bank about 0.6 mile NNW of Rocas Craster. A light, shown from a cylindrical tower 8m high, is situated on the islet. A depth of 19.5m lies about 0.8 mile WSW of Islote Cohorn Light.

Punta Arauz (53°32'S., 72°21'W.), a low point with rocks and foul ground extending 0.3 mile NW from it, is located just over 1 mile NW of Islote Cohorn.

8.55 The SW side of Paso Ingles is formed by islands and islets that are described in order from SE to NW. There are passes between these islands that will be described later.

Islas Charles (53°44'S., 72°07'W.), midway between Cabo Gallant and Cabo Edgeworth, 6.75 miles SSW, consists of three islands with several islets off their SE side.

Punta Jacquinot, 2.5 miles SW of Cabo Gallant, is the N extremity of the E island. Marca Wallis (Wallis Mark), a conspicuous white patch, is located 0.5 mile SE of Punta Jacquinot. The islets and rocks off the E extremity of the E island rise as high as 85m.

The three main islands of Islas Charles are separated by Paso Norte, Paso Sureste, and Paso Oeste.

A shoal, with a depth of 3m, lies in the middle of Paso Norte. It lies on the E edge of a bank extending from the W island.

Bahia Tres Pasos is located at the junction of the three channels, about 1 mile SSW of Punta Jacquinot. It may be used for shelter in an emergency. Vessels enter by Paso Norte or Paso Oeste. Paso Sureste is too narrow.

Isla Monmouth (53°42'S., 72°11'W.), 40m high, lies 5.5 miles W of Cabo Gallant. Isla James is the N of two islets located 0.5 mile W of Isla Monmouth. A shoal, marked by kelp, lies about 0.9 mile WSW of Isla James.

Rocas Rupert (53°40'S., 72°11'W.), 1.5 miles N of Isla Monmouth, are two rocks. The NE rock is 19m high.

Isla Rupert (53°40'S., 72°12'W.), 102m high, lies about 0.6 mile NW of Rocas Rupert.

Foul ground extends 0.25 mile NW from the island; an isolated rock, with a depth of less than 2m and marked by kelp, lies about 0.3 mile S of the island.

A light shown from a cylindrical tower, 2.1m high, is situated on the NE extremity of the island.

Two dangerous rocks have been reported to lie 0.75 mile NW of Isla Rupert.

A bank, with depths of 25m, extends NW from Isla Rupert to Isla Carlos III, 1.25 miles distant.

The bank is steep-to and the tidal currents set across it a rate of 3 knots.

Isla Carlos III (53°37'S., 72°20'W.), a wooded islet 8.75 miles long in a NW-SE direction, is about 4 miles wide and about 540m in height. Punta Ballena is its SE extremity and Cabo Crosstide is the NW extremity. The island is separated from Peninsula Ulloa by Canal David, which has a least width of about 0.3 mile.

Bahia Mussel, on the N coast of Isla Carlos III, is entered W of Cabo Middleton, about 3 miles N of Punta Ballena. Rocas Dessant, marked by kelp with a least depth of 1.7m, lie in the entrance to the bay, about 0.6 mile NW of Cabo Middleton.

Bahia Mussel is deep and sheltered, but the bottom is stony and uneven. It is not recommended as an anchorage.

8.56 **Isla el Bonete** (53°35'S., 72°21'W.), 49m high, lies about 0.2 mile offshore, 2.25 miles NW of Bahia Mussel.

Islote el Bonetito, 24m high, lies 0.3 mile farther NW. The depths are great and the tidal currents are strong nearby.

Bahia Tilly is entered between Punta Rowe, 1.25 miles WNW of Islote el Bonetito, and Punta Merrill, 0.25 mile farther WNW. The bay extends nearly 1 mile SW.

A moderate-sized vessel may anchor in the middle of the bay or a little farther in, where depths of 32 to 36m, mud, will be found. When entering the bay, particular attention must be paid to the steering of the vessel, for the tidal currents run strongly across the entrance.

Cabo Crosstide (53°34'S., 72°25'W.), 1.25 miles NW of Punta Merrill, is massive and steep, with deep water all around it. The currents here, at the NW extremity of Isla Carlos III, are quite strong. They produce violent seas, choppiness, and whirlpools. A light, shown from a tower 5.5m high, is situated on Cabo Crosstide.

The time of the turn of tidal currents in this stretch of the strait is irregular because of the meeting of the current from Canal Jeronimo with those of Paso Ingles and Paso Tortuoso.

Strong overfalls and tide rips are produced and the currents attain a rate of 3.5 knots. On the N side of Paso Ingles, there is an eddy setting W during the time of ebb, which sets E.

Cabo Edgeworth to Mogete del Morrion

8.57 From **Cabo Edgeworth** (53°48'S., 72°09'W.), the coast extends in a NW direction for 17 miles to Mogote del Morrion. This coast along the NE side of Isla Santa Ines is indented by numerous bays and inlets, of which only one affords an anchorage.

Bahia Choiseul and Bahia Nash lie 4.5 and 9 miles NW, respectively, of Cabo Edgeworth. Bahia Choiseul is a large shoal bay full of islets and rocks. It has not been fully examined. Bahia Nash is similarly impeded with islets and rocks; neither of the bays afford an anchorage.

Seno Ballena, on the S side of Peninsula Ulloa, is entered between Bahia Nash and the SE end of Canal David. It is flanked by mountains and extends 7 miles W. A valley, with a large glacier, lies at its head.

Anchorage may be obtained on the W side of the entrance by vessels with local knowledge, in a depth of 25m, off a small cove with a sandy beach.

Canal David, between Isla Carlos III and Peninsula Ulloa, joins Paso Tortuoso between Cabo Crosstide and Mogote del Morrion. Although the channel is deep, it is considered dangerous and should only be used with local knowledge.

Bahia Galiano and Bahia Ponce are entered 3.25 and 4 miles, respectively, NW of Seno Ballena; they lie on the SW side of Canal David.

The mouth of each of these bays is encumbered with rocks and islets; neither have been examined. An isolated rock, with a depth of 3.5m, lies in Canal David, 0.5 mile N of the E entrance point of Bahia Galiano.

Mogote del Morrion (53°35'S., 72°27'W.) lies close offshore about 0.75 mile N of Bahia Ponce. This islet lies on a shoal bank on the W side of the N entrance to Canal David.

Paso Tortuoso

8.58 Paso Tortuoso is a continuation of the strait from Paso Ingles to Paso Largo, a distance of about 9 miles WNW.

The N shore of the channel extends from **Punta Arauz** (53°32'S., 72°21'W.) to Cabo False Quod, 8 miles WNW. Regulations for vessels transiting Paso Ingles and Paso Tortuoso are given beginning in paragraph 8.53.

Canal Jeronimo, entered between Punta Arauz and Punta San Jeronimo, 1.25 miles W, leads to Seno Otway.

Punta San Jeronimo is the SE extremity of Peninsula Cordova and Isla Riesco.

From Punta San Jeronimo, the coast trends 3.25 miles W to Punta Isabel then WNW to Bahia Borja. Roca Anson, with a depth of 3.5m, lies on the N side of the channel, 1 mile SW of Punta San Jeronimo. The kelp on this rock only shows at slack water as it is run under by the tidal currents. The rock is marked by a buoy.

Bahia Borja (53°32'S., 72°30'W.) may be identified by Isla Borja Grande, 28m high, located 0.75 mile SW of Punta Isabel. Islote Borja Chica, surrounded by kelp, lies 0.19 mile SW of Isla Borja Grande. There is foul ground between the two islets. Islotes Ortiz lie between Isla Borja Grande and Punta Rosario, 0.35 mile N. The entire area between the islet and point is foul.

Bahia Borja anchorage, one of best in the strait, is sheltered from W and SW gales which usually prevail, but is open to SE winds, which rarely blow here. The anchorage should be approached with the head of the bay bearing 325° and the anchor is let go when Islote Borja Chica bears 201°, in a depth of 25 to 30m, sand and shells.

Roca Crooked (53°33'S., 72°31'W.), with a depth of less than 2m and marked by kelp, lies 0.5 mile offshore, 0.7 mile WSW of Islot Borja Chica. A lighted buoy lies close S of the rock.

Cabo Quod (53°32'S., 72°33'W.), 2 miles W of Isla Borja Grande, 244m high, is unmistakable to vessels coming from the E as it appears to have a cut in its summit. Islote Beware, 8m high, lies 0.35 mile W of Cabo Quod.

Cabo Falso Quod, 275m high, is located 1.5 miles NW of Cabo Quod. When approaching from the W at night or in thick weather, care is necessary to avoid confusing the two capes, which are similar. Cabo Quod can be identified by Islote Beware, which lies close W.

Bahia Barcelo, entered between Cabo Quod and Cabo Falso Quod, extends 2 miles NNE from its entrance. The bay is filled with islets and kelp and does not afford safe anchorage.

8.59 From Mogote del Morrion, the coast trends in a WNW direction 8.5 miles to Isla Spider, along the N shore of Peninsula Ulloa.

is a remarkable promontory, 337m high, located 2.75 miles WNW of Mogote del Morrion. The outer face is perpendicular, bare, and of a light clay color with a large white patch. It forms an excellent landmark.**Cerro el Morrion** (53°34'S., 72°32'W.)

Bahia Riders is a cove entered 1.75 miles WNW of Mogote del Morrion. There are islets and foul ground close off the E entrance; it does not appear to offer an anchorage.

Bahia Butler, accessible to small craft with local knowledge, is entered 0.75 miles W of Cerro el Morrion. There is a sheltered anchorage on the W side over a bottom of rock, partially covered with mud. There is a waterfall on the S shore of the cove.

Bahia Chance is entered close W of Bahia Butler; Bahia Mass is entered 2 miles farther NW. These two bays are unsuitable for anchorage.

Caleta White, close NW of Bahia Mass, affords anchorage to vessels with local knowledge, in a depth of 27m, mud.

Isla Spider (53°32'S., 72°41'W.) lies off the NW extremity of Peninsula Ulloa, 1.75 miles NW of Caleta White. Foul ground extends about 0.6 mile WSW from the island into the entrance of Seno de las Nieve.

Paso Largo

8.60 Paso Largo is a continuation of the strait and extends from the NW extremity of Peninsula Ulloa to Cabo Lunes, a distance of about 34 miles. The N side of the reach is formed by Peninsula Cordova; the S shore is formed by Isla Santa Ines and Isla Desolation.

The weather in this reach is frequently so thick that, although it is only 2 or 3 miles wide, one shore can not be seen from the other because of the mist. Rain squalls often blow along the land while it is comparatively clear in the middle of the reach.

There is less rain with the wind from the SW quarter than when it is from the NW, but it is very capricious. A clear bright morning is usually followed by a stormy and wet day, the change generally setting in before noon.

8.61 From **Cabo Falso Quod** (53°31'S., 72°35'W.), the coast trends 14.5 miles NW to Fondeadero Field. The coast is indented with numerous small coves and various bays. Few of these inlets have value as an anchorage.

Bahia Osorno, entered N of Cabo Falso Quod, is exposed to W winds and does not afford an anchorage. Islotes Osorno lie 1 mile NW of Cabo Falso Quod and 0.25 to 0.35 mile offshore. The W islet of these two is 4.5m high.

Bahia Langara is entered close N of Islotes Osorno and is not recommended even as a temporary anchorage. Seno del Leon is a narrow inlet, 2.5 miles long. It lies 1 mile NW of Bahia Langara.

Bahia Arce, Bahia Good Luck, and Caleta Villena lie 1.25, 2, and 4 miles NW, respectively, of Seno del Leon.

Bahia Guirior (53°25'S., 72°47'W.) is entered close W of Caleta Villena and extends 2 miles N from the strait. A rock, with a depth of 1.8m and covered with kelp, lies 1.75 miles within the entrance. A small vessel with local knowledge can anchor, in a depth of 3.6m, mud and shells, 0.2 mile SW of the rock.

Cabo Notch (53°26'S., 72°47'W.), a conspicuous rock rising perpendicularly from the sea to a height of 119m, forms the extremity of the peninsula that separates Bahia Guirior from Bahia Paulina.

Islotes Skinner, 1.5 miles NW of Cabo Notch, is little more than rocks, 8m high, lying 0.25 mile offshore. A sunken rock,

marked by kelp, lies 0.2 mile W of them. A light is shown from the S islet.

Bahia Paulina, on the W side of Cabo Notch, is entered between Islotes Skinner and Punta Hill, 4 miles WNW. Caleta Notch lies within the bay. Islote Chope, covered with moss and grass and always appearing green, lies in the middle of the bay, 1.75 miles NW of Islotes Skinner.

Bahia Paulina is partially encumbered with islets and rocks; although there are considerable depths on its W side, it is so foul that it is not considered safe to anchor there.

Caleta Notch is entered from the NE part of Bahia Paulina. It is an excellent harbor, but the approach to the anchorage is intricate and passes over a shoal, with a depth of 3.4m, that lies between two islets, which are about 115m apart.

Bahia Ventisquero is entered 0.5 mile NNW of Punta Hill, which is steep and bold and rises to a height of 579m. The bay extends 1.75 miles ENE.

8.62 Fondeadero Field (53°22'S., 72°55'W.) is situated in the middle of the outer bay of Bahia Ventisquero, S of several islets. Isla Rock, with a summit that rises to 162m, lies in the middle of the bay.

Punta Little, on the island, lies 0.4 mile WSW of its summit. Islote Sombrero, 12m high, lies nearly 0.3 mile W of Punta Little, and Isla Aris is the farthest S of the islets in the bay. Its N part lies about 0.1 mile W of Islote Sombrero.

The anchorage, only recommended for vessels up to 70m in length, may be approached with Punta Little and the peak of Isla Rock in line bearing 073°.

When anchoring here in heavy weather, a vessel should moor; the port anchor should be let go with Isla Aris abeam, followed by the starboard anchor, as convenient. The holding ground is excellent, in depths of 11 to 22m, sand and mud.

8.63 From Isla Spider, the coast extends 13 miles NW to Islote Stella. It is indented by two sounds and several small inlets that extend S into Isla Desolacion.

Seno de Las Nieves is entered between **Isla Spider** (53°32'S., 72°41'W.) and a point 1.5 miles WNW. The sound has not been examined in detail and should only be entered by vessels with local knowledge. Caleta Basin, 1.25 miles within the W entrance and Puerto Black Mud, 0.75 mile farther S, afford anchorage as does a cove, with a depth of 16m, stones, which lies at the N end of a small peninsula S of Puerto Black Mud. A fourth cove lies on the E side of the sound, 3 miles from its head, and has depths of 16 to 22m, stones.

Bahia Swallow (53°30'S., 72°46'W.), which may be used in case of an emergency, is entered 2.5 miles NW of Isla Spider. Islotes Wallis lie 0.175 mile NNW of the E entrance point of the bay. Isla Carteret lies on the W side of the bay and separates Bahia Swallow from Bahia Condesa.

A group of rocks, marked by kelp, lies close SE of the E extremity of Isla Carteret. These rocks can be passed on either side. A 12.8m shoal, marked by kelp, lies about 0.3 mile SW of the group of rocks.

Anchorage for medium-sized vessels may be obtained about 0.1 mile SW of the group of rocks, in a depth of 31m. The bay should only be entered by vessels with local knowledge.

Bahia Condesa is entered W of Isla Carteret; Bahia Stewart lies 1 mile NW of Bahia Condesa. These bays should only be entered by small vessels with local knowledge.

8.64 Cabo Hunter (53°27'S., 72°52'W.), 3.25 miles NW of Bahia Stewart, is the E entrance point of Seno Nevado. It rises steeply to a height of 112m. There is a sunken rock, marked by kelp, close N of the cape.

Seno Nevado is entered W of Cabo Hunter. It extends 13 miles S into Isla Santa Ines, and is quite deep. The shores of the sound, as far as they have been examined, are clear of known dangers.

Bahia Havergal, on the W side of the sound, is entered 2.75 miles SSW of Cabo Hunter. The bay extends 3.25 miles SSW from its entrance. Its outer part is divided into 2 parts by Isla Arthur, which is about 2 miles long in a NNE-SSW direction. The position of the bay is marked by a large glacier that descends from Monte Wharton, which attains an elevation of 1,327m, 6 miles SSW of Cabo Hunter. Cerro Moraine rises to a height of 162m at the head of the arm.

Bahia Havergal Occidental, W of Isla Arthur, affords anchorage to medium-sized vessels with local knowledge, in a depth of about 16m, muddy sand over loose stones, poor holding ground.

Bahia Yacht, a cove on the W side of Bahia Havergal Occidental, is suitable only for small craft. Punta Let-Go, on the S side of the cove 0.25 mile within the entrance, is a convenient mark for vessels anchoring in Bahia Havergal Oriental.

Bahia Havergal Oriental (53°30'S., 72°55'W.), on the E side of Isla Arthur, provides anchorage for a vessel not more than 60m in length, in a depth of 40m, stiff black mud, with Cerro Moraine bearing 212° and Punta Let-Go, seen over the isthmus in the middle of Isla Arthur, bearing 304°.

The wind always blows either in or out of this arm, and though the squalls change their direction from N to S, they are not as violent as those in the W arm.

Caleta Humphrey lies 2.75 miles NW of Cabo Hunter, and **Islote Stella** (53°24'S., 72°58'W.) lies on a shoal bank, 2.5 miles farther NW.

8.65 The N shore of Paso Largo continues in a NW direction from Fondeadero Field to Punta Havannah, a distance of 19 miles. The mountain range that backs this part of the coast is covered with snow and is the highest on Peninsula Cordova. Monte Wyndham, on this range, rises to a height of 1,183m, 3 miles N of the head of Bahia Ventisquero.

Caleta Ginn, about 4 miles NNW of Fondeadero Field, is small and unsheltered.

A deep ravine extends into the hills from the cove, up to the lower part of a huge glacier.

Caleta Playa Parda, 1.25 miles NW of Caleta Ginn, has a basin at its head approached through a narrow passage. The inner basin is landlocked and sheltered, although very restricted. Vessels under 50m in length, with local knowledge, may anchor in the cove.

Isla Shelter (53°19'S., 73°02'W.) is a well-defined steep-to island that rises to a height of 119m. It lies about 0.2 mile S of the W entrance point of Caleta Playa Parda, but this channel has not been closely examined.

An above-water rock lies about 0.2 mile off the NE side of the island; a rock, with a depth of less than 2m, lies 0.3 mile WNW of the NW side of the island.

Estero Playa Parda, entered N of Isla Shelter, extends 2 miles NNW. It is deep to within 91m of its head where there is a sandy beach backed by flat ground.

Caleta Marion, a deep cove with an irregular rocky bottom, is entered 1.5 miles NNW of Isla Shelter. Islote Beagle, 18m high, lies close off the W entrance point of the cove.

Caleta Estrella, 1.5 miles WNW of Caleta Marion, is encumbered by rocks. Caleta Pollard, entered 3 miles farther WNW, is too deep and narrow for anchoring.

8.66 Cabo Cooper Key (53°15'S., 73°13'W.), just W of Caleta Pollard, is rounded and difficult to recognize from the W, but from the E it appears as a bold headland. After rounding Cabo Quod, it will be visible in clear weather and appears to be the termination of Paso Largo. A light is situated on the cape and is shown from a cylindrical iron tower, 2m high.

Bahia Campana, entered 3.25 miles NW of Cabo Cooper Key, recedes 2.25 miles ESE. It is surrounded by bare gray hills and affords no anchorage, as the depths are too great and the bottom is rocky.

Bahia Hannant, entered close N of Bahia Campana, has deep water throughout. Monte Oscuro, a crag 319m high, is located 0.5 mile E of the bay. It is distinctly darker than the other rocky summits nearby, the general color is light gray.

Roca Negra, awash, lies 0.25 mile S of the NW entrance point to Bahia Hannant; it is steep-to and marked by kelp.

Punta Havannah (Punta Habana) (53°10'S., 73°19'W.), 2.5 miles NW of Roca Negra and 7.25 miles NW of Cabo Cooper Key, is a sloping projection of bare white rocks. It is the W limit of Paso Largo on the N side and is also the extremity of Peninsula Cordova.

8.67 Cabo Lunes, situated about 11 miles NW of Islote Stella, is a bold cape that forms the W limit of Paso Largo. The inlets and passages on this coast are discussed, in order, from SE to NW.

Bahia Arathoon (53°25'S., 73°00'W.), entered 0.75 mile W of Islote Stella, divides into two arms 1.25 miles within the entrance. The W arm is too deep for anchoring. The E arm extends 5 miles to Puerto Marsh, at the head of the bay, and is also deep.

Punta Doyle, 1.75 miles within the entrance of Bahia Arathoon, is the E extremity of the peninsula which separates the arms of the bay. A rock, with a depth of less than 2m in the middle of the E arm, lies 0.2 mile E of Punta Doyle.

Puerto Marsh (53°28'S., 73°00'W.) is entered 2.5 miles S from the head of the E arm.

Punta Drew, located on the E arm 2 miles S of Punta Doyle, is the entrance point to Puerto Marsh. Punta Henry lies 0.4 mile S of Punta Drew.

Islote Steele is located near the head of the bay, 1.5 miles SSE of Punta Henry. Rocas Blancas, 1.5m high, lie close off the E shore of the outer basin, 0.8 mile SSE of Punta Henry.

Anchorage may be obtained in the outer basin by a vessel of moderate size, in a depth of 18m, muddy sand over rock, with Islote Steele bearing 148° and Rocas Blancas bearing 096°.

Caleta Bates (53°23'S., 73°02'W.), about 1 mile NW of Bahia Arathoon, is too narrow to be of service to vessels.

Canal Abra, 1 mile NW of Caleta Bates, connects Estrecho de Magallanes with Bahia Otway and the Pacific Ocean. An incomplete examination has shown it to be a fine navigable passage, but no anchorages were found.

Isla Abra, which stands in the center of the entrance, is 94m high and covered with vegetation. The entrance is 2 miles wide, but it quickly narrows to 0.75 mile. There are several islands in the channel. One of them, Isla Maycock, lies about 6 miles within the entrance. A rock, with a depth of less than 2m, lies in the fairway 0.75 mile SE of Isla Maycock.

Punta Aldea (53°21'S., 73°05'W.), the NW entrance point of Canal Abra, is a bold headland 183m high, which rises to 468m about 1.25 miles farther WSW.

Estero Rocalloso, entered 3.75 miles WNW of Punta Aldea, is narrow and recedes in a SW direction from the S part of a bay formed by the projection of Punta Casper.

Punta Harry, 0.8 mile SW of Punta Casper, is the NW entrance point. Islote Ellen, which is small and rocky, lies about 0.5 mile S of Punta Casper. There are two rocks, awash, 0.6 mile ESE of the islet.

Bahia Underhill, 3.5 miles NW of Punta Casper, affords no anchorage.

8.68 Islotes Pritchard (53°15'S., 73°18'W.) are located 2.25 miles NNW from the mouth of Bahia Underhill. Isla Wellard lies in the entrance to Estero Cormorant close S of Islotes Pritchard.

Estero Cormorant, entered S of Isla Wellard, extends SW then WNW for a distance of 3 miles. It is a deep body of water.

Bahia Lewis is entered W of Islotes Pritchard and runs NW under Monte Posesion, which is 502m high.

Puerto Angosto (53°13'S., 73°21'W.) is entered S of Islote Entry, which is 9m high. A rock awash, marked by kelp, lies 91m SE of the islet. The best mark for identifying the bay is Monte Posesion, which usually stands out well.

Punta Wise, the S entrance point of Puerto Angosto, lies about 0.1 mile S of Islote Entry, and is fringed with kelp. Isla Pasaje lies close off the N shore of the bay, 0.5 mile within the entrance, and Punta Hoy projects from the S shore, about 0.8 mile W of Punta Wise. A shoal spot, with a depth of 11m, lies in mid-channel about 91m N of Punta Hoy.

Anchorage for vessels of moderate size may be obtained in the middle of the basin at the head of Puerto Angosto, in a depth of 27m, with Punta Hoy, distant about 0.1 mile, in line with the S extremity of Isla Pasaje, bearing 078°. The bottom is rocky and uneven with clay, in which the anchor holds well.

Caleta Half Port is a small indentation 1 mile NW of Puerto Angosto.

Estero Canoa, close NW of Caleta Half Port, is very deep for a distance of 1.5 miles WSW to an island that nearly blocks the passage.

Punta Davis, N of Estero Canoa, has a conical-shaped mossy hill, 38m high at its extremity. A rock, awash and surrounded by kelp, lies about 183m NE of the point.

Estero Indio extends 2 miles W from Punta Davis. It is deep and of no value to navigation.

Caleta Byron lies between Estero Indio and Cabo Lunes. It is too confined for other than small vessels.

Cabo Monday (Cabo Lunes) (53°11'S., 73°24'W.), 289m high, has a flat summit which drops abruptly to the sea. It is the NW limit of Paso Largo on the S side of the strait.

Paso del Mar

8.69 Paso del Mar is the continuation of Estrecho de Magallanes from Paso Largo and forms the W portion of the strait. From Cabo Monday, on the S shore, it extends 55 miles NW to Cabo Pilar. This portion of the strait lies between Isla Desolacion on the S and the islands SW and W of Peninsula Munoz Gamero on the mainland. On the N shore, it opens into Canal Smyth and then by other channels into Golfo de Penas.

In a heavy gale or strong breeze a short sea may be experienced in the wider part of the strait, especially W of Cabo Froward, but on reaching Paso del Mar, a heavy swell will be met coming from the Pacific Ocean. This will be found to a certain extent even on the calmest days, and with strong W winds it becomes a serious drawback, giving a good indication of what may be expected outside.

Isla Blaxland (53°09'S., 72°20'W.), a small rocky island, 30m high, partly covered with moss, lies 0.75 mile NW of Punta Havannah. A 7.2m patch, marked by kelp, lies about 183m E of the island.

Grupo Santa Ana, consisting of five small islands, lies 1.5 miles N of Punta Havannah in the entrance to Golfo Xaultegua. The group will be discussed with Golfo Xaultegua in paragraph 8.100. Isla Pillolco, the farthest W of the group, lies 2.25 miles N of Punta Havannah.

Peninsula Munoz Gamero forms the N shore of Paso del Mar. It presents a succession of high, jagged peaks over 1,585m high, with deep ravines and precipitous cliffs. There are several inlets, but all are too deep and narrow to be of any service.

Bahia Clift, Bahia Thomas, and Bahia Corkscrew lie 5, 6.5, and 7.5 miles, respectively, NNW of Punta Havannah.

All three bays are narrow and too deep to be used as anchorages. There is a large glacier at the head of Bahia Clift.

8.70 **Isla Richardson** (53°03'S., 73°27'W.) lies close off the mainland, 8 miles NNW of Punta Havannah. The island is mostly low, but has two hills.

The S hill is 99m high and appears conical from E. The N hill, 100m high, has a square flat summit. Islets and rocks, marked by kelp, extend up to 1 mile SE, S, and SW of the island.

Canal Cripples is the passage between Isla Richardson and the mainland. It has several kelp patches and a shoal with a least depth of 3.7m. Punta Cummins on the N side of the NW entrance is steep-to.

Islotes Maze lie in the entrance to Seno Northbrook, 1.5 to 2.75 miles NW of Isla Richardson. A conical hill rises to a height of 67m on the S island.

The remaining islets of the group are low, especially those in the NW which terminate in Punta Brown. A below-water rock lies about 0.2 mile N of Punta Brown.

Banco Providencia (53°01'S., 73°33'W.), a rocky shoal with a depth of less than 2m at its S end, lies 1.5 miles SW of Punta Brown.

To pass S of Banco Providencia, Pico Jones on **Isla Tamar** (52°54'S., 73°49'W.) must be kept bearing 312° or more.

To pass E of Banco Providencia, keep Punta Brown in range with **Cerro York** (52°58'S., 73°30'W.) on Isla Providencia, bearing 017° until Cabo Providencia bears 292°, when course can be altered to clear Punta Brown.

8.71 The inshore passage is recommended for vessels of up to 1,000 gt who wish to avoid the heavy seas that may be experienced in Paso del Mar.

This passage, N of Canal Cripples, passes between **Isla Pike** (53°00'S., 73°29'W.), 0.5 mile NE of Islotes Maze, and Isla Vince, 0.5 mile farther NE.

There is a rock about 73m off the W extremity of Isla Vince; otherwise the passage, about 0.4 mile wide, is deep and clear.

Seno Northbrook, a deep fjord entered N of Isla Vince, extends 10 miles ENE and ends in a basin. It has not been surveyed and no anchorage has been found.

Canal Sylvia, a continuation of the inshore route, is the passage between Isla Providencia and Isla Emiliano Figueroa. The fairway is deep throughout, and is about 0.1 mile wide at the narrows.

The E entrance is partly blocked by Islotes Pasaje. There is a deep channel N of them. Isla Entrada, located close NE of the highest islet, is the E islet of Islotes Pasaje; it is steep-to.

Roca Coombes (52°57'S., 73°30'W.), a small rounded knob of granite, 0.6m high, located on the S shore 1.5 miles NW of Isla Entrada, lies 137m offshore and is surrounded by kelp and shoal water extending 137m N. A mid-channel course will clear these dangers.

Punta Poulter, close NW of Roca Coombes, and Punta Hayes, on the N shore, are the W entrance points to Canal Sylvia. A 3.5m shoal, marked by kelp, lies off the W entrance to the channel, 0.3 mile NW of Punta Hayes.

Pico Channel, 3.5 miles NW of Punta Hayes, is a conspicuous peak, 469m high. There is another mountain, 679m high and similar in shape, 1.75 miles NE.

Isla Ward (52°56'S., 73°34'W.), 0.5 mile NW of the N extremity of Isla Providencia, is 18m high and is covered with moss and stunted trees. A group of rocks lie close NW of Isla Ward; islets extend SE of the island to Isla Providencia.

Roca Sullen (52°56'S., 73°35'W.), located 0.4 mile W of Isla Ward, is awash. It is marked by kelp and is an impediment to the free navigation of Canal Sylvia.

Roca Steed, with a depth of 2.4m, lies just over 1 mile SSW of Roca Sullens.

Anchorage may be taken in Canal Sylvia, in a depth of 27m, gravel, mud, and stones, with Roca Coombes bearing 156°, distant about 0.2 mile. If the weather is clear, Pico Channel should be seen a little open of Punta Poulter. A waterfall, on the SW shore, bears 216° from the anchorage.

The track for vessels transiting Canal Cripple and Canal Sylvia may be seen on the chart. After a vessel has rounded Isla Ward and the rocks off it, a vessel can pass either E or W of Roca Sullens and Roca Steed, but it is advisable to keep E, especially in thick weather.

In Canal Sylvia, the current usually runs strongly to the SE, but in calm weather the tidal current asserts itself and sometimes runs NW. The turning of the current does not

coincide with the time of HW, and it is much affected by winds blowing in the main strait.

8.72 **Isla Providencia** (52°58'S., 73°32'W.) lies with its S extremity 4.25 miles WNW of Isla Richardson. It extends 4.25 miles NE and is separated from Isla Emiliano Figueroa by Canal Sylvia. The island is mountainous and, when seen from the strait, appears as an undulating ridge with several peaks. Cerro York rises to 304m in the E part of the island.

Cabo Providencia, the S extremity of the island, is a bold headland which is steep-to on its E side.

Punta Byron (52°56'S., 73°44'W.), 7.5 miles NW of Cabo Providencia, is the E entrance point of Puerto Tamar.

Arrecife Percival, with a depth of 3.4m, lies 0.75 mile SE of Punta Bryon.

Isla Dolphin, 0.3 mile S of Punta Bryon, is a bare rock, 6m high. Islas Mouat lie 0.45 mile W of Isla Dolphin and extend W about 0.5 mile to within 183m of the shore near Cabo Tamar.

Roca Sunk, which has a depth of 4m, is located 110m S of the E islet of the group.

A shoal, with a depth of 4m and marked by kelp, lies about midway between Islas Mouat and Punta Bryon.

Cabo Tamar (52°56'S., 73°47'W.) is the W entrance point of Puerto Tamar. A hill close N of the cape is 155m high, and a rounded hill, 250m high, rises 0.5 mile NW of the cape.

Isla Sentry, 3m high, lies about 0.1 mile S of Cabo Tamar. Shoal depths, marked by kelp, extend about 0.1 mile SW of the island.

Puerto Tamar (52°56'S., 73°46'W.) is entered between Punta Byron and Cabo Tamar, 0.9 mile WSW. It is backed by Alturas Beloe, a range of hills with several hummocks that have a highest elevation of 225m.

A prominent white mark, like a tombstone, is located 0.3 of the way up the side of the hill, 0.4 mile N of Cabo Tamar.

Islas Spencer are two small islands in the middle of the bay, 0.2 mile N of the highest of Islas Mouat.

It is not recommended to use Puerto Tamar as an anchorage if it is at all possible to reach a more sheltered anchorage. The best anchorage is about 0.2 mile E of Islas Spencer, in a depth of 27m, rocky, uneven bottom with stiff clay in the hollows between the rocks.

The approach to Puerto Tamar should be made with the E islet of Islas Mouat in line with the white mark bearing 310°.

When the left hand tangent of the point, about 0.1 mile NW of Punta Bryon, bears 010°, course should be altered to maintain this bearing, which leads W of Isla Dolphin and E of the 4m shoal which is clearly marked by kelp. After passing this shoal, the vessel can steer for the anchorage.

The E flood current may attain a rate of 1.5 knots. The ebb current is not so strong, but, when running to windward, causes overfalls and tide rips S of Cabo Tamar. In the entrance to Puerto Tamar, the currents run at rates from 1 to 2 knots, with varying direction, according to the wind.

8.73 Paso Roda is entered W of **Cabo Roda** (52°56'S., 73°49'W.), about 1 mile W of Cabo Tamar. The pass separates Isla Emiliano Figueroa from Isla Tamar and extends 3.25 miles NNE to Punta Grup on the E shore. The channel is used by small vessels bound N for Canal Smyth.

Isla Tamar lies 0.8 mile N of Cabo Roda. It rises to two peaks. Pico Taylor, the S peak, is 421m high, square, and flat-topped. Pico Jones, 0.5 mile NNW, is 428m high and has a sharp summit.

Rocks and islets skirt the shores of Isla Tamar for 1.25 miles to the SW and 0.5 mile W. Isla Falgate, the highest, is marked by a light on its E side and is 18m above-water.

An anchorage has been tested by Chilean authorities, bearing 079°, about 1,040m from Isla Falgate Light.

Roca Astree (52°56'S., 73°51'W.), the outermost danger SSW of Isla Tamar, has a depth of 4.5m, marked by kelp. It lies 0.7 mile SW of Isla Falgate.

A patch of kelp lies 2 miles W of the W extremity of Isla Tamar.

Islotes Direccion consist of two islets that lie 0.1 and 0.4 mile E of Isla Falgate and two above-water rocks lying 0.5 mile NW of Cabo Roda. A beacon stands on the E of the two rocks.

Roca Estribor and Roca Babor lie about 0.4 mile N and 0.5 mile NNW, respectively, of Cabo Roda.

There are two narrows in Paso Roda. The first narrow, 1.3 miles N of Cabo Roda, is about 0.1 mile wide with a least depth of 11m. At the N entrance, close W of **Punta Grup** (52°53'S., 73°46'W.), the channel is about 0.1 mile wide between the dangers with a least depth of 10.1m.

Islotes Carabantes are located in the entrance to Bahia Sargaza, 2.3 miles NNE of Cabo Roda.

Roca Carabantes, awash, lies on the E side of the fairway, about 0.6 mile SSW of Punta Grup, a rock, awash, lies on the W side of the fairway 0.4 mile WSW of Roca Carabantes.

A rock, awash, lies about 0.1 mile SW of Punta Grup, and a group of islets lie between this rock and the point.

A chain of islets and rocks lies about 0.2 mile W of Punta Grup and extends 0.7 mile SW to the NE extremity of Isla Tamar. A beacon is situated on the NE rock in this group.

Outside Paso Roda, a rock, awash, lies about 0.3 mile NNW; there are breakers about 0.3 mile WNW of Punta Grup.

Directions.—A vessel approaching Paso Roda from the S should pass 0.4 mile WSW of Cabo Roda, steering to pass 0.15 mile E of the beacon on Islotes Direccion and between Roca Babor and Roca Estribor.

A mid-channel course should be steered through S narrows, and when clear, a vessel should steer for the beacon 0.2 mile W of Punta Grup until clear of Roca Carabantes.

Then steer to pass midway between the rock, awash, that lies about 0.1 mile SW of Punta Grup and the beacon.

Caution.—There are numerous tide rips in the vicinity of the S entrance.

8.74 From **Cabo Monday** (53°11'S., 73°24'W.), the coast trends in a NW direction about 9 miles to Cabo Upright, then WNW 11.5 miles to the entrance to Puerto Churruca. This coast is indented by numerous bays and sounds which are relatively deep, but afford few anchorages.

Caleta Medal is a small indentation about 0.1 mile in diameter, 1 mile NW of Cabo Lunes. Its entrance is encumbered by a small islet.

Isla Cordova (53°08'S., 73°30'W.), 4 miles NW of Cabo Lunes, rises to a height of 217m in its S part. Monte Conway, on the N of the island, is a remarkable hillock. Cerro del Castillo rises to a height of 162m, 0.5 mile farther W.

Caleta Luis is a two-armed bight located on the N shore of Isla Cordova. Monte Conway forms its W entrance point.

Paso Cordova, between Isla Cordova and the coast SE, is 0.5 mile wide at the entrance and narrows to 0.25 mile at its S end.

A small islet lies E of mid-channel and some rocks lie near the E shore at the narrowest part. Kelp lies off the S point of Isla Cordova, but there is 11m in mid-channel.

Estero Cordova is entered NW of Isla Cordova and extends 10 miles S. The inlet divides into several small arms, but it is deep and affords no good anchorages. It has not been examined S of Bahia Williwaw, which lies 4.5 miles within the entrance on the W side.

Bahia Upright is entered W of Estero Cordova. It should be avoided. The bottom is rocky and uneven. There are several below-water rocks marked by kelp in the entrance.

8.75 Cabo Upright (53°05'S., 73°36'W.), a flat-topped, square-faced headland, 268m high, is the termination of a promontory which separates Estero Cordova from Seno Wallis. Several islets and rocks lie close off the cape.

Isla Centinela, 16m high, is small and rocky; it lies about 0.3 mile E of Cabo Upright. Foul ground extends 0.25 mile from the islet. A light, shown from a round concrete tower, 6m high, is situated on the summit of the islet.

Bahia Ildefonso is an indentation on the N face of the promontory W of Cabo Upright. A line of rocks runs out from its center, terminating in **Roca Midge** (53°05'S., 73°37'W.), about 0.3 mile outside the W entrance point of the bay.

Islotes Coughtry lie 1 mile W of Roca Midge. The islets, which have rocks, awash, off their N sides, are mostly low, but the largest islet rises in a rounded hill to an elevation of 50m.

Seno Wallis is entered W of Islotes Coughtry and has not been properly examined. It extends 6.5 miles S and has two bays on its W side, close to the entrance; these bays have rocky bottoms and are too deep for anchoring.

Bahia Alquilqua is entered E of Punta Santa Casilda. Caleta Uriarte lies in the SW part.

Islas Chapman front Caleta Uriarte and lie from 1.25 to 2.75 miles E of Punta Santa Casilda.

Outside, in the strait off Islas Chapman, as well as off Islotes Coughtry, the tidal currents and wind raise a heavy sea with fierce tide rips. This, combined with the fact that the wind generally blows in towards the shore, unless from the SW, makes it an undesirable locality which should be avoided.

Punta Santa Casilda (53°03'S., 73°48'W.) is the NE extremity of a peninsula which separates Bahia Alquilqua from Estero Puchachailgua. It is low, but is immediately backed by a steep mountain, 411m high.

Estero Puchachailgua is entered close W of Punta Santa Casilda. It is a long narrow inlet, which extends 4.25 miles SSE. Two islets almost fill the entrance.

Punta Echenique, the W entrance point to Estero Puchachailgua, is backed by precipitous mountains.

Caleta Santa Monica, a small bay with a narrow entrance, lies 0.75 mile WNW of Punta Echenique.

8.76 Puerto Churruca (53°02'S., 73°56'W.) is entered between Punta Buti, 2 miles WNW of Punta Echenique, and Isla Diaz, 1.25 mile W of Punta Buti. The port is small and is only appropriate for small vessels up to 130m long with local knowledge.

There are some notable mountains in the vicinity of the inlet which are bare and slate-colored, with precipitous sides.

Monte Cunningham, 750m high, is located on the E side, 1 mile SSE of Punta Buti. It is sharp and prominent when seen from E or N. A peak, 765m high, is located 1.25 miles SE of Monte Cunningham.

Monte Campbell, a sharp peak 775m high, is located near the head of the inlet, 2.5 miles SW of Punta Buti.

Monte Hart-Dyke, the highest summit in the vicinity, rises to an elevation of 1,373m, 2.5 miles WNW of Monte Campbell. It is covered with a sheet of ice, and in clear weather one of its glaciers can be seen from the strait, high up over one of the W arms of Puerto Churruca. All these peaks are almost continually enveloped by clouds.

8.77 Between Isla Tamar and **Cabo Phillip** (52°45'S., 73°55'W.), the S extremity of Isla Manuel Rodrigues, 8.5 miles NNW, are the approaches to Bahia Beaufort and Canal Smyth.

Bahia Beaufort lies between Isla Tamar and Peninsula Merino, 6.5 miles NE. It recedes more than 25 miles NE, and is divided into Seno Glacier and Seno Icy. The bay is full of hidden dangers, and should not be used even by light-draft vessels.

Cabo Phillip is the W entrance point to Canal Smyth.

Isla Parker (52°42'S., 74°10'W.), 8.5 miles NW of Cabo Phillip, attains an elevation of 320m near its NE side.

Bahia Parker, entered between Cabo Phillip and Isla Parker, has numerous rocks and islets marked by kelp. Several inlets and channels lead off the bay.

Bahia Lecky, a small bay on the SE side of Isla Parker, is entered between **Punta Woolcott** (52°43'S., 74°10'W.), the S extremity of the island, and a point 1 mile NE.

An above-water rock lies 0.4 mile ESE of Punta Woolcott, and a large patch of kelp extends 1 mile ESE.

Cabo Parker is the SW extremity of Isla Parker. An island surrounded by shoal water lies about 0.2 mile SW of the cape. A rock awash, which generally breaks, lies 3.5 miles WNW of the cape.

Isla Westminster (52°36'S., 74°24'W.), a precipitous mass of granite, 342m high, lies at the S end of a group of islets, 8.75 miles NW from Cabo Parker. This islet has a remarkable appearance when viewed from any direction.

Grupo Narborough extends about 10 miles NNW of Isla Westminster. They are a chain of two large islands and a number of small islets and rocks. The coasts of this group, and the coasts of those that run as far as Cabo Victoria, 18 miles NW, are dangerous due to the large number of rocks over which the sea always breaks and the currents which generally set over the edges of the line of shoals.

Rocas Buena Esperanza lie 5 miles S, 8 miles SW and 8 miles NW of the principal island of Grupo Narborough. This area should be avoided. Not only are there numerous rocks, on which the sea breaks heavily, but also the tidal currents set toward them near the edges of the shoals.

8.78 Isla King (52°22'S., 74°40'W.), located 18 miles NNW of Isla Westminster, rises to a height of 710m. It is the highest land in this area. A group of islets, rocks, and shoals

lies up to 2 miles W of Cabo King, the SW extremity of the island, and are separated from the island by Paso King.

Grupo Cuarenta Dias, located about 2.5 to 5.7 miles NW of Cabo King, consists of two principal islands and several islets and rocks.

Roca Ballenato (52°24'S., 74°49'W.), which dries, lies 4.5 miles W of Cabo King. Another rock, awash, lies 3.75 miles W of Roca Ballenato, and Rocas Duble, two rocks awash, 0.45 mile apart, lie 1 mile farther WNW. A shoal, with a depth of 9m, is reported to lie 2.25 miles SW of Roca Tortuga.

Puerto Cuarenta Dias lies on the E side of an island, in a group of islands by that name, 4.5 miles NW of Cabo King. It is frequently visited by the vessel which carries supplies to Grupo Evangelistas Light.

Cabo Victoria (52°17'S., 74°56'W.), the N point of the W entrance to Estrecho de Magallanes, is a small, cliffy islet 100m high, close off the W end of Isla Victoria, 11 miles NNW of Cabo King. Isla Victoria is rugged, precipitous, and rises to a height of 375m; it is surrounded by rocks.

Grupo Evangelistas (52°23'S., 75°06'W.), consisting of four rugged rocky islets and some detached rocks, above and below-water, lies 9.5 miles SW of Cabo Victoria. The W islet, which is the largest of the group, rises to a height of 60m.

A reef, with two rocks which dry, lie 1 mile E of the W rock; the reef extends about 1 mile SSE from this position.

The W islet may be seen from a distance of 15 miles in fairly clear weather. A light is shown from a white circular tower, 11m high, with a dwelling alongside, situated on the summit of the W islet; a racon is located at the light.

Tidal currents in the vicinity of Grupo Evangelistas are variable and sometimes set toward the SW rocks of Grupo Narborough and Grupo Cuarenta Dias.

8.79 The S side of the strait continues in a NW direction from Puerto Churruca to Cabo Pilar, a distance of about 33 miles, and is formed by Isla Desolacion. This coast is indented by several bays and coves, with few satisfactory anchorages.

Caleta Darby (53°01'S., 73°56'W.) is entered about 0.7 mile W of Puerto Churruca. It appears to have a rocky bottom as there are large quantities of kelp.

Between Caleta Darby and Bahia Wodsworth, 3 miles WNW, there is a succession of small bays between low rocky points; none of the bays afford shelter to large vessels.

Bajo Magallanes (52°57'S., 73°55'W.) is a rocky bank, with a least charted depth of 19.8m, located near mid-channel 3 miles N of Caleta Darby. The bank is steep-to and a heavy sea rises on it during strong W gales.

A shoal depth of 42m was reported to exist close to the recommended track about 8 miles NW of Bajo Magallanes.

Bahia Wodsworth (52°59'S., 74°02'W.) is entered between Punta Oeste and Punta Este, about 0.75 mile SE. It divides into three arms and is generally deep and easy of access.

Bajo Carlos, with a depth of 7m and marked by kelp, lies near the middle of the N of the two W arms, 0.5 mile SSW of Punta Oeste.

Anchorage may be taken in the SE arm, in a depth of 29m, mud, where the arm is about 0.2 mile wide. Particular care is required in NW winds which often gust at 70 knots.

The coast W of Bahia Wodsworth is fronted by islets and rocks for 2 miles. A rock lies on foul ground 0.5 mile offshore, 1 mile NNW of Punta Oeste.

A light is shown from a circular metal tower 14m high, situated on the E islet of a group, about 2 miles NW of Punta Oeste.

Bahia Felix is entered about 1 mile W of the light. It has a rocky bottom with much kelp, and is exposed to the prevailing winds. It is unsuitable as an anchorage.

8.80 Punta Felix (52°57'S., 74°08'W.), the NW entrance point of Bahia Felix, forms a peninsula. The point is prominent and appears as a ridge with two peaks on it. The N peak is 192m high; the S peak is 359m high. Rocks and foul ground extend 0.2 mile from the coast.

On the SW side of Punta Felix there is an extensive unsurveyed bay.

The coast between Punta Felix and Cabo Valentine, 6 miles WNW, has not been surveyed and should be given a wide berth.

Bahia Valentine lies between Cabo Valentine and a small islet 0.5 mile S. It has a narrow entrance between the rocks.

Cabo Cuevas (52°52'S., 74°21'W.) lies 3 miles NW of Cabo Valentine. It is 137m high. Bahia Trujillo, about 2.7 miles W of Cabo Cuevas, is sheltered but has deep water rather near the shore.

Bahia Tuesday (52°50'S., 74°28'W.) is entered close S of Cabo Cortado, about 3 miles NW of Cabo Cuevas.

There is passage on either side of Islas Nodales, a cluster surrounded by foul ground in the middle of the entrance, but the N one is 137m wide and is preferred.

Roca Quartermaster, on which the sea always breaks, lies close E of the N entrance point of Bahia Tuesday.

There are dangerous rocks charted 183m off the N shore, 0.75 mile W of Roca Quartermaster.

There is anchorage in Bahia Tuesday, in depths of 36 to 40m, with Punta Nose bearing 142°, distant 0.3 mile, or with Punta Nose bearing 052°, distant about 0.2 mile, in a depth of about 36m, mud and rock.

8.81 Cabo Cortado (52°51'S., 74°25'W.) is a perpendicular rock, 61m high. This cape is easily recognized by vessels in transit along the shore, and if a vessel is well out in the strait, it may be recognized by a needle mountain that rises over Bahia Tuesday.

From Cabo Cortado to Cabo Pilar, 12 miles to the NW, the coast is foul and dangerous.

Surgidero Skyring is located 4 miles NW of Cabo Cortado, and Roca Santiago lies 2.5 miles farther NW.

Roca Volpe (52°45'S., 74°34'W.), with a depth of less than 2m, lies 1.5 miles offshore 1.5 miles NNW of Roca Santiago. Depths of 27.4m lie 2.25 miles NNE and ENE of Roca Volpe.

Puerto Misericordia lies 1.25 miles S of Roca Volpe. This small bay is encumbered with rocks and patches of kelp, and should be avoided at all costs.

Cabo Pilar (52°44'S., 74°41'W.) is the S entrance point of the W entrance to Estrecho de Magallanes. It lies 4.5 miles NW of Puerto Misericordia and 25 miles SE of Grupo Evangelistas. The sides of the cape are sheer and it is backed by two mountains which form a high and remarkable promontory.

When viewed from the E, the cape appears to have a double-peaked summit. The W peak is shaped like a tower and rises to a height of 522m. The E peak, 1 mile SE of the cape, is 561m high.

In addition to the peaks inside the strait and on the coast, two other peaks are seen. The S one is the highest.

The high tableland SSW of Cabo Pilar slopes abruptly nearly to the sea and falls off to the S and W, forming a long spit. Two or three prominent detached rocks lie off this spit.

Lanchas Espanolas are several small, but steep islets close off Cabo Pillar. The largest, 93m high, is clearly seen as a prominent detached islet from E. Shoal water is reported to lie 2 miles NW of Cabo Pilar.

Caution.—It is recommended that Cabo Pilar be passed in daylight hours only.

Approach to Estrecho de Magallanes

8.82 When approaching from N, toward the W entrance of Estrecho de Magallanes, do not pass less than 9 miles W of **Isla Duque de York** (50°38'S., 75°20'W.), about 91 miles NNW of Grupo Evangelistas, and the same distance W of **Isla Diego de Almagro** (51°30'S., 75°10'W.), whose N extremity is about 27 miles SSE of Isla Duque de York.

If possible, Cabo Santa Lucia or Cabo Jorge, the W and S extremities of Isla Diego de Almagro, respectively, should be sighted. Then steer to pass at least 9 miles W of Grupo Evangelistas, to ensure safely passing Roca Galicia, and the shoal depths of 24, 25, and 32m charted 16 miles NW, 7 miles WNW, and 5 miles W, respectively, of Grupo Evangelistas.

A course of 151°, passing 10 miles W of Grupo Evangelistas, leads W of the 100m contour. In bad weather, the swell causes a rough sea inside the 100m contour.

After rounding Grupo Evangelistas, steer to pass 4 miles NNE of Cabo Pilar, then steer as required to maintain the recommended charted track.

The current in the vicinity of Grupo Evangelistas runs between SE and ESE into the straits, but a portion deviates S and W of Cabo Pilar to run along the W side of Isla Desolacion. Care should be taken to make good the course set between Grupo Evangelistas and Cabo Pilar. Usually a vessel is set S and E of its assumed position.

Passages North of Estrecho de Magallanes

8.83 Isla Riesco extends 70 miles ENE from Estrecho de Magallanes and is 30 miles wide. Peninsula Cordova, its SW part, forms the shores of Paso Tortuoso and Paso Largo. The island is separated from Peninsula Brunswick to the SE by Seno de Otway, which is approached through Canal Jeronimo.

Canal Fitzroy connects the N end of Seno de Otway with the E end of Seno Skyring. Seno Skyring lies N of Isla Riesco and is joined to the strait by Canal Gajardo and Golfo Xaultegua, which lie W and SW, respectively, of Isla Riesco.

Canal Jeronimo

8.84 Canal Jeronimo leads from the W end of Paso Ingles, between **Punta Arauz** (53°32'S., 72°21'W.) and Punta San Jeronimo 1.25 miles W, to a position 9 miles NNW, then extends 12 miles NNE where it joins Seno de Otway.

In the S half, Canal Jeronimo has an average width of 0.75 mile, but NE of Fiordo Condor it gradually widens; in this part of its course are several small islands with clear shores.

Tides—Currents.—The tides are regular in Canal Jeronimo, and have a range of 1.4m. In the S end of the channel, the flood current sometimes reaches a velocity of 8 knots, and the ebb 6 knots; but these velocities decrease rapidly towards the N. Slack water is of short duration, not exceeding 20 minutes at HW and 10 minutes at LW.

Vessels should guard against being set off their course by the strong tidal current when in this channel.

Vessels are required to maintain a listening watch on VHF channel 16 from 1 hour before their ETA of Islotes Teran. During this period, the ETA should be broadcast every 10 minutes.

Punta San Carlos (53°30'S., 72°24'W.), about 2 miles NW of Punta Arauz, is cliffy. A light is shown from a position about 0.2 mile WNW of the point.

8.85 **Caleta Real** (53°26'S., 72°27'W.), on the E shore about 5.2 miles NNW of Punta San Carlos, is entered N of Punta San Miguel. Anchorage may be obtained in depths of 18 to 22m, sand, good holding ground, but exposed to W winds.

When entering Caleta Real do not pass more than 0.3 mile off Punta San Miguel, in order to clear the dangers extending SSE from Islotes Teran.

Islotes Teran (53°25'S., 72°29'W.) are two islets, 9m high, located in mid-channel 1.5 miles NNW of Punta San Miguel.

A bank marked by kelp extends 0.9 mile SSE of the S islet; a 7.9m patch lies about 0.2 mile farther SSE. A similar bank extends 0.75 mile NNW from the N islet. Vessels should pass W of these islets. A light is shown from the N islet.

Cabo Viejo (53°24'S., 72°29'W.) lies 0.5 miles N of Islotes Teran, on the E side of the canal. Here the channel leads to the NE.

Estero Condor is entered between Cabo Forty-Five, which is high and steep-to, 2 miles W of Cabo Viejo, and Punta Condor, which is 2.25 miles NNE and marked by a light. The cove extends 6 miles WNW and has a least width of 0.4 mile.

It is clear of charted dangers except for Bajo Yavar, a shoal with less than 2m, near its head.

Strong squalls descend from the heights which border the shores. There are heavy tide rips and overfalls 1 mile within the entrance of Fiordo Condor.

Puerto Henry (53°25'S., 72°37'W.), entered W of Punta El Morro, 1 mile WNW of Cabo Forty-Five, affords anchorage, in depths of 33 to 36m, sand and shells, good holding ground, about 0.3 mile SSW of Punta Piedras, which is a small promontory projecting well out from the W shore 1.5 miles SSW of Punta El Morro.

Puerto Condor (53°21'S., 72°39'W.), at the head of Fiordo Condor, affords anchorage, in 27m, sand and mud, midway between Isla Dagnimo and the shore 0.25 mile NE.

Vessels approaching the anchorage should pass between Bajo Yavar and Isla Dagnimo and pass W of the island.

8.86 **Islas Cutter** (53°22'S., 72°29'W.), on the E side of Canal Jeronimo, are two islets 1.5 miles N of Cabo Viejo. The

W islet, very small and grassy, is 7m high. Midway between it and the shore is a larger islet, which is 30m high.

Puerto Cutter, 1 mile E of Islas Cutter, affords good anchorage, in depths of 14 to 18m, mud and shell, in the N part of the harbor; strong squalls sweep across the harbor.

Between Puerto Cutter and Cabo Charles, 8 miles NE, the mountains are high and rugged. Monte Condor, 936m, Monte McIntosh, 949m and Monte Muela, 1,220m lie, respectively, 3 miles NE, 6.75 miles NE, and 8.5 miles E, of Puerto Cutter.

Islotes Tree (53°18'S., 72°24'W.) are two islets close off the E shore lying 2 miles NE of **Punta Limit** (53°19'S., 72°26'W.), a low and fairly prominent point. Rocks and kelp extend 183m W from the islets.

Isla Guzman (53°20'S., 72°30'W.) rises to a height of 491m on the W side of Canal Jeronimo, 3.25 miles NNW of Cabo Viejo. On the NE side of the island there is a conspicuous black patch with parallel sides and a dome-shaped top. This landmark can be seen from a considerable distance to the NE.

Cabo One, which ends in an outcrop of rocks, lies 4.5 miles NE of Isla Guzman. Fiordo Sullivan is entered N of Cabo One, but affords no anchorage.

Islas Corona, a group of three islands, lie off the entrance of Fiordo Sullivan. Isla Pan de Azucar, lies 2 miles E of Cabo One. It is 38m high, conical in shape, wooded, and marked by a light. Isla Corona, also marked by light, is saddle-shaped and is 45m high. It lies close off the N shore and is very hard to distinguish from the S.

Isla Ward, the W island, is 24m high and lies 1.25 miles ENE of Cabo One.

8.87 Cabo Charles (53°16'S., 72°17'W.) lies on the E side of Canal Jeronimo at the entrance to Seno de Otway. The cape can be identified by three sharp summits in line, decreasing in elevation progressively towards the channel.

At the foot of these heights, there is a hillock covered with reddish-yellow moss, which shows as a patch amongst the vegetation in the vicinity.

Punta Manning (53°14'S., 72°18'W.), 4 miles ENE of Cabo One, slopes gradually to the sea, with two small islets close N of it. This point, with Cabo Charles 1.5 miles SSE, marks the NE end of Canal Jeronimo.

Directions.—Vessels entering Canal Jeronimo should keep nearer the W shore to avoid the rocks extending from Punta Arauz. After passing this point, steer in mid-channel until 2 miles SSE of Islotes Teran, then keep close to the W shore until these islets and banks have been passed.

When abreast Cabo Forty-Five, steer for Cabo One and, when nearing it, steer to pass between Isla Pan de Azucar and Isla Corona. A mid-channel course should be steered from here into Seno de Otway.

Seno de Otway

8.88 Seno de Otway extends 49 miles NE from its entrance between Cabo Charles and Punta Manning. It opens out to a width of 16 miles. There are charted depths of 602m in the W part of the sound, but the depths gradually lessen toward the NE end.

The SW part of the sound is surrounded by high steep hills, covered with dense forest, with steep shores and small beaches here and there. In the E part, the hills decrease gradually in height. The shores are low and fronted by beaches which afford landing in fine weather. The tidal currents are imperceptible in the open part of the sound.

The NW shore rises gradually to a range of many hills. There is a dense forest between **Punta Manning** (53°14'S., 72°18'W.) and Punta Grimal, 33 miles NE. Estero Bending is entered close E of Punta Manning.

Punta Islote, located 4 miles NE of Punta Manning, is low and rocky, with a small promontory at its end. Rocks and kelp extend 0.5 mile off the point which should be given a berth of at least 1 mile.

8.89 Punta Solitaria (53°12'S., 72°11'W.) is located 0.5 mile NE of Punta Islote. Estuario Fanny is entered between Punta Solitaria and Punta Villiers, 6 miles NE. The bay divides into 2 arms, 3.5 miles within the entrance which extend 6.5 miles NW and 13.5 miles WNW. It is surrounded by high mountains rising to a height of 1,240m on the N, and 1,019m on the S side.

Between Punta Villiers and **Punta Martin** (53°06'S., 71°58'W.), 4 miles NE, several islets and detached rocks lie close offshore.

Caleta Toro, a small cove surrounded by comparatively low wooded hills, is entered 1 mile SW of Punta Martin.

Monte Toro, 994m high, and Monte Hamond, 509m high, lie 5.5 miles NW and 3 miles W, respectively, of Punta Martin.

There is an anchorage in Caleta Toro near the head of the cove, in a depth of 14m, sand and shells, abreast the extremity of a prominent cliff on the S shore.

Caleta Eros is located close N of Islotes Eros, which lie 1.75 miles NNE of Punta Martin. There is a shoal in the center of the cove, with a least depth of 2m, marked by kelp. There is an anchorage SW of this shoal near the W shore, in a depth of 20m, with good holding ground.

Isla Englefield and Isla Vivian, 106m and 123m high, respectively, are two flat-topped wooded islands lying close together, 4 miles E of Punta Martin. A light is shown from the SE extremity of Isla Vivian. Isla Diaz, 20m high, is located 1 mile E of the passage between these two islands. The passage is not navigable.

A bank, with a least depth of 18m, lies 1.5 miles SE of Isla Vivian Light. Vessels bound for Pecket Mine Terminal should pass S of Isla Vivian.

Puerto Ward, off the E side of Isla Vivian, affords a temporary anchorage, in a depth of 30m, sand and shells, 137m offshore.

A bank, with a least depth of 18m, extends 1.5 miles SE from the S extremity of Isla Vivian.

Punta Sunshine (53°02'S., 71°55'W.), 4.75 miles NNE of Punta Martin, is low, sandy, and covered with vegetation. The water around the point is deep and clear of dangers.

Caleta Alonso lies N of Punta Sunshine. There is a jetty where a vessel with a draft up to 3.7m may moor.

Anchorage may be obtained 91m off the jetty, in a depth of 23m. A course of 270°, with the jetty ahead, leads clear of dangers to the anchorage.

Punta Grimal (52°54'S., 71°35'W.), 15 miles NE of Punta Sunshine, is a low distinctive point with a clump of trees.

At this point, the dense forest which covers the NW shore of Seno de Otway begins to diminish, and farther E it is only seen in patches.

Ensenada del Indio lies close W of Punta Grimal. A rocky ridge extends 0.2 mile SW of the point; 0.5 mile SW a reef extends NW to the coast.

Anchorage for vessels of moderate size, with local knowledge, may be obtained between the ridge and the reef.

Punta Hall (See paragraph 8.92).

8.90 Caleta Ocasion (53°16'S., 72°15'W.) is entered 1.75 miles E of Cabo Charles. Anchorage may be obtained, sheltered from SW winds, 0.3 mile from the head of the cove, in depths of to 25m, sand and shells.

Puerto Pomar (53°16'S., 72°09'W.), 3 miles E of Caleta Ocasion, affords good anchorage, in a depth of 28m, mud and shells. When making this port, vessels should give Punta Luis, the W entrance point, a berth of at least 0.5 mile, pass 0.2 to 0.3 mile E of Isla Roa and then steer to the anchorage about 0.45 mile S of Punta Luis.

Fiordo Wickham is entered E of Cabo Stokes which lies 1.25 miles E of Isla Roa. The inlet trends S and SW for 16 miles. The N part is deep and clear of dangers in the fairway, but the S part contains many islets and rocks and requires careful navigation.

There are two anchorages; one is where the inlet bends SW, in 14.6m, mud, while the other at the head of the inlet, in 9m. These anchorages are for vessels with local knowledge.

Cabo Flinn (53°14'S., 71°51'W.) is located 7.5 miles E of Fiordo Wickham. It is the W entrance point of Fiordo Silva Palma. Punta Entrada, 4.5 miles farther E, is the E entrance point of the inlet which extends S and SW for 29 miles.

There is an anchorage near the E shore, 8 miles within the entrance, in a depth of 20m, mud, and another near the W shore, 3 miles farther in, in a depth of 4.6m.

East of the latter anchorage is a shoal extending from the E shore to mid-channel.

8.91 Cabo Camden (53°12'S., 71°40'W.), 2.5 miles E of Punta Entrada, is the W entrance point of Caleta Camden. Caleta Camden is open, but affords good anchorage, in a depth of 12m, mud, near the E shore.

From Caleta Camden, the coast trends NE 27 miles to **Punta Espolon** (52°49'S., 71°12'W.) at the head of the bay.

Arrecife Las Piedras, 9 miles SSE of Punta Espolon, lies up to 1 mile offshore. A reef, marked by kelp, extends 2.75 miles NE from Arrecife Las Piedras.

Pecket Marine Terminal (52°57'S., 71°12'W.) consisting of a conveyor belt leading to a slewing ship-loader, is situated 1.5 miles NE of Arrecife Las Piedras and about 0.5 mile offshore. It serves a nearby coal mine.

The pier is 1,800m in length, oriented toward the WNW, supported by steel piles and with 4 dolphins.

The mooring should then be approached on a heading of 212°. Two floating lighted beacons mark this course; an inflatable rubber float marks the anchorage point for the starboard anchor. Casting off should be started with a slight flood current.

Medium and strong winds from the SW and NW should be taken into account, as these create a choppy and persistent swell. It has also been determined that the ebb current pushes vessels against the pier.

Ensenada Torino (52°49'S., 71°16'W.), midway between Punta Espolon and Punta Jorge, the E entrance point of Canal Fitz Roy, 5 miles W, affords anchorage 1 mile offshore, in a depth of 14.9m, sand and shells. The bay is open S and SW, and is foul with rocks and kelp.

8.92 Canal Fitz Roy extends NNW from Seno de Otway to Seno Skyring, a distance of 13 miles. This channel separates Isla Riesco from the mainland to the E. There are least navigable depths of 7.6 to 9.1m in the S entrance.

The fairway, through the wider parts of the channel, is restricted by banks which extend from both shores, sometimes to mid-channel, making navigation difficult. This problem is increased by the tidal currents which run through the channel at an average rate of 4 knots.

In the entrance, when wind and tide oppose each other, strong tide rips and a short high sea may be met.

Slack water, which is considered the best time to pass through, occurs 2 hours after the time of HW or LW at Puerto Curtze.

The E shore is about 12m high and sloping. The W is low with the exception of Punta Fenton, 5.2 miles N of Punta Hall.

Punta Hall (52°50'S., 71°25'W.), the W entrance point, is a sandy spit with a conical white beacon, 10m high, lying 6.75 miles ENE of Punta Grimal.

Punta Jorge, the E entrance point, is low and not easily recognizable, but a beacon stands on the point.

Punta Titus (52°48'S., 71°23'W.), a steep-to sandy spit, lies 2.5 miles NNE of Punta Hall. A beacon stands on the point. A 4.6m shoal lies about 0.6 mile offshore 1.5 miles NE of Punta Hall. Between Punta Hall and Punta Titus, a bank of sand, shells, and stones, with a depth of 2.7m, extends 0.5 mile offshore.

Puerto Curtze, on the W side of the channel, W of Punta Titus, affords the best anchorage in Canal Fitz Roy. Anchor in 10m, mud, with the beacon on Punta Titus bearing 095°.

This anchorage is sheltered from W winds and is out of the tidal currents. A stranded wreck lies at the head of Puerto Curtze, about 0.5 mile SW of Punta Titus.

Punta Arnott, 1 mile NNW of Punta Titus, is a prominent sand spit which can be approached to within 183m. A beacon stands near the point.

Ensenada Kelway is located on the W coast 1.75 miles NNW of Punta Arnott and Punta Fenton, 23m high, is located on the W side, 0.8 mile farther NNE.

A cable, with a vertical clearance of 8.5m at HW, spans the narrows 0.2 mile N of Punta Fenton.

8.93 Punta Rivera (52°48'S., 71°23'W.), located on the E side of the channel 0.75 mile NE of Punta Titus, is low and flat, with a small cliff S of it. Punta Reynard, a low stony point, lies 2 miles NNW of Punta Rivera.

Bajo Reynard, with depths of less than 3.2m, lies at the N end of a bank that extends between Punta Rivera and Punta Reynard, and up to 0.4 mile offshore.

Angostura Santa Cruz is the narrows that is entered between Punta Reynard and Punta Fenton; it extends 2 miles N to Punta Turn, on the E coast, and has a least width of 0.2 mile.

The fairway is clear of dangers, but kelp extends from either shore. The current attains a velocity of 5 knots, causing overfalls when it is running at its greatest strength.

Bahia Palomares, on the E side of the narrows, affords anchorage, in 14m, sand and shells, but the tidal currents are strong.

Punta Turn (52°43'S., 71°24'W.) is fringed with kelp, but deep water can be found 91m offshore.

Punta Meric is located on the E shore, 1.5 miles NNW of Punta Turn; two yellow boulders lie close to the point.

There is a jetty located 183m E of the point; anchorage may be taken off the jetty, in a depth of 15m, sand and shells. There are some houses, one with a prominent red roof, close E of the jetty. Range beacons stand E of the point.

Quebra da Uribe is a ravine which stands on the W shore, 0.7 mile WNW of Punta Meric.

The channel is about 183m wide between the shore banks SW of Punta Meric.

Punta Canuto (52°41'S., 71°27'W.) is on the W shore, about 0.4 mile NNW of Quebrada Uribe. A detached shoal, with a depth of 4m, lies 0.2 mile NE of Punta Canuto.

Punta Stokes, 1.75 miles NNW of Punta Canuto, is backed by a hill, 94m high.

8.94 Punta Bennet (52°39'S., 71°28'W.), the W entrance point at the N end of Canal Fitz Roy, is low; there are some houses on it. A depth of 5.3m lies 0.2 mile NW of the point.

On the E side of the channel between Punta Meric and **Punta Crossover** (52°41'S., 71°26'W.), 0.6 mile NW, a bank with depths of less than 2.5m, marked by kelp, extends 0.2 mile offshore.

Quebrada Vives lies at the head of a bight, 0.5 mile N of Punta Crossover. A beacon stands 0.2 mile NW of the ravine.

Caleta de los Amigos is a small settlement on the E shore, 0.25 mile ENE of Punta Stokes.

Punta Wapshot (52°38'S., 71°30'W.), the NE entrance point of the N end of Canal Fitz Roy is precipitous and fairly high. It is located 1 mile NNW of Punta Bennet.

Directions.—Vessels from S steer to a position 2 miles E of Punta Hall and enter Canal Fitz Roy on a course of 331°. This course should be steered until within 0.5 mile of Punta Titus, when course should be changed to the N and pass 0.2 mile E of that point.

Then keep in mid-channel, passing 0.2 mile E of Punta Arnott, keeping to the W side to clear Bajo Reynard.

When SW of Punta Reynard, and after the bank has been cleared, course may be altered for the entrance to Angostura Santa Cruz, steering to pass 183m E of Punta Fenton. A mid-channel course should then be steered through the narrows.

After passing Punta Turn, steer with the range beacons on Punta Meric bearing 343°, until about 0.3 mile off the front beacon, then steer 290° with Quebrada Uribe ahead.

Hold this course until about 0.1 mile off Quebrada Uribe, then steer for the beacon NW of Quebrada Vives, bearing 000°. When 0.3 mile S of this beacon, keep a mid-channel course to the N entrance.

Seno Skyring

8.95 Seno Skyring, which is bound by Isla Riesco on the S and the mainland of Chile on the N, is about 50 miles long E to W and has a width of 8 miles near its W end. The sound is entered from the E through Canal Fitz Roy and from the W through Canal Gajardo, which connects the sound with Golfo Xaultegua.

The E part of the sound has moderate and regular depths, open shores, and is bordered by low and undulating land with few trees.

The W part of the sound is indented by many bays, inlets, and numerous islands. The shores are rocky and precipitous, the water deep, and the sounding irregular.

The land rises to lofty rugged mountains enclosing narrow valleys or tortuous channels

8.96 Morro Hopper (52°36'S., 71°31'W.), 2.5 miles NNW of Punta Wapshot, is a black cliffy projection, in contrast to the neighboring coast, which is grassland. A rock, with a depth of less than 2m, lies 2.5 miles W of Morro Hopper.

From Punta Harvey, about 1.2 miles S, a reef extends 0.5 mile SW.

Ensenada Lorca is formed between Morro Hopper and **Punta Isabella** (52°34'S., 71°44'W.), about 8 miles WNW in the NE corner of the sound.

Caleta Las Minas is entered between Punta Hurtada, 2.5 miles WNW of Punta Isabella, and Punta Julio (Punta Julia), 0.55 mile further WNW.

Anchorage, exposed to the prevailing wind, may be taken, in a depth of 14m, with Punta Julio bearing 320°, about 0.3 mile distant.

Cabo Graves (52°33'S., 71°56'W.) lies 3.75 miles WSW of Punta Julio. Shoal depths extend 1 mile E of the cape.

Porto Altamirano

Puerto Altamirano (52°33'S., 71°59'W.), 2 miles W of Cabo Graves, is entered between Punta Malogro and Punta Eulogio, a high treeless yellowish-colored point.

Anchorage may be obtained, in a depth of 17m, soft mud, 0.3 mile NW of Punta Adelina, located on the E side 0.25 mile NW of Punta Malogro. Care should be taken to avoid the reefs which extend 0.5 mile SE of Punta Eulogio and 0.5 mile S of Punta Malogro.

8.97 Puerto Williams (52°32'S., 72°05'W.), 0.75 miles NW of Punta Eulogio, affords sheltered anchorage with good holding ground, in a depth of 12.8m, about 0.7 mile from the N shore.

Isla Juan, about 1 mile long in a N to S direction, lies off the peninsula that forms the E side of Puerto Williams. A shoal, with a depth of 3.2m, lies close off the S extremity of the island. Rocks fringe the W coast of the island up to a distance of about 0.1 mile.

Ensenada Ponsonby lies on the S shore of Seno Skyring, between Punta Bennet and Punta Rocallosa Este, 17 miles W.The coast is low, with marshes and lagoons in many places. The beaches are strewn with boulders.

Punta Elias (52°39'S., 71°33'W.) is located about 2 miles W of Punta Bennet. Punta Greive lies about 2 miles farther WSW.

A large white boulder stands on shore midway between these two points. Kelp extends 0.7 mile offshore between these two points.

8.98 Caleta Mina Elena (52°41'S., 71°54'W.) (World Port Index No. 14175) is located in the SW part of Ensenada Ponsonby, 12 miles SW of Punta Greive. A pier extends 183m N from the shore. The pier was reported to be derelict. Anchorage may be obtained, in a depth of 9m, about 183m offshore.

Punta Rocallosa Este (52°38'S., 71°58'W.) is bare and light-colored, contrasting with the woods that surround it. It is the W extremity of Ensenada Ponsonby.

Punta Rocallosa Weste, 1 mile W of Punta Rocallosa Este, along with that point, form the most conspicuous projections on the S coast of Seno Skyring. Shoals extend 183m N from both points.

Caleta Lenka, 2 miles WSW of Punta Rocallosa Weste, affords good anchorage, in 22m, sand and mud, and is sheltered from the prevailing winds. Two small islets mark the E limit of the cove.

Puerto Garay (52°39'S., 72°03'W.) is formed between a point on the W and a group of islets and islands on the N and E, close W of Caleta Lenka.

Grupo Guzman, 4 miles WNW of Punta Rocallosas Weste, consists of two large and several small islets. Roca Negra lies close N of the group. Roca Blanca lies close S of the group; both rocks are very distinctive.

Punta Adelaida (52°38'S., 72°08'W.) is the NW extremity of a large promontory located 2.25 miles SW from Grupo Guzman.

Bahia Leon is entered between Punta Adelaida and Cabo Leon 2 miles SSW. It is deep but affords no shelter and is not recommended as an anchorage.

8.99 The configuration of the W part of Seno Skyring can best be seen on the chart.

Caleta Jara is entered between **Punta Onofre** (52°32'S., 72°09'W.) and Punta Pinto, 2.25 miles WSW. It is free of kelp and the bottom is mud, but it is not a good anchorage as it is very open.

Bahia Pinto (52°32'S., 72°15'W.), entered W of Punta Pinto, is located on the N shore about 5.5 miles to the W of Isla Juan. Although protected, it is subject to strong winds from the S and SW.

Punta Laura, the S extremity of a peninsula, lies 10 miles SW of Bahia Pinto.

Estuario La Pera, on the NW side of the peninsula, is entered between Punta Spoorer, 6 miles NW of Punta Laura, and Punta Marshal, 1 mile N. There is good anchorage at the head of the bay, in depths of from 15 to 30m, mud and sand, for vessels with local knowledge.

Estero Navarro (52°50'S., 72°39'W.) on the S side of Seno Skyring, 18 miles SW of Cabo Leon, is deep and sometimes freezes over. It and other inlets to the E are of no value to navigation.

Canal Gajardo (53°00'S., 72°57'W.) is the passage between the SW part of Seno Skyring and the NE part of Golfo Xaultegua. It is about 30 miles long and has a width of 0.65 mile for the greater part of its length.

It is generally deep and clear, but about 15 miles from the N entrance it bends at a right angle to the SE and contracts to about 91m. This narrow is obstructed by large rocks which leave a passage only 20m wide.

The depth here is not more than 2 to 3m, and the tidal currents, which attain a rate of 8 knots, make navigation difficult and dangerous. In winter, ice accumulates here and is dragged away by the current.

Golfo Xaultegua

8.100 Golfo Xaultegua extends 23 miles E of Estrecho de Magallanes, between the N side of Peninsula Cordova and Peninsula Munoz Gamero. It is entered between **Bahia Clift** (53°05'S., 73°20'W.) and Grupo Santa Ana, 2.5 miles S; the entrance is 1.5 miles wide.

The gulf is deep and clear of dangers except for a few points. Most of these dangers are marked by kelp which is always visible. The bottom is mostly mud, but in the W and E ends there is also rock in places.

The mountains which surround this gulf are high and scarped, and approach nearly to the water's edge. They give good shelter to the bays and inlets from the prevailing W winds, but squalls descend into the valleys rendering some anchorages unsafe.

The tides in the gulf are regular and the range is small. In general, they produce no appreciable tidal currents except in some inlets.

Grupo Santa Ana (53°08'S., 73°17'W.) is comprised of five small islands, bare and of white granite, on the S side of the entrance to the gulf. The islands are steep-to, and, so far as examined, appear to be free of dangers on the S and SW sides, but there are shoals off the NE side.

The summit of Isla Santa Ana, the largest island, is 270m high, 1.75 miles NNE of Punta Habana. Isla Pillolco, the W island, is 146m high; Isla Lagartija, the N island, is 37m high.

8.101 Estuario Portaluppi is entered between **Punta Alfredo** (53°06'S., 73°10'W.), 6.5 miles ESE of Bahia Clift, and Punta Este, 0.75 mile farther E.

Grupo Soto lies 2 miles SW of Punta Alfredo; the passage between these islands and the land to the N is foul and should not be attempted. Grupo Arturo extends 1 mile S of Punta Este.

A mid-channel course should be maintained between Grupos Soto and Arturo, taking care to avoid the rocky bank extending ESE from Punta Alfredo.

Anchorage may be taken by vessels with local knowledge at the head of the inlet, in a depth of 25m. It is exposed to W squalls.

A number of islands and rocks lie 2 to 6 miles ENE of Grupo Arturo. From W to E they are Isla Anderson, Isla Esfinge, Isla Campamento, and Grupo Altamirano.

Puerto Guzman is situated on the N shore, 4.75 miles ENE of Estuario Portaluppi. Punta Quidora is located 1.25 miles E of Puerto Guzman. It forms the W entrance point of the S end of Canal Gajardo.

The S coast of Golfo Xaultegua has not been properly examined; it trends E from Punta Havannah, and, in general, is cliffy and fairly broken with sparse, stunted vegetation.

Surgidero Meteoro lies 3.5 miles ESE of Punta Havannah, and **Punta Oberreuter** (53°11'S., 73°06'W.) lies 5 miles E of Surgidero Meteoro. Ensenada Tucapel and Ensenada Colocolo lie, respectively, 2 and 4 miles E of Punta Oberreuter.

Punta Vogel lies 5.25 miles E of Punta Oberreuter, and taken together with the islets NW, is the most salient point of the S coast.

8.102 Puerto Bobillier (53°12'S., 72°55'W.), 2 miles SE of Punta Vogel, affords good anchorage inside the entrance points, in about 30m, mud.

Estuario Perez de Arce, located in the SE extremity of the gulf, is entered 4 miles ESE of Punta Vogel.

The head of the gulf is entered between Punta Fronton, the N entrance point of Estuario Perez de Arce, and Punta Hope, 2 miles N. It extends 6 miles E and divides into several small arms. Below-water rocks lie up to 0.5 mile off Punta Hope.

The coast between Punta Hope and **Punta Spoerer** (53°07'S., 72°59'W.), 5.5 miles NW, is high and cliffy. There are shoals and rocks extending up to 0.75 mile off this coast, making it necessary to give them a wide berth.

The S entrance to Canal Gajardo is between Punta Spoerer and Punta Quidora, 2 miles N, in the NE corner of Golfo Xaultegua.

Puerto Gomez (52°59'S., 72°58'W.), located on the W side of Canal Gajardo, about 6 miles within the S entrance, is well sheltered and easy of access.

The port offers anchorage to vessels up to 150m in length, in a depth of 18.3m, hard mud.

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

SECTOR **9** — CHART INFORMATION

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SECTOR 9 — DNC LIBRARY INFORMATION

SECTOR 9

TIERRA DEL FUEGO—CABO ESPIRITU SANTO TO CABO DE HORNOS

Plan.—This sector describes the coastal waters of Tierra del Fuego that are fronted by the South Atlantic Ocean.

The description is from Cabo Espiritu Santo, the S point of the E entrance to Estrecho de Magallanes, SE to Cabo San Diego then SSW to Cabo Buen Suceso. From this position the coast trends WSW to Cabo San Pio.

The ports, off-lying islands, and channels are discussed in order of appearance with the coastal features.

General Remarks

9.1 Winds—Weather.—The prevailing winds of the South Atlantic Ocean are from the W. Generally speaking the velocity of the winds increases, through irregularly, toward the S. Between 50° and 55°S, the mean velocity is about 18 knots except toward the coast where it falls to 15 knots. The highest monthly velocities occur, for the most part, during colder seasons.

In coastal area from 50° to 55°S, W of 65°W, winds of Beaufort force 8 or higher, were reported on 7 per cent of the observations for the year, and there is little change in expectancy from winter to summer.

South of Tierra del Fuego, however, in the historically stormy region about and to the S of Cape Horn (Cabos de Hornos), there is a sharp rise in gale occurrence.

Within the area 55° to 60°S, and 65° to 70°W, where nearly 70 per cent of the winds are from the W, gales are recorded in 20 per cent of the annual observations, with monthly percentages ranging from 30 in October and 11 in December and January.

Except in these two summer months, some 90 per cent or more of the gales have a W component, with about 25 per cent of them from the W alone. Squalls are frequent and severe gales from the E direction sometimes occur in connection with cyclones passing to the N.

South of Tierra del Fuego, in the area 55° to 60°S, and 65° to 70°W, 4 per cent of the annual observations show fog, with a maximum of 5 per cent in December and a minimum of 2 per cent in May, June, and August.

The E coast of Tierra del Fuego (Isla Grande de Tierra del Fuego) from Cabo Espiritu Santo to Cabo San Diego, 185 miles SE, forms a large area open to the NE.

There are few irregularities in the coastline except the Bahia de San Sebastian, about 37 miles SSE of Cabo Espiritu Santo. Proceeding S, yellow cliffs, backed by a few low mountain ranges, change gradually as signs of vegetation appear.

Numerous rivers and streams flow out from this coast, the most important being the Rio Grande. The area S of Cabo Penas is wooded and the beaches give way to a rocky coastline backed by mountain ranges.

Along the coast of Tierra del Fuego from Cabo San Diego to Cabo Buen Suceso, then W to Cabo San Pio, about 39 miles distant, the coast is indented by several small bays.

There are several hills along the coast while the mountain ranges from NE of Cabo San Pio, about 10 miles, and extend W along the archipelago.

Isla de los Estados lies 22 miles offshore ENE of Cabo Buen Suceso, and the island group Islas Hermite lies 60 miles SSW of Cabo San Pio.

The winds in this sector are predominantly from the W, with about 10 to 15 per cent of the winds from the N and 6 to 10 per cent from the S.

Generally speaking, the mean velocity along the coastal area is 15 knots. The highest monthly velocities occur, for the most part, during the colder season, but the available observations show a variability as to the month of greatest force.

There is an average difference of about 6 knots between the highest and lowest mean monthly velocities. In the coastal waters the range is less than farther out at sea.

In Tierra del Fuego and adjacent islands, snow is rather frequent and small amounts may fall even in summer. At Punta Arenas, the mean annual snowfall is 800mm, with an average maximum monthly fall of 120mm in July. At sea near the SE coast, and at Cabo de Hornos, snow is rather frequent except in the summer.

Tides—Currents.—The current passing S of Tierra del Fuego is known as the Cape Horn Current. From Isla Diego Ramirez, 60 miles SW of Cabo de Hornos, the current sets ENE toward Estrecho de le Maire. The Cape Horn Current passes finally into the Falkland Current.

The current between Cabo de Hornos and Isla de los Estados has been observed to exceed 22 miles per day.

Drifts of 8 or 9 miles a day are not uncommon, while occasionally a set with a W component is encountered.

Caution.—Ice in the form of bergs and floes is to be found throughout the year in the S part of the South Atlantic Ocean. It is impossible to give any distinct idea of where ice may be expected.

It frequently happens that one or more years may elapse during which the route around Cabo de Hornos will apparently be free from ice.

No rule can be laid down to insure safe navigation, as the position of the ice and the quantity met with, differs so greatly in different seasons. Vigilance is urged when crossing the iceberg region.

Tierra del Fuego—Northeast Coast

9.2 From Cabo Espiritu Santo, the coast trends 22 miles SSE to **Cabo Nombre** (52°58'S., 68°17'W.), and is composed of cliffs about 30 to 90m high, with but few breaks.

Inland the land is irregularly rounded and has no trees and, except for it being more green, resembles the coast N of Estrecho de Magallanes.

A radio tower, 100m high, stands about 11 miles SSE of Cabo Espiritu Santo.

Rio Cullen Marine Terminal (52°49'S., 68°13'W.) handles crude oil exports from the Hidra Oil Field. The oil field consists of fixed production platforms and sub-sea production facilities; exports are handled through an SBM.

Depths—Limitations.—A lighted SBM is moored about 7 miles offshore in a depth of 35m. Vessels of 20,000 to 150,000 dwt can be accommodated.

Pilotage.—Pilotage is compulsory. The mooring master will board in a position agreed upon with the vessel. Berthing is normally undertaken in daylight only, but night berthing may be permitted in special circumstances.

Regulations.—The oil field is enclosed within a restricted area, best seen on the chart, within which anchoring is prohibited. Additionally, within the restricted area, the production facilities and the SBM are enclosed within areas where entry is prohibited to all vessels except those using the terminal.

Anchorage.—Arriving tankers may be required to anchor or wait in a position to be agreed upon between the vessel and the terminal. The recommended location is S of the restricted area surrounding the terminal, in approximate position 52°54'S, 68°10'W, in 20m. During adverse weather shelter may be taken in Bahia San Sebastian.

To the N and to the S of the prohibited anchorage area, good anchorage can be found, in depths of 10 and 20m, respectively. The bottom consists of silt and clay; both anchorages are protected from winds from the NW to SW passing through W.

Caution.—Terminal operations may be suspended if the maximum wave height exceeds 2m or the maximum sustained wind speed exceeds 25 knots.

9.3 Cabo Nombre is the end of a range of hills. From this cape to Cabo San Sebastian, 22 miles S, the land is low. A tower (oil derrick) is located 1.5 miles W of Cabo Nombre. The inshore coast between Cabo Espiritu Santo and Cabo Nombre is inadequately surveyed.

From Cabo Nombre, a narrow shingle ridge, 3m high, extends 12 miles SSE, ending in **Punta de Arenas** (53°09'S., 68°13'W.). This point, the N entrance to Bahia de San Sebastian, is steep-to and free of dangers.

A light shown from a metal framework tower, 17m high, is situated close N of Punta de Arenas.

Caution.—Shoals, with depths of 12.5 and 8.7m, lie, respectively, 12.5 miles SE of Cabo Espirito Santo and 6.5 miles NNE of Punta Arenas. Both shoals lie about 1.5 miles offshore.

Two shoals, each with a depth of 8.5m, lie 3 miles and 6.5 miles NNE, respectively, of Cabo Nombre.

Another shoal with a depth of 8.5m, lies 7 miles NE from the light on Punta de Arenas. A patch of kelp is found 18 miles SE of the light.

9.4 **Bahia de San Sebastian** (53°14'S., 68°15'W.) is entered between Punta de Arenas and **Cabo San Sebastian** (53°20'S., 68°10'W.), situated 11 miles S. The bay is sheltered from all except E winds, which seldom blow with any force.

Cabo San Sebastian is a bold and cliffy headland 60m high, and dark in color. A range of mountains 13 miles W of the cape rises to a height of 290m. A light is shown from a circular concrete tower 11m in height, situated on the cape. A mast, painted with red and white bands, and 100m high, lies 4 miles W of Cabo San Sebastian.

The N side of the bay is clear of dangers, but on the S side, a stony bank, with depths of less than 5.5m for the first 4 miles, and of less than 9.1m over the remainder, extends 11 miles NNE from Cabo San Sebastian. There is no kelp on this bank, which is fairly steep-to on its W side.

Tides—Currents.—The spring range of tide in Bahia de San Sebastian is 8.5m and the mean range is 7m. The ebb tide flows from the bay with a velocity of 2 knots, and tide rips form over the bank extending NNE from Cabo San Sebastian.

Depths—Limitations.—Two submarine pipelines extend about 1.5 miles N from the S shore of the bay.

Berth No. 2, the E berth, is near the intersection of Range No. 4 and Range No. 6 and can accommodate tankers up to 40,000 dwt and 15.5m draft; Berth No. 1, the W berth, is near the intersection of Range No. 1 and Range No. 3 and can accommodate tankers up to 20,000 dwt and 9.7m draft.

An oil terminal with several tanks is located on the shore of the pipeline. An antenna, 100m high, painted with red and white stripes, stands near the tanks.

Aspect.—Range No. 4, consisting of beacons in line bearing 250°, is situated about 8 miles W of the light on Cabo San Sebastian.

The front range light of Range No. 1 is situated 0.8 mile ESE of Range No. 4 front beacon. The lights are in line bearing 238.5°.

There are four other lighted range beacons, with a common rear range light situated 1.75 miles WNW from Cabo San Sebastian light. From E to W they are Range No. 5, in line bearing 161°; Range No. 6, in line bearing 155°; Range No. 2, in line bearing 121°; and Range No. 3, in line bearing 126°.

Pilotage.—Pilotage is compulsory for all foreign vessels berthing at San Sebastian.

Anchorage.—Anchorage may be taken, in a depth of 10.4m, at the intersection of Range No. 1 and Range No. 2.

Directions.—Vessels should remain at least 10 miles offshore when approaching Bahia de San Sebastian, until the light on Punta Arenas bears 258°; this course should then be steered with the light structure directly ahead.

When the light structure on Cabo San Sebastian bears 189°, a course of 201° should be steered until Range No. 4 can be headed for on a bearing of 250°.

Caution.—Caution should be exercised not to get S of the 250° range line when approaching the inner berth because the depths shoal rapidly.

9.5 Between Cabo San Sebastian and a small cliff 5 miles SSE, the coast is low. Foul ground, with rocks awash at its outer end, extends 2 miles seaward from this cliff.

From this cliff to **Cabo Domingo** (53°41'S., 67°51'W.) 19 miles farther SSE, the coast is low, but hilly inland, and fronted by a sand beach.

Cabo Domingo is a prominent, sheer headland of reddish color, 80m high, with a light. A reef which dries, extends 0.5 mile off the cape, and extends 25 miles SSE. A shoal, whose position is doubtful, lies 5 miles ESE of Cabo Domingo.

Caleta La Mision, about 1.2 miles SE of Cabo Domingo, is formed by a bight in the reef. It is sheltered from S and SW

Cabo Domingo Light

winds. Two range lights, which are lit on request, are shown at the head of the bight, in range 211°.

La Mision, about 3 miles SSE, may be identified by a prominent white church and a conspicuous cross. A port construction project is currently underway at La Mision (2001). Work includes construction of a 740m causeway and jetty. A 30m high crane can be seen at the end of the causeway.

The Cruz del Sur Oil Terminal has been constructed. The terminal consists of an SBM situated about 4.5 miles NW of Cabo San Sebastian Light, with a submarine pipeline running SSW to shore.

Anchorage may be taken on this range with the prominent white cross at La Mision (Mission) bearing 166°, and the light on Cabo Domingo bearing 278°, in a depth of 10m, mud.

A shoal, with a depth of about 4.6m lies close E of this anchorage. A stranded wreck lies on the range about 0.3 mile from the shore.

9.6 The **Rio Grande** (53°47'S., 67°41'W.) (World Port Index No. 13970), 7 miles SE of Cabo Domingo, divides the pampas region from the wooded region S. The E side of the entrance is a stony peninsula ending in Punta Popper.

Puerto Rio Grande is situated 2 miles within the river's entrance. There was a least reported depth of 0.3m on the range lines, and a least width of 91m as far as the port.

The port is available for vessels with local knowledge, having a draft not exceeding 3.7m, which can be increased to 4.3m at springs, but should only be entered during the last hour of the rising tides. It was reported that the port was closed to commercial traffic.

Tides—Currents.—The mean range of tide in the river is 5.9m. The tidal currents in the river run at a rate of 3 to 6 knots.

Pilotage.—Pilotage is reported to be compulsory.

Anchorage.—Anchorage can be taken, in a depth of 16m, mud, 2.5 miles NE of Punta Popper, with the front beacon of the outer range bearing 259°, and Cabo Penas Light bearing 155°.

Cabo Penas Light

9.7 **Cabo Penas** (53°50'S., 67°33'W.), 5.5 miles SE of the Rio Grande, is 30m high.

The sea nearly always breaks over the rocks which extend 2 miles E of the cape. The cape should be given a wide berth, especially at night and in bad weather, as soundings give no indications of its proximity.

A light, shown from a pyramidal iron framework structure 13m high, is situated on Cabo Penas.

Cabo Santa Ines (54°07'S., 67°09'W.) lies 21 miles SE of Cabo Penas. The hills in the vicinity of Cabo Penas are high and partially wooded.

A radio tower, 65m high, stands about 9 miles SW of Cabo Penas.

Roca Comodoro, a rock awash, 7 miles SE of Cabo Penas and 3 miles offshore, has no kelp, and should be given a wide berth. A dangerous submerged wreck is reported in the vicinity of the rock.

From Cabo Santa Ines to Cabo San Pablo, 17 miles SE, the coast is high and bold, and is fronted by cliffs 60 to 90m high.

Roca Champion, with a depth of 2.4m, and steep-to on its seaward side, lies 1 mile offshore, 5.5 miles NW of Cabo San Pablo.

Cabo San Pablo (54°17'S., 66°44'W.) is an isolated hill that protrudes from the line of the coast. Its rounded form makes it conspicuous. A light is shown from the summit of the hill. On the E coast of the cape is a sunken wreck.

From Cabo San Pablo to Cabo San Diego, the E extremity of Tierra del Fuego, 61 miles ESE, the coast is lower. The depths off the coast are moderate, affording anchorage during W and S gales.

Cabo Campo del Medio, 30m high, lies 11.5 miles SE of Cabo San Pablo.

Meseta de Orozco, a distinctive table-topped hill, rises to a height of 250m, 23 miles SE of Cabo Campo del Medio.

Tres Hermanos, three hills that from W to E are 380m, 510m, and 420m high, respectively. They are situated 19 miles E of Meseta de Orozco. The W hill of this group is similar to Meseta de Orozco. They form an excellent landmark for vessels proceeding to Estrecho de le Maire.

9.8 **Cabo San Vicente** (54°37'S., 65°15'W.), situated 5 miles WNW of Cabo San Diego, is a low, dark gray point, backed by wooded hills 60 to 90m high.

Rocks and foul ground, marked by kelp, extend 0.5 mile from the cape.

Bahia Thetis is located on the E side of Cabo San Vicente, and might be useful as a temporary anchorage for vessels bound through Estrecho de le Maire; it is a safe refuge during strong winds from between S and W.

The tidal currents, with rates of 1 to 3 knots, set strongly across the entrance. When the wind opposes or crosses the tidal current, a great sea rolls into the bay.

Two beacons in line 252.5° lead to an anchorage in Bahia Thetis. Temporary anchorage may be obtained, with good holding ground, on the range line, 0.75 mile from the front range, in a depth of 11m, sand and mud. Bad holding ground composed of stone is to be found off the range line.

Two shoals, with a depth of 4.9 and 4.3m, lie 183m S of the range line, 1.25 miles and 0.9 mile, respectively, E of the front range beacon.

9.9 **Cabo San Diego** (54°39'S., 65°07'W.) ends in a small sandy promontory, which rises to a height of 132m, nearly 2 miles W. A reef extends about 0.2 mile E of the cape. A light shown from a prominent white square concrete framework structure 13m high, is situated on the cape.

Meseta de Orozco and Tres Hermanos are easily seen terrain reliefs when navigating in sight of the coast.

Caution.—A heavy and dangerous tidal race, with irregular depths in the middle, extends 5 or 6 miles off Cabo San Diego. At times this race reaches a rate of 8 to 10 knots near the coast. Vessels are warned to give the cape a berth of at least 6 miles.

Estrecho de le Maire

9.10 Estrecho de le Maire, which is 16 miles wide, separates Isla de los Estados from the E side of Tierra del Fuego.

Cabo San Diego Light

The W side of the strait extends from Cabo San Diego to Cabo Buen Suceso, about 20 miles SSW.

The depths through the central part of the channel are between 55 and 183m; however, a rock with a depth of 4.6m, whose position is doubtful, lies 1.5 miles SE of Cabo San Diego Light.

Tides—Currents.—On the axis of the strait the maximum flood current sets N and the ebb current sets S, at 3 knots, but may attain 3.5 knots at springs.

Tidal currents in the strait are regular, but occasionally set in a direction other than expected, especially on the ebb. This would seem to be caused by continuous E and SE winds.

It is recommended that vessels entering the strait from N should wait until 1 hour after HW to avoid the heavy race and foul tidal current.

In addition to the heavy tide rips off Cabo San Diego, heavy tide rips are found off the W coast of Isla de los Estados.

In the approaches to Estrecho de le Maire from the N, Isla de los Estados will be difficult to see in reduced visibility and determining position by soundings may provide no aid. Under such conditions radar returns from the peaks of Cabo San Antonio and Cabo Galeano (54°47.'S., 64°41.5'W.) are easily recognized on the screen. Visual recognition of Cabo San Diego is also difficult during poor visibility, because of the low coastal stretch, and that also may easily cause a misleading identity for Cabo San Vincente. In 1989, it was reported that Cabo San Diego Light was not visible until it bore W at a distance of 10 miles.

Caleta San Mauricio (54°45'S., 65°13'W.) is situated 6 miles SSW of Cabo San Diego.

Anchorage may be obtained with the center of the beach bearing 270°, 0.75 mile distant, in 20m, where there is shelter from SW winds, or vessels can anchor farther out, in 27m. The first anchorage leaves little room to maneuver, and the outer anchorage is uncomfortable.

9.11 **Bahia Buen Suceso** (54°48'S., 65°13'W.) is a small bay entered about 3 miles SSW of Caleta San Mauricio.

The entrance is easy to recognize by the deep canyon, formed in the coast, and by the surrounding mountains which rise to an elevation of 360m, and are the highest in the area. Unless covered with snow, the mountains appear bare and black.

Good anchorage may be taken, in 15m, fine sand, 0.85 mile from the head of the bay. Vessels should not anchor farther in as a heavy swell with dangerous rollers run in during SE gales.

Squalls are frequent during strong winds and are violent during W gales.

A light structure that is difficult to see by day is situated on the S entrance point of Bahia Buen Suceso. Another light is shown from the center of the shore at the head of the bay.

Ensenada Patagones lies midway between Bahia Buen Suceso and Cabo Buen Suceso. It affords a good anchorage during offshore winds, in 26m, with Islote Veleros bearing 199°, and the center of the small sandy beach at the head of the bay bearing 282°.

Cabo Buen Suceso (54°56'S., 65°24'W.) is high and steep. Rocks, which dry, lie close off the cape. Islote Veleros, a rocky islet which resembles a boat under sail, is situated about 0.5 mile offshore, 2 miles NE of the cape.

Isla de los Estados

9.12 Isla de los Estados (54°50'S., 64°15'W.), off the SE extremity of Tierra del Fuego, is 34 miles long in an E to W direction and about 9 miles wide; the island is deeply indented by bays. It is mountainous, and its peaked summits, rising to a height of 823m, are covered with snow throughout most of the year. The harbors are a continuation of the valleys, and are surrounded by high land, with the water in them deepening toward the center.

The coast of the island consists of rocky cliffs, varying in height from 61 to 152m.

The best harbors are on the N side of the island. All the anchorages, though well protected, are difficult to enter due to the force of the tidal currents setting across the mouths of the inlets, the great depth of water, and the inconstant wind, which finds its way down the ravines of the mountains from various directions.

The W coast of the island from **Cabo San Antonio** (54°43'S., 64°33'W.) to Cabo San Bartolome, 12.5 miles SW, forms the E shore of Estrecho de le Maire. It is high, rugged, and deeply indented by the Bahia Flinders, Bahia Crossley, and Bahia Franklin. These bays are open to the prevailing winds, afford little protection from the sea, and are not recommended.

The N tidal current has rates of 5 to 7 knots. Heavy tide rips occur off Cabo San Antonio and off the W coast of the island to Cabo San Bartolome.

Caution.—The area of Isla de los Estados has been declared a National Preserve for all kinds of wildlife by the Government of the Province of Tierra del Fuego, Antarctic, and the Islands of the South Atlantic. This decree restricts access to the area, except for scientific research. Vessels or individuals specifically engaged in scientific research must first obtain authorization from the Secretary of Development and Planning for the province.

9.13 Bahia Flinders (54°45'S., 64°35'W.) is entered between Cabo San Antonio, 150m high, and Cabo Beaulieu, 4.5 miles SW; it recedes about 3 miles. The bay is fronted by cliffs, except in the SE corner, and the ground rises sharply behind the cliffs.

Monte Spegazzini, 741m high, is situated 2 miles SE of the head of the bay.

Islote Tripode lies in the S corner of the bay; a beacon 12m high is situated on the island. Two rocky patches with least depths of 9.4 and 10.1m, marked by kelp, lie midway between Cabo San Antonio and Cabo Beaulieu.

A large patch of kelp extends about 1 mile N from Punta Rollheiser, at the head of the bay, about 1.5 miles NE of Islote Tripode. There are general depths of 18 to 46m in the bay.

Anchorage may be taken, in 44m, fine sand, with the beacon on Islote Tripode bearing 158°, 0.7 mile distant.

Bahia Crossley is entered between **Cabo Galeano** (54°47'S., 64°42'W.), 144m high, located 1.75 miles W of Cabo Beaulieu, and Cabo Le Maire, 0.8 mile SW.

A light, which is difficult to see, is shown from an iron structure 3m high, situated on an islet about 0.1 mile N of Cabo Le Maire.

Anchorage in Bahia Crossley can be obtained by small vessels with local knowledge, about 0.2 and 0.4 mile SE of the light. Entry into the bay is not difficult, but under certain conditions of sea, wind, and tide, small but fierce tide rips form in the entrance.

9.14 Punta Cuchillo (54°50'S., 64°46'W.), the W extremity of Isla de los Estados, lies 3 miles SSW from Cabo Le Maire.

Islote Los Tres Garcia (54°50'S., 64°47'W.), with above-water rocks close SW and SE of it, lies 0.8 mile W of Punta Cuchillo.

Bahia Franklin lies between Cabo Sur and **Cabo San Bartolome** (54°55'S., 64°42'W.), 60m high, the SW extremity of the island, 4 miles SSE. Cabo Setabense is a hilly peninsula which separates Bahias Crossley and Franklin.

A rock, whose position is doubtful, lies 4 miles SSW from Cabo San Bartolome, and dangerous rocks are charted 1 and 1.5 miles SSE from the same cape.

From Cabo San Bartolome, the coast trends ENE 33 miles to Cabo San Juan, the NE extremity of the island. It is indented by numerous bays and inlets. Tide rips are found S of Cabo San Bartolome and E of Cabo San Juan.

Islotes 350 Pies (54°55'S., 64°37'W.) lie 3 miles E of Cabo San Bartolome, from 0.5 to 1 mile offshore. The islets and rocks are steep-to. The largest is 107m high.

A rock, awash and marked by breakers, lies about 0.5 mile S of the islets. A 16m patch lies 2.5 miles E of the islets.

9.15 Bahia Capitan Canepa (Bahia Canepa) (54°52'S., 64°30'W.) is entered 4 miles NE of Islotes 350 Pies, and **Cabo Kempe** (54°52'S., 64°22'W.) is situated 2 miles farther NE.

There are a number of small islets lying close offshore along this coast.

A local magnetic anomaly is reported to exist in the bay.

Punta Menzies is situated 4 miles NE from Cabo Kempe. Bahia York is entered between Punta Menzies and Cabo Webster, 5 miles ESE. Islas Menzies, a group of islets, lie 1

mile SE of Punta Menzies. There are two above-water rocks 0.7 mile S of this point.

A rocky shoal, with a depth of 4.6m, lies 0.25 mile E of Islas Menzies.

In the middle of Bahia York, 2.75 miles NW of Cabo Webster, there are some above-water rocks. Near the E shore of the bay stands a rock 61m high.

Puerto Celular, a cove in the NW corner of Bahia York, affords anchorage for vessels up to 800 gt, in 29m, sand.

There are no dangers in the fairway, and it is sheltered from S and SW winds, but a heavy swell enters with SE winds.

Between Cabo Webster and **Cabo Kendall** (54°50'S., 64°07'W.), 4 miles ENE, there are three small bays, open to the S.

Islas Dampier, from 150 to 245m high, lie 2 miles SE and E of Cabo Webster. The coasts of the islets are sheer and free from dangers.

9.16 Puerto Vancouver (54°48'S., 64°04'W.) is entered between Punta Rinoceronte, 2 miles NE of Cabo Kendall, and Punta Gilbert, 1.5 miles farther E. In the W arm of the bay a vessel not longer than 60m may anchor in 24 to 27m, sand.

A reef extends some distance from the S entrance point of the W arm. To avoid this reef a vessel should not alter course for the anchorage until a prominent white ravine, on the S shore of the W arm, is visible.

Bahia Blossom (54°47'S., 63°59'W.), entered between Punta Gilbert and Punta Ventana, 2.75 miles ESE, recedes about 3 miles. Puerto Back is situated 2.5 miles NE of Punta Ventana.

Punta Fallows (54°47'S., 63°51'W.), the SE extremity of Isla de los Estados, is situated 1.25 miles E of Puerto Back. The point is easily distinguished by its round shape with a nipple on top.

9.17 Cabo San Juan (54°43'S., 63°48'W.), the NE extremity of the island, is situated 4.25 miles NNE of Punta Fallows. The cape is high and steep.

Isla San Juan, 183m N of Cabo San Juan, is covered with guano and visible at a distance of about 10 miles.

Caution.—Off Cabo San Juan, a heavy tide rip extends for a distance of 5 or 6 miles or more to seaward. When the wind is strong and opposed to the tidal current the overfalls are overwhelming and dangerous; they have been reported to extend 18 miles E of the island. Mariners must use every precaution to avoid this area.

The N coast from Cabo San Juan to Cabo San Antonio, 25 miles W, is much indented, with few off-lying rocks or islands.

Puerto San Juan del Salvamento is approached between Cabo San Juan and Cabo Furneaux, 2 miles W. It may be easily identified from a distance by Monte Richardson, 678m high, situated at the head of the inlet.

When nearing the entrance, Barranca Paleta, a remarkable cliff like a painter's palette, is visible on the E shore, which is high and steep. This cliff is formed by the slope of a small mountain, 260m high.

The entrance to the inlet is E of **Punta Lasserre** (54°43'S., 63°51'W.), about 1 mile SE of Cabo Furneaux.

Here the inlet is 0.25 mile wide and deep in the fairway, but near the head of the inlet depths decrease gradually to the beach.

The shores are bold and fringed with kelp giving an indication of a shallow bank, mostly near the shore. There is a submerged rock a short distance off Punta Lasserre.

A vessel can anchor within the line joining Cabo Furneaux and Cabo San Juan, in 36 to 55m. A small bay close S of Punta Lasserre affords anchorage, in 18m. A more sheltered berth is 2 miles within the entrance, in 30m; a rock, covering 11m, is located about 0.1 mile W of this anchorage.

Vessels entering this inlet should steer a mid-channel course to the anchorage.

Tidal currents run strongly across the entrance to the inlet but within the line joining Cabo San Juan and Cabo Furneaux they are weaker.

9.18 Puerto Cook (54°45'S., 64°02'W.) is situated 5 miles W of Cabo Furneaux. Caleta Cinco de Eneri and Caleta San Luis indent this coast. Puerto Cook is entered between Punta Pickersgill and Punta Bayly, 1.5 miles WSW.

Islote Pleamar, light-colored, has no vegetation. It lies close off the E shore of the inlet, 0.6 mile SSE of Punta Bayly. This islet restricts the inlet to a width of about 0.1 mile.

Two rocks, awash and marked by kelp, lie 0.6 mile W and 0.5 mile SW of Punta Pickersgill.

Puerto Ano Nuevo is situated 2.5 miles W of Puerto Cook and Puerto Basil Hall is situated 2.75 miles farther W. Cabo Cooper is the N extremity of a peninsula that separates these two inlets.

Islas Ano Nuevo, consisting of five islands, lies from 2 to 4 miles offshore, NW to N of Cabo Cooper. They afford some protection from W winds. The S island of the group is joined to Isla de los Estados, 4 miles W of Cabo Cooper, by kelp and foul ground.

Puerto Cook is considered the best harbor in the island for a vessel seeking anchorage. The recommended anchorage is at the head of the inlet, in 22 to 27m, sand. There is a depth of 8.5m about 0.2 mile SSW of Islote Pleamar.

9.19 Isla Observatorio (54°40'S., 64°08'W.), about 61m high, is similar in appearance to the land near Cabo San Juan.

A light, shown from a circular iron tower, 23m high, is situated on the island. A beacon is situated about 0.1 mile E of the light structure.

Anchorage may be taken in the lee of the island, in a depth of 14.6m, sand, with the light and beacon in range bearing 280.5°, about 0.3 mile offshore. Because of the velocity of the tidal currents, the uncertainty of the eddies, it is advised not to use this berth except in cases of necessity.

Bahia Colnett lies between the foul ground which joins the SW Islas Ano Nuevo to Isla de los Estados, and **Cabo Colnett** (54°43'S., 64°21'W.). This bay should be avoided.

Bahia San Antonio is entered between Cabo Colnett and Cabo San Antonio, 7 miles W. Puerto Parry and Puerto Hoppner lie at the head of the bay on its E side.

Anchorage may be obtained in the SW corner of Bahia San Antonio, in depths of 15 to 27m, over a bottom of sand and pebbles, sheltered from S and W winds, but N winds bring in a heavy sea.

Cabo San Pio Light

Tierra del Fuego—South Coast

9.20 Cabo San Pio (55°03'S., 66°32'W.) is situated 39 miles WSW of Cabo Buen Suceso and is marked by a light shown from a conical stone beacon, 7.9m high.. The intervening coast is indented by three principal bays. There are mountain peaks close inland.

The 200m curve lies about 4 to 5 miles offshore to Punta Kinnaird, 20 miles W of Cabo Buen Suceso, then falls off quickly to the S.

Bajo Loyola, with a least depth of 36.6m, lies 7.5 miles SSE of Cabo Buen Suceso, but its position is approximate only; it rises abruptly from depths of over 183m.

9.21 Between Cabo Buen Suceso and **Cabo Hall** (54°58'S., 65°43'W.), 11 miles W, the coast is high and cliffy. It is fringed with rocks, some of which dry. Cabo Hall is fringed with a reef.

Up to a distance of 1 mile or more, E of Cabo Buen Suceso, the bottom is irregular with depths of less than 18.3m, and there are probably underwater rocks in this area.

It is therefore imprudent to close the cape to less than 2 miles, and should it be necessary to approach more closely, this should be done from the S, but never to within 1 mile. A current runs E at a rate of 3 knots.

Monte Campana, 800m high, is situated 4.75 miles NE of Cabo Hall. It resembles a large bell and is prominent. This mountain is often the last remarkable object visible before weather thickens preceding a storm.

Bahia Aguirre is entered between Cabo Hall and Punta Kinnaird, 9 miles W, a small peninsula forming the SE extremity of Cabo San Gonzalo.

Rocks, which dry, lie up to 0.6 mile S of Punta Kinnaird, and there is a below-water rock 0.3 mile ENE of the point.

Bahia Valentin, on the W side of Cabo Buen Suceso, affords anchorage, in 20m, sand, in its NE corner, for vessels with local knowledge.

Puerto Espanol (54°55'S., 65°57'W.), the NW arm of Bahia Aguirre, is entered between Punta Pique, 2 miles N of Punta Kinnaird, and Punta de la Pena, 2 miles NE of Punta Pique.

Islote Elizalde, high, rugged, and dark colored, lies 0.5 mile SW of Punta de la Pena. Shoal ground extends 0.5 mile S, SE, and SW from the point enclosing the islet.

Breakers, extending up to 0.5 mile from the coast, have been observed between Punta de la Pena and Punta Colmillo 3 miles E, and were reported 1 mile W of Islote Elizalde.

There is good anchorage, in 11m, fine sand, 1.25 miles W of Islote Elizalde; it is protected from all winds except those from NE to SSE. The light structures in the vicinity and Islote Elizalde are good anchorage marks.

9.22 Bahia Sloggett (55°00'S., 66°18'W.) is entered E of Punta Jesse, 15 miles WSW of Punta Kinnaird. Punta Jesse is low, cliffy, and bordered by foul ground. It should be given a wide berth. The bay gives no shelter from winds between E and S and only very temporary anchorage with winds from other directions.

Islote San Martin de Tours is situated in the middle of Bahia Sloggett, 2.5 miles NE of Punta Jesse. A submerged rock, marked by breakers and kelp, lies 1.75 miles SSE of the islet.

Monte Tres Picos, the most prominent summit in the area, rises to three flat peaks 6 miles NE of Punta Jesse.

From Punta Jesse, the coast trends 2 miles WSW to Punta Falsa, and then 2.5 miles W to Cabo San Pio.

Anchorage, in 20m, sand and pebbles, can be taken about 0.4 mile S of the light structure. A sea is raised by SW winds.

Caution.—A rock, awash, lies about 0.2 mile SE of Cabo San Pio Light, and a breaker has been reported about 183m SE of the rock. Islote Blanco is situated 0.75 mile SW of Cabo San Pio. Uncharted shoals have been discovered between the islet and the cape.

Isla Nueva and Isla Lennox

9.23 Isla Nueva (55°14'S., 66°33'W.) lies 7 miles S of Cabo San Pio. It extends 7 miles S, and is 8 miles long from E to W. It is hilly and wooded; the summits are more apparent from the E than any other direction.

Cerro Orejas de Burro, 310m high, is situated in the NE extremity of the island. It is the only well-defined summit and resembles the ears of a burro.

Punta Waller (55°10'S., 66°34'W.) is the N extremity of the island. Caleta Carlos, Caleta Pescado, and Caleta Orejas de Burro are small inlets that lie 0.75, 1.25, and 4 miles, respectively, E of Punta Waller.

Caleta Orejas de Burro can be identified by two islets which lie 183m off the entrance points. There is a prominent waterfall in the center of the beach on the SE side of the cove.

The E coast of Isla Nueva between Caleta Orejas de Burro and Cabo Graham, 5.5 miles SSW and marked by a light, affords no shelter.

Foul ground extends E from Punta Oriental, the E point of the island. It should be given a wide berth.

Anchorage may be obtained in the middle of the cove, in 15m, sand, about 0.3 mile offshore.

Punta Fifty (Punta Cincuenta) (55°17'S., 66°38'W.), the SW extremity of the island, lies 4.5 miles W of Cabo Graham. A

reef, which seldom breaks, extends some distance W of the point.

Punta Chihuau is situated 1 mile NNW of Punta Fifty. Isla Augusto (Isla Augustus) lies about 0.9 mile W of Punta Chihuau.

Anchorage may be obtained outside the kelp, in a depth of 12m, with Punta Chihuau bearing 182°, distant 0.3 mile.

A shoal with 8.5m, marked by kelp, lies 2.25 miles NNW of Punta Fifty. A bank of kelp, 3 miles in extent, was reported to lie NW of Isla Augustus.

Punta Jorge (55°12'S., 66°39'W.), the NW extremity of Isla Nueva, lies 5 miles N of Punta Fifty. Kelp extends NW from this point to Cabo Maria, the SE extremity of Isla Picton, 7.5 miles distant. A 6.4m shoal lies 4.25 miles NW of Punta Jorge.

9.24 Isla Lennox (55°17'S., 66°57'W.), about 6 miles W of Isla Nueva, is almost round in shape, and 7.5 miles across. It is separated from Isla Nueva by Paso Richmond and from the SE end of Isla Navarino, 3.5 miles W, by Paso Goree. It is fronted on the N by Bahia Oglander (Paso Oglander). This island, and others in the vicinity, can be approached with safety by taking soundings and keeping a lookout for kelp. Kelp extends up to 1 mile off the S coast of Isla Lennox.

From **Punta Raquel** (55°13'S., 66°52'W.), the NE extremity of Isla Lennox, the coast trends S for about 8 miles to Cabo Carolina.

Isla Raquel lies 0.8 mile SE of Punta Raquel. Rocks marked by kelp exist in an area 0.5 mile E of the islet, which should be given a wide berth.

Isla Luff (Isla Gratil) lies 0.75 mile offshore, 5 miles SSE of Punta Raquel. The island is 123m high, and 1 mile long.

Punta Maria (Punta Mary), the SW extremity of Isla Lennox, lies 5 miles WNW of Cabo Carolina, and Punta Medio, the W extremity of the island, lies 3.75 miles N of Punta Maria.

Isla Medio lies about 1.7 miles WSW of Punta Medio.

Anchorage may be taken off Caleta Lennox, near the center of the E coast of Isla Lennox, in a depth of 15m, and off Caleta Cutter, 2 miles SW of Isla Gratil, in a depth of 18m, sand.

Caution.—A 9.6m patch lies about midway between Punta Medio and Isla Medio. A depth of 11.8m lies 1.5 miles S of Punta Maria.

9.25 Isla Terhalten (55°27'S., 67°03'W.) is a small, high island about 6 miles S of Isla Lennox; Isla Sesambre, also high, lies 1 mile farther SE.

A reef marked by kelp lies 0.5 mile SE of Isla Sesambre; there is another rock situated 0.5 mile farther S.

Islas Evout (55°34'S., 66°47'W.) lie from 10 to 11 miles SE of Isla Sesambre, in the middle of the E entrance to Bahia Nassau.

Islas Wollaston

9.26 The principal islands of this group are, from N to S, Isla Grevy, Isla Bayly, Isla Wollaston, and Isla Freycinet.

The group lies with **Cabo Ross** (55°34'S., 67°21'W.), the N extremity of Isla Wollaston, 17.5 miles SW of Isla Lennox.

The islands are all mountainous. Monte Hyde, 674m high, is situated in the SW part of Isla Wollaston.

The channels between these islands are narrow and mostly deep. All the known rocks in them are above-water, or thickly covered with kelp. There are deep passages N and W of this group.

Bahia Gretton is entered between **Punta Dillon** (55°30'S., 67°39'W.), the N extremity of Isla Grevy, and Cabo Ross, 11 miles ESE. It affords anchorage in convenient depths, but is exposed to N winds. A drying bank lies 1 mile WNW of Cabo de Ross.

Banco Banner, with a least depth of 3.3m, marked by kelp, lies 3.5 miles SE of Punta Dillon, 0.5 mile offshore.

Rocas Hazeltine, which have depths of 4.8 to 8m, lie 4 miles ENE of Punta Dillon.

9.27 Isla Daedalos (55°29'S., 67°37'W.) is the E islet of a group of islets extending 2 miles NE of Punta Dillon. Roca Daedalos, with a depth of 0.9m, steep-to, and marked by kelp, lies 0.4 mile NE of Isla Daedalos.

Rada Norte, off the NE side of Isla Grevy, close SE of Punta Dillon, is a temporary anchorage, easy of access, with depths of 14 to 18m. It is sheltered from NW, but care is required to avoid Rocas Hazeltine.

Anchorage.—There is an anchorage at the head of Bahia Gretton, close W of the Islas Otter, in a depth of 25m. A depth of 5m is charted 0.5 mile W of the anchorage.

Cabo Coquille is the SW extremity of Isla Grevy. Bahia Beaufort lies between Cabo Coquille and Isla Bayly. It has not been examined. A depth of 12.5m, the charted position being approximate, lies 5.25 miles S of Cabo Coquille.

Canal Washington separates the W extremity of Isla Wollaston from Isla Bayly, and connects Bahia Gretton with Canal Franklin. The canal is narrow and not very deep.

9.28 Caleta Alsina (Bahia Alsina) (55°38'S., 67°20'W.), situated on the NE coast of Isla Wollaston, 4 miles SSE of Cabo Ross, has general depths of 16 to 18m.

Anchorage may be obtained, in 20m, sand, where there are no known dangers; however, there is a line of kelp at the entrance to the bay.

Isla Freycinet, the SE island of the Islas Wollaston, attains an elevation of 335m and is separated from the SE extremity of Isla Wollaston by Canal Bravo.

Canal Bravo is narrow; near its center there is a rock awash. In its SW entrance is a small conical islet which can be passed to the W.

Cabo Scourfield (55°47'S., 67°10'W.) is the E extremity of Isla Freycinet. Puerto Colon lies in Bahia Arquistade, 1.5 miles WSW of Cabo Scourfield. The harbor is spacious and well-sheltered from the prevailing winds.

Anchorage.—There is good anchorage in the middle, in 30 to 45m, sand and shells.

Canal Franklin, which has only been cursorily surveyed, is the inner portion of the channel between Islas Wollaston and Islas Hermite to the S; its least width is 0.5 mile. It is entered from the E through Bahia Arquistade, which separates Isla Freycinet from Isla Deceit, 2.5 miles to the SE.

The W entrance to the canal is through Seno Franklin, which is entered between Cabo Coquille and Cabo West, the W extremity of Isla Hermite, 13 miles SSW.

Canal Franklin is apparently free of known dangers, but there is a small islet charted 1.75 miles WSW of the W extremity of Isla Freycinet, and a shoal with a depth of 10.7m is charted 1.5 miles farther WNW.

A rock, awash, is charted 0.5 mile offshore, off the SW extremity of Isla Wollaston.

Islas Hermite

9.29 Islas Hermite consist of four principal islands and several smaller ones. The principal islands are Isla Deceit, Isla Herschel, Isla Hermite, and Isla Hornos, which lies 2 miles S of Isla Herschel.

Courtesy of Liam Quinn

Cabo de Hornos (Cape Horn)

The shores of the islands are bold and steep-to; the mountains are pointed, with steep ascents, and are thickly overgrown with shrubs and evergreen trees to about 91m of their summits.

Isla Hermite, the largest and farthest W, is 516m high, and rugged in the E part, but slopes toward Cabo West, which is low.

Isla Deceit is 441m high. Cabo Austin is the N extremity of the island; Cabo Deceit, 6 miles S, is the S extremity of the island. Rocas Deceit, a group of islets and rocks, lies close off Cabo Deceit. A detached group of pinnacle rocks, 9 to 12m high, lies 2 miles further SE.

Caleta Wilfredo, on the E side of the island 2.5 miles NNW of Cabo Deceit, affords anchorage to small vessels, in 34m, sand and mud.

Larger vessels can anchor outside the cove taking care to avoid the numerous patches of kelp close offshore.

Paso Mar del Sur separates Isla Deceit from Isla Herschel, 1 mile W. It is encumbered by a group of barren islets marked with a lighted beacon.

Isla Barnevelt (55°50'S., 66°48'W.) lies 8.5 miles E of Isla Deceit. It is nearly 1 mile long and rises to a height of 57m.

Detached islets lie 0.5 mile N and 2.5 miles W of the main island. There are numerous rocks around the islet.

9.30 **Isla Hornos** (55°57'S., 67°17'W.), about 3.5 miles long N to S, lies 2 miles S of Isla Herschel.

Cabo de Hornos (Cape Horn) (55°59'S., 67°16'W.) is the S extremity of Isla Hornos. It is 425m high and presents a remarkable appearance when seen close-to, showing high black cliffs to the S, but is not so striking when seen from a distance. A light is shown from a tower, 4m high, situated on Cabo de Hornos.

Barranco Cloven is the SW extremity of the island, 2 miles NW of the cape; it ends in two summits resembling towers rather than horns.

There are two rocks, above-water, 0.2 mile off Barranco Cloven, and another rock about 0.8 mile SW of the same point. There are also small rocks, above-water, off the SE extremity of Isla Hornos.

Anchorage can be taken, in 20m, sand, 0.3 mile from the NE side of Isla Hornos, 1.5 miles NW of the E extremity of the island.

Boarding places for Chilean pilots are established about 1.5 miles NE and 1.5 miles S of Isla Hornos.

A Chilean naval observation station established on the E spur of Isla Hornos; passing vessels are requested to pass details of nationality, port of destination, speed, etc., on VHF channel 16. The station, comprising two aluminum-roofed huts and a radio mast, is conspicuous.

Roca Bascunan and Roca Robinson, marked by breakers, lie 1.5 miles W and 2 miles WNW of Cabo de Hornos respectively.

9.31 Isla Hermite (55°51'S., 67°40'W.), the largest island of the group, lies with Cabo Spencer, its S extremity, 12.5 miles NW of Cabo de Hornos. Isla Hermite is 12 miles long in an E-W direction.

Bahia San Francisco is entered between Cabo de Hornos and Cabo Spencer. Isla Hall lies nearly in its center. The bay should not be entered without local knowledge.

Caleta San Martin is entered between two points about 2.5 miles N of Cabo Seal, the SE extremity of Isla Hermite; Isla Chanticleer lies 1.5 miles E of the S entrance point.

In the direction of Isla Chanticleer there are no known submerged dangers except for some rocks, awash, which extend 0.2 mile SE from the islet; otherwise the cove is of easy access.

Vessels can anchor, in 29m, sand, in the middle of the cove, 0.3 mile from its head. This anchorage is safe with good holding ground, although the squalls during W winds blow from all directions and are severe. The shores are steep and fringed by kelp.

Isla Jerdan (55°50'S., 67°28'W.), close off the NE end of Isla Hermite, is separated from Isla Herschel, to the E, by a passage 1.75 miles wide.

A rock, awash and marked by breakers, lies in the middle of this passage. Rocks, marked by kelp, extend 0.4 mile W from the NW extremity of Isla Herschel.

Puerto Maxwell (55°49'S., 67°30'W.), a good harbor with a secure anchorage free from squalls, lies 12 miles E of Cabo West. It is formed by the NE end of Isla Hermite and Isla Jerdan, Isla Saddle, and Isla Maxwell.

Anchorage.—The best anchorage is in 29m, sand, in the middle of the harbor, with the E extremity of Isla Maxwell bearing 348°, distant about 0.3 mile.

The best entrance to the anchorage is through Paso Norte, between Islas Maxwell and Saddle. Local knowledge is advisable.

9.32 Isla Maxwell (55°49'S., 67°31'W.), on the W side of Paso Norte, is crowned by an isolated rock 160m high. Isla Saddle, 0.6 mile E of Isla Maxwell, is 59m high.

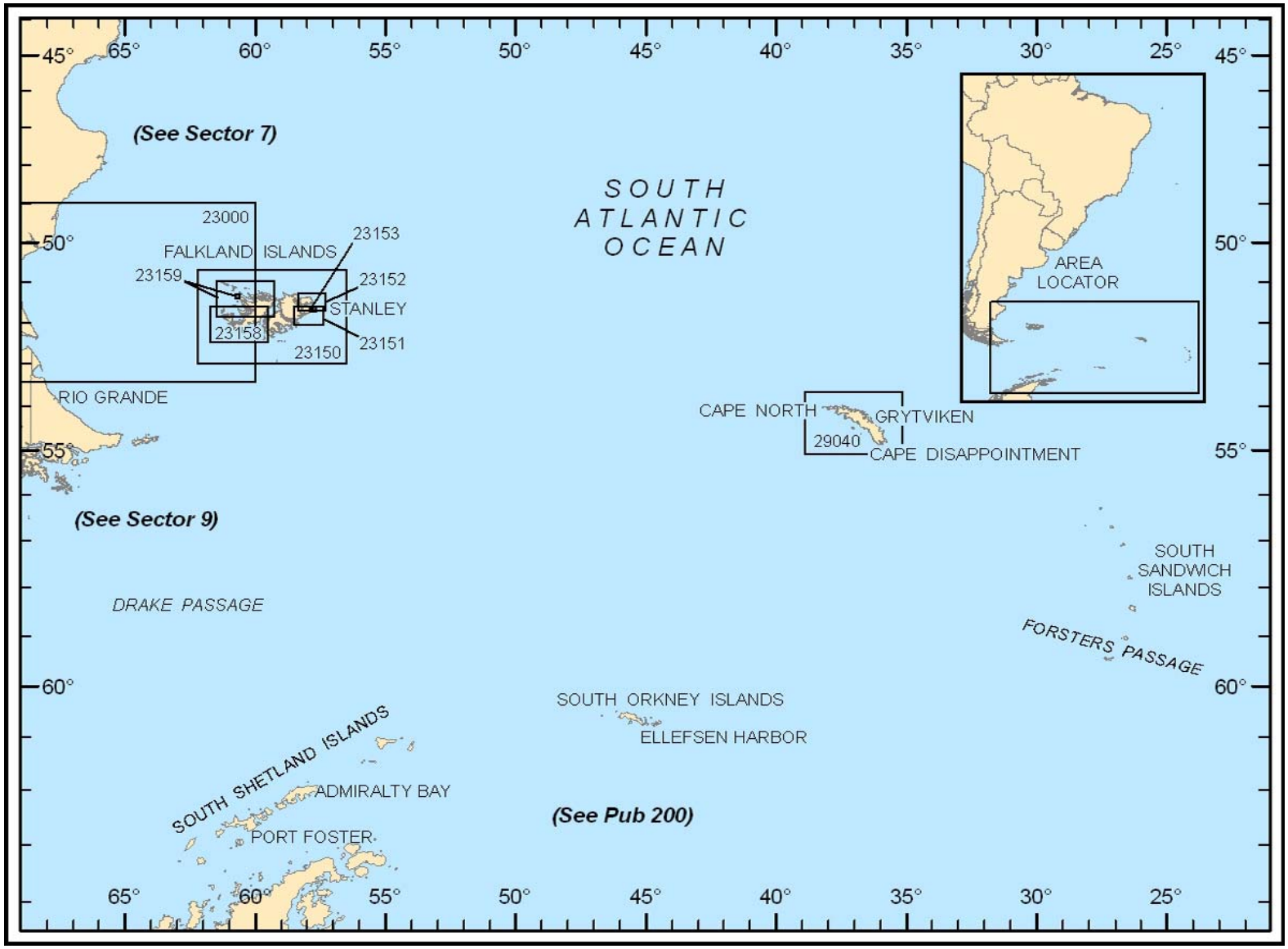
A rock with a depth of 0.9m lies 0.35 mile E of the NE extremity of Isla Maxwell. A rock, awash, lies 0.6 mile ENE of this rock, with another rock, with a depth of 0.9m, lying about 0.3 mile further NE.

Another rock, with a depth of 5.8m, lies near the middle of Paso Norte, 0.3 mile E of the E extremity of Isla Maxwell. Other dangers are noted in the pass.

Caleta Martial (55°50'S., 67°17'W.) is situated on the NE side of Isla Herschel, 6.75 miles W of Cabo Austin, the N extremity of Isla Deceit.

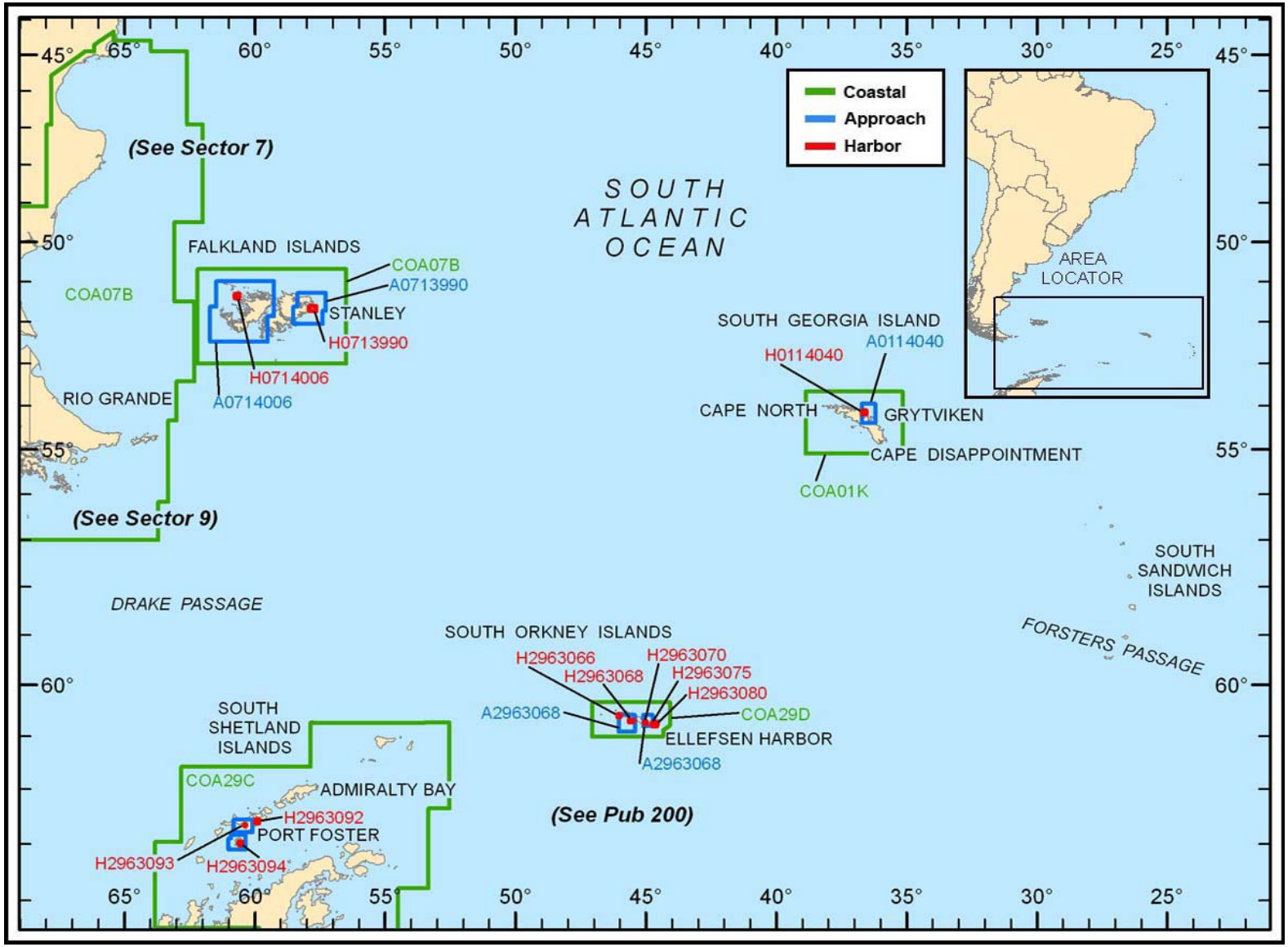
Anchorage.—There is good anchorage in the middle of the cove, in 11m, sand and mud, with good holding ground, sheltered from all directions except from E. The N and S shores are fringed with masses of kelp.

For islands and passages W, see Pub. 125, Sailing Directions (Enroute) West Coast of South America.



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

SECTOR **10** — CHART INFORMATION



Additional DNC library coverage may be found in NGA DNC 01, 07, 29 (Limited Distribution) disc within the README\GRAPHICS folder.

SECTOR 10 — DNC LIBRARY INFORMATION

SECTOR 10

THE FALKLAND ISLANDS, SOUTH GEORGIA, AND THE SOUTH SANDWICH ISLANDS

Plan.—This sector describes the Falkland Islands, as well as South Georgia and the South Sandwich Islands. The narrative begins with East Falkland Island, followed by descriptions of the Falkland Sound and the West Falkland Island, and finally South Georgia and the South Sandwich Islands.

General Remarks

10.1 Winds—Weather.—In the vicinity of the Falkland Islands, strong winds between NW and SW predominate and gales are reported to be less frequent than on the Pacific Coast of South America. Squalls are common and occasionally violent.

In the vicinity of South Georgia, any anchorage close to high ground is subject to very violent katabatic winds or williwaws when a strong wind is blowing from shore. Small vessels can often find areas of comparative calm close under the steep coast. Main valleys frequently accelerate winds blowing along them into fierce squalls.

Vessels visiting South Georgia should be prepared for strong winds from any direction at the various harbors, as these winds may be purely local and depend entirely on the land formations.

Vessels S of 40°S should keep a good lookout for icebergs and loose ice.

Most of the ice encountered on the open sea comes from the ice shelves surrounding the Antarctic continent and, after initially drifting N and W, later become involved in the S Ocean Current. On the Atlantic Ocean side of the continent, the general NE drift through Drake Passage becomes N towards the Falkland Islands and the Rio de la Plata, and takes with it occasional icebergs.

Wherever there is a risk of icebergs, vessels should proceed with caution, keeping a good lookout both for bergs and for the smaller pieces of ice which may sometimes serve as a warning of the proximity of larger icebergs. The number and size of icebergs varies greatly from year to year so that the experience of one or two voyages should not be relied on for future occasions.

There is little evidence of icebergs of Antarctic origin being encountered in the channel and inlets of Patagonia; most of them are free of ice throughout the year.

There are, however, a number of glaciers which occupy the valleys at the heads of some of the more landlocked inlets. Most of these do not reach the sea, but some provide a local source of icebergs which, from time to time affect certain channels.

South Georgia lies between the mean and extreme limits of the packs of ice throughout the year.

Off the N coast, watch should be kept for growlers which are continually breaking off from the numerous glaciers during the summer and drifting out to sea. They are frequently of a dark green color, and difficult to distinguish.

Tides—Currents.—The Falklands Current flows NE on the W side of the Falkland Islands and continues toward the Rio de la Plata. This current may be regarded as occupying the E half of the passage between the Falkland Islands and the coast of Argentina. Farther W, it weakens and becomes more variable; between 20 and 50 miles from the coast, where the movements are in part tidal. It has been reported that S sets are stronger and run longer than those setting to N.

Strong winds may cause appreciable currents in this area. A strong NW set in January has been reported between Estrecho de le Maire and the Falkland Islands.

The average strengths of the currents in this whole area are moderate rather than strong, but due to the unsettled and stormy character of the region, strong currents may be expected well in excess of the average values quoted.

The average rate of the current over most of the area is less than 0.5 knots; it is highest in the Cape Horn Current and in the S to SE current within 60 miles of the W and S coast of Chile, S of 51°S.

The tidal currents, in different parts of the Falkland Islands, differ much with regard to strength and direction. The flood comes from SE and splits off Lively Island; one part runs N, with the other part running SW past the Sea Islands, at a rate of 1 to 2 knots near the coast.

Along the S, W, and N coast, it increases in strength towards the Jason Islands, off the NW coast, where it runs at a rate of 6 knots and causes heavy and dangerous races.

The flood enters Falkland Sound at both ends, meeting near Swan Island, and causing a double HW.

During and after lengthy SE gales, with a heavy sea which rolls in on the S and SE coasts of the Falkland Islands, a strong NW set has been experienced. This set has been attributed to the loss of several vessels in the vicinity of Bull Point.

Aspect.—The Falkland Islands, which are a Crown Colony of Great Britain, comprise the only notable group in the South Atlantic. The Falkland Islands form a group of over 100 islands that lie nearly 300 miles E of the entrance to Estrecho de Magallanes.

South Georgia and the South Sandwich Islands were considered to be Falkland Island dependencies and, as such, were subject to the authority thereof. Now known as the South Georgia and South Sandwich Islands, they are a United Kingdom Overseas Territory. The Governor of the Falkland Islands acts as the Commissioner of the Territory. Many years ago, South Georgia and Southern Thule were the only islands of South Georgia and the South Sandwich Islands permanently inhabited by small scientific staffs at King Edward Point and Ferguson Bay.

East Falkland Island and West Falkland Island are separated by Falkland Sound, the width of which varies from about 2 to 12 miles. The entire group takes up an area of about 4,700 square miles and is indented by sounds and bays which form excellent harbors. Stanley is the principal port.

South Georgia, barren and mountainous, lies about 700 miles ESE of the Falkland Islands and has an area of 1,450 square miles. The South Sandwich Islands are comprised of an archipelago of islands connected by a low submarine ledge. Zavodovski, the northernmost island of these, lies about 297 miles ESE of South Georgia.

For the most part, the appearance of the Falkland Islands is not striking. There are ridges of rocky hills, more than 300m high, which traverse extensive tracts of moor land. These treeless areas are bound by a low, rocky coast.

The hills on the N part of East Falkland Island rise to a considerable height while the S part is low and can barely be seen at a distance of 5 miles. Wickham Heights, the main range of hills, stretch E and W, and end in Mount Usborne, 684m high.

West Falkland Island is slightly greater in elevation than East Falkland Island. The highest peak, Mount Adam, rises to a height of 698m in the N part of the island. On the W face, and on some of the adjoining islets, are some steep cliffs exposed to the fury of the W seas. The rugged summits of the hills and mountains end in points and ridges.

South Georgia is high and consists of very steep glacier-covered mountains; it presents the features of a deeply dissected upland. Mount Paget, the summit of the Allardyce Range, rises to 2,934m near the center of the island.

In summer, the lower hills near the coast appear to be a light brown color, being free from snow and in most cases covered with tussock and moss. There is but little flat land and the island, except for the tussock, is almost entirely barren, the SW side, except for Fanning Ridge (paragraph 10.87) and the Nunez Peninsula (paragraph 10.88), being permanently ice-covered.

The coasts, especially the N, are deeply indented, reducing the island in places at the W end to a few hundred meters in width. Large quantity of loose ice in the bay renders them inconvenient during a great part of the year for a vessel to lie in on account of the calving of large parts of the ice cliffs, which break off and float to sea.

The second largest glacier in the island is the Nordenskjold Glacier, in Cumberland East Bay; the largest is the Esmark Glacier, in Holmestrand. The summer is the worst time as the heat of the sun causes large pieces to break off the glaciers. The larger icebergs, however, originate from the Antarctic mainland, but they are of too great a draft to penetrate far into the bays.

Most of the South Sandwich Islands are of a volcanic nature, with some being active. Snow and poor visibility are frequent, making the islands difficult to approach. All of these islands are uninhabited.

Kelp grows on just about every danger with a rocky bottom; no vessel should pass through it unless the spot has been carefully examined and sounded. Many dangers, however, are not marked by kelp. A heavy sea sometimes tears the weed from the rock or a moderate tidal stream or current draws it underwater and out of sight.

Kelp can grow, in some places, from depth of 55m; in many parts of the coast thick beds of weed exist without having a depth of less than 10m near it. Growing kelp should invariably be considered as a sign of danger. It forms long streamers, level or just beneath the surface of the sea, and shows an occasional leaf.

Never pass through growing kelp if it can be avoided and give it a wide berth if passing on the upstream side. A clear patch of water in the middle of a thick growth of kelp often indicates the position of least depths over the danger.

Dead kelp, which has broken away from the bottom, floats in curled masses, with leaves showing above the surface. It sometimes drifts in long lines. It is reported that kelp often gives a strong radar echo, particularly at LW.

Steam vessels are warned that condensers will foul with small marine life in the vicinity of the Falkland Islands. The fouling can be reduced by limiting the use of deck lights at night.

Regulations.—A Marine Protected Area has been established within a radius of 200 miles around South Georgia and the South Sandwich Islands. This area has been created in order to protect and manage the flora and fauna native to the region.

The following restrictions are in effect within the Protected Area:

1. Commercial bottom trawling is prohibited.
2. Other fishing activity is closely regulated and only permitted subject to licenses issued by the Government of South Georgia and South Sandwich Islands.
3. Disposal of plastic, fishing material and inorganic waste is prohibited.
4. Fishing is prohibited S of 60°S latitude.

The following fishing activities are permitted within the Protected Area, subject to licensing:

1. Bottom fishing with longlines in depths in excess of 700m.
2. Pelagic trawling for certain species of fish and krill.
3. Research bottom trawling in certain areas.

Additional information and regulations on the Marine Protected Area including no-take zones and licensing procedures can be obtained from the Government of South Georgia and South Sandwich Islands at the following location:

Government of South Georgia Home Page

http://www.sgisland.gs

In addition to the above regulations, all vessels entering the Maritime Zone around South Georgia Island are directed to contact the Government Officer, based at King Edward Point in Cumberland East Bay. The vessel's name, call sign, vessel type, ETA at King Edward Point, and purpose of visit are all included in this message. The King Edward Point Government Officer can be contacted, as follows:

1. Telephone: 00870-382-359-033
   0044-1223-221781
2. Facsimile: 00870-382-359-034
3. E-mail: go@gov.gs

Unless previously granted permission in writing, vessels must make their first port call in South Georgia at King Edward Point.

Directions.—Vessels approaching from N at about 60°W longitude can, in thick weather, get a good check on their longitude utilizing the edge of a bank lying off the E coast of

Argentina. On this bank, the depths decrease from more than 183 to 110m, with a sandy bottom, over a distance of 10 miles. When at latitude 49°30'S, the vessel will have reached the edge of the bank N of the islands.

On the outer part of this bank there are depths of 145 to 155m, over fine dark sand. The edge of the bank, about 50 miles NE of **Cape Carysfort** (51°25'S., 57°50'W.), shows up rather distinctly on a fathometer trace.

10.2 Burdwood Bank (55°00'S., 60°00'W.), which lies about 90 miles S of the Falkland Islands, has a bottom which is mostly coral and is steep-to on its N and S sides. This bank, which is best seen on the chart, has depths from about 43 to 144m and is 200 miles long.

Off the Falkland Islands, penguins may be encountered 300 miles from land; therefore, they need not cause alarm. One sign well worth noting is the presence of the cormorant, which is rarely seen more than 10 miles off the land.

Eddystone Rock, situated in the N entrance to the North Falkland Sound, should be seen from N, with a clear horizon on a dark night before a vessel would run into danger, as it is steep-to. However, if not sure of the longitude, vessels should not, at night, proceed within depths than 100m.

The first appearance of the land is very unfavorable. This aspect is due to the rugged hills, whose summits are stony and very light colored, which gives the notion that the highland is always covered with snow. However, snow is rarely present from October to May, though patches sometimes remain in the hollows until November.

Vessels approaching from S at night or thick weather will find soundings to be of little help.

Beauchene Island (52°55'S., 59°12'W.) should be passed to the E, then a course of 038° should be steered for about 60 miles, having due regard for currents. See paragraph 10.28 for more details about Beauchene Island.

Vessels approaching South Georgia should keep in mind that most of the approaches and offshore areas, particularly on the SW side, are inadequately surveyed, and caution should be exercised.

Caution.—Mine clearance work within the Falkland Islands coastal waters has been completed and hazards to shipping have been marked; restrictions on vessels entering these waters imposed during the past hostilities have, therefore, been lifted, with the exception of special arrangements for Argentine registered vessels wishing to enter a zone 150 nautical miles around the islands. However, the possibility remains of discovering hazards to navigation in the future.

Mariners wishing to transit these waters or to enter Falkland Island harbors are advised to contact the Queen's Harbormaster, Stanley, on VHF channel 16.

East Falkland Island

10.3 Cape Dolphin (51°14'S., 58°58'W.) is the NW tip of the island and is shaped like a rounded finger pointing to Eddystone Rock. Cape Dolphin is the tip of a peninsula that rises to a height of 55m. The peninsula ends at the cape in cliffs about 21.3m high. Cerro Montevideo, which has a rounded summit that rises to a height of 291m, is located about 17 miles S by E of Cape Dolphin. This peak is visible over the promontory and provides a good landmark for vessels approaching Falkland Sound from E or NE.

Eddystone Rock (51°12'S., 59°02'W.) is conspicuous and rises to a height of 44m. At a distance of about 8 miles this rock looks like a vessel under sail and appears to have a small stone cairn on its peak. This islet is radar conspicuous and is apparently steep-to.

Caution.—Vessels should give Eddystone Rock a berth of at least 0.5 miles as it has not been closely examined.

A shoal with a depth of 13.6m lies about 2 miles SE of Eddystone Rock. Shallower depths may exist nearby.

A turbulent race, that lies between Cape Dolphin and Eddystone Rock, is dangerous to small vessels. With N winds, a heavy sea prevails along the coast from Cape Carysfort to Cape Dolphin.

A shoal area marked by kelp lies about 0.7 mile WSW of Cape Dolphin. A rocky ledge, marked by kelp, projects about 0.2 mile NW of the above cape. The channel between the kelp marking the shoal and the kelp marking the ledge has a least depth of 17.1m, and provides safe passage for small vessels with local knowledge.

10.4 Cape Bougainville (51°18'S., 58°28'W.) lies 19 miles ESE of Cape Dolphin, and between these capes the coast recedes, into which a indraft has been observed.

Lion Point lies about 4 miles W of Cape Bougainville. About 4 miles off Lion Point there are depths of 73.2 to 82.3m, over fine greenish sand with small black specks, decreasing gradually to 21.9m close inshore. Concordia Rock, 15m high, lies about 1 mile WNW of Lion Point.

Sea Lion Point (51°21'S., 58°19'W.) lies 5.75 miles SE of Cape Bougainville; kelp extends up to 0.7 mile NE from the point. An islet lies 0.2 mile E of Sea Lion Point.

Port Salvador Passage is entered about 9 miles E of Cape Bougainville between Shag Island and **Hut Point** (51°24'S., 58°17'W.). The depths in this channel range from 24.7 and 34.7m. The bottom here is sand and shell with bare patches or rock, providing poor holding ground.

This inlet is difficult to enter due to the narrow entrance and to the strong tidal currents which sweep the kelp underwater and cause races in many sections.

There is a rocky shelf, with a depth of 14.9m, that projects about 1.1 miles NNW of Hut Point. A depth of 11.8m lies 0.7 mile NNW of Hut Point. Mid Rock, which dries 0.6m, lies in the center of the entrance channel 1.5 miles SW of Hut Point.

Center Islet and Rat Islet lie, respectively, 2.25 and 3.75 miles SSW of Hut Point. Both above islets are tussock-covered and steep-sided above the HW mark. The surrounding land of the inlet is, for the most part, rough and grass-covered, with some sandy beaches. Mostly all the coastline and reefs in this vicinity are kelp-fringed.

Within the inlet are four primary settlements. A wool shed, with a jetty with 3.7m alongside, lies on the N side of the entrance of Rincon del Moro Creek at Douglas Station, about 5 miles NW of **Big Point** (51°28'S., 58°25'W.).

A settlement with a boat jetty lies on the S side of Teal Inlet, about 5 miles S of Big Point. A wool shed with a jetty is located on the E side of Foam Creek about 6 miles SSW of Hut Point. Salvador Settlement, with a jetty that dries, lies in a small creek about 4 miles SW of Hut Point.

A radio mast is reported to stand in the settlement of Salvadore, about 4.5 miles SW of Huty Point.

Tides—Currents.—Currents off the entrance to Port Salvador run at a rate of about 2 knots, with the ebb current being slightly stronger than the flood. There is a race which runs N on the ebb, 0.3 mile E of Big Shag Island.

In the channel W of Centre Island, the ebb attains a rate of 5.5 knots at springs; the flood attains a rate of 4.5 knots. In the channel E of the above island, the currents are somewhat less. The ebb current causes a violent race N of the island.

For the most part, the tidal current changes approximately 1 hour after HW and LW, but this may be altered considerably by weather conditions. There is relatively little slack water. Strong eddies may be met along the edges of the channel.

Inside the inlet, the tidal currents are weak, except between some of the islands, where they seldom exceed 1.5 to 2 knots.

Anchorage.—Having cleared the entrance channel, good and secure anchorage is found all over the harbor outside the limits of the kelp. Nearly all the dangers are visible.

A secure anchorage is situated about 0.6 mile SW of the jetty at Salvador Settlement, in about 7m, mud.

Directions.—The best time to enter Port Salvador is 0.5 hour after LW, with the last of the ebb current still running.

The best time for departure is about 1 hour after LW, when the flood is just commencing. At these times the kelp on the dangers will be visible.

Vessels from N should pass about 0.4 mile E of **Big Shag Island** (51°24'S., 58°19'W.). A course should then be shaped to pass W of both Mid Rock and Centre Island and then E of Rat Island.

The channel E of Centre Island is not recommended because of shallower depths; the dangers are not all marked by kelp.

10.5 Cape Frehel (51°23'S., 58°12'W.) lies about 3 miles ENE of Hut Point. Armantine Rocks, comprised of two areas which dry, lie about 1 mile N of Cape Frehel.

Due to the foul ground which projects SE from these rocks, vessels should remain at least 1.5 miles offshore to clear these dangers.

Macbride Head (51°22'S., 57°59'W.) is a cliffy point. Cape Carysfort, also cliffy, lies about 6 miles SE of Macbride Head, and can be passed safely at a distance of 1 mile. Cow Bay lies close S of Cape Carysfort and may be recognized by its white sandy beach and bluff land around the cape.

Foul ground projects 0.7 mile offshore from Cape Carysfort almost to the head of the bay, and also 0.6 mile off the S entrance point of the bay.

Vessels may find anchorage, open to the E, in Cow Bay, in depths of 12.8 to 14.6m, sand.

Volunteer Point (51°31'S., 57°44'W.) has an archipelago of rocky islets extending 1 mile ESE.

Uranie Rock, awash, lies 1.5 miles E of the point. It is not marked by kelp; the sea seldom breaks on the rock during W winds. The point is marked by a light.

Directions.—To pass about 2 miles to seaward of Uranie Rock, vessels should keep Cape Carysfort bearing less than 305° until **Mount Low** (51°38'S., 57°50'W.) bears 228°, or at night, with Cape Pembroke Light bearing more than 198°.

Vessels can then begin to change course to bring Mount Low ahead.

Mount Low is the easternmost hill on East Falkland Island; on a clear night the hill may be easily seen from N of Volunteer Point. This hill's summit rises to a height of 265m, and forms two peaks.

10.6 Berkeley Sound (51°35'S., 57°45'W.) is entered between Eagle Point on the N and Kidney Island on the S. This sound has four excellent anchorages in its W part, namely, Uranie Bay, Johnson Harbor, Stag Road, and Port Louis Harbor.

Johnson Harbor is situated in the NW part of Berkeley Sound and is entered E of **Duclos Point** (51°32'S., 58°01'W.).

Sea Lion Rocks, and a rock marked by kelp, with a depth of 4.6m, lie respectively, about 1 mile ESE and 1 mile SSW of Duclos Point. The shores of Johnson Harbor are bordered by a rocky bank.

Banks of kelp project out to depths of 11m and reduce the navigable width of the entrance channel to Johnson Harbor to about 0.65 mile. The passage between Duclos Point and Sea Lion Rocks, is shallow.

A patch of foul ground, marked by kelp, lies near the center of the harbor. The kelp, which projects from the above foul ground, and that from Lamarche Point, narrows the passage between to about 0.3 mile.

Chabot Creek is situated in the NW corner of Johnson Harbor and is shallow. Johnson Harbor settlement, with a jetty, stands on the NE shore of the creek. A 2.1m patch lies 0.8 mile SE of Chabot Point, the SW entrance point to the creek.

Magellan Cove forms the NE corner of the harbor. An uncharted patch, marked by kelp, was reported to lie in Magellan Cove.

There is an anchorage, as charted, about 0.9 mile NW of Lamarche Point, in a depth of 11m, mud.

Directions.—Vessels heading for Johnson Harbor or Chabot Creek should steer for a position 0.5 mile S of Monkey Point. Vessels then head NW, keeping 0.5 mile offshore until Lamarche Point is abeam. Course may then be changed for Magellan Point.

When clear of the foul ground in the center of Johnson Harbor, vessels may anchor as above.

Reporting requirements are reported to be in effect for Berkeley Sound. See paragraph 10.11 "Stanley Harbor—Regulations" for details.

10.7 Stag Road (51°32'S., 58°05'W.) is entered between Duclos Point and Peat Islet, 1.75 miles WSW. Shoals project up to 0.4 mile offshore between Duclos Point and Grave Point, about 0.6 mile W.

A dangerous rock lies about 0.5 mile W of Grave Point; another dangerous rock lies about 0.3 mile NNW of Peat Islet.

Numerous dangers marked by kelp, and best seen on the chart, lie in close proximity to Peat Islet.

Stag Road provides a better anchorage for large vessels than Johnson Harbor. For the most part, vessels can anchor, as charted, in depths of 8 to 11m. The best berth is between Hog Island and the N shore.

During daylight the approach to Stag Road may be made without difficulty. Vessels should steer to pass 0.6 mile S of Duclos Point and then to the anchorage. Dangers on both sides are marked by kelp.

Port Louis Harbor (51°33'S., 58°08'W.), situated at the W end of Berkeley Sound, is entered S of Peat Island and Hog Island, and N of Long Island.

A rocky patch, nearly in mid-channel, and a rocky islet 0.4 mile NNE of the W end of Long Island, narrow the main passage to a width of about 183m.

Celery Island (Round Island) lies about 0.75 mile NNE of the W tip of Long Island. A rocky shoal, parts of which are above-water, lies 1.5 miles W of Celery Island.

Green Patch Settlement, where there is a jetty, is located about 2 miles WSW of Round Island. There is a derelict jetty 0.75 mile W of the settlement.

The Careenage is a round lagoon located on the N side of Port Louis. It has depths of 0.9m and is entered by a channel 91m wide.

Deputy Harbor is located on the S side of Port Louis. This narrow inlet is entered about 1.25 miles SSW of Round Island via a channel 91m wide and has depths from 1 to 5m.

Small vessels can anchor, as charted, about 0.2 miles S of The Careenage, in a depth of 5m.

Directions.—Vessels heading for Port Louis steer to pass midway between the 4.6m rock, situated 0.9 mile SSW of Duclos Point, and a 7.3m rocky shoal, 0.4 mile further SSW. Both of these dangers are marked by kelp and are often radar conspicuous.

Vessels should then head to pass midway between the N tip of Long Island and the rocky islets S of Hog Island. Then pass about 0.1 mile N of Round Island, anchoring as directed above.

10.8 Long Island (51°33'S., 58°05'W.) is situated about 1.5 miles SSW of Duclos Point. Between its E tip and the above 4.6m rock is a rocky shoal, marked by kelp, with depths of 7.3 to 11m. The W end of the island is joined to the S shore by a narrow sandy ridge 0.5 mile long.

Uranie Bay is situated at the W end of Berkeley Sound, S of Long Island.

Although this bay is open E, it is sheltered from S and W by rugged coastline and thin hills. It is encumbered by kelp to the S and E, but the bay is clear in the center. There is good holding ground and shelter in the center of Uranie Bay. Margaret Hill is a conspicuous peak situated about 2.6 miles SSE of the E tip of Long Island.

Mount Round, 157m high, with a cairn on its summit, lies 1 mile E of Margaret Hill. Long Island House, also conspicuous, lies about 2 miles SW of the E tip of Long Island.

10.9 Port William (51°40'S., 57°42'W.), which also provides access to Stanley Harbor, is entered between Mengeary Point and Cape Pembroke, 2.25 miles S.

Port William affords good anchorage with shelter from the prevailing W wind, but NE gales send in a heavy sea.

Mengeary Point (51°39'S., 57°43'W.) is the low rocky tip of the long narrow tongue of land which separates Berkeley Sound from Port William. A light tower marks the point.

Kidney Cove, 1.25 miles NW of Mengeary Point, offers good sheltered anchorage for small vessels with local knowledge off the sandy beach on the SW side of Kidney Island, which is 32m high and lies 0.2 mile offshore. Cochon Island, 31m high, lies 0.25 miles NW of Kidney Island.

Hutchison Shoal, with 10.9m, lies 1 mile ENE of Mengeary Point. Except at slack water, this rocky shoal is clearly marked by tide rips. A rocky shoal, with a depth of 9.4m, lies almost 3 miles ESE of Mengeary Point.

Charles Point lies on the N shore of Port William, about 1.8 miles WSW of Mengeary Point. High Rock, 10m high and prominent from SW, lies close off the E side of Charles Point.

Sparrow Cove, on the N side of the inlet, is entered between Arrow Point, about 0.5 mile W of Charles Point, and Sparrow Point, about, 0.3 mile further W. Sparrow Cove affords good anchorage to vessels in all weathers.

Caution.—There is danger from semi-buoyant plastic land mines on the beaches of Port William. Tidal actions may transport the mines as far Port Harriet (paragraph 10.12).

Mariners considering beach landings should first contact the shore authorities or up to date information on mine clearance (see the "Caution" section of paragraph 10.1).

Reporting requirements are in effect for Port William. See paragraph 10.11 "Stanley Harbor—Regulations" for details.

Cape Pembroke Light

10.10 Cape Pembroke (51°41'S., 57°43'W.), the S entrance point to Port William, is the tip of a lengthy white isthmus which makes up the S side of the inlet.

Due to a rocky ledge extending from the cape, it should be given a berth of at least 1 mile. Seal Rocks lie about 1 mile ENE of Cape Pembroke, and are steep-to on all sides. A shoal, with a depth of 9m, lies 0.25 mile E of Seal Rocks.

Billy Rock, which dries 1.6m, lies 0.4 mile NE of Cape Pembroke. There is a little kelp close around and deep water is close to its E side.

The Tussac Islands, which lie about 0.5 mile off the S shore of Port William, are comprised of islets that are steep-to beyond the kelp. The Viper, a rock which dries 1.6m, lies close E and a rock, awash, close W of the E islet.

Fripp Rock, with a depth of 13.8m lies 1.25 miles NW of Cape Pembroke. Kelly Rocks, which are above-water, lie W of the Tussac Islands.

A conspicuous radar scanner stands near Stanley Airport. A buoy moored about 0.4 mile NW of Yorke Point marks the seaward end of a submarine pipeline. All vessels should pass N of this buoy.

Tides—Currents.—Off the SE side of Falkland Islands, the tidal currents are weak. A current, with rates of 0.5 to 1 knot, will generally be found setting with the wind. After passing NE of the entrance to Port Harriet, a strong tidal current begins to be felt. Having passed Wolf Rock, the current setting NE becomes stronger as it approaches Cape Pembroke, round which it runs at a rate of 2 to 3 knots. Then it runs directly N past Seal Rocks to Volunteer Point, very little current being felt in either Port William or Berkeley Sound. The S current is equally strong and, during strong winds, a heavy tide rip extends 2 miles off Cape Pembroke.

Anchorage.—Shelter from NW or NE gales can be found off the N shore of Port William, good holding ground. The bottom consists of soft sand E of **Doctor Point** (51°39'S., 57°49'W.) and of soft mud W of Doctor Point. Vessels should avoid anchoring S of Sparrow Cove, as the depths drop quickly to 12.2m forming a bar, and in NE gales the sea becomes a continuous roller. The best berth for a vessel of deep draft can be found SW of Doctor Point.

Directions.—For the most part, entry into Port William should present no problem; however, vessels should avoid kelp. Between **Yorke Point** (51°41'S., 57°47'W.) and Arrow Point, 0.7 mile N, the edges of the kelp banks are a sure guide.

The only dangers not marked by kelp are the 9.4m shoal, 3 miles ESE of Mengeary Point, and Fripp Rock.

Vessels approaching from N should, after rounding Uranie Rock, steer for the lighthouse on Cape Pembroke until Port William opens up. Some white sand hills will then be seen ahead, close to Kidney Island; at the same time Seal Rocks will be on the horizon clear of Cape Pembroke.

From S, vessels should keep **Mount Low** (51°38'S., 57°50'W.) bearing 010°, which leads towards the coast S of the entrance to Port Harriet. Wolf Rock and Cape Pembroke will then be seen and course can be made for Port William.

With a flood current vessels should guard against being set towards Cape Pembroke or Seal Rocks.

A vessel leaving Port William with the outgoing tidal current and intending to pass between Billy Rock and Seal Rocks should guard against being set onto the former.

No tidal current will be felt until the vicinity of Billy Rock is reached, when a strong S current outside the inlet will be met, which has the effect of setting the vessel on to it

10.11 Stanley Harbor (51°42'S., 57°50'W.) (World Port Index No. 14000), a landlocked basin, is entered between Engineer Point, on the E, and Navy Point, on the W. A submarine cable lies between these two points. The town of Stanley stands on the slopes of Murray Heights on the S shore.

Tides—Currents.—Under normal conditions, the tidal currents in the entrance to Stanley Harbor attain rates of 0.5 knot at springs, but may be increased up to 3 knots.

Depths—Limitations.—This excellent harbor has general depths from 6 to 10m, gray mud, with shoal depths, marked by kelp, bordering its shores. A rock, with a depth of 6m, was reported to lie about 0.5 mile NW of Navy Point.

Stanley Harbor

Stanley Harbor Wreck

Vessels with a draft up to 8.2m can enter the inner harbor between Navy Point and Engineer Point.

A number of partially-ruined jetties exist on the S side of the harbor. The only usable ones are the Falkland Island Company's East Jetty, with a depth of 3.7m alongside its head; the Public Jetty, with a depth of 3.6m alongside its head; and the Government Jetty, with a depth of 3.1m alongside its head.

The oil jetty, situated on the N side of the harbor 0.5 mile W of Navy Point, has a depth of 3.3m alongside. An immobile vessel was berthed there, enabling others to lie outboard of it, in depths of at least 4.3m.

The Falkland Interim Port and Storage System (FIPASS), a 305m long floating quay, is located at the SE end of Stanley Harbor, 0.5 mile SSE of Engineer Point. It comprises six pontoon barges secured by mooring dolphins and linked

together to provide quay and storage facilities. It is connected to the shore via a seventh barge and a 235m long causeway. There are charted depths of 5.7 to 7m alongside.

Aspect.—There is a conspicuous spire of a cathedral situated about 1.2 miles WSW of Navy Point. Government House, situated 0.5 mile W of the cathedral is prominent.

A rotating radar scanner is at the airport, about 2 miles E of Navy Point. The wreck of the Lady Elizabeth, a three-masted sailing vessel, lies in Whalebone Cove, about 0.5 mile ENE of the FIPASS facility.

Four prominent tanks stand 0.2 mile SSE of the Government House.

A prominent pavilion stands 0.5 mile SW of the Government House. also, there are a number of conspicuous radio masts painted red and white, 0.75 mile ESE of the cathedral. The hospital, a gray building with a green roof, stands about 0.1 mile SW of the Government Jetty.

A conspicuous white satellite dish aerial stands close to the NW corner of Government House.

Lights are shown from Navy Point and Engineer Point. Range lights, in line bearing 185.75°, stand on the S side of the harbor and lead between Navy Point and Engineer Point.

Pilotage.—Pilotage is not compulsory, but can be arranged through the agent.

Regulations.—Vessels carrying more than 50 tons of explosives, or more than 1 ton of explosives if laden with coal, petroleum, or other inflammable cargo, may not enter Stanley Harbor until such explosives have been discharged.

Vessels are advised to send in their ETA 24 hours in advance.

Vessel Traffic Service.—All vessels entering or leaving Berkeley Sound, Port William, or Stanley Harbor are required to report to Stanley Port Control on VHF channel 10 or 16 when passing the Reporting Line.

The Reporting Line joins **Volunteer Point** (51°31'S., 57°44'W.) and **Cape Pembroke** (51°41'S., 57°43'W.). This line forms the outer limit of Berkeley Sound and Port William.

The inbound Entry Report should state the vessel's name, call sign, type of vessel, number of persons on board, name of local agent, date of entry, local time of entry, intentions, location of intentions, and type and amount of fuel aboard.

The outbound Exit Report should state the vessel's name, call sign, type of vessel, number of persons on board, date of exit, local time of exit, intentions, and place of departure.

Vessels entering Stanley Harbor should also report their estimated time at the Narrows.

All vessels at anchor within Falkland waters should maintain a continuous listening watch on VHF channel 16.

All vessels within Stanley Harbor intending to get underway should first request permission via VHF from the harbor.

A tug will stand by all vessels entering the harbor. Speed is limited to 10 knots within the harbor.

Contact Information.—Stanley Harbor Port Authority can be contacted, as follows:

1. VHF: VHF channels 10 and 16
2. Telephone: 500-27260
3. Facsimile: 500-27265

The FIPASS Manager can be contacted, as follows:

1. VHF: VHF channel 9
2. Telephone: 500-22671
3. Facsimile: 500-22673

Anchorage.—The harbor, though easy of access and secure, is somewhat restricted for large vessels. However, S of Navy Point, there is good swinging room, in depths from 7 to 9m, and it is necessary for long vessels to moor.

Good anchorage may be found NW of the cathedral, subject to strong prevailing W winds, which may make turning difficult when leaving this position. The best time to leave is before 0800 or after 1800, unless there is a widespread area of bad weather over the islands. The W wind, which is local, is seldom strong between these above hours.

The bottom of the harbor is soft mud overlying stiff mud, excellent holding ground. Due to the nature of the bottom, vessels may experience some difficulty retrieving the anchor.

The designated anchorages and the several mooring buoys in the harbor may best be seen on the chart.

Directions.—Vessels bound for Stanley Harbor should proceed through Port William until the harbor range beacons come into line bearing 185.75°. This course maintained will lead 20m W of the middle of the entrance. Navy Point Light is obscured when bearing less than 204°.

A vessel leaving Stanley Harbor should keep the beacon W of Doctor Point bearing 005.75°, ahead, until Yorke Point opens N of Ordnance Point, before altering course E.

Caution.—Restricted areas, in which diving and anchoring are prohibited except for emergency situations, are located at the following points:

1. Within 1,000m of Billy Rock (51°40.5'S., 57°42.7'W.).
2. Blanco Bay (51°40S., 57°50.6'W.).
3. Doctor Point (51°40.0'S., 57°49.0'W.).

10.12 The S coast of East Falkland from Cape Pembroke leads SW for 4.75 miles to Horse Point.

Young Rock (51°42'S., 57°44'W.), with a depth of 5.7m, lies 1.25 miles SW of Cape Pembroke. Wolf Rock, 4.3m high, lies 3 miles SSW of Cape Pembroke.

Dangerous ground, on which are some rocks, projects up to 0.5 mile from Wolf Rock.

Maggie Elliot Rock (51°43'S., 58°00'W.), with a depth of less than 2m and which breaks in heavy weather, lies 1.75 miles ENE of Horse Point. A shoal, with a depth of 6.4m, lies 0.25 mile WSW of the rock. There is no passage between these dangers and the coast.

Kelp projects nearly 1 mile offshore along the middle section of this stretch of coast.

Port Harriet (51°44'S., 57°54'W.) is entered between Horse Point and Seal Point, 1.5 miles SW. Mount William, a prominent peak 244m high, lies about 4.7 miles WNW of Horse Point.

Seal Point, the end of a long thin promontory, is in the shape of a low mound. Foul ground, marked by kelp, extends 1 mile E of Seal Point; on it are some rocks, awash. A 5.5m shoal, marked by kelp, lies 0.3 mile NW of Seal Point.

The N shore of the port rises to the range of hills which separates this port from Stanley Harbor. Both shores are swampy. Lake Point, which lies 1.5 miles WNW of Seal Point, has a small detached rock close off its end.

A bar projects across the inlet from Lake Point to the S shore.

There are depths over this bar of 5.5m, with a bottom of fine sand in mid-channel, shoaling gradually to depths of 3.7m close to the kelp on either side.

Within the bar depths increase quickly from 7.3 to 12.8m, the bottom changing from sand to mud.

Anchorage.—Vessels may find anchorage outside the bar, in depths of 6.4 to 12.8m. Occasionally, winds between ENE and SE raise a sea at the entrance. Port Harriet affords good anchorage up to a distance of 3 miles W of the bar.

Most dangers are marked by kelp, except for a sand bank which projects 183m from the S shore halfway up the inlet. Vessels anchor in mid-channel, in depths of 9.1 to 14.6m, soft black mud.

10.13 Bold Point (51°46'S., 58°04'W.) lies about 8 miles W of Seal Point; the coast between is bold, rocky, and almost straight. Halfway between these points is Beach Point, on whose NE side is a cove with a white beach, open to the E.

A detached 13m shoal, marked by kelp, lies 1.5 miles SSE of Beach Point; a bank, with a least depth of 7.3m, rock, lies 1 mile SSW of the same point. Depths are irregular in the vicinity of both these shoals.

North of Bold Point is a bay open to E, which has a drying rock, surrounded by kelp, near its center. A narrow inlet on the N side of the bay leads to the shallow North Basin about 0.75 mile inland.

Port Fitzroy is entered between Bold Point and East Island, 1 mile S. A rocky kelp-covered patch with a least depth of 6.4m lies from 0.75 to 1.5 miles E of the E tip of East Island.

Some dangerous rocks lie about 0.2 mile E of the above-mentioned point and 0.3 mile S of the same point is Little East Island.

There is a bar which projects across the inlet from the N shore to the W tip of East Island. The deeper water lies close to the S edge of the kelp patch on the N side of the bar, where there are depths of 5.1m. North of the kelp patch is a narrow passage with depths of 4.3m.

10.14 White Point (51°46'S., 58°09'W.) lies about 4 miles W of Bold Point. A sandy spit with depths less than 2m projects 0.25 mile S from White Point. While this danger is not marked by kelp, it is readily made out as the water over it appears white.

The W end of Port Fitzroy is divided into two arms by **Tussac Island** (51°47'S., 58°12'W.). The S arm forms Shallow Cove, which is nearly filled with kelp. The old part of Fitzroy Settlement is situated on the S side of this cove, 1 mile WSW of Tussac Island.

On the N side of the inlet, 0.35 mile NW of White Point, is the entrance to a narrow channel, 0.5 mile in length, with depths of 2.7 to 3.7m. This channel leads through a remarkable gorge in the ridge of low hills and opens into a shallow basin named Bluff Cove. Fitz Cove, a smaller basin, is entered 0.75 mile further W.

Near Garden Point, which lies about 2 miles W of White Point, and off the point 0.45 mile further W on the opposite shore, there are rocks that dry.

Kelp projects beyond these rocks, leaving a fairway 0.2 mile wide, with a least depth of 2.8m. On the E side of Rock Point, about 1 mile WNW of Garden Point, there is a narrow passage spanned by Fitzroy Bridge, beyond which navigation is not possible.

North East Point lies 2 miles WSW of Bold Point; between North East Point and South East Point, about 0.6 mile SW, is Loafers Cove. Several islets and rocks lie between the cove and East Island. A narrow winding channel, relatively deep, leads through the above to Port Fitzroy. Within its central section the channel widens to form East Roads, where small vessels, with local knowledge, can anchor.

Tides—Currents.—In Port Fitzroy, the tidal currents are scarcely felt. However, in the entrance to East Road, they run about 1.5 knots and rather stronger nearer the head.

Anchorage.—Port Fitzroy provides good anchorage inside the bar, in depths of 8 to 12m. Small vessels with local knowledge anchor, in a depth of 4.6m, soft mud, 0.2 mile SE of Garden Point.

Directions.—Vessels entering Port Fitzroy from the E should keep a good lookout for kelp and steer to avoid kelp patches between East Island and Beach Point. When abeam of East Island, the vessel should keep towards the N side of the channel, passing close S of the large kelp patch NW of the bar.

A vessel approaching from SE or S will see a range of mountains, N of Port Fitzroy, with three peaks close together. The middle peak has a broad, flat summit; the W and highest peak rises to an elevation of 468m.

This peak, bearing 303°, will lead directly to the extremity of the kelp E of East Island, and when clear the vessel should steer W to enter Port Fitzroy as described above.

10.15 Port Pleasant (51°48'S., 58°10'W.), close S of Port Fitzroy, is entered between South East Point and Pleasant Point 2 miles WSW. Lawson Bank, with a depth of 24m, lies 5 miles ESE of Pleasant Point. Snaiths Twins, two above-water rocks, lie 0.75 mile ESE of South East Point and several islets and rocks extend up to 1 mile ESE of the same point.

Poole Rocks, covered by kelp, lie 0.5 mile E of Pleasant Point; kelp extends up to 0.7 mile E of the rocks.

Pleasant Island lies about 1 mile NW of Pleasant Point and divides the inlet into two channels, each of which is crossed by a bar. Foul ground, covered with kelp, on which there are several islets and rocks, awash, projects 0.5 mile N and 2 miles E of Pleasant Island. Kelp extends 0.75 mile further E.

Depths—Limitations.—The bar in the N channel lies 1.5 miles W of South East Point and has a greatest depth of 5.4m.

The bar in the S channel lies between the E part of Pleasant Island and the S shore, having a greatest depth of 5.1m on the N side of the bar.

Vessels up to 2m draft should have no difficulty crossing either bar; however, vessels of greater draft should not attempt to cross without local knowledge.

The N channel, 0.4 mile W of the bar, is steep-to, with a depth of 13.5m, and is narrowed to 91m by an islet. West of the above narrow passage, the channel expands to a width of 0.5 mile and continues so until it connects with the S channel off the W tip of Pleasant Island.

Turn Point is located on the S shore of the inlet about 1 mile W of Pleasant Island.

From Turn Point, a narrow and torturous channel, with depths of 5.3 to 7.3m, leads SW for 2.5 miles to a basin called

Island Harbor. Island Harbor is shallow except for its E end and almost dries 1 mile from its head.

Tides—Currents.—In both the N and S channels into Port Pleasant, currents only attain a rate of 1 knot at springs; however, in the narrow section of the N passage currents attain a rate of almost 2 knots.

Directions.—The entrance to Port Pleasant and Port Fitzroy are hard to make out from seaward. This is due to the surrounding land being low and indistinguishable until almost up on it. The best guide is the high range of hills N of Port Fitzroy, with three peaks near together; the middle peak shows a broad flat summit.

Mount Kent (51°42'S., 58°11'W.), 468m high, is the westernmost and highest peak; on a bearing of 336°, Mount Kent will lead directly to the entrance of Port Pleasant and clear of the large kelp field S of Pleasant Road. The same hill bearing 303° will lead direct to the end of the kelp off East Island.

Anchorage.—Anchorage may be secured by vessels with local knowledge in the N channel of Port Pleasant, in a depth of about 10m, between the bar and the narrow passage W.

In addition, vessels with local knowledge can anchor virtually anywhere in this channel N of Pleasant Island and W of the narrow passage, in depths of 11 to 18.3m, soft mud.

10.16 Pleasant Road (51°50'S., 58°11'W.) is a bay sheltered from S and SE by a bed of kelp, and lies close S of Pleasant Point. The Kelp Islands, comprised of three islets and some rocks, awash, lie in this kelp. Boat Rock lies near the edge of the kelp about 0.3 mile E of **Boat Point** (51°51'S., 58°13'W.).

Kelp Lagoon, SW of Pleasant Road, is shallow and both of its entrances are blocked by kelp.

Anchorage.—Vessels may secure anchorage exposed to infrequent NE gales in Pleasant Road, 0.7 mile N of Boat Point, in a depth of 8m, good holding ground of sand over stiff clay.

It was reported that over a 14-day period, despite continual W winds, a significant swell from between SSE and E predominated in Pleasant Roads.

10.17 Choiseul Sound (51°56'S., 58°31'W.) is entered between **Fox Point** (51°55'S., 58°23'W.) and Dangerous Point, 5.5 miles SSE. This sound leads about 23 miles WNW from its entrance, narrowing gradually towards Darwin Harbor at its head. Most of the known dangers, which are marked by kelp, and the numerous islands and islets can be best seen on the chart. The islands, creeks, and coves afford good anchorage to small vessels.

Large vessels can generally anchor in any part of Choiseul Sound, in depths of from 21.9 to 32.9m. The bottom of the sound is mud, covered with shells and weed, which give it the characteristics of a rocky bottom.

Aspect.—The shores of Choiseul Sound are low and interrupted by valleys with small streams in them. From E, vessels can identify the sounds entrance by a long white sandy beach projecting NE from Fox Point.

Direction Islet, which lies 2.25 miles NE of Fox Point, is small, dark and conspicuous against the white background.

A prominent radio tower stands 6 miles NNW of Fox Point; a conspicuous hanger stands 0.5 mile further NNW.

The entrance to the sound is divided into two channels by **Middle Island** (51°57'S., 58°28'W.). Kelp projects 2.25 miles E from Middle Island. There are two islets in the W part of the kelp and a large black above-water rock in its E part.

A shoal, with a depth of 11.5m and marked by kelp, lies about 3 miles E of Middle Island.

The main channel into the sound lies N of Middle Island, between that island and Black Rocks; three above-water rocks lie 0.5 mile off the N shore. There are patches of kelp extending 1.75 miles E and 1.5 miles W from these rocks.

The W part of this kelp grows over Choiseul Sound Shoal, with a least depth of 1.3m, lying 1.1 miles W of the W extremity of Black Rocks, and marked by a lighted buoy.

Centre Island, 9m high and conspicuous, is situated 2.75 miles WNW of Middle Island and appears ahead when approaching the sound.

The main channel S of Black Rocks is 1 mile wide; patches of kelp can be seen clearly on its N and S sides.

The passage N of Black Rocks has a least depth of 6.4m but is not recommended except for small vessels with local knowledge. The channel S of Middle Island is full of kelp patches. Green Island lies in this channel about 0.7 mile SW of the W end of Middle Island.

Directions.—Vessels with local knowledge should not experience much trouble navigating Choiseul Sound in daylight. The sound can be approached from E, or through Lively Sound, from S.

From E, after identifying the entrance, vessels should head to pass between the kelp and islets projecting E from Middle Island and Black Rocks to the N, being careful to avoid all patches of kelp.

10.18 White Bluff (51°54'S., 58°44'W.), a bare rock face covered with guano, on a grass-covered bluff, is conspicuous ahead. The channel then passes between two kelp reefs.

The N reef lies 0.5 mile ESE of White Bluff. The S reef lies 0.7 mile E of **Button Island** (51°55'S., 58°44'W.).

A vessel with a draft of 4.3m, reportedly entered Darwin Harbor via the route described below.

From a position E of **Scott Island** (51°51'S., 58°56'W.), course was made for the 5m high islet about 0.3 mile SSW of **Squib Point** (51°51'S., 58°55'W.).

When 0.3 mile from this islet, course was altered toward the 15m high islet 0.3 mile NW of Squib Point, keeping to the W side of the channel which is marked by kelp, and passing W of the rock with 5.5m.

Course was then altered N into the harbor, keeping towards the E side of the narrows until course could be altered NW towards Goose Green Jetty, keeping 0.2 mile NE of the Seccomb Islands and 0.2 mile S of the small islet situated 0.4 mile NE of the settlement.

Lights on this jetty, when approaching at night, may be misleading, and a searchlight in conjunction with radar is recommended to assist in establishing the vessel's position, especially if the wind is strong.

Darwin Narrows are easily navigated during daylight, but this is not considered advisable at night unless there is a bright moon or much snow is lying. Speed should be reduced when

passing through the narrows in either direction with strong favorable winds or tidal currents.

10.19 Mare Harbor (51°53'S., 58°29'W.) is entered between Pandora Point, 2.5 miles W of Fox Point and Johnsons Island (Seal Island), 1.75 miles WNW. The W part of the entrance is obstructed by Sniper Island, 0.3 mile off the SW extremity of Johnsons Island and an area of shoal water ending in Johnsons Island Shoal, 0.6 mile NNE of Sniper Island. Whaler Reef lies in the center of the entrance and shoals extend 0.2 mile N and 0.5 mile WSW.

Mare Harbor is a military port. A deep but tortuous channel leads into Mare Harbor, passing close S and E of Sniper Island, but it is not recommended. The main channel entrance E of Whaler Reef is 0.3 mile wide and clear of danger.

The approach to the harbor either through Choiseul Sound or Lively Sound is clear with the exception of Choiseul Sound Shoal, lying 1.1 miles W of the W extremity of Black Rocks, with a least depth of 1.3m. There is an area of kelp on an 11.2m shoal 0.8 mile WSW of Choiseul Sound Shoal, but this does not present any danger to vessels entering the harbor.

A light is shown at an elevation of 29m from a beacon with a white and fluorescent orange daymark, situated on the East Falkland Island shore about 0.35 mile N of Arrow Head. The white sector of this light, bearing between 011° and 017°, indicates the buoyed channel. The least depth in the entrance is 11.5m.

The maximum recommended draft for vessels entering Mare Harbor is 10m.

Prominent Point and Arrow Head are located 0.5 mile NNW and 0.9 mile N, respectively of Pandora Point.

Boot Head is situated 0.8 mile NW of Arrow Head and forms the NE side of Mare Harbor. A submarine oil pipeline is laid from Boot Head WSW for 0.6 mile and ends in a lighted SBM. The SBM can accommodate tankers up to 35,000 dwt.

Pilotage for Mare Harbor is compulsory for all vessels with a length over 50m. It is also available upon request. For further information, see East Cove (paragraph 10.20).

Anchoring is prohibited within 300m of the SBM and within 100m of the pipeline.

Anvil Point lies 0.6 mile WNW of Boot Head. A light is shown 0.2 mile NE of Anvil Point. Mare Harbor Shoal, with a depth of 1.8m, lies 0.25 SW of Anvil Point and is marked by a lighted buoy.

An orange spherical buoy is moored 0.2 mile SE of Anvil Point; when a tanker is present in Mare Harbor, a pollution control boom is secured to this buoy.

A prominent tank farm is situated about 1 mile ESE of Boot Head. Lattice masts, each about 35m high, are situated about 0.3mile WSW of Providence Head and 183m W of the root of the terminal jetty in East Cove.

10.20 East Cove (51°54'S., 58°27'W.) is another deep water harbor branching E from Mare Harbor. Hecate Channel, leading from Mare Harbor into East Cove, is entered 1 mile N of Pandora Point. It is 91m wide between buoys marking the edge of shoal water. The least depth is 10.5m.

A vessel with a draft of 9m can safely transit the channel at all states of the tide.

Depths—Limitations.—Main Jetty, T-shaped and with a ro-ro terminal at its W end, is situated on the N shore of the cove, about 0.7 mile E of Camp Bay, an indentation at the NW end of East Cove. A dolphin stands off the E end of the jetty; four dolphins stand off the W side of the jetty. Main Jetty has depths alongside up to 9.4m.

West Jetty, with a dolphin at each end and a depth alongside of 9m, is situated on the N shore, between Camp Bay and the ro-ro terminal.

Pilotage.—Pilotage for East Cove is compulsory for all vessels with a length over 50m. It is also available upon request.

Regulations.—Vessels should report their ETA at Pandora Point to Port Operations, on VHF channel 12, when within range. Port Operations should be informed of any vessel movements within the harbor and ETD.

Anchorage.—Anchorage can be obtained either in Mare Harbor or in East Cove. Vessels should keep clear of the SBM, the pipeline, and the mooring buoys. The bottom is silty mud containing a high amount of peat. The holding ground is poor but is reported to be better in Mare Harbor than in East Cove.

The anchorage in Mare Harbor is exposed to S and SW winds. East Cove affords more shelter; West Cove affords good anchorage to small vessels.

10.21 Mackinnon Creek (51°54'S., 58°41'W.), whose entrance lies about 8 miles W of Mare Harbor, affords an anchorage 0.5 mile within the entrance, in depths of 11 to 16.5m.

Bluff Creek lies about 1.5 miles W of Mackinnon Creek. White Bluff, SW of the entrance to Bluff Creek, is a bare rock face whitened with guano on a grass-covered bluff that is prominent in sunny weather.

Button Island (51°55'S., 58°45'W.), about 0.7 mile S of White Bluff, is also prominent. There is a bay on the W side of John Point, 4.5 miles WNW of Mackinnon Creek, that has a rocky bottom and is an unsafe anchorage. A depth of 10m lies in the channel about 1 mile WSW of John Point.

Tides—Currents.—Tidal currents are negligible in Choiseul Sound except in the entrances to the creeks and between the islands.

Off the entrance to Mare Harbor, the currents attain a rate of less than 1 knot, while in Hecate Channel, a maximum rate of 0.5 knot, in an E-W direction, can be expected.

At the entrance to Choiseul Sound, the general NE flood current runs E, but can barely be felt.

10.22 Darwin Harbor (51°51'S., 58°56'W.) comprises the N part of the head of the sound and is entered through Darwin Narrows, close W of **Squib Point** (51°51'S., 58°55'W.).

A rock, with a depth of 5.5m, lies in mid-channel 183m W of Squib Point. Kelp and rocky ground with depths less than 5.5m extend 0.4 mile S and SE of Squib Point.

Kelp projects about 0.1 mile N of the N side of Hare Island, 0.8 mile NW of Squib Point. A stranded wreck lies on the E shore close N of Squib Point. Goose Green Settlement lies on the W shore of the harbor about 2 miles NW of Squib Point.

The chimney of a canning factory is a very conspicuous mark. About 0.1 mile WNW of the settlement is a T-headed pier with a depth of 2.7m alongside.

Darwin Settlement lies on the W shore of the harbor, about 2.2 miles NNW of Squib Point. There is a flagstaff which stands on the summit of a hill close to Darwin.

There is a boat jetty on the S entrance point of a small inlet about 0.1 mile NW of Darwin.

Anchorage.—In Darwin Harbor, the best anchorage, for vessels with local knowledge, is about 0.2 mile NNE of Hare Island, in a depth of 7m, stiff mud. A small patch of kelp lies S of a small islet located 0.4 mile NE of Goose Green Settlement. For the most part, there appears to be depths of 4.6m up to 183m from the islet.

10.23 Arrow Harbor is situated between the SW shore of Choiseul Sound and the Arrow Islands. A rocky shoal, with a least depth of 4.9m, lies in the E entrance to Arrow Harbor.

Vessels with local knowledge can find anchorage in Arrow Harbor, in depths of 7.3 to 12.8m mud, avoiding the above rocky shoal which lies in the entrance.

Victoria Harbor (51°55'S., 58°52'W.) can be approached by vessels with local knowledge either E or W of Sea Lion Island. The passage E of the island is preferred by local vessels as the W is narrowed by a kelp reef projecting 0.5 mile ENE of Rock Point.

The entrance of the harbor lies S of **Gull Island** (51°57'S., 58°45'W.) and N of Little Island, the latter surrounded by kelp.

A jetty with a depth of 3m at its head serves Walker Creek Settlement and is located 0.4 mile W of Little Island. There is a conspicuous building near the root of this jetty.

The Samuel Islands and Sea Lion Island lie halfway up Choiseul Sound, NE and NW, respectively, of **Low Point** (51°57'S., 58°41'W.).

The passages between Big Samuel Island and Little Samuel Island, and between the Samuel Islands and the mainland are for small vessels with local knowledge.

Anchorage.—Good anchorage for vessels with local knowledge is found in Choiseul Sound E of Sea Lion Island. Anchorage may be obtained by small vessels 0.5 mile E of Low Point, in 13m, mud. The area S of Sea Lion Island has good holding ground but is more exposed.

There is an anchorage exposed to W winds in Victoria Harbor, for those vessels with local knowledge, between the entrance and Heifer Point, 2.5 miles WNW, in depths of 9 to 18m. More sheltered anchorage may be found in the approaches to Walker Creek about 2 miles SW of the center of Sea Lion Island, in a depth of about 13m.

Directions.—Vessels with local knowledge approaching Victoria Harbor via the channel E of Sea Lion Island should pass 0.35 mile off the prominent NE tip of that island. Vessels should then steer a SW course to clear the kelp reefs on either side. This track passes over a 6.2m shoal. When through the passage, vessels should steer towards Gull Island to clear the kelp which lies off Low Point and off the entrance to False Creek. The buildings of the settlement are conspicuous from the approach.

10.24 Hamond Cove (51°58'S., 58°37'W.), situated on the S side of the sound, provides anchorage to small vessels with local knowledge in the entrance.

Lively Island (52°02'S., 58°29'W.), 37m high, is located on the S side of the entrance to Choiseul Sound.

Lively Sound separates Lively Island from East Falkland Island and has a least width of 1.25 miles between Enderby Point and Pyramid Point, about 2 miles WNW. The sound is entered from S between Reef Point, the S tip of Lively Island, and Motley Island, 6 miles WSW. Reefs project up to 2 miles off Reef Point, and kelp, with an islet in it, projects 0.5 mile SE from Motley Island.

The passage between Motley Island and the shore NW is not navigable. Vessels may find a good temporary anchorage N of Motley Island. A heavy swell rolls into Lively Sound with strong SW or SE winds.

Sal Point, from which a shallow spit extends 1.75 miles W, lies about 3 miles NW of Reef Point. Seal Island lies on the W side of the sound about 3 miles NW of Sal Point.

A reef, marked by kelp, extends 0.5 mile SE of Seal Island and W to the mainland of East Falkland Island. Another reef, marked by kelp, extends W from a position 1 mile S of Seal Island. The channel, between the above reefs off Seal Island and the shallow spit projecting W from Sal Point, is about 1 mile wide. A white house stands on the SW side of Lively Island about 1 mile ENE of Sal Point.

Seal Cove is entered N of Seal Island. The edge of the kelp N of Seal Island is steep-to, and kelp-covered reefs project from it.

Caution.—A restricted area, 4 miles in diameter, containing unexploded ordnance, lies centered 2 miles SE of Reef Point.

10.25 Pyramid Point (52°01'S., 58°35'W.), from which kelp extends 0.7 mile SSW, lies N of Seal Cove. Pyramid Cove is the next cove N of Seal Cove.

Reefs extend S and E of **Knob Point** (51°59'S., 58°36'W.) and off Island Point, 0.5 mile N. A continuous belt of kelp connects these reefs.

Kelp Bay, located off the NW coast of Lively Island, is entered N of **Kidney Island** (52°00'S., 58°31'W.).

Shallow Harbor, on the N coast of Lively Island, is entered S of Reef Island and **Philimore Island** (51°59'S., 58°28'W.). There is a settlement with a T-shaped jetty within Shallow Harbor on the N side of Lively Island, 2.5 miles WNW of Sand Hills Point.

Tides—Currents.—During springs, tidal currents reach a rate of 2 knots in both directions in Lively Sound. During strong winds they cause a tide rip off Pyramid Point.

Anchorage.—There is a good anchorage for vessels with local knowledge in Seal Cove, sheltered from all winds, in a depth of 6m, mud and sand. Pyramid Cove affords good anchorage, in depths from 9 to 20m, sand over stiff clay.

A vessel of 2,641 tons anchored SE of **Knob Point** (51°59'S., 58°36'W.); this anchorage is recommended for use when the prevailing W winds are blowing.

This same vessel anchored 0.6 mile SSW of **Reef Island** (51°59'S., 58°29'W.), but this anchorage is not recommended when winds are from the W.

Directions.—To make Lively Sound, vessels should steer 335° with the W edge of Seal Island ahead. This course will take a vessel into the passage between the reefs off that island and the spit extending off Sal Point.

From this position, a course of 010° will take a vessel through the narrows to the main channel of Choiseul Sound NE

of **Centre Island** (51°56'S., 58°34'W.), which is 9m high and conspicuous.

A 13.6m shoal is reported to lie about 2 miles NNE of Pyramid Point.

A dangerous rock, in a patch of kelp, lies 0.65 mile W of Centre Island. A depth of 7.9m lies 0.2 mile SE of Centre Island.

10.26 Low Bay (52°06'S., 58°48'W.) is entered W of the Triste Islands, a rocky group 1.5 miles W of Motley Island.

Although the shores of Low Bay are indented by several coves, this bay doesn't afford good anchorage, as the ground is rocky and foul in places and a heavy swell rolls in with S gales. There are tidal currents of 1 knot at the entrance to Low Bay. The least reported depth in the entrance to the bay is 23.7m.

The most conspicuous landmark in Low Bay is **Bluff Head** (52°05'S., 58°51'W.), a dark bluff cliff, 18m high. There is a small islet close off Bluff Head.

The only known dangers in Low Bay are some kelp-fringed rocks that dry, lying halfway between Turn Islet and Bluff Head, 3 miles NE.

Shag Rock (52°13'S., 58°39'W.) lies about 5 miles off the entrance to Low Bay. This rock is an excellent unique mark for those vessels bound for Lively Sound or Adventure Sound from the S. The low land of East Falkland Island is so uniform that it is almost impossible for one unfamiliar with the area to positively recognize the landfall, particularly as the high range of hills is seldom visible from so far S.

The Sea Lion Islands or Shag Rock, once distinguished, will greatly assist the navigator. Several below-water rocks lie up to 0.75 mile NE and 2 miles SW of Shag Rock.

A shoal with depths of 14.5 and 13.1m were reported to lie 1.5 miles W and 1.75 miles NNE of Shag Rock. It was also reported that there was less water than charted lying to the W of the rocks. There may be several ridges running off Shag Rock; vessels should give this area wide berth.

Bleaker Island (52°13'S., 58°53'W.) is a long low narrow island at the entrance to Adventure Sound. The passage between its SW end, Cassard Point, and Driftwood Point, 1 mile SW, is obstructed by a rocky reef named Bleaker Jump.

The land in this vicinity is featureless, making identification difficult.; the channel, with depths from 4.8 to 6.5m, is navigable by small vessels with local knowledge.

Kelp projects across the width of the passage. Its effect on vessels is lessened at high tide.

Vessels should stay in the middle of the channel through the narrows. There is a 4.8m shoal, unmarked by kelp, 2.5 miles NE of Cassard Point.

10.27 Sandy Bay Island (52°11'S., 58°48'W.) is located off the E coast of Bleaker Island. A reef extends off the SE tip of Bleaker Island to a position 1.5 miles S of Sandy Bay Island.

A rock, whose existence is doubtful, was reported to lie 1.5 miles SE of Sandy Bay Island.

Anchorage.—Sheltered anchorage, from most winds can be found in a bay on the E side of Bleaker Island, 1 mile NW of Sandy Bay Island, in a depth of 21.9m.

Adventure Sound is entered from Low Bay between Turn Islet and the N tip of Bleaker Island. This sound has within its confines several fine harbors, the main ones being Adventure Harbor and Moffit Bay. Both harbors lie in the S part of the sound. Situated on the SW side of the sound are the harbors of Barrow, Fox, and Sullivan.

North Point Island lies 0.5 mile W of the N tip of Bleaker Island; between them is a passage with depths of 9 to 11m, suitable only for small vessels. Halt Island is situated about 3 miles S of North Point Island. A kelp spit projects 1 mile N of Halt Island.

Small vessels with local knowledge can find anchorage in a bay E of Halt Island, in depths of 11 to 12.8m. Bleaker Settlement Jetty is situated 1.25 miles SE of Halt Island.

Moffit Bay lies in the S corner of Adventure Sound; it is not easy of access, but provides anchorage, in depths of 12.8 to 18.3m.

Moffit Bay is entered SE of The Sisters, a chain of rocks which lies NE of the entrance of the bay.

Adventure Harbor lies about 4.2 miles N of Driftwood Point. This harbor, which is spacious and easy of access, can accommodate vessels of virtually any size.

In Adventure Sound currents are negligible, except in West Arm at the head of the sound, where the ebb current is strong.

Anchorage may be taken in Adventure Harbor, in depths of 9 to 21.9m, stiff mud. Barrow Harbor, separated from Adventure Harbor by a promontory, is entered N of **Large Island** (52°08'S., 59°00'W.). Little Island, a small dark mound of tussac grass, lies 0.5 mile off Large Island's E side.

A steep-to kelp patch lies 1.25 miles SSE of Little Island. Kelp Islet, whose N side is steep-to lies 1 mile W of the N tip of Large Island. Barrow Harbor affords anchorage, in depths of 7.3 to 18.3m, good holding ground.

Fox Harbor, entered S of **Low Point** (52°05'S., 59°05'W.), provides a good harbor for small craft. Great Island lies about 0.4 mile E of Low Point, and the passage between has a depth of 5.5m, but can only be used by small craft. A rocky spit, which partly dries, projects 0.5 mile N, with depths of 7.3m close to the kelp. A patch of kelp with depths of less than 2m at its E end lies 0.5 mile SE of Great Island.

Button Island, which is small and round, lies 0.5 mile E of Great Island. A patch of kelp, marking a rock, depth of less than 2m, lies halfway between Button Island and Shell Island.

Sullivan Harbor, entered N of a promontory about 3 miles N of Low Point, is kelp-fringed and accessible only by small vessels.

Anchorage in good holding ground, mud and peat, may be obtained 1.5 miles E of Button Island, in a depth of about 22m.

Sheltered anchorage may be obtained 0.7 mile NE of **Burnt Island** (52°02'S., 59°11'W.), stiff mud, good holding ground.

10.28 The **Sea Lion Islands** (52°25'S., 59°00'W.), a group of one large and four small islets, lie about 11 miles S of Bleaker Island. The large island lies 18 miles SW of Shag Rock.

A reef, with the three small islets and several below-water rocks, projects 2 to 6 miles E from the E tip of the large island. A detached reef lies 2.5 miles further ENE.

The channel between the E tip of the large island and Brandy Island, the W most islet on the reef, has a least reported depth of 7.8m.

However, a reef on which the sea breaks projects 3 miles S from the large island, and vessels from S intending to use this

channel should keep a good lookout. It was reported that this reef extended further S than charted. A wool shed stands on the N side of the large island and a house near its E end. A shoal, with a depth of 18m, lies 9.5 miles WSW of the island.

A 23.5m shoal lies 1.5 miles NW of the W end of the Sea Lion Islands. Lesser depths possibly exist between it and the islands. A bank, marked by kelp and with a least depth of 17.9m, lies about 10 miles WSW of the W end of the largest of the Sea Lion Islands.

Beauchene Island (52°55'S., 59°12'W.) lies about 27 miles S of the Sea Lion Islands. The N point rises to a green mound 82.6m high, and the S end, which is less than half that height, is rocky. The S and E sides form high cliffs, and the W side slopes down to the sea. There are no known dangers beyond 0.25 mile offshore.

It was reported that a shoal or below-water rock was believed to exist about 4 miles WNW of Whirlwind Point the N point of Beauchene Island.

Mintay Rock was reported to lie 3.5 miles SW of Beauchene Island. However, while the existence of this sunken rock is doubtful, vessels should exercise caution when passing S of Beauchene Island.

10.29 Bay of Harbors (52°17'S., 59°11'W.) is entered between Driftwood Point and Porpoise Point, about 12 miles WSW. This bay, which is much indented by coves and inlets, has upon its shores hills which rarely exceed 55m in height, and that present a regular appearance from the offing.

Rocks, which are below-water, project 1 mile off Driftwood Point. A shoal, with a depth of 23m, lies about 2.2 miles SW.

Cassies Island and Driftwood Island lie, respectively, close S and 0.6 mile SE of Driftwood Point.

Porpoise Point (52°21'S., 59°18'W.), the SW entrance point of Bay of Harbors, has two kelp patches 1.5 miles SE, and kelp, in which there are some rocks awash, 0.5 mile SE.

Bull Point lies 1.25 miles NE of Porpoise Point. A depth of 20m lies 1.5 miles WNW of Bull Point. A depth of 19m lies 0.75 mile NE of Bull Point.

The point is reported to be marked by a light from which a racon transmits.

Tides—Currents.—The flood current runs W along the S coast of East Falkland Island at a rate of 1 to 2 knots. Off Porpoise Point the current attains a rate of almost 3 knots and forms a strong race during W gales.

Bull Road lies in the SW part of Bay of Harbors, and is entered between Bull Point and Bull Islet, 3 miles NW. This road is the most convenient anchorage in the S part of East Falkland Island. Bull Cove is entered 1 mile WSW of Bull Point.

Anchorage.—Vessels with local knowledge can anchor, in 12.8 to 18.3m, good bottom, 0.5 mile NNW of the entrance to Bull Cove. The large kelp reefs, NW of Bull Point, provide good shelter from E winds.

Middle Shoal has a depth of 11.2m and lies 3.5 miles NE of Bull Point. A rock, awash, whose existence is doubtful, lies 0.3 mile NE of the shoal.

The Fanny Islands and the Harbor Islands, 0.5 mile E, lie in a bank of kelp on the W side of the bay, 4.5 miles N of Bull Point.

Little Harbor Island lies on a bank of kelp 1 mile E of the S harbor island. A detached patch of kelp, marking a rock with a depth of less than 2m, lies 0.6 mile NE of the N Fanny Island.

Fanny Road is entered N of the Fanny Islands, between them and West Point (Devil's Point), 1.5 miles NW. Vessels with local knowledge can find secure anchorage, in Fanny Road, in depths of 9.1 to 29.3m, sand and mud. Snug Cove is entered 3.5 miles NW of West Point.

There is a good anchorage, as charted, W of the three kelp patches and S of the cliffy point forming Snug Cove, in 14.6 to 27.4m, sand and mud.

North Arm and Northwest Arm provide secure anchorage to vessels of moderate tonnage in the inlets at the head of the bay. There is a large settlement at the head of the E creek of North Arm. This settlement is not visible from a distance until North Arm is entered.

There is a pier, with a depth of 2.3m alongside, but the passage to it is narrow, and requires local knowledge. Garden Point, the point separating the W and E inlets of North Arm, has a sheep corral which can be identified. The Round Islets lie about 4 miles NW of West Point.

A vessel of 2,641 gt obtained good anchorage with excellent holding ground, in a depth of 8.2m, sand and mud, 1.5 miles NNE of the Round Islets. However, the anchorage is restricted and streamers of kelp were observed.

Anchorage has also been obtained 0.5 mile SE of Garden Point, in 18m, soft gray mud, good holding ground.

Eagle Passage is situated between the SW end of East Falkland Island and Barren Island, George Island, and Speedwell Island. This passage is entered between a point about 3 miles WSW of Porpoise Point and the S tip of Barren Island, 11.5 miles W. It passage extends 18 miles NNW and has a least width of 1 mile in the N section, E of Speedwell Island.

10.30 Barren Island (52°22'S., 59°41'W.), from which foul ground is reported to extend up to 5 miles E and 4 miles SE from the S tip, forms the SW side of Eagle Passage.

Two parallel reefs project 2 miles NE from the NE coast of Barren Island. These reefs were reported to extend further NE than charted. Below-water rocks surrounded by kelp are situated 2 miles N of Tea Point, the N tip of Barren Island.

Owen Road is located between the NW side of Barren Island and the E side of George Island. The passage at the head of Owen Road between George Island and Barren Island is reported to be foul and only 0.3 mile wide.

Winds—Weather.—During SW gales, the water is quite smooth in Owen Road. During SE gales, which cause the heaviest seas on the coast, smooth water will be found when the N tip of Barren Island bears less than 100°.

Anchorage.—Vessels with local knowledge can find anchorage in Owen Road. A good berth lies close off George Island, 3.5 miles NNW of the S tip of Barren Island in depths from 14.6 to 18.3m, stiff clay, covered with broken shell.

Vessels will see stems of kelp which are reported to be of no consequence. A 5.6m shoal was reported to lie about 1.7 miles WNW of Tea Point.

There is a below-water reef to be avoided when utilizing this anchorage. This reef projects nearly 1.5 miles ENE into the middle of the road from the S part of the E side of George

Island. There is a house and a jetty at the head of a small bay on the E side of George Island and a house on the N side of the SW part of Barren Island.

Directions.—Vessels entering Eagle Pass from SE should avoid the foul ground that projects about 4 to 5 miles SE and E from Barren Island and Barren Reefs, which extend 2 miles or more NE from the NE tip of Barren Island.

Those vessels intending to change course for anchorage in Owen Road should not do so until the passage between Barren Island and George Island is open, or until in a position from which the N tip of Barren Island bears 225°, and the NE tip of George Island bears 293°. Vessels can then alter course to 245°, which will lead to the anchorage.

The passage which is recommended lies N of the N end of Barren Reefs and S of the below-water rocks lying 2 miles N of Tea Point, and the dangers off the SE side of George Islet; it is 1 mile wide and clear of dangers.

If bound for Owen Road from N, vessels should steer to pass 0.5 mile E of the NE tip of George Island. Then course should be shaped to pass midway between the two islets 1.25 miles S of the NE tip of George Island and the below-water rocks 1 mile E, then to the anchorage.

10.31 Speedwell Island (52°11'S., 59°42'W.) represents the largest of the three islands on the W side of Eagle Passage. Speedwell Passage lies between Georgel Island and Speedwell Island and should not be attempted without local knowledge as there are strong tidal currents within, and a lack of soundings to the W.

Annie Island, 2 miles N of George Island, is fringed with kelp and reefs up to 0.25 mile offshore. A reef of below-water rocks extends from the W end of Annie Island 1 mile NW to the shore of George Island.

Anchorage.—Speedwell Island has two good anchorages for those small vessels with local knowledge on its NE side. Halfway Cove is entered N of the E tip of Speedwell Island.

This cove offers a restricted anchorage, in depths of 9 to 14.6m, good holding ground, N of the S entrance point.

The other anchorage is about 2 miles SE of **Phillips Point** (52°07'S., 59°46'W.), the NW tip of Speedwell Island. This anchorage, in the first sandy bay when standing along the island to the S, should be approached with care as shoal water projects 0.75 mile from the NE part of Speedwell Island.

Stinker Island, a small kelp-fringed islet, lies 1 mile NW of Phillips Point.

Elephant Cays, lying off the NW end of Speedwell Island, are low sandy islets surrounded by reefs and kelp. Shoals project 3.25 miles NNW from the N end of these islets.

Golden Knob is a conspicuous cone-shaped islet, 23m high, situated in the center of Elephant Cays, 2 miles WSW of Phillips Point. There is a passage about 0.5 mile wide between Elephant Cays and Speedwell Island. This channel is relatively free of dangers except for a 9.1m patch 0.5 mile S of the Cays.

Depths of 11 to 12.8m have been reported 2 miles NW of Elephant Cays; a 15m shoal patch lies 2.75 miles NW and a rock, marked by a patch of kelp, on which the sea occasionally breaks, lies 1 mile SW of Elephant Cays, and should be given a wide berth.

Heavy breakers were reported in the area between 0.5 mile and 1 mile W of Elephant Cays. Kelp was reported to extend 2 miles NW of Elephant Cays.

Caution.—The area N of Elephant Cays has not been adequately surveyed, and depths less than charted may exist and vessels should therefore keep to the deep channel.

10.32 Blind Island (52°16'S., 59°33'W.) lies on the E side of Eagle Passage about 5 miles ENE of the NE tip of George Island. Detached shoal patches, marked by kelp, of which the shallowest has a depth of 12.8m, lie 1.75 miles W of the N tip of Blind Island.

Mid Island, 15m high, lies 3 miles NW of Blind Island. A reef, which dries, projects 0.25 mile NW of Mid Island. Ladrillo Island lies 2 miles N of Mid Island. A conspicuous wreck lies inshore of Ladrillo Island. A detached rock, with a depth of 6m, lies 0.5 miles N of Phillips Point.

A reef, which is marked by kelp, is situated 1 mile W of the W extremity of Ruggles Island and extends to within 0.5 mile of the detached 6m rock. Depths of less than 6m may exist in this area.

Tides—Currents.—Tidal currents within Eagle Passage, influenced by the winds, attain rates of 2 to 3 knots. The flood current runs N; the ebb current runs S.

Directions.—Vessels with local knowledge proceeding through Eagle Passage should pass W of the 12.8m patch 1.75 miles W of Blind Island and W of Mid Island. The channel N of Mid Island is narrow but clear of dangers.

Vessels entering Eagle Passage from N, with local knowledge, should remain at least 2 miles NE of Elephant Cays and well clear of the kelp off Stinker Island.

Caution is required to avoid the detached rock 3.5 miles N of Phillips Point, and also the reef which projects 2.5 miles WNW from the S end of Ruggles Island.

The areas W of George Island and Speedwell Island have not been adequately surveyed; vessels should exercise extreme caution when navigating in these waters.

Falkland Sound

10.33 Falkland Sound, which divides East Falkland Island from West Falkland Island, is about 50 miles long. Directions for the passage through Falkland Sound are given at the conclusion of the narrative in paragraph 10.42.

Tides—Currents.—Off Race Point, the tidal currents attain a rate of 4 knots. In Grantham Sound it diminishes to 1.5 knots. In both entrances to the sound and between the islands, the tidal currents attain rates of 3 to 5 knots at springs. In the wider parts, they are moderate.

Among the islands in the SE part of the sound, the currents are very irregular in direction and rate.

The flood currents enter both entrances to the sound and meet near the N end of **Swan Island** (51°44'S., 59°28'W.). They appear to turn at about half tide, but they have not been fully investigated. In the N entrance, the incoming flood current begins 3 hours before HW by the shore.

Aspect.—At the S end of the sound there are many flat islands and some shoals.

The dangers, as far as is known, are generally visible. Due to the smooth nature of the water and the rarity of thick weather,

navigation of the sound is normally easy by day. However, it is not considered prudent to navigate the sound at night unless equipped with good radar.

To vessels entering from N, the E side of the sound, S of the Northwest Islets and Grantham Sound, changes its aspect and is low, with gentle undulating hills that seldom exceed 46m in height, maintaining this character to the S end of the sound.

This E shore is pocked with good harbors offering good shelter.

The W side of the sound is high, bold and formed by a ridge, 90 to 180m high, running almost the length of the sound. There are several breaks in this ridge where harbors are formed. The gaps or fissures in the S part of the sound are excellent guides to the harbors and islands on the opposite side. Immediately behind the above mentioned ridge are the Hornby Mountains. This group, 549 to 610m high, project in a parallel line as far as Hill Gap, where they head W.

Mount Maria, the highest summit near the sound, rises to a height of 669m, 5 miles WNW of Bold Point.

10.34 Foul Bay, which forms the E side of North Falkland Sound, is entered between Cape Dolphin, previously described in paragraph 10.3, and Middle Point, about 9 miles S. This bay is reported to be encumbered by many rocks and shoals.

Elephant Beach forms the head of Foul Bay and is reportedly fronted by foul ground 2 miles off and extending.

The N shore of Foul Bay rises gradually to cliffs, attaining an elevation of 38m. A stone cairn, with a height of 36m, lies 4 miles SSE of Cape Dolphin. The S shore of the bay is distinguished by rugged cliffs, about 48m high, broken only by the mouths of two streams.

Middle Bay is entered between Middle Point and **Race Point** (51°25'S., 59°06'W.), 4 miles WSW.

The shores of this bay are cliffy and kelp fringes the SW shore. Smylie Creek, used only by small craft, is entered close S of a sharp bluff 2.25 miles SSW of Middle Point. There are three prominent hills on the S side of Smylie Creek, named Rincon de los Tres Picos. These hills range in height from 158 to 168m.

Vessels without local knowledge should not navigate within lines joining the entrance points of Foul Bay and Middle Bay.

Rocks and patches of shoal water are known to exist in Foul Bay and may exist in Middle Bay, although the latter bay appears to be free of dangers.

Race Point, the NE entrance point of Falkland Sound, consists of steep cliffs that rise abruptly from the water to heights of 46m.

Sunk Rock, over which the depth is not known, lies near mid-channel between White Point Rock and Race Point. The kelp which marks this danger is only visible at slack water. Tide Rock, 2 miles WSW of Race Point, is 1.5m high; a rock, awash, lies close S. Tide Rock is nearly always awash at HW.

This rock is almost steep-to and is a useful mark for the middle of the channel; vessels usually pass E of it, and it is safe to do so within 183m of the kelp, which is visible at all times.

The kelp-fringed coast 3.5 miles SSW, from Race Point to Fanning Head, is notable for its sheer cliffs which rise to a height of 107m. These cliffs are broken midway by a wide sandy beach.

Fanning Head has two summits and is prominent and high. The NE, and higher, summit rises to a height of 234m about 0.5 mile inland and has a conspicuous cairn on its top.

Fanning Harbor lies on the N side of Fanning Island, 2 miles SE of Fanning Head. Good anchorage, for vessels with local knowledge, may be found, in depths of 12.8 to 25.6m, mud.

Foul ground projects about 183m W from the W end of Fanning Island. The E end of the island is joined to the mainland by a rocky bank that dries.

Port San Carlos and San Carlos Water are both approached between Fanning Head and Chancho Point, about 2 miles SSE.

Port San Carlos

10.35 Port San Carlos (51°30'S., 59°00'W.) is large, secure, and mostly free of dangers. Careening Cove lies on the N side of the head of Port San Carlos. There is a T-head jetty at Port San Carlos. It is 9m long and can handle a vessel with a length of 51m and a draft of 3.5m.

Anchorage.—Small vessels with local knowledge might find anchorage off the jetty at Careening Cove, in depths of 21.9 to 27.4m, the shores at the head of the inlet being steep-to. However, due to a sand and rock bottom, a depth of 25m, and poor holding ground, vessels should only use it as a temporary anchorage.

Directions.—Vessels entering the inner section of Port San Carlos should heed the limited maneuvering space and the speed at which the weather deteriorates.

San Carlos Water is reported to project about 7 miles SE from **Chancho Point** (51°30'S., 59°08'W.). At the head of the inlet are two shallow creeks, between which stands a large prominent white house. In the main part of the inlet there are no known dangers within 0.2 mile offshore. However, within 1 mile of the head of the inlet the depths are less than 5.5m.

A kelp-fringed rock, which dries 1.5m, lies about 0.2 mile from the W shore, 1 mile from the head of the inlet.

Caution.—A wreck, with a depth of 7.6m and marked by a buoy close N, lies in the middle of San Carlos Water, about 0.4 mile E of **Red Point** (51°33'S., 59°04'W.). The area within 100m of any part of the wreck is designated a prohibited area.

10.36 Ajax Bay lies on the W side of the inlet 4.5 miles SSE of Chancho Point. There is a settlement and a disused refrigeration plant at Ajax Bay.

Bonners Bay, with depths less than 5.5m, lies on the E shore about 2 miles SE of Ajax Bay. There is a pier, which dries at LW, at Bonners Bay, that is used by small craft.

Anchorage.—Vessels with local knowledge can obtain anchorage in San Carlos Water, in depths of 7.3 to 25.6m.

Cat Island lies 2.5 miles SSW of Chancho Point. This island lies in a large area of kelp that has not been closely examined, and should be given a wide berth.

The Northwest Islets, which are connected to East Falkland Island by foul ground, lie 5.5 miles SSW of Chancho Point.

Caution.—A wreck, with a depth of 18m, lies 0.6 mile SW of the Northwest Islets. The area within 100m of any part of the wreck is designated a prohibited area.

Rookery Island (51°37'S., 59°08'W.) lies about 0.7 mile off the N shore of Grantham Sound and is encompassed by rocks. A chain of rocks extends E to the coast from a position 1.25 miles S of Rookery Island.

Port Sussex, entered on the NE side of Grantham Sound, provides a good harbor for small vessels. There is a small kelp patch with a depth of 5.2m that lies near the middle of the entrance. There is a prominent house which is located on the N shore of the inlet 1.5 miles E of the entrance.

Vessels with local knowledge can find anchorage beyond a flat stony point on the S side of the inlet 1.5 miles inside the entrance, in depths of 7.3 to 9.1m, stiff mud.

Brenton Loch is entered about 2 miles to the S of Port Sussex. However, due to a narrow entrance and strong tidal currents its use is reported to be restricted to small craft with local knowledge.

New Haven lies on the S side of Grantham Sound 7 miles S of the Northwest Islands. This small port affords good anchorage; although open NW, little sea sets in.

Small vessels with local knowledge can find anchorage towards the W side of New Haven Inlet, 1 mile from the entrance, in depths from 7.3 to 11m, stiff clay under a layer of sand. There is a group of below-water rocks that lies 2.5 miles WSW of the entrance to New Haven Inlet.

A depth of 14.4m lies 4.25 miles WNW of the W entrance point of New Haven Inlet. Kelp Harbor is situated 5 miles SW of New Haven Inlet.

10.37 Egg Harbor (51°50'S., 59°23'W.), about 15 miles SW of the Northwest Islets, is entered between Long Point and John Strong Island, which is covered with tussock grass and about 3 miles NNE.

Garden Point is situated 1.5 miles SSE of Long Point. Parker Shoal, with a depth of 4.8m, lies 1.25 miles N; a below-water rock lies about 0.6 mile ENE of Long Point. Parker Shoal is not marked well by kelp and is only visible in calm conditions.

A dilapidated jetty, awash at HWS, with depth of 2m at its head, is located on the SW side of a creek at the head of the harbor. A range, marked by cairns, in line bearing 187.5°, may be used to enter the harbor; it was reported that these cairns were difficult to see.

High Cliff Island (51°48'S., 59°28'W.) is the highest island in the sound, rising to a height of 30m. This island is conspicuous for a prominent white cliff discolored by birds.

High Cliff Island is connected to the shore to the S by foul ground. High Cliff Island East lies 0.75 mile S of High Cliff Island; High Cliff Island West lies 1.5 miles SW of the same island.

Main Passage lies W of High Cliff Island West; between it and the SE tip of Swan Island the passage is 2 miles wide, deep, and clear of dangers. However, a 12.8m patch, located 2 to 3 miles NNE of the SE end of Swan Island, has not been adequately examined and depths less than charted may exist.

The Tyssen Islands lie about 7 miles SW of High Cliff Island. A rock, existence doubtful, with a depth of less than 2m, lies 0.5 mile N of North Tyssen and a ridge, terminating in a shoal of 12m extends 1.25 miles NNE of the charted position of the rock.

Another ridge, which has not been closely examined, but with charted depths between 13 and 20m, lies parallel with, and about 2 miles NW of the Tyssen Islands.

Depths less than charted may exist on this ridge. Tyssen Patch is a rocky kelp-fringed shoal that lies 1 mile WNW of the S tip of the SW Tyssen Island. A kelp-marked shoal with a least depth of 6.6m lies in the fairway 1.5 miles NW of Tyssen Patch. Sandbar Island is connected to the SW Tyssen Island by foul ground, on which are some islets and rocks.

Cygnet Harbor is entered 4.75 miles SSW of High Cliff Island. Though encumbered by several kelp patches, this harbor offers good shelter for small vessels.

Port King, Wharton Harbor, and Findlay Harbor, entered 3.5 miles ENE, 1.5 miles SSE, and 3 miles SSW, respectively, of Sandbar Island, all afford good secure anchorages and are almost clear of dangers.

An obstruction, with a depth of 8m, and a wreck close SE of it, lie in the entrance to Port King.

Great Island lies about 1.2 miles WSW of Sandbar Island. In the channel between Great Island and the SW entrance point to Findlay Harbor is an islet joined to the point by foul ground.

Tickle Pass, with a least known depth of 10.3m, is the channel between the islet and Great Island. This passage can only be used by small vessels with local knowledge as it is narrow and subject to strong current.

A shoal, marked by kelp, with a depth of 9.4m, lies 2.75 miles WSW of the N tip of Great Island. Off the NW side of Great Island, depths less than charted may exist.

Vessels with local knowledge may obtain good anchorage in Anchorage Bay. This cove lies on the E side of Great Island and has depths of 21.9 to 27.4m.

Directions.—The passage E of the Tyssen Islands, which leads to Port King, Wharton Harbor, and Findlay Harbor, is mostly free of dangers except for a 12.8m shoal 0.5 mile SE of the northernmost Tyssen Island. The kelp on the reef projecting 0.4 mile S of Sandbar Island is frequently run under by tidal currents.

Ruggles Island (52°03'S., 59°42'W.) fronts the SW part of Ruggles Bay. Clump Islet and Wolf Island lie, respectively, 1.75 miles NE and 1.5 miles NW of the N tip of Ruggles Island. Rocks, awash, and patches of kelp, lie halfway between Clump Islet and Great Island, 2.5 miles NE. A rock with a depth of 1.8m lies 0.5 mile ESE of the N tip Ruggles Island.

A patch of rocks with depths less than 2m lies 1.25 miles WSW of the same point. Rocks project 1.25 miles WNW and a detached rock, with a depth of 2m lies 1.75 miles W of the SW end of Ruggles Island.

Ruggles Bay lies E of Ruggles Island and is entered between that island and Wolf Island, 1 mile NE. Moffittt Harbor and Danson Harbor are coves at the head of the bay. Robinson's Patch, a shoal with a depth of 7.7m, lies about 183m NW of the peninsula separating the two harbors.

Anchorage.—Vessels with local knowledge may find good anchorage in Ruggles Bay. The best berth can be found in the SE corner of the bay as the bottom is hard near the entrance.

Calista Island (52°01'S., 59°50'W.) lies in the S entrance to Falkland Sound. Wedge Islet and other islets, rocks, and kelp patches form an archipelago stretching 4 miles NE to within 1 mile of Great Island.

A shoal, with a least known depth of 8.2m, lies 2 miles S of Calista Island. Depths less than charted may exist on the shoal.

10.38 White Rock Point (51°24'S., 59°10'W.), 34m high, comprises the NW entrance point to Falkland Sound. White Rock, conspicuous, haystack-shaped and whitened by lichen, lies at the end of a rocky ledge that projects some 0.2 mile NE from White Rock Point and rises to a height of about 26m.

Rocks, awash and marked by kelp, lie 0.75 mile ENE of White Rock. The kelp on these rocks is only visible at slack water. The passage between these rocks and White Rock has a least depth of 12.8m. However, the passage can only be used in good weather by vessels with local knowledge.

White Rock Bay is entered between White Rock Point and Jersey Point, 2 miles S. Jersey Point is long, thin, and steep-to, and rises from a height of 40m at its seaward tip to 120m near the head of the bay. Jersey Harbor is formed by two coves in the S part of the head of the bay.

Small vessels with local knowledge awaiting fair weather or tide can find anchorage in White Rock Bay sheltered from W and SW winds. Although the head of the bay has not been surveyed, it is known to provide good shelter. Most of the dangers are marked by kelp.

The kelp-fringed coast between Jersey Point and Many-Branch Harbor, about 8 miles SW, is mostly steep-to and consists of cliffs, 30 to 60m high. Mount Rosalie, 425m high and prominent, lies about 3 miles N of the Many-Branch Harbor entrance.

Many-Branch Harbor lies between two cliffy headlands and is a good harbor whose entrance is tortuous and narrow. The harbor should not be entered without local knowledge as it has not been examined. Bold Cove, 7.5 miles SW of Many-Branch Harbor, offers good anchorage, in 14.6 to 15.8m, mud.

10.39 Port Howard (51°39'S., 59°32'W.) lies 11 miles SW of Many-Branch Harbor and is narrow, but very secure. West winds are often stronger in Port Howard than in the sound outside, with squalls that are violent off its W shore.

Winds, locally named “Woollies” are funneled by the surrounding hills. The N part of the inlet is covered by kelp streamers which may block condenser inlets. Kelp marks the shoal water on either side.

A settlement lies on the W side of the head of a creek located at the N part of Port Howard, 2 miles NNE of the entrance.

Port Howard

Situated on the W side of the creek is a T-headed pier, 9m long, with depths of 3m alongside its head, utilized by vessels up to 30m long.

Anchorage.—Good anchorage, for vessels with local knowledge, may be found just inside the heads, in depths of 7 to 8.9m, with soft mud. Moreover, anchorage further N is not recommended as the swinging room is restricted and there are many patches of kelp.

There is additional anchorage available in a small cove outside Port Howard, 0.8 mile S of the entrance.

10.40 Shag Harbor (51°44'S., 59°35'W.) lies 6 miles SW of Port Howard and is suitable only for small craft. A kelp-covered reef extends 0.3 mile NE from the S entrance point; depths up to 18m exist in the harbor.

Holding ground is excellent but anchoring is not recommended as W winds cause violent squalls to blow down the ravine.

There is a good anchorage off the entrance to Snug Harbor, taking care to avoid a line of below-water rocks and shoals extending NE from West Swan Island and lying about 0.7 mile off the entrance. This danger may reach as far NE as the reefs S of Port Howard.

The Swan Islands are comprised of North Swan Island, Swan Island, and West Swan Island, which all lie off the entrance to Snug Harbor. For the most part the islands are low, flat and grass-covered; their coasts are formed by cliff up to 10m high.

Patches, with depths of 13 and 17.7m, lie 5.5 and 3.75 miles NE of North Swan Island. A wreck, with a depth of 14.8m, lies 0.9 mile E of the extremity of the same island. A kelp-covered shoal, with a depth of 8.7m, lies 0.5 mile N of the N extremity of the same island. A shoal, with a least known depth of 11.8m, lies 1 mile E of Swan Island.North Swan is connected to Swan by a rocky bank through which there is no passage. A 13m patch lies 5.25 miles NE of North Swan. Swan Passage, between Swan Island and West Swan Island, is narrowed by a

reef extending from both islands and has not been fully surveyed.

The least known depth in the center of the channel is 8m, but a reef, with a least depth of 1.9m at its outer end, extends about 0.3 mile W from the W extremity of Swan Island. Kelp marks the edges of the channel. Swan Passage should be used only by small vessels with local knowledge.

The narrow channel W of West Swan Island is not recommended as it is blocked at its SW end by shoals. An anchorage, which is not recommended during N and W winds, for vessels with local knowledge, lies 0.5 mile N of a foul cove on the N side of North Swan, in a depth of 14m.

The headland which forms the E side of this foul cove may be identified by a prominent house and shearing shed with a boat jetty.

Caution.—Tidal currents attain rates of 2.5 knots between Swan Island and North Swan Island, and 3 knots in Swan Passage. A large standing wave forms at the S end of Swan Passage during S gales.

10.41 Oberon Patch (51°49'S., 59°41'W.), which is marked by kelp and almost dries, lies 2 miles SW of the S tip of West Swan Island. This patch has depths of 10m close around it. An 8m shoal, marked by kelp, lies 1.5 miles ESE of the center of Oberon Patch.

Depths less than charted may exist SW, NE, and E of Oberon Patch, off the N entrance to Hill Gap Cove. A rock, awash at HW, lies 0.75 mile WNW of Oberon Patch.

Hill Gap Cove (51°48'S., 59°44'W.), which is entered about 4 miles WSW of the W tip of Swan Island, affords anchorage for small vessels with local knowledge, in general depths of 11m. The Hill Gap Islands, lying 0.5 mile offshore, project 5 miles SW of Hill Gap Cove. Passage between these islands and West Falkland Island is not recommended.

West Island (51°58'S., 59°49'W.) is small and surrounded by rocks. The channel between West Island and the point 1 mile NW, though deep, is narrowed by a rocky shoal with rocks, the largest of which dries 1.5m, projecting from the point.

East Head lies 6.5 miles WSW of West Islet, and represents the NW entrance point of the S entrance to Falkland Sound.

Directions.—Deep draft vessels intending to transit Falkland Sound are advised to do so by daylight only. Vessels should endeavor to identify Eddystone Rock and Cape Dolphin prior approaching the N entrance.

On the E and W sides of the N entrance to Falkland Sound, Fanning Head and Goat Hill, respectively, are easily identified, especially the former.

As the entrance to the sound is approached, Tide Rock, Jersey Point, and White Rock can usually be made out.

When approaching Falkland Sound from N, head for the high double summit of Fanning Head or, if this is obscured, make good a course of 186° from a position 1.5 miles W of Eddystone Rock, until 2 miles off Race Point. Then steer to pass E of Tide Rock. Tide Rock bearing more than 190° leads E of Sunk Rock.

The depths between Eddystone Rock and the entrance to the sound are fairly regular, over fine black speckled sand. A ledge extends 0.2 mile off Race Point, then to Fanning Head, the E shore is clear of dangers. Vessels entering the inner part of Port San Carlos should not proceed E of Hospital Point, 1.5 miles SE of the E tip of Fanning Island, without local knowledge.

From off Fanning Head, a vessel with local knowledge bound for San Carlos Water should alter course to keep the prominent rocky outcrop near the extremity of **Jersey Point** (51°26'S., 59°11'W.) bearing 314°, astern. This leads towards the entrance to San Carlos Water, clear of all dangers.

When the conspicuous white house at the head of San Carlos Water bears 159° alter course to that bearing which will lead abreast of Ajax Bay.

Vessels continuing SW through Falkland Sound from abeam of **Fanning Head** (51°28'S., 59°08'W.) follow the fairway towards the entrance to Main Passage, which lies between High Cliff Island and the Swan Islands. Through main passage, after rounding Swan Island, vessels steer with the SE tip of that island astern bearing 062°.

When NW of the 5.5m patch, marked by kelp, which lies 2.5 miles W of the N end of West Tyssen, change course SSW to pass 1 mile E of West Islet, then SE to pass NW of Calista Island and the islets and rocks projecting NE from it.

A shoal depth of 9.1m was reported to lie 0.5 mile NE of West Islet.

Vessels entering Falkland Sound from S, should avoid the reef, marked by kelp, extending SW from the W tip of George Island. After passing Wood Shoal, the directions described above should be followed in reverse order.

West Falkland Island

10.42 Pebble Island (51°17'S., 59°41'W.), whose E tip lies about 10 miles WNW of White Rock Point, is separated from the mainland by Tamar Pass. Cape Tamar, the N tip of Pebble Island, is a steep and cliffy promontory. Close off the cape are three or four sharply pointed rocks.

The peaks of Pebble Island are conspicuous when approaching from N, and are the best marks for identifying this section of coast.

Tamar Pass (51°20'S., 59°24'W.), which separates the E end of Pebble Island from the mainland of West Falkland Island, leads into Ship Harbor (Tamar Harbor) and Inner Pass, 1.5 miles SW. Tamar Pass is narrowed by a reef that projects halfway across it from the W side.

The kelp on this reef is run under by the strong tidal currents, and the eddies are very dangerous. Ship Harbor (Tamar Harbor) affords the first shelter W of Falkland Sound, but it should not be entered without local knowledge.

A rock, with a depth of 2m, and a 2m shoal, both covered with kelp, lie in the fairway between Tamar Pass and Inner Pass. This shoal has not been examined.

Tides—Currents.—One part of the flood current, running W along the N coast of West Falkland Island, runs S through Tamar Pass, where it attains a rate of 6 to 10 knots. The other part sweeps round Government Islet and enters Keppel Sound, SW of Pebble Island.

Directions.—Tamar Pass should only be used by vessels with local knowledge. Reportedly this pass is not difficult to navigate during slack water when kelp may help to mark dangers.

A vessel with a draft of 4.3m entered Pebble Sound from sea by passing about 0.1 mile W of the E entrance point to Tamar

Pass, then 0.4 mile W of a prominent point 0.7 mile S, then 0.3 mile N of an island lying close N of the E entrance point of inner pass, and finally into Pebble Sound.

When proceeding NE through Inner Pass and Tamar Pass, enter Inner Pass, keeping in mid-channel. When the island situated close N of the E entrance point of Inner Pass is abeam to starboard, alter course towards the prominent point 1 mile ENE of the island.

When 0.4 mile from this prominent point, alter course to port to pass 0.15 mile off the E entrance point of Tamar Pass. Do not pass closer than 0.15 mile from the E entrance a rock lying off the point which may not show and on to which current sets.

A shoal depth of 6.4m reported lies 0.8 mile N of the E entrance point of Tamar Pass; this shoal has not been examined.

10.43 Elephant Bay (51°17'S., 59°34'W.) indents the N shore of Pebble Island about 6 miles NW of Tamar Pass. There is no good anchorage on the N side of Pebble Island, but with offshore winds temporary anchorage may be found by vessels with local knowledge on the W side of this bay.

There is a settlement on the S side of the narrow isthmus that forms the SW side of the bay. The approach to the settlement through Elephant Bay is not recommended.

Government Island (51°13'S., 59°54'W.), with an elevation of 30m, is long and cliffy. Government Island lies on a bank of kelp-covered rocks, the passage between being foul with kelp.

Shoal depths of 9 and 8.5m lie 0.8 mile and 1.5 miles W, respectively, of the W end of Government Island.

Port Egmont Cays are comprised of two small islets, 30m high, and lie between 3.5 and 4.5 miles WNW of Government Island. The main islands lie in an area of kelp in which there are some above-water rocks.

A rock, with a depth of 2m or less, and which sometime shows in heavy seas at LW, lies 0.5 mile E of the SE islet, just within the kelp area.

Wreck Island (51°09'S., 60°14'W.) lies about 9 miles WNW of Port Egmont Cays, and a reef projects 1 mile E and N from it. From N, Wreck Island first appears as 3 low islets, and actually it is very low, little more than a reef.

The area between Wreck Island and Sedge Island, 4 miles W, is full of kelp-covered rocks visible at half-tide. Sedge Island consists of flat layers of rocks, the tops of which are covered with tussac grass. The N coast of this island is cliffy and from 5 to 10m high.

Vessels with local knowledge can find temporary anchorage off the W cove on the S coast of the island, in a depth of 33m, and. It was reported that Sedge Island lay 0.5 mile N of its charted position.

A rock, awash, has been reported to lie approximately 1 mile off the S shore of Sedge Island. Sollis Rock lies 1.5 miles S of Sedge Island. Also, it was reported that a patch of kelp is about 4 miles SW of the W end of Sedge Island.

10.44 Pebble Sound (51°22'S., 59°30'W.), lying between Pebble Island and the mainland, is encumbered by many islands and shoals. This sound provides good anchorages for small vessels with local knowledge. Pebble Sound is entered from E through Tamar Pass and from W through North West Passage, Anxious Passage, and an unnamed passage.

North West Passage is located 1 mile SW of **Rabbit Point** (51°18'S., 59°42'W.). Sea Lion Islet, 3m high, lies on the NE side of the passage, close S of Rabbit Island. Paul Islet, low and grassy, and Horseshoe Island lie on its SW side. This channel should only be used by those vessels with local knowledge.

Caution.—Range lights leading through this channel have been reported missing (2001). Without the range, the passage is unsafe, even at slack water.

To the NE of Horseshoe Island, the channel is constricted to a width of about 0.1 mile, within the 4m depth contour, by spits extending NE from that island and SW from Rabbit Island.

Tides—Currents.—The tidal currents in North West Passage may exceed 5 knots, and the channel should only be used at or near slack water. This flow continues to sweep through a part of Pebble Sound and meets that current that has entered from Tamar Pass, causing whirlpools and eddies. Slack water is only of short duration, and then the opposite current begins to run with equal strength.

10.45 Anxious Passage (51°22'S., 59°48'W.) lies between the SW tip of Golding Island and Passage Island, and leads to Rock Harbor. Another passage, which is very narrow, also leads to Rock Harbor. Both above passages are intricate and can only be used by small vessels with local knowledge and are not recommended. Port Purvis is entered via a narrow entrance situated near the E end of Pebble Sound.

Keppel Sound lies between Keppel Island and the W end of Pebble Island, 4.5 miles ENE. This sound, which is entered between North Point and Keppel Islet, 2.25 miles ENE, is connected to Pebble Sound by North West Passage.

Cove Hill, 233m high, is a prominent cone-shaped peak which is located on the NE part of Keppel Island. A reef, on which are some rocks awash, and marked by kelp, projects 0.7 mile NE from North Point.

Another reef, also kelp-covered, projects 1.5 miles NE from Reef Point. Reef Point lies 2.75 miles SE of North Point. Kelp extends between Keppel Islet and a 2.7m shoal, 1 mile W.

Committee Bay (51°20'S., 59°54'W.), on the E side of Keppel Island, is entered between Lancaster Point and Gascoigne Point, 0.6 mile S. The settlement is located on the W side of the bay. The main house of the settlement, which is the nearest building to the shore, is white and visible to ships entering the bay on a clear day.

Close behind the main building are the ruins of the old mission, which are not prominent from seaward.

An anchorage for vessels with local knowledge lies about 0.5 mile E of the settlement, in a depth of 3.7m. Vessels with drafts greater than 4.3m should not proceed W of a line joining the two entrance points of the bay. A kelp-covered reef, which partly dries, extends 183m NE of Gascoigne Point.

Bold Rocks, which are located 2 miles SSW of Reef Point, form a prominent circle of drying rocks. Two rocks, named East Bold Rocks, lie 0.5 mile NE of Bold Rocks.

There is an anchorage, for vessels with local knowledge, on the S side of the passage between Bold Point and Bold Rocks, in a depth of 11m.

Directions.—Vessels with local knowledge and intending to enter Keppel Sound from N should try to identify **Mount Harston** (51°17'S., 60°18'W.). This peak, 433m high, will be seen in clear weather, before Sedge Island and Wreck Island,

though its summit is not well-defined. There is a clear channel on either side of Port Egmont Cays.

The fairway into Keppel Sound is about 1 mile wide between the reef projecting NE from North Point and the kelp projecting from Keppel Islet. Vessels approaching from W enter North West passage at or near slack water.

10.46 Elephant Point (51°15'S., 60°18'W.) is the NW tip of Saunders Island. A group of below-water rocks lies 4.5 miles WNW of this point, and any kelp which marks this obstruction is usually swept under by the tidal currents. Race Rocks lie 1.25 miles NW of Elephant Point. There is a rocky patch with a depth of 6.1m, usually marked by a tide rip, that lies 0.75 mile N of Race Rocks.

Port Egmont (51°21'S., 60°00'W.) is formed by the SW coast of Keppel Island, the SE coast of Saunders Island, and the N coast of West Falkland Island. Port Egmont provides good anchorage for those vessels with local knowledge. The tidal currents are not strong. The N, and usual entrance, between Saunders Island and Keppel Island, is about 0.7 mile wide and free of dangers.

A small patch, marked by kelp, with a least depth of 11.6m, which is not always visible, lies 1.25 miles NW of Gull Point, the W tip of Keppel Island.

A below-water reef, marked by kelp, projects 0.5 mile NNW from Gull Point. Island Channel, with a least depth of 7.1m, leads to Port Egmont from Keppel Island. Small vessels with local knowledge can utilize Reef Channel, located at the SW end of Port Egmont between West Falkland Island and the SE coast of Saunders Island. This channel, which leads to Burnt Harbor and then to Byron Sound, is narrow, tortuous, and encumbered with rocks and kelp patches.

Tides—Currents.—Currents attain a rate of up to 5 knots and the kelp is clearly visible at LW.

Anchorage.—Vessels with local knowledge can utilize a berth 0.2 mile off Settlement Cove, 3 miles S of Gull Point, in a depth of 11m, sand and shells.

Anchorage may be found further SW in Sealers Cove, in a depth of 12.8m, mud and sand, which is better sheltered from S winds. It is considered unwise for any vessel to anchor closer than 0.25 off this cove owing to the very thick kelp.

The stern post of a wooden wreck lies close inshore in the NW part of Sealers Cove and is visible at LW. The settlement is situated 0.2 mile S of its charted position. The largest white house in its center, bearing 267°, leads into the anchorage.

Directions.—Vessels with local knowledge bound for Port Egmont from N should, as above, strive to identify Mount Harston. The entrance to Port Egmont is easily seen from the passage between Wreck Island and Port Egmont Cays.

Island Channel, with a least depth of 7.1m, leads to Port Egmont from Keppel Sound.

10.47 Carcass Island (51°16'S., 60°33'W.) is the largest of a chain of islets that projects about 16 miles NW from the SW tip of Saunders Island. This island is prominent for a double peak, 220m high, in its center. Off the NW end of Carcass Island lie The Twins, the outermost of the chain of islets. These two islets rise steeply to a height of 17m.

Off the SE end of Carcass Island are the steep-to Needles Rocks. Carcass Reef lies off the SW side of the island.

Port Pattison (51°18'S., 60°33'W.) lies within a bay off the SW side of Carcass Island; on the N shore is Carcass Island settlement. Kelp abounds in the bay and unless in possession of local knowledge vessels should keep outside the line joining the two entrance points. A rocky islet lies between these headlands.

Anchorage.—Anchorage, with good holding ground, can also be found in a bay on the SE side of the island. The only kelp here can clearly be seen off the N entrance point of the bay. Vessels should not pass between Carcass Island and Needles Rocks.

Low Island and Dunbar Island lie 2 and 5 miles SE, respectively, of Carcass Island. A large shoal, with a least depth of 11.9m, lies 1.5 miles NE of Low Island. A kelp reef, with a least depth of 2.4m, extends nearly 1.5 miles E from the N end of Low Island.

A group of drying rocks lies 1.75 miles N of Dunbar Island while another drying rock lies 1.25 miles E of the E end of Dunbar Island. Button Islet, a hummock off the SE end of Low Island, is reported to be a good mark for the passage W of Dunbar Island. Rocky outcrops lie about 0.5 mile W and SW of Low Island.

Directions.—The recommended route for vessels with local knowledge into Byron Sound from N is that channel between Needles Rocks and Low Island, keeping 0.5 mile E of Needles Rocks. Due to the many dangers, passage between Button Islet and Dunbar Island is dangerous.

10.48 Byron Sound (51°25'S., 60°17'W.) is much exposed to W gales that send a heavy sea up to its head. Sloop Rock, which lies close to the shore near the NW end of the sound, is white and very prominent. The land S of Byron Sound is mountainous.

Mount Adam (51°36'S., 59°55'W.), the highest in the Falkland Islands, rises to a height of 700m about 9 miles SE of **Hill Cove** (51°29'S., 60°05'W.).

Burnt Harbor is situated on the N shore of Byron Sound between Saunders Island and Burnt Island. This harbor affords the only good anchorage at the head of Byron Sound.

Fairway Reef in the W entrance, which dries up to 1.5m, forms two narrow channels suitable only for small vessels with local knowledge. The N channel is about 0.1 mile wide and steep-to; the S channel is 0.2 mile wide but shoals on its S side. Both channels are marked by kelp. Kelp Passage, the channel SE of Burnt Island, is very narrow and can only be used by boats.

The anchorage lies about 1.2 miles inside the W entrance, in depths of 7 to 10.8m, mud.

Westpoint Island (51°21'S., 60°41'W.) is situated about 0.5 mile W of the tip of the peninsula that comprises the SW shore of Byron Sound. Gibraltar Reef projects 8.25 miles WNW of the NW tip of West Point Island. This kelp-covered reef has considerable tide rips except at slack water.

Gibraltar Rock, which is very prominent, is located on Gibraltar Reef, about 2 miles from Cape Terrible, the NW tip of West Point Island. White Rock, 6.1m high and pink in color, lies on the NW part of Gibraltar Reef.

Tides—Currents.—The flood current sets to the W along the N side of West Falkland Island for about 2 hours after it is HW in Port Egmont. At springs it runs at a rate of almost 3

knots off the points and around the islets, causing strong tide rips in heavy weather.

The flood current sets strongly around the W end of Carcass Island toward Gibraltar Reef and also through all the passages into Byron Sound. There is little tidal current in that sound until as far W as Carcass Reef, where the flood gets strongly towards Hope Harbor and through it to the S. It attains a rate of 7 knots at springs; during the flood current there is a weak N eddy close under the E shore of West Point Pass.

The ebb or E current sets from Hope Harbor towards both ends of Carcass Island and through the channel E of the island to the N. Again, this current is scarcely felt in Bryon Sound. The tidal currents run directly across Gibraltar Reef at a rate of 5 knots.

The flood current runs S, after passing the NW point of Saunders Island, between Carcass Island and the islets near it, and through all the channels between West Point Island and the several Jason Islands. In this area, the last 4 hours of the flood and the first 2 hours of the ebb run to the N.

10.49 Hope Harbor (51°20'S., 60°40'W.) is entered W of Hope Point and is formed by a cove on the E side of West Point Island.

Directions.—Westpoint Pass, known locally as Wooley Gut, is the channel that leads into Hope Harbor from S. For vessels with local knowledge this passage is relatively simple to navigate, but tidal currents are strong.

Squalls have been known to descend from West Point Island during SW and W winds. These squalls form small waterspouts which rarely last for more than a few seconds.

Vessels with local knowledge heading, from N, for Hope Harbor or other harbors S of it should avoid passing W of Carcass Island. From Sedge Island or Wreck Island to the E end of Carcass Island, the only known dangers are Sollis Rock which dries 2m, an 11.4m shoal 4 miles WSW of Sollis Rock, the 7.3m rocky patch 0.75 mile NNW of Race Rocks, and the below-water rocks 3.5 miles WNW of them.

A race projects 1 mile W from the 7.3m patch during strong winds, and it should be given a berth of 1 mile. From this position course can be made for Needles Rocks. The channel E of Needles Rocks is the preferred one, and then to the entrance to Hope Harbor, where the only danger is the 5.7m shoal 0.4 mile NNW of Hope Point.

Vessels entering Hope Harbor should not pass Hope Point nearer than 183m because kelp is under run by tidal currents.

The ebb current sets strongly to the E off the point. A tidal race exists between Hope Point and West Point Island, intensified on the flood during springs with SW or S winds.

Should it be necessary to pass to the W of Carcass Island, which is not recommended, the best passage is 1 mile W of The Twins and 1 mile E of the rock that breaks, 2.5 miles NNW of Carcass Island. West of this rock are some reefs, the kelp on which shows only at slack water.

Vessels should exercise caution to avoid these reefs, as no clearing marks can be given.

Anchorage.—Vessels with local knowledge can find anchorage, although restricted, in the cove on the E side of West Point Island. This anchorage has been used by a vessel of 2,641 gt and 92m long. There is a large patch of kelp off the entrance, with a least depth of 12m.

This is the best anchorage for a long stay as it is not exposed to the heavy squalls from West Point Island.

Caution.—Vessels should take care not to mistake the low isthmus E of Hope Point for the harbor entrance in poor visibility. Hope Point, the NW tip of West Falkland Island ends in a low knob that is higher than the narrow isthmus close E of it. From N the entrance is not easily made out. It lies between the high ground of West Point Island and the lower ground E.

A shoal, with a least depth of 5.7m lies about 0.4 mile NNW of Hope Point. A ridge, with a least depth of 5.5m, projects S across Hope Harbor from a position ESE of Hope Point.

10.50 The **Jason Islands** (51°00'S., 61°15'W.) form an archipelago of islands that projects about 40 miles NW from Carcass Island. Jason West Cay, located at the extremity of the chain and Jason East Cay, 5 miles E, are similar in nature, that is, low and small.

A patch of kelp, position doubtful, has been reported 6.5 miles N of Jason East Cay. There are several shoal patches and reported shoals lying within an area up to 12 miles NE, N, and NW from Jason East Cay. They may best be seen on the chart.

The shallowest known depth lying off the Jason Islands is a 9.8m patch lying 12 miles NNW of Jason East Cay.

Steeple Jason, 1.5 miles SE of Jason East Cay, consists of two parts, which rise to elevations of 263 and 290m, joined by a low, narrow isthmus.

Grand Jason, the largest and highest of the group, rises to an elevation of 361m. The only possible anchorage off the Jason Islands exists in a cove off the NE side of Grand Jason.

A vessel of 1,600 gt approaching from NE found depths of more than 55m until within 0.5 mile of the shore and anchored in this cove, in 36m, rock. Also, a vessel of a similar size anchored in the cove, in 25m, rock, with reasonable shelter from a SW gale. This vessel reported no signs of dragging in winds up to force 10.

Tidal currents are reported to run viciously through the Jason Islands, attaining rates of up to 8 knots at springs.

The Fridays (51°03'S., 60°57'W.) and Flat Jason, 3 miles SE, are moderately low. A strong race with heavy overfalls has been observed on either side of The Fridays. A shoal with a depth of 22m lies 0.7 mile SE of The Fridays. A reef was reported to extend up to 1 mile NE of the islets. A reef was reported to extend up to 1 mile N and NNW of Flat Jason.

Seal Rocks, with North Fur Island 1 mile ESE, are low and barren. A reef, with rocks, awash, extends 1.25 miles WNW from Seal Rocks.

Elephant Jason and South Jason, close SW, lie between Flat Jason and **South Fur Island** (51°15'S., 50°81'W.); they are steep-to and attain elevations of 208 and 288m, respectively.

A shoal, with a depth of 15.3m, located 5 miles WSW of South Jason, should be avoided.

Lindblad Reef, lying 1.5 miles S of South Jason, and extending over 2 miles WSW to ENE, has several drying rocks on it and often breaks. The area NE of this reef is unsurveyed.

Hope Reef projects 4.25 miles ENE from the NE tip of **South Jason** (51°12'S., 60°52'W.). The passage E of this reef, between North Fur Island and Carcass Island is encumbered with reefs and kelp patches with tide rips.

Hunt Rock, 4.5 miles S of North Fur Island, has a depth of 7.8m but has not been examined. Goodwin Reef 6 miles ESE of North Fur Island, has a depth of 6.8m.

The passages between the Jason Islands are generally clear of dangers, although tidal currents run strongly through them.

Gammon Channel leads between Flat Jason and Elephant Jason. Hecate Passage, the channel between Elephant Jason and South Jason, has been sonar swept to a least depth of 28m, although a shoal with a depth of 25.5m charted 1.25 miles S of North Fur Island has not been disproved.

There are many dangers between South Jason and Westpoint Island, and the tidal currents run strongly.

Forrest Gap leads between South Jason and Lindblad Reef.

10.51 King George Bay (51°31'S., 60°39'W.), SW of Byron Sound, is entered between Death's Head and Dunnose Head, 15 miles S. In almost the center of the entrance lies Split Island, 155m high. The passage into the bay on either side of the island is wide, deep and clear.

Port North, a deep bight on the N shore of King George Bay, is exposed to W and SW gales, and has depths from 18.3 to 29.3m Cliff Island, with a rock, awash, and an islet close NE, lies off the entrance to Port North.

Bense Harbor, between the two Bense Islands and the S entrance point of Port North, affords anchorage for small vessels. A clear passage runs through the harbor.

Rabbit Island (51°33'S., 60°29'W.), whose W side is high and prominent, lies about 5 miles SE of Cliff Island. Rocks, locally known as the Lion Islets, lie close S of the island. A patch of kelp lies 1.75 miles W of the S end of Rabbit Island.

Hummock Island (51°37'S., 60°26'W.) is the best guide for a vessel heading up King George Bay. The peak forms a cliff on the N side and slopes S.

There are a chain of small islets between Rabbit Island and Hummock Island, through which there are three good passages. One of the passages is close to the S tip of Rabbit Island,; the other two lie on each side of an islet nearest to Hummock Island.

These passages are clear of known dangers and, as tidal currents set rapidly through them, vessels should endeavor to remain in the middle of these passages.

10.52 Whaler Bay (51°33'S., 60°27'W.) affords good anchorage for vessels with local knowledge 0.5 mile ENE of Rabbit Island except during winds from the SE.

The narrow channel between Rabbit Island and the mainland N is scarcely available for even the smallest vessels, as the currents are strong. Roy Cove is a secure inlet entered 3 miles E of Rabbit Island.

There is an important settlement here and a pier with an alongside depth of 4.5m. There is swinging room for small vessels up to 60m in length.

Middle Island lies 2 miles ESE of Hummock Island; Gid's Island lies 1 mile further ESE. There is good anchorage off the E side of both of these islands.

Christmas Harbor (51°39'S., 60°15'W.) is located within an inlet at the head of King George Bay and entered between Brown Point and Town Point, 2 miles S. There is an important settlement situated on the N shore of the Chartres River, which flows into the head of the harbor.

The approach to this settlement is restricted by a sand bar SE of **Tide Islet** (51°40'S., 60°10'W.) and by shoaling in the final reaches. This sand bar is liable to shift and may reach further S than charted.

10.53 Brown Point (51°37'S., 60°15'W.), from a position on either side of Hummock Island, has the appearance, to a vessel approaching, of a somewhat bold promontory that ends in 9.1m cliffs. Town Point, about 2 miles S, has a sandy aspect, though much of it is covered by tussock grass.

The entrance is obstructed by foul ground that projects 0.3 mile NW of Town Point. A narrow patch of kelp, 0.75 miles long, lies in the middle of the outer part of the estuary, with its NW extremity 1.25 miles ENE of Town Point. The passage SW of this patch can only be used by small boats.

The passage to the NE is clear of known dangers and has depths of 6.7m as far as Tide Islet. Nearly 1 mile SE of Tide Islet, the estuary widens, but a bar, with depths of 4m near the S shore, projects across it. This bar, which in mid-channel and to the N, dries in places, is not marked by kelp due to a sandy bottom.

Low Point (51°41'S., 60°08'W.) lies 2 miles SE of Tide Islet; kelp-covered foul ground projects 0.3 mile W of a small islet SW of the point. Another area of kelp-covered foul ground is situated 0.7 mile ESE of this small islet, named Half-Tide Islet. Shallow Bay, whose entrance lies about 1 mile SW of Low Point, is foul.

Tides—Currents.—Tidal currents reach a maximum rate of 3 knots S of Tide Islet, and 3.5 knots in the narrows W of the settlement. The ebb is generally stronger than the flood. Elsewhere in the estuary the tidal currents are not as strong.

Anchorage.—Vessels with local knowledge can find a good anchorage abreast of Tide Islet, in depths of 8.8 to 14m.

To avoid the strong tidal currents. vessels with local knowledge can find better shelter with more swinging room, in similar depths, in an area S and SE of Half-Tide Islet.

Directions.—The following directions were used by a vessel with a draft of 3.7m. Vessels with local knowledge bound for Christmas Harbor should head to pass at least 0.3 mile off Brown Point. Then steer to keep 0.2 mile off the N shore, which will lead N of the narrow patch of kelp in the middle of the outer section of the estuary. This patch generally is radar conspicuous when within 0.3 mile of it.

When clear of the kelp patch course should be changed to pass 0.15 mile SW of Tide Island and steer 151° for a conspicuous fence that lies in a valley 1.5 miles SSE of Tide Island. The beach end of the fence is radar conspicuous.

When about 1 mile from the fence change course to 119° to bring the N edge of the S shore just open of a prominent white bunkhouse at Chartres Settlement and stay S of the shallowest part of the bar 0.5 mile N of the fence.

When clear of the bar, change course to 107°, heading for **Shallop Point** (51°42'S., 60°05.3'W.) and anchoring as convenient.

10.54 The **Passage Islands** (51°36'S., 60°45'W.) are a group of islands that project about 11 miles NW of Dunnose Head, and separate King George Bay from Queen Charlotte Bay to the S. East Passage, off Dunnose Head, and Whale Passage, between First Island and Second Island, are clear of dangers.

West Passage is narrow; False Passage, between Third Island and Fourth Island, is totally blocked by kelp.

Round Islet and Sail Rock, lying close off the SE tip of Second Island, are good marks for Whale Passage, the widest passage between the islands. A kelp patch, on which there is a tide rip during strong breezes, lies 0.75 mile NW of Fourth Island.

Two rocks, awash, lie close NW of Fourth Island. Another rock, awash, the existence of which is doubtful, was reported to lie in Whale Passage, about 0.5 mile SE of Round Islet.

Tidal currents set directly through the passages, turning at about half flood and ebb by the shore. The flood current sets SW.

Queen Charlotte Bay (51°43'S., 60°44'W.) is entered between Dunnose Head and Swan Point, the NE tip of Weddell Island. This bay is mostly clear of dangers, and has within its confines many fine harbors. A depth of 17.3m lies 3.25 miles NE of Swan Point. A shoal depth of 10.1m lies 9 miles SSE of Swan Point.

Philomel Road, in the E part of the bay, is entered between Green Islet and Black Rock, 1.25 miles SSE. A vessel entering Philomel Road can pass close to the S side of Green Islet and alter course directly into the roadstead. The chart and a lookout for kelp will be better guides than any directions.

A narrow passage lies N from the islet and almost joins the kelp off Dick Point.

Shallow Harbor is positioned in the NW corner of Philomel Road and is entered on either side of an islet located 1.5 miles NE of Dick Point. Vessels passing W of the islet should give a wide berth to Shallow Point. Shallow Point lies about 0.7 mile W of the above islet; foul ground projects 183m outside of the kelp off this point.

Vessels with local knowledge can obtain good anchorage in Shallow Harbor, in depths of 5.5 to 9.1m, mud.

10.55 Port Philomel (51°44'S., 60°13'W.) is entered via Philomel Pass, a narrow channel from the NE end of Philomel Road. Port Philomel is a harbor comprised of two arms; Port Philomel projects 7 miles ENE while Symonds Harbor projects 6 miles S.

There is a small bay on the N side of Halfway Cove, which affords good anchorage out of the tidal currents for those vessels with local knowledge.

Tides—Currents.—Currents in Philomel Pass run at a rate of 8 to 10 knots. These currents are particularly strong between the two islets in the narrows at the E end.

Within the inlet at Port Philomel, HW occurs 2.75 hours after HW in Philomel Road and Shallow Harbor. Also, the tide rise is 6m less.

Port Philomel affords good anchorage to those vessels with local knowledge in all parts, in depths from 12.8 to 18.3m. Vessels with local knowledge entering Philomel Pass from SW keep within 0.2 or 0.3 mile off the shore SW of Tide Point, the S entrance point of the pass. This avoids the reef projecting SW from the N side of the entrance.

Once inside the pass a mid-channel course avoids all dangers as far as the anchorage off Halfway Cove; however, a drying ledge was observed to extend from the N shore N of Tide Point.

Vessels proceeding through Philomel Pass, even on the incoming current, should anchor off Halfway Cove and await slack water to pass through the narrows at the E end. Known dangers in Port Philomel are marked by kelp.

Port Richards lies in the SE part of Queen Charlotte Bay and is entered to the S of **Queen Point** (Penguin Point) (51°57'S., 60°38'W.).

Vessels with local knowledge can secure anchorage in a cove on the N side of the inlet about 6 miles E of Queen Point.

Double Creek lies on the S side of Port Richard about 5 miles SE of Queen Point. This creek separates into two arms close within its entrance.

A house is reported to be standing very near the head of the E arm. The entrance itself is narrowed by some islets and rocks leaving passage to the W of them. Small vessels with local knowledge can secure anchorage S of the islets.

Carew Harbor and Anthony Creek are two small but sheltered inlets on the S side of Queen Charlotte Bay. These inlets, both backed by high land, are entered on the E and W side, respectively of a point 3 miles SSW of Queen Point.

Small vessels with local knowledge may find anchorage in Carew Harbor, in depths from 22 to 35m, and also in Anthony Creek. The S coves of both of these inlets offer anchorages, in depths of 7.3 to 12.8m.

Those vessels needing to anchor in Queen Charlotte Bay would do better to anchor in Carew Harbor or Anthony Creek as opposed to Port Richards.

Anthony Creek is the preferred anchorage as the water is not so deep; depths of 18.3 to 21.9m may be found off a cove on the W side, 1 mile inside the entrance.

10.56 Weddell Island (51°54'S., 61°00'W.), whose E shore forms the W side of Queen Charlotte Bay, is the SE and largest of a group of islands. Mount Weddell is the summit of the island and rises to a height of 381m. Weddell Island is separated from West Falkland Island by Smylie Channel.

Gull Harbor (51°53'S., 60°51'W.), situated on the E side of Weddell Island, is an excellent harbor. However, it has been reported that a heavy sea or swell sets in to this harbor during and after SE gales. There is a settlement in the NW part of the harbor with a small pier usable only by boats. A shoal, with a depth of 1m, lies 3.5 miles ESE of Mark Point.

Chatham Harbor is situated on the N side of Weddell Island and is entered E of **Bald Island** (51°46'S., 60°56'W.). All the known dangers within the harbor are marked by kelp.

Beacon Point (51°46'S., 60°57'W.) lies close SW of Bald Point, and is backed by a hill 83m high.

The channel between this point and Bald Island, small and round-topped with a high cliff on its W side, is clear of known dangers and has depths of 9.1m. Bald Road lies W of Chatham Harbor and affords good anchorage for vessels with local knowledge. This anchorage is approached via the above channel between Beacon Point and Bald Island.

Those vessels intending to pass E of Bald Island should give it a wide berth to avoid a patch of kelp lying NE.

Anchorage may then be taken in Bald Road or further up in Chatham Harbor. Elephant Cove, lying 2.5 miles S of Beacon Point, on the W side, affords the best anchorage in Chatham Harbor.

10.57 New Island (51°42'S., 61°17'W.), which forms the N side of Grey Channel, is a good mark for vessels bound into any part of King George or Charlotte Bays. The lofty cliffs of the N and W coasts of this island are notable.

To vessels coming from SW these high cliffs will be seen as the extremity of the land. From W, two small but high islands, North and Saddle, will be open N of New Island.

Between these islands and New Island is a narrow passage that is clear with much kelp.

The SE side of New Island is indented by North Harbor, Ship Harbor, and South Harbor. North Harbor is free from reported dangers. Kelp extends from the N shore and covers a shoal, with a depth of 3.7m, lying 0.3 mile S of the N entrance point. There is shelter from all but E and SE gales.

Ship Harbor is located N of Beef Island, 55m high; Ship Island located in the NW part of the harbor. There are depths of at least 30m S and E of Ship Island, where holding ground, fine sand, is reported good. There is shelter from all but SE gales.

South Harbor is situated SW of Beef Island and is further protected by Coffin Island, 122m high. Both islands are steep-to, with deep water to within 183m.

Anchorage.—Vessels with local knowledge can secure anchorage close to the head of South Harbor, abreast a peninsula close off its W shore, in a depth of 21.9m, stiff sand and mud. The holding ground here is good with ample swinging room. The alignment of the N extremity of Coffin Island with the S end of Beef Island, bearing 113°, astern, leads to the anchorage.

Anchorage has also been obtained 0.4 mile SW of the S end of Beef Island, in 31m, good holding ground. Shelter from E gales is obtained by anchoring in the lee of Coffin Island.

Within Ship Harbor vessels with local knowledge can obtain secure anchorage inside Ship Islet, located off the head of the harbor. The kelp is steep-to in every part of the harbor.

Vessels bound for Ship Harbor round **Bold Point** (51°40'S., 61°12'W.) and pass close SE of Cliff Island, about 2.2 miles SSW. From this position steer for Ship Islet at the head of the harbor.

Grey Channel divides New Island from Beaver Island and the islands to the E of it. This channel is clear of all dangers on either side of Seal Rocks, which lie in its SW and narrowest section, with the exception of a rock lying 0.35 mile NE of the NW extremity of Beaver Island.

Tides—Currents.—The tidal currents in Grey Channel attain a rate of 4 knots in a W direction and 6 knots in an E direction, at springs. Tidal currents of up to 1.5 knots may be experienced off the W coast of New Island; the N current is stronger than the S current.

Beaver Island (51°51'S., 61°16'W.) lies W of Weddell Island; between them are many islands and anchorages.

Caution.—Tide rips have been observed about 1 mile N of Cape Percival, the W extremity of Beaver Island, when the tidal current is setting W against the prevailing W winds.

Vessels are advised to pass N of New Island and not use Grey Channel unless conditions are favorable.

10.58 Beaver Harbor (51°49'S., 61°13'W.) is situated on the E side of Beaver Island, and provides the best of the anchorages between the two islands. The harbor can be approached by vessels with local knowledge N or S of Beaver Island.

The N approach to Beaver Harbor from Grey Channel is between the E coast of Beaver Island and the Channel Islets, 0.5 mile E. This approach can be identified by two notable rocks, named The Colliers, which lie in the middle of the entrance. These rocks, which from some directions resemble a vessel under sail, can be passed close on either side.

From S of the Channel Islets the approach to Beaver Settlement lies 0.25 mile S of the narrow islet S of **Peak Point** (51°48'S., 61°11'W.) and 0.25 mile S of Rookery Island, which lies 1.25 miles SW of Peak Point.

Vessels then pass between Rookery Island and a small islet 0.3 mile S. Fish Creek is entered N of this islet. A settlement, with a jetty and a flagstaff, stands near its head.

Vessels with local knowledge can obtain anchorage in Fish Creek close within the line joining the entrance points, 1 mile from the settlement, in a depth of 12.8m, clay, with good holding ground.

Vessels approaching Beaver Harbor from S do so through Governor Channel, between the S part of Beaver Island and Staats Island. There is a depth of 12m in the channel 0.6 mile SW of the E extremity of Governor Island; the channel can be used during all but the heaviest gales.

Vessels continuing through Governor Channel to Beaver Harbor then pass E or W of Governor Island (51°51'S., 61°10'W.). The channel W, suitable only for small craft with local knowledge, has a least depth of 3.7m.

The channel E of Governor Island, known locally as "Stick in the Mud Passage," is reported to be clear of dangers but unpredictable eddies may occur at the S end of the passage.

10.59 Staats Island (51°54'S., 61°11'W.) comprises the S side of Governor Channel and is remarkable for Staats Bluff, a detached cliff, 138m high, at its SW end.

Tea Channel (Tea Island Passage) is the passage on the E side of **Tea Island** (51°53'S., 61°09'W.).

There are several above-water rocks grouped close together SW of **Weddell Point** (51°53'S., 61°07'W.). Within the kelp that stretches across the entrance, there is a least depth of 11m, but it only shows at slack water. There is a heavy race across the entrance with a S gale. Horse Block, a conspicuous needle-shaped rock, 67m high, lies 2.5 miles SSE of Weddell Point and provides a good mark for making out Tea Channel from S.

French Harbor (51°50'S., 61°05'W.) lies E of the junction of Governor Channel and Tea Channel; though the channel is narrow, it is free of dangers.

Anchorage.—Vessels with local knowledge can find good anchorages sheltered from all winds off the NE point of Staats Island, in depths of 27.4 to 32.9m. Additionally, anchorage may be taken in French Harbor in the S part of the head of the inlet, in depths of 9.1 to 12.8m.

There are other channels too intricate to be used by vessels without extensive local knowledge. The tidal currents set strongly through them and at times form a heavy race.

Caution.—A shoal depth of 10.6m was reported in a position about 0.2 mile E of Horse Block; lesser depths may exist in the vicinity.

10.60 Smylie Channel (51°59'S., 61°00'W.), lying between the S end of Weddell Island and the SW end of West Falkland Island, is the entrance to Queen Charlotte Bay from SW. This channel is entered between Cape Orford and a point 2.5 miles NNE.

Cape Orford (52°00'S., 61°03'W.) comprises the W cliffy tip of a small isthmus.

Sea Dog Island, 42m high, lies about 0.5 mile NW of the cape. Sea Dog Passage, between Sea Dog Island and Cape Orford, is 0.5 mile wide.

Rock ledges extend 183m from the E side and 0.25 from the W side, the latter terminating in a depth of 7.9m. Kelp extends completely cross the passage. Vessels should keep 0.2 mile from the E side of the passage, where depths exceed 11m.

10.61 Race Point (51°59'S., 60°59'W.) is the S tip of Weddell Island and lies 2.75 miles ENE of Cape Orford; kelp marks depths of 5m which extend 0.3 mile S of the point, while numerous rocks, some awash, extend 0.15 mile offshore between the point and Stop Island, 1.25 miles E.

A bank of kelp, containing numerous shoals, some awash, at its outer end, extends 0.75 mile W and NW from Barren Head, the N extremity of Black West Island, situated 1 mile S of Race Point. The outer shoal, lying about 0.4 mile NW of Barren Head, has a depth of 3.9m, another shoal, lying 0.4 mile N of the head, has a depth of 3.2m. The fairway through the reef, between these shoals and those S of Race Point, is 0.25 mile wide, with depths of 7.1 to 8.8m and a rock bottom.

Tides—Currents.—The tidal currents attain rates in the fairway of 6.5 knots. Kelp stretches completely across the channel, but is generally run under, even at slack water, by eddies and overfalls. There is a race to the W of Race Reef during the W current. On calm days, a standing wave up to 1.5m may form, the height doubling during W winds.

During the E current, series of boils and eddies forms E of Race Reef, without a standing wave.

Off Race Point two openings will be noticed, one on either side of Dyke Island. The S opening leads to South Harbor. Vessels can obtain anchorage in all parts of South Harbor.

Anchorage.—Good anchorage may be found in Stop Cove, entered N of Stop Islet, 1.25 miles NE of Race Point.

Stop Islet, which is a low, green tussac islet, is joined to Weddell Island by a sand spit which covers at HWS. Stop Cove is the best anchorage in Smylie Channel.

The opening N of Dyke Island is the continuation of Smylie Channel into Queen Charlotte Bay. Smylie Rock, 1.5m high, lies in mid-channel, 3.5 miles NW of Stop Islet, and can be passed on either side.

The main channel, to the W, has depths of 24 to 44m. Rock Passage, to the E between the rock and Rock Point, the N extremity of Dyke Island, has depths of 11 to 13.8m about 0.3 mile N of Rock Point. A rock, which dries 0.5m, lies 0.4 mile N of Smylie Rock and a rock, awash, lies 183m S. Kelp and tide rips extend between this rock and Rock Point.

New Year Cove, an excellent harbor providing good anchorage, is entered 0.75 mile NNW of Smylie Rock; the cove is subject to strong squalls during W gales.

Circum Island, lying in the NE entrance of Smylie Channel, can be passed on either side. The main channel, to the E, has depths of 17 to 46m while Circum Passage to the W, has a least depth of 10.2m in the center.

Directions.—Entering from the W, a vessel should pass 0.35 mile S of Race Point, steering 103° with the S extremity of Dyke Island ahead on that bearing until Stop Island is abeam; then alter course NE to steer 052° with Smylie Rock ahead on that bearing, passing 0.3 mile NW of South West Point on Dyke Island.

When 0.6 mile from Smylie Rock, course should be altered NNE to steer 025° on the SE extremity of Circum Island.

When 0.5 mile from Circum Island course should be altered ENE to 058° with Hadassah Point, the S entrance point of New Year Cove, astern, bearing 238°, into Queen Charlotte Bay.

Caution.—The channel should be navigated with caution as the kelp, especially on the S side, is always run under, except at slack water. A vessel entering the channel from the W should note that the kelp on both sides of the narrows S of Race Point is visible only at slack water.

10.62 Rodney Cove (52°03'S., 60°59'W.) is a secure and safe anchorage for small vessels with local knowledge. The kelp projects almost across the entrance leaving a small lane of clear water near the middle. Vessels can anchor in any part of the cove, within the kelp, in depths of 5.5 to 14.6m.

Castle Rock, 52m high, lies 1.75 miles WNW of **Stephens Bluff** (52°11'S., 60°44'W.). Both Stephens Bluff and Castle Rock appear similar from WNW and W, that is, steep-to.

Port Stephens (52°12'S., 60°42'W.) is approached between Stephens Bluff and a point 2 miles E. Three Crowns, a notable hill with three summits of bare rock, attains a height of 146m 0.5 mile E of the point. Stephens Bluff is conspicuous and is the S end of an island connected to West Falkland Island by a shallow spit.

The entrance, which is 0.3 mile wide and is easily recognized, lies between **Pea Point** (52°10'S., 60°42'W.) and the W end of Cross Island, both cliffy and 18 to 21m high. Streamers of kelp will be seen in the approach, but there are ample depths.

Kits Creek lies SE of Cross Island and has an entrance 0.15 mile wide. Vessels with local knowledge can find good anchorage here, in depths of 11 to 31.1m.

Anchor Inlet is entered 1 mile NE of Pea Point and affords good anchorage to those vessels with local knowledge, off a sandy beach on the E side, 0.5 mile within the entrance, in depths of 16.5 to 23.8m, sand and mud.

At the head of the cove at the NW end of Port Stephens is a settlement comprised of some red-roofed houses and a flagstaff. A wool shed and a boat jetty are situated near the settlement on the N side of this cove. A stone cairn is located on the point 0.75 mile SE of the settlement.

Anchorage.—Vessels with local knowledge anchoring for the night will find a convenient place about 1 mile SW of Pea Point, in depths of 11 to 18.3m, sand and mud.

Vessels with local knowledge can find good anchorage in the NW part of Port Stephens, in a depth of 25.6m, with **Stephens Peak** (52°07'S., 60°50'W.) bearing 205°, distant 1.7 miles. This is a sheltered berth with a bottom consisting of a thin layer of mud rock.

Directions.—Vessels with local knowledge should have little trouble entering Port Stephens, keeping in mind that S and SW winds cause a heavy swell in the entrance.

The approach from W passes well off Castle Rock and Stephens Bluff.

However, if much swell from SW or S is present, open up the entrance well before standing in. From a position abreast of Stephens Bluff head E until the W tip of Cross Island bears 012°, and then alter course towards the entrance. Kelp streamers may be seen, but, these can be avoided by keeping a little E of this line.

When within the entrance, pass midway between the islets NE of Pea Point and the reef about 0.2 mile WNW, then shaping a course for Anchor Inlet or the settlement in the NW section of Port Stephens.

10.63 Cape Meredith (52°15'S., 60°39'W.) lies about 4 miles SE of the entrance of Port Stephens. There is a heavy race off the cape with S winds; tidal currents attain a rate of 3 knots. A shoal, with a depth of 12.8m, position approximate, was reported to lie about 0.5 mile S of the cape.

Several reported depths of between 25 and 52m lie between 1.5 and 3 miles SW of the cape; shallower depths may exist in this vicinity.

The **Arch Islands** (52°13'S., 60°27'W.), which lie 7 miles NE of Cape Meredith, are distinguished by their rugged appearance and sheer light-colored cliffs. The arch, from which these islands take their name, lies at the W end of the SW island.

The Clump Islets lie 0.2 mile W of the Arch Islands. Clegg Rock, with a least depth of 3.7m, lies 1 mile S of the Clump Islets. This kelp-marked shoal breaks in heavy weather and may be run under by tidal currents.

Arch Road, an anchorage for small craft, is entered E of the Clump Islets and between it and the SW end of the Arch Islands.

This anchorage is preferred to that of Port Albemarle because of more convenient depths. Vessels lie in Arch Road well sheltered from the swell, but exposed to the full force of the wind.

Albemarle Rock (52°13'S., 60°23'W.), 73m high, is saddle-shaped at the top and whitened by birds on its sides. This prominent sheer rock is a good guide for making Port Albemarle. A shoal depth of 8.9m lies close W of the S end of Albemarle Rock; another 7.9m shoal lies 0.2 mile NNE of the N end of Albemarle Rock.

Port Albemarle (52°11'S., 60°26'W.) is entered either through Arch Road or between the NE tip of the Arch Islands and Lucas Point, 2 miles NE. The depths within this harbor are too great for anchoring. Lucas Bay lies N of Port Albemarle and is entered E of Lucas Reef. Good anchorage may be found in Lucas Bay.

Albemarle Harbor lies 5 miles NW of the road at the head of the narrow North West Arm.

Anchorage can be obtained, in depths of from 18 to 21m. West Arm is clear of all dangers except for a sandy spit on the S side of the entrance.

Vessels with local knowledge can take anchorage sheltered from all but winds from ESE, in 14.6 to 18.2m sand, about 0.5 mile SE of the entrance to West Arm.

Chaffers Gullet is entered close NE of Lucas Point and its branches of water project several miles inland. However, it is too narrow to call for a more detailed description and should only be used by small vessels with local knowledge.

Wood Shoal, over 4 miles in extent, lies 8.5 miles ENE of Lucas Point. There are several isolated heads with less than 2m. However, the sea has been known to break during severe S gales and therefore may be shallower and should be avoided.

Wood Shoal is marked by kelp, extending up to 1.5 miles WSW, that might not be visible.

A patch of kelp, 2 miles SW of Wood Shoal, covers a depth of about 21m.

10.64 Port Edgar (52°00'S., 60°14'W.) is entered between South Head, the N extremity of Edgar Ridge, and North Head, 137m NE. South Head rises to a height of 127m. North Head rises to a height of 171m about 1 mile NE. Both these bluff headlands are easily made out after making Cape Meredith and the Arch Islands. The kelp-fringed rocks on both sides of the entrance are steep-to.

The tidal currents in the entrance are weak, and a heavy swell continues to run for sometime after a S gale.

Gull Point is situated on the NW shore of Port Edgar, 1.5 miles NW of North Head. A reef projects 91m E of the point, with a rock at its outer end from which foul ground projects 183m NE.

There is a settlement about 3 miles SSW of South Head. A narrow tongue of land called Settlement Spit projects about 0.5 mile N abreast the settlement, forming the E side of Settlement Creek.

Anchorage.—Vessels with local knowledge can anchor anywhere in the S arm of Port Edgar, off Edgar Ridge, in depths of 11 to 31m, sand or mud.

A good berth lies in the middle of this arm 0.2 mile E of the pier that lies on the E side of the S end of Settlement Spit, in a depth of 12.8m, mud.

10.65 Fox Bay (51°59'S., 60°01'W.) is entered between West Head and East Head, 2.5 miles E. Fox Bay is exposed during S winds to a heavy sea. However, small vessels with local knowledge, if caught here, can find good anchorage in North Arm at the W end of the head of the bay.

There are settlements on both sides of North Arm, about 0.5 mile above the first flat island. Both settlements have T-shaped jetties usable only by local craft. Fox Bay East Settlement is the port of entry to West Falkland Island for vessels over 15 gt. Vessels under 15 gt should report to Stanley for clearance.

Anchorage.—Within North Arm, vessels with local knowledge can find good anchorage, in depths of 5.5 to 7.3m, stiff mud, with Flat Islet bearing 190° distant 0.3 mile.

Flat Islet lies close within the entrance of North Arm off the W shore.

Directions.—Vessels with local knowledge can approach North Arm via a channel between Knob Islet and the kelp E. This kelp projects WSW from Kelp Point, which lies at the head of the bay 2 miles NW of East Head, to within 0.35 mile of Knob Islet. The kelp on either side marks the channel.

A small detached patch of kelp lies in the channel 0.7 mile ENE of Knob Islet.

South Georgia and the South Sandwich Islands

10.66 Shag Rocks (Rocas Cormoran) (53°32'S., 42°02'W.) are comprised of six main rocks which appear to be arranged in two groups of three. Shag Rocks are covered with guano giving them a light brown appearance. The main rock is 70m high. Black Rock, 3m high, lies 10 miles SE of Shag Rocks. A rock, over which the sea breaks heavily, lies 0.5 mile E of Black Rock.

Shag Rocks and Black Rock have been reported to lie 5.5 miles S and 0.5 mile E, respectively, of their charted positions.

South Georgia (54°15'S., 36°45'W.), a dependency of the Falkland Islands, is barren, mountainous and lies about 700 miles ESE of the Falkland Islands. For information on aspect, weather, ice, etc., see paragraph 10.1.

Directions.—The following represents general directions for making the NW end of South Georgia from NW.

In clear weather, the bearing of the Willis Islands and Bird Island will give a good position and Cape North will be easily made out. However, should the weather be thick, vessels should try to make the land at Cape Buller to order to avoid passing W of the island. Cape Buller, because of its elevation and rugged nature, is easily identified.

The Welcome Islets and small rocks that lie W of the cape are the only off-lying islands on this section of coast and they serve to also serve to render it unmistakable.

The Fortuna Glacier, about 15 miles ESE of the Bay of Islets, is very conspicuous when viewed from NE. After making Cape Buller the coast E is easily followed, the Bay of Isles, being readily apparent, has within it several glaciers. From the Bay of Isles, course should be changed to pass Cape Saunders, which can usually be made out if close in, but Larsen Point, farther E and also low lying, is generally easier to distinguish.

Cape George, 16 miles SE of Cape Saunders, is cone-shaped and stands out well from the land with some off-lying rocks. The coast between Cape Buller and Cape George appears to be free of all dangers beyond about 3 miles from the land.

The Nordenskjold Glacier is a good mark for approaching Cumberland Bay. If the weather is clear, Mount Paget, the highest peak on South Georgia, brought to bear 197° will lead towards Cumberland Bay. This mountain is snow-covered and saddle-shaped. The bottom in this vicinity is very irregular and is not a reliable indicator of the nearness of land.

For the most part, the holding ground at most of the anchorages is poor and gales come up with little or no warning.

10.67 The **Willis Islands** (54°00'S., 38°13'W.) are the outer group of a chain of islands and rocks that projects 10 miles W of **Cape Alexandra** (54°00'S., 38°01'W.), the NW tip of the mainland of South Georgia.

Bird Island forms the main group, which is separated from the Willis Islands by Stewart Strait. The Willis Islands are comprised of seven tussock-covered islands and a number of rocks.

Main Island, the largest of the group, is steep-sided and rocky, with a cone-shaped summit near its E side that rises to a height of 550m. The top is frequently overhung with clouds when other peaks are clear.

Acorn Rock, with an elevation of 20m, lies 0.4 mile off the NW side of Main Island.

Ramp Rocks are made up of three barren rocks, the highest of which is 32m. These rocks lie 2.5 miles WNW of Main Island. Tiger Rocks, the highest of which is in 23m high, lies 0.7 mile E of Ramp Rock.

Holgate Shoal, with 11m, lies 0.8 mile ENE of Tiger Rock. Bryde Rocks, the highest being 17.7m, lie 1 mile WSW of Johannesen Point, the SW point of Main Island.

The triangle created by Ramp Rock, Main Island and Bryde Rocks has within it a region of confused sea and tidal disturbance; this area should be approached with caution.

Pugh Shoal, with a depth of 10m, lies 2.25 miles S of Main Island. This shoal breaks in any but calm weather. Shoal patches lie 0.8 mile W.

Vaughan Island (54°00'S., 38°11'W.), with a prominent cone-shaped peak 145m high, is separated W from Main Island by a boat passage.

Proud Island, which forms part of the W side of Stewart Strait, is tussock-covered and a good landmark because of a vertical rock face, 95m high at the NE tip.

10.68 Stewart Strait (54°00'S., 38°06'W.), almost 2 miles wide at its narrowest part, lies between Proud Island and Bird Island. The navigation of Stewart Strait requires extensive local knowledge as there are many dangers. Also, the bottom is extremely irregular causing tidal eddies and even in calm weather, the swell is noticeable.

Owen Shoals, with depths of 9.8 and 9.1m at the W and E ends, lies 3 miles NNE of Proud Island. Elliot Rock, which always breaks, lies about 0.3 mile W of Bird Island; a 12.8m shoal lies 0.5 mile N of the central N extremity of Bird Island.

Vessels with extensive local knowledge usually pass through the strait on a course of 360° or 180° passing 0.45 mile W of Elliot Rock.

Bird Island, forming the E side of Stewart Strait, has as its NE tip, Farewell Point, a tussock-covered promontory that is not conspicuous unless the sun is shining upon it.

Roche Peak is the highest point of Bird Island, rising to an elevation of 365m, 0.75 mile W of Farewell Point.

Stejneger Peak lies in the NW part of Bird Island and rises to a height of 186m. This peak, which has a dome-shaped top of white stone and tussock-covered lower slopes, is a useful landmark, as it is prominent from many angles.

Johnson Cove, on the SW tip of Bird Island, affords temporary anchorage to small vessels with local knowledge, but is exposed to the prevailing SW winds.

Gony Point is the conspicuous promontory of Black Cliffs, 35m high, which forms the SE point of Bird Island.

Bird Sound lies between Bird Island and Cape Alexandra, and is about 0.3 mile wide at its narrowest point between Gony Point and Pillar Rock, a conspicuous rock stack.

This sound, which is much encumbered by shoals, is dangerous in any but calm weather and local knowledge is essential. Tidal currents flood SW in Bird Sound and there is a prevailing N current.

Hornaday Rock, which dries 1.5m, lies 0.2 mile S of Gony Point, in the center of Bird Sound.

There are no satisfactory anchorages in the bay SW of Bird Sound, although temporary shelter has been found at times.

10.69 Elsehul Harbor (54°01'S., 37°58'W.) is a small port that is entered between **Post Rock** (54°01'S., 37°59'W.) and Cape Pride, 0.5 mile NE.

Vessels with local knowledge can find adequate anchorage here in all but NW winds subject to an occasional swell, the size of which depends on the direction of the wind.

The approaches from N appear mostly clear except for a reef, with a least depth of 7m, and a shoal, with a least depth of 14.6m, 0.6 mile ESE and E, respectively, of Cape Alexandra. Also, a rock with a depth of 18.3m lies 0.35 mile NNW of Post Rock.

The Knob is a conspicuous promontory on the W side of the bay, and rises to 58m, 0.3 mile from the head. Stina Rock, 33m high, is prominent from N and lies on the E side of the bay close NW of Cape Pride.

Fairway Patch, with a least depth of 9.4m, lies almost in the middle of the entrance, about 0.3 mile SSW of Cape Pride. A shoal patch lies in the middle of the harbor between Fairway Patch and Middle Ground, a shoal in the entrance to inner bay. All these shoals are marked by kelp.

Anchorage.—Vessels with local knowledge can find temporary anchorage in the outer harbor, in a depth of 25m, about 0.2 mile SW of Stima Rock. Restricted anchorage can be found in Inner Bay, in 10m, sand, SE of The Knob.

Sorn (53°59'S., 37°55'W.), 73m high, is the N of two rocky islets, situated 2 miles ENE of Cape Pride. This islet, which lies close offshore, has a sharp pointed top, conspicuous from E or W.

10.70 Right Whale Bay (54°00'S., 37°40'W.) is entered between Nameless Point and Craigie Point, 1.5 miles SE.

Except for a moraine beach at its W end this bay's coast is largely steep and reef-fringed. An unexamined patch, which breaks during E gales, lies 0.5 mile W of Craigie Point.

Vessels with local knowledge can obtain anchorage sheltered from all but E winds in the inner bay. However, W winds blow with considerable strength down the moraine and across the beach. The anchorage is not safe when E winds raise a swell. Exposed anchorage can be taken, in a depth of 20m, good holding ground 0.35 mile NW of Bluff Point. Bluff Point lies 0.7 mile WSW of Craigie Point.

Cape Buller (53°59'S., 37°22'W.) lies about 10 miles E of Craigie Point, and its summit, Pyramid Peak, is 473m high.

The cape is easily made out for its height and rugged appearance. The Welcome Islets lie 4.5 miles W of Cape Buller and are the only off-lying islets off this part of coast.

These islets range in height from 70 to 88m high; through one of which is a natural arch. Sky Rock, 3m high, lies 0.75 mile S of the main rocks, the space between being foul by kelp, with a narrow channel between. Kelp lies 0.5 mile S of Sky Rock. High Rock, 29m high, lies N of the Welcome Islets.

Three isolated shoal patches, with depths of 26m, 29m, and 19m, lie up to 3.5 miles NW of the Welcome Islets.

A rock with a depth less than 1.8m lies 1.5 miles W of High Rock.

Anchorage.—Vessels with local knowledge can find temporary anchorage, in depths of 18 to 27m, in a small bay situated 1 mile W of Cape Buller, named Sitka Bay.

Sitka Bay, though sheltered from W and SW, is too restricted in size to be comfortable in strong and shifting gusts.

10.71 The **Bay of Isles** (54°00'S., 37°20'W.) is entered between Cape Buller and Cape Wilson, nearly 8 miles ESE. The shores of this bay are barren and glaciated while the off-lying islands are well covered with tussock and surrounded by kelp.

Barlas Bank, with a depth of 27m reported to lies 1.5 miles E of Cape Buller. A steep sea runs over this bank when a heavy swell is running. Within the bay are a W and E group of islands which are best shown on the chart.

Rescue Rock, with a depth of 3.1m and surrounded by kelp, lies 1 mile NE of Skua Island. In a big swell the sea breaks over this rock. In the channel between Rescue Rock and Skua Island, 1 mile SW, there is a least depth of 28m. There are several coves in the Bay of Isles but there are few adequate anchorages.

Koppervik, a small cove 1.75 miles SW of Cape Buller, affords anchorage for small vessels, in a depth of 21m, sand, but it is exposed to winds from the S.

Rosita Harbor (54°01'S., 37°26'W.) has general depths from 16.6 to 51m, shoaling gradually to its head. Vessels have regularly found anchorage here, in a depth of 44m, mud, good holding ground, with Ram Head, the S entrance point, bearing 170°, distance 0.4 mile.

A shoal depth of 22m lies in the S approaches to Rosita Harbor, about 0.5 mile E of Ram Head. Camp Bay, situated close S of Rosita Harbor, affords anchorage, in a depth of 55m, sand, with Shag Point, the S entrance point bearing 159°, distant 0.45 mile. A swell frequently sets into this bay.

Kelp Bank, with a least known depth of 16.5m, lies 3 miles NE of Cape Wilson.

During a heavy swell, the sea breaks over this bank and it should be avoided.

Cape Crewe (54°02'S., 37°08'W.) is the N entrance point of Cook Bay. A conspicuous white gallows stands 137m SW of the cape. Crewe Rock, 0.3m high, and surrounded by kelp, lies 91m E of Cape Crewe. Olav Rocks, 6m high, lie about 0.6 mile ESE of the same cape.

10.72 Prince Olav Harbor (54°02'S., 37°09'W.) (World Port Index No. 14020), in the inner part of Cook Bay, is entered between Point Abrahamsen and Sheep Point, 0.5 mile S. A tower stands on Sheep Point. This harbor has within it three bays, namely, North Bay, South Bay, and East Bay.

North Bay offers shelter on its S side, safe in almost all winds, there being no swell except during E gales. There is a 6.4m patch in the middle of North Bay about 183m NW of Pig Point.

Within North Bay, SW winds attain hurricane force at times, but winds from other directions are scarcely felt. A former whaling station, reported dismantled, derelict, and deserted, is situated at the head of North Bay.

It is forbidden to approach within 200m of the whaling station.

South Bay is protected from swell by Brutus Island, though subject to occasional violent SW winds.

Vessels may find shelter here subject to the above winds, in depths of 26 to 40m, mud, good holding ground.

Directions.—Vessels heading to Prince Olav Harbor should make Cape Crewe, taking care to avoid all the above-mentioned dangers.

Both Crewe Rock and Olav Rock should be given a wide berth, also staying clear of an 11m patch about 0.2 E of Port Abrahamsen. Pig Point, marked by a prominent building close to the water's edge, bearing 266°, will lead in mid-channel to North Bay N of Brutus Island. Vessels going to South Bay head midway between Brutus Island and Restitution Point.

Possession Bay, entered SE of **Black Head** (54°04'S., 37°06'W.), is the windiest place in South Georgia. Waterfall Bay, close NE of Possession Bay, is notable for a waterfall that is conspicuous from the NW.

10.73 Cape Constance (54°03'S., 36°59'W.) is situated about 5 miles E of Black Head. This cape is separated into two fairly low tussock-covered spurs; the E spur is known as Antarctic Point. Between the spurs is Tornquist Bay, which is not recommended.

Blue Whale Harbor (54°04'S., 37°01'W.), which lies 1 mile SW of Cape Constance, is an excellent sheltered, though restricted, anchorage. A good berth lies in the NW part of the harbor, in a depth of 12.8m; another lies in the S part, in a depth of 22m, mud and sand, S of the kelp.

Directions.—Passing through the entrance, vessels should favor the W side, remaining fairly close off Shelter Point. Vessels can then anchor under the lee of this point or continue further in, passing W of the central patch of kelp, through a narrow, deep channel anchoring SW of Clear Point, on the E side of the harbor.

Antarctic Bay, entered about 2 miles SE of Cape Constance, affords indifferent anchorage in deep water subject to violent winds off the glaciers and ice.

The Fortuna Glacier, a very conspicuous landmark when approaching South Georgia from NE, lies just W of **Cape Best** (54°05'S., 36°49'W.). Two tussock-covered islets, named The Guides, are 21 and 9m high, and lie 1.75 miles NW of Cape Best. A rock, with a depth less than 3.4m, was reported to lie 0.75 mile NNE of Cape Best.

Fortuna Bay (54°05'S., 36°46'W.) lies between Cape Best and Robertson Point, 1.5 miles SE. For the most part, this bay is very deep and steep-to, with the exception of Anchorage Bay. Within Anchorage Bay, on the W side, there is good anchorage, in depths of 27 to 37m, mud and sand. There is an occasional swell with N winds and at times the wind blows with some violence from the SW. This bay is partially protected by Fortuna Rocks.

Stromness Bay lies between **Cape Saunders** (54°08'S., 36°38'W.) and Busen Point, about 3.2 miles SE. Within the bay on the W side are Leith Harbor, Stromness Harbor, and Husvik Harbor.

Black Rocks, one of which is 4.6m high, lies about 0.3 mile ESE of Framnaes Point. The southwesternmost of these rocks is awash.

A rock, which dries, and surrounded by kelp, lies about 0.5 mile NNE of Framnaes Point.

The passage between Framnaes Point and Black Rocks was formerly used by whalers but it is not the preferred channel.

Middle Ground Rock lies 1.5 miles SE of Cape Saunders, and is kelp-covered, with depths of 3.7 to 5.5m. With a heavy NE swell the sea breaks on this rock. A patch with a depth of 12.8m lies 0.75 mile farther ESE.

Foul ground projects about 0.6 mile to the NW from Busen Point. The preferred channel lies between Black Rocks and Middle Ground Rock.

Leith Harbor (54°08'S., 36°41'W.), on the NW side of Stromness Bay, is the sight of an abandoned whaling station on its NW side. The land rises steeply W of this station to mountains 610m high. The harbor affords good anchorage, but NW winds blow with great strength. The harbor in the vicinity of the whaling station was choked with kelp. A dangerous wreck lies close S of the main jetty.

It is forbidden to approach within 200m of the whaling station.

10.74 Stromness Harbor (54°09'S., 36°42'W.) (World Port Index No. 14040), situated on the W side of the bay, has an abandoned whaling station with two floating dry docks, which are submerged, at its head. Grass Island lies at the entrance to the harbor, and rises to a height of 75m.

It is forbidden to approach within 200m of the whaling station.

Bill Rock, 4.6m high, lies 0.3 mile NNW of Tonsberg Point, the SE entrance point of this harbor. Foul ground projects E and ENE from Bill Rock; many shoals are charted between it and Tonsberg Point.

Anchorage.—Anchorage may be found, in a depth of 55m, off the whaling station, but the depths increase rapidly E and gales blow offshore with hurricane force.

Near **Harbor Point** (54°09'S., 36°41'W.), the NW entrance point of Stromness Harbor, excellent anchorage can be found, in depths of 37 to 46m. A vessel can lie here at single anchor in relatively calm weather while a gale is blowing in Leith Harbor and Stromness Harbor.

10.75 Husvik Harbor (54°10'S., 36°39'W.) lies in the SW part of Stromness Bay between Tonsberg Point and Kelp Point, 0.75 mile SE. The inner portion of this harbor, which is entered between Point Purvis and Kanin Point, 0.75 mile SW, is fronted and protected by Bar Rocks.

There are two primary channels which lead into the inner part of this harbor. Main Channel, the S one, has a least depth of 16.5m, and leads between Bar Rocks and the reef projecting 137m N from Kanin Point. Whaler Channel lies about 0.1 mile NNE of Bar Rocks and has a least depth of 11m. The other two secondary channels are narrow and seldom used.

It is forbidden to approach within 200m of the whaling station.

Directions.—Vessels bound for Stromness Bay head for Tonsberg Point bearing 225°. This course will lead between Black Rocks and Middle Ground Rock. Vessels continuing to Leith Harbor or Stromness Harbor head for Harbor Point bearing 270°, when the SW edge of Black Rocks is abeam.

Vessels bound for Husvik Harbor should proceed as above until passed Middle Ground Rock and then steer so to pass 0.25 mile off Tonsberg Point. Tonsberg Point is not easily made out against its backdrop unless snow is apparent.

Tonsberg Point can be identified by its slightly domed summit and sheer sides, with rocks at its base. After passing Tonsberg Point, steer a SW course for the anchorage about 0.3 mile NE of Kanin Point.

10.76 Jason Island (54°11'S., 36°30'W.) is kelp-fringed and lies 2.25 miles ESE of Busen Point. This island should be given a berth of 1 mile. A saddle hill, named The Crutch, lies 1 mile W of Jason Island, and is an excellent mark.

Cumberland Bay is entered between Larsen Point and Barff Point, 4 miles SE. This bay is divided into two parts known as Cumberland West Bay and Cumberland East Bay.

Barff Point (54°14'S., 36°24'W.) is dark in color and forbidding.

Right Whale Rocks lie 0.25 mile N of Barff Point and are covered with tussock grass with kelp projecting off them. A conspicuous hut with a red roof stands on the W rock. A disused lighthouse stands on the N part of the E rock.

Merton Passage lies between Right Whale Rocks and a rock, awash, between them and Barff Point; this passage has not been fully surveyed and except for small vessels with local knowledge it is not recommended.

A shoal, with a depth of 9m, lies about 0.1 mile NW of Right Whale Rocks. A patch of kelp, with a least known depth of 8.8m, lies 0.75 mile SW of Barff Point.

Cumberland West Bay is entered between Larsen Point and Sappho Point, 3 miles S. Sappho Point is the NE tip of the headland that separates Cumberland West from Cumberland East Bay. Glaciers spill into the head of Cumberland West Bay filling it with brash ice. Jason Harbor, on the NW shore of Cumberland West Bay, affords anchorage, in about 18 to 46m, mud, but it is not sheltered.

During SW gales, the harbor may fill up with ice from the glaciers at the head of the bay. A swell sets in with strong SE winds. Maiviken is a bay on the S side of Cumberland West Bay, entered 1.25 miles WNW of Sappho Point.

Anchorage.—This bay affords good anchorage, in depths of 24 to 47m, mud, sheltered from SW and W winds. George Rock, on the W side of this bay, lies about 0.2 mile SSW of Rocky Point.

Cumberland East Bay is entered between Sappho Point and Barff Point, 2.5 miles E. This bay appears to be deep throughout, with no dangers more than 0.5 mile from its shores.

The glacier at the head of this bay is constantly calving into the bay. This glacier front is about 21m high and there is a depth of 115m close off it.

At about the middle of the W side of the bay is the entrance to Moraine Fjord, which is blocked by a reef, making it useless for navigation; the sea breaks on this reef in all but the calmest weather. Dartmouth Point, the E entrance point of Moraine Fjord, is low and tussock-covered, with a stony beach.

Small vessels with local knowledge can obtain anchorage, in depths of 13 to 30m, in a cove on the E side of Cumberland East Bay close S of Barff Point. However, within this cove, it is foul in spots and there is a lot of kelp. Sandebugten, a cove 4 miles S of Barff Point, is fairly sheltered except from NW.

Caution.—This bay is, at times, subject to violent SW winds which come up without warning. Growlers and brash, from the glacier at the head, are always present.

10.77 King Edward Cove (54°17'S., 36°29'W.) lies about 2.33 miles S of Sappho Point, and is entered between Hope Point and Hobart Rock.

Hope Point (54°17'S., 36°30'W.) is a rocky bluff, 15m high, that is covered with tussock grass. Upon this point is a conspicuous monument, comprised of a stone cairn surmounted by a white cross, 1.5m high. A conspicuous dark green building is situated 183m WNW of Hope Point.

Hobart Rock, which lies on the S side of the approach to the cove, is 0.5m high, and is surrounded by banks of kelp which extend from the rock to the coast about 0.2 WSW.

King Edward Point (54°17'S., 36°30'W.) is a low promontory on the N side of the cove. It is the only permanently-inhabited place on the island. King Edward Cove is the only port of entry for the island of South Georgia.

The controlling depth for entry into the cove is 13.4m. The maximum draft at the berth is 7.8m alongside the jetty on the W side of King Edward Point. The jetty head is 25m long and vessels up to 125m long can be accommodated.

The cove occasionally freezes over. The local weather is unpredictable and changes rapidly.

King Edward Cove is free of hidden dangers. Numerous stranded wrecks litter the shore line. Kelp, which extends as much as 183m from the S shore, marks the shoal areas around the edges of the cove. Both the N and S shores of the cove are foul within the kelp line.

King Edward Point Light stands close E of the SW extremity of the point. Close N and 100m ENE of the light tower are two radio masts, 28 and 32m high.

Two range lines have been established; the outer line leads through the approaches and the inner line leads within the cove. The outer range beacons, located on the S side of the cove, are in range bearing 282°. The inner range beacons, located at the head of the cove, are in range bearing 304.5°. The recommended track into the cove is to steer 282° along the outer range line between Hope Point and Hobart Rock, turning to starboard as required to berth at King Edward Point jetty.

If bound for Grytviken, course should be altered S of King Edward Point to steer 304.5° along the inner leading line.

Anchorage.—Anchorage outside the cove can be found, in 30m, 0.3 mile ESE of Shackleton Cross, with mud bottom and good holding ground. A second anchorage is available 0.5 mile NE of Dartmouth Point, in 25m.

In E winds, ice may prove troublesome to vessels anchored outside the cove.

Caution.—A heavy chain is reported to lie on the bottom about 0.1 mile WNW of the jetty.

10.78 Grytviken (54°16'S., 36°30'W.) (World Port Index No. 14060) is situated at the head of King Edward Cove and is the site of the former principal settlement in South Georgia.

There are two wharves at Grytviken, both reported to be in poor repair. Grytviken North can accommodate a vessel with a draft of 6 9m and a length of 75m. Grytviken South can accommodate a draft of 5.8m and a length of 90m.

An alternative track into King Edward Cove is to steer 288° on the mast of the conspicuous stranded wreck lying S of Grytviken. Then steer 308° with the Grytviken church spire ahead. Kelp marks the shoal areas around the edges of the cove.

10.79 Skrap Skerries (54°15'S., 36°19'W.), comprised of East Skerry and West Skerry, lie 2.5 and 3.5 miles,

Grytviken

Grytviken

respectively, ESE of Barff Point. Alert Rock, which is awash, lies about 1 mile W of West Skerry. Patches of kelp, over which the sea breaks in heavy weather, lie within 1.25 miles N of West Skerry.

Cobblers Cove (54°16'S., 36°18'W.) is entered 0.5 mile W of Long Point. Vessels with local knowledge can find good, but restricted, anchorage, in depths of 12 to 20m, sand. Babe Island lies on the W side of the channel and is separated from the mainland W by a narrow rock-encumbered channel. The entrance to the cove is narrow, deep and clear of dangers.

Godthul Bay (54°17'S., 36°17'W.) is entered between Long Point and **Cape George** (54°17'S., 36°15'W.). This bay affords good anchorage, in depths of 33 to 37m, mud, in its SE part. While this berth is sheltered from S and SW winds the rest of the bay is almost always subject to a heavy swell.

A rock, whose charted position is approximate, and which only shows in a heavy sea, lies 1 mile ENE of Cape George. Breakers have been reported about 1 mile NNE of Cape George.

It was reported that the coastline between Cape George and Cape Charlotte, 20 miles SE, differs considerably from that shown on the chart. The salient points along this stretch provide a reasonable fix, but other headlands and bays cannot be relied upon.

Nansen Banks (Nansen Reef) is a rocky steep-to ridge which lies from 2.5 to 4 miles ESE of Cape George. There are depths less than 1.8m E end; the sea breaks upon it when there is a heavy swell.

10.80 Ocean Harbor (54°20'S., 36°14'W.) is entered 3 miles SSE of Cape George and provides good anchorage, for those vessels with local knowledge, in the central part, in depths of 14.6 to 18.3m, mud. This berth is sheltered from all winds, but a heavy E swell sets in at times, causing a ground swell 91m from the head of the bay. The mostly intact (2014) wreck of a large three-masted vessel lies at the head of the harbor.

Penguin Bay, the S entrance point of which is **Tijuca Point** (54°20'S., 36°12'W.) is entered S of Ocean Harbor; it is kelp-infested and provides no anchorage. It was reported that a patch of kelp, attached to the sea bed in a position about 2.2 miles E of Tijuca Point, suggested the existence of a possibly dangerous shoal.

Hound Bay is entered about 5 miles SSE of Cape George. Rolf Rock, 4m high, lies 1.25 miles W of Cape Vakop, the S entrance point of this bay. Vessels with local knowledge can obtain sheltered anchorage in this bay, in depths of 18 to 27m.

Cape Vakop (54°22'S., 36°10'W.) is the tip of at thin tussock-covered headland with a height of 102m. A ridge of rocks projects NE of the cape and terminates in a massive tussock-topped stack, 61m high.

Calf Head (54°28'S., 36°04'W.), lies about 7 miles SE of Cape Vakop, reported to lie about 0.5 mile NE of its charted position.

Cape Harcourt (54°30'S., 36°00'W.), low and tussock-covered, is the E extremity of Harcourt Island, which lies close off the head of a promontory about 3 miles SE of Calf Head.

10.81 Royal Bay (54°30'S., 35°55'W.) is entered between Cape Harcourt and Cape Charlotte, 4.5 miles SE. This bay is not well sheltered and is subject to frequent violent winds that blow out of this bay. Foul ground lies on the N side of the bay 1 mile ESE, and between 0.5 and 2 miles SW of Cape Harcourt.

Moltke Harbor is a small cove on the NW side of Royal Bay entered between Pirner Point and Koppen Point 1.75 miles NE. This harbor is difficult to distinguish because of the low land on the N side.

Off the entrance, two glaciers will be observed in the bight; between them is a black rock, 24m above HW, that stands out well against the snow-covered mountains. The harbor is not immediately identifiable from the entrance to Royal Bay.

Vessels can secure anchorage, in depths of 14 to 27m, mud, in the middle of the bay. This berth is sheltered from WSW, through N to ENE. However, it is open to other quarters, especially ENE to ESE.

Strong W winds blow here, with squalls of hurricane violence, setting in from SW and shifting to NW. Southeast

Ocean Harbor

winds send a heavy sea into the bay, and when these winds blow (usually of less than 24 hours duration), it is recommended that vessels put to sea.

In calm weather, with an E swell, drifting ice is brought into the bay by the flood current. The tidal rise is much influenced by the wind. The currents set fairly in and out of the bay, with a velocity of 0.5 knot.

In the offing, the current has been observed to set NE at a rate of 0.5 to 1 knot; close to the coast it sets ESE.

Directions.—Vessels with local knowledge approaching from NW steer to keep Cape Charlotte bearing 180° until the S edge of the Ross Glacier, at the head of Royal Bay, bears 245°, changing course to that heading.

When the N edge of the Ross Glacier bears 268°, change course to that heading. Change course to 310° to keep the tongue of land in the center of Moltke Harbor.

10.82 Cape Vahsel (54°45'S., 35°48'W.) lies about 14 miles SSE of Cape Charlotte; the coast between is broken exposed and largely unsurveyed.

Filchner Rocks, which are submerged as well as above-water, lie 3 to 4 miles NNE of Cape Vahsel.

Adequate anchorage has been found, in a depth of 33m, about 1.5 miles S of Cape Vahsel.

Gold Harbor (54°37'S., 35°56'W.) is entered between Gold Point, about 10 miles SSW of Cape Charlotte, and a point 1.25 miles SSW. Small craft can obtain good sheltered anchorage, in a depth of 14.6m, fairly close inshore. Larger vessels can find a sheltered anchorage, in about 25m, 0.6 mile S of Gold Point.

Cooper Sound (54°48'S., 35°49'W.) is situated between Cooper Island and the entrance to Cooper Bay, S of Cape Vahsel. A 14m patch lies 2 miles E of Cooper Island and foul ground extends W from the same island. Indifferent anchorage

may be obtained by small vessels with local knowledge in the SW part of Cooper Bay.

Clerke Rocks (55°01'S., 34°42'W.), which lie from 35 to 40 miles ESE of Cooper Island, consist of two groups. The W group includes three large rocks, one of which is about 244m high. The E group, one of which is large, includes The Office Boys, which attain an elevation of 82m, and Nobby Rock.

A shoal, with a depth of 31m, lies 5.5 miles SW of Clerke Rocks. A patch of kelp, the position of which is approximate, has been reported to lie 4 miles ESE of Nobby Rock.

Larsen Harbor

Cooper Bay

10.83 Drygalski Fjord (54°50'S., 35°55'W.), which indents the SE tip of South Georgia, is entered between the SW entrance point of Hamilton Bay and Nattriss Head, 3 miles SW. This fjord is notable for a steep rocky ridge on its NE side that is overlooked by the high peaks of the Salvesen Range. The SW side is reported to be less precipitous, with two minor glaciers.

Larsen Harbor (54°50'S., 36°00'W.) is entered on the S side of Dygalski Fjord, and is well sheltered. Squalls occasionally blow down the valley at the head with great force.

Fairway Rock, with a depth of 2.4m, lies in the middle of the harbor, 1 mile within the entrance. Vessels passing this rock should maintain about 91m off the N shore, where the depth is 3.1m.

Anchorage.—Small vessels with local knowledge can find anchorage in the E part of the harbor, in depths of 7 to 14m, or, in depths of 14.6 to 20m, in its W section.

Esbensen Bay (54°52'S., 35°58'W.) is entered between the S point of **Nattriss Head** (54°51'S., 35°56'W.) and Shannon Point, 1 mile SW. Vessels with local knowledge can find anchorage in this bay. Doubtful Bay, 2 miles WSW of Esbensen Bay, is a good harbor for small craft, with depths of about 64m.

Rocks, awash, are situated in the 0.5 mile wide entrance, and it should not be entered without local knowledge.

Smaaland Cove is entered about 2 miles W of Doubtful Bay and affords good anchorage within for small craft.

10.84 The SW coast of South Georgia, from Cape Disappointment to Cape Nunez, about 60 miles NW, is not as well known as the rest of the island. Steep heavily-crevassed glaciers and precipitous black headlands appear in a regular alternating pattern.

From Cape Nunez to Cape Paryadin, 24 miles NW, the coast is indented by several harbors.

The **Kupriyanov Islands** (54°45'S., 36°19'W.) lie about 10 miles NW of Cape Disappointment. Dias Cove, close N of the islands, may afford anchorage, but due to its recent discovery and unexamined status, it is not recommended. The approaches to the cove are encumbered with islets and rock.

Novosilski Bay (54°39'S., 36°22'W.), into which a large glacier flows, is 6.5 miles NNW of the Kupriyanov Islands. Nilsen Island, 30m high, lies 2 miles W. Jonassen Rocks, 3m high, lie 1 mile SW of Novosilski Bay.

Between Novosilski Bay and Leon Head, 12 miles NW, there are two below-water rocks, over each of which the sea break. The rocks lie 0.75 mile offshore, 5.5 miles NW and about 3 miles WNW of **Mount Fraser** (54°38'S., 36°21'W.), respectively.

10.85 Undine South Harbor (54°32'S., 36°33'W.) is entered between Leon Head and Ducloz Point, 5 miles NW. This large bay, which is broken up by Austin Head, a conspicuous dark promontory, does not afford any shelter. A below-water rock lies in the middle of the harbor.

Rocky Bay (54°30'S., 36°40'W.) is entered N of Ducloz Head. While this bay could afford anchorage to those vessels with local knowledge, the approaches are encumbered by rocks. Breakers project up to 2 miles offshore.

Hauge Strait is a deep channel 1.5 miles wide that lies between Hauge Reef and the rocks that extend W from **Cape Darnley** (54°27'S., 36°49'W.). This strait is frequently used by vessels of the British Antarctic Survey that should have local knowledge.

Annenkov Island (54°30'S., 37°04'W.) lies about 10 miles WSW of Cape Darnley. Vessels of the British Antarctic Survey have found anchorage with the E tip of Annenkov Island bearing 190°, distance 1.4 miles, in a depth of 22m.

Tussock Island lies close to the coast of Annenkov Island, NE of Mislaid Rock. A patch of kelp was reported to lie 4.5 miles NW of Mislaid Rocks.

Low Reef extends ENE from the E tip of Annenkov Island joining Hauge Reef. Pillow Rock, which stands near the ENE tip of Hauge Reef, is comprised of pillowed lavas.

Theodor Rock, which breaks when there is any swell, lies 7 miles S of Annenkov Island. The Pickersgill Islands, the highest of which is 146m, lie 11.5 miles SE of Annenkov Island and 7.5 miles offshore. A shoal, with a depth of 19.2m, was reported to lie 2 miles ENE of the Pickersgill Islands.

10.86 Fanning Ridge (54°20'S., 37°03'W.) lies about 11 miles NW of Cape Darnley.

Aspasia Point (54°19'S., 37°06'W.) is a very prominent steep headland that marks the W end of Fanning Ridge. Fanning Ridge, dark, precipitous, and rocky, is from 610 to 915m high with a serrated skyline.

During the summer months, Fanning Ridge is the best and only unmistakable long distance landmark on the SW coast of South Georgia. It is as recognizable from a distance of about 50 miles as it is from a distance of 15 miles. The appearance of this feature during winter months is undetermined.

Breakers have been reported about 1 mile offshore, midway between the above headland and Newark Bay.

10.87 Cape Nunez (54°16'S., 37°25'W.) is the SW tip of the large rocky and relatively snow-free Nunez Peninsula.

Vessels with local knowledge can obtain good anchorage in Holmestrand, a bay on the S side of the Nunez Peninsula, 6 miles E of Cape Nunez. This berth is in depths of 14.6 to 18.3m, mud. This bay is sheltered, but, in E and SE winds the bay fills up with ice from the large glacier which lies on its E side.

The approach to this bay, which is encumbered with rocks and breakers, is via a narrow channel that leads N towards a conspicuous black rock located in front of the glaciers.

Vessels are advised to anchor close up to the NW corner of the bay and not more than 183m off the glacier face, which in E gales provides a convenient lee. There is a possibility of hurricane force squalls when the wind blows off the land.

Queen Maud Bay is entered N of Cape Nunez and is bounded by the steeply rising N side of the Nunez Peninsula on the S and the spiky summits of the Cape Rosa Peninsula on the N. Three towering black dolomites lie close E of Shallop Cove.

Vessels with local knowledge can obtain good anchorage here, in 22m, at its head 0.35 mile NW of the S entrance point to Shallop Cove. This berth is sheltered from all but the strongest SW winds, when a heavy swell enters the bay.

King Haakon Bay is entered N of **Cape Rosa** (54°11'S., 37°25'W.) and affords good anchorage for those vessels with local knowledge. McNeish Island, McCarthy Island, and the Vincent Islands lie, respectively, 2.75 miles NW, 1 mile NNW, and 5.25 miles ENE of Cape Rosa. Rocks lie between 1.25 and 2.5 miles WNW of Cape Rosa. A large patch of kelp lies between these rocks and McNeish Island.

The best approach to the head of the bay, where anchorage can be taken, is along the N coast N of McNeish Island, with depths of 22 to 53m, and N of McCarthy Island. There is a passage close N of Cape Rosa but it should be navigated with caution.

Caution.—A rock pinnacle, with a depth of about 6.8m, was reported (2004) to lie about 1.5 miles WNW of Cape Rosa.

10.88 Klutschak Point (54°10'S., 37°41'W.) is the NW entrance point of the large bight which contains King Haakon Bay and Queen Maud Bay. A kelp-covered shoal, whose position is approximate, with a depth of 8.2m, lies 4 miles SE of Klutschak Point, and 2 miles offshore.

Cape Demidov (54°09'S., 37°44'W.), 0.5 miles NW of Klutschak Point, is steep and rocky, with many off-lying islets and rocks radiating from it. Anvil Stacks, two prominent tussock-covered islets, lie about 2 miles SE of Cape Demidov.

Wilson Harbor, entered between Cape Demidov and Kade Point, 2 miles N, affords anchorage to those vessels with local knowledge in its NE corner. This berth, in a depth of 20m, mud and sand, is sheltered from most winds. However, SE winds of great intensity occasionally blow off the Schrader Glacier, situated at the head of the harbor.

A shoal, with a depth of 18m, was reported to lie 7 miles WSW of Kade Point. Also, a rock on which the sea breaks, lies 0.75 mile WNW of Kade Point.

The harbor and the middle of the entrance between Kade Point and Saddle Island appears to be clear of dangers. There is a 91m wide channel between Saddle Island and Cape Demidov that also appears to be clear.

Ice Fjord is entered between Kade Point and Weddell Point, 4 miles NW. Vessels with local knowledge can find good anchorage here about 1 mile from the head of the fjord, in 18m, on a gently shelving bottom.

Schlieper Bay, entered about 1.2 miles W of Weddell Point, affords good anchorage, in a depth of 18m, but the entrance is reported to be foul.

Coal Harbor (54°03'S., 37°53'W.) lies about 7 miles NW of Cape Demidov. It has good anchorage for small vessels with local knowledge, in 16.5m. There is a reef across the entrance and the passage between this and the land on the S side is clear but narrow. Vessels must keep close to the kelp on the south side when entering the harbor.

The approaches to this harbor are encumbered by reefs which may not be marked by kelp, owing to their being cleared by stranded ice.

10.89 Undine Harbor (54°02'S., 37°57'W.) lies abut 0.75 mile W of Coal Harbor. The harbor is protected from all winds except those from the SW and S.

Vessels with local knowledge can obtain anchorage, in depths from 14 to 29m. The bottom on the E side of the anchorage is sand and the W side is mud. The entrance is partially blocked by kelp and is about 0.1 mile wide.

Johan Harbor is entered 1 mile SW of Undine Harbor. Vessels with local knowledge can obtain anchorage, in a depth of 27m, sand and pebbles. However, the holding ground here is not good and not recommended with winds between SE and NE.

Directions.—From the vicinity of Stewart Strait vessels with local knowledge bound for Johann Harbor, Undine Harbor, or Coal Harbor should remain at least 0.5 mile SW of **Jomfruene** (54°04'S., 38°03'W.) and 1 mile SW of **Cape Paryadin** (54°04'S., 38°01'W.).

Vessels can then pass 0.5 mile S of Olsen Rock and head ENE, giving a wide berth to the rock. Olsen Rock, position doubtful, is 1 mile E of Cape Paryadin. However, it was reported that this rock was clearly visible and appeared to lie about 183m SW of its charted position.

When Johann Harbor can be approached on a heading of 345°, this course should be steered passing about 0.1 mile E of Laurie Island.

Caution.—Vessels should exercise caution in the approaches to these harbors as they have not been completely surveyed and require local knowledge for entry.

The South Sandwich Islands

10.90 Winds—Weather.—The prevailing SW winds are deflected in the vicinity of the islands into a circular motion around the islands.

The general weather patterns in the group are cloudy with fog or snow, and clear and cloudless days are rare. Mountain summits are almost always hidden by low clouds.

Tides—Currents.—The prevailing set of the current is to the NE. In Nelson Strait, the Candlemas Islands, Douglas Strait, and the South Thule Islands, a S set of about 1 knot was experienced.

Aspect.—The South Sandwich Islands consist of an archipelago of islands, most of which are volcanic. The N island, Zavodovski Island, is situated about 297 miles ESE of South Georgia. All of these islands are uninhabited and snow and bad visibility are frequent, making the approaches difficult.

The South Sandwich Islands are completely surrounded by pack ice from the Weddell Sea during the late winter and spring. During summer, conditions vary; the N islands should be free of ice about the end of November and the more S islands a few weeks later. Many tabular, weathered, black/white bergs, sometimes grounded, will be seen around the islands.

Anchorage.—These islands are without harbors, but many of them offer anchorage areas where a vessel could find shelter. Ferguson Bay, in Southern Thule, affords the best anchorage, but because of its location it will often be unavailable due to ice. The next best anchorages are in Nelson Strait in the Candlemas Islands.

This strait affords shelter from most winds and may be free of ice for a slightly longer period than Ferguson Bay.

Zavodovski Island

10.91 Zavodovski Island (56°20'S., 27°35'W.) is formed by Mount Curry, a volcanic cone about 550m high. The W shore is precipitous, with sheer cliffs falling abruptly to the sea. From the N to the SE side of the island, there is a low-lying plateau rising to the base of the cone.

This plateau is for the most part free of snow, except for some patches near its seaward limit; the plateau ends in low, black cliffs, 9 to 12m high. The crater is constantly erupting. The shore line is cliffy, but there are two sandy beaches of black sand or lava.

Close inshore of the island, W and NW, are depths from 91 to 183m. On the E and SE sides there are depths of 26 to 37m less than 1 mile from shore, good holding ground of scoria and boulders. The swell carries around the island, making it necessary to shift berth as the wind changes.

A shoal, with a least known depth of 27m, was reported to lie 27 miles NW of Zavodovski Island.

10.92 Visokoi Island (56°43'S., 27°09'W.) is located about 25 miles SSE of Zavodovski Island, and is also a single volcanic cone. The summit, Mount Hodson, is 1,005m high and is generally obscured by smoke or steam.

From most directions, this glacier-covered island appears a rounded mass with a steep coast. The largest offshore rock, Coffin Rock, lies about 1 mile SE of Finger Point, the N tip of the island. The most conspicuous rock is a pinnacle rock off the NW side of the island.

There are possible anchorages N or S of Irving Point, but the swell carries around and no good protection is afforded.

Leskov Island (56°40'S., 28°08'W.), which lies 30 miles W of Visokoi Island, has a flat summit and is precipitous. A prominent cone-shaped rock, 114m high, is located at the SE tip.

Crater Bay, on the NE side of this crescent-shaped island, is flanked by sheer walls of rock falling almost straight down from the summit to the sea. Since Leskov Island is steep-to on all sides, there is no place where a vessel might anchor.

10.93 The **Candlemas Islands** (57°05'S., 26°44'W.), comprised of two islands separated by Nelson Channel, lie about 23 miles SE of Visokoi Island. The E island is known as Candlemas Island; the W island is known as Vindication Island.

Candlemas Island, whose S end is buried into a glacier, rises to two peaks, Mount Andromeda, 549m high, and Mount Perseus, close N. The N part of the island is comprised of lava, and rises to Lucifer Hill, a 235m high volcanic cone.

The N and S parts of the island are joined by a wide stretch of low-lying land. Demon Point is the NE tip of the island and the E entrance of Kraken Cove. Within this cove is a steeply shelving beach of black sand and boulders.

Black Rock, 24m high, lies 0.6 mile off the NE side of the island. The NW coast is bordered by basalt cliffs about 9 to 12m high.

Vindication Island (57°06'S., 26°47'W.), the W island, rises to a height of 427m in its SW part. Crosscut Point, on the NW coast, ends in a row of pointed rocks.

Buddha Rock, a prominent rock, 37m high, lies 0.3 mile from Knob Point, the W tip of the island.

A bank, with a depth of 108m, lies 3 miles S of Knob Point. Saw Rock and Santa Rock, both conspicuous, lie, respectively, 1 and 1.5 miles NNW of Crosscut Point.

A reef projects NE to about midway across Nelson Channel from Low Point, the NE tip of Vindication Island. Cook Rock and Trousers Rock, both arched, stand on the reef.

Nelson Channel should only be navigated by vessels with local knowledge. The least depth that has yet been found in the fairway is 11m. It has been reported that there are greater depths closer to the reef extending NE from Low Point.

Anchorage.—The best berth, for vessels with local knowledge, lies off the E side of Vindication Island between Cook Rock and Rocky Point, the SE tip of Vindication Island, in a depth of 20m, good holding ground.

There is good anchorage S of Candlemas Island during N winds, and NE of Vindication Island, 0.4 mile ENE of Crosscut Point, during S winds.

10.94 Saunders Island (57°47'S., 26°27'W.), crescent-shaped, lies with Harpers Point, its N tip, about 41 miles S of Candlemas Island. Mount Michel, 990m high, is located in the center of the island. On the SE corner of the island is a promontory comprised of bare hills. On the S side of these hills is a notable half section of a crater, scored with radial grooves. When approaching from S, this crater is a conspicuous mark.

Off the NE side of Cordelia Bay, which forms the NE side of the island, are several rocks, the highest being Brothers Rocks. These rocks lie in the vicinity of three reefs, with foul ground and breakers that close the N entrance to the bay.

Vessels with local knowledge can obtain good anchorage W of a group of rocks near Nattriss Point. This berth, in depths of 24 to 26m, is sheltered from NW, through S to SW, and lies close inshore in the S part of the bay.

The bottom shelves steeply around the island except outside the reefs fronting the bay where there is a larger area with depths of less than 37m.

10.95 Montagu Island (58°25'S., 26°22'W.) is the largest of the South Sandwich Islands. It lies 34 miles S of Saunders Island and is reported to be larger than charted.

Mount Belinda, 1,371m high, is the summit of the island and is heavily glaciated. Recent volcanic activity is evident, indicated by ash plumes and lava flows, with one flow reaching the sea on the N shore. Allen Point is the tip of the headland that forms the SE point of the island; it rises to Mount Oceanite, a cone-shaped hill, 914m high.

A rock, awash, lies close off the E side of the headland, 0.5 mile N of Allen Point. Between Allen Point and Scarlett Point, 2.75 miles WNW, is Phyllis Bay.

Anchorage.—Vessels with local knowledge can secure good anchorage, in depths of 36m or less, on either side of Allen Point. The anchorage to the N of the point affords protection from NW to SW, and that in Phyllis Bay, from NW to N to SW. Allen Point stops the swell from following round.

To the NE of the island, shallow water reportedly extends for some distance seaward.

10.96 Bristol Island (59°03'S., 26°34'W.), which is glaciated, lies 32 miles S by W of Montagu Island, and is reported to be larger than charted. Mount Darnley 1,097m high, lies S of its center. The S side of the island, the S tip of which is Harker Point, rises steeply in a great rocky bluff 580m high.

Three rocky islets with a bold appearance lie W of the island. The outermost islet, lying 3 miles W of Bristol Island, is remarkable for a towering pillar rock, 305m high, and a lesser summit, 190m high. This rocky islet was the landfall Captain Cook made when he discovered the South Sandwich Islands. It is now known as Freezland Rock. The middle inner rocks, named Wilson Rock and Grindle Rock, are 183m and 213m high, respectively.

It is possible to anchor, with good holding ground and protection from wind, anywhere off the N and E sides of Bristol Island. However, due to the shape of this island the swell follows round, whatever its direction. There are navigable passages between Grindle Rock and Wilson Rock, and between Wilson Rock and Freezland Rock.

Between Grindle Rock and Bristol Island, there is a continuous breaking reef.

10.97 Southern Thule (59°27'S., 27°17'W.), about 27 miles SW of Bristol Island and separated from it by Forsters Passage, is comprised of three islands.

Bellingshausen Island is the easternmost and smallest of the group. This island is separated from Cook Island by Maurice Channel, which is 1.5 miles wide, with depths in the center of 25 to 31m. Bellingshausen Island has upon it a single volcanic cone which ends abruptly in the ragged edges of a crater, and reaches a height of 253m on its N part.

Cook Island, the largest and highest of the group, has upon it three ice-capped peaks, of which Mount Harmer is the highest, reaching an elevation of 1,077m. The shores are precipitous, alternating between steep rugged cliffs with glaciers hanging above them and glaciers reaching the water's edge.

Thule Island (59°27'S., 27°23'W.), the W island of the group, is buried beneath an ice cap, but a jagged ridge of black rock sticks through the ice in the center of its SW side at Wasp Point. The SE part of Thule Island is made up of a low plateau ending S in Hewison Point.

Ferguson Bay, the best anchorage in the South Sandwich Islands, is entered between Hewison Point and Herd Point, about 0.5 mile W. It has been reported that this berth lies about 0.3 mile WNW of the E entrance point, and affords good holding ground, with shelter from all winds except from S. A metal beacon stands on Herd Point. The Argentine scientific station is located at the head of Ferguson Bay. A refuge hut lies 0.5 mile W of the lighted beacon. A wood beacon painted in red and white stripes marks the hut.

Twitcher Rock, 55m high and conspicuous, lies 0.5 mile E of Hewison Point. The channel between this rock and the point is foul.

10.98 Douglas Strait (59°28'S., 26°17'W.) is situated between Cook Island and Thule Island.

This strait, which requires local knowledge for use, has depths in its central part of over 731m, but its N and S entrances have depths of less than 37m.

The N entrance is closed for a great part of its breadth by a reef with sunken rocks extending E from Beach Point, the NE extremity of Thule Island, with a 13m patch close off its outer end; a 9.1m patch was reported to lie close SE of the 13m patch.

The S entrance is narrower and lies between the end of the rocks off Reef Point, the SW extremity of Cook Island, and Twitcher Rock, from which shoal water extends toward Thule Island. A S current of about 1 knot sets through the strait.

Caution.—A bank, with a least charted depth of 84m, the position of which is approximate, lies about 28 miles SW of the W extremity of Thule Island.

Dutch

DUTCH	English
A	
aan	at, near, on
B	
baak	beacon
berg	mountain, hill
binnen	inner
blauwe	blue
bocht	bay, bend, light
bosch	forest
boschje	small wood, brush
boom	tree
bol	ball
breed	broad
brug	bridge
buiten	outer
bult	hump
D	
dam	dam, breakwater
de, den	the
diep	deep
dijk	dike
dorp	village
draaikalk	eddy
drempel	bar
dric	three
drichoek	triangle
droogte	shoal
duin	dune
dwars	across
E	
eiland	island
F	
friesche	frisian
G	
gat	channel
geul	narrow channel
groei	green
gronden	grounds
groot	great
H	
haven	harbor
helft	half
het	the
heuvel	hill
hoek	cape, point
hoofd	head
hoog	high
hout	wood, timber

DUTCH	English
K	
kaap	cape
kake	quay
kegel	cone
kil	channel
klein	small
klip	rock
kop	head
kreek	creek
kromme	crooked
kust	coast
L	
laag, lage	low
lang	long
licht	light
loods	pilot
loodswezen	pilotage
M	
meer	inland sea
middel, midden	middle
modder	mud
molen	mill
N	
nauw	narrows
nieuw	new
noord	north
noorder	northern
O	
oost	east
oud	old
P	
peilschaal	tide gage
plaat	shoal
plaatje	small shoal
plat	flat
polder	reclaimed land
punt	point
R	
rak	channel
rechthoekig	rectangular
reddingboot	lifeboat
rede	roadstead
rode, rood	red
rots	rocks
rug	ridge
ruitvormig	diamond-shaped

DUTCH	English
S	
schaar	channel
schor	shoal
schutsluis	lock
scherm	screen
seinen	signals
sluis	lock
smal	narrow
spits, spitse	pointed
spoorweg	railway
stad	town
steen	stone
steiger	jetty, pier
steile	steep
strand	beach, shore
stroom	current, stream
T	
toegang	access
tramweg	tramway
U	
uit	out
V	
vaarwater	fairway
vaart	canal
valsch	false
van	of
veerboot	ferry
verklikker	warning light
vliegtuigen	aircraft
W	
wad	coastal bank
wal	wall
waterweg	waterway
watergetijden	tidal current
weg	way
werk	work
wester	western
wit, witte	white
wrak	wreck
Z	
zand	sand
zee	sea
zeegat	estuary
zuid	south
zuider	southern
zwart	black

French

FRENCH	English
A	
anse	bay, creek
archipel	archipelago
arriere port	inner port
avant port	outer port
B	
baie	bay, gulf
balise	beacon
banc	bank
barre	bar
basse	shoal
bassin	basin
blanc	white
bois	wood
bouche	mouth
C	
canal	channel, canal
cap	cape, headland
chaloupe	launch
chalutier	trawler
chateau	castle
chaussee	bank
chenal	channel
clocher	steeple
colline	hill
couvent	convent
crique	creek
D	
digue	mole, breakwater
E	
ecluse	lock of a canal or basin
eglise	church
est	east
etang	lake
F	
falaise	cliff
faux	false
fleuve	river
fosse	ditch
G	
golfe	gulf
goulet	narrow entrance
grande	great
I	
ile	island
ilot	islet
J	
jetee	jetty
L	
lac	lake
lagune	lagoon
M	
maison	house
mamelles	paps
menhir	a large raised stone
milieu	middle
mole	mole, pier
mont	mountain
mouillage	anchorage
moulin	mill
N	
noir	black
nord	north
O	
occidentale	western
orientale	eastern
ouest	west
P	
passe	channel
pertuis	opening or strait
petit	small
pic	peak
pierre	stone
piton	mountain peak
plateau	tableland or flat
pointe	point
pont	bridge
port	port, harbor
presqu'ile	peninsula
Q	
quai	quay, wharf
R	
rade	roadstead
recif	reef
reviere	river
roche	rock
rocher	rock, usually above-water
rouge	red
S	
sable	sand
sommet	summit
sud	south

FRENCH	English
T	
tour	tower

FRENCH	English
V	
vert	green
ville	town

Portuguese

PORTUGUESE	English
A	
a, as	the (fem.)
aldeia	hamlet
alto, s	height, heights
altura, s	height, heights
amarclo	yellow
ancordouro	anchorage
angra	inlet, bight, cove
aquario	aquarium
areia	sand
arquipelago	archipelago
atalaia	lookout
azul	blue
B	
bacia	basin
baia	bay
baixia	shoal
baixio	shallow
baliza	beacon
banco	bank
barra	bar
basilica	basilica
bateria	battery
boca	mouth, entrance
branco,	white
C	
cabeca	summit of a hill or shoal
cabo	cape
cais	quay, wharf
cala	creek, channel, narrow inlet
calheta	inlet
canal	channel
capela	chapel
carreira	narrow channel, slipway
casa	house
casal	farmhouse
castelo	castle
catedral	cathedral
cemiterio	cemetery
chale	chalet
cidade	city, large town
cidadela	citadel
cinzento	grey
colina	hill
colonia	colony, settlement
concha	cove
convento	convent
coroa	sandy head
cruz	cross
D	
de dentro	inner
desembarcadouro	landing
doca	dock
duna	dune
E	
enseada	bay, bight, cove
entrada	fairway
ermida	hermitage
espigao	projecting point
esporao	groyne
estacada	pier, projecting wharf, mole
estaleiro	shipyard
este	east, eastern
esteiro	creek
estreito	strait, narrows
estuario	estuary
F	
fabrica	factory
farillhao	stack, steep-sided rocky islet
fora	outer
fortaleza	fortress
forte	fort
foz	mouth of a river
fundeadouro	anchorage
G	
grande	large
golfo	gulf
H	
hotel	hotel
I	
igreja	church
ilha	island
ilheu, ilhota	islet
istmo	isthmus
L	
lago	lake, lock
lagoa	small lake, marsh
laguna	lagoon
laje	flat-topped rock
lugar	hamlet, place
M	
mar	sea
mata	forest, wood, thicket
meridional	southern
moinho	mill
molhe	mole, pier
montanha	mountain
monte	mount
morro	hill, knoll

PORTUGUESE	English
N	
note	north
O	
o, os	the (masc.)
occidental	western
oeste	west
oriental	eastern
P	
palheiros	fishing village
paredao	sea wall
pedra	rock
pena	rocky, peak
penedo	rocky peak
peninsula	peninsular
pequeno	small
pico	peak
pinhal	pine wood
ponta	point (of land)
pontal	promontory
ponte	bridge, pier
pontecais	pier, jetty
portinho	small port or harbor
porto	port, harbor
povoa	large town
povoacao	village
povoado	village
praia	beach
preto	black
promontorio	promontory
Q	
quebramar	breakwater
quebrada	cut, gap, precipice
R	
rampa	ramp
restinga	spit, reef
ria	estuary, lagoon, sunken valley
ribeiro	brook
rio	river
rocha	rock
rochedo	rocky place
rocher	rock, rocky place
S	
santo	saint
sanatorio	sanatorium
sepentrional	northern
serra	mountain range
serro	rocky reef or ridge
sul	south
T	
terra	land
torre	tower
V	
vale	valley
varadouro	landing
verde	green
vermelho	red
vigia	lookout
vila	town, village, villa

Spanish

SPANISH	English
A	
abra	cove, creek, haven, opening
acantilados	cliffs
adentro	inner, inside
afuera	outer, outside
aguada	watering place
agudo	sharp, pointed
aguja	needle
albufera	lagoon, pond
aldea	village
alto	tall, high
altos	heights
alturas	heights
amarillo	yellow
ancho	wide, broad
ancladero	anchorage
anclaje	anchorage
ancon	open bay or roadstead
angostura	narrows
archipielago	archipelago
arena	sand
arenal	extensive area of sand
arrecife	reef
arroyito	brook
arroyo	steam, rivulet
astillero	shipyard
atalaya	watchtower, high viewpoint
azul	blue
B	
bahia	bay
bajio	shoal
bajo	shoal
baliza	beacon
balneario	seaside resort
banco	sandbank
bancha	bank
barlovento	windward
barra	bar
barranco	precipice, ravine
barrera	barrier
barrio	ward, section
bateria	battery
blanco	white
boca	mouth
bodega	storehouse
boqueron	wide mouth, opening or entrance
boquete	narrow entrance, gap
brava	beach exposed to heavy seas
bravo	coast, shore
brazo	arm of the sea
C	
cabeza	shoal head
cabezo	summit of a hill
cabo	cape
cadena	chain
cala	narrow cove or creek with steep sides
caleta	cove
caleton	large cove
campo	any tract of country
canada	glen
canal	channel
canalizo	narrow channel between islands
cano	creek
canto	bluff
capilla	chapel
cargardero	shore-ship loading appliance
carrera	narrow channel or passage
casa	house
cascada	waterfall
caserio	hamlet, group of houses
castillo	castle
castro	headland, hillock surmounted by ruins
catedral	cathedral
cayo	cay
cerrito	hillock
cerro	hill, hillock
chico	small
chubasco	squall
cima	summit, crest
ciudad	city, town
ciudadela	citadel
co	rocky shoal, rock
colina	hill, hillock
collado	hillock, elevation
colonia	colony, settlement
colorado	reddish in color
comarca	region
concha	bay or cove
cono	cone
convento	convent
cordillera	mountain range
corona	crown, summit
cortadura	very narrow channel
costa	coast
coto	summit
cruz	cross
cuartel	barracks
cuesta	sloping ground, hill, hillock
cueva	cave
cumbre	peak
cuna	wedge
cuspide	summit
D	
darsena	basin, dock
delta	delta
departamento	department

SPANISH	English
desembarcadero	landing place
desembocadura	mouth of a river
desierto	desert
dique	mole, dock, embankment, levee
distrito	district
doble	double
duna	dune

E

el	definite article (masc.)
embocadura	mouth
ensenada	bay
entrada	entrance
ermita	hermitage
escollera	breakwater
escollo	shallow rock, reef awash
espigon	arm of a mole
estacion	station
estancia	ranch, country estate
este	east
estero	creek, inlet
estrecho	straits, narrows
estuario	estuary
exterior	outer, exterior

F

farallon	rocky islet
faro	lighthouse
fondeadero	anchorage
fortaleza	fortress
fraile	friar
freo	strait
freu	narrow strait between island and mainland
fronton	wall-like cliff
fuerte	fort

G

garganta	narrow restricted passage, sound
garita	sentry box, hut lookout
golfo	gulf
grande	large, great, big
gris	gray
grupo	group

H

hacienda	farm, plantation
haciendo	plantation
herradura	horseshoe-shaped bay

I

iglesia	church
insua	small islet or rock
interior	inner
isla	island
islete	islet
islita	small island, islet
islote	barren islet, skerry
islotillo	small barren islet
istmo	isthmus

L

la, las	definite article (fem.)
lago	lake
laguna	lagoon, pond
laja	flat rock
largo	long
lastra	rocky ledge
laxe	rock
levante	eastern
loma	hillock, knoll
lomo	ridge
los	definite article (masc.)
lugar	village, place
lugarejo	hamlet
llana	plain
llano	plain, flat
llanura	plain

M

malecon	quay, mole
mar	sea
margen	shore
marisma	marsh
medano	dune, sandhill
medio	middle
meridional	southern
mesa	tableland
meseta	plateau
mogote	hummock
molino	mill
monasterio	monastery
montana	mountain
monticulo	knoll
monte	mountain, mount
monte	forest
moreno	brown
morro	headland, bluff, head of breakwater
muelle	pier, jetty, mole
muralla	a wall of mountains

N

negro	black
norte	north
nuevo	new

O

obscuro	dark
oscuro	dark
occidental	western
oeste	west
oriental	eastern
oriente	east
orilla	shore, edge, bank (of a river)

SPANISH	English
P	
palacio	palace
pan de azucar	sugar loaf
pantano	swamp, marsh
pardo	gray
parque	park
pasco	promenade, avenue
pasaje	passage
paso	pass
pedregal	stony or rocky patch
peninsula	peninsula
pena	rock
penasco	a large rock
penon	rocky mountain
pequeno	small
peton	pinnacle rock
picacho	sharp peak
pico	peak
piedra	stone, rock
placer	shoal
playa	beach
poblacion	town
poblado	village
poniente	western
pozo	well, deep hole in river or sea bed
presa	barrage
promontorio	promontory
provincia	province
puebla	village
pueblecito	small town, village
pueblito	hamlet
puente	bridge
puerto	port, harbor
punta	point
puntal	narrow point
Q	
quebrada	ravine, gully
R	
rada	roadstead
redondo	round
regato	torrent, stream
restinga	reef
reventazones	breakers
ria	sunken valley forming estuary
riachuelo	riverlet
ribera	shore, river bank
rincon	a small cove
rio	river
roca	rock
rocalloso	pebbly, stony
rochel	rocky patch
rodal	shoal
rojo	red
rompeolas	breakwater
rompientes	breakers
roquerio	rocky shoal
S	
salinas	saltpans
san, santo	saint
seco	dry
seno	bight, sound
septentrional	northern
sierra	mountain range
silla	saddle
sotavento	leeward
sucio	foul
sud, sur	south
surgidero	anchorage
T	
tenedero	holding ground, anchorage
tetas	nipples
teton	large nipple
tierra	land
torre	tower
touza	rock
V	
vado	ford
valle	valley
vega	plain
verde	green
viejo	old
vigia	lookout
villa	town, villa
volcan	volcano
vuelta	bend, turn
Z	
zona	zone

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					
ALBEMARLE ROCK	52	13 S	60	23 W	10.63
ALBINA	5	38 N	54	25 W	1.21
ALMIRANTE SOARES DUTRA	30	01 S	50	06 W	4.69
ANGRA DOS REIS	23	01 S	44	19 W	4.22
ANNA REGINA	7	16 N	58	29 W	1.5
ANNENKOV ISLAND	54	30 S	37	04 W	10.85
ANTO ANTONIO DO ICA	3	05 S	67	57 W	1.66
ANXIOUS PASSAGE	51	22 S	59	48 W	10.45
ARACATI	4	34 S	37	46 W	2.27
ARCH ISLANDS	52	13 S	60	27 W	10.63
AREIA BRANCA	4	57 S	37	08 W	2.30
ARENAL GRANDE	33	41 S	58	26 W	5.43
ARQUIPELAGO DE ALCATRAZES	24	06 S	45	42 W	4.33
ARQUIPELAGO DOS ABROLHOS	17	58 S	38	42 W	3.24
ARRECIFE BARNACLE	52	45 S	70	02 W	8.14
ARROYA NAPOSTA	38	47 S	62	14 W	6.13
ARROYO CLAROMECO	38	52 S	60	04 W	6.8
ARROYO VERDE	42	00 S	65	05 W	7.7
ASPASIA POINT	54	19 S	37	06 W	10.86
ATOL DAS ROCAS	3	52 S	33	49 W	2.41
B					
BAHIA AINSWORTH	54	22 S	69	35 W	8.37
BAHIA ALSINA	55	38 S	67	20 W	9.28
BAHIA ARATHOON	53	25 S	73	00 W	8.67
BAHIA AZOPARDO	54	28 S	69	00 W	8.37
BAHIA BLANCA	38	47 S	62	16 W	6.10
BAHIA BLOSSOM	54	47 S	63	59 W	9.16
BAHIA BORJA	53	32 S	72	30 W	8.58
BAHIA BROOKES	54	20 S	69	50 W	8.37
BAHIA BUEN SUCESO	54	48 S	65	13 W	9.11
BAHIA BUSTAMANTE	45	08 S	66	24 W	7.33
BAHIA CAMARONES	44	45 S	65	35 W	7.23
BAHIA CANEPA	54	52 S	64	30 W	9.15
BAHIA CAPITAN CANEPA	54	52 S	64	30 W	9.15
BAHIA CARRERAS	53	36 S	70	56 W	8.39
BAHIA CAYETANO	45	02 S	65	45 W	7.28
BAHIA CLIFT	53	05 S	73	20 W	8.100
BAHIA CORDES	53	43 S	71	54 W	8.49
BAHIA DE LOS NODALES	48	01 S	65	52 W	7.45
BAHIA DE MALDONADO	34	56 S	55	00 W	5.9
BAHIA DE MONTEVIDEO	34	54 S	56	14 W	5.17
BAHIA DE SAN SEBASTIAN	53	14 S	68	15 W	9.4
BAHIA DESVELOS	48	19 S	66	16 W	7.46
BAHIA ENGANO	43	20 S	65	00 W	7.17
BAHIA FLINDERS	54	45 S	64	35 W	9.13
BAHIA FORTESCUE	53	41 S	72	00 W	8.49
BAHIA GENTE GRANDE	52	59 S	70	13 W	8.23
BAHIA GREGORIO	52	37 S	70	08 W	8.12
BAHIA GUIRIOR	53	25 S	72	47 W	8.61
BAHIA HAVERGAL ORIENTAL	53	30 S	72	55 W	8.64
BAHIA HUEVO	45	03 S	65	43 W	7.27
BAHIA INUTIL	53	30 S	69	45 W	8.31
BAHIA LAURA	48	23 S	66	25 W	7.48
BAHIA LEE	52	50 S	70	20 W	8.23
BAHIA LOMAS	52	33 S	69	00 W	8.7
BAHIA LOMOS	53	50 S	70	42 W	8.38
BAHIA MORRIS	54	15 S	71	00 W	8.45
BAHIA OSO MARINO	47	56 S	65	46 W	7.44
BAHIA PINTO	52	32 S	72	15 W	8.99
BAHIA PORVENIR	53	18 S	70	22 W	8.30
BAHIA POSESION	52	16 S	69	11 W	8.5
BAHIA REGASIFICATION TERMINAL	12	49 S	38	41 W	3.6
BAHIA ROSAS	41	09 S	63	23 W	7.3
BAHIA SAN CLEMENTE	36	18 S	56	47 W	5.29
BAHIA SAN GREGORIO	45	01 S	65	36 W	7.25
BAHIA SAN NICOLAS	53	51 S	71	06 W	8.40
BAHIA SAN SEBASTIAN	44	35 S	65	26 W	7.23
BAHIA SANGUINETO	47	06 S	66	06 W	7.39
BAHIA SANTIAGO	52	32 S	69	52 W	8.12
BAHIA SLOGGETT	55	00 S	66	18 W	9.22
BAHIA SNUG	53	51 S	71	26 W	8.48
BAHIA SOLANO	45	39 S	67	16 W	7.34
BAHIA SWALLOW	53	30 S	72	46 W	8.63
BAHIA TRANSICION	54	20 S	71	06 W	8.46
BAHIA TUESDAY	52	50 S	74	28 W	8.80
BAHIA UNION	39	58 S	62	08 W	6.19
BAHIA USELESS	53	30 S	69	45 W	8.31
BAHIA VERA	44	12 S	65	15 W	7.20
BAHIA WHITSAND	52	43 S	70	36 W	8.17
BAHIA WILLES	53	49 S	70	26 W	8.34
BAHIA WODSWORTH	52	59 S	74	02 W	8.79
BAIA DE BENEVENTE	20	53 S	40	42 W	3.44
BAIA DE ESPIRITU SANTO	20	19 S	40	16 W	3.28
BAIA DE GUANABARA	22	57 S	43	08 W	4.3
BAIA DE GUARATUBA	25	52 S	48	34 W	4.44
BAIA DE IMBETIBA	22	23 S	41	46 W	3.50
BAIA DE JACUACANGA	23	02 S	44	15 W	4.21
BAIA DE MAMANGUA	23	14 S	44	36 W	4.25
BAIA DE MANGARATIBA	22	58 S	44	04 W	4.18
BAIA DE PORTO SEGURO	16	26 S	39	03 W	3.18
BAIA DE SANTOS	24	01 S	46	21 W	4.35
BAIA DE SAO MARCOS	2	21 S	44	17 W	2.7
BAIA DE TAMANDARE	8	46 S	35	06 W	2.52
BAIA DE TURIACU	1	30 S	45	15 W	2.5
BAIA DO ESPIRITO SANTO	20	18 S	40	16 W	3.36
BAIXO DO CARAPEBUS	20	15 S	40	10 W	3.37
BAIXO DO UNA	20	33 S	40	21 W	3.41
BAJIO LA PANELA	34	55 S	56	27 W	5.24
BAJO CUMBERLAND	34	57 S	55	57 W	5.4
BAJO DEL MEDIO	52	48 S	70	40 W	8.19
BAJO FALKLAND	34	38 S	54	07 W	4.82
BAJO LA PANELA	34	55 S	56	27 W	5.19
BAJO LADAS	34	52 S	54	38 W	4.83
BAJO MAGALLANES	52	57 S	73	55 W	8.79
BAJO POLONIO	34	26 S	53	48 W	4.79
BAJO SPEEDWELL	34	40 S	54	07 W	4.81
BALD ISLAND	51	46 S	60	56 W	10.56
BANCO ARQUIMEDES	35	13 S	56	06 W	5.5
BANCO BUCKLE	0	17 S	47	00 W	2.2
BANCO DE MEIO NORTE	1	05 N	49	39 W	1.43
BANCO DEL TUYU	36	16 S	57	49 W	6.2
BANCO DO MERGULHO	2	36 S	41	22 W	2.19
BANCO DO SUPERAGUI	25	29 S	48	14 W	4.41

	Position °	'	°	'	Sec. Para
BANCO DOS NAUFRAGADOS	27	51 S	48	33 W	4.59
BANCO HYLAS	0	18 S	47	18 W	2.2
BANCO MARTA	52	49 S	70	33 W	8.21
BANCO PROVIDENCIA	53	01 S	73	33 W	8.70
BANCO SANTA LUCIA	34	48 S	56	30 W	5.20
BANCO TRITON	52	37 S	69	55 W	8.11
BANCO XINGU	0	20 S	47	54 W	1.50
BARFF POINT	54	14 S	36	24 W	10.76
BARRA DA ESTANCIA	11	27 S	37	21 W	2.59
BARRA DAS CANAVIEIRAS	15	43 S	38	54 W	3.15
BARRA DE BELMONTE	15	50 S	38	52 W	3.16
BARRA DE CATUAMA	7	43 S	34	48 W	2.47
BARRA DE NOVA VICOSA	17	54 S	39	21 W	3.31
BARRA DE SANTA CRUZ	19	57 S	40	08 W	3.36
BARRA DE SAO CRISTOVAO	11	11 S	37	08 W	2.59
BARRA DE SAO JOAO	22	36 S	41	59 W	3.53
BARRA DO ALMEIDA	20	03 S	40	11 W	3.37
BARRA DO CAMARAGIBE	9	20 S	35	24 W	2.54
BARRA DO FURADO	22	06 S	41	08 W	3.48
BARRA DO PRADO	17	22 S	39	13 W	3.22
BARRA GRANDE	8	59 S	35	11 W	2.53
BARRA NOVA DE CABO FRIOS	22	53 S	42	00 W	3.56
BARRA SECA	19	05 S	39	43 W	3.33
BARRANCA NORTE	41	01 S	62	41 W	6.21
BARREIRAS VERMELHAS	16	30 S	39	04 W	3.19
BARREN ISLAND	52	22 S	59	41 W	10.30
BARTICA	6	25 N	58	37 W	1.7
BATTURES DU CONNETABLE	4	56 N	51	57 W	1.34
BAY OF HARBORS	52	17 S	59	11 W	10.29
BAY OF ISLES	54	00 S	37	20 W	10.71
BEACON POINT	51	46 S	60	57 W	10.56
BEAUCHENE ISLAND	52	55 S	59	12 W	10.28
BEAVER HARBOR	51	49 S	61	13 W	10.58
BEAVER ISLAND	51	51 S	61	16 W	10.57
BELEM	1	27 S	8	30 W	1.54
BELLA VISTA	32	41 S	60	44 W	5.50
BELMONTE	15	51 S	38	53 W	3.16
BENJAMIN CONSTANT	4	22 S	70	02 W	1.67
BERKELEY SOUND	51	35 S	57	45 W	10.6
BETWEEN PONTA DO UNA	24	25 S	47	01 W	4.38
BIG POINT	51	28 S	58	25 W	10.4
BIG SHAG ISLAND	51	24 S	58	19 W	10.4
BLACK HEAD	54	04 S	37	06 W	10.72
BLEAKER ISLAND	52	13 S	58	53 W	10.26
BLIND ISLAND	52	16 S	59	33 W	10.32
BLUE WHALE HARBOR	54	04 S	37	01 W	10.73
BLUFF HEAD	52	05 S	58	51 W	10.26
BOA VISTA	2	49 N	60	40 W	1.73
BOAT POINT	51	51 S	58	13 W	10.16
BOLD POINT	51	40 S	61	12 W	10.57
BOLD POINT	51	46 S	58	04 W	10.13
BORJA	4	26 S	77	33 W	1.75
BRAAMSPUNT	5	58 N	55	10 W	1.17
BREVES	1	41 S	50	29 W	1.57
BRISTOL ISLAND	59	03 S	26	34 W	10.96
BROWN POINT	51	37 S	60	15 W	10.53
BUENOS AIRES	34	36 S	58	22 W	5.36
BURDWOOD BANK	55	00 S	60	00 W	10.2
BURNT ISLAND	52	02 S	59	11 W	10.27
BUTTON ISLAND	51	55 S	58	44 W	10.18
BYRON SOUND	51	25 S	60	17 W	10.48

C

	Position °	'	°	'	Sec. Para
CABECO DO JOCA	0	26 S	48	48 W	1.50
CABEDELO	6	58 S	34	50 W	2.45
CABO ARISTIZABAL	45	13 S	66	31 W	7.34
CABO BACOPARI	6	22 S	35	00 W	2.42
CABO BLANCO	47	12 S	65	45 W	7.41
CABO BOQUERON	53	29 S	70	12 W	8.30
CABO BRANCO	7	09 S	34	48 W	2.46
CABO BUEN SUCESO	54	56 S	65	24 W	9.11
CABO BUEN TIEMPO	51	33 S	68	57 W	7.54
CABO BUZIOS	22	45 S	41	52 W	3.54
CABO CALCANHAR	5	10 S	35	29 W	2.36
CABO CAMDEN	53	12 S	71	40 W	8.91
CABO CASSIPORE	3	54 N	51	06 W	1.37
CABO CASTILLO	34	21 S	53	46 W	4.77
CABO CHARLES	53	16 S	72	17 W	8.87
CABO COLNETT	54	43 S	64	21 W	9.19
CABO COOPER KEY	53	15 S	73	13 W	8.66
CABO CORRIENTES	38	01 S	57	32 W	6.3
CABO CORTADO	52	51 S	74	25 W	8.81
CABO COVENTRY	53	45 S	71	51 W	8.49
CABO CROSSTIDE	53	34 S	72	25 W	8.56
CABO CUEVAS	52	52 S	74	21 W	8.80
CABO CURIOSO	49	11 S	67	36 W	7.49
CABO DA GAVEA	23	01 S	43	18 W	4.8
CABO DANOSO	48	50 S	67	13 W	7.49
CABO DE HORNOS	55	59 S	67	16 W	9.30
CABO DE SANTA MARTA GRANDE	28	36 S	48	49 W	4.65
CABO DE SANTO AGOSTINHO	8	21 S	34	56 W	2.49
CABO DE SAO ROQUE	5	29 S	35	16 W	2.37
CABO DE SAO TOME	22	00 S	40	59 W	3.48
CABO DOMINGO	53	41 S	67	51 W	9.5
CABO DOS BAHIAS	44	55 S	65	31 W	7.25
CABO EDGEWORTH	53	48 S	72	09 W	8.57
CABO ESPIRITU SANTO	52	40 S	68	36 W	8.6
CABO EXPECTACION	54	14 S	70	12 W	8.41
CABO FALSO QUOD	53	31 S	72	35 W	8.61
CABO FLINN	53	14 S	71	51 W	8.90
CABO FRIO	23	01 S	42	00 W	4.2
CABO FROWARD	53	54 S	71	18 W	8.48
CABO GALEANO	54	47 S	64	42 W	9.13
CABO GALLANT	53	42 S	72	02 W	8.49
CABO GRAVES	52	33 S	71	56 W	8.96
CABO GREGORIO	52	39 S	70	13 W	8.15
CABO GUARDIAN	48	21 S	66	20 W	7.47
CABO HALL	54	58 S	65	43 W	9.21
CABO HOLLAND	53	49 S	71	38 W	8.48
CABO HUNTER	53	27 S	72	52 W	8.64
CABO IGUAPE	3	56 S	38	17 W	2.26
CABO KEMPE	54	52 S	64	22 W	9.15
CABO KENDALL	54	50 S	64	07 W	9.15
CABO LUNES	53	11 S	73	24 W	8.68
CABO MAGUARI	00	17 N	48	22 W	1.46
CABO MONDAY	53	11 S	73	24 W	8.68
CABO MONMOUTH	53	22 S	70	26 W	8.30
CABO NEGRO	52	57 S	70	48 W	8.26
CABO NEGRO GAS TERMINAL	52	56 S	70	48 W	8.20
CABO NOMBRE	52	58 S	68	17 W	9.2
CABO NORTE	1	41 N	49	55 W	1.40
CABO NOSE	53	45 S	70	08 W	8.32
CABO NOTCH	53	26 S	72	47 W	8.61
CABO ORANGE	4	28 N	51	29 W	1.37
CABO ORANGE	52	28 S	69	23 W	8.7
CABO PENAS	53	50 S	67	33 W	9.7
CABO PHILLIP	52	45 S	73	55 W	8.77
CABO PILAR	52	44 S	74	41 W	8.81
CABO POLONIO	34	24 S	53	47 W	4.79
CABO QUOD	53	32 S	72	33 W	8.58
CABO RASO	44	20 S	65	14 W	7.21
CABO RODA	52	56 S	73	49 W	8.73
CABO ROSS	55	34 S	67	21 W	9.26
CABO SAN ANTONIO	36	20 S	56	45 W	5.28
CABO SAN ANTONIO	53	53 S	70	54 W	8.38
CABO SAN ANTONIO	54	43 S	64	33 W	9.12
CABO SAN BARTOLOME	54	55 S	64	42 W	9.14
CABO SAN DIEGO	54	39 S	65	07 W	9.9
CABO SAN FRANCISCO DE PAULA	49	45 S	67	43 W	7.51
CABO SAN ISIDRO	53	47 S	70	58 W	8.40
CABO SAN JUAN	54	43 S	63	48 W	9.17
CABO SAN PABLO	54	17 S	66	44 W	9.7
CABO SAN SEBASTIAN	53	20 S	68	10 W	9.4
CABO SAN VICENTE	54	37 S	65	15 W	9.8
CABO SANTA INES	54	07 S	67	09 W	9.7
CABO SANTA MARIA	34	40 S	54	09 W	4.80
CABO SCOURFIELD	55	47 S	67	10 W	9.28
CABO TAMAR	52	56 S	73	47 W	8.72
CABO TRES PUNTAS	47	06 S	65	52 W	7.40
CABO TROMBA GRANDE	14	16 S	38	59 W	3.11
CABO TURN	54	24 S	71	07 W	8.46
CABO UPRIGHT	53	05 S	73	36 W	8.75
CABO VALENTIN	53	34 S	70	31 W	8.38
CABO VICTORIA	52	17 S	74	56 W	8.78
CABO VIEJO	53	24 S	72	29 W	8.85
CABO VIRGENES	52	20 S	68	21 W	8.2
CALETA AGUILA	53	58 S	70	59 W	8.40
CALETA ALSINA	55	38 S	67	20 W	9.28
CALETA BATES	53	23 S	73	02 W	8.67
CALETA BEAUBASIN	54	05 S	71	03 W	8.50
CALETA BRIGHTMAN	39	26 S	62	02 W	6.18
CALETA CLARENCIA	52	54 S	70	08 W	8.24

	Position °	'	°	'	Sec. Para
CALETA CORDOVA	45	44 S	67	21 W	7.35
CALETA DARBY	53	01 S	73	56 W	8.79
CALETA DISCORDIA	53	23 S	69	50 W	8.31
CALETA HOBBS	53	03 S	70	20 W	8.25
CALETA LA PACIENCIA	54	25 S	69	04 W	8.37
CALETA MARTIAL	55	50 S	67	17 W	9.32
CALETA MINA ELENA	52	41 S	71	54 W	8.98
CALETA OCASION	53	16 S	72	15 W	8.90
CALETA OLIVIA	46	26 S	67	31 W	7.36
CALETA PERCY	52	53 S	70	14 W	8.24
CALETA RASO	44	20 S	65	14 W	7.20
CALETA REAL	53	26 S	72	27 W	8.85
CALETA SAN MAURICIO	54	45 S	65	13 W	9.10
CALETA VALDES	42	30 S	63	36 W	7.11
CALF HEAD	54	28 S	36	04 W	10.80
CALHAU DE SAO PEDRO	27	15 S	48	25 W	4.54
CALISTA ISLAND	52	01 S	59	50 W	10.37
CAMARONES	44	48 S	65	43 W	7.24
CAMETA	2	15 S	49	30 W	1.69
CAMOCIM	2	54 S	40	50 W	2.20
CANAL ANICA	54	05 S	70	30 W	8.36
CANAL BARBARA	53	50 S	72	11 W	8.52
CANAL COSTANERO	34	33 S	58	25 W	5.40
CANAL DA GIPOIA	23	02 S	44	21 W	4.24
CANAL DE PAPAGAIOS	22	51 S	41	57 W	3.55
CANAL DE SAO SEBASTIAO	23	48 S	45	24 W	4.31
CANAL DEL NORTE	34	28 S	57	52 W	5.3
CANAL GAJARDO	53	00 S	72	57 W	8.99
CANAL SANTIAGO	34	50 S	57	53 W	5.31
CANDLEMAS ISLANDS	57	05 S	26	44 W	10.93
CAPAO DA CANOA	29	46 S	50	01 W	4.67
CAPE ALEXANDRA	54	00 S	38	01 W	10.67
CAPE BEST	54	05 S	36	49 W	10.73
CAPE BOUGAINVILLE	51	18 S	58	28 W	10.4
CAPE BULLER	53	59 S	37	22 W	10.70
CAPE CARYSFORT	51	25 S	57	50 W	10.1
CAPE CONSTANCE	54	03 S	36	59 W	10.73
CAPE CREWE	54	02 S	37	08 W	10.71
CAPE DARNLEY	54	27 S	36	49 W	10.85
CAPE DEMIDOV	54	09 S	37	44 W	10.88
CAPE DOLPHIN	51	14 S	58	58 W	10.3
CAPE FREHEL	51	23 S	58	12 W	10.5
CAPE GEORGE	54	17 S	36	15 W	10.79
CAPE HARCOURT	54	30 S	36	00 W	10.80
CAPE HORN	55	59 S	67	16 W	9.30
CAPE MEREDITH	52	15 S	60	39 W	10.63
CAPE NUNEZ	54	16 S	37	25 W	10.87
CAPE ORFORD	52	00 S	61	03 W	10.60
CAPE PARYADIN	54	04 S	38	01 W	10.89
CAPE PEMBROKE	51	41 S	57	43 W	10.10
CAPE ROSA	54	11 S	37	25 W	10.87
CAPE SAUNDERS	54	08 S	36	38 W	10.73
CAPE VAHSEL	54	45 S	35	48 W	10.82
CAPE VAKOP	54	22 S	36	10 W	10.80
CAPE VIRGINS	52	20 S	68	21 W	8.2
CARAGUATATUBA	23	37 S	45	25 W	4.28
CARCASS ISLAND	51	16 S	60	33 W	10.47
CAYENNE	4	56 N	52	20 W	1.31
CENTRE ISLAND	51	56 S	58	34 W	10.25
CERRO CONO	52	40 S	70	23 W	8.14
CERRO EL MORRION	53	34 S	72	32 W	8.59
CERRO SUTLEJ	52	23 S	69	45 W	8.11
CERRO YORK	52	58 S	73	30 W	8.70
CHANCHO POINT	51	30 S	59	08 W	10.35
CHAVES	00	10 S	49	59 W	1.46
CHILOE ISLAND	43	20 S	73	35 W	8.1
CHOISEUL SOUND	51	56 S	58	31 W	10.17
CHRISTMAS HARBOR	51	39 S	60	15 W	10.52
CIDADE DE COLATINA	19	32 S	40	37 W	3.34
CIDADE DE TOUROS	5	12 S	35	28 W	2.36
CIDREIRA	30	10 S	50	12 W	4.70
CIGUENA OIL TERMINAL	38	57 S	62	02 W	6.11
CIUDAD DE BAHIA BLANCA	38	44 S	62	16 W	6.16
CLERKE ROCKS	55	01 S	34	42 W	10.82
CLONBROOK	6	44 N	57	57 W	1.10
COAL HARBOR	54	03 S	37	53 W	10.88
COARI	4	07 S	63	07 W	1.66
COBBLERS COVE	54	16 S	36	18 W	10.79
COCAL	1	44 S	49	31 W	1.56
CODAJAS	3	50 S	62	05 W	1.66
COLON	32	13 S	58	08 W	5.48
COLONIA	34	28 S	57	51 W	5.27
COMMITTEE BAY	51	20 S	59	54 W	10.45
CONCEPCION DEL URUGUAY	32	29 S	58	14 W	5.41
CONCORDIA	31	24 S	58	02 W	5.49
CONDOR CLIFF	52	17 S	68	24 W	7.56
COOPER SOUND	54	48 S	35	49 W	10.82
COPPENAME PUNT	5	49 N	55	55 W	1.16
CORENTYN RIVER	6	00 N	57	07 W	1.13
COURANTYNE RIVER	6	00 N	57	07 W	1.13
CRUZEIRO DO SUL	7	39 S	72	37 W	1.73
CURRALINHO	1	49 S	49	48 W	1.57

D

DARWIN HARBOR	51	51 S	58	56 W	10.22
DEGRAD DES CANNES	4	51 N	52	16 W	1.33
DOCTOR POINT	51	39 S	57	49 W	10.10
DOUGLAS STRAIT	59	28 S	26	17 W	10.98
DRYGALSKI FJORD	54	50 S	35	55 W	10.83
DUCLOS POINT	51	32 S	58	01 W	10.6

E

EAST COVE	51	54 S	58	27 W	10.20
ECLAIREUR BANK	20	19 S	37	46 W	3.28
EDDYSTONE ROCK	51	12 S	59	02 W	10.3
EGG HARBOR	51	50 S	59	23 W	10.37
EL CADILLO	35	08 S	56	59 W	5.32
EL RINCON LIGHT	39	24 S	62	01 W	6.17
ELEPHANT BAY	51	17 S	59	34 W	10.43
ELEPHANT POINT	51	15 S	60	18 W	10.46
ELSEHUL HARBOR	54	01 S	37	58 W	10.69
ENSEADA DAS PALMAS	23	08 S	44	07 W	4.17
ENSEADA DE ARACATIBA	23	09 S	44	20 W	4.19
ENSEADA DE CAMBORIU	26	59 S	48	36 W	4.52
ENSEADA DE CARAGUATATUBA	23	40 S	45	23 W	4.28
ENSEADA DE IMBITUBA	28	13 S	48	39 W	4.61
ENSEADA DE ITAPOCOROI	26	47 S	48	37 W	4.50
ENSEADA DE UBATUBA	23	26 S	45	03 W	4.27
ENSEADA DO ABRAAO	23	08 S	44	09 W	4.17
ENSENADA DE LA POCITOS	34	55 S	56	09 W	5.16
ENSENADA DEL PORTRERO	34	55 S	55	08 W	5.12
ENSENADA MOGOTES	38	07 S	57	35 W	6.5
ENSENADA TORINO	52	49 S	71	16 W	8.91
ESBENSEN BAY	54	52 S	35	58 W	10.83
ESTERO NAVARRO	52	50 S	72	39 W	8.99
EVERTON	6	12 N	57	29 W	1.11

F

FALSO PAO DE ACUCAR	22	58 S	43	02 W	4.3
FAMINE REACH	53	44 S	70	50 W	8.38
FANNING HEAD	51	28 S	59	08 W	10.41
FANNING RIDGE	54	20 S	37	03 W	10.86
FAZENDINHA	00	04 S	51	06 W	1.49
FIORDO KEATS	54	18 S	70	43 W	8.43
FIORDO OWEN	54	00 S	70	34 W	8.36
FIRST NARROWS	52	30 S	69	35 W	8.8
FLEUVE KOUROU	5	10 N	52	37 W	1.28
FLEUVE MANA	5	45 N	53	55 W	1.25
FLORESTA	1	11 S	51	14 W	1.59
FONDEADERO CRACKER	42	56 S	64	29 W	7.16
FONDEADERO FIELD	53	22 S	72	55 W	8.62
FONDEADERO MAZARREDO	47	02 S	66	42 W	7.39
FORDLANDIA	3	40 S	55	30 W	1.70
FORTUNA BAY	54	05 S	36	46 W	10.73
FOX BAY	51	59 S	60	01 W	10.65
FOX POINT	51	55 S	58	23 W	10.17
FRENCH HARBOR	51	50 S	61	05 W	10.59

G

GEORGETOWN	6	50 N	58	10 W	1.8
GODTHUL BAY	54	17 S	36	17 W	10.79
GOLD HARBOR	54	37 S	35	56 W	10.82
GOLFO NUEVO	42	40 S	64	30 W	7.13
GOLFO SAN JOSE	42	14 S	64	26 W	7.9
GOLFO SAN MATIAS	41	30 S	64	00 W	7.2
GORRITI LIGHT	34	58 S	54	58 W	5.10

	Position °	'	°	'	Sec. Para
GOVERNMENT ISLAND	51	13 S	59	54 W	10.43
GOVERNOR ISLAND	51	51 S	61	10 W	10.58
GRUPO EVANGELISTAS	52	23 S	75	06 W	8.78
GRUPO SANTA ANA	53	08 S	73	17 W	8.100
GRYTVIKEN	54	16 S	36	30 W	10.78
GUAIBA ISLAND TERMINAL	23	01 S	44	02 W	4.11
GULL HARBOR	51	53 S	60	51 W	10.56
GULL ISLAND	51	57 S	58	45 W	10.23
GURUPA	1	24 S	51	39 W	1.59
H					
HAMOND COVE	51	58 S	58	37 W	10.24
HARBOR POINT	54	09 S	36	41 W	10.74
HIGH CLIFF ISLAND	51	48 S	59	28 W	10.37
HILL COVE	51	29 S	60	05 W	10.48
HILL GAP COVE	51	48 S	59	44 W	10.41
HOEK VAN MEERZORG	5	49 N	55	09 W	1.18
HOPE HARBOR	51	20 S	60	40 W	10.49
HOPE POINT	54	17 S	36	30 W	10.77
HOTSPUR BANK	17	50 S	35	55 W	3.27
HUMMOCK ISLAND	51	37 S	60	26 W	10.51
HUSVIK HARBOR	54	10 S	36	39 W	10.75
HUT POINT	51	24 S	58	17 W	10.4
I					
IGUAPE	24	42 S	47	33 W	4.38
ILE DE CAYENNE	4	56 N	52	20 W	1.30
ILHA ANCHIETA	23	32 S	45	04 W	4.28
ILHA ANCORA	22	46 S	41	47 W	3.54
ILHA BRANCA	21	00 S	40	47 W	3.45
ILHA BRANCA	22	43 S	41	53 W	3.53
ILHA DA BARRA	1	22 S	48	30 W	1.53
ILHA DA GALE	27	11 S	48	24 W	4.54
ILHA DA GIPOIA	23	03 S	44	22 W	4.20
ILHA DA JIBOIA	23	03 S	44	22 W	4.20
ILHA DA MOELA	24	03 S	46	16 W	4.34
ILHA DA TRINDADE	20	30 S	29	20 W	3.29
ILHA DA VITORIA	23	45 S	45	01 W	4.29
ILHA DAS ANDORINHAS	21	10 S	40	53 W	3.45
ILHA DAS ARARAS	28	19 S	48	39 W	4.63
ILHA DAS COUVES	23	25 S	44	51 W	4.27
ILHA DAS COUVES	23	48 S	45	43 W	4.33
ILHA DE BOM ABRIGO	25	07 S	47	52 W	4.39
ILHA DE CORAL	27	56 S	48	33 W	4.61
ILHA DE FERNANDO DE NORONHA	3	52 S	32	26 W	2.40
ILHA DE ITACURUCA	22	57 S	43	53 W	4.13
ILHA DE JAGUANUM	23	00 S	43	56 W	4.12
ILHA DE MACACOS	23	05 S	44	14 W	4.17
ILHA DE MARACA	2	05 N	50	25 W	1.39
ILHA DE PERUIBE	24	22 S	46	59 W	4.37
ILHA DE SANTA CATARINA	27	37 S	48	30 W	4.55
ILHA DE SANTANA	2	18 S	43	41 W	2.14
ILHA DE SANTO ALEIXO	8	37 S	35	02 W	2.51
ILHA DE TINHARE	13	29 S	38	58 W	3.9
ILHA DO CRUZADOR	1	22 S	48	31 W	1.53
ILHA DO FRADE	12	47 S	38	38 W	3.6
ILHA DO FRANCES	20	55 S	40	45 W	3.44
ILHA DO MAR VIRADO	23	34 S	45	10 W	4.28
ILHA DO MEL	25	31 S	48	20 W	4.40
ILHA DOS ARVOREDOS	27	17 S	48	22 W	4.54
ILHA DOS BUZIOS	23	48 S	45	08 W	4.29
ILHA DOS LOBOS	28	27 S	48	42 W	4.63
ILHA DOS PACOTES	20	21 S	40	15 W	3.41
ILHA DOS PORCOS	23	48 S	45	04 W	4.28
ILHA FEIA	26	45 S	48	38 W	4.50
ILHA GRANDE	23	09 S	44	13 W	4.15
ILHA GUAIBINHA	22	59 S	44	02 W	4.12
ILHA JIPIOCA	1	51 N	50	13 W	1.39
ILHA JURUBAIBA	22	58 S	43	57 W	4.12
ILHA MANGUNCA	1	36 S	44	39 W	2.6
ILHA MONTAO DE TRIGO	23	52 S	45	47 W	4.33
ILHA QUEIMADA GRANDE	24	30 S	46	40 W	4.38
ILHA QUEIMADA PEQUENA	24	23 S	46	48 W	4.38
ILHA QUIEPE	13	50 S	38	56 W	3.9
ILHA RAPADA	23	10 S	44	40 W	4.25
ILHA RAPADA	23	26 S	44	54 W	4.27
ILHA RATA	3	49 S	32	23 W	2.40
ILHA RAZA	23	04 S	43	09 W	4.4
ILHA SANDRI	23	03 S	44	30 W	4.25
ILHA SARACURA	23	03 S	44	16 W	4.20
ILHA SUESTE	17	59 S	38	42 W	3.24
ILHA TATUOCA	1	12 S	48	30 W	1.52
ILHAS ARUANS	1	05 S	51	43 W	1.58
ILHAS CURRAIS	25	44 S	48	22 W	4.44
ILHAS DAS TRES IRMAS	27	50 S	48	31 W	4.55
ILHAS DE SANTANA	22	25 S	41	42 W	3.49
ILHAS DE SAO JOAO	1	19 S	44	56 W	2.5
ILHAS DOS MOLEQUES DO SUL	27	51 S	48	26 W	4.55
ILHAS JUCU	20	25 S	40	19 W	3.41
ILHAS MARICAS	23	01 S	42	55 W	4.2
ILHAS MARTIN VAZ	20	30 S	28	51 W	3.30
ILHAS PEDREIRA	0	20 N	50	37 W	1.44
ILHAS RASAS	20	41 S	40	22 W	3.41
ILHO DO BAILIQUE LIGHT	0	59 N	49	57 W	1.43
IQUITOS	3	58 S	73	22 W	1.68
ISLA ARCE	45	00 S	65	29 W	7.25
ISLA ARIADNA	39	15 S	62	01 W	6.17
ISLA BARNEVELT	55	50 S	66	48 W	9.29
ISLA BLAXLAND	53	09 S	72	20 W	8.69
ISLA CARLOS III	53	37 S	72	20 W	8.55
ISLA CONTRAMAESTRE	52	57 S	70	21 W	8.23
ISLA CORDOVA	53	08 S	73	30 W	8.74
ISLA DAEDALOS	55	29 S	67	37 W	9.27
ISLA DAWSON	53	55 S	70	33 W	8.38
ISLA DE FLORES	34	57 S	55	56 W	5.4
ISLA DE LOBOS	35	02 S	54	53 W	5.2
ISLA DE LOS ESTADOS	54	50 S	64	15 W	9.12
ISLA DIEGO DE ALMAGRO	51	30 S	75	10 W	8.82
ISLA DUQUE DE YORK	50	38 S	75	20 W	8.82
ISLA EL BONETE	53	35 S	72	21 W	8.56
ISLA ESCONDIDA	43	43 S	65	17 W	7.18
ISLA FARALLON	34	29 S	57	55 W	5.25
ISLA FLORES	34	57 S	55	56 W	5.18
ISLA GORRITI	34	57 S	54	58 W	5.10
ISLA GUZMAN	53	20 S	72	30 W	8.86
ISLA HERMITE	55	51 S	67	40 W	9.31
ISLA HORNOS	55	57 S	67	17 W	9.30
ISLA ISABEL	52	52 S	70	42 W	8.18
ISLA JERDAN	55	50 S	67	28 W	9.31
ISLA KING	52	22 S	74	40 W	8.78
ISLA LENNOX	55	17 S	66	57 W	9.24
ISLA LEONES	45	03 S	65	36 W	7.26
ISLA LIEBRES	48	06 S	65	54 W	7.46
ISLA MAGDALENA	52	55 S	70	35 W	8.21
ISLA MARGARITA	39	52 S	62	07 W	6.18
ISLA MARTIN GARCIA	34	11 S	58	15 W	5.39
ISLA MAXWELL	55	49 S	67	31 W	9.32
ISLA MONMOUTH	53	42 S	72	11 W	8.55
ISLA NUEVA	55	14 S	66	33 W	9.23
ISLA OBSERVATORIO	54	40 S	64	08 W	9.19
ISLA PARKER	52	42 S	74	10 W	8.77
ISLA PIKE	53	00 S	73	29 W	8.71
ISLA PINGUINO	47	55 S	65	43 W	7.43
ISLA PROVIDENCIA	52	58 S	73	32 W	8.72
ISLA QUINTANO	45	15 S	66	42 W	7.34
ISLA RASA	45	06 S	65	24 W	7.25
ISLA RICHARDSON	53	03 S	73	27 W	8.70
ISLA RUPERT	53	40 S	72	12 W	8.55
ISLA SAN GABRIEL	34	27 S	57	54 W	5.25
ISLA SHELTER	53	19 S	73	02 W	8.65
ISLA SPIDER	53	32 S	72	41 W	8.59
ISLA TAMAR	52	54 S	73	49 W	8.70
ISLA TERHALTEN	55	27 S	67	03 W	9.25
ISLA TOVA	45	06 S	66	00 W	7.31
ISLA WARD	52	56 S	73	34 W	8.71
ISLA WESTMINSTER	52	36 S	74	24 W	8.77
ISLA WICKHAM	54	06 S	70	23 W	8.35
ISLAS BLANCAS	44	47 S	65	40 W	7.24
ISLAS CHARLES	53	44 S	72	07 W	8.55
ISLAS CUTTER	53	22 S	72	29 W	8.86
ISLAS DE CASTILLO GRANDE	34	21 S	53	44 W	4.78
ISLAS EVOUT	55	34 S	66	47 W	9.25
ISLAS VIANA	45	11 S	66	24 W	7.33
ISLOTE CENARIA	54	18 S	70	56 W	8.46
ISLOTE COHORN	53	33 S	72	20 W	8.54
ISLOTE LOS TRES GARCIA	54	50 S	64	47 W	9.14
ISLOTE STELLA	53	24 S	72	58 W	8.64
ISLOTES 350 PIES	54	55 S	64	37 W	9.14
ISLOTES LAS TOSCAS	34	49 S	55	34 W	5.13
ISLOTES PRITCHARD	53	15 S	73	18 W	8.68

	Position °	'	°	'	Sec. Para
ISLOTES TERAN	53	25 S	72	29 W	8.85
ISLOTES TREE	53	18 S	72	24 W	8.86
ITACOATIARA	3	09 S	58	27 W	1.64
ITAJAI	26	55 S	8	38 W	4.51
ITAQUI	2	34 S	44	22 W	2.11
J					
JASON ISLAND	54	11 S	36	30 W	10.76
JASON ISLANDS	51	00 S	61	15 W	10.50
JERSEY POINT	51	26 S	59	11 W	10.41
JOINVILLE	26	19 S	48	51 W	4.49
JOMFRUENE	54	04 S	38	03 W	10.89
K					
KAIMANS HOOFD	5	50 N	54	02 W	1.22
KAIMANSHOOFD	5	50 N	54	02 W	1.22
KAUROW SPACE CENTER	5	09 N	52	39 W	1.23
KIDNEY ISLAND	52	00 S	58	31 W	10.25
KING EDWARD COVE	54	17 S	36	29 W	10.77
KING EDWARD POINT	54	17 S	36	30 W	10.77
KING GEORGE BAY	51	31 S	60	39 W	10.51
KLUTSCHAK POINT	54	10 S	37	41 W	10.88
KM 109.5 BUOY	34	08 S	58	19 W	5.38
KM 39 BUOY	34	39 S	57	58 W	5.38
KM 70 BUOY	34	23 S	58	00 W	5.38
KNOB POINT	51	59 S	58	36 W	10.25
KUPRIYANOV ISLANDS	54	45 S	36	19 W	10.84
L					
L'ENFANT PERDU	5	02 N	52	21 W	1.30
LAGUNA MAR CHIQUITA	37	44 S	57	24 W	6.3
LAJE DA MARAMBAIA	23	07 S	43	51 W	4.9
LAJE DE CONCEICAO	24	14 S	46	41 W	4.38
LAJE DE SANTOS	24	19 S	46	11 W	4.34
LAJE DOS HOMENS	23	02 S	44	18 W	4.20
LAJE PRETA	23	03 S	44	18 W	4.20
LARGE ISLAND	52	08 S	59	00 W	10.27
LARIVOT	4	54 N	52	22 W	1.31
LARSEN HARBOR	54	50 S	36	00 W	10.83
LE PERE	4	56 N	52	12 W	1.32
LE PETIT CONNETABLE	4	48 N	51	58 W	1.34
LEITH HARBOR	54	08 S	36	41 W	10.73
LES BATTURES DE CONNETABLE	4	56 N	51	57 W	1.34
LESKOV ISLAND	56	40 S	28	08 W	10.92
LETICIA	4	09 S	69	57 W	1.67
LIGHTED BUOYS NO. 21	35	10 S	57	00 W	5.33
LINDEN	6	00 N	58	18 W	1.9
LIVELY ISLAND	52	02 S	58	29 W	10.24
LOMAS BAY	52	33 S	69	00 W	8.7
LONG ISLAND	51	33 S	58	05 W	10.8
LOW BAY	52	06 S	58	48 W	10.26
LOW POINT	51	41 S	60	08 W	10.53
LOW POINT	51	57 S	58	41 W	10.23
LOW POINT	52	05 S	59	05 W	10.27
LUIS CORREIA	2	53 S	41	40 W	2.18
M					
MACAE	22	22 S	41	46 W	3.51
MACAPA	0	02 N	51	03 W	1.47
MACAU	5	07 S	36	38 W	2.31
MACBRIDE HEAD	51	22 S	57	59 W	10.5
MACKENZIE	6	00 N	58	18 W	1.9
MACKINNON CREEK	51	54 S	58	41 W	10.21
MAGDALENA	35	05 S	57	31 W	5.31
MAGGIE ELLIOT ROCK	51	43 S	58	00 W	10.12
MALHADO	14	47 S	9	01 W	3.13
MANAUS	3	08 S	60	01 W	1.65
MAR DEL PLATA	38	02 S	57	32 W	6.4
MARE HARBOR	51	53 S	58	29 W	10.19
MATARIPE	12	42 S	38	35 W	3.3
MEDANO MIERCOLES	38	32 S	58	30 W	6.6
MENGEARY POINT	51	39 S	57	43 W	10.9
MIDDLE ISLAND	51	57 S	58	28 W	10.17
MIRAMAR	38	16 S	57	51 W	6.6
MOENGO	5	38 N	54	25 W	1.21
MOGOTE DEL MORRION	53	35 S	72	27 W	8.57
MONT D'ARGENT	4	21 N	51	39 W	1.36
MONTAGU ISLAND	58	25 S	26	22 W	10.95
MONTE ALEGRE	2	00 S	54	04 W	1.60
MONTE AYMOND	52	09 S	69	29 W	8.5
MONTE BUCKLAND	54	27 S	70	10 W	8.44
MONTE MESTRE ALVARES	20	10 S	40	19 W	3.36
MONTE PAN DE AZUCAR	34	48 S	55	16 W	5.3
MONTE PASCOAL	16	53 S	39	24 W	3.20
MONTE POND	53	52 S	71	55 W	8.52
MONTE SAN JOSE	44	31 S	65	17 W	7.22
MONTE SARMIENTO	54	27 S	70	50 W	8.44
MONTE SERRAT	23	56 S	46	20 W	4.36
MONTE TRISTE	44	04 S	65	21 W	7.20
MONTEVIDEO	34	55 S	56	11 W	5.2
MORRO ARACAGI	2	27 S	44	09 W	2.8
MORRO AZUL	4	31 S	38	06 W	2.26
MORRO BRANCO	5	09 S	35	32 W	2.35
MORRO CASCAVEL	4	08 S	38	16 W	2.26
MORRO DE SAO PAULO	13	22 S	38	55 W	3.8
MORRO DO CHAPEU	6	23 S	35	01 W	2.43
MORRO DO MANDIOCA	4	34 S	37	40 W	2.27
MORRO DO TIBAU	4	50 S	37	17 W	2.28
MORRO HOPPER	52	36 S	71	31 W	8.96
MORRO MANGUE SECO	5	09 S	36	25 W	2.32
MORRO NUEVO	42	51 S	64	09 W	7.13
MORRO NUNEZ	52	29 S	69	36 W	8.9
MORRO PACOTI	3	52 S	38	23 W	2.26
MOUNT ADAM	51	36 S	59	55 W	10.48
MOUNT FRASER	54	38 S	36	21 W	10.84
MOUNT HARSTON	51	17 S	60	18 W	10.45
MOUNT KENT	51	42 S	58	11 W	10.15
MOUNT LOW	51	38 S	57	50 W	10.5, 10.10
MUCURIPE	3	43 S	38	29 W	2.25
MUNGUBA	0	55 S	52	25 W	1.49
N					
NATAL	5	47 S	35	12 W	2.38
NATTRISS HEAD	54	51 S	35	56 W	10.83
NEW AMSTERDAM	6	15 N	57	31 W	1.11
NEW ISLAND	51	42 S	61	17 W	10.57
NIEUW NICKERIE	5	57 N	57	00 W	1.14
NITEROI	22	53 S	43	07 W	4.6
NOSSA SENHORA DOS PRAZERES	8	09 S	34	56 W	2.49
NOVOSILSKI BAY	54	39 S	36	22 W	10.84
O					
OBERON PATCH	51	49 S	59	41 W	10.41
OBIDOS	1	55 S	55	31 W	1.62
OCEAN HARBOR	54	20 S	36	14 W	10.80
OLIVENCA	14	58 S	39	01 W	3.14
P					
PARADIJS	5	54 N	56	56 W	1.15
PARAMARIBO	5	50 N	55	10 W	1.18
PARANAM	5	37 N	55	05 W	1.20
PARCEL DA CONCEICAO	24	18 S	46	47 W	4.38
PARCEL DA ILHA DO CALOMBO	23	02 S	44	19 W	4.23
PARCEL DAS PAREDES	17	49 S	38	57 W	3.22
PARCEL DOS ABROLHOS	17	59 S	38	39 W	3.25
PARIACABO	5	08 N	52	39 W	1.29
PARINTINS	2	38 S	56	44 W	1.63
PARNAIBA	2	54 S	41	47 W	2.18
PASO DEL HAMBRE	53	44 S	70	50 W	8.38
PASO NORTE	34	28 S	57	52 E	5.3
PASO REINA	52	53 S	70	40 W	8.22
PASO ROMAN	32	49 S	58	08 W	5.44
PASSAGE ISLANDS	51	36 S	60	45 W	10.54
PAYSANDU	32	19 S	58	04 W	5.47
PEA POINT	52	10 S	60	42 W	10.62
PEAK POINT	51	48 S	61	11 W	10.58
PEBBLE ISLAND	51	17 S	59	41 W	10.42
PEBBLE SOUND	51	22 S	59	30 W	10.44
PECKET MARINE TERMINAL	52	57 S	71	12 W	8.91

	Position °	'	°	'	Sec. Para
PEDRA DO CAMPO BOM	28	45 S	49	00 W	4.67
PEDRA DO CORVO	23	51 S	46	08 W	4.34
PEDRA SECA	6	57 S	34	49 W	2.44
PEDRA SELADA	8	25 S	35	12 W	2.51
PENEDOS DE SAO PEDRO	0	55 N	29	21 W	2.39
PENGUIN POINT	51	57 S	60	38 W	10.55
PHILIMORE ISLAND	51	59 S	58	28 W	10.25
PHILLIPS POINT	52	07 S	59	46 W	10.31
PICO DA RAJADA	3	54 S	38	44 W	2.24
PICO RIVADAVIA	41	37 S	65	21 W	7.5
PIEDRA DIAMANTE LIGHT	34	25 S	57	58 W	5.38
PIEDRAS DE AFILAR	34	48 S	55	32 W	5.13
PIRAMIDE	42	35 S	64	17 W	7.14
PIRIAPOLIS	34	52 S	55	15 W	5.12
PLAYA DE LOS POCITOS	34	55 S	56	09 W	5.16
PLEASANT ROAD	51	50 S	58	11 W	10.16
POINTE BEHAGUE	4	40 N	51	54 W	1.35
POINTE CHARLOTTE	5	12 N	52	38 W	1.26
POINTE PANATO	5	43 N	53	58 W	1.24
POMEROON RIVER	7	37 N	58	45 W	1.4
PONTA ACAIA	23	10 S	44	23 W	4.19
PONTA ACU DA TORRE	12	34 S	38	00 W	2.60
PONTA AGUDA	3	21 S	39	07 W	2.23
PONTA ARARIPE	16	10 S	38	57 W	3.17
PONTA BOIUCUCANGA	0	48 S	46	38 W	2.4
PONTA CAJAIBA	23	13 S	44	33 W	4.25
PONTA CURUCA	0	32 S	47	49 W	1.41
PONTA CURUCA	0	33 S	47	49 W	2.3
PONTA DA ATALAIA	0	36 S	47	19 W	2.3
PONTA DA ATALAIA	2	52 S	41	39 W	2.18
PONTA DA BALEIA	17	41 S	39	08 W	3.22
PONTA DA GAMELEIRA	5	13 S	35	25 W	2.36
PONTA DA ILHOTA	27	05 S	48	35 W	4.52
PONTA DA MADEIRA	2	34 S	44	23 W	2.9
PONTA DA MADEIRA ORE TERM.	2	34 S	44	23 W	2.9
PONTA DA MANGUEIRA	12	47 S	38	29 W	3.4
PONTA DA SAPOCA	12	50 S	38	29 W	3.4
PONTA DA SERRA GRANDE	14	28 S	39	01 W	3.12
PONTA DA SETIBA	20	39 S	40	26 W	3.41
PONTA DA TABATINGA	6	03 S	35	06 W	2.42
PONTA DA TIJOCA	00	33 S	47	53 W	1.50
PONTA DAS ALMAS	2	54 S	41	16 W	2.19
PONTA DAS CANAS	23	44 S	45	21 W	4.31
PONTA DAS PEDRAS PRETAS	8	18 S	34	56 W	2.49
PONTA DE BOMBAS	27	9 S	48	28 W	4.53
PONTA DE CASTELHANOS	23	10 S	44	06 W	4.17
PONTA DE CORUMBAU	16	52 S	39	07 W	3.20
PONTA DE GALINHOS	5	05 S	36	18 W	2.34
PONTA DE GUARATIBA	23	05 S	43	34 W	4.9
PONTA DE ITACOLOMI	2	09 S	44	28 W	2.6
PONTA DE ITAPAGE	2	51 S	40	00 W	2.22
PONTA DE JERICOACOARA	2	47 S	40	30 W	2.21
PONTA DE JUATINGA	23	18 S	44	30 W	4.25
PONTA DE LESTE	23	03 S	44	15 W	4.21
PONTA DE LUCENA	6	54 S	34	51 W	2.43
PONTA DE MUCURIPE	3	42 S	38	28 W	2.24
PONTA DE OLINDA	8	01 S	34	51 W	2.47
PONTA DE PEDRAS	7	38 S	34	48 W	2.46
PONTA DE SANTO ANTONIO	13	01 S	38	32 W	3.2
PONTA DE SAO MARCOS	2	29 S	44	18 W	2.8
PONTA DE SAQUAREMA	22	56 S	42	30 W	4.2
PONTA DO ALAGAMAR	5	06 S	36	41 W	2.31
PONTA DO ALGODOAL	0	35 S	47	35 W	2.3
PONTA DO CAPINAL	0	37 N	50	22 W	1.44
PONTA DO CRISTOVAO	4	55 S	36	58 W	2.31
PONTA DO JARIUBA	1	24 S	51	57 W	1.60
PONTA DO MEL	4	57 S	36	53 W	2.31
PONTA DO PAU CAVADO	0	12 N	50	48 W	1.45
PONTA DO PONTAL	4	56 S	37	09 W	2.29
PONTA DO PREGO	9	32 S	35	35 W	2.54
PONTA DO SINO	23	05 S	44	01 W	4.10
PONTA DO TUBARAO	5	04 S	36	30 W	2.32
PONTA DO VIEIRA	1	06 S	51	12 W	1.59
PONTA DO VIERA	1	06 S	51	12 W	1.57
PONTA DOS MANGUES VERDES	2	20 S	43	22 W	2.15
PONTA DOS MEROS	23	14 S	44	21 W	4.15
PONTA DOS MOLEQUES	6	15 S	35	03 W	2.42
PONTA DOS NAUFRAGADOS	27	50 S	48	34 W	4.58
PONTA DOS OSTRAS	22	32 S	41	56 W	3.52
PONTA DOS TRES IRMAOS	5	03 S	35	59 W	2.35
PONTA EMERENCIA	22	49 S	41	56 W	3.55
PONTA GRANDE	16	22 S	39	01 W	3.18
PONTA GROSSA	23	35 S	45	13 W	4.28
PONTA GROSSA	4	38 S	37	30 W	2.28
PONTA GROSSA DE PARATI	23	11 S	44	39 W	4.25
PONTA ITAPARICA	12	53 S	38	41 W	3.7
PONTA ITAPUA	12	57 S	38	22 W	2.60
PONTA ITAPUA	14	59 S	38	59 W	3.14
PONTA ITAPUAZINHO	13	01 S	38	29 W	2.60
PONTA JUACEMA	16	45 S	39	08 W	3.19
PONTA MACEIO	4	25 S	37	46 W	2.26
PONTA MATO GROSSO	16	57 S	39	10 W	3.21
PONTA MIRIM	12	44 S	38	37 W	3.6
PONTA MUNDAU	3	11 S	39	23 W	2.22
PONTA NEGRA	22	58 S	42	41 W	4.2
PONTA PARACURU	3	24 S	39	00 W	2.23
PONTA PECEM	3	33 S	38	49 W	2.24
PONTA PEREGRINO	1	55 S	53	50 W	1.60
PONTA PIRAJUBA	2	13 S	44	24 W	2.6
PONTA PIRAREMA	2	20 S	44	22 W	2.8
PONTA PITIMBU	7	28 S	34	48 W	2.46
PONTA REDONDA	4	55 S	36	58 W	2.31
PONTA TOQUE-TOQUE	23	50 S	45	31 W	4.31
PONTA VERDE	9	40 S	35	41 W	2.54
PONTAL DE CORURIPE	10	10 S	36	08 W	2.56
PONTAL DE SERNAMBITIBA	23	02 S	43	28 W	4.9
PONTAL DO PEBA	10	22 S	36	17 W	2.56
PORPOISE POINT	52	21 S	59	18 W	10.29
PORT ALBEMARLE	52	11 S	60	26 W	10.63
PORT EDGAR	52	00 S	60	14 W	10.64
PORT EGMONT	51	21 S	60	00 W	10.46
PORT HARRIET	51	44 S	57	54 W	10.12
PORT HOWARD	51	39 S	59	32 W	10.39
PORT LOUIS HARBOR	51	33 S	58	08 W	10.7
PORT OF ILHEUS	14	47 S	39	01 W	3.13
PORT OF LA PLATA	34	50 S	57	56 W	5.2
PORT OF SALVADOR	12	58 S	38	31 W	3.3
PORT PATTISON	51	18 S	60	33 W	10.47
PORT PHILOMEL	51	44 S	60	13 W	10.55
PORT PLEASANT	51	48 S	58	10 W	10.15
PORT STEPHENS	52	12 S	60	42 W	10.62
PORT WILLIAM	51	40 S	57	42 W	10.9
PORTO AFONSO	2	44 S	66	55 W	1.66
PORTO ALEGRE	30	02 S	51	14 W	4.73
PORTO DA ALUMAR	2	40 S	44	22 W	2.12
PORTO DE ANTONINA	25	26 S	48	42 W	4.43
PORTO DE ARACAJU	10	55 S	37	03 W	2.58
PORTO DE ARATU	12	47 S	38	30 W	3.5
PORTO DE CAMAMU	13	52 S	38	56 W	3.10
PORTO DE CARAVELAS	17	44 S	39	16 W	3.23
PORTO DE FLORIANOPOLIS	27	36 S	48	33 W	4.60
PORTO DE IMBITUBA	28	14 S	48	40 W	4.62
PORTO DE LAGUNA	28	30 S	48	47 W	4.64
PORTO DE MACEIO	9	40 S	35	44 W	2.55
PORTO DE MADRE DE DEUS	12	45 S	38	37 W	3.6
PORTO DE PARANAGUA	25	30 S	48	31 W	4.42
PORTO DE PEDRAS	9	09 S	35	18 W	2.54
PORTO DE PELOTAS	31	47 S	52	20 W	4.74
PORTO DE SANTANA	00	03 S	51	11 W	1.48
PORTO DE SEPETIBA	22	56 S	43	50 W	4.14
PORTO DO ACU (21°52'S., 41°00'W.)	3.47				
PORTO DO FORNO	22	58 S	42	01 W	3.57
PORTO FRANCES	9	46 S	35	50 W	2.56
PORTO SEGURO	16	27 S	39	04 W	3.18
PORTO TROMBETAS	1	28 S	56	23 W	1.62
PORTO VELHO	8	46 S	63	54 W	1.71
PORTO VITORIA	20	19 S	40	20 W	3.39
POSSESSION BAY	52	16 S	69	11 W	8.5
POST ROCK	54	01 S	37	59 W	10.69
POZO DE FANGO	34	45 S	53	30 W	5.2
PRAINA	1	48 S	53	29 W	1.60
PRIMERA ANGOSTURA	52	30 S	69	35 W	8.8
PRINCE OLAV HARBOR	54	02 S	37	09 W	10.72
PROMONTORIO BELEN	41	09 S	63	51 W	7.3
PUCALLPA	8	22 S	74	32 W	1.75
PUERTO ALTAMIRANO	52	33 S	71	59 W	8.96
PUERTO ANGOSTO	53	13 S	73	21 W	8.68
PUERTO ATUCHA	33	58 S	59	16 W	5.53
PUERTO BELGRANO	38	53 S	62	06 W	6.12
PUERTO BOBILLIER	53	12 S	72	55 W	8.102
PUERTO CAMPANA	34	09 S	58	58 W	5.52
PUERTO CARMEN DE PATAGONES	40	48 S	62	59 W	6.23
PUERTO CHOISEL	54	07 S	70	33 W	8.36
PUERTO CHURRUCA	53	02 S	73	56 W	8.76

	Position °	'	°	'	Sec. Para
PUERTO CONCEPCION	32	29 S	58	14 W	5.45
PUERTO CONCEPCION	44	33 S	65	22 W	7.22
PUERTO CONDOR	53	21 S	72	39 W	8.85
PUERTO COOK	54	45 S	64	02 W	9.18
PUERTO CORRIENTES	27	29 S	58	50 W	5.65
PUERTO DE ASUNCION	25	16 S	57	41 W	5.65
PUERTO DE CONCHILLAS	34	12 S	58	12 W	5.38
PUERTO DE CONCORDIA	31	24 S	58	00 W	5.46
PUERTO DE LA PALOMA	34	39 S	54	09 W	4.82
PUERTO DE LA PLATA	34	50 S	57	53 W	5.34
PUERTO DE MONTEVIDEO	34	54 S	57	13 W	5.17
PUERTO DE NUEVO PALMIRA	33	53 S	58	25 W	5.43
PUERTO DE PUNTA DEL ESTE	34	51 S	54	57 W	5.11
PUERTO DEL BUCEO	34	54 S	56	08 W	5.15
PUERTO DEL HAMBRE	53	38 S	70	56 W	8.40
PUERTO DESEADO	47	45 S	65	54 W	7.42
PUERTO DIAMANTE	32	04 S	60	39 W	5.63
PUERTO ESPANOL	54	55 S	65	57 W	9.21
PUERTO FRAY BENTOS	33	07 S	58	19 W	5.44
PUERTO GALLEGOS	51	37 S	68	58 W	7.55
PUERTO GALVAN	38	47 S	62	18 W	6.16
PUERTO GARAY	52	39 S	72	03 W	8.98
PUERTO GOMEZ	52	59 S	72	58 W	8.102
PUERTO HENRY	53	25 S	72	37 W	8.85
PUERTO HOPE	54	08 S	71	00 W	8.45
PUERTO IBICUY	33	45 S	59	11 W	5.55
PUERTO INGENIERO WHITE	38	48 S	62	16 W	6.14
PUERTO LA PLATA	34	47 S	57	51 W	5.1
PUERTO LEGUIZAMO, COLOMBIA	00	12 S	74	46 W	1.74
PUERTO MADRYN	42	46 S	65	02 W	7.15
PUERTO MARSH	53	28 S	73	00 W	8.67
PUERTO MAXWELL	55	49 S	67	30 W	9.31
PUERTO MELO	45	02 S	65	51 W	7.29
PUERTO MESKEM	54	03 S	70	25 W	8.35
PUERTO NACIONAL	38	48 S	62	17 W	6.15
PUERTO PARANA	31	43 S	60	32 W	5.65
PUERTO PIRAMIDE	42	36 S	64	18 W	7.13
PUERTO POMAR	53	16 S	72	09 W	8.90
PUERTO PROGRESO	52	29 S	69	28 W	8.10
PUERTO QUEQUEN	38	35 S	58	42 W	6.7
PUERTO RAMALLO	33	29 S	60	01 W	5.57
PUERTO ROSALES	38	55 S	62	04 W	6.11
PUERTO ROSARIO	32	57 S	60	38 W	5.60
PUERTO SAN ANTONIO ESTE	40	48 S	64	53 W	7.4
PUERTO SAN BLAS	40	34 S	62	14 W	6.20
PUERTO SAN JUAN DE LA POSESION	53	38 S	70	56 W	8.40
PUERTO SAN JULIAN	49	19 S	67	42 W	7.50
PUERTO SAN LORENZO	32	45 S	60	44 W	5.61
PUERTO SAN MARTIN	32	43 S	60	44 W	5.62
PUERTO SAN NICOLA	33	20 S	60	14 W	5.58
PUERTO SAN PEDRO	33	35 S	59	49 W	5.56
PUERTO SANTA CRUZ	50	01 S	68	31 W	7.52
PUERTO SANTA ELENA	44	32 S	65	12 W	7.22
PUERTO SANTA FE	31	39 S	60	42 W	5.64
PUERTO SARA	52	38 S	70	12 W	8.13
PUERTO SAUCE	34	26 S	57	27 W	5.22
PUERTO TAMAR	52	56 S	73	46 W	8.72
PUERTO VANCOUVER	54	48 S	64	04 W	9.16
PUERTO VILLA CONSTITUCION	33	14 S	60	20 W	5.59
PUERTO WILLIAMS	52	32 S	72	05 W	8.97
PUERTO YARTOU	53	53 S	70	08 W	8.33
PUERTO ZARATE	34	05 S	59	02 W	5.53
PUNTA ADELAIDA	52	38 S	72	08 W	8.98
PUNTA ALBATROSS	44	48 S	65	42 W	7.24
PUNTA ALDEA	53	21 S	73	05 W	8.67
PUNTA ALFREDO	53	06 S	73	10 W	8.101
PUNTA ANEGADA	52	27 S	69	26 W	8.10
PUNTA ANXIOUS	54	07 S	70	55 W	8.42
PUNTA ARAUZ	53	32 S	72	21 W	8.54
PUNTA ARBOLADA	53	52 S	70	24 W	8.34
PUNTA ARENAS	53	08 S	70	51 W	8.27
PUNTA ARENOSA	53	08 S	70	51 W	8.27
PUNTA ARTILLEROS	34	27 S	57	32 W	5.23
PUNTA ASUNCION	38	57 S	60	39 W	6.8
PUNTA ATALAYA	35	02 S	57	32 W	5.31
PUNTA ATLAS	44	08 S	65	13 W	7.20
PUNTA BAJOS	42	23 S	63	37 W	7.11
PUNTA BALLENA	34	55 S	55	03 W	5.9
PUNTA BARRANCA	52	33 S	69	42 W	8.11
PUNTA BAXA	52	35 S	69	36 W	8.1
PUNTA BENNET	52	39 S	71	28 W	8.94
PUNTA BERMEJA	41	09 S	63	04 W	7.3
PUNTA BRAVA	34	56 S	56	10 W	5.16
PUNTA BYRON	52	56 S	73	44 W	8.72
PUNTA CANUTO	52	41 S	71	27 W	8.93
PUNTA CARRERAS	53	35 S	70	55 W	8.38
PUNTA CARUKINCA	54	04 S	70	04 W	8.33
PUNTA CASTILLOS	45	03 S	65	56 W	7.30
PUNTA CHAPARRO	33	49 S	58	26 W	5.42
PUNTA CHUBASCOSA	54	10 S	70	58 W	8.45
PUNTA CINCUENTA	55	17 S	66	38 W	9.23
PUNTA CLARA	43	58 S	65	14 W	7.19
PUNTA COLORADA	41	42 S	65	01 W	7.6
PUNTA CRACKER	42	56 S	64	33 W	7.16
PUNTA CROSSOVER	52	41 S	71	26 W	8.94
PUNTA CUCHILLO	54	50 S	64	46 W	9.14
PUNTA DE ARENAS	52	49 S	68	13 W	9.2
PUNTA DE ARENAS	53	09 S	68	13 W	9.3
PUNTA DE HORNOS	34	26 S	57	54 W	5.26
PUNTA DEL CHILENO	34	55 S	55	01 W	5.10
PUNTA DEL ESTE	34	58 S	54	57 W	5.7
PUNTA DELFIN	43	32 S	65	11 W	7.18
PUNTA DELGADA	42	46 S	63	38 W	7.12
PUNTA DELGADA	52	27 S	69	33 W	8.8
PUNTA DESNUDEZ	38	50 S	59	46 W	6.8
PUNTA DILLON	55	30 S	67	39 W	9.26
PUNTA DUNGENESS	52	24 S	68	26 W	8.4
PUNTA ELIAS	52	39 S	71	33 W	8.97
PUNTA ESPINILLO	34	50 S	56	26 W	5.2
PUNTA ESPOLON	52	49 S	71	12 W	8.91
PUNTA FALLOWS	54	47 S	63	51 W	9.16
PUNTA FELIX	52	57 S	74	08 W	8.80
PUNTA FIFTY	55	17 S	66	38 W	9.23
PUNTA FINAL	54	24 S	70	32 W	8.43
PUNTA GENTE	53	00 S	70	25 W	8.25
PUNTA GLASCOTT	53	51 S	71	06 W	8.40
PUNTA GORDA	33	55 S	58	25 W	5.42
PUNTA GORDA	34	54 S	56	05 W	5.15
PUNTA GRACIA	52	44 S	70	32 W	8.15
PUNTA GRIMAL	52	54 S	71	35 W	8.89
PUNTA GRUP	52	53 S	73	46 W	8.73
PUNTA GUANACOS	45	02 S	65	44 W	7.28
PUNTA GUANACOS	47	48 S	65	53 W	7.43
PUNTA HABANA	53	10 S	73	19 W	8.66
PUNTA HALL	52	50 S	71	25 W	8.92
PUNTA HAVANNAH	53	10 S	73	19 W	8.66
PUNTA HERCULES	42	37 S	63	35 W	7.12
PUNTA HETTERLEY	53	57 S	71	26 W	8.51
PUNTA HORNOS	34	26 S	57	54 W	5.24
PUNTA IGLESIA	38	00 S	57	32 W	6.3
PUNTA INDIO	35	16 S	57	14 W	5.30
PUNTA ISABELLA	52	34 S	71	44 W	8.96
PUNTA JORGE	55	12 S	66	39 W	9.23
PUNTA JOSE IGNACIO	34	51 S	54	38 W	4.83
PUNTA KELP	53	48 S	70	24 W	8.34
PUNTA LAGUNA	33	04 S	58	21 W	5.43
PUNTA LARA	34	47 S	58	00 W	5.35
PUNTA LASSERRE	54	43 S	63	51 W	9.17
PUNTA LIMIT	53	19 S	72	26 W	8.86
PUNTA LOBERIA	44	17 S	65	16 W	7.20
PUNTA LOBOS	34	54 S	56	15 W	5.19
PUNTA LOBOS	39	14 S	61	52 W	6.17
PUNTA MANNING	53	14 S	72	18 W	8.87
PUNTA MANSO	34	54 S	56	04 W	5.14
PUNTA MARTIN	53	06 S	71	58 W	8.89
PUNTA MARTIN CHICO	34	10 S	58	12 W	5.38
PUNTA MEDANOS	36	53 S	56	40 W	6.2
PUNTA MEDANOSA	48	06 S	65	55 W	7.46
PUNTA MEJILLON	41	01 S	64	08 W	7.3
PUNTA MOGOTES	38	06 S	57	33 W	6.5
PUNTA MURPHY	46	39 S	67	18 W	7.39
PUNTA NEGRA	38	38 S	58	49 W	6.8
PUNTA NINFAS	42	57 S	64	20 W	7.13
PUNTA NORTE	42	04 S	63	46 W	7.11
PUNTA OBERREUTER	53	11 S	73	06 W	8.101
PUNTA ONOFRE	52	32 S	72	09 W	8.99
PUNTA PAJARITO	54	21 S	70	54 W	8.43
PUNTA PASAJE	53	38 S	72	12 W	8.54
PUNTA PAVON	34	32 S	57	04 W	5.20
PUNTA PEDRO LOPEZ	34	47 S	55	38 W	5.14
PUNTA PIEDRAS	35	27 S	57	08 W	5.29
PUNTA PIEDRAS NEGRAS	34	47 S	55	46 W	5.14
PUNTA PIRAMIDE	54	26 S	71	07 W	8.44
PUNTA PLAYA	8	33 N	60	00 W	1.3

	Position °	'	°	'	Sec. Para
PUNTA PORFIDO	41	46 S	65	00 W	7.7
PUNTA POZOS	41	35 S	65	00 W	7.5
PUNTA QUETA	54	20 S	70	43 W	8.43
PUNTA RAQUEL	55	13 S	66	52 W	9.24
PUNTA RASA	34	54 S	55	13 W	5.12
PUNTA RASA	36	18 S	56	47 W	5.28
PUNTA RASA	40	52 S	62	18 W	6.21
PUNTA RASA	40	52 S	62	19 W	6.20
PUNTA REDONDA	41	02 S	62	46 W	6.23
PUNTA RIACHUELO	34	28 S	57	44 W	5.23
PUNTA RIVERA	52	48 S	71	23 W	8.93
PUNTA ROCALLOSA ESTE	52	38 S	71	58 W	8.98
PUNTA ROSA	52	51 S	70	48 W	8.19
PUNTA ROSARIO	34	27 S	57	21 W	5.21
PUNTA RUBIA	40	44 S	62	14 W	6.21
PUNTA SAN ANDRES	38	12 S	57	40 W	6.5
PUNTA SAN CARLOS	53	30 S	72	24 W	8.84
PUNTA SAN GREGORIO	34	41 S	56	50 W	5.20
PUNTA SAN ISIDRO	52	44 S	70	08 W	8.16
PUNTA SAN PEDRO	34	28 S	57	51 W	5.23
PUNTA SAN PEDRO	34	29 S	57	51 W	5.27
PUNTA SAN ROQUE	45	03 S	65	39 W	7.27
PUNTA SANTA ANA	53	38 S	70	55 W	8.39
PUNTA SANTA CASILDA	53	03 S	73	48 W	8.75
PUNTA SANTA MARIA	53	21 S	70	57 W	8.29
PUNTA SANTA RITA	34	28 S	57	51 W	5.24
PUNTA SARANDI	34	54 S	56	13 W	5.18
PUNTA SIERRA	41	31 S	64	59 W	7.5
PUNTA SOLITARIA	53	12 S	72	11 W	8.89
PUNTA SPOERER	53	07 S	72	59 W	8.102
PUNTA SUNSHINE	53	02 S	71	55 W	8.89
PUNTA TAFOR	45	03 S	66	17 W	7.32
PUNTA TEHUELCHE	42	24 S	64	18 W	7.10
PUNTA TEJADA	38	59 S	61	49 W	6.10
PUNTA TIGRE	34	46 S	56	34 W	5.20
PUNTA TITUS	52	48 S	71	23 W	8.92
PUNTA TOMBO	44	02 S	65	11 W	7.19
PUNTA TURN	52	43 S	71	24 W	8.93
PUNTA WALLER	55	10 S	66	34 W	9.23
PUNTA WAPSHOT	52	38 S	71	30 W	8.94
PUNTA WOOLCOTT	52	43 S	74	10 W	8.77
PUNTA YEGUAS	34	54 S	56	19 W	5.19
PUNTA YORK	53	35 S	72	17 W	8.54
PUNTA ZIG ZAG	54	04 S	70	53 W	8.38
PYRAMID POINT	52	01 S	58	35 W	10.25
Q					
QUEEN CHARLOTTE BAY	51	43 S	60	44 W	10.54
QUEEN POINT	51	57 S	60	38 W	10.55
QUERANDI LIGHT	37	28 S	57	07 W	6.2
R					
RABBIT ISLAND	51	33 S	60	29 W	10.51
RABBIT POINT	51	18 S	59	42 W	10.44
RACE POINT	51	25 S	59	06 W	10.34
RACE POINT	51	59 S	60	59 W	10.61
RADA DE MONTE HERMOSO	38	59 S	61	41 W	6.9
RADA DE PUNTA ARENAS	53	10 S	70	54 W	8.28
RAPIDES DE APIPE	27	29 S	56	43 W	5.65
RECALADA LIGHT	39	00 S	61	16 W	6.9
RECIFE	8	03 S	34	52 W	2.48
RECIFE MANOEL LUIS	0	52 S	44	16 W	2.2
RECIFES DE GUARATIBAS	17	26 S	39	08 W	3.22
RECIFES ITACOLOMIS	16	54 S	39	04 W	3.20
RED POINT	51	33 S	59	04 W	10.35
REEF ISLAND	51	59 S	58	29 W	10.25
RIA COIG	50	57 S	69	08 W	7.53
RIGHT WHALE BAY	54	00 S	37	40 W	10.70
RIO ACARAU	2	50 S	40	08 W	2.21
RIO ACU	5	06 S	36	41 W	2.31
RIO AMAPA GRANDE	2	08 N	50	41 W	1.38
RIO ARARANGUA	28	55 S	49	20 W	4.67
RIO ARROZAL	00	17 N	50	29 W	1.44
RIO BARCA GRANDE	34	10 S	58	23 W	5.54
RIO CALCOENE	2	32 N	50	45 W	1.38
RIO CHORO	4	06 S	38	09 W	2.26
RIO CHUBUT	43	21 S	65	03 W	7.17
RIO CUNANI	2	49 N	50	57 W	1.38
RIO DAS CONTAS	14	16 S	39	00 W	3.11
RIO DE JANEIRO	22	54 S	43	10 W	4.5
RIO DE LA PLATA	35	30 S	56	00 W	5.2
RIO DOCE	19	38 S	39	49 W	3.34
RIO FORMOSO	8	42 S	35	05 W	2.51
RIO GALLEGOS	51	37 S	8	58 W	7.55
RIO GRANDE	32	03 S	52	05 W	4.71
RIO GRANDE	53	47 S	67	41 W	9.6
RIO GUALEGUAYCHU	33	05 S	58	24 W	5.41
RIO GUARAPARI	20	40 S	40	30 W	3.42
RIO GURUPI	1	04 S	46	02 W	2.4
RIO IGARACU	2	52 S	41	40 W	2.18
RIO ITABAPOANA	21	18 S	40	58 W	3.46
RIO ITANHAEM	24	11 S	46	48 W	4.37
RIO ITAPICURU	11	44 S	37	31 W	2.60
RIO JAGUARAO	32	39 S	53	11 W	4.75
RIO JOAO DE TIBA	16	17 S	39	02 W	3.18
RIO LUJAN	34	26 S	58	31 W	5.51
RIO MADEIRA	3	23 S	58	46 W	1.71
RIO MUCURI	18	06 S	39	34 W	3.32
RIO NEGRO	41	02 S	62	47 W	6.22
RIO PARAGUACU	12	50 S	38	48 W	3.7
RIO PARAIBA	6	58 S	34	51 W	2.44
RIO PARAIBA DO SUL	21	37 S	41	01 W	3.47
RIO PARANA BRAVO	33	54 S	58	27 W	5.54
RIO PARANA DE LAS PALMAS	34	20 S	58	27 W	5.51
RIO PARANA GUAZU	33	44 S	59	11 W	5.55
RIO PARANA GUAZU	34	01 S	58	25 W	5.54
RIO PARANA MINI	34	14 S	58	23 W	5.54
RIO PIRANHAS	5	06 S	36	41 W	2.31
RIO SALADO	35	45 S	57	21 W	5.29
RIO SAN SALVADOR	33	28 S	58	24 W	5.43
RIO SAO FRANCISCO DO NORTE	10	31 S	36	23 W	2.56
RIO SAO FRANCISCO DO SUL	26	10 S	48	35 W	4.45
RIO SAO MATEUS	18	37 S	39	44 W	3.33
RIO SAUCE	33	57 S	58	27 W	5.54
RIO UNA	13	23 S	38	56 W	3.9
RIO UNA	15	15 S	39	00 W	3.14
RIO XINGU	1	32 S	51	52 W	1.70
RISCA DO ZUMBI	5	11 S	35	11 W	2.37
ROCA ASTREE	52	56 S	73	51 W	8.73
ROCA BALLENATO	52	24 S	74	49 W	8.78
ROCA BELLACO	48	30 S	66	11 W	7.47
ROCA CLEOPATRA	52	16 S	68	12 W	8.3
ROCA COOMBES	52	57 S	73	30 W	8.71
ROCA CROOKED	53	33 S	72	31 W	8.58
ROCA DE LAS PIPAS	34	54 S	56	02 W	5.14
ROCA MIDGE	53	05 S	73	37 W	8.75
ROCA NASSAU	52	22 S	68	16 W	8.3
ROCA SAN VICENTE	52	34 S	69	38 W	8.10
ROCA SANTA CRUZ	48	48 S	66	14 W	7.49
ROCA SULLENS	52	56 S	73	35 W	8.71
ROCA VIRGEN	52	20 S	68	20 W	8.2
ROCA VOLPE	52	45 S	74	34 W	8.81
ROCAS CORMORAN	53	32.5 S	42	01.7 W	10.66
ROCAS DE LAS PIPAS	34	29 S	57	41 W	5.23
ROCAS RUPERT	53	40 S	72	11 W	8.55
ROCKY BAY	54	30 S	36	40 W	10.85
RODNEY COVE	52	03 S	60	59 W	10.62
ROOKERY ISLAND	51	37 S	59	08 W	10.36
ROSITA HARBOR	54	01 S	37	26 W	10.71
ROYAL BAY	54	30 S	35	55 W	10.81
RUGGLES ISLAND	52	03 S	59	42 W	10.37
S					
SACO DA MANGUEIRA	32	03 S	52	05 W	4.71
SACO DO BANANAL	23	06 S	44	15 W	4.19
SAINT LAURENT	5	30 N	54	02 W	1.25
SALINOPOLIS	0	37 S	47	21 W	2.3
SALTO	31	23 S	57	58 W	5.49
SAN CARLOS	51	30 S	59	00 W	10.35
SANDY BAY ISLAND	52	11 S	58	48 W	10.27
SANTA ISABEL	0	25 S	65	01 W	1.72
SANTAREM	2	25 S	54	43 W	1.61
SANTOS	23	57 S	46	18 W	4.36
SAO FRANCISCO DO SUL	26	15 S	48	38 W	4.48
SAO LUIS	2	32 S	44	17 W	2.10
SAO MIGUEL	1	10 S	50	29 W	1.57
SAO PAULO DE OLIVENCA	3	27 S	68	48 W	1.66
SAO SEBASTIAO	23	48 S	45	24 W	4.32

	Position °	'	°	'	Sec. Para
SARAMACCA PUNT	5	54 N	55	58 W	1.16
SAUNDERS ISLAND	57	47 S	26	27 W	10.94
SCOTT ISLAND	51	51 S	58	56 W	10.18
SEA LION ISLANDS	52	25 S	59	00 W	10.28
SEA LION POINT	51	21 S	58	19 W	10.4
SEGUNDA ANGOSTURA LIGHT	52	44 S	70	11 W	8.16
SEGUNDA BARRANCA LIGHT	40	47 S	62	16 W	6.20
SENO ALMIRANTAZGO	54	18 S	69	30 W	8.37
SENO BRENTON	54	09 S	70	25 W	8.36
SENO MAGALLANES	54	29 S	70	54 W	8.44
SENO OWEN	54	00 S	70	34 W	8.36
SERGIPE TERMINAL	10	51 S	36	55 W	2.56
SERRA DO CAVALO	19	54 S	40	21 W	3.36
SHAG HARBOR	51	44 S	59	35 W	10.40
SHAG ROCK	52	13 S	58	39 W	10.26
SHAG ROCKS	53	32 S	42	02 W	10.66
SHALLOP POINT	51	42 S	60	05 W	10.53
SIERRA DE LA BALLENA	34	50 S	55	01 W	5.3
SIERRA DEL AS ANIMAS	34	43 S	55	28 W	5.3
SKRAP SKERRIES	54	15 S	36	19 W	10.79
SMALKALDEN	5	38 N	55	05 W	1.19
SMYLIE CHANNEL	51	59 S	61	00 W	10.60
SOLIDAO	30	42 S	50	29 W	4.70
SORN	53	59 S	37	55 W	10.69
SOUTH FUR ISLAND	51	15 S	50	81 W	10.50
SOUTH GEORGIA	54	15 S	36	45 W	10.66
SOUTH JASON	51	12 S	60	52 W	10.50
SOUTHERN THULE	59	27 S	27	17 W	10.97
SPEEDWELL ISLAND	52	11 S	59	42 W	10.31
SQUIB POINT	51	51 S	58	55 W	10.18
ST. ANDREW POINT	6	19 N	57	31 W	1.11
STAATS ISLAND	51	54 S	61	11 W	10.59
STAG ROAD	51	32 S	58	05 W	10.7
STANLEY HARBOR	51	42 S	57	50 W	10.11
STEPHENS BLUFF	52	11 S	60	44 W	10.62
STEPHENS PEAK	52	07 S	60	50 W	10.62
STEWART STRAIT	54	00 S	38	06 W	10.68
STROMNESS HARBOR	54	09 S	36	42 W	10.74
SUAPE	8	24 S	34	58 W	2.50
SUZANNASDAAL	5	52 N	55	05 W	1.18
SWAN ISLAND	51	44 S	59	28 W	10.33
SYLVIA BANK	20	19 S	37	46 W	3.28

T

TABATINGA	4	15 S	69	57 W	1.67
TAMAR PASS	51	20 S	59	24 W	10.42
TARTARUGAS	20	31 S	29	18 W	3.29
TEA ISLAND	51	53 S	61	09 W	10.59
TEBIG OIL TERMINAL	23	04 S	44	14 W	4.18
TEFE	3	22 S	46	42 W	1.66
TERM. MAR. ALMIRANTE BARROSO	23	48 S	45	23 W	4.32
TERMINAL DA ARACRUZ	19	51 S	40	03 W	3.35
TERMISA OFFSHORE TERMINAL	4	49 S	37	03 W	2.30
THE FLEUVE MAHURY	4	52 N	52	14 W	1.32
THE FRIDAYS	51	03 S	60	57 W	10.50
THE MARONI RIVER	5	45 N	54	00 W	1.24
THULE ISLAND	59	27 S	27	23 W	10.97
TIDE ISLET	51	40 S	60	10 W	10.52
TIJUCA POINT	54	20 S	36	12 W	10.80
TONANTINS	2	47 S	67	47 W	1.66
TORRES	29	20 S	49	44 W	4.67
TRAMADAI MARITIME TERMINAL	30	01 S	50	06 W	4.69
TRAMANDAI	29	59 S	50	08 W	4.68
TUBARAO	20	17 S	40	15 W	3.40
TUSSAC ISLAND	51	47 S	58	12 W	10.14
TUTOIA	2	47 S	42	17 W	2.16

U

UNDINE HARBOR	54	02 S	37	57 W	10.89
UNDINE SOUTH HARBOR	54	32 S	36	33 W	10.85
URCA DO TUBARAO	4	51 S	36	27 W	2.32

V

VAUGHAN ISLAND	54	00 S	38	11 W	10.67
VICTORIA HARBOR	51	55 S	58	52 W	10.23
VILA BITTENCOURT	1	27 S	69	25 W	1.73
VILA DO CONDE	1	33 S	48	45 W	1.55
VINDICATION ISLAND	57	06 S	26	47 W	10.93
VISOKOI ISLAND	56	43 S	27	09 W	10.92
VOLUNTEER POINT	51	31 S	57	44 W	10.5

W

WAGENINGEN	5	46 N	56	41 W	1.15
WAINI POINT	8	24 N	59	49 W	1.3
WEDDELL ISLAND	51	54 S	61	00 W	10.56
WEDDELL POINT	51	53 S	61	07 W	10.59
WEST ISLAND	51	58 S	59	49 W	10.41
WESTPOINT ISLAND	51	21 S	60	41 W	10.48
WHALER BAY	51	33 S	60	27 W	10.52
WHITE BLUFF	51	54 S	58	44 W	10.18
WHITE POINT	51	46 S	58	09 W	10.14
WHITE ROCK POINT	51	24 S	59	10 W	10.38
WILLIS ISLANDS	54	00 S	38	13 W	10.67
WRECK ISLAND	51	09 S	60	14 W	10.43

X

XAPURI	10	39 S	68	31 W	1.73

Y

YORKE POINT	51	41 S	57	47 W	10.10
YOUNG ROCK	51	42 S	57	44 W	10.12

Z

ZAVODOVSKI ISLAND	56	20 S	27	35 W	10.91