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SECTOR 5 — CHART INFORMATION

SECTOR 5

COASTS OF PANAMA, COSTA RICA, AND NICARAGUA—BRUJAS POINT TO CABO GRACIAS A DIOS

Plan.—This sector describes the N and E coasts of Central America from Brujas Point, Panama to Cabo Gracias a Dios, Honduras. It includes the off-lying dangers and islands which lie seaward of the 200m curve off the Nicaraguan and Honduran coasts. The descriptive sequence is W then N.

General Remarks

5.1 This sector includes that part of the Central American coast which lies between the Panama Canal and Cabo Gracias a Dios, 383 miles NNW. It includes a part of the N coast of Panama and the E coasts of Costa Rica and Nicaragua.

The coast, which is low with occasional bold promontories and bluffs, is indented by several large lagoons. Aids to navigation are sparse, but sufficient to allow for safe navigation to the important commercial ports.

Depths along the coast are ample from Brujas Point to Punta del Mona, with the 200m curve lying from 3 to 11 miles offshore, except in the vicinity of Escudo de Veraguas, where it lies 20 miles offshore. From about 30 miles S of Punta del Mona, the 200m curve extends generally NE to a position about 29 miles E of that point. From there, the 200m curve continues NE to a position about 90 miles E of Cabo Gracias a Dios. Within this curve, N of Punta del Mona, the depths are very irregular and range from 20 to 55m. There are numerous off-lying dangers, cays, and islets between Punta del Mona and up to about 65 miles N of Bluefields, where they become less frequent. The outermost of these lie about 60 miles offshore. Between Puerto Cabezas and Cabo Gracias a Dios, these dangers again become very numerous.

The western Caribbean, outside the 200m curve off Nicaragua and Honduras, is fouled and marked by scattered banks, cays, and islands. Cayos de Albuquerque, located 107 miles E of Bluefields, and Serranilla Bank, located 187 miles ENE of Cabo Gracias a Dios, are the S and E dangers of those described in this sector. Rosalind Bank and the dangers W and NW of it are described beginning in paragraph 6.4.

Many of the cays and islands are on banks that are steep-to and composed of coral. These banks should be approached with caution at all times and given a wide berth at night. The aids to navigation are few and unreliable, and the currents are fairly swift and unpredictable, especially after storms.

Winds—Weather.—In the area covered by this sector, the Northeast Trade Winds prevail during most of the year, although strong N winds are frequent and may reach gale force for short periods of time, especially during the winter months.

There is clear sunny weather over the whole area, except during the wet season, which prevails from May or June until November or December. This season is usually marked by frequent heavy rain squalls and thunderstorms of short duration. Sea fog seldom occurs in any part of the area.

Several hurricanes cross the Caribbean Sea during the season from June to November, but very rarely do they travel S of

15°N. However, rough seas and heavy swells occur during the passage of a hurricane further N.

During the season of the northers, which occur from October to April, heavy rain accompanied by rough seas and swells may be experienced by vessels in exposed coastal areas. Those northers which do reach the coasts of Nicaragua, Costa Rica, and Panama are usually short-lived and seldom reach gale force.

While fogs are rare, the frequent heavy rains may reduce visibility as much as the thickest fogs. The summits of inland peaks are usually enveloped in clouds and seldom visible, except at dawn or on sudden cessations of heavy rains, when the atmosphere will almost instantly become remarkably clear.

Tides—Currents.—Throughout the year, the highly constant offshore Equatorial Current sets WNW at a mean rate of 0.5 to 1 knot. A few currents in the area have been observed to set at a rate of 2 knots; the maximum rate reported was between 3 and 4 knots. As the current approaches Mosquito Bank, the greater part is deflected NW at a mean rate of 1.5 knots.

The main current sets through the off-lying islands S of Serranilla Bank in directions mostly between NW and SW at a mean rate of 1 knot and a maximum rate of 2 to 3 knots. The greater part then sets N to NW around Mosquito Bank but, in the vicinity of Isla de Providencia, a part of the current is deflected SW toward San Juan del Norte, where it turns S and later rounds Golfo de Los Mosquito continuing E as a countercurrent with a mean rate of 1 knot. Over Mosquito Bank, inshore of these deflected currents, the currents are variable and to a large degree dependent on the prevailing winds. In particular, a norther may cause a current of 0.5 to 1 knot to set S close inshore along the entire bank S of Cabo Gracias a Dios to join the countercurrent in the vicinity of San Juan del Norte.

Brujas Point to Punta Valiente

5.2 Brujas Point (9°21'N., 79°59'W.) is a bold, rocky, wooded headland. Brujas Rock, a bush covered rock, 11m high, stands close offshore about 0.5 mile NE of the point. It is prominent when open of the point and its sides are perpendicular.

From Brujas Point, the coast extends about 2.5 miles SSW to the entrance to the Rio Chigress. The coastline consists of rocky bluffs topped with thick vegetation. There are no conspicuous features visible from seaward.

The Rio Chigress is the outlet for the surplus waters of Gatun Lake. The flow is regulated by spillways in Gatun Dam. Three promontories stand on the N side of the river entrance. The N promontory is 37m high. The S promontory, about the same height, is marked by the ruins of a fort and a castle. Punta Arenas, on the S side of the river entrance, consists of a low,

sandy beach backed by trees. Heavy breakers extend off the beach. The town of Chigress stands on the N bank of this river.

Lajas Reef, a rocky ledge nearly awash in the fairway for the Rio Chigress, lies 0.1 mile W of the W extremity of the S promontory. Two channels lead on either side of Lajas Reef and then across a bar into the river. There was a reported (1952) least depth of 3m in the channel E of the ledge and 4.3m in the channel W of the ledge. Four beacons, with a diagonal black stripe on each, stand on the S side of the entrance. One pair of beacons, in line bearing 156°, leads through the E channel and another pair of beacons, in line bearing 130°, leads through the W channel. Another pair of beacons stand on the E bank of the river and, in line bearing 101°, lead from the intersection of the two entrance channels into the river.

Anchorage can be taken off the river, in a depth of 18m, mud, with the ruins of the fort and castle bearing 123° and Brujas Rock bearing 055°.

From Punta Arenas to Punta Boca de la Furnia, 0.8 mile WSW, the coast is low and sandy. The mouth of a small creek lies E of the point. A rock, awash, and some below-water rocks lie off the mouth of the creek.

5.3 From Punta Boca de la Furnia to Los Morrillos, where the coast rises, a group of above-water rocks lies close off an abrupt cliff, 0.5 mile WSW of Los Morrillos. From Los Morrillos to the Rio Pina, about 2.5 miles farther SW, the coast is fronted by red clay banks. The village of Pina stands on the N side of this river.

Morro Guisao, a rocky promontory 15m high, is located 2.8 miles SW of Pina. The village of Lagarto is situated on the S side of the entrance to the Rio Lagarto, 0.8 mile farther SW.

Between the Rio Lagarto and Punta Rincon, about 43 miles SW, the coast continues low with a few occasional cliffs. A range of hills rises about midway along this stretch of coast and backs the shore for a distance of 18 miles.

From Lagarto, the coast extends WSW for about 3 miles to the Rio Salud and continues in the same direction for 8.5 miles to a ridge of low, red cliffs about 0.5 mile long, with a 108m round hill in the middle of them. The coast then extends 2.5 miles SW to the village of Donoso, on the E bank of the Rio Miguel.

The Rio Mangle, 8 miles farther SSW is marked by a low, rocky point on the E side of the entrance. Behind this point the Sierra de Miguel de La Borda rises abruptly to a height of 180m and continues to its 473m high summit 5 miles SSE of the river mouth.

Pilon de Miguel de La Borda rises to an isolated conical peak, 509m high, 15 miles SE of the entrance to the Rio Mangle.

From Punta Platanal, 3.5 miles W of the Rio Mangle, the coast extends 5 miles SW to the Rio Cocle del Norte, with the village of the same name on its E bank.

Sierra de Cocle de Norte (9°02'N., 80°34'W.) rises to a conical peak, 436m high, 4 miles S of the mouth of the river of the same name.

5.4 Punta Rincon (9°01'N., 80°41'W.), a bold, rocky, headland, rises to a height of 168m about 0.8 mile inland, and a height of 244m, 3 miles to the S.

Between Punta Rincon and Punta Icaica, 58 miles W, the coast is indented 12 miles S by the head of the Golfo de Los Mosquitos. This entire stretch of coast is backed by a mountain range which follows the coast for almost its entire length.

From Punta Rincon, the coast gradually decreases in height and extends 19 miles SW to the Rio Concepcion, which has the town of Concepcion on its E bank. About 1.5 miles SW of the river entrance there is a conspicuous red cliff, 30m high. Punta Zapatero, a low, sandy point 1 mile W of the river, is marked by breakers which extend about 0.5 mile offshore.

The Cordillera de Veragua, a mountain range, rises abruptly to a height of 318m about 4 miles WSW of Punta Zapatero and 2 miles inland. This range attains a height of over 2,133m and traverses the Isthmus of Panama for a distance of 70 miles from E to W about 15 miles from the coast.

5.5 Silla de Veragua, at the E extremity of the range and 20 miles SSE of Punta Rincon, rises from the Panamanian plain to a height of 1,350m. When viewed from the NW this mountain resembles a double peak or saddle. Castle Choco, a mountain rising 15 miles W of Silla de Veragua, ascends almost perpendicularly to a flat 1,933m summit which has the appearance of a huge square castle with a small tower at one angle. From the base of Castle Choco, irregular wooded hills extend NW and attain an elevation of 948m, 6 miles SSW of Punta Zapatero. The base of this range then backs the shore and extends to about 8 miles S of Punta Icaica.

From Punta Zapatero, the coast extends 3.5 miles WSW to the Rio Bejuco. The river discharges into the head of a sandy bay, about 0.8 mile wide. The W entrance point of the bay is a high, rocky bluff.

From a position 4 miles W of the Rio Bejuco, some prominent red cliffs, 30 to 61m high, extend 2.5 miles W. When the sun shines on these cliffs they glitter and sometimes resemble white sails. The E cliff has been likened to the stern of a large ship.

A high, bold, rocky headland lies 0.8 mile E of where the Rio Candelaria (8°48'N., 81°11'W.) discharges into the sea. The Rio Calovebora discharges through a wide valley 2 miles W of the Rio Candelaria. Some red cliffs, topped by trees, lie about 0.8 mile W of the river. A ridge rises gradually to a height of 797m, 5 miles SE of the river mouth.

5.6 Punta Coaica (8°48'N., 81°17'W.), low and sandy, is the S point of the coast on this side of the Isthmus of Panama. From this point, the coast extends W about 7 miles to a ridge of red cliffs, and then 4.5 miles farther W to a bold promontory consisting of two bold headlands close together. Punta Penasco de Guapan lies 1.5 miles farther W. All three bluffs rise steeply to rounded cones, 213 to 245m high. Pico del Rey Buppan, standing 4 miles S of Punta Penasco de Guapan, is a narrow hill, 758m high, backed by a higher mountain.

From a position 2 miles W of Punta Penasco de Guapan, a low sandy beach extends NW in a very regular sweep for a distance of 19 miles and terminates at Punta Icaica (Coco Plum Point) (9°02'N., 81°43'W.). The entrance to the Rio Cana is located 1.5 miles SE of Punta Icaica.

Escudo De Veraguas (9°06'N., 81°34'W.) is located with its W extremity lying 10 miles ENE of Punta Icaica. This island is low and wooded, the trees being 30 to 55m high. Reddish

brown cliffs, 12 to 15m high, stand on the E side of the island. A light is shown from this side of the island. The W and S sides of the island are low and swampy, with dark sandy beaches.

Tides—Currents.—During the daytime, there is usually a W current in the anchorage. There is usually a NW current between Escudo de Veraguas and the mainland.

Anchorage.—Vessels can anchor off the SW extremity of the island, but the holding ground is poor and may not be safe at all times.

5.7 The coast between Punta Icaya and Punta Valiente is irregular and extends 14.5 miles NW along Peninsula Valiente. Reefs fringe Punta Icaya and Punta Vieja Isabel (Old Bess Point), 3 miles NW. The wooded coast about midway between these two points rises to a height of 142m.

Punta Gorda de Tobobo, a bold headland 152m high, stands 5 miles NW of Punta Vieja Isabel. An irregular shoal bight, with a dangerous reef extending across it, lies between these two points.

Cayo de Platanos (Big Plantain Cay) (9°08'N., 81°48'W.) lies near the outer edge of a rocky reef which extends 1 mile NE from Punta Gorda de Tobobo. Tobobo Bank, a detached shoal with a least depth of 12.8m and marked by heavy rollers, lies about 5.5 miles E of Cayo de Platanos.

From Punta Gorda de Tobobo, the bold high coast extends 5 miles NW to Punta Chiriqui. Several rugged islets lie close off this latter point. From Punta Chiriqui, the coast extends 2.3 miles W to Punta Valiente.

Punta Valiente to Punta Terraba

5.8 Between Punta Valiente and Punta Terraba, the current sets SE at a velocity of about 2 knots. Currents setting E at velocities of 1 to 2 knots will be encountered in the approaches to Canal del Tigre and Boca del Toro.

Punta Valiente (9°11'N., 81°55'W.), a bold, densely-wooded point, rises to an elevation of 152 to 183m on the E side of the E entrance to Laguna de Chiriqui. Foul ground extends 1.3 miles W from the point and continues S about 1.8 miles to the entrance to Bluefield Creek. Cayos Valiente, a group of islets extending about 0.3 mile in an E-W direction, lie on the N part of this reef. Virginia Rocks lie on the W edge of the reef 1.3 miles WSW of Punta Valiente, and Bluefield Rock, a small black rock 9.8m high, stands on the S edge about 1.5 miles S of the point.

Pico Valiente (9°10'N., 81°55'W.), a conspicuous 213m high hill, stands 1 mile S of Punta Valiente.

Cayos Tigre (Tiger Cays) (9°13'N., 81°55'W.), consisting of several red clay islets about 1 mile long in a E-W direction, lie 1.8 miles N of Punta Valiente. Roca Tigre, a detached small rock, marked by a beacon, equipped with a racon, lies 2.5 miles NNW of Punta Valiente. Reventazones Tigre, a small rock awash, over which the sea usually breaks, together with several shoal patches, lies on a bank within 0.8 mile NW of Roca Tigre. During calm weather, Reventazones Tigre cannot always be seen.

A 7m coral patch lies 0.3 mile WNW of Reventazones Tigre.

5.9 Laguna de Chiriqui (8°56'N., 82°07'W.) (World Port Index No. 9825), a deep bay, is 30 miles long, lies in an E-W

direction, and is 10 miles wide. It is bound on the E side by Peninsula Valiente, on the S and W sides by the mainland, and on the N side by Isla Popa, Isla Cayo de Agua, and the adjacent islands and reefs. Canal del Tigre, which lies between Peninsula Valiente and Cayo de Agua, is the main approach channel.

The N side of the lagoon, including the entrance, is fringed by detached shoals. These lie up to about 5 miles S of the entrance and along the E shore of the lagoon. The W end of the lagoon, S of the fringing reefs, is almost entirely clear of dangers.

The low shores of the lagoon are indented by numerous small bays and rivers and are marked by several villages.

Canal Valiente (9°12'N., 81°55'W.), the NE approach channel leading into Canal del Tigre, lies between Cayos Tigre and the W end of Cayos Valiente, and has depths of 12.8 to 18.3m in the fairway on either side of Reventazones Valiente, a 5.5m shoal area about 0.8 mile NW of Virginia Rocks. There is usually a very heavy swell in the channel.

The flood current in Canal Valiente sets SW at a velocity of 0.5 to 1 knot; the ebb sets in the opposite direction at a velocity of 1 to 2 knots.

Canal del Tigre (Tiger Channel) (9°11'N., 81°59'W.), the N approach to Laguna de Chiriqui, lies between Roca Tigre and the SE side of Cayos Zapatilla to the W. This channel lies between two 40m curves which converge from E and W and extends S between Reventazones Tigre, awash, about 0.5 mile WNW of Roca Tigre, and Cayos Zapatilla. It enters the lagoon between Punta Bluefield to the E and Punta Piedra Roja (9°09'N., 82°00'W.) to the W.

Channel depths range from 36 to 72m, but some lesser depths may be encountered. The channel fairway has been dredged to an effective depth of 18.3m. Inside the lagoon and on the W side of the channel an extensive shoal lies between 2.5 miles S and 5 miles SW of Punta Piedra Roja. On the E side of the channel, there are two detached shoals, with depths of 5.5m and less, which lie 2.5 and 4 miles S of the same point.

Another channel leads into the lagoon between the W side of Cayo de Agua and Isla Popa (9°10'N., 82°08'W.) to the W, but is not recommended without local knowledge.

Bluefield Creek, entered 1.5 miles N of Punta Bluefield, extends 2 miles E to its head and is considerably narrowed by fringing reefs. Cayos del Toro, a small group of islets, lies on the S side of the approach to this creek on the outer edge of an area of foul ground which extends 1 mile NNW and N from Punta Bluefield. Densely-wooded hills rise on the N side of the creek. The head of the creek is swampy and fringed with mangroves.

Sheltered anchorage can be taken, in a depth of 20m, mud, with Bluefield Rock bearing 292°, distant 0.7 mile.

Caution.—When entering the creek, vessels should avoid the 6.1m shoal depth lying about 1.3 miles W of Bluefield Rock.

5.10 The Rio Cricamale (8°59'N., 81°55'W.) has its mouth lying close W of Cricamale, a village which stands on a salient point backed by trees up to 37m high. A low mangrove-covered cay located W of this point divides the river mouth into two channels. The Rio Biarra enters the lagoon close W of a defined point lying 5 miles WSW of the Rio Cricamale.

The S side of the lagoon extends irregularly W from the Rio Cricamale for 20 miles to Punta Muerto (9°00'N., 82°15'W.). The principal settlement of Chiriqui Grande is situated midway along this stretch of coast and is reported to be radar prominent.

Tides—Currents.—Tidal currents are seldom experienced within Laguna de Chiriqui, but a N set may be caused by the rivers. In the dry season, from March to June, off the mouth of the Rio Cricamale and as far as the entrance to Canal del Tigre, the ebb current attains velocities of 0.5 to 1 knot; there is a weak flood current on the rising tide.

Depths—Limitations.—Two SPM offshore oil facilities are situated just offshore, NNE and NE of Chiriqui Grande village. Submerged pipelines extend from the shoreside facility, close N of Chiriqui Grande, to these terminals. The facility can accept vessels of 30,000 dwt at the pier and 150,000 dwt at the SPM. The depth in the approach channel is 36.6m. The controlling depths at the SPMs is 22m.

A general cargo terminal has been constructed at Chiriqui Grande.

Pilotage.—Pilotage is compulsory. Pilots board in Canal del Tigre, 2.8 miles WSW of Roca Tigre. Pilots should be requested at least 72 hours in advance. If the ETA changes by more than 4 hours, a new ETA should be sent. When inside 50 miles of the terminal, a vessel should contact the oil terminal by calling "Rambala Control" on VHF channel 16. Pilots can be contacted via VHF channel 14 by calling "Chiriqui Grande Pilots."

Vessels may proceed directly through the buoyed channel to the anchorages in the lagoon. Outbound vessels have priority in the channel. A berthing master is mandatory when securing to the SPMs. The pilot remains on board during loading operations. Vessels anchored within the lagoon should minimize the use of VHF channel 13.

Anchorage.—Secure anchorage can be taken in most parts of Laguna de Chiriqui. Vessels can anchor, in depths of 12.8 to 18m, mud, SE of the pier at Eureka (8°57'N., 82°07'W.).

There are also three anchorage berths available for vessels awaiting their turn at the SBMs.

The E berth (8°59'18"N., 81°59'30"W.) has a depth of 27m; the middle berth (8°59'48"N., 82°01'30"W.) has a depth of 35m, and the W berth (9°00'18"N., 82°03'30"W.) has a depth of 40m.

Caution.—Focused attention is required in entering the lagoon because the water in the entrance is not very clear and shoals may not be seen. Since the shoals are steep-to, soundings are of little help. The water lying S of the entrance is reported to be clear and shoals may be seen.

5.11 From Punta Muerto, the W side of the lagoon extends about 10 miles N to Monkey Cay (9°10'N., 82°15'W.) near the head of Ensenada Uyama. Several villages which serve the plantations inland stand along this stretch of coast. The greater part of the S and W sides of the lagoon are low and swampy, but toward the W part of the S shore the land rises to several high peaks 3 miles inland. Along the W shore, the land rises to a height of 457m, 4 miles inland.

The N coast of the lagoon between Monkey Cay and Punta Piedra Roja, 15 miles E, passes along the S coasts of Isla Split Hill (9°09'N., 82°10'W.), Isla Popa, and Isla Cayo Agua.

The S part of Isla Popa rises to a height of 115m; Cerro Popa is a prominent 109m high peak in the NE part of the island. Isla Split Hill, 1.3 miles long, lies between the SW end of Isla Popa and the mainland to the W. Two narrow channels lead on either side of this island into the Bahía de Almirante, but both require local knowledge.

5.12 Isla Bastimentos (9°18'N., 82°08'W.), from its E extremity of Punta Patino, extends 8 miles NW to Cabo Toro, the E entrance point of Boca del Toro.

Cabo Toro (Punta Toro) (9°22'N., 82°12'W.), a bold headland, terminates to the N in a conspicuous, 35m high rock. A steep-to, breaking reef fringes the point and extends 1.5 miles SW around Punta Bastimentos, which is low and sandy, and the W end of Isla Bastimentos. Roca Toro lies, awash, close NE of Cabo Toro; several rocks lie up to about 1 mile ESE and SE of the point. A shoal depth of 6.6m lies 1 mile ENE of the point.

A ridge of irregular hills standing on the N side of Isla Bastimentos attains an elevation of 122m, but the S side of the island is low.

Crawl Cay Channel (9°14'N., 82°08'W.), fouled by several cays and shoal depths, lies between the S end of Isla Bastimentos and the N end of Isla Popa, and extends W into the E part of Bahía de Amirante. Local knowledge is necessary to enter this channel.

Cayo Nancy (9°19'N., 82°11'W.) lies with Hospital Point, its NW extremity, located 0.8 mile SSW of Punta Bastimentos. The densely-wooded island extends 3.5 miles SE and is nearly joined to a W projection of Isla Bastimentos. Hospital Bight, an encumbered inlet, lies between Cayo Nancy and Isla Bastimentos. The bight should not be entered without local knowledge.

5.13 Isla Colon (9°25'N., 82°17'W.), densely-wooded, about 6.5 miles long, and from 3 to 4 miles wide, rises to heights of 61 to 122m. From Long Bay Point, a 16m high rocky bluff, located 2.8 miles NW of Cabo Toro, the N coast of the island, extends 4.2 miles NW to Punta Norte, low and rocky, and then 2.3 miles WSW to Punta Cauro (9°26'N., 82°19'W.). The SE part of the island is a low peninsula.

Cayo Carenero (9°21'N., 82°14'W.), a low, narrow island fringed by foul ground up to about 0.3 mile E, lies close off the E side of Bocas del Toro. Roca Norte, 6.4m high and conspicuous, stands close N of Cayo Carenero.

Bahía de Almirante, 15 miles long and 10 miles wide, is bound by Isla Popa, Isla Bastimentos, and the adjacent islands and dangers to the E; Isla Colon to the N; and the mainland to the S and W. The commercial port of Almirante and the town of Bocas del Toro are the only two towns of any size within the bay. Several small towns and villages are found along the shores of the bay, but they have little or no commercial importance.

Isla San Cristobal, the largest of several islands found within the bay, lies almost in the middle and divides it into three large bights. The E end of the bay is fringed by numerous cays and reefs, whereas the central and SW parts are comparatively free of dangers. General depths within the bay are 12.8 to 27.4m, but less water is encountered in the NW and SE bights.

The irregular coast forms numerous bights and lagoons, into which several rivers discharge. The S side of the bay is backed 2 miles inland by a table ridge, which ranges in height from 533 to 614m and which extends 15 miles from the SE to the NW. The mainland SE and the islands to the E and N rise to heights of about 150m, but the mainland coast at the NW end of the bay is low.

5.14 Canal de Bocas del Toro (9°20'N., 82°15'W.), the principal entrance channel, lies between Cabo Toro and Long Bay Point and is about 0.8 mile wide between Isla Bastimentos and Cayo Carenero. However, both sides are fringed by coral reefs and detached shoals which narrow the navigable width of the channel.

The buoyed channel between Lighted Buoy No. 1 and Lighted Buoy No. 2, as far S as Lighted Buoy No. 5 and Lighted Buoy No. 6, has a depth of 9.1m. From there, it has depths in excess of 12.2m, except for the 9.7m patch which extends 90m S of Lighted Buoy No. 7, a 7.5m patch lying close E of Lighted Beacon No. 8, and the W edge of Dry Reef, which extends, with a depth of 8.4m, close SW of Lighted Beacon No. 9. This latter beacon was reported (1995) to be missing.

Nancy Shoal (Bajo Solarte) (9°20'N., 82°13'W.), with a least depth of 2.5m, lies about midway between Punta Bastimentos and Hospital Point and extends about 0.5 mile NNW. Nancy Rock (Roca Solarte), a reef with a depth of less than 1.8m and on which the sea generally breaks, lies on the S end of this shoal.

Shepherd Bank (Bajo Garcia) fronts the S end of Bocas del Toro, about 0.8 mile SW of Hospital Point, and has a least depth of 5m. Clear channels pass SE and NW of this bank. Pallas Shoal, a detached shoal with a least depth of 5m, lies about 0.5 mile SSW of the S extremity of Cayo Carenero.

A current, which enters Bahía de Almirante through Boca del Drago and emerges through Bocas del Toro, sets SE along the S side of Isla Colon. As a result, the ebb is increased and the flood is decreased in Canal de Bocas del Toro. A velocity of 1 knot is sometimes encountered. In the approach to Canal de Bocas del Toro, a SE setting current with a velocity of 1 to 2 knots will be encountered.

Boca del Drago (9°25'N., 82°20'W.), the W entrance leading into Bahía de Almirante, lies between the W end of Isla Colon and the mainland to the W. This passage is 0.8 to 1.3 miles wide, but the channel is only about 0.3 mile wide between the 10m curves in the entrance and about 340m wide at its narrowest part. Because of the sharp turns and lack of navigational aids, it is not advisable for a vessel other than one of shallow draft to attempt to enter without a pilot.

Sail Rock, Wreck Rock, and Swan Cay, all above-water dangers, lie between 2 miles and 2.3 miles NE of Punta Cauro, on the E side of the approach, and have been reported to be radar prominent. These features could be as much as 100m out of position to the SW and should be given a wide berth.

The E side of the channel between Punta Cauro and Lime Point, a low and sandy point about 1 mile SSW, is fringed by shoal ground and detached shoals which extend up to 1 mile offshore.

5.15 Punta Sarabeta (9°26'N., 82°20'W.), the W entrance point of Boca del Drago, lies 1 mile W of Punta Cauro and is

fringed by foul ground extending about 0.8 mile E into the channel. Five Fathom Bank, small in extent, with a least depth of 9.1m, lies on the W side of the approach 1 mile NE of Punta Sarabeta. Mandeville Rock, a dangerous pinnacle with a least depth of 2.4m, lies 0.5 mile ENE of the same point. The sea occasionally breaks over this danger.

The currents in Boca del Drago are irregular in set and velocity. When a strong current sets E outside the passage it is deflected into the passage where it attains a velocity of 1 knot on the flood, but is inappreciable during the ebb.

The W part of Bahía de Almirante extends 14 miles S from Punta Anton on the W side of Boca del Drago. Punta Pondsock, the E extremity of a peninsula, is located about midway along the W side of the bay and 3 miles W of Punta Juan. An inner bay, which is entered between Punta Pondsock and Juan Point (Punta Juan), extends 6.3 miles S from a line joining those points to the head of Logan Bight, and about the same distance WNW from the middle of the W side of Isla Cristobal to the head of Ensenada Ambrusio, a bight with the port of Almirante at its head.

Laguna Porras and **Laguna Palos** (9°14'N., 82°15'W.), two almost landlocked bodies of water at the S end of Isla Cristobal, are available only to small craft with local knowledge.

Ensenada Shepherd lies in the SW side of Bahía de Almirante between Punta de Pargo (9°12'N., 82°19'W.) and Punta de Gallinazo, 3.8 miles NW. Isla Pastores, together with several small cays, lies across the entrance to this bay on a line joining the two above points. Two channels lead into the bay. The NW channel lying between Isla Pastores and Punta de Gallinazo is fouled by an extending shoal, whereas the SE channel lying between Cayo Roldan and Punta de Pargo is deep and clear, except for a detached 14.6m depth which is located near mid-channel.

Anchorage can be taken, in a depth of 22m, mud, about 0.5 mile S of the middle part of Isla Pastores.

5.16 Split Hill, 336m high, stands 2.1 miles SE of Punta de Pargo. Middle Channel Hill, 106m high, stands on the E part of Isla Pastores. Both of these peaks are prominent.

Sister Cays (9°16'N., 82°21'W.), two reef-fringed islets, stand near the outer end of an area of foul ground extending 1 mile SE from the coast, about midway between Punta de Gallinazo and Punta Pondsock, 3.2 miles NNE.

Ensenada Ambrosio (Ambrosio Bight) (9°16'N., 82°22'W.), entered between Punta Gallinazo and Sister Cays, extends 3 miles NW to the port of Almirante at its head. Depths within the bay range from 27m in the entrance to a depth of 10m at its head. There are several cays located close along its shores and a 9.2m shoal lies at the mouth of Ensenada Ambrosio, 1 mile SSE of Gerechow Cay.

Pondsock Reef (9°17'N., 82°20'W.) lies on an area of foul ground extending about 1.5 miles ESE from Punta Pondsock. Two above-water wrecks lie near the SE end of the reef. A lighted beacon marks the SE end of the reef.

The W shore of Bahía de Almirante between Punta Pondsock and Punta Donato, 5.3 miles N, recedes 2.5 miles W in its middle part. All of the dangers between the two points are contained within the 10m curve, which lies between 0.5 and 1.3 miles offshore.

Punta Blanca (10°00'N., 83°02'W.), 20 miles NW of Punta Cahuita, is a bold white, cliffy point 122m high; it is the NE extremity of a promontory extending 0.5 mile E from the general line of the coast. A prominent 1,375m high peak of the Matama range rises 15 miles SSW of Punta Blanca. Isla Uvita, small in extent, lies on a coral reef lying 0.8 mile E of Punta Limon. A dangerous wreck lies 0.3 mile E of Punta Blanca.

5.20 Puerto Limon (10°00'N., 83°01'W.) (World Port Index No. 9810), an open coastal harbor, is the principal Costa Rican port on the Caribbean coast. Bananas and cocoa are the principal exports, but a considerable amount of general cargo is also handled. It is safe and of easy access.

Winds—Weather.—A typical Central American climate prevails in the Puerto Limon area. The annual mean daily temperature is 31°C. The annual mean relative humidity is 85 percent. The rainfall is heavy, frequently torrential, and varying from 2,600 to 4,800mm per year. Fog occurs only in the early mornings and is generally very light.

Tides—Currents.—A S setting current is generally experienced between Isla Uvita and Puerto Limon. During the dry season, it attains a velocity of less than 1 knot, and 0.7 to 1.2 knots in the rainy season. During the rainy season, there is a strong discharge from the mouth of the rivers in the NW part of the bay.

Between Punta Terraba and Puerto Limon, the current sets SE. A 2 knot current setting ESE was experienced by a vessel approaching Puerto Limon from the E.

Depths—Limitations.—Vessels with drafts up to 9.5m and lengths up to 210m can be accommodated in Puerto Limon. At some berths, vessels are held off by hauling off buoys because of the scend. An offshore anchor is also used when the scend is heavy.

The Metallic Pier has four berths. Bananas are loaded at Berth No. 1, which is 182m long and has an alongside depth of 10m. Berth No. 2 and Berth No. 3 are general cargo berths and are 122m and 137m long, respectively. They have alongside depths of 7.6 to 9.1m. Berth No. 4 has a depth of 6m alongside and is used for general cargo.

The National Pier forms Berth No. 5 and Berth No. 6. Berth No. 5 is used for general cargo. It is 90m long and has depths of 3.6 to 4.8m alongside. Berth No. 6 is fitted with a ro-ro ramp. It is 90m long and has an alongside depth of 8.8m. Containers are also handled at Berth No. 6.

Berth No. 7 to Berth No. 9 are situated at the Seventy Pier, which is used for general cargo. Berth No. 7 is 152m long and has a depth of 9m alongside. Berth No. 8 is 152m long and has a depth of 8.5m alongside. Berth No. 9 is 60m long and has a depth of 6m alongside.

Berth No. 10 and Berth No. 11 are located at the Alamen Pier Terminal. Berth No. 10 has a depth of 10m alongside; Berth No. 11 has a depth of 11m alongside.

A shoal, with a depth of 3.3m, lies close off the seaward end of Berth No. 11.

Aspect.—In approaching the port, the sugarloaf peak at the E end of Matama range is prominent, although the coast has been reported to be a poor radar target. At night, the loom of the bright lights on the piers can be seen well out to sea, beyond the range of any of the aids to navigation. The piers are

reported to be easily identifiable by day at a distance of 8 miles.

Pilotage.—Pilotage is compulsory for merchant vessels going alongside the wharves. Pilots may be ordered by radio prior to arrival or summoned by sounding four blasts on the whistle or siren. The pilot boards 1 mile off the harbor. Pilots can be contacted on VHF channels 14 and 16. An ETA should be sent 24 hours in advance.

Anchorage.—There is anchorage, clear of the dangerous wrecks, 1.5 mile SE of Puerto Limon. This anchorage has good holding ground and receives partial shelter from Isla Uvita. A good berth is reported to be 1 mile S of the S extremity of Isla Uvita. Anchorage can also be taken, in depths of 12 to 16.5m, about 0.4 mile WNW of the S extremity of Isla Uvita. A vessel that anchored about 1 mile S of Isla Uvita experienced dragging in E and NE winds, but found good holding ground farther E, about 1.4 miles SSE of Isla Uvita.

Caution.—The anchorage and piers are exposed to swell and surging may be encountered pierside.

5.21 The coast between Punta Blanca and Punta Castilla, 58 miles NW, is low, bordered by a dark sandy beach, and backed by numerous lagoons which parallel almost the entire coast 1 mile inland. There is no protection from the Northeast Trade Winds and a continuous heavy surf breaks on the shore. Depths of 5.5m are found 0.5 mile offshore, but the depths increase gradually to the 200m curve which follows the coastal trend 6 to 7 miles offshore. Excellent holding ground, over a bottom of dark green mud, can be found 3 to 4 miles offshore, in a depth of about 36m.

Bahia de Moin (10°00'N., 83°05'W.) lies 3 miles W of Punta Blanca and indents the coast 1 mile. Isla Pajaros, heavily wooded and 30m high, lies off the E entrance point and the Rio Moin discharges into the SE part of the bay. A bare rock is located close off the NW side of Isla Pajaros. A light is also shown from this same side of the islet. Depths range from 18.3m at the entrance to 5.5m about 0.2 mile NW of the river mouth. A 9.1m shoal lies 0.8 mile WSW of Isla Pajaros.

5.22 Puerto Moin (10°00'N., 83°05'W.) (World Port Index No. 9805) lies on the E side of Bahia de Moin, N of the entrance to the lagoon.

Depths—Limitations.—A channel, 200m wide, with a dredged depth of 15m, leads to the berths. The port is designed for banana exportation and the importation of crude oil. It has four berths. The berth for tankers is 190m long and has an alongside depth of 9.6m. The two berths for bananas are each 160m long and have alongside depths of 9m. The fourth berth is for ro-ro vessels and is 190m in length, with alongside depths of 9.0m. It has a 30m wide ro-ro ramp.

There is no turning basin and vessels must be towed in or out. It was reported (2001) that a Navy frigate-size vessel was able to back out of the port having moored port side-to to the tanker pier. There is a continual alongside surge, but it is reported to be not as strong as in Puerto Limon. The swell is most pronounced during N winds in December and January, which can cause vessels to surge alongside the berths.

Aspect.—Range lights are shown from short towers marked with black and white horizontal stripes. The front marker is seen from seaward between the rooftops of two buildings at the



Puerto Moin

pier. The rear marker stands on a small hill and may be partially obscured by brush. It has been reported (2001) that the range is useless, with the rear mark totally obscured by brush, and the front mark not visible if any vessel is already using the piers.

Pilotage.—Pilots are obtained from Puerto Limon and board about 1 mile NNE of the channel entrance buoys. Berthing is restricted to daylight hours only. Vessels should arrive before 1500; pilots will not board before 0600.

Anchorage.—Anchorage is located in the charted area N of the port. The holding ground of packed sand was reported excellent (2001).

Caution.—Depths have been reported (1993) to be as much as 1.5m less than charted due to earthquake activity.

5.23 From Bahía de Moin, the coast extends 25 miles NW to the outlet of the Rio Parismina (10°19'N., 83°21'W.). Two other rivers, the Rio Matina and the Rio Pacuare, lie along this stretch of coast. This portion of coastline should be navigated with caution. A heavy swell always rolls in from the NE and breaks heavily on the beach.

Volcan Turrialba (10°01'N., 83°45'W.), a 3,460m high inactive volcano, stands 30 miles WSW of the mouth of the

Rio Parismina. When seen from the E, the peak and crater appear clearly defined, with the hollow of the crater being on the N side. The volcano is generally hidden by clouds.

Monte Irazu, 3,627m high, stands close S of the above peak. On a clear day, these conspicuous peaks can be seen for a considerable distance.

From the Rio Parismina, the low coast extends 31 miles NNW to the mouth of the Rio Colorado (10°46'N., 83°35'W.). This shallow river leads inland to the Rio San Juan and then to Lago de Nicaragua. The mud carried out by this river discolors the sea for some distance. A prominent two story red-roofed building stands in the village of Barra del Colorado, on the S bank near the mouth of the Rio Colorado.

Cerro de Las Lomas, a prominent ridge of hills, 354m high, rises 10 miles N of the Rio Parismina and 4 miles inland. This ridge of hills is usually covered by mist rising from the marshes around them. An easily identified conical hill, 213m high, stands between them and the shore.

Cerro Tortuguero (10°35'N., 83°30'W.), a small isolated hill, 137m high, stands on the coast 18 miles NNW of the Rio Parismina. This hill is a useful mark. When seen from the NE, it appears wedge-shaped, with the higher end to the E. From the E and SE, it appears as a rounded lump as broad as it is high, rising almost perpendicularly on its S side, but sloping gradually N and terminating in one or two hillocks.

The current along the coast between Bahia de Moin and Punta Castillo sets SE and increases from 1 knot to as much as 3 knots as it approaches the bay.

Punta Castillo (10°56'N., 83°40'W.), a low point marked by breakers located 10 miles NNW of the Rio Colorado, has the entrance to San Juan del Norte lying 2.8 miles W of it. Morris Shoal, 4 miles long and 1 mile wide, lies 10 miles E of this point and has depths of 18.3 to 22m, over soft mud.

5.24 San Juan del Norte (10°56'N., 83°42'W.) is located W of Punta Castillo. This place is notable as the proposed Atlantic terminus of the Nicaraguan ship canal. The harbor of San Juan del Norte has been closed to shipping because of silting and is now available only to small craft. The village and the abandoned equipment are now obscured by trees.

The best anchorage off San Juan del Norte is in depths of 18 to 20m, mud and sand, about 3.5 miles NW of Punta Castillo.

Between Punta Castillo and Punta del Mono, 39 miles N, the coast extends in a gentle curve 13 miles to the W. From San Juan del Norte, the low sandy shore of this bight extends 29 miles NNW terminating at a bold rocky point. A small, green, wooded island, 18m high, lies close off this point. This portion of the coast is low, wooded, and bordered by a dark sandy beach on which the sea always breaks heavily. Round Hill, an isolated twin peak, rises abruptly from the shore to a height of 188m about 20 miles NW of Punta Castillo.

The coast then becomes higher and extends irregularly NE to Punta Gorda (11°26'N., 83°48'W.), a prominent rocky point. Several steep-to islets lie close off this section of coast.

From Punta Gorda, the coast extends irregularly NE for 12.5 miles to Punta del Mono. The Rio de Punta Gorda discharges into the sea 4.5 miles NE of the point of the same name. Several small settlements are situated at the river mouth.

Isla del Pajaro Bobo (11°30'N., 83°43'W.), a 47m high islet, is wooded and lies 5.8 miles SW of Punta del Mono and 3 miles offshore. When seen from the E it appears as a small green conical hill, but from the S it appears wedge-shaped, with the higher end to the W.

Punta del Mono to Punta Gorda

5.25 Punta del Mono (11°36'N., 83°40'W.) is the S extremity of a bold, rocky peninsula which extends 1.5 miles SE and is 2 miles wide. Red Hill, 30m high and red in color, stands in the middle of the promontory 1 mile NNE of Punta del Mono. Red cliffs extend 1 mile NW from Black Bluff, on the NE end of the promontory. Shoal water and several cays lie within 1 mile of Punta del Mono.

From Punta del Mono, the low coast extends 45 miles N to Punta Mosquito, at the entrance to Laguna de Perlas. El Bluff, a bold promontory, rises midway along this stretch of coast at the entrance to Laguna de Bluefields and the port of Bluefields. The coast then extends 8 miles ENE from Punta Mosquito to Punta de Perlas, then 100 miles N to Puerto Cabezas, and then 22 miles NNE to Punta Gorda.

The unusually low aspect of this coast is broken by a few bluffs and low hills. Several lagoons and numerous rivers indent the shore and there is an occasional village.

Numerous dangerous reefs and cays lie off this coast.

Caution.—The off-lying dangers described in this sector only include those which lie seaward of the 200m curve between Punta del Mono and Cabo Gracias a Dios, 204 miles N.

Cayos de Albuquerque (12°10'N., 81°51'W.) lie 111 miles ENE of Punta del Mono on a bank about 5 miles in extent. The edge of this bank is steep-to and has depths of 18m and less within the edge of the 200m curve. Numerous rocky heads and drying reefs exist, particularly near the E and S sides of the bank.

Cayo del Norte and Cayo del Sur, near the E side of the bank, are about 1.8m and 1.2m high and have been reported to be radar prominent. Both cays have been reported to be heavily wooded with palm trees, 18m high. A light is shown from Cayo del Norte.

5.26 Cayos del Este Sudeste (12°24'N., 81°28'W.), 7 miles long and 2 miles wide, lie on a coral bank lying 24 miles ENE of Cayos de Albuquerque. A reef extends across the bank 1.5 miles within the N end. North and E of this reef the depths range from 9 to 31m, coral and sand, to the edge of the bank. The E side of the reef is steep-to and extends 2 miles S to a bight indenting the E side. A broken reef continues S to about 1 mile within the bank's S extremity. Between this reef and the S end of the bank, the depths range from 11 to 23.8m, sand, coral and rock. The middle and W parts of the bank have numerous shallow patches. A stranded wreck lies on this reef, 3.3 miles NW of Cayo Bolivar Light.

Cayo del Este lies on the SE portion of the bank. The cay, about 0.3 mile long and 1.2m high, is thickly wooded with palm trees. Cayo Bolivar, 1.3 miles W of Cayo del Este, is 1.8m high with several palm trees on it. West Cay, 0.4 mile WNW of Cayo del Este, is very small and low. Cayo Arena is a small dry sandbank 1.3 miles NW of Cayo del Este. Huts have been erected on these cays by fishermen. Cayo Arena is reported to be radar conspicuous.

Anchorage can be taken on the W part of the bank, but only near the edge.

5.27 Isla de San Andres (12°33'N., 81°43'W.) lies 16 miles WNW of Cayos del Este Sudeste. It is about 7 miles long and 1.5 miles wide, and is marked by a ridge of hills extending from near its N end to within 1.5 miles of its S end. Three flat-topped summits rise above this ridge. These summits appear as only two hills when viewed from the N or S. A cliff at the N end of the ridge is distinctive. The island is reported to be radar conspicuous.

Punta Norte (12°36'N., 81°42'W.), the N extremity of Isla de San Andres, is fringed by foul ground which extends about 1 mile N from it. Blowing Rocks, low rocks over which the sea breaks heavily during N winds, lie 0.8 mile N of the point.

Cayo Johnny (Cayo Sucre), low, small, and covered by palm trees, lies on the NW end of a detached reef 1 mile ENE of Punta Norte. The coastal reef which lies 0.5 mile N and E of Cayo Sucre extends 4 miles S to a position about 1.8 miles ENE of Punta Sterthemberg. The S side of the reef is indented by a narrow irregular channel which leads N to Bahia de San Andres, 2.3 miles N. South of Punta Sterthemberg, the coastal

reef nowhere lies more than 0.3 mile offshore. The W side of the island is steep-to and free of dangers.

Punta Sur (12°29'N., 81°44'W.), the S extremity of Isla de San Andres, is of moderate elevation, wooded, and marked by a light. The W side of the island is composed mainly of rocky cliffs and is indented 2.5 miles N of Punta Sur by Rada El Cove.

Temporary anchorage can be taken about 0.3 mile W and SW of the cove, in a depth of 13m, sand, but the swinging room is restricted. Although the holding ground is reported good, this anchorage is not recommended during the season of the northers.

The principal town is San Andres, situated on the N side of the island. A small pier used by lighters extends from the shore SE of the town. San Luis, a small village, stands S of Punta Sterthemberg.

On the N end of Isla de San Andres, the current generally sets strongly to the W, except during and after northers, when it sets S. This may be considered a locality where variable currents exist. It was reported (1959) that an unusual E set was experienced between Cristobal and Isla de San Andres.

5.28 Bahia de San Andres (12°35'N., 81°42'W.) is formed on its E side by the coastal reef extending S from Cayo Sucre and by the W side of Isla de San Andres.

Depths—Limitations.—A wharf, 300m long, is reported to have depths of 6.7 to 8.5m alongside. It lies parallel to the shore in the SW part of the bay. The channel leading to this wharf is entered about 2.3 miles S of the bay and is reported to be available to small vessels with drafts up to 4.6m.

Pilotage.—Pilotage is compulsory, but is available during daylight hours only. The pilot boards in the vicinity of the Approach Lighted Buoy.

Anchorage.—Anchorage can be taken, in depths of 5.5 to 9m, in the bight at the entrance to the harbor. Anchorage can also be taken, in a depth of 11m, sand, SW of Cayo Cordoba (12°33'N., 81°41'W.).

Caution.—Shoal depths are reported (1997) to exist in the entrance to the bay.

5.29 Isla de Providencia (13°21'N., 81°22'W.) lies 50 miles NNE of Isla de San Andres. Together with Isla Santa Catalina, close off its N end, these islands extend 4.5 miles in a N - S direction. The mountainous center rises to three peaks of about the same elevation, the highest being 363m high. The islands lie on a bank, as defined by the 200m curve, that extends 10.5 miles N and 3 miles S from them. The N extremity of Isla de Providencia is Jones Point. On a spur extending S from this point stands Spit Hill, 168m high. From the NW or SE, a rocky chasm, about 18m wide and 24m deep, is prominent on Split Hill. Isla de Providencia is reported to be radar conspicuous.

A reef lies within 2 miles of the E and S sides of the island and up to 8 miles N from its N side. Between the N end of the reef and the outer edge of the bank, about 2 miles N and 2.8 miles NE, there are general depths of 11 to 36m; between the S end of the reef and the edge of the bank, 1.8 miles S, the depths range from 7.3 to 95m. The W side of the island is foul, except for an area about 1.5 miles in extent W of Catalina Harbor.

Low Cay (13°32'N., 81°21'W.), which shows a light, is located on the NW extremity of the reef 8.5 miles N of Jones Point. A reef, which dries in places, extends up to about 0.5 mile S from it.

Good anchorage can be taken 1 mile S of Low Cay, in depths of 11 to 18m, sand. Care should be taken to avoid the shoal patches in the vicinity.

Basalt Cay and Palm Cay, 0.3 mile N of Isla Santa Catalina, are small with moderate elevations. Palm trees stand on the latter island. A light is shown from Palm Cay.

5.30 Catalina Harbor (Bahia Catalina) (13°23'N., 81°23'W.) (World Port Index No. 9730), on the W side of the N part of Isla de Providencia, is 1 mile long and 0.5 mile wide. It provides sheltered anchorage to vessels with drafts up to 4.6m. The greater part of the harbor is shoal and depths of 5.5m and more can be found in a small area off the SW side of Isla Santa Catalina. Morgan Head, the W extremity of Isla Santa Catalina, is a prominent 12m high black rock.

Isabel Village (13°23'N., 81°22'W.), the chief settlement of Isla de Providencia, is situated close SE of Isla Santa Catalina.

Anchorage.—Sheltered anchorage from the prevailing winds can be taken, in depths of 5.5 to 8m, close SW of Isla Santa Catalina. Anchorage can be taken on the outer part of the bank, in a depth of 9m, with Morgan Head bearing 143° and the two small cays N of Isla Santa Catalina nearly in line bearing 094°. Anchorage can also be taken, in a depth of 11m, about 1.3 miles SW of the above anchorage on the outer part of the bank with Alligator Point, the W extremity of Isla de Providencia, bearing 168°, and the N extremity of Isla Santa Catalina bearing 072°. Isolated shallow depths may exist in this area.

Caution.—Caution must be exercised, as the depths have been reported to be as much as 0.6m less than charted. Strong and irregular currents exist in the vicinity of Isla de Providencia and should be guarded against by vessels passing through this area.

5.31 Roncador Bank (13°34'N., 80°04'W.) lies with its N part located 75 miles ENE of Isla de Providencia. This very steep-to bank, as defined by the 200m curve, is 7 miles long and has a maximum width of 3.5 miles. Roncador Cay, composed of sand and blocks of coral, lies on the N part of the bank and is 4m high. With the exception of an area 0.5 mile wide within the E edge of the bank, where the general depths range from 9 to over 73m, the bank is covered by reefs, drying sandbanks, and coral heads. A light is shown from the N end of the bank. The SW part of the bank has more regular depths, but numerous coral heads and shallow depths lie scattered throughout the area. A conspicuous stranded wreck lies on the S end of Roncador Bank and has been reported to be radar conspicuous.

Anchorage.—Good anchorage can be taken on the W edge of the bank, in depths of 9 to 13m, but care should be taken to avoid the coral heads which are easily seen.

Caution.—A large area of discolored water, having the appearance of a shoal, was reported to lie 7 miles NW of Roncador Cay. In 1980, it was reported that a shoal, with a depth of 9.1m, was located 7 miles NNW of Roncador Cay

5.32 Serrana Bank (14°24'N., 80°16'W.), an extensive dangerous shoal area, lies with its SW end located 45 miles NNW of Roncador Cay. This steep-to bank is 20 miles long and 6 miles wide. All sides except the W and SW edges are fringed by a nearly unbroken reef. The sea breaking over the reef on the E side of the bank is visible for several miles farther than the cays which stand on it. Mariners are advised to use extreme caution when in the vicinity of Serrana Bank because of the strong currents. On the W and SW parts of the bank, there are numerous heads of live coral, with depths of only 1m. This part of the bank should be avoided by all except small craft with local knowledge.

Southwest Cay (14°16'N., 80°24'W.), composed of sand covered with grass and stunted brushwood, is 10m high and the largest cay on Serrana Bank. This cay has been reported to be radar conspicuous. A light is shown from the cay.

Eclipse Rock, a steep-to pinnacle with a depth of 4.6m, lies 0.4 mile WSW of Southwest Cay.

Temporary anchorage can be taken by small craft, in depths of 13 to 16.5m, about 0.6 mile NNW of Southwest Cay. A steep-to reef extends 9 miles NE from Southwest Cay, is partially protected by the windward reefs and is not always visible. A 0.6m high ledge stands on the edge of the reef lying 6 miles NE of Southwest Cay. A drying sandbank lies 1.5 miles farther NE.

North Cay (14°28'N., 80°17'W.), located 13.5 miles NE of Southwest Cay, lies on the N end of the reef and is small and low. An object resembling a light pylon was reported to stand on or near this cay. It should not be mistaken for the light structure on Southwest Cay. A reef, which is only visible during N winds or strong trade winds, extends 3 miles from the cay in a SW direction. A stranded wreck was reported (1971) to lie 1 mile SW of North Cay.

Turtle fishermen visit this area from March to August. On occasion, the masts of their vessels and their temporary huts may be sighted before the reefs themselves.

South Channel (14°21'N., 80°15'W.), about midway along the SE side of Serrana Bank, is about 0.3 mile wide between the cays and fringing dangers which lie on either side. Depths in the fairway range from 7.3 to 12.8m. Care should be taken to avoid several 3.7m shoal patches which lie within the reef.

Temporary anchorage can be taken by small craft, in a depth of 8m, about 1 mile NE of the channel entrance or just within the entrance in a depth 12m about midway between the cays.

East Channel (14°21'N., 80°11'W.), 4 miles E of South Channel, is about 0.5 mile wide between the fringing dangers and has depths of 18.3 to 25.6m in the fairway. East Cay lies on the W side of the entrance and a spur of the reef extends about 2 miles N from it.

Anchorage can be taken by small craft, in depths of 13 to 16.5m, about 0.8 mile NE of East Cay.

The current sets in and out of South Channel and East Channel at a velocity of 1.5 to 2 knots.

An extensive bank, with a least known depth of 52m, was discovered (1973) lying about 25 miles ESE of Southwest Cay.

5.33 Quita Sueno Bank (14°15'N., 81°15'W.) lies with its S end located 39 miles NNE of Isla de Providencia and is very

steep-to and dangerous. This bank, as defined by the 200m curve, extends 34 miles N and has a maximum width of 13.5 miles. Depths over this bank, exclusive of the 22 mile long reef which lies along its E side, range from 11 to 57m. From time to time, lesser depths have been reported to exist on this bank.

Good anchorage can be taken, in depths of 18 to 25m, clear sand and coral, W of the rocky ground that lies near the middle of the reef.

The two wrecks which lie stranded near mid bank are reported to be radar prominent. An additional stranded wreck lies in the SE corner of the reef.

Caution.—Great caution should be exercised by vessels passing E of Quita Sueno Bank, as the current here sets strongly to the W and on to the bank. Care is also required since the description of this area is based on inadequate surveys.

A detached shoal, with depths of 5.2 to 6.8m, lies about 14 miles WNW of the N edge of the reef. A vessel struck a coral head about 14 miles SW and a dangerous below-water rock is charted 19 miles SSW of the N edge of the reef. It seems probable that another unsurveyed reef exists W of Quita Sueno Bank. A shoal depth of 18.3m was reported (1964) to lie 38 miles WNW of Quita Sueno Light.

5.34 Serranilla Bank (15°55'N., 79°54'W.) lies 78 miles NNE of Serrana Bank. This bank, as defined by the 200m curve, is 24 miles long, 20 miles wide, and very steep-to. With the exception of the shoal area in the vicinity of the cays on the E and S parts of the bank, there are general depths of 9 to 37m.

There is no perceptible current on this bank, but a current generally sets WNW at a rate of 0.3 to 1 knot.

East Cay (15°52'N., 79°44'W.), the easternmost above-water feature on Serranilla Bank, is a small bush-covered cay, 2.1m high, that lies 3 miles W of the E edge of the bank. Foul ground, consisting of reefs and coral heads, extends 2.5 miles N through NE from the cay.

Northeast Breaker, a coral ledge with a rock, awash, on its S edge, lies 1 mile W of the edge of the bank, 3 miles NE of East Cay.

Beacon Cay (15°47'N., 79°50'W.), the largest of the three cays on the bank, lies 7.5 miles SW of East Cay, and is composed of sand and coral. This 2.4m high cay is covered with grass and is marked by a coral stone beacon on its W end.

A light, equipped with a racon, is shown from Beacon Cay. A shoal, existence doubtful, with a depth of 2.2m, lies 5 miles S of the light.

There are numerous obstructions in the area lying N of a line joining East Cay and Beacon Cay, and within the limits of lines drawn 4.5 miles NW from each cay. A small 2.1m cay, Middle Cay, lies in this foul area almost 2 miles W of East Cay.

A 15.5m shoal, existence doubtful, is charted 36 miles SW of the light, midway between Serrana Bank and Rosalind Bank.

Good anchorage can be taken, in a depth of 11m, about 1 mile NW of Beacon Cay, but care should be taken to avoid the coral heads.

West Breaker (15°48'N., 79°59'W.), a dangerous breaking ledge about 0.6m high, lies almost 8 miles W of Beacon Cay and is the W danger on the bank. It has been reported (1985) that West Breaker extends 2 miles W of its charted position.

5.35 Alice Shoal (16°05'N., 79°18'W.), located NE of Serranilla Bank, with a least depth of 11m, coral, lies at the E edge of a circular bank about 10 miles in extent as defined by the 200m curve. Depths over the greater part of the bank are less than 36m. The bottom is fine white sand. Rips mark the edges of the bank.

Currents in the vicinity of the bank attain a velocity of about 2 knots. An observation of short duration taken at the E edge of the bank revealed a set NE at a velocity of 1 knot with light ESE breezes. This current probably is a countercurrent that sets across the bank.

A depth of 96.9m was reported (1973) to lie 6 miles ESE of the E extremity of Alice Shoal. Unconfirmed reports (1983) indicate that depths on the W part of Alice Shoal may be considerably less than charted.

Bajo Nuevo (15°53'N., 78°33'W.), about 5 miles wide, is 14 miles long. It has been reported (1967) that Bajo Nuevo has extended W to about 15°48'N., 78°55'W. The bank has not been completely examined and its SW end is not well defined. The NW side of the bank is clear of known dangers. Depths of 3.7m are reported to extend up to 10 miles W of Bajo Nuevo. Seals gather on the reefs of the bank and are hunted in March and April. East Reef and West Reef, consisting of numerous rocky heads and separated by an opening about 0.5 mile wide, extend along the SE side of the bank. They are over 2.5 miles wide and steep-to on the SE and N sides. Sand accumulates on the reefs and forms low ridges, barely awash. At times these wash away. A stranded wreck, which is reported to be radar conspicuous, lies at the NE end of East Reef. Another stranded wreck lies on the W end of West Reef.

Low Cay (15°52'N., 78°39'W.), 1.5m high and barren, lies at the N end of West Reef. It is composed of broken coral, driftwood, and sand. In moderate weather, exposed anchorage can be taken, in depths of 12 to 14m, sand and coral, about 1.5 miles W of Low Cay. The anchorage should be approached from the W. Care must be taken to avoid a 3.7m coral head that lies 2 miles WSW of the cay and the foul ground between. The current in the vicinity of the bank sets W and SW and attains a velocity of 2 knots.

Bajo Nuevo Light is shown from a tower standing on Low Cay.

5.36 From a position lying 25 miles S of **Punta del Mono** (Monkey Point) (11°36'N., 83°40'W.), the 200m curve extends NNE to a position 28 miles E of that point, and then extends NNE to a position lying 72 miles E of Punta Gorda. This area is part of the Miskito Bank, which lies between the coast and the 200m curve to the E. A detached shoal, with depths of 10 to 18m, lies 65 miles ENE of Punta del Mono and 8 miles E of the 200m curve.

The depths within the 200m curve are irregular and numerous cays, islands, and other dangers exist. In the E edge of the bank, depths of 36 to 55m will be found, but there are numerous 9 to 18m detached steep-to patches and some with depths as little as 1.8m. The greater part of the bank has depths of 24 to 33m. During a gale, the water over the fine sand or muddy bottom near the cays becomes turbid.

The turtle fishermen in this area know most of the rocks with depths of 11m or less, and are adept at estimating within 0.9m

the depth of a rock 1 mile distant. Under ordinary conditions, they can pilot a vessel at slow speed clear of all dangerous patches. In navigating over the bank, it is advantageous to have the observer aloft, the sun directly overhead, no haze or mist, and clear smooth water.

Coral reefs in these waters may grow about 6cm annually, and depths may be formed which are less than those charted.

Most dangers are contained within the 200m curve, which follows somewhat irregularly the coastal trend from 2 to 17 miles offshore between Punta del Mono and a position 13 miles S of Puerto Cabezas.

A 9.1m shoal depth, located on a bank with depths up to 20m, about 4 miles in extent, lies 16 miles NE of Punta del Mono; a similar shoal depth lies 20 miles NNE of the bank.

Caution.—Great care is required when navigating in this area due to the unreliability and/or age of the surveys, the growth of reefs, and reports of new shoals.

5.37 Blowing Rock (12°02'N., 83°02'W.), 1.2m high and with a hole in its center through which water is occasionally forced like the spouting of a whale, lies 38 miles E of El Bluff.

A shoal, with a depth of 10.1m, is located 22 miles E of Blowing Rock. Another shoal, with a depth of 20m, lies 3.5 miles SW of Blowing Rock.

Isla Grande del Maiz (12°10'N., 83°03'W.) (World Port Index No. 9775), 2.5 miles long and 2 miles wide, lies 38 miles ENE of El Bluff. Mount Pleasant rises to a 113m wooded peak in the middle of the N part of the island. A 30m high, rocky, bluff stands at the S end of the island. The island is fringed by foul ground extending 0.3 mile to 1.5 miles offshore.

A wreck that lies stranded 1.3 miles NNE of the summit of Mount Pleasant is reported to be radar prominent.

Anchorage can be taken in Southwest Bay, on the SW side of the island, in depths of 8 to 9m; in Brig Bay, on the W side of the island, in depths of 9 to 11m; and in Long Bay, on the SE side of the island, in a depth of 9m. Care should be taken to avoid the reefs and shoal patches in or near these anchorages.

A pier, which is 98m long and has depths of 2.1 to 4m alongside, extends from the shore in the vicinity of a shrimp-processing plant at the head of Southwest Bay. This conspicuous building is lighted at night. A similar building, also lighted at night, stands at the head of Brig Bay.

5.38 Isla Pequena del Maiz (12°18'N., 82°59'W.), 0.5 mile long, 0.5 mile wide, and 38m high, stands 7.5 miles NNE of Isla Grande del Maiz. The N and E sides of the island are fringed by reefs extending 0.5 to 1 mile offshore. The W side of the island is fairly steep-to seaward of the 10m curve, which lies between 0.2 mile and 0.5 mile offshore.

Anchorage can be taken in Pelican Bay, on the SW side of the island, in a depth of 11m, with the W tangent of the island bearing 342° and the S tangent of the island bearing 106°.

Cayos de Perlas (12°29'N., 83°19'W.) and several reefs lie between Punta de Perlas and a position lying 13.5 miles E. They extend 12 miles N. All of the cays and reefs lie within the 20m curve, which follows the irregular coastal trend in this vicinity a distance of 8 to 17 miles offshore. Several detached patches, with depths of 12 to 18m, lie up to 2 miles seaward of the 20m curve to the E of these cays.

Although there are depths of 11 to 18m in this area, navigation is very hazardous because of the numerous charted and uncharted reefs and shoals, some of which may not be visible because of the turbid waters. Although soundings in many places show a muddy bottom, it is only a thin covering over coral; tripping gear and a buoy should be used to prevent loss of the anchor.

It is evident that because of the dangers within these cays it is prudent to avoid them entirely and pass to the E.

5.39 Seal Cay (12°25'N., 83°17'W.), the southeasternmost of the Cayos de Perlas, is a small coral ridge 0.9m high, lying 12.5 miles E of Punta de Perlas. Foul ground extends 0.5 mile NW and 1 mile SSW from the cay, but the SE side is steep-to. Several 9m shoal patches lie within 1.8 miles S through about 4.5 miles SW of the cay.

The S limits of the Cayos de Perlas are marked by Columbilla Cay, a steep-to reef-fringed islet, 33m high to the tops of the trees, lying 6.5 miles SW of Seal Cay. Maroon Cay, a similar islet on the edge of a reef extending 2 miles E from Punta de Perlas, stands at the SW extremity of these cays. Maroon Knoll, with a least depth of 5.5m, together with several detached 7.3 to 9.1m patches, lies up to 2.5 miles SSE of Maroon Cay.

Boden Reef (12°30'N., 83°19'W.), 0.8 mile long and with a least depth of 4.3m, lies on the E edge of the Cayos de Perlas, about midway between Seal Cay and the NE Cays 8 miles NW of Seal Cay. The NE Cays, a small group of reef-fringed islets with several rocks, awash, lying 1 mile NW, mark the NE extremity of the Cayos de Perlas. Numerous rocks, awash, and 3 to 5.5m patches lie up to 5 miles WSW of these cays.

Within the limits indicated above lie the Crawl Cays and the Tungawarra Cays, as well as numerous other small cays and shoals.

Although ample depths exist throughout the limits of the Cayos de Perlas, the numerous unmarked dangers and intricate channels make it advisable to pass well E of them.

Good anchorage can be taken about 0.3 mile SW of Little Tungawarra Cay. This anchorage should be approached from the S. Other anchorages may be found in the lee of the larger cays.

Two detached 7.3m depths and a shoal, with depths of 3 to 9m, lie 5 miles N of Cays de Perlas and between 4.5 miles and 8.2 miles offshore.

5.40 Great King Cay (12°45'N., 83°21'W.) is 21m high and the largest of a group of islets lying 12 miles N of the Cayos de Perlas and 9 to 13 miles offshore. Little King Cay, 10m high, stands 0.8 mile E of Great King Cay. Rocky Cays, two in number, lie 1 mile NW and Little Tyra Cay, 2.4m high together with a detached 3.9m patch, lie between 2 miles and 3 miles WSW of Great King Cay.

Great Tyra Cay (12°52'N., 83°23'W.), 18m high to the tops of the trees and with foul ground extending 0.5 mile N from it, is the largest of a group of islets and shoals which lie 8 miles N of Great King Cay. Seal Cay, two barren rocks 3m high, lies 0.8 mile S of Great Tyra Cay. A dangerous shoal patch lies 1 mile E of Seal Cay; several detached reefs lie between 1 mile and 3 miles SW of Great Tyra Cay. There are two detached shoals lying 1 mile and 5 miles NW of Great Tyra Cay.

Roca Tyra, 2.4m high and steep-to on its E side, lies 4.5 miles NE of Great Tyra Cay. Numerous detached reefs and shoals, over which the sea breaks, lie up to 3.5 miles W and 1 mile N of Tyra Rock.

Cayos Man O War (13°01'N., 83°23'W.), a cluster of islets, with the largest being 15m high, lies 11 miles offshore, 6.8 miles NW of Tyra Rock. An old oil barge, formerly used as a storage tank, stands on the W cay. A sheltered bight on the W side of this cay has pilings where vessels formerly moored to load lightered cargo. Depths alongside range from 4 to 6.7m.

Numerous detached reefs and shoals lie up to 3 miles SSW and WNW of Cayos Man O War. A 9.1m depth lies 5 miles WSW and two 9.1m depths lie 6 and 7 miles WNW of the cays. A coral head, with a depth of less than 7.3m, lies 2 miles W of Cayos Man O War.

Egg Rock (13°02'N., 83°22'W.), 1.8m high and steep-to, lies 1.4 miles NE of Cayos Man O War.

A dangerous shoal lies 13 miles NNW of Cayos Man O War.

Caution.—Many vessels have reported striking coral heads inside the 20m curve in the vicinity of Cayos Man O War and between them and Puerto Cabezas. It is advisable to keep seaward of the 20m curve when navigating along this part of the coast. A shoal, with a depth of 6.4m, lies about 49 miles SE of Puerto Cabezas.

5.41 Between Punta del Mono and Punta Gorda, the currents on the edge of the 200m curve are affected by the Equatorial Current, and generally from the vicinity of Isla de Providencia, part of the current recurves to the SW, while the main flow continues NW across Miskito Bank. Subsequently, the currents along the coast are variable and subject to great and sudden change, being influenced to a large extent by the wind; however, they tend to run S at a velocity varying from 0.5 to 3 knots. This S set has at times reversed its direction for several days before resuming its normal flow.

The current is stronger in the vicinity of Punta del Mono, where it sometimes sets E, then between Cayos de Perlas and Puerto Cabezas. Between Puerto Cabezas and Punta Gorda, the current is variable, but tends to set N; however, it too may be completely reserved by a norther. A countercurrent setting S may be experienced close inshore.

From **Black Bluff** (11°37'N., 83°39'W.), on the NE extremity of a promontory, the low swampy coast extends 10 miles N to a ridge of low red cliffs which terminate 1 mile farther N at Green Point. A small ridge of low red cliffs lies about 1 mile S of Green Point. The coast continues 12 miles N from Green Point to El Bluff, on the E side of the main entrance to Laguna de Bluefields. A shallow S entrance lies about 4 miles N of Green Point and leads into the lagoon, from which Isla La Venada extends 8 miles to the N entrance. The sea usually breaks heavily on the bar at the S entrance.

Silk Grass Cay, wooded and 18m high at its SW end, lies about 1 mile SSE of Black Bluff.

French Cay (11°44'N., 83°37'W.), a small, wooded islet with a flat summit, 27m high, lies 7.5 miles NNE of Black Bluff on the N part of a narrow reef, 1.3 miles long.

Sister Cays, consisting of three small islets, lies 8.5 miles N of Black Bluff.

Breaking reefs lie 3 miles SE and 2.5 miles E of Green Point.

Cayo de la Paloma, reef-fringed and 33m high, with a saddle-shaped summit, lies 1.5 miles ENE of Green Point and is the largest cay in this vicinity. White Rock, 15m high and prominent, is located 0.5 mile NNW of Cayo de la Paloma. Trees cover this rock.

Guano Cay, composed of red cliffs on its sides, lies 7 miles S of El Bluff. Two breaking reefs lie 2 miles and 4.3 miles N of this cay.

Caution.—There are many reefs and dangers, the positions of which can best be seen on the chart, in the vicinity of the above cays.

5.42 El Bluff (12°00'N., 83°41'W.), a bold promontory, 43m high and wooded, stands on the E side of the entrance to Laguna De Bluefields and is connected to the mainland to the N by a narrow strip of land known as the Haulover. Red cliffs stand on the E side of the promontory. From seaward, the bluff has the appearance of an island.

The lagoon entrance lies between Schooner Point, on the SW side of El Bluff, and Deer Point, on the N end of Isla del Venado. Cayo Casaba, a low and wooded islet with a smaller islet located close W of it (Isla San Demetrio), lies in the middle of the entrance. The navigable channel is 0.1 to 0.2 mile wide.

5.43 Bluefields (12°01'N., 83°45'W.) (World Port Index No. 9770) is situated on the W side of Laguna de Bluefields, 3.5 miles inside the entrance. The port for the town stands on the W and NW sides of El Bluff, where all cargo is handled and then lightered to the town by barge.

On the bar extending S from Schooner Point, there is a limiting depth of 3.4m. The recommended draft for vessels entering at LW is not more than 2.7m; however, vessels with a draft of 3.7m have entered at HW with a calm sea. Deep water in the harbor is confined to an area off the wharves that is 0.5 mile long and 0.1 mile wide. Depths in this area range from 5.5 to 9m. Elsewhere, the depths are less than 5.5m.

A wharf fronts the NW side of El Bluff. It is 183m long and has a depth of 6.1m alongside. The E end of this wharf has a berth, 114m long, which can accommodate vessels up to 3.7m draft. Booth Dock, a T-head pier 122m long across the face, fronts the W side of El Bluff and is used only by small craft. A dangerous wreck with exposed masts encumbers the approach to Booth Docks.

In the approach to the port, a conspicuous white house situated on the NW side of El Bluff and the radio towers standing in the town of Bluefield are good landmarks.

Winds—Weather.—From the middle of June through August, the NE wind is steady and very fresh raising a heavy sea and swell. The strong S current causes vessels at anchor to swing across the wind and roll and pitch uncomfortably. Rain is heavy and frequent, coming up in fresh squalls which follow closely upon one another.

From the first of September through October, the weather becomes variable with intervals of calms and frequent offshore winds. During this period heavy thunderstorms from the WSW are frequent.

From October, the wind begins to blow from the NE again accompanied by rain squalls and in early November it becomes stronger from the N with a considerable sea. At this time, the

northers may be expected, which generally attain the greatest violence from NW to N.

Tides—Currents.—The current usually sets S off the entrance at a velocity of 1.5 to 2 knots, but at times it may reverse itself at reduced strength for a day at a time for no apparent reason.

Pilotage.—Pilotage is compulsory. Pilots usually board about 0.5 mile seaward of El Bluff. Pilots can be contacted on VHF channel 16.

Anchorage.—Good anchorage can be taken, in a depth of 7m, about 1.5 miles S of El Bluff. The bottom is soft mud, with excellent holding ground. Vessels should use the starboard anchor because they will invariably lie heading N with the wind on the starboard bow. The anchorage area will be designated by the pilot.

Inside the bar, there is a good, though confined, anchorage, in a depth of 8m, close W of the wharf on the NW side of El Bluff.

5.44 From El Bluff, the low and swampy coast extends 21 miles N to Punta Mosquito, the N entrance point of Laguna de Perlas. This lagoon is 1 to 6 miles wide and navigable only by boats.

Between El Bluff and Punta Perlas, 6 miles E of Punta Mosquito, most of the coastal dangers are contained within the 10m, curve which lies between 1 mile and 4.5 miles offshore. Punta Perlas, bordered by a white sandy beach, is a prominent projection when seen from the S.

Cayman Roca (12°05'N., 83°39'W.), a small rock, 8m high and marked by a red conical tower, lies 6 miles NNE of El Bluff. False Bluff, a green mound, 18m high, stands on a small point of red bluffs about 12 miles N of El Bluff.

Cerro Cucra (12°15'N., 83°46'W.), isolated and 192m high, rises 16 miles NNW of El Bluff and is a good landmark for the approach to Bluefields.

The **Rio Grande** (12°54'N., 83°32'W.) is navigable by barges up to 106 miles upstream. A depth of 1.5m exists on the bar at the entrance to the river. Rio Grande village is situated on the N bank of the river close within the entrance. A fruit station and a wharf lie on the S bank. Two radio towers standing on the S side of the entrance are conspicuous, and Sandy Bay village, situated 3.5 miles N, is a fairly good landmark.

The **Rio Prinzipolca** (13°25'N., 83°34'W.), with a small village on its S bank, lies 31 miles N of the Rio Grande. Shoal water, with depths of less than 1.8m, extends 1 mile E from the river mouth.

5.45 Puerto Isabel (13°22'N., 83°34'W.) (World Port Index No. 09765), an open roadstead and a privately-owned port, is situated 3 miles S of the Rio Prinzipolca.

Tides—Currents.—From March to April, the current sets in a N direction at a velocity of 1 to 2 knots; from May to February it sets in a S direction at the same velocity.

Depths—Limitations.—A pier, extending 0.5 mile E from the shore abreast of the town, has a berth, 76m long, situated at its outer end, with depths of 4.6 to 5.2m alongside. Vessels berth port side-to on the S side of the pier, with their bows heading E, using the anchor and running a wire rope to a mooring dolphin off the head of the pier. Only vessels up to

4.6m draft can berth due to the heavy E swell. The N side of the pier is shoal.

Aspect.—Landmarks consist of the houses in the town, three oil tanks, and a conspicuous ore loader standing on the pier. Lighted range beacons, in line bearing 276°, are situated on the pier.

Pilotage.—No pilots are available and berthing is limited to daylight hours.

Anchorage.—Anchorage can be taken about 0.3 mile E of the pier head, in depths of 5.5 to 7.3m, hard sand, good holding ground.

5.46 The Rio Walpasixa (Rio Hualpasixa) (13°29'N., 83°33'W.), with a village situated at its entrance, lies 4 miles N of the Rio Prinzapolca.

The sea breaks heavily on a bar at the river mouth. The village of Wounta stands on the S side of the entrance of a small lagoon located 4 miles N of the Rio Walpasixa. Foul ground extends about 3 miles E from a position just N of the lagoon entrance. Two shoals lie about 6 miles and 11 miles NNE of Wounta.

Several prominent mounds, each 24m high, stand near the coast 14 miles N of Wounta. From a position lying 11 miles N of the Rio Grande to a position E of these mounds, numerous dangers are contained within the 20m curve, but from there to Puerto Cabezas, it is comparatively free of charted dangers within the 10m curve, which lies 2 to 4 miles offshore.

The **Rio Wawa** (Rio Huahua) (13°53'N., 83°27'W.) discharges 21 miles N of Wounta. After heavy rains, muddy river water discolors the sea for some distance offshore. From the Rio Wawa, the coast extends 10 miles N to Bragman Bluff, a bold headland, 30m high, with red cliffs extending 0.5 mile along its E edge.

5.47 Puerto Cabezas (14°01'N., 83°23'W.) (World Port Index No. 9760) consists of an open roadstead fronted by a pier extending SE from Bragmans Bluff. The principal exports are bananas and lumber.

Tides—Currents.—The current in the vicinity of the pier sets S or SSW at a velocity of 1.3 knots. Current signals are displayed at the head of the pier to facilitate berthing.

Depths—Limitations.—In the vicinity of the port, depths of 5.5m lie up to about 0.5 mile offshore and depths of 9m lie 1 to 2 miles offshore. Isolated depths of 8 to 9m are found outside the 10m curve, about 1.8 miles SE and 2 to 3 miles E of the bluff. A number of wrecks lie 0.3 to 0.7 mile E and ESE of the head of the jetty. They can best be seen on the chart.

Government Wharf extends 0.5 mile SE from the S extremity of Bragman Bluff. It is a wooden pier, 683m long and 8.4m wide, with a depth of 6.7m alongside the seaward end. Vessels up to 91m in length and 4.3m draft can be handled.

A sandbar, with a depth of 5.2m, was reported (1985) to lie close SW of the wharf.

Aspect.—Several water towers, the radio towers on the E side of the town, and several chimneys in its SE part are prominent landmarks.

At night, the glare of the lights in the town may be seen long before the navigational lights can be identified. The beach is reported to form a poor radar target, although the railroad cars

on the siding are reported to be radar conspicuous. The pier is also reported to be radar conspicuous.

Pilotage.—Pilotage is compulsory. Pilots will berth vessels only during daylight hours. An ETA should be sent 24 hours in advance. The pilot boards 1 mile off the port.

Anchorage.—Anchorage can be taken off the end of the pier, in depths of 6 to 9m, mud, good holding ground. Good anchorage can also be taken, in a depth of 8m, with the pier head bearing 319°, distant 0.4 mile. Care should be taken to avoid an obstruction lying 0.5 mile ESE of the pier head. There is practically no shelter from the wind and sea.

The coast between Puerto Cabezas and Punta Gorda, 23 miles NE, is low and wooded, with few distinguishing marks other than the mouth of the Rio Hueson, lying 8.8 miles NE of Puerto Cabezas. A prominent steeple stands 2.8 miles SW of the mouth of the Rio Hueson.

Most of the dangers that lie adjacent to this section of coast are contained within the 10m curve, which lies between 1 mile and 2 miles offshore. Some shoal patches, with depths of 7.3 to 10m, lie outside that curve, but within 2 miles of the shore. A narrow shoal, with a least depth of 7.3m, extends 1.3 miles S from a position located 2 miles SE of Punta Gorda.

The W edge of the reefs and other dangers, which are a part of the Cayos Miskitos, lies 7.5 miles E of Punta Gorda and extends SE to a position located 29 miles E of the mouth of the Rio Hueson.

Punta Gorda to Cabo Gracias a Dios

5.48 Punta Gorda (14°21'N., 83°12'W.) is a low, wooded point with almost no identifying features. About 5 miles NNW of the point, there is a conspicuous ridge, 7m high, which parallels the shore 1 mile inland for a distance of 2 miles. The 10m curve lies less than 1 mile offshore; there are depths of 14.6 to 20.1m in Miskito Channel between Punta Gorda and the W of the Cayos Miskitos, 7.5 miles E.

Between Punta Gorda and Cabo Gracias a Dios, 39 miles N, the low coast is indented 7 miles W by a gradual bight. Several streams and rivers discharge along this coast and there are a few settlements.

From a position located 72 miles E of Punta Gorda, the 200m curve extends NE to a position lying 92 miles E of Cabo Gracias a Dios. Inside this curve, the water of this part of Miskito Bank shoals rapidly to depths of less than 37m, and there are numerous patches and banks between it and the E edge of Cayos Miskitos, 40 to 50 miles offshore. The largest of these banks extends 12 miles N from a position lying 63 miles NE of Punta Gorda and is 6 miles wide. Between the cays and the mainland, most of the dangers are contained within the 10m curve, which follows the coastal trend between 0.5 mile and 4 miles offshore.

In the deep water off the edge of the 200m curve, the bottom is formed of fine sand, sometimes with a few broken shells, and on the E part of the Miskito Bank coral sand is prevalent with some coarser areas of small, flat, white stones. The bottom is generally rocky within small patches lying in depths of less than 18m.

The NE part of the bank consists of fine sand with small black specks and minute shells, which merges into blue mud as

the cays are approached. In places, this bottom sediment becomes pale and so soft as to be washed off the sounding lead; near the cays it may be light gray in color. The beaches are formed of finely broken shells.

The numerous cays are small, with little or no vegetation, having been stripped by heavy seas and gales; however, some of the larger ones are wooded. Many of the cays and reefs are steep-to on the windward side, and there are numerous deep cuts which may provide sheltered anchorage.

Cayos Miskitos and Surrounding Cays and Reefs

5.49 The Cayos Miskitos group, consisting of Cayos Miskitos and the surrounding cays and reefs, lies within a circle, with a radius of 19 miles, centered on the largest cay, 26 miles E of Punta Gorda. Approach to this area is dangerous from any direction because of the many detached reefs and shoals and the lack of any navigational aids.

Cayos Miskitos (14°23'N., 82°46'W.), the largest cays of the group, consists of one main island, 2.5 miles in diameter, with several smaller islands and islets lying adjacent to it and several others separated from it by a shallow lagoon. Cayos Miskitos, extending 5.5 miles NE, lies near the middle of the Cayos Miskitos group and in the center of the S half of a reef which extends 19 miles NNE from a position located 21 miles E of Punta Gorda. Porgee Channel (14°26'N., 82°41'W.), narrow and intricate, bisects the reef from E to W, about 0.5 mile NE of the NE island. To the N of the cays, the channel widens into a bay with depths of 12 to 18m.

Blue Channel (14°25'N., 82°50'W.), about 1.5 to 3 miles wide, has depths of 9 to 25m and runs parallel to the W side of Miskito Reef (14°28'N., 82°42'W.) and between it and the Morrison Dennis Cays, the Ualpatara Reefs (14°27'N., 82°58'W.), and others which extend 12 miles N.

5.50 Hamkera (14°34'N., 82°58'W.), a small group of islets and reefs, lies 15 miles NNW of Cayos Miskitos on the NW limits of the reef and the Cayos Miskitos group. From Outer Mohegan, the largest of the Hamkera group, numerous detached reefs extend about 3.5 miles N to several rocks awash.

Auiapuni Reef (14°31'N., 83°05'W.), a group of shoal patches 1.5 miles in extent, lies 7.5 miles SW of Outer Mohegan and at the W extremity of the Cayos Miskitos group. Depths over this reef are 4.8 to 8.5m.

Tsiankualiaia Rock (14°20'N., 83°04'W.), with a depth of 2.7m, lies on the SW side of the Cayos Miskitos group, 7.8 miles E of Punta Gorda. Several rocks, with depths of less than 1.8m, lie within 0.5 mile S and SE of this rock. Waham Cay, 0.9m high, lies 3.5 miles NNE of the rock. Toro Cay and Kisura Cay, two similar islets, lie 2 miles NNW and 2 miles N, respectively, of Waham Cay.

Alice-Agnes Rocks, several rocks awash, with detached 7.3 and 8.2m patches within 1 mile of them, lie on the SW limits of the Cayos Miskitos group, 13 miles WSW of Cayos Miskitos and about the same distance SE of Punta Gorda.

5.51 Ned Thomas Cay (14°10'N., 82°48'W.) and The Witties lie in the center of a group of reefs about 8 miles in

extent, 11.5 miles S of Cayos Miskitos. Sea Devil Reef, a 5.9m shoal patch, and Franklin Reef, a 4.6m shoal patch, lie on the S limits of the Cayos Miskitos group, 3.5 miles SW and 4 miles SSE of The Witties.

Southeast Rock (14°10'N., 82°29'W.), with a least depth of 2.7m, lies on a 10m bank 1 mile in extent, 19.5 miles E of Cayos Miskitos, at the SE extremity of the group. A 9.1m shoal patch lies 3 miles SE of the rock, and there are depths of 10m near the 20m curve, about 5.5 miles farther SE. A 4m shoal patch was reported (1975) to lie about 12 miles SE of the rock.

From Southeast Rock, the E edge of the Cayos Miskitos group extends 32 miles N to the NE extremity of the group, where a 6.7m shoal patch is located.

Hannibal Shoals (14°26'N., 82°31'W.), with a least depth of 7.6m, lie on the E edge of the Cayos Miskitos group, 13.3 miles E of Cayos Miskitos.

Within the described limits of the Cayos Miskitos group many other reefs and shoals exist, and although there are depths of 11 to 25m in the vicinity of these dangers, navigation throughout this area is difficult and dangerous.

5.52 Edinburgh Reef (14°50'N., 82°39'W.), 4 miles long and awash, lies about 8.3 miles N of the N limits of the Cayos Miskitos group. Edinburgh Cay lies detached about 1.5 miles WNW of the SW end of Edinburgh Reef. Edinburgh Channel, lying between Edinburgh Reef and the reefs to the S, is a clear passage with depths of 14 to 27m.

Cock Rocks, a group of several drying rocks 0.5 mile in extent, lies 4.5 miles N of Edinburgh Reef. A 7.3m shoal patch and a 12.2m shoal patch lie 2.5 miles E and 4 miles SE, respectively, of these rocks.

Between Punta Gorda and Cabo Gracias a Dios, the normal set of the current over Miskito Bank is NW, at a velocity of 0.3 to 0.8 knot. In the vicinity of Cayos Miskitos, the set is more to the N, and between Kisura Cay and Ualpatara Reefs it sets N at a velocity of 1 knot. Inside the 20m curve and close to the coast, a countercurrent setting S may be experienced.

The currents near this coast are variable and at times may be completely reversed.

From Punta Gorda, the low coast extends 26 miles NNW to Laguna Huani, fronted by a shallow entrance 2 miles wide and partly obstructed by islands; the coast then extends 15 miles NE to Cabo Gracias a Dios. With the exception of the ridge previously described, 5 miles N of Punta Gorda, and the mouths of several shallow rivers, the coast is low, with few distinguishing marks other than groups of trees, 9 to 21m high.

The Sandy River, a narrow river leading into a lagoon, discharges 7 miles N of Punta Gorda; another river, the Rio Teikapalaga, discharges 13 miles farther NNW.

Most of the dangers are contained within the 10m curve, which lies 0.5 to 1 mile off the coast between Punta Gorda and a position 15 miles NNW, where it extends N to the cape and lies up to 4 miles offshore.

5.53 Uatlatara Rocks (14°34'N., 83°12'W.), two dangerous pinnacles with a least depth of 5.8m, lie 3 miles offshore, about 12.5 miles N of Punta Gorda.

Between the Rio Teikapalaga and Cabo Gracias a Dios, there are numerous 9m shoal patches lying up to 1 mile outside the 10m curve. A bank, with a depth of 10.5m, lies 8.5 miles E of

the Laguna Huani entrance. It is 4 miles long and 2 miles wide. A 9.1m shoal patch lies about 4.3 miles SE of Cabo Gracias a Dios.

The **Rio Coco** (14°59'N., 83°10'W.), which discharges on the S side of Cabo Gracias a Dios, is obstructed by several cays at its mouth. The bar has a depth of 1.8m, but this is subject to change because of silting.

5.54 Cabo Gracias a Dios (15°00'N., 83°10'W.) (World Port Index No. 9750), a small town, stands on the S side of the

cape and is the seat of the governor. Timber and bananas are exported on vessels which call irregularly. Vessels desiring local assistance in sending a boat across the bar should proceed to a position E of the town and signal by whistle, light, or radio. They should then anchor close S of the bar to await the pilot.

Except for several radio masts standing in the town, the buildings cannot be seen by vessels approaching from the S due to heavy foliage.