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DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

E. LESTER JONES, SUPERINTENDENT

UNITED STATES COAST PILOT

PHILIPPINE ISLANDS

PART I

LUZON, MINDORO, AND VISAYAS

FIRST EDITION

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INTRODUCTORY.

DEPARTMENT OF COMMERCE,
UNITED STATES COAST AND GEODETIC SURVEY,
Washington, D. C., June 14, 1919.

This publication covers the coasts of Luzon, Mindoro, and the Visayan Islands with the adjacent islands and waters. It is based mainly upon the work of the United States Coast and Geodetic Survey. The waters north and northeast of Luzon have not yet been surveyed, and the notes relating to those waters have been compiled from a variety of sources, principally from the Spanish Derrotero and from reconnaissances by United States and Philippine Islands Government vessels.

This volume covers the area formerly included in Sections I to IV, Philippine Islands Sailing Directions, compiled by John Dow, nautical expert in the Manila suboffice of the United States Coast and Geodetic Survey, and it consists of a rearrangement and revision of the fourth edition of that publication, together with a large amount of new information gathered by the various field officers of the Survey. The present (first) edition has been prepared in the office of the United States Coast and Geodetic Survey at Manila by R. J. Christman, Acting Chief of Chart Division, under the supervision of Fremont Morse, Director of Coast Surveys. The aids to navigation are corrected to July 1, 1918. Navigators are requested to notify the Director of Coast Surveys, Manila, P. I., of any errors or omissions they may find in this publication or of additional matter which they think should be inserted for the information of mariners.

E. LESTER JONES,
Superintendent.

NOTE.

The true courses and bearings are given in degrees, reading clockwise from 0° at north to 360°, and are followed by the equivalent *magnetic* value from 0° at magnetic north to 360°, in parentheses.

Bearings relating to the visibility of lights are given from seaward.

Heights for lights are given in feet above high water; for other features, above mean sea level.

Distances are in *nautical miles*, unless otherwise stated, and may be converted approximately to statute miles by adding 15 per cent to the distances given.

Depths are referred to the mean of lower low waters.

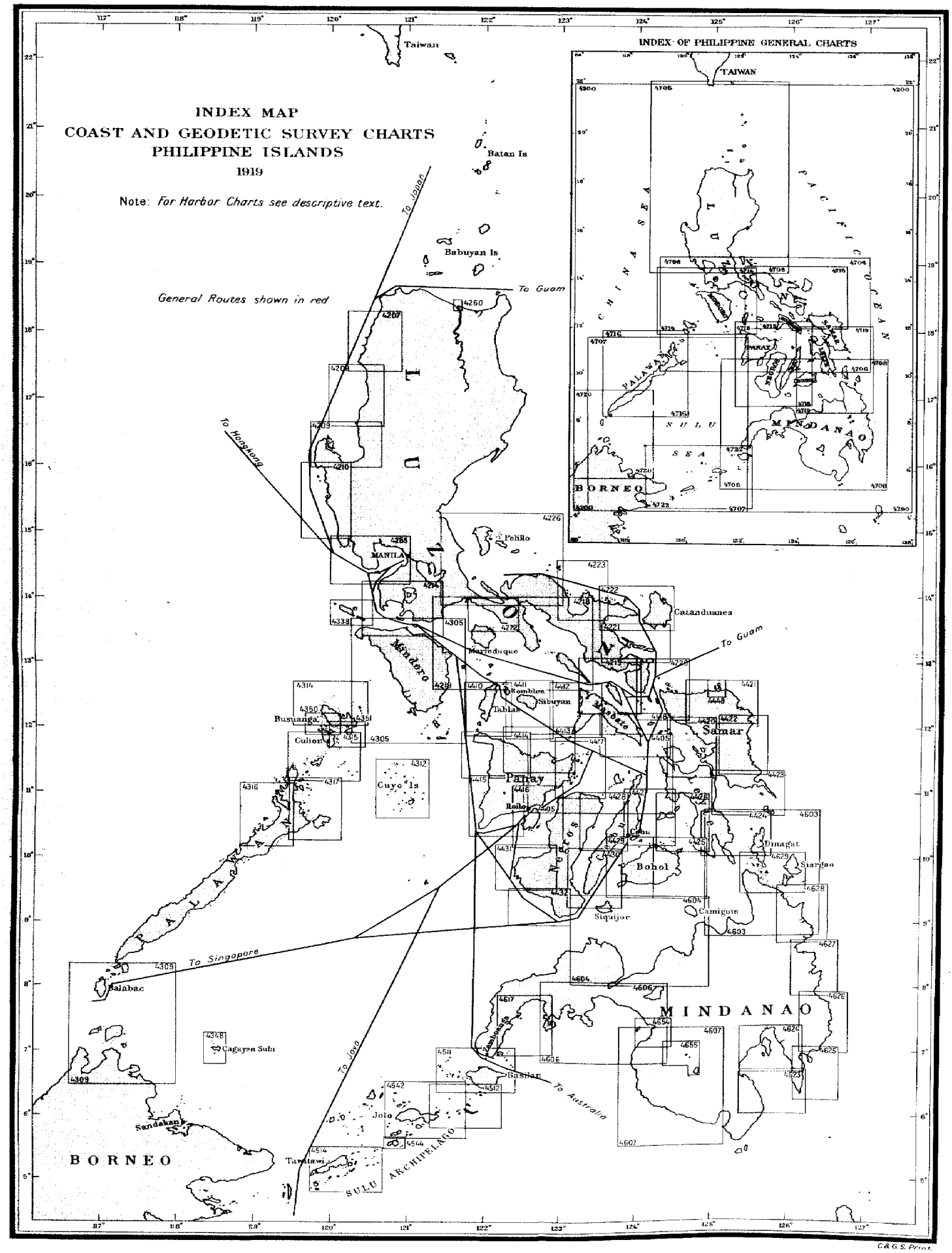
Currents are expressed in knots, which are nautical miles per hour, and are referred to by the direction toward which they set.

Winds are referred to by the direction from which they blow.

All charts referred to are published by the United States Coast and Geodetic Survey.

The aids to navigation described in this volume are corrected to July 1, 1918.

Notices to Mariners affecting the Charts and Sailing Directions of the Philippine Islands are published quarterly, and may be obtained free of charge on application to the Director of Coast Surveys, Manila, P. I.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PHILIPPINE COAST PILOT.

PART I—LUZON, MINDORO, AND THE VISAYAS.

NAVIGATIONAL AIDS AND THE USE OF CHARTS.

The Coast and Geodetic Survey is charged with the survey of the coasts, harbors, and tidal estuaries of the United States and its insular possessions, and issues the following publications relating to these waters as guides to navigation: Charts, Coast Pilots, Tide Tables, a catalogue of these publications, and Notices to Mariners, the last named published weekly by the Bureau of Lighthouses and the Coast and Geodetic Survey.

CHARTS bear three dates which should be understood by persons using them: (1) the date (month and year) of the edition, printed on the late charts below the border in a central position, and on the older ones on the face of the chart; (2) the date of the latest correction to the chart plate, printed in the lower left-hand corner below the border; (3) the date of issue, stamped below the border and just to the left of the subtitle.

Charts show all necessary corrections as to lights, beacons, buoys, and dangers, which have been received to the date of issue, being hand corrected since the latest date printed in the lower left-hand corner. All small but important corrctions occurring subsequent to the date of issue of the chart are published in Notices to Mariners, and should be applied by hand to the chart immediately after the receipt of the notices.

The date of the edition of the chart remains unchanged until an extensive correction is made on the plate from which the chart is printed. The date is then changed and the issue is known as a new edition.

When a correction not of sufficient importance to require a new edition is made to a chart plate, the year, month, and day are noted in the lower left-hand corner.

All the notes on a chart should be read carefully, as in some cases they relate to the aids to navigation or to dangers that can not be clearly charted.

The charts are various in character, according to the objects to which they are designed to subserve. The most important distinctions are the following:

1. Sailing charts, mostly on a scale of approximately $\frac{1}{1200000}$, which exhibit the approaches to a large extent of coast, give the offshore soundings and enable the navigator to identify his position as he approaches from the open sea.

2. General charts of the coast, on scales of $\frac{1}{400000}$ and $\frac{1}{200000}$, intended especially for coastwise navigation.

3. Coast charts, on a scale of $\frac{1}{80000}$, by means of which the navigator is enabled to avail himself of the channels for entering the larger bays and harbors.

4. Harbor charts, on larger scales, intended to meet the needs of local navigation.

Note.—General charts of the Philippine Islands are on scales $\frac{1}{1600000}$, $\frac{1}{800000}$, and $\frac{1}{400000}$; coast charts are on scales $\frac{1}{100000}$ and $\frac{1}{200000}$.

Coast Pilots, relating to surveyed waters of the United States, Porto Rico, and Alaska, and Sailing Directions of the Philippine Islands, contain full nautical descriptions of the coast, harbors, dangers, and directions for coasting and entering harbors. Similar information relating to Hawaii is published in Coast Pilot Notes.

Coast Pilots are corrected for important information received to the date of issue, which is stamped on the correction sheets accompanying the volume. From time to time, as the material accumulates, supplements are issued, containing the more important corrections since the publication of the volume. The supplements are printed on one side of the paper only, so that they may be cut and pasted in the appropriate places in the volume. Supplements and other corrections for any volume can be furnished, free of charge, on application to the Coast and Geodetic Survey, Washington, D. C., provided the volume itself has not been superseded by a subsequent edition.

Tide Tables.—The Coast and Geodetic Survey Tide Tables are issued annually in advance of the year for which they are made and contain the predicted time and height of the tides for each day in the year at the principal ports of the world, including the United States and its possessions. A table of tidal differences is given by means of which the tides at more than 3,000 intermediate ports may be obtained. Separate reprints from the general Tide Tables are issued for the Atlantic and Pacific coasts of the United States and its dependencies.

Agencies for the sale of the Charts, Coast Pilots, and Tide Tables of the Coast and Geodetic Survey are established in many ports of the United States and in some foreign ports. They can also be purchased in the office of the Coast and Geodetic Survey, Washington, D. C., or any of the suboffices. If ordered by mail, prepayment is obligatory. Remittances should be made by postal money order or express order, payable to the "Coast and Geodetic Survey." Postage stamps, checks, and drafts can not be accepted. The sending of money in an unregistered letter is unsafe. Only catalogue numbers of charts need be mentioned. The catalogue of charts and other publications of the Survey can be obtained free of charge on application at any of the sale agencies or to the Coast and Geodetic Survey Office, Washington, D. C.

Other Publications.—A List of Lights, Buoys, Beacons, and Daymarks of the Philippine Islands, and Notices to Mariners, showing changes and additions to the same, are published by the Bureau of Commerce and Industry, and may be obtained free of charge on application to the Director, Bureau of Commerce and Industry, Manila, P. I. Notice to Mariners, relating to Philippine waters, is published

quarterly by the Coast and Geodetic Survey, and may be obtained free of charge on application to the Director of Coast Surveys, Manila, P. I.

USE OF CHARTS.

ACCURACY OF CHART.—The value of a chart depends upon the character and accuracy of the survey on which it is based, and the larger the scale of the chart the more important do these become. In these respects the source from which the information has been compiled is a good guide.

This applies particularly to the charts of the Alaska Peninsula, Aleutian Islands, Arctic Ocean, and parts of Bering Sea and the Philippine Islands. The early Russian and Spanish surveys were not made with great accuracy, and until they are replaced by later surveys these charts must be used with caution.

With respect to these regions the fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed it may be taken for granted that the survey was not in great detail.

A wide berth should therefore be given to every rocky shore or patch, and this rule should invariably be followed, viz, that instead of considering a coast to be clear unless it is shown to be foul, the contrary should be assumed.

With respect to a well-surveyed coast only a fractional part of the soundings obtained are shown on the chart, a sufficient number being selected to clearly indicate the contour of the bottom. When the bottom is uneven the soundings will be found grouped closely together, and when the slopes are gradual fewer soundings are given. Each sounding represents an actual measure of depth and location at the time the survey was made.

Shores and shoals where sand and mud prevail, and especially bar harbors and the entrances of bays and rivers exposed to strong tidal currents and a heavy sea, are subject to continual change of a greater or less extent, and important ones may have taken place since the date of the last survey. In localities which are noted for frequent and radical changes, such as the entrance to a number of estuaries on the Atlantic, Gulf, and Pacific coasts, notes are printed on the charts calling attention to the fact.

It should also be remembered that in coral regions and where rocks abound it is always possible that a survey with lead and line, however detailed, may have failed to find every small obstruction. For these reasons when navigating such waters the customary sailing lines and channels should be followed and those areas avoided where the irregular and sudden changes in depth indicate conditions which are associated with pinnacle rocks or coral heads.

DREDGED CHANNELS.—These are generally shown on the chart by two broken lines to represent the side limits of the improvement. Before completion of the project the depth given is that shown by the latest survey received from the engineer in charge. After completion the depth given is the one proposed to be maintained by redredging when necessary.

The actual depth of a completed channel may be greater than the charted depth shortly after dredging, and less when shoaling occurs

as a result of storms or other causes. These changes are of too frequent occurrence and uncertain duration to chart. Therefore when a vessel's draft approximates the charted depth of a dredged channel, the latest information should be obtained before entering.

Danger Curves.—The curves of depth will be found useful in giving greater prominence to outlying dangers. It is a good plan to trace out with a colored pencil the curve next greater than the draft of the vessel using the chart and regard this as a "danger curve," which is not to be crossed without precaution.

Isolated soundings shoaler than surroundings depths should be avoided, as there is always the possibility that the shoalest spot may not have been found.

Caution in Using Small-Scale Charts.—It is obvious that dangers to navigation can not be shown with the same amount of detail on small scale as on those of larger scale; therefore, in approaching the land or dangerous banks regard should be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile.

For the same reason, bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

Distortion of Printed Charts.—The paper on which charts are printed has to be dampened. On drying, distortion takes place from the inequalities of the paper, which varies with the paper and the amount of the original dampening; but it is not sufficient to affect ordinary navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree, when carefully plotted upon the chart, especially if the lines to objects be long. The larger the chart the greater the amount of this distortion.

Buoys.—Too much reliance should not be placed on buoys always maintaining their exact position, especially when in exposed positions; it is safer, when possible, to navigate by bearings or angles to fixed objects on shore and by the use of soundings.

Gas buoys and other unwatched lights can not be implicitly relied on; the light may be altogether extinguished, or, if intermittent, the apparatus may get out of order.

Lights.—The distances given in the light lists and on the charts for the visibility of lights are computed for a height of 15 feet for the observer's eye. The table of distances of visibility due to height, published in the light list, affords a means of ascertaining the effect of a greater or less height of the eye. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking for a light the fact may be forgotten that from aloft the range of vision is increased. By noting a star immediately over the light a bearing may be afterwards obtained from the standard compass.

The actual power of a light should be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by its candlepower as given in the light lists and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus a light standing 200 feet above the sea and recorded as visible only 10 miles in clear weather is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of sufficient power.

Fog Signals.—Sound is conveyed in a very capricious way through the atmosphere. Apart from the wind, large areas of silence have been found in different directions and at different distances from the origin of the sound signal, even in clear weather. Therefore, too much confidence should not be felt as to hearing a fog signal. The apparatus, moreover, for sounding the signal may require some time before it is in readiness to act. A fog often creeps imperceptibly toward the land and is not observed by those at a lighthouse until it is upon them, whereas a vessel may have been in it for many hours while approaching the land. In such a case no signal may be sounded. When sound travels against the wind it may be thrown upward; in such a case a man aloft might hear it when it is inaudible on deck. The conditions for hearing a signal will vary at the same station within short intervals of time; mariners must not, therefore, judge their distance from a fog signal by the force of the sound and must not assume that a signal is not sounding because they do not hear it.

Taken together, these facts should induce the utmost caution when nearing the land or danger in fog. The lead is generally the only safe guide and should be faithfully used.

Submarine Bells have an effective range of audibility greater than signals sounded in air, and a vessel equipped with receiving apparatus can determine the approximate bearing of the signal. These signals can be heard also on vessels not equipped with receiving apparatus by observers below the water line, but a bearing of the signal can not then be readily determined.

Tides.—A knowledge of the tide, or vertical rise and fall of the water, is of great and direct importance whenever the depth at low water approximates to or is less than the draft of the vessel and wherever docks are constructed so as to be entered and left near the time of high water. But under all conditions such knowledge may be of indirect use, as it often enables the mariner to estimate in advance whether at a given time and place the current will be running flood or ebb. In using the tables slack water should not be confounded with high or low tide nor a flood or ebb current with flood or ebb tide. In some localities the rise or fall may be at a stand while the current is at its maximum velocity.

The Tide Tables published by the Coast and Geodetic Survey give the predicted times and heights of high and low waters for most of the principal ports of the world and tidal differences and constants for obtaining the tides at all important ports.

Plane of Reference for Soundings on Charts.—For the Atlantic coast of the United States and Porto Rico the plane of reference for soundings is the mean of all low waters; for the Pacific

coast of the United States and Alaska, with the exception noted below, and for the Hawaiian and Philippine Islands, it is the mean of the lower low waters. For Wrangell Strait, Alaska, it is 3 feet below mean lower low water.

For the Atlantic coast of the Canal Zone, Panama, the plane of reference for soundings is mean low water, and for the Pacific coast of the same it is low-water springs.

For foreign charts many different planes of reference are in use, but that most frequently adopted is low-water springs.

It should be remembered that whatever plane of reference is used for a chart there may be times when the tide falls below it. When the plane is mean low water or mean lower low water there will generally be as many low waters or lower low waters below those planes as above them. Also the wind may at times cause the water to fall below the plane of reference.

Tidal Currents.—In navigating coasts where the tidal range is considerable, special caution is necessary. It should be remembered that there are indrafts into all bays and bights, although the general set of the current is parallel to the shore.

The turn of the tidal current offshore is seldom coincident with the time of high and low water on the shore.

At the entrance to most harbors without important tributaries or branches the current turns at or soon after the times of high and low water within. The diurnal inequality in the velocity of current will be proportionately but half as great as in the height of the tides. Hence, though the heights of the tide may be such as to cause the surface of the water to vary but little in level for 10 or 12 hours, the ebb and flow will be much more regular in occurrence.

A swift current often occurs in narrow openings between two bodies of water, because the water at a given instant may be at different levels.

Along most shores not seriously affected by bays, tidal rivers, etc., the current usually turns soon after high and low waters.

Where there is a large tidal basin with a narrow entrance, the strength of the current in the entrance may occur near the time of high and low water, and slack water at about half tide, outside.

The swiftest current in straight portions of tidal rivers is usually in the mid-channel, but in curved portions the strongest current is toward the outer edge of the curve.

Counter currents and eddies may occur near the shore of straits, especially in bights and near points.

Tide Rips and Swirls occur in places where strong currents occur, caused by a change in the direction of the current, and especially over shoals or in places where the bottom is uneven. Such places should be avoided if exposed also to a heavy sea, especially with the wind opposing the current; when these conditions are at their worst the water is broken into heavy, choppy seas from all directions, which board the vessel, and also make it difficult to keep control owing to the baring of the propeller and rudder.

Current Arrows on charts show only the usual or mean direction of a tidal stream or current. It must not be assumed that the direction of the current will not vary from that indicated by the arrow. In the same manner the velocity of the current constantly varies with circumstances, and the rate given on the chart is a mean value, cor-

responding to an average range of tide. At some stations but few observations have been made.

FIXING POSITION.—The most accurate method available to the navigator of fixing a position relative to the shore is by plotting with a protractor, sextant angles between well-defined objects on the chart; this method, based on the "three-point problem" of geometry, should be in general use.

In many narrow waters, also where the objects may yet be at some distance, as in coral harbors or narrow passages among mud banks, navigation by sextant and protractor is invaluable, as a true position can in general be obtained only by its means. Positions by bearings are too rough to depend upon, and a small error in either taking or plotting a bearing might under such circumstances put the ship ashore.

For its successful employment it is necessary, first, that the objects be well chosen; and second, that the observer be skillful and rapid in his use of the sextant. The latter is only a matter of practice.

Near objects should be used either for bearings or angles for position in preference to distant ones, although the latter may be more prominent, as a small error in the bearing or angle or in laying it on the chart has a greater effect in misplacing the position the longer the line to be drawn. On the other hand, distant objects should be used for direction because less affected by a small error or change of position.

The three-arm protractor consists of a graduated circle with one fixed and two movable radial arms. The zero of the graduation is at the fixed arm, and by turning the movable arms each one can be set at any desired angle with reference to the fixed arm.

To plot a position, the two angles observed between the three selected objects are set on the instrument, which is then moved over the chart until the three beveled edges in case of a metal instrument, or the radial lines in the case of a transparent or celluloid instrument, pass respectively and simultaneously through the three objects. The center of the instrument will then mark the ship's position, which may be pricked on the chart or marked with a pencil point through the center hole.

The tracing-paper protractor, consisting of a graduated circle printed on tracing paper, can be used as a substitute for the brass or celluloid instrument. The paper protractor also permits the laying down for simultaneous trial of a number of angles in cases of fixing important positions. Plain tracing paper may also be used if there are any suitable means of laying off the angles.

The value of a determination depends greatly on the relative positions of the objects observed. If the position sought lies on the circle passing through the three objects, it will be indeterminate, as it will plot all around the circle. An approach to this condition, which is called a revolver, must be avoided. In case of doubt select from the chart three objects nearly in a straight line or with the middle object nearest the observer. Near objects are better than distant ones, and, in general, up to 90°, the larger the angles the better, remembering always that large as well as small angles may plot on or near the circle and hence be worthless. If the objects are well situated, even very small angles will give for navigating purposes a fair position, when that obtained by bearings of the same objects would be of little value.

Accuracy requires that the two angles be simultaneous. If under way and there is but one observer, the angle that changes less rapidly may be observed both before and after the other angle and the proper value obtained by interpolation.

A single angle and a range give, in general, an excellent fix, easily obtained and plotted.

THE COMPASS.—It is not intended that the use of the compass to fix the position should be given up; there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed. Where accuracy of position is desired, angles should invariably be used, such as the fixing of a rock or shoal or of additions to a chart, as fresh soundings or new buildings. In such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained prevent any errors.

When only two objects are visible, a sextant angle can be used to advantage with the compass bearings and a better fix obtained than by two bearings alone.

DOUBLING THE ANGLE ON THE BOW.—The method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "bow and beam bearing," the distance from the object at the latter position being the distance run between the times of taking the two bearings, gives the maximum of accuracy and is an excellent fix for a departure, but does not insure safety, as the object observed and any dangers off it are abeam before the position is obtained.

By taking the bearings at two points and four points on the bow, a fair position is obtained before the object is passed, the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current. Taking afterwards the beam bearing gives, with slight additional trouble, the distance of the object when abeam; such beam bearings and distances, with the times, should be continuously recorded as fresh departures, the importance of which will be appreciated in cases of being suddenly shut in by fog.

A graphic solution of the problem for any two bearings of the same object is frequently used. The two bearings are drawn on the chart, and the course is then drawn by means of the parallel rulers, so that the distance measured from the chart between the lines is equal to the distance made good by the vessel between the times of taking the bearings.

DANGER ANGLE.—The utility of the danger angle in passing outlying rocks or dangers should not be forgotten. In employing the horizontal danger angle, however, charts compiled from early Russian and Spanish sources, referred to in a preceding paragraph, should not be used.

SOUNDINGS.—In thick weather, when near or approaching the land or danger, soundings should be taken continuously and at regular intervals, and, with the character of the bottom, systematically recorded. By marking the soundings on tracing paper, according to the scale of the chart, along a line representing the track of the ship, and then moving the paper over the chart parallel with the course until the observed soundings agree with those of the chart, the ship's position will in general be quite well determined.

SUMNER'S METHOD.—Among astronomical methods of fixing a ship's position the great utility of Sumner's method should be well understood, and this method should be in constant use. The Sumner line—that is, the line drawn through the two positions obtained by working the chronometer observation for longitude with two assumed latitudes, or by drawing through the position obtained with one latitude a line at right angles to the bearing of the body as obtained from the azimuth tables—gives at times invaluable information, as the ship must be somewhere on that line, provided the chronometer is correct. If directed toward the coast, it marks the bearing of a definite point; if parallel with the coast, the distance of the latter is shown. Thus the direction of the line may often be usefully taken as a course. A sounding at the same time with the observation may often give an approximate position on the line. A very accurate position can be obtained by observing two or more stars at morning or evening twilight, at which time the horizon is well defined. The Sumner lines thus obtained will, if the bearings of the stars differ three points or more, give an excellent result. A star or planet at twilight and the sun afterwards or before may be combined; also two observations of the sun with sufficient interval to admit of a considerable change of bearing. In these cases one of the lines must be moved for the run of the ship. The moon is often visible during the day, and in combination with the sun gives an excellent fix.

CHANGE OF VARIATION OF THE COMPASS.—The gradual change in the variation must not be forgotten in laying down positions by bearings on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are reengraved for every new edition if the error is appreciable. Means for determining the amount of this error are provided by printing the date of constructing the compass and the annual change in variation near its edge.

The change in the magnetic variation in passing along some parts of the coast of the United States is so rapid as to materially affect the course of a vessel unless given constant attention. This is particularly the case in New England and parts of Alaska, where the lines of equal magnetic variation are close together and show rapid changes in magnetic variation from place to place, as indicated by the large differences in variation given on neighboring compass roses.

LOCAL MAGNETIC DISTURBANCE.—The term "local magnetic disturbance" or "local attraction" has reference only to the effects on the compass of magnetic masses external to the ship. Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places.

Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local center of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow and the force strong the compass may be temporarily deflected when passing

over such a spot, but the area of disturbance will be small, unless there are many centers near together.

The law which has hitherto been found to hold good as regards local magnetic disturbances is, that north of the magnetic equator the north end of the compass needle is attracted toward any center of disturbance; south of the magnetic equator it is repelled.

It is very desirable that whenever an area of local magnetic disturbance is noted the position should be fixed and the facts reported as far as they can be ascertained.

USE OF OIL FOR MODIFYING THE EFFECT OF BREAKING WAVES.—Many experiences of late years have shown that the utility of oil for this purpose is undoubted and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil skillfully applied may prevent much damage both to ships (especially of the smaller classes) and to boats by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:

1. On free waves—i. e., waves in deep water—the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances, but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, either when running or lying-to, or in wearing.

6. No experiences are related of its use when hoisting a boat at sea or in a seaway, but it is highly probable that much time would be saved and injury to the boat avoided by its use on such occasions.

7. In cold water the oil, being thickened by the lower temperature and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. For a ship at sea the best method of application appears to be to hang over the side, in such a manner as to be in the water, small canvas bags, capable of holding from 1 to 2 gallons of oil, the bags being pricked with a sail needle to facilitate leakage of the oil. The oil is also frequently distributed from canvas bags or oakum inserted in the closet bowls.

The positions of these bags should vary with the circumstances. Running before the wind, they should be hung on either bow—e. g., from the cathead and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying-to, the weather bow, and another position farther aft, seem the best places from which to hang the bags, using sufficient line to permit them to draw to windward while the ship drifts.

9. Crossing a bar with a flood tide, to pour oil overboard and allow it to float in ahead of the boat, which would follow with a bag towing

astern, would appear to be the best plan. As before remarked, under these circumstances the effect can not be so much trusted.

On a bar, with the ebb tide running, it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil can be diffused well ahead of the boat and the bag readily hauled on board for refilling, if necessary.

USE OF SOUNDING TUBES.

Although of undoubted value as a navigational instrument, the sounding tube is subject to certain defects which, operating singly or in combinations, may give results so misleading as to seriously endanger the vessels whose safety is entirely dependent upon an accurate knowledge of the depths.

Efforts have been made from time to time by the Coast and Geodetic Survey to utilize tubes for surveying operations. The results obtained, however, have been so unsatisfactory that the general use of such tubes for surveying work has been discouraged.

In practical tests, carefully made by surveying parties, where up-and-down casts of the lead were taken with tubes attached to the lead, errors in the tube amounting at times to as much as 25 per cent of the actual depths have been noted. Errors of 10 to 12 per cent of the actual depth were quite common.

It is also worthy of note that in the great majority of cases the tubes gave depths greater than the true depths, which, in actual use in coastwise navigation, would usually have resulted in the conclusion that the ship was farther offshore than was really the case.

There are various types of tubes in common use which are too well known to require detailed description here. They are all based on the general principle that air is elastic and can be compressed, and that if a column of air in a tube be lowered into the water in such a way that the air can not escape, yet, at the same time, the pressure of the water can be transmitted to it, the amount by which the air is compressed furnished a measure of the depth to which it was lowered.

Theoretically this principle is sound, but when we come to apply the theory to actual practice certain elements enter which result in errors in the depth determination. It is important to note that the amount of these errors depends on the depth; the greater the depth the greater the numerical value of the error.

The causes which produce these errors are as follows:

1. In order to give correct results the bore of the tube must be exactly cylindrical; in other words, the volume of air in any one inch of length of the tube must be exactly the same as in an inch in any other part. But because of the way in which glass tubes are made it is very difficult to accomplish this. The bore may taper slightly or vary in other ways from a true cylinder. If tapering, the minimum diame-

ter of bore may be at the top, middle, or bottom of the tube as submerged. If the minimum diameter be at the top, the tube will register depths less than the actual depths of water, and if at the bottom the registered depth will be greater than the true depth.

This defect may be detected in a suspected tube by introducing a small quantity of mercury into the tube and comparing its length at different points along the bore. For satisfactory results the length of this column should not vary more than 5 per cent.

2. In order that even a perfect tube should give accurate results, the conditions of barometric pressure and air and water temperatures under which the sounding is being taken must be the same as those under which the scale for reading the depths was made.

In making the scale a barometric pressure of 29 inches is usually assumed as normal.

Then, if in actual use, the barometer registers above normal, the air in the tube is already partly compressed, and when lowered to any given depth the amount of compression due to water pressure is correspondingly diminished. With a barometer below normal the reverse is true, and it therefore follows that when the barometer reads above normal the tubes will register less than the true depths, whereas if the barometer reads below normal the registered depths will be greater than the true. The amount of error introduced from this cause is about 3 per cent of the depth for each inch of barometric pressure above or below normal.

The density of the air in the tube also depends directly upon its temperature. Therefore, the difference between the temperature of the air in the tube before and after submergence will affect the accuracy of the sounding. Where the temperature of the tube in the air is greater than that of the tube in the water, the depth recorded will be greater than the actual depth, and, conversely, when the temperature of the air is lower than that of the water the depth recorded will be less than the true depth. Also, the temperature of the water may vary at different depths, so that the actual amount of this error depends on the difference between the temperatures of the tube in the air and at the bottom.

The amount of error introduced from this cause is about 1 per cent of the depth for each 3 degrees Fahrenheit difference in temperature.

3. While the tubes are usually 24 inches long, and the scales are designed for that length of tube, the manner of closing the upper end of the tube may introduce an error. The thickness of the caps used for this purpose varies considerably in different makes of tubes, even when such caps are made of the same material. This variation in thickness results in moving the tube slightly up or down in the scale. Thus, with a thin cap the sounding read from the scale will be too deep; with a thick cap, the sounding read will be less than the true depth.

Copper caps put on with sealing wax have been found to vary sufficiently to produce errors of about 5 per cent of the depth in depths of 50 to 70 fathoms. Rubber caps seem to be more nearly uniform and to give better results when new. Rubber, however, deteriorates, and when used too long there is apt to be leakage of air.

When removable caps are used care should be taken to see that they are pushed home thoroughly before sounding.

4. The integrity of the air in the tube should be carefully preserved. Even a slight leakage of air will result in showing a sounding considerably in excess of the true depth.

Vessels sometimes approach dangers coming from depths of over 100 fathoms. As they approach, they begin feeling for the bottom, sounding at infrequent intervals to pick up depths of 75 to 100 fathoms. So long as they get no bottom in such depths navigators feel secure. But a leaky tube may show no bottom at 100 fathoms when the ship is actually in much less depths, possibly resulting in disaster before the error is discovered.

Special precautions should, therefore, be taken on this point. Copper caps should be sealed in place with sealing wax, and rubber caps should be supplied with wire clamps, giving a tight fit.

5. Accumulated salt on the inner surface of the tube will cause the watermark to creep up and register greater than true depths.

The type of tube exemplified by the well-known Bassnett sounder is based on the same principle as the ordinary glass tube, but is more complicated in design. It consists essentially of a metal case containing a glass tube closed at the upper end. Inside the glass tube is a metal tube, through which the water enters and is trapped by a valve at the top of the metal tube.

In this device the scale is graduated directly on the glass tube, thus eliminating those errors due to thickness of cap; but, on the other hand, the possibility of errors increases directly with the number of working parts of which the sounder is made.

In using sounders of this type care should be exercised to preserve perfectly gasketed joints between the bottom of the glass tube and the metal case and to keep the outlet valve well oiled and water-tight.

Leaking valves and water remaining in the tube before a sounding is taken will give increased depths, while deficient depths may be recorded as a result of loss of water through suction at the inlet as the tube is being reeled in.

The Bassnett type, in common with all other forms of pressure tube, is subject to the above-described errors due to variations in temperature and barometric pressure.

It will be noted that wherever the amount of the various errors can be stated they are all small. Their importance lies in the fact that two or more of them, acting together, may result in considerable errors. As already stated, actual experiments show that errors of 10 to 12 per cent are not uncommon and that considerably greater errors may occur.

There are certain precautions which can be taken to eliminate or reduce these errors:

1. In purchasing tubes a type should be selected which can be used until broken or lost. The navigator can then make a study of the results obtained from each individual tube and thus gain a fair idea of its accuracy under known conditions. This necessitates some permanent means of identifying the various tubes used, which may readily be accomplished in the case of the glass tubes by means of various colored paints or threads.

2. Before undertaking the sounding necessary to make any particular landfall, the vessel should be stopped for an up-and-down cast of the lead in order to test the accuracy under the prevailing conditions of the tubes which are to be used. For this purpose it is not

necessary to get bottom; simply run out 60 to 80 fathoms of wire and then see how closely the tubes register that amount. A number of tubes can be sent down at one time, and it is then possible to select one or two which register most nearly correct.

It is well to keep a permanent record of the results of each tube tested. By so doing the navigator will soon obtain valuable information as to the performace of the various tubes and the degree to which they may be trusted. Such a record should, of course, take into account the various conditions affecting the result.

It will be noted that the factors which produce errors may be divided roughly into three groups:

(*a*) Inherent: Those which occur as a result of permanent defects in the tube, such as the variation of the bore from a true cylinder, variation in the thickness of the cap, etc.

(*b*) External: Those which occur as a result of the conditions under which the sounding was taken, variations of temperature or barometric pressure from the normal, etc.

(*c*) Accidental: Those which affect a single sounding, due to the failure of the tube to register properly, leakage of air, loss of water from leaky valves, errors due to the presence of salt in the tube, etc.

These accidental errors are probably the most serious of the three types, both because they are apt to be larger in amount and because it is impossible to foresee when they will occur. But, on the other hand, they occur only as a result of a few known causes, already enumerated, and therefore by the exercise of proper caution in the use of the tubes they may be to a large extent eliminated. If the ordinary glass tube is used, see that the bore is thoroughly dry and free from salt and that the cap makes a tight fit. If using a sounder, see that the tube is free from water and that the valves are tight and well oiled.

And, above all, during the course of the sounding take an occasional up-and-down cast as a check, for by that means alone can one be sure that the proper results are being obtained.

The smallest possible number of tubes should be used. It is obviously much better to use, over and over again, one tube which is giving good results than to use a number whose errors are uncertain. This is particularly desirable where sounders involving valves are used.

If a tube shows no bottom at 100 fathoms, examine the arming to make sure that the lead actually failed to find bottom.

Finally, beware of overconfidence. Tubes which have been working properly for a number of soundings suddenly develop errors. It is chiefly for this reason that they have been discarded for surveying operations.

Assuming that the accidental errors can be reasonably controlled, the inherent and external errors present no serious difficulty.

As already indicated, the bore of a tube (or at least of any tube which is capable of constant use) can be tested with mercury, and those tubes rejected which show variations in bore greater than about 5 per cent.

Errors due to variations in the thickness of caps can be eliminated by using a scale graduated for a true length of 24 inches (the length of the glass tube) and removing the cap before the sounding is read.

Errors due to differences between air and water temperatures can be reduced to a minimum which can usually be neglected by immersing the tube before using, in a bucket of sea water, newly drawn, so that its temperature has not had time to change. Care should, of course, be taken to see that no water enters the tube. When this is done, there may still remain an error due to the difference in temperature of the water at the surface and at the bottom. This may, if desired, be corrected by sending down a self-registering thermometer with the lead, but for the ordinary purposes of navigation this is a refinement which may be ignored.

There is no ready method available for correcting the error due to variations in the barometric pressure. The correction should be applied to the sounding recorded.

It is interesting to note that sounding tubes which give good results can readily be made from plain glass or metal tubes aboard ship—gauge glasses, for instance. One end of the tube is closed with a cork and sealing wax. A narrow strip of chart paper of uniform width, on which a line has been ruled with an indelible pencil, is inserted the entire length of the tube. The paper is held in place by bending the projecting lower end upward along the outside of the tube and securing it with a rubber band. The height in which the water rises in the tube will be indicated by the blurring of the pencil line.

If the air column in the tube is 24 inches long, the sounding may be read from any scale graduated for tubes of that length. If of a different length, a special scale must be prepared; its graduations, compared to those of the 24-inch scale, will be proportional to the comparative lengths of the two tubes.

If certain precautions are taken, these tubes will give results which compare favorably with commercial tubes. The paper should be inserted uniformly in the tube, and its upper end, or a mark from which the measurement is taken, should coincide with the top of the air column. Metal tubes have the advantage of uniform bore, but if metal tubes are used the paper, in order to insure uniformity, should be fastened at the upper end when that end is being sealed and then stretched lightly at the bottom. The depth should always be read from the dry portion of the paper, as the wet portion is subject to considerable change in length.

PHILIPPINE ISLANDS.

GENERAL INFORMATION.

This rich and beautiful group of islands, situated in the northern part of the East Indian Archipelago, was discovered by the Portuguese navigator Fernando de Magalhaens (or Magellan) in 1521. Magalhaens, who was in command of a Spanish expedition and was the first to pass through the strait still bearing his name, approached the Philippines from the eastward and entered the archipelago through the Strait of Surigao. He was killed in a skirmish with the natives on Mactan Island, east of Cebu, in 1521. The Philippines were formally annexed to Spain in 1565. The early history of the islands is a record of continual trouble. After the war between the United States and Spain they were ceded by Spain to the United States of America by the treaty of peace signed at Paris, December 10, 1898, and as a voluntary consideration the United States paid to Spain $20,000,000. According to this treaty the Philippine Archipelago comprehends all of the islands within the following limits: A line drawn from west to east, along or near the parallel of 20° N latitude, through the middle of the navigable channel of Bashi (21° 25′ N latitude, approximately) from the meridian 118° to that of 127° E longitude, thence southward along the latter meridian to the parallel of 4° 45″ N latitude, thence westward along that parallel to the meridian of 119° 35′ E longitude, thence northward along that meridian to the parallel of 7° 40′ N latitude, thence westward along that parallel to the meridian of 116° E longitude, thence by a direct line to the intersection of the parallel of 10° N latitude with the meridian of 118° E longitude, thence northward along that meridian to the point of beginning.

Spain also relinquished on November 7, 1900, to the United States, all title and claim to the islands of Cagayan Sulu and Sibutu and their dependencies, and all others belonging to the Philippine Archipelago and lying outside of the limits described by the treaty of Paris, the United States paying the sum of $100,000.

The archipelago comprises over 3,000 islands, with a combined area of about 114,400 square statute miles. Luzon in the north and Mindanao in the south are the two largest islands of the group. Besides these two there are only 29 islands with areas greater than 100 square statute miles, the most important of which are Samar, Negros, Panay, Palawan, Mindoro, Leyte, Cebu, Bohol, and Masbate. The islands are generally mountainous and heavily wooded, and contain many volcanoes. Mount Apo, in Mindanao, 9,609 feet high, and Mount Pulog, in Luzon, 9,593 feet high, are probably the highest points in the archipelago.

Earthquakes of severe character have been experienced in the Philippine Islands. The most disastrous of recent times was that of 1863, when 400 persons were killed and 2,000 wounded in Manila, and 46

public buildings and 1,100 private houses were seriously injured or destroyed. Other serious earthquakes have occurred in 1610, 1645, 1658, 1675, 1699, 1852, 1880, and 1911, when on January 30 there was an explosion of gas in the crater of Taal volcano, devastating the country surrounding Lake Taal. Active volcanoes exist in the Babuyan Islands, Luzon, Negros, Mindanao, and Camiguin.

Climate.—The climate of the Philippines differs but little from that of other islands in the same latitude. The range of the thermometer at sea level varies from about 60° to about 100° F. The year may be divided into three seasons: The first, cool and dry, commences in November; the second, hot but still dry, commences in March, the greatest heat being experienced from April to the end of May; and the third, which is exceedingly wet, continues from June to November. This division of seasons does not apply to coasts exposed to the northeast monsoon, where the wet and dry seasons are to some extent reversed. In the southern portion of the archipelago the wet season is also much less distinct. During the rainy seasons inundations are frequent, and traveling in the interior is difficult. The greater part of the group comes within the range of typhoons, and terrific storms occur. The local thunderstorms that come in the months of May and June, the period of greatest heat, are also at times very severe. The endemic complaints of the country are malarial and other fevers, diarrhea, beriberi, and a few others. The islands have also been visited by epidemics of cholera, bubonic plague, and smallpox. The mortality is, as a rule, low, considering the number of inhabitants and their mode of life.

Prevailing winds.—The two regular monsoons that are met with in the China Sea prevail to a certain extent over the Philippine Islands, the Sulu Sea, and the northern part of the Celebes Sea, but they blow with diminishing force as lower latitudes are reached.

The northeast monsoon, which is the more uniform and steady of the two, prevails for six months, from November to April. On the west coast of Luzon northerly winds predominate during November, December, and January, and easterly winds during February, March, and April. In April southeasterly winds are nearly as prevalent as easterly. The northeast monsoon is the season of dry and fine weather, except on the coast directly exposed to it. The high land of the Philippines naturally interrupts the regular course of the wind, and under the land calms are frequent, and often a light wind blows from westward, while in front of the open channels it blows hard, especially off Cape Calavite. In the Sulu Sea the east or northeast monsoon is not a steady, fresh breeze, but often variable.

The southwest monsoon is less uniform, being more interrupted by storms, most of which occur during this season. For the six months from May to October the prevailing wind is southwesterly, May being the month in which the winds veer from east to southwest, and October is the month of change from southwest to north.

Throughout the year calms or light winds occur more frequently at night or early morning, the average least force of wind being about 6 or 7 a. m.; the greatest force is usually during the hours of greatest heat, from 1 to 4 p. m. The average daily velocity of the wind is greatest in September, being nearly double that for December, the month of least wind.

Storms and gales.—During the rainy season local tempests or tornadoes, accompanied by thunder and lightning, are frequent. They occur from May to October, and occasionally in April and November, and usually in the afternoon or night. These rains, while sometimes fierce and in torrents, are usually of short duration.

The gales of the Philippines are known by the local names of colla and baguio. The latter, generally known as typhoons, are the most severe storms of this region, and will be described separately. Colla is the native name for a storm caused by an atmospheric depression to the north or northeast of Luzon, and accompanied by brisk or strong winds from south to southwest, continuing for several days, with violent squalls at intervals. Collas occur more frequently in June or July.

Similar depressions appear in the lower latitudes (4° to 12° N) during the months of December, January, February, and March, causing brisk northeasterly winds, accompanied by rain in Mindanao and the central islands, sometimes extending to southern Luzon.

Typhoons.—These storms which are similar to the cyclones of the Indian Ocean and the hurricanes of the West Indies, generally have their origin eastward or southeastward of the Philippines, whence their course is westward or northwestward, the average direction appearing to be about west by north. Some of the storms that cross the Philippines break up in the China Sea, while others reach the China coast or recurve northward and northeastward. Some do not cross the Philippines, either recurving before reaching the islands or having their origin in the China Sea.

About 20 of these storms are recorded annually, but few of these are destructive in the archipelago, and the destructive area of any one storm is usually quite limited. Very few typhoons occur during the months from January to April, inclusive, but February is the only month in which none have been recorded. They are most prevalent in the months from June to November, inclusive, and one-fifth of all the typhoons occur in September.

Typhoons are rarely encountered in latitudes below 9° N.

With respect to their relation to Manila, typhoons may be divided into five classes:

1. Typhoons which cross the archipelago north of Manila. If not distant, they are the most dangerous. They are more frequent from July to October, and never occur from December to May. The winds blow from north to northwest and from west to southwest. If the distance is less than 180 miles, the influence usually lasts in Manila not more than two days.

2. Typhoons which cross south of Manila. These are felt with much less intensity at Manila than the preceding, even when at the same distance. The winds blow from northeast to southeast. They are more common in November, October, May, and December.

3. Typhoons which recurve into the Pacific to the east of longitude 121° E without crossing the meridian of Manila. The effect of these is similar to a distant typhoon passing to the northward, except that the strong wind, and wind and rain squalls from the southwest, continue at times for five or six days. These are very frequent in September and quite frequent in August and July.

4. Typhoons formed in the China Sea, to the west of the Philippines. These are the least felt in Manila, as they generally move

northwesterly away from the archipelago. These are fairly frequent from June to October, inclusive.

5. Typhoons which recurve in the China Sea between the parallel of 10° and 20°, passing first to the south and afterwards to the north of Manila. The influence of these storms is usually prolonged for six or eight days, accompanied by continuous rains and brisk winds, which veer from north to northeast and east-southeast while the vortex crosses to the south. When, after several days, the typhoon recurves to the northeast this is accompanied by a rapid veering of the winds to the southwest and west. But a small number of such storms have been recorded, scattered in various months from March to December.

In a typhoon the air currents form a vast whirlwind revolving about a space of relative calm, called the vortex. In the northern hemisphere the rotation is always from right to left, or in direction opposite to that of the hands of a watch placed face up. The lower currents of air are more or less convergent toward the vortex, the middle currents are nearly circular, and the higher currents are divergent, so that the highest cirrus clouds may go out in a radial direction from the vortex. Because of the convergence of the lower currents, an observer facing the wind will have the vortex of the storm 8 to 12 points to his right, but within the archipelago or near the land this rule is liable to be disturbed by the topography of the country.

The rate of progress of typhoons varies from about 5 to 17 miles an hour, averaging 9 miles. The maximum hourly velocity of the wind observed at Manila has been 54 miles, but for short periods velocities of 80 miles per hour have been recorded. The diameter of the exterior revolving circle of the storm is estimated to vary from 40 to 130 miles and of the vortex or calm region from 11 to 16 miles. The duration of the true typhoon at any place is not longer than 10 hours, and generally is much less. These storms are always accompanied by abundant rain, with low, dense clouds, which at times limit the visible horizon to a few yards distance, and are generally accompanied by electrical discharge.

The barometer falls slowly for several days before the typhoon, then rapidly on its near approach, and reaches its lowest when the vortex is at a little distance. It then rises rapidly as the vortex passes away and slowly when it has passed to some distance off, and finally regains its normal height, while near the vortex there are usually marked oscillations. The typhoon generally begins with a northerly wind, light, drizzling rain, weather squally and threatening, a falling barometer, and the wind veering eastward when the observer is northward of the path of the storm and backing westward when he is southward of it; wind and rain increasing as the wind shifts. The storm generally ends with a southerly wind, after falling gradually.

The lowest barometer reading observed in the Philippines is 27.16 inches (689.9 mm.), obtained on the Survey steamer *Pathfinder* at San Policarpo, Samar, September 25, 1905.

Indications of approach of typhoons.—The earliest signs of a typhoon are high cirrus clouds, looking like fine hair, feathers, or small white tufts or wool, appearing while the weather is still fine and the barometer high. They may be best seen at sunrise or sunset. They are prolonged in the direction of some point on the horizon, toward

which they converge, which is the direction of the vortex of the storm. These warning cirrus clouds may be distinguished from others by the persistence with which they remain on the horizon and by their convergence.

In some cases one of the earliest signs is a long, heavy swell and a confused sea, which comes from the direction from which the storm is approaching and travels more rapidly than the storm's center. This precursory sign of the cyclonic swell is so valuable and so reliable for vessels on the eastern coasts of Luzon, Samar, Leyte, Dinagat, and Mindanao that its importance can not be exaggerated. From its direction the path of the typhoon north and south of the vessel may be predicted with almost absolute certainty, enabling a vessel to choose an anchorage if within reach, affording the best protection from wind and sea. This is only possible, of course, when the swell has an uninterrupted advance from the storm center, as on the eastern coast of the archipelago, and would be valueless west of the islands unless in the China Sea, with the storm center approaching from westward or southwestward. This swell has frequently been noticed 24 to 72 hours before the outbreak of the storm, giving good warning, especially if from a different direction than the prevailing wind at the time.

This swell is probably in part due to the heaping up of the water under the vortex of the storm, which is one of the destructive features of typhoons. In the typhoon of October 12, 1897, the water rose from 12 to 20 feet at points on the coast of Samar and Leyte.

The best and surest of all warnings, however, is given by the barometer. In every case there is great barometric disturbance. Any departure of the barometer from its usual movements in normal weather is an indication of doubtful weather, and the intensity of a typhoon will correspond to the amount of this departure. The weather may be regarded as very suspicious:

1. When the daily variation of the barometer is not normal. The highest readings of the barometer should be about 9 a. m. and between 10 and 11 p. m., and the lowest between 3 and 4 a. m. and about 3 p. m., the latter being the lower. The average daily range should be about 0.1 inch (2.5 mm.).

2. When the barometer rises barely 0.04 inch (1 mm.) during the daily oscillation.

3. When the daily fall of the barometer at its normal height exceeds about 0.15 inch (4 mm.), this limit varying somewhat with the season. If below normal, a less fall of the barometer may indicate a distant typhoon.

The storm will pass near by and be violent—

1. When the barometer remains stationary without rising any, or scarcely any, during the normal hours of ascent.

2. When the barometer continues to fall after the normal hours of the morning or afternoon minimum (when it should rise in normal weather) the condition is more alarming than the preceding.

3. When the barometer falls at the rate of more than 0.04 inch (1 mm.) per hour.

These signs are followed by the usual ugly and threatening appearance of the weather which forebodes most storms and the increasing number and severity of the gusts with the rising of the wind.

No positive rule can be given as to the amount of depression to be expected, but at the center of some of the storms the barometer is often 2 inches lower than outside of the storm field.

As the center or vortex of the storm is approached, unless the vessel be on the line of its advance, the changes of the wind become more rapid, till at length, instead of its direction altering gradually, as is the case on first entering the storm field, the wind flies around at once to the opposite point, the sea meanwhile breaking in mountainous and confused heaps. There are many instances on record of the wind falling suddenly in the vortex and the clouds dispersing for a short interval, though soon the wind springs up again and blows with renewed fury. Few vessels have ever passed through the vortex without losing either masts or rudder or meeting with some worse disaster, and therefore, at whatever cost, the central part of the storm field should be avoided.

Practical rules for typhoons.—When there are indications of a typhoon being near, vessels should remain in or, if possible, seek refuge in port, carefully observing and recording the changes in barometer and wind and taking every precaution to avert damage by striking light spars, strengthening moorings, and, if a steamer, preparing steam to assist the moorings. The waters of the Philippines are so limited in area and encumbered with islands and shoals that the practical rules for handling a vessel in a typhoon are not applicable within the archipelago. They may, however, be of benefit to a vessel when threatened with a typhoon in the China Sea or Pacific, and therefore are given below.

Vessels unable to reach port and having sea room to maneuver should observe the following rules:

When there are indications of a typhoon near, sailing vessels should heave to on the starboard tack and steamers remain stationary and carefully observe and record the changes in wind and barometer so as to find the bearing of the center and ascertain by the shift of wind in which semicircle the vessel is situated. Much will often depend on heaving to in time.

To find the bearing of the center, face the wind, then the center of the storm will be 8 to 12 points to the right; when the storm is distant it will be from 10 to 12 points, and when the barometer has fallen five or six tenths it will be about 8 points. A line drawn through the center of a typhoon in the direction in which it is moving is called the axis or line of progression, and looking in the direction in which it is traveling the semicircle on either side of the axis is called, respectively, the right-hand, or dangerous, semicircle, and the left-hand, or navigable, semicircle.

To find in which semicircle the vessel is situated: If the wind shift to the right, the vessel will be in the right-hand, or dangerous, semicircle, with regard to the direction in which the storm is traveling, in which case the vessel should be kept on the starboard tack and increase her distance from the center.

If the wind shifts to the left, the vessel will be in the left, or safe, semicircle. The helm should be put up and the vessel run with the wind on the starboard quarter, preserving the compass course, if possible, until the barometer rises, when the vessel may be hove to on the port tack. Or if there is not sea room to run the vessel can be put on the port tack at once.

Should the wind remain steady and the barometer continue to fall, the vessel is in the path of the storm and should run with the wind on the starboard quarter into the safe semicircle.

In all cases act so as to increase as soon as possible the distance from the center, bearing in mind that the whole storm field is advancing.

In receding from the center of a typhoon the barometer will rise and the wind and sea subside.

Typhoon harbors.—In the section covered by this volume, the following harbors offer excellent shelter during typhoons. They are the more important harbors of refuge, but numerous other harbors offer shelter, and masters of vessels should use discretion in their choice of a typhoon harbor. Since typhoons usually give ample warning of their approach, together with their probable path, anchorage should be chosen which offers best shelter from the winds which will prevail during the coming typhoon. If in the vicinity of any of the following harbors, they should be given preference:

North coast of Luzon: Port San Vicente.

West coast of Luzon: Bolinao Harbor, Port Matalvi, Olangapo Harbor, Manila Harbor.

Marinduque Island: Santa Cruz Harbor, Port Balancan.

Burias Island: Port Busin.

South coast of Luzon: Sorsogon Bay.

East coast of Luzon: Port San Vicente, Casiguran Sound, Hook Bay (Pollilo Island), Dahikan Bay, Lamit Bay.

Lubang Island: Port Tilig.

Mindoro Island: Soguicay Bay.

Tablas Island: Looc Bay.

Romblon Island: Romblon Harbor.

Ticao Island: Port San Miguel.

Panay Island: Iloilo Harbor.

Cebu Island: Cebu Harbor.

Samar Island: Helm Harbor, Port Borongan, Pambujan Harbor, Port Aguirre (Canahuan Islands).

STORM WARNINGS.

Typhoon signals (see appendix, p. 343) are hoisted in accordance with advices from the central observatory of the weather bureau at Manila, and their meaning is the same wherever shown in the archipelago. During the progress of a typhoon within the range of the observatory special warnings are furnished to the Cavite naval radio station and from there broadcasted for the information of shipping. Besides these special warnings, two regular daily weather reports are furnished to that station by the Manila observatory. Typhoon warnings are also sent to the threatened localities by telegraph and cable if possible.

Time signals.—In cooperation with the Manila observatory, time signals are sent out from the Cavite naval radio station at 11 a. m. and 10 p. m. daily, including Sundays and holidays. The signals begin at 10.55 a. m. and 9.55 p. m., standard mean time of the one hundred and twentieth meridian, and continue for 5 minutes, and during this interval every tick of the clock is transmitted except the twenty-eighth, twenty-ninth, fifty-fourth, fifty-fifth, fifty-sixth, fifty-seventh, fifty-

eighth, and fifty-ninth of each minute. The radio transmission is by a 5-kilowatt spark on a wave length of 952 meters.

In addition to the time service by radio, time signals are sent daily over the lines of the Postal Telegraph and Cable service at 11 a. m., and mariners can avail themselves of this service at the principal ports of the islands by applying at the local telegraph offices.

RADIO SERVICE.

The following is a list of governmental radio stations of the Philippine Islands. With the exception of the United States naval radio stations, they are open to general public service (commercial traffic). The Insular Government radio stations are under the control of the Bureau of Posts and are operated in connection with the land wire and cable service of that bureau. Information concerning regulations, rates, and commercial work of United States radio stations may be obtained by addressing the Director of Naval Communication, Radio, Va.

Station.	Location.						Call signal.	Wave length.
	Latitude.			Longitude.				
	°	′	″	°	′	″		
United States naval radio stations:								
Cavite	14	28	55 N	120	55	00 E	NPO	600.
Olongapo	14	49	02	120	16	59	NPT	600.
United States Army Radio Station:								
Fort Mills, Corregidor Island	14	22	52	120	34	40	WVN	300; 600; 1,800.
Insular Government radio stations:								
San Jose, Mindoro	12	27	30	121	03	00	WVY	600.
Cuyo	10	51	25	121	00	20	WVX	600; 1,200.
Puerto Princesa	9	44	00	118	42	40	WVV	600; 1,200.
Malabang	7	35	20	124	04	10	WVT	600; 1,200.
Davao	7	04	00	125	36	20	WVO	600; 1,200.
Zamboanga	6	55	10	122	02	19	WVW	600; 1,200.
Jolo	6	02	40	121	00	00	WVS	600.

Supplies, repairs, and communication.—Vessels usually obtain their supplies and stores in Manila, Cebu, or Iloilo. Limited quantities of supplies may be obtained at several other places. Most of the coal for the use of vessels is imported from Japan and Australia. Philippine coal is being developed, with Government aid and supervision, but is not yet produced in sufficient quantity to supply the demands of industry and commerce. Small patent slipways are available for making repairs at Cebu and Iloilo. The Marine railways at Manila and at Cavite have a capacity of 3,000 and 2,400 tons, respectively, and the United States Navy floating dock *Dewey*, at Olongapo, has a lifting capacity of 18,500 tons.

Communication among the islands and with foreign ports is by regular lines of steamers, cable, telegraph, telephone, and radio. Several trans-Pacific lines of steamers call at Manila for passengers and freight.

Ports of entry.—The Philippine Islands are divided into seven customs districts whose principal ports are Manila, Sual, Tabaco, Iloilo, Cebu, Zamboanga, and Jolo.

Quarantine for the ports of entry of the Philippine Islands is enforced in accordance with the requirements of the United States **Quarantine Laws and Regulations**, and is administered by the United

States Public Health Service. Quarantine Regulations will be found at the stations of that service and at American consulates, and will be furnished to vessels upon application, either by officers of that service or by the bureau at Washington, D. C. Every vessel should be provided with the Quarantine Regulations. There are two disinfection and detention stations for quarantine purposes—one at Mariveles and one on Cauit Island, in the harbor of Cebu. Port sanitary statements are issued by the United States Public Health Service and may be obtained at the stations of that Service.

Quarantine regulations for coastwise ports, except ports of entry, are under the jurisdiction of the Philippine Health Service and inquiries concerning them should be addressed to the Director of Health, Manila, P. I.

The Philippine Customs Law assigns to the Bureau of Customs, the general supervision, control, and regulation of shipping and navigation (see appendix, p. 340, for extract from Regulations) and specially directs that, in such matters, collectors of customs shall perform the duties that devolve on American consuls or consular officers.

Aids to navigation are constantly being improved and extended. There are a number of automatic (unwatched) acetylene lights in isolated locations, and navigators should consider the possibility of their not burning if they fail to make the light when expected. The buoyage accords with the system adopted in United States waters. The principal coast lights are described in the text of this volume. For a complete description of all aids see the List of Lights, Buoys, Beacons, and Day Marks of the Philippine Islands, published by the Bureau of Commerce and Industry, which can be obtained, free of charge, from the Director, Bureau of Commerce and Industry, Manila, P. I.

System of buoyage.—In conformity with section 4678 of the Revised Statutes of the United States, the following order is observed in coloring and numbering the buoys along the coasts or in bays, harbors, sounds, or channels, viz:

1. In approaching the channel, etc., from seaward, red buoys, with even numbers, will be found on the starboard side of the channel, and must be left on the starboard hand in passing in.
2. In approaching the channel, etc., from seaward black buoys, with odd numbers will be found on the port side, and must be left on the port hand in passing in.
3. Buoys painted with red and black horizontal stripes will be found on obstructions, with the channel ways on either side of them, and may be left on either hand in passing in.
4. Buoys painted with white and black perpendicular stripes will be found in midchannel, and must be passed close-to to avoid danger.

All other distinguishing marks to buoys will be in addition to the foregoing, and may be employed to mark particular spots, a description of which will be given in the printed list of buoys.

Perches, with balls, cages, etc., will, when placed on buoys, be at turning points the color and number indicating on which side they shall be passed.

Different channels in the same bay, sound, river, or harbor will be marked, as far as practicable, by different descriptions of buoys. Principal channels will be marked with nun buoys; secondary channels will be marked with can buoys; and minor channels with

spar buoys. When there is but one channel, nun buoys properly colored and numbered are usually placed on the starboard side and can buoys on the port side of it.

Whenever practicable the towers, beacons, buoys, spindles, and all other aids to navigation are arranged in the light list in regular order as they are passed by vessels entering from the sea.

Day beacons, stakes, and spindles (except such as are on the sides of channels, which will be colored like buoys) are constructed and distinguished with special reference to each locality, and particularly in regard to the background upon which they are projected.

Bearings are magnetic, and distances in nautical miles.

Signals for surveying vessels.—The following special signals for surveying vessels of the United States employed in hydrographic surveying, have been prescribed:

A surveying vessel of the United States under way or at anchor in a fairway and employed in hydrographic surveying may carry where they can best be seen, but in any case well above the rigging lights prescribed by law for preventing collisions, three lights in a vertical line one over the other and not less than 6 feet apart. The highest and lowest of these lights shall be green, and the middle light shall be white, and they shall be of such a character as to be visible all around the horizon at a distance of at least 2 miles. In the case of a small vessel the distance between the lights of such private code may be reduced to 3 feet, if necessary.

By day such surveying vessel may carry in a vertical line, not less than 6 feet apart, where they can best be seen, three shapes of not less than 2 feet in diameter, of which the highest and lowest shall be globular in shape and green in color, and the middle one diamond in shape and white.

VARIATION OF THE COMPASS.

The magnetic variations for 1920 at points mentioned are given below. The annual change may be neglected as it averages about 1′ for most of the places.

Locality.	Compass variation.	Locality.	Compass variation.
	Easterly. ° ′		*Easterly.* ° ′
Aparri, Northern Luzon	0 00	San Bernardino Strait	1 03
Bolinao, Lingayen Gulf	0 35	Tacloban, Leyte	1 27
Manila, Manila Bay	0 55	Cebu, Cebu	1 31
Atimonan, Eastern Luzon	0 38	Iloilo, Panay	1 35
Calapan, Mindoro	1 02		

TIDES AND CURRENTS.

In the inland waters and western coasts of the Philippine Islands the tides are affected more by the declination of the moon (tropic tides) than by the opposition and conjunction of the sun and moon, or full and new moon (spring tides).

Two or three days after the moon crosses the Equator there are two tides a day of equal height. One of the high waters increases, reaching its maximum about two days after the moon's greatest northerly

or southerly declination. The other high water diminishes, and at Manila usually disappears entirely for from three to eight days near the time of the moon's greatest declination. During this period there is therefore but one high water and one low water each lunar day. From two to five days after the greatest declination the second tide again appears, and the two high waters again become equal after the moon crosses the Equator.

The greatest range of tide occurs in June and December and the least range in March and September.

The high water when there is but one tide a day, or the higher tide when there are two high waters, follows the moon's upper transit when the moon is south of the Equator and follows the moon's lower transit when the moon is north of the Equator.

The "establishment" is much affected by the diurnal inequalities above referred to. The Coast Survey charts give the tropic high-water intervals and tropic low-water intervals, which are the intervals of high and low waters after the moon's transits at the periods of greatest declination, when the highest tides occur. The intervals when the moon is near the Equator may differ an hour or two from these.

On the east coast of the archipelago, at points open to the Pacific, the effect of the tropic tides is less marked, and there are two high waters and two low waters each lunar day throughout the month, though the tides are still affected by some diurnal inequality.

Tidal currents.—Two tidal streams enter the Sulu Sea and passages between the Philippines from opposite directions—one from the China Sea through the western openings, the other from the Pacific through the eastern straits, San Bernardino, Surigao, and Basilan. These streams meet in the many channels between the southern islands.

The stream from the China Sea enters that sea from the Pacific by the wide opening between Formosa and Luzon and passes from north to south along the western shores of Luzon and Palawan and through the Verde Island Passage, Mindoro Strait, Linapacan, and Balabac Straits.

The Verde Island stream after passing south along the coast of Luzon and deflecting some of its waters in Manila Bay, continues along the coast as far as Puñas Point, where it branches. One stream runs northeast around Tayabas Bay and north and east of Marinduque through Mompog Pass, reunites with the other branch, which passes southeast along the Mindoro coast as far as Dumali Point, and then eastward, south of Marinduque as far as the Bondoc Peninsula, where it meets the flood stream from the Pacific which has passed through San Bernardino Strait. The northern part of the Verde Island stream, which follows round Balayan and Batangas Bays, reunites with the principal current near Verde Island, producing violent tide rips and eddies in that part of the channel between Malabrigo and Escarceo Points.

The flood that enters Mindoro Strait follows the coast of Mindoro, setting southeast as far as Nasog Point, Panay, part of it continuing round the coast of Mindoro northward of Dumali Point, where it meets the stream through Verde Island Passage. The rest of the stream divides at the northwest point of Panay Island. One branch flows along the north coast of Panay past Bulacaue Point and the

Gigantes Islands to Bulalaqui Point, the north point of Cebu, where it turns southward and meets the stream from the Pacific through Surigao Strait, about 6 miles south of the Camotes Islands; it also flows through Iloilo and Tanon Straits, in both of them meeting the flow which has entered from southward on the parallels of the north end of Negros and of Tajao Point, Cebu, respectively.

The other branch turning to the south from the northwest point of Panay, and being joined midway by the stream setting eastward from Cuyos Islands or Linapacan Strait, continues coasting Panay and Guimaras Islands into Iloilo Strait until it meets the other branch described above.

Between the Calamianes and the north end of Palawan the flood stream sets southeast and the ebb northwest.

The flood stream entering by Balabac Strait turning north-northeast along the coast of Palawan spreads itself like a fan over the Sulu and Mindoro Seas from northeast to east, forming the current from west to east felt between Cuyos Islands and Panay, and also that which sets to the south of the Cagayanes, where it is said to meet the stream from Surigao Strait approximately in the meridian of the Cagayanes.

In the Sibutu Passage the flood stream sets northward and westward; and also in the Sulu Archipelago the flood stream sets generally in the same direction, but takes many local directions among the islands. Through Basilan Strait the flood stream makes westward and passes up the west coast of Mindanao northward until it meets the flood stream from Surigao Strait about midway on the coast.

In some places the tidal current seems to be influenced by a monsoon current. Along the Panay coast there is a constant northerly current which varies but little in strength with the change of tide. In the vicinity of Seco Island and Batbatan this current changes its direction to westward and then southwestward through the Cuyo Islands, thus forming a great eddy. A somewhat similar eddy exists in the Mindanao Sea southeastward of Bohol.

The time of high water of the wave that enters from the China Sea seems to be from 10 to 12 hours and that which comes from the Pacific through the eastern and northern straits from 6 to 7 hours.

Tide Tables for western North America, Eastern Asia, and many island groups of the Pacific Ocean, including the Philippine Islands, are published annually in advance by the United States Coast and Geodetic Survey. This volume furnishes, at the nominal cost of 10 cents, United States currency, full tidal data for the ports of the Philippine Islands.

It contains a table of full daily predictions of the times and heights of high and low waters for certain standard or principal ports along the coast; full explanations for the use of this table are given on page 8. The use of Table 2 of the Tide Tables should be known to every navigator. By means of this table the predictions given for the standard ports are extended so as to enable one to obtain complete tidal data for each day for stations only a few miles apart for the greater part of the coast, and with almost the same accuracy as though full predictions were given for all of these points.

Instead of using the height differences of Table 2, however, a more accurate method is that of multiplying both high and low water heights at the standard port by the ratio of ranges for the given port to obtain the heights of the corresponding high and low waters. The ratio of ranges is given in Table 2 of the Tide Tables. The minus sign before the predicted heights in the Tide Tables indicates that the water is below the plane of reference, which is mean lower low water.

The time of high or low water at any given port in Table 2 is found by taking the time of the corresponding tide for that day from the standard port for reference and applying to it the time difference for the given port from the third column of Table 2, adding it if the sign is plus and subtracting if minus.

Caution.—In using the Tide Tables, slack water should not be confounded with high or low water. For ocean stations there is usually but little difference between the time of high or low water and the beginning of ebb or flood current; but for places in narrow channels, landlocked harbors, or on tidal rivers the time of slack current may differ by two or three hours from the time of high or low water stand, and local knowledge is required to enable one to make the proper allowance for this delay in the condition of tidal currents.

The figures given in Tables 1 and 2 of the Tide Tables are the times of high and low water, and these times are not necessarily the times of slack water.

COASTWISE NAVIGATION.

The navigation of coral seas demands constant vigilance; aside from this the waters described in this volume present no unusual difficulty to the mariner. The lead gives little or no warning of the approach into danger, and the effect of uncertain and irregular currents is a constant source of danger on the longer courses. Over rocky bottom and on shoals the 10-fathom curve should be considered the danger curve, as coral bowlders frequently rise from 3 to 4 fathoms above the general level of the shoal, and the surveys may not have found the least water in every case. The waters northward of Luzon and the north and northeast coast of Luzon have not yet been surveyed and are but imperfectly charted.

The following directions give the courses and distances for some of the principal routes among the islands. They serve to indicate the general route followed by coasting vessels, rather than as courses strictly to be adhered to. Navigators should consult the charts freely and in some cases may be able to save in distance, with perfect safety to the vessel.

A detailed description of the coast, including landmarks, dangers, etc., follows, beginning on page 37:

General routes.

[Objects are abeam unless otherwise stated. Bearings are magnetic.]

	Course.		Distance.	Distance from Manila.
	True.	Magnetic.		
CAPE ENGAÑO TO MANILA.	*Degrees.*	*Degrees.*	*Nautical miles.*	*Nautical miles.*
1. From 5 miles north of Cape Engaño light to Cape Bojeador light, bearing 202°, distant about 15 miles	273	273	83	404½
2. To Cape Bojeador light, bearing 90°, distant 6 miles	220	220	18	321½
3. To Piedra Point light, bearing 90°, distant 5 miles	199	199	140	303½
4. To Hermana Mayor light, bearing 90°, distant 6 miles	181	180	31	163½
5. To Capones Island light, bearing 2°, distant 10 miles and Los Frailes Rocks, bearing 90°, distant 5 miles	164	163	65	132½
6. To Corregidor light, bearing 90°, distant 10 miles	133	132	33	67½
7. To Monja light, bearing 180°, distant 1/16 mile	91	90	6¾	34½
8. To Manila Harbor entrance light at southern end of north breakwater	66	65	27¾	.....
(*a*).—MANILA TO VERDE ISLAND.				
1. Manila to San Nicolas light, distant 2 miles (light at south end of north breakwater astern)	242	241	13½	13½
2. To Caballo light, distant 1¾ miles	221	220	9½	23
3. To El Fraile Rock, distant 1⅛ miles	221	220	2¼	25¼
4. To north end Carabao Island, distant 2⅛ miles; Corregidor light bears 0°	221	220	3½	28¾
5. To Fuego Point, distant 2½ miles, Fortune Island ahead	200	199	8¾	37½
6. To Fortune Island light, distant 2 miles	180	179	4¾	42¼
7. To Cape Santiago light, bearing 135°, distant 10½ miles	180	179	9½	51¾
8. To Cape Santiago light, distant 2½ miles	149	148	10½	62¼
9. To Mount Casapao, highest point on Maricaban Island, distant 3¾ miles; Escarceo light is ahead	122	121	18	80¼
10. To east tangent Verde Island, bearing 179°; 1½ miles 31° from NE. point of island	89	88	12½	92¾
(*b*).—VERDE ISLAND TO SAN BERNARDINO STRAIT (from position 10a).				
11. To Baltasar Island, highest point, 2¼ miles distant	121	120	47	139¾
12. To Bugui Point light, distant 4⅜ miles	110	109	91¾	231½
13. To Bugui Point light, bearing 254°, distant 7½ miles	110	109	6	237½
14. To San Miguel Island light, bearing 180°, distant 1 mile. Bagatao light will be picked up right ahead	65	64	15¼	252¾
15. To a position about 5 miles 0° of the western side of San Andres Island, with Capul Island light bearing 90° and Calantas Rock light bearing 69°	122	121	29	281¾
16. To a position 1 mile off Capul Island light	90	89	7½	289¼
17. To San Bernardino Island light, 1 mile distant	27	26	18¾	308
(*c*).—VERDE ISLAND TO ILOILO—FIRST ROUTE (from position 10a).				
11. To Mount Dumali, bearing 247°, distant 5 miles	133	132	40½	133¼
12. To Maniquin Island light, distant 3 miles	174½	173	92½	225¾
13. To Nogas Island light, distant 3 miles	174½	173	71½	297¼
14. To Nogas Island light, bearing 0°, distant 2½ miles	128	127	4	301¼
15. To a position with Bondulan Point, bearing 36°, and Lusaran Point light, bearing 177°, distant 4 miles	72	71	34½	335¾
16. To Cabalic Point, distant ¼ mile	38	37	5	340¾
17. To red gas buoy, bearing 36°, distant 200 yards; the twin spires and the white dome of the church in Molo will bear 4° (black buoy C3 will be passed close-to on port hand)	33	32	1¾	342½
18. To a position with Fort San Pedro open of Bondulan Point	5½	4	⅜	342⅞
19. To Bondulan Point, distant ¼ mile, Fort San Pedro ahead	47	46	1½	344⅜
20. To flashing red light, distant ⅝ mile	63	62	2	346⅜
21. To recommended anchorage	14	13	⅝	347
(*d*).—VERDE ISLAND TO ILOILO—SECOND ROUTE (from position 10a).				
11. To western end Simara Island, distant 2 miles, Cobrador Island light bearing 114°	133	132	74	166¾
12. To a position within 2 miles of Cobrador Island light	115	114	12	178¾
13. To south end Romblon Island, distant 5 miles	181	180	12	190¾
14. To Cresta de Gallo Island, distant 7 miles	132	131	35	225¾
15. To Jintotolo Island light, bearing 0°, distant 2 miles	121	120	33	258¾
16. To Manigonigo Island light, distant 8 miles; Gigante light ahead, distant 7½ miles	125	124	10	268¾
17. To Gigante light, distant 1 mile	118	117	7½	276¼
18. To north end Uaydajon Island, bearing 266°, in range with Gigante light just disappearing, distant 1 mile	118	117	1¾	278

General routes—Continued.

	Course. True.	Course. Magnetic.	Distance.	Distance from Manila.
(*d*).—VERDE ISLAND TO ILOILO—SECOND ROUTE (from position 10a)—Continued.	*Degrees.*	*Degrees.*	*Nautical miles.*	*Nautical miles.*
19. To south end Antonia Island, distant 2 miles	189	188	5½	283½
20. To a position with Baliguian Island light, bearing 180°; south end Sicogon Island, bearing 253°, distant 5 miles	198	197	6½	290
21. To a position 1¼ miles off Baliguian light	181	180	13¼	303¼
22. To Calabazas light, bearing 270°, distant 5 miles	237	236	16½	319¾
23. To Calabazas light, bearing 270°, distant 2 miles	270	269	3	322¾
24. To lighted black buoy off Tomonton shoal, distant ¾ mile	228	227	12½	335¼
25. To a position with Siete Pecados light, bearing 273°	212	211	12½	347¾
26. To black buoy C1, ⅝ mile distant	274	273	1¾	349½
27. To black buoy C3, ⅝ mile distant	274	273	3¼	352¾
28. To Siete Pecados light, ½ mile distant, with Jaro Church tower bearing 246°	293	292	1½	354¼
29. To a position with Fort San Pedro and Bondulan Point in range, bearing 219°	247½	246	2½	356¾
30. To anchorage northward of the mouth of river in 15 fathoms of water	216	215	4½	361¼
(*e*).—VERDE ISLAND TO CEBU—FIRST ROUTE (from position 16d).				
17. To Gigante light, bearing 180°, distant 1 mile	119	118	7	275¾
18. To Tanguingui light, bearing 180°, distant 1¾ miles	111	110	23	298¾
19. To Chocolate Islet, bearing 225°, distant ¾ mile	121	120	23½	322¼
20. To Malapascua light, bearing 0°, distant 3 miles	121	120	2¾	325
21. To Capitancillo light, bearing 90°, distant 2 miles	187	186	18¼	343¼
22. To Managao Point, distant 3 miles; Capitancillo light bears 0°	164	163	7	350¼
23. To Danao Point, distant 4 miles; Bagacay light bears 214°	181	180	22¾	373
24. To Bagacay Point light, bearing 268°, distant 1½ miles	204	203	7½	380½
25. To beacon on edge of reef NE of Bantolinao Point, bearing 179°, distant ¼ mile; Bantolinao light ahead	229	228	3⅜	384⅛
26. To Bantolinao light, bearing 77°, distant ½ mile	242	241	1½	385¼
27. To red nun buoy N8, distant 110 yards; Round Tower, Mandaue bears 298°	236	235	1½	386⅝
28. To Opon flashing green light, distant 175 yards	243	242	¾	388⅜
29. To an anchorage east of town, San Pedro Fort light a little on starboard bow	236	235	2⅝	390¾
(*f*).—VERDE ISLAND TO CEBU—SECOND ROUTE, VIA BLACK ROCK PASS (from position 12b).				
13. To Colorada Point light, bearing 180°, distant 5 miles	110	109	7½	239
14. To Tatus Island, bearing 90°, distant ¾ mile; Argos Point light ahead	127	126	28½	267½
15. To Argos light, bearing 20°, ¼ mile distant (light a little abaft the beam)	131	130	3¼	270¾
16. To Argos light, distant ¼ mile	91	90	⅛	270⅞
17. To a position with Mount Calumpan on Canduian Point, bearing 180°, and Argos light, bearing 273°	91	90	4⅛	275
18. To Bugtung Island (highest part), distant 4¼ miles	146	145	28¼	303¼
ALTERNATE ROUTE VIA TICAO PASS (from position 14b).				
To San Jacinto light, distant 3¼ miles	125	124	13	265¾
To Bugtung Island (highest part), distant 4¼ miles	152	151	47½	313¼
19. To Malapascua Island light, bearing 270°, distant 2 miles	181	180	34¼	337½
20. To Capitancillo light, bearing 90°, distant 2 miles	191	180	21½	360
Continue as on first route.				
Total distance to Cebu				406¼
NOGAS LIGHT TO ZAMBOANGA, (from position 13c).				
1. To Calders Point, distant 5 miles; Santa Cruz Island light bears 119°	180	178	208	505
2. To a position off flashing red light on Zamboanga wharf	107	105	12	517

ISLANDS AND CHANNELS NORTH OF LUZON.

TAIWAN (FORMOSA) ISLAND.—**Goaram Pii** (Nansha or South Cape), the southern extremity of the Island of Taiwan, is the usual landfall of northward-bound vessels from the Philippine Islands. An isolated rock, with deep water around, stands up boldly close to the southeastern point. At 4 miles northwestward of the cape is a peculiarly rugged hill 1,035 feet high, from which the land slopes down gradually to the cape, the whole, with the exception of a few clearings, being densely wooded. Farther northward is a double-peaked mountain about 2,000 feet high.

A fixed white light with a red sector—visible 20 miles—is exhibited 180 feet above high water from a white circular lighthouse on Goaram Pii.

In answer to a vessel's fog signal, two guns are fired with an interval of 3 minutes between them, and if the vessel's fog signal is still heard the firing is repeated after an interval of 8 minutes.

Vele Rete Rocks, about 9 miles southward of Goaram Pii (South Cape), Taiwan, are a group of rocks about 1 mile in extent, above and below water. The three highest, lying northwest and southeast from each other, are 15 to 25 feet above the sea. The depths near the rocks are from 39 to 78 fathoms, except off the southern side, where at a distance of ½ mile the depth is 17 fathoms. In bad weather the sea breaks heavily over these rocks. The channel between the rocks and Taiwan is safe, but very heavy tide rips, resembling the sea breaking over a shoal, are frequently experienced nearly the whole distance between them and the land.

Bashi Channel is between the Batan Islands and the Island of Taiwan and connects the Pacific Ocean with the China Sea. This channel, frequently used by sailing vessels when making the eastern passage to China and Manila and sometimes by steamers trading between the United States, Japan, and Manila, is 56 miles wide between Y'Ami Island, of the Batan Group, and Little Botel Tobago Island, lying east of the south point of Taiwan Island, but its navigable width is much contracted by the dangerous Gadd Rock and Forest Belle Rock, which must be remembered when sea room is necessary to avoid the track of a typhoon.

FOREST BELLE ROCK, with a depth less than 6 feet, lies 6 miles southward of Little Botel Tobago Island.

GADD ROCK lies 14 miles southward of Little Botel Tobago Island, and in the fairway of Bashi Channel, is about 100 yards across, with a least depth of 10 feet, and 30 to 40 fathoms close around, deepening to 69 and 127 fathoms within 1 mile.

At low water the sea probably breaks, but the locality is generally covered by violent tide rips and swirls, which extend more or less the whole distance to Vele Rete Rocks, off the south point of Taiwan Island. These indications of its position are not always visible, and the vicinity of this danger should, therefore, be avoided.

Heavy overfalls and discolored water have been passed through about 11 miles southward of Gadd Rock; no soundings were obtained, and bottom could not be seen from aloft; from this it seems probable that the tide rips and swirls extend southward of Gadd Rock.

BASHI ROCKS, the existence of which is considered doubtful, are shown on the charts as being in approximate latitude 21° 12′ N, longitude 122° 06′ E. Capt. Sir E. Belcher, of H. M. S. *Samarang*, searched unsuccessfully for them, and states that they have no existence in the position assigned them on the chart, nor in the visual radius from the masthead of the ship, 108 feet above the sea.

BATAN ISLANDS

lie northward of the Babuyan Islands, and consist of a chain of islands, mostly high, extending from latitude 20° 17′ N to 21° 06′ N; the channels among them are thought to be safe and free from danger. The physical characteristics of the larger islands indicate volcanic origin.

Itbayat, Batan, and **Sabtang** are particularly mountainous, with intervening valleys and plains sloping to the shore and well watered by small rivers. The smaller islands are generally low and rest on coral foundations. The climate of these islands is noted for its salubrity. The inhabitants possess many of the characteristics of the native races of Taiwan, and their peculiar language increases their exclusiveness. This has been strengthened by the ocean currents and consequent difficulties of intercourse with the mainland of Luzon southward.

The chief industry is raising cattle, hogs, horses, and goats, which grow to a large size, and, on account of their superior quality, are exported in large numbers to the mainland.

Y'Ami Island, the northern island of the Batan Group, is about 1 mile in extent, moderately high, and has an islet lying off its southwest point.

North Island, lying 1½ miles south-southwestward of Y'Ami, is high and steep, except off its eastern side, where three islets and some detached rocks extend 200 yards.

The channel between Y'Ami and North Island is safe, and shows soundings with rocky bottom, but too deep for anchorage.

Mabudis Island, lying 8½ miles southward of North Island, is about 1½ miles long in a northeast and southwest direction, high and steep-to. The channel between it and North Island is wide and free from danger, except that breakers have been reported about $2\frac{8}{10}$ miles 229° (229° mag.) from North Island.

Siayan Island, lying about 1 mile south-southwestward of Mabudis Island, is about ½ mile in diameter and has several detached rocks off its northeast side, rendering the channel between it and Mabudis unsafe.

Itbayat Island, the largest of the group, lies 4 miles south-southwestward of Siayan and 14 miles north-northwestward of Batan. It is about 8 miles long in a north-northeast and opposite direction, and has an area of 26 square miles.

Mount Santa Rosa, at the north end, is 800 feet high, and **Mount Riposet,** in the southeastern part, is 900 feet high. The island, from seaward, presents a barren outline, defying debarkation to any but those acquainted with the locality, and is, moreover, without anchorage; the interior is, however, highly cultivated and exhibits many patches of good timber trees. The waters in the vicinity of the

island have not been sounded. Vessels desiring to communicate with Itbayat may obtain a pilot at Basco, on Batan.

A late report states that anchorage may be found westward of the south end of the island in 20 fathoms, sandy bottom, well protected from northeast winds and with sufficient swinging room in case the wind should haul to the southward and westward.

Diogo Island is a small, round island over 1,800 feet high about ¾ mile in diameter, lying 3½ miles southeastward of Itbayat Island. It is steep-to on the western side but has several small islets lying off the eastern side, the outermost being nearly ½ mile distant. In 1903 Diogo Island was observed to be volcanic, discharging vapor and dark material.

Batan Island (chart 4270) is the second in size and the most important of the group. **Mount Irada,** apparently an old volcano, thickly covered with trees, is at the northeast end of the island and 3,806 feet high; the rest of the island is mountainous and has several broad cultivated spots.

There are several small towns and villages, the principal one, **Basco,** is on the west side of the island at the foot of Mount Irada. It is well built of stone and is prominent. Pilots for the other islands of the group may be obtained here. Commercial steamers from Aparri visit these islands three or four times a year.

Anchorage.—There is anchorage off Basco, the best berth being off the northern point of the bay, with the convent barely open, in 13 fathoms, bottom fine coral sand. This, however, is not very secure with a northerly wind. Anchorage for small vessels may also be had closer in, about 200 yards offshore, in 5½ fathoms, bottom fine sand, with the southern part of the town and the southeastern foot of Mount Irada in line, bearing 90° (90° mag.). Although the holding ground is good, this bay can be resorted to only in the northeast monsoon.

A patch of rocks, bare at low water, lies 800 yards north-northeastward of **Chaguie Point,** the south point of the bay. They have 27 fathoms close-to on the west and 4¼ fathoms on the east side, and 200 yards east-northeastward of the point is a rock awash at low water.

The authorities recommend the anchorage off MAHATAO (SAN CARLOS), ½ mile southward of Chaguie Point, as the best for obtaining a supply of water, but this position is exposed, and watering can only be effected in fine weather. The passage through the reef is, however, quite safe for the largest boats, which land on a sandy beach. This passage has been cut to admit schooners of 50 tons, which are generally hauled up when they arrive from Manila with the first of the southwest monsoon.

Anchorage may be had off SAN VICENTE, which is the port of IVANA, or landing place for that town. It should not be resorted to, as it is very confined, with sandy bottom close to the reefs, and must be left the moment a northerly wind threatens. Several vessels have been driven off and, being unable to weigh their anchors, have had to cut or slip.

Anchorage may also be had off the town of UYUGAN (SAN ANTONIO), 1 mile eastward of Point Mabien, in 8 fathoms, about 200 yards off shore, with the church bearing 45° (45° mag.).

SONSON or CHAAMPAAN BAY, as it is called by the natives, is the northern of the two large bays on the eastern side of Batan. It has not been thoroughly surveyed, but is reported to afford good sheltered anchorage during the southwest monsoon. The southern entrance to the bay is a prominent black bluff, southward from which is a group of high rocks. The beach at the landing, under the gap in the hills, is composed of small water-worn rocks, slopes abruptly, and has 3 or 4 feet of water close-to. From the landing a good trail leads to the town of Basco, about 1½ miles distant.

DIRECTIONS.—Approaching from northward, round the north end of the island at a distance of about ½ mile and steer for the prominent black bluff on the southern entrance point until a conspicuous gap in the hills westward bears 285° (285° mag.), when it should be steered for and anchorage in 7 or 8 fathoms, rocky bottom, will be found about ½ mile from shore; from this anchorage the group of rocks southward of the bluff will be just open of it, bearing 217° (217° mag.).

MANANION BAY, southward of Sonson Bay, is reported to afford anchorage sheltered from westerly winds, but has not been surveyed. It is impossible to land anything in Mananion Bay, as the shores rise perpendicularly to a height of about 150 feet. This side of the island is practically uninhabited.

Sabtang Island is separated from the southwest end of Batan by a safe channel over 2 miles wide, through which the tidal currents run with a velocity of from 5 to 6 knots, the flood setting southeastward and the ebb northwestward. Off the north end of Sabtang are two rocky ledges with a passage between them of 10 to 14 fathoms. These rocks have only 3 feet on them at spring tides. Between them and Sabtang is a deep channel ½ mile wide.

Sapiang (San Vicente) is substantially built of stone and lies on the northeast side of the island. Good sheltered anchorage during the southwest monsoon may be found off the town, with the church bearing 225° (225° mag.), in 10 or 12 fathoms, sandy bottom. The depths decrease gradually from 15 fathoms about ½ mile offshore to 6 and 8 fathoms, about 150 yards from the beach.

Ibugos Island is small and rather low, except a hill on the south end, where there is a settlement. It is separated from the west side of Sabtang by a deep channel nearly 1 mile wide, which affords indifferent anchorage in 10 fathoms, bottom rocky, with sandy patches, with the center of Ibugos Island bearing 225° (225° mag.). The flood tide sets southward with a velocity of from 3 to 4 knots, and the ebb northward.

There are no facilities for watering; the stream from the rivulet inside the southwest point of Sabtang, entering at the coral beach near the barrio of Suminanga (San Luis), is at least 100 yards from where boats could float. This is the only safe landing place, the shores on both sides of the channel being bordered by a reef, through some of the gaps in which the native boats can pass in fine weather.

Dequez Island, very small and rather low, lies nearly ½ mile westward of the northwest point of Ibugos Island. It is clear westward and can be approached within a mile with safety, but has a very strong tide rip setting northward on its southwest side.

DIRECTIONS.—As the current sets strongly southward between the above islands during the northeast monsoon, it is advisable for a sailing vessel to work westerly round Dequez and not to cross the channel between Batan and Sabtang until the dividing neck of Mahatao (San Carlos) is clearly open, bearing east-southeast, as the stream, splitting at Mabatui Point, sends one current southerly; the other, which is an eddy, is favorable from thence northeasterly to Basco.

Sailing vessels bound to this latter anchorage work up the northwest angle of the island until the wind is free to run down, when round-to with all aback and drop the inner anchor in 12 fathoms; then sheer and drop the outer anchor in 25 fathoms, which will afford sufficient room to weigh. When moored the vessel will be in 15 fathoms and the current will keep a fair strain on both cables.

Balintang Channel, between Sabtang, the southernmost of the Batan Islands, and Babuyan Island, is 43 miles wide, and, being free from danger, is frequently used by vessels proceeding by the eastern passages to China and Manila.

Balintang Islands lie in the eastern part of Balintang Channel, with Mount Irada bearing 348° (348° mag.) and the west tangent to Babuyan Island, 205° (205° mag.). They consist of four small, sharp-peaked, rocky islets, visible about 24 miles in clear weather. The westernmost island, showing three peaks, is about ¾ mile in a north and south direction and is much larger than the others; a hole is seen through it from southwestward. One of the other islets lies off its northern point, and the other two, about 75 feet high, off its southeast side. They are steep-to and may be passed on either side at a distance of 2 or 3 miles. In bad weather the sea breaks heavily against them. It has been reported that these islands lie about 3 miles farther south than shown on the chart.

THE BABUYAN ISLANDS

named **Babuyan, Panuitan, Calayan, Dalupiri, Fuga,** and **Camiguin,** form a roughly circular group lying northward of the channel along the north coast of Luzon and south of the Balintang Channel. The channels between them are said to be safe and deep and their shores generally steep-to, but, as these islands have not been surveyed, they should be approached with caution.

Babuyan Island, the northernmost and highest of the group, lies about 27 miles south-southwestward of Balintang Islands, and about 55 miles northward of Cape Engaño Lighthouse. It is about 8 miles long in a northeast and southwest direction, with an average width of about 6 miles. Near the western point is a volcano, about 2,200 feet high, and in the eastern part another about 3,800 feet high, between which the mountains are much lower, so that from a considerable distance eastward it appears as a round mountain with a detached hummock northward. The island seems to be steep all around and apparently affords no anchorage. A reef projects from its western point. The south point is steep and rocky with a black, rocky, sugarloaf islet, **Pan de Azucar,** close inshore.

Wyllie Rocks, consisting of two clusters above water, with high breakers between them, are dangerous to vessels passing through the Babuyan Group at night. The southernmost rock, which is the

largest, lies about 6 miles northeastward of Panuitan Islet. The other cluster lies about 3 miles north-northeastward of the largest rock. The chart shows sunken rocks between Panuitan and the Wyllie Rocks.

Calayan Island, lying about 24 miles west-southwest of Babuyan Island, is formed of mountainous and uneven land, highest in the center, with low gaps in places. It is steep-to, without any safe anchorage and is visible 45 miles in clear weather. Temporary anchorage may be had off the village of Calayan, in the southeastern part of the island, about 150 yards offshore in 14 fathoms, bottom sand and coral. From the anchorage the stone building in the village bears 11° (11° mag.) and the 5-foot rock about 146° (146° mag.). The 5-foot rock shown on the chart is very prominent and breakers show ¼ mile outside of it. There are rocks above water about 1 mile from the south points of Calayan.

Panuitan Islet is a small islet lying about 1½ miles off the northeast point of Calayan Island.

Dalupiri Island, the westernmost of the group, lies about 20 miles south-southwestward of Calayan Island. The north point of the island is reported to extend about 3 miles farther north than shown on the chart. Tide rips extend several miles north of the point. The island has a regular aspect and is visible about 30 miles. In smooth weather anchorage can be had on the east side of the island, close inshore, but the holding ground is poor. Some cattle are shipped from the island.

About 2½ miles off its south point is **Irao Islet,** with shoals extending southward. **Herminia Shoal** is a coral shoal about 2½ miles off the southwest part of Dalupiri Island and 4 miles northwestward of Irao Islet. No information is available as to the depth over this shoal.

Fuga Island, about 8 miles southward and eastward of Dalupiri Island, is about 10 miles long east and west with an average width of about 2 miles. It is moderately high and terminates in low land at the eastern part. Two small islands, **Mabac** and **Bari,** lie off its western end. The soundings off its southern side are irregular, the depths in some places permitting temporary anchorage in smooth weather.

Musa Bay (chart 4270), between the western end of Fuga Island and Bari and Mabac Islands, is a rather circular basin about 1 mile wide by 1½ miles long. Although sheltered from the sea, the holding ground is poor and the anchorage has been reported unsafe in heavy northeast weather. The depths are 12 to 17 fathoms in the middle, shoaling to 4 and 5 fathoms near the coral reef that lines the shores. The best anchorage is near the northeast side of Bari Island in from 14 to 15 fathoms, bottom rotten coral and sand. Near Fuga Island the bottom is very rocky. Bari Island has a reef lying off the north and east sides and another projecting from the southeast point. A narrow shoal ledge has been reported as extending about ¾ mile in a northwest direction from Mabac Island.

The best channel into the bay is from southward, between Bari and the west point of Fuga, the depths being from 14 to 16 fathoms outside and from 9 to 12 fathoms in mid-channel. The west channel into the bay is between Bari and Mabac, with soundings of from 5 to 10 fathoms. The north channel into the bay is rendered intricate

by a reef extending halfway across from the northeast point of Mabac toward Fuga, and at the tail of this reef, joining the northwest point of Fuga, is a rocky patch with 5 or 6 fathoms on it. This channel, therefore, should not be attempted unless in a case of necessity, and to enter by it a vessel must pass rather close to Fuga.

The tide rises in Musa Bay 5 or 6 feet, but is irregular, and the tidal current runs with considerable velocity.

Camiguin, the southeastern island of the group, is about 12 miles in extent north-northeast and south-southwest, 2,747 feet high, and lies 21 miles northwestward of Cape Engaño. Its shores in some places are bordered with coral rocks having from 30 to 35 fathoms, about ½ mile off, and the land is low close to the sea along its eastern and northern sides. The southern part of this island is 2,417 feet high, formerly a volcano. Westward of this mountain some steep white cliffs face the sea, about 2 miles southward of Port San Pio Quinto.

Port San Pio Quinto (chart 4270) may be considered the only place among these islands tolerably safe for a large ship, for the bottom is not so rocky as in Musa Bay, Fuga Island. The port is about 3 miles wide and 1½ miles deep, is situated a little southward of the middle of the west side of Camiguin Island, and is sheltered from westward by **Font Islet,** which lies in the middle of the entrance. This islet is high, about ¾ mile in diameter, steep-to to seaward, and has on each side a safe channel leading to the port.

The south channel, 1½ miles wide, with 40 fathoms at the entrance, decreasing gradually inside, is between the islet and the south point of the port, which, with an islet near it, has the color of iron, and there is a boiling spring of salt water a little southward. The north channel, between Font Islet and north point of the port, is about 1 mile wide, with 28 and 30 fathoms at the entrance, and 17 and 18 fathoms inside; but a rocky patch of only 6 or 8 fathoms lies nearer the islet than mid-channel, and a coral reef projects about ¼ mile from the north point of the entrance. The bottom in the channels and in the port is mostly soft sand, with a little coral in some places, and the soundings decrease gradually to the shore. The best anchorage is in 15 or 16 fathoms eastward of Font Islet, abreast a small rivulet of fresh water, which bears east-northeast from Font Islet.

The U. S. S. *Yorktown* found good anchorage 1 mile southeast of the above-recommended anchorage.

Guinapac Rocks lie about 10 miles east by south from the north point of Camiguin and consist of two rocks like towers, one larger than the other, with smaller rocks contiguous. There are no soundings within a short distance of their eastern side; between them and Camiguin is a channel 6 miles wide, which is safe on the island side. A submerged rock, on which the U. S. S. *Charleston* was wrecked, is reported to lie 1½ miles north from Guinapac Rocks, with foul ground between.

Didicas Rocks, about 7 miles northeastward of the Guinapac Rocks, are a group of four sharp-pointed rocks, much higher than the latter, and from a distance appear like ships under sail. They are 2 miles in extent northeast and southwest; and among them are many rocks of various sizes, which render their approach dangerous in light

winds, for the current runs strongly northward in the southwest monsoon, producing ripplings like breakers in the vicinity of and among these dangers, and there are no soundings near them where a vessel could anchor in case of necessity.

The chart shows a volcanic islet, 700 feet high, on the northwestern edge of this group.

Duguay Trouin Shoal.—According to the statement of the master of the French bark *Duguay Trouin*, a shoal awash exists about 150 miles 79° (79° mag.) from Cape Engaño. This was formerly shown on the chart in latitude 19° 05′ N, longitude 124° 43′ E (existence doubtful).

Anson or **Clare Reef.**—Information is wanting about this danger, which was formerly shown on the charts as lying in latitude 17° 35′ N, longitude 124° 50′ E (position doubtful).

Directions.—Babuyan Channel between Cape Engaño and Camiguin Island, lying northwestward, is 20 miles wide and clear of danger. As the current sets strongly northward in the southwest monsoon, it will be prudent for those proceeding eastward from this coast with light winds to keep on the south side of the channel to prevent being drifted northward near the Guinapac and Didicas Rocks, which lie northeastward of Camiguin Island.

LUZON

is the largest island of the Philippines. It extends from north to south, with a curve toward the east, between latitudes 18° 40′ and 12° 32′ north, and has a length of about 420 miles (484 statute miles), with a width varying from 8 to 120 miles (9 to 138 statute miles). It has a very irregular outline, with a length of general shore line about 1,946 miles (2,242 statute miles). Its area is about 40,969 square statute miles, being nearly the same as the State of Kentucky. The population of Luzon is about half that of the entire Philippine Archipelago. Ranges of mountains, running in general parallel with the length of the island, give it a mountainous character. North of latitude 16° there are two chains, an eastern and a western, separated by the great valley of the Cagayan River. The eastern range, known as the Sierra Madre, is continuous and lofty and forms a bold and almost inaccessible shore, exposed to the full force of the northeast monsoon and the waves of the Pacific. There are a number of isolated volcanic peaks in southern Luzon.

NORTH COAST OF LUZON.

Cape Engaño is the northern point of Palaui Island, a small, high, prominent island lying close to the northeastern extremity of Luzon.

A group occulting white light, visible 15 miles, is shown 315 feet above high water from a graystone tower surrounded by dwellings and storehouses on the summit of the cape.

Palaui Island is 5 miles in extent, moderately high, and lies off the northwestern part of a large promontory which forms the northeastern extremity of Luzon; the port of San Vicente is formed between Palaui Island and the coast. The western shore of the island appears bold, but a reef projects from its eastern side for 1½ miles, the edge

of it being ½ mile from and extending around the small islet **Escucha.** The **Hermanos Islets** lie off Cape Engano, and there are some rocks off the northeast point of the island, about 1 mile eastward of the cape. **Gran Laja,** as formerly described in the sailing directions, is said not to exist, but a low rock surrounded by breakers is in about the position assigned to it. The two rocks said to be about 2½ miles 101° (101° mag.) from Gran Laja were not seen by the U. S. S. *Samar*, though this vessel passed several times close to the assigned position of the rocks. **Engaño Cove** is a small cove southwest of the lighthouse, where supplies are usually landed. Small vessels may find good anchorage in this cove, protected except in northwesterly and westerly winds, steering in for a beacon, consisting of a pole with several horizontal slats, all painted white, on a 111° (111° mag.) bearing, and anchoring in from 10 to 12 fathoms of water.

Port San Vicente (chart 4263), as a place of refuge for vessels during typhoon weather, is the best harbor in northern Luzon, and, in fact, the only thoroughly protected one. It is also resorted to by vessels bound to Aparri when the bar at the mouth of the Cagayan River is too rough to be crossed. Vessels should not attempt to enter this harbor from eastward, as the rocks and shoals on that side make it dangerous to do so. The entrance from westward may, however, be made without difficulty. PUERTO POINT is a high, wooded bluff at the southwest end of Palaui Island; RONA ISLAND is a low, wooded island with a white base of sand and rocks, and Escucha Island is high and wooded, beyond Rona Island when seen from southwestward through the channel between Palaui Island and the mainland. There is foul ground from west to east between Puerto Point and the south end of San Vicente Island. TRUENO SHOAL is believed not to exist, as the steamer captains using this harbor say that they have never seen it, and the U. S. S. *Wheeling* passed over its supposed position and saw no sign of it.

A fixed red light is shown from a concrete pedestal on the eastern extremity of the reef extending eastward of San Vicente Island. This light may be passed close-to on its eastern side. A red buoy, about 350 yards southeastward of the light tower, marks the shoal extending westward from Nulton Point.

Directions—OUTER HARBOR.—Vessels from northward should not skirt Palaui Island too closely; pass about ¾ mile southward from Puerto Point and stand eastward until nearly south of San Vicente Island when Escucha and Rona Islands will be seen in the opening between Palaui Island and Luzon. Good anchorage will be found in the outer harbor with the above two islands in range bearing 36° (36° mag.) and Puerto Point 277° (277° mag.) in about 7 fathoms, muddy bottom. This anchorage is exposed to west and southwest winds.

The INNER HARBOR is a small cove with an anchorage area about ¼ mile in diameter, practically landlocked, with depths of from 4 to 4½ fathoms, muddy bottom. The channel in entering is about 300 yards wide in its narrowest part, west of Nulton Point, where it is contracted by a shoal covered by from 3 to 4 feet. This is marked by a red nun buoy in 5 fathoms off its western edge. From the recommended anchorage in the outer harbor steer for the lighthouse and around its southern and eastern sides at a distance of from 150 to 200 yards and anchor ¼ mile north-northwestward from it in 4 or 4¼

fathoms. The red buoy may be passed close-to, allowing more room to make the turn around the lighthouse. The flood sets northeastward and the ebb southwestward. A current of from 3 to 4 knots may be expected off the lighthouse. Nulton Point, about ½ mile eastward of San Vicente Island and opposite the entrance to the inner harbor, is low.

From the anchorage off San Vicente Island to the mouth of the Cagayan River the coast trends in a west-by-south direction, with a bend southward, for about 30 miles. The large bay between these two points appears to be free from danger. From Batulinao Point to Aparri, about 27 miles, the coast is low, with sand beach.

The **Cagayan River** is the largest river in Luzon. The bar at its mouth generally has from 15 to 18 feet over it at low tide, and the channel is continually changing with the currents caused by the river and the winds. The bar should not be attempted without a pilot. Pilotage for the port of Aparri is compulsory, and pilots are always in attendance when it is possible for vessels to enter (see appendix, p. 340, for special regulations). At times during the northeast monsoon the bar is impassable, and vessels are obliged to seek shelter in Port San Vicente until the weather moderates. Vessels awaiting a pilot may drop an anchor under foot, or keep under way, taking care to keep Linao light bearing southward of 270° (270° mag.) and the church in Aparri southward of 146° (146° mag.). Linao lighthouse (a cylindrical iron tower standing alongside a white stone dwelling) is near the town of Linao on the western side of the mouth of the Cagayan River. It stands about ¾ mile from the river and about ⅜ mile from the sea; and from a distance the tower and dwelling appear as a single large white rectangular building. The light shows one white flash every second, is visible 11 miles, and is 36 feet above high water. A red buoy is northeastward of the foul ground on the western side of the approach to the entrance to the Cagayan River. Owing to its exposed position this buoy is liable to drag and therefore it should be passed with caution.

Aparri (chart 4260), the principal port in northern Luzon, is on the eastern side of the mouth of the Cagayan River and is very prominent. The best anchorage off Aparri for vessels which do not intend to cross the bar is in 10 or 12 fathoms, sand and mud bottom, with the church in Aparri bearing 180° (180° mag.) and Linao light bearing 247° (247° mag.).

The usual anchorage for vessels after entering the river is in the western channel opposite the town of Aparri. The eastern channel in front of the town can be entered only by small craft and usually only from upstream.

Twelve feet can be carried 12 miles up the Cagayan River to Lallo, which is the head of navigation for seagoing vessels. At times freshets occur, causing the river to rise rapidly, so that it is necessary to take precautions against the velocity of the current and the débris brought down by the river.

From the mouth of the Cagayan River the coast, which is low and sandy, trends northwesterly for 14 and 17 miles to the mouths of the small rivers, Abulug and Pamplona, and thence 14 miles farther in the same direction to Pata Point. A sand bank, on which the sea breaks heavily in bad weather extends a considerable distance off the mouths

of the Abulug and Pamplona Rivers. This is the only known danger on this part of the coast.

Pata Point is a knoll 125 feet high with a small detached ridge back of it. A light, visible 18 miles, is shown from the top of a small concrete dwelling on the ridge back of Pata Point.

From Pata Point to Mairaira Point, 18 miles westward, the coast is bold and clear, with two deep bays between them. In the eastern one, at the mouth of the Cabicungan River, is the small town of CLAVERIA, containing a church and convent with iron roofs, which are prominent. Anchorage may be taken in this bay, near the shore, in from 5 to 15 fathoms, sandy bottom, with shelter except in northerly winds.

Pasaleng, the western and larger of the two bays, has two small towns on its shore, but affords no protected anchorage.

Mairaira Point, about 20 miles northeastward of Cape Bojeador, is the most northern point of the island of Luzon. The charts have shown a number of shoal patches, with from 3½ to 5 fathoms over them, extending about 1 mile northward of the point, which is fringed by a narrow reef. It has been reported that these shoals do not extend as far as stated above, but in the absence of detailed surveys the point should be given a good berth. About 1 mile southeast of the point are two rocky cones with several smaller outlying rocks.

Dialao Point, about 4 miles west-southwest of Mairaira Point, is low, rounding, covered with trees, and fringed by a narrow coral reef and a bright sand beach. Behind it is a small but prominent ridge, 500 to 600 feet high, parallel to the coast, almost bare of trees, and reddish in color. This is the only reddish ridge in the vicinity and is visible for a considerable distance.

Negra Point, a black, rocky point, lies about 10 miles west-southwest of Dialao Point, and between the two a deep indentation extends 4 miles southward, forming **Bangui Bay**, where anchorage sheltered from all except northerly winds may be had. There is much foul ground in the eastern part of Bangui Bay. The town of Bangui, lying close to the beach at the head of the bay, is not visible from the sea, being completely obscured by trees.

From Burayoc Point, 2½ miles southward of Dialao Point to a point about 2½ miles east of Negra Point, the shore is low and fringed by a sandy beach. From the end of the sand beach and extending around Cape Bojeador the coast is rocky and fringed by reefs. A great deal of this coast to a point west of the lighthouse is a rocky cliff.

Cape Bojeador, the northwestern extremity of Luzon, is about 300 feet high near the lighthouse, sloping down to the shore and rising southeastward to a mountain ridge, with summit bare of trees. It is surrounded by a reef which extends northeastward to Negra Point and southward beyond Dirique Inlet. A shoal having a least-known depth of 2½ fathoms has been reported about 1 mile westward of the extreme point, and passing vessels are recommended to give the extremity of the cape a berth of at least 2 miles.

A light, visible 26 miles, is shown 386 feet above high water from a white octagonal tower on the summit of a hill ⅞ mile eastward of the northwest extremity of the cape and 700 yards from shore.

WEST COAST OF LUZON.

CAPE BOJEADOR TO LINGAYEN GULF.

Southward from Cape Bojeador the coast is fringed by reefs as far as 3 miles south of Dirique Inlet. **Nagabungan Cove** is an inlet southward of Cape Bojeador, where it is said that the Spanish lighthouse tender landed supplies, but it is too small to afford swinging room except for very small vessels.

Dirique Inlet (chart 4270), affords good anchorage for small craft in the northeast monsoon in a basin about 300 yards in diameter, sheltered from all winds except southwest. Large vessels may anchor outside of the inlet in 15 fathoms, with Bojeador Light bearing 23° (23° mag.).

Range marks.—The following range marks for entering the inlet have been established: Front range, a diamond-shaped slat-work beacon painted white, with a vertical black stripe through the center; rear range, a triangular slat-work beacon painted white, with a vertical black stripe through the center. These marks in range bearing 45° (45° mag.) lead in clear of the reefs to an anchorage in 10 fathoms.

From Dirique Inlet the coast is low, with sandy shore for 15 miles southward to Mount Cauit, at the mouth of the Laoag River, the country some distance in the interior being very high. Anchorage can be found along this coast during the northeast monsoon.

The chain of high mountains inland, which commences near San Fabian, on Lingayen Gulf, extends parallel to the coast, gradually diminishing in height and trending inland about 24 miles south of Cape Bojeador.

Mount Cauit, 18 miles southward of Cape Bojeador, is a grassy sand hill, 299 feet high, with some trees on the crest, near the shore on the right bank of the Laoag River; its highest point is nearly central and rises like a nipple. It is a conspicuous landmark, being the only considerable elevation near the coast line in this vicinity.

Laoag.—The important town of Laoag lies 4½ miles up the Laoag River. The mouth of the river is closed by a bar only passable by boats, the landing being a little over ½ mile from the mouth. From here there is a good road to the town. There is telegraphic communication with Manila.

A good anchorage off Laoag River may be found by bringing Mount Cauit to bear 45° (45° mag.) and steering for it, anchoring in 7 fathoms, sandy bottom, when Culili Point bears 204° (204° mag.). On this bearing Laoag River is open and in range with Mount Cauit. In case the weather is not suitable for anchoring off Laoag River a berth may be taken up off Currimao.

From Mount Cauit, at the mouth of the Laoag River, the coast trends southerly for about 8 miles to Culili Point and is low and sandy. Culili Point is 114 feet high, abrupt and rocky, and without trees. It is quite prominent on account of the sand dunes behind it and is visible for a considerable distance. From here the coast trends southerly for 4 miles to Port Currimao.

Port Currimao (chart 4207) is a small opening in the coral reef and affords anchorage during the northeast monsoon. It is the nearest available anchorage to Laoag when vessels are unable to lie off the

mouth of the Laoag River. Owing to the scant room and the absence of protection, except from a northerly swell, it affords indifferent anchorage for small vessels and a poor one for large ones. The bottom is sandy. Point Arboledan, the northern point at the mouth, is 12 to 15 feet high, rounding, and fringed by a coral reef 200 to 250 yards wide, partly bare at low water. With the exception of a narrow break opposite the village in the northeast part of the cove, this reef extends southward around the shore line, baring considerably at low water, but with its outer limits always submerged and rising rapidly from deep water. The southern point of the cove, marked by a light, is low and rounding, with a submerged coral reef about ⅓ mile wide projecting southwesterly for about ¾ mile. There is an average depth on this reef of about 2 fathoms for the greater part of its length with a least depth of 1½ fathoms, but the bottom is very uneven and the limits of the reef irregular.

On the north side of the cove, extending northward and parallel to the coast and rising rather abruptly to a height of about 150 feet, is a long ridge covered with thick dark-green brush and a few groups of taller trees. This ridge is useful in identifying the locality from seaward or northward, its southern end marking the port. A large stone church, now used as a warehouse, is in the northeast part of the cove near the inner end of the break in the reef. This is a prominent landmark from southward except in the early morning with the sun in the east. The circular stone forts or towers on either side of the cove are convenient and reliable when close in; the southeastern one has been whitewashed and shows well. Only a small portion of the village of Currimao is visible from the anchorage.

The boat landing is at the inner end of the break in the reef near the warehouse, but owing to the numerous coral heads near the surface caution must be used, as at low water there is some difficulty in landing even in a small boat.

Directions.—Vessels bound for Currimao should, when about 1 mile offshore, bring the old whitewashed fort on the eastern shore to bear 105° (105° mag.); then stand in cautiously with the fort on the above bearing and when the western extremity of Arboledan Point is in range with the next point northward and the warehouse bears 30° (30° mag.) anchor in 11 fathoms, soft bottom. Small vessels may find better protected anchorage in 9 fathoms, ⅓ mile northward and eastward of the above.

Gan Bay immediately southward of Port Currimao affords good shelter in northerly weather; during southerly weather small boats can land in the southern part just inside the southern entrance, where there is a break in the shore reef with a sand beach at its head. Its northern limit is formed by the reef, previously described under Port Currimao, extending southwestward from the low point between Port Currimao and Gan Bay. In the southern part of the bay about ½ mile offshore is a shoal with a least depth of ¾ fathom. The anchorage area northeast of this shoal is about ½ mile in diameter with depths of from 6 to 10 fathoms, sand and mud bottom, shoaling gradually to the beach. A narrow, winding channel lies southward of the shoal, but in the absence of buoys should not be attempted. The northern and main channel is nearly ⅜ mile wide

between the 3-fathom curves and would present no difficulties if buoys or ranges were established.

Gabot Point is immediately southward of Gan Bay. With its reef and Gabot Islet it forms a peninsula with a narrow neck, affording a good boat landing on either side. That on the southern side is good in a northerly swell, but the other one is better most of the time, being more nearly landlocked. It is very probable that a landing could be made on one side or the other at any time.

In the open bight between Gabot Point and Lugot Point, about 2½ miles southwestward, the bottom is smooth sand with no indications of coral except that fringing the above-mentioned points. The beach is sand, backed by shifting sand dunes. The 10-fathom curve is about 1 mile offshore and the depths shoal gradually to the beach.

Badoc Island lies ¾ mile from shore, about 11 miles southward of Culili Point. It is 130 feet high, very abrupt on the west side, and almost bare of trees. The top of the island is covered with grass and has a solitary tree near the center. The north and west sides are fringed by a reef. The channel between Badoc Island and the mainland has a depth of 20 fathoms.

During ordinary northerly and westerly weather a fairly good anchorage may be had between Badoc Island and the mainland, although the depth is 20 fathoms. In heavy northerly winds better protection may be had a little over 1½ miles southeastward of the island in 11 fathoms, just outside the mouth of a deep inlet through the coral reef. This inlet furnishes a good landing for boats at nearly all times, as it is deep and narrow, with a good sand beach at its head.

Southward of Badoc Island are two banks each with a least depth of 7 fathoms. The first lies 2 miles and the second 3¾ miles south-southwestward of the south point of the island. These are the shoalest points on a submarine ridge extending south-southwestward from Badoc Island, on which are depths of from 11 to 15 fathoms, rising abruptly from 30 fathoms.

Cabugao Bay, between the next point southward of Solot Point and the point eastward of Salomague Island, affords two anchorages, with protection in southerly weather; the first in the deep bight eastward of Cabugao Point in from 6 to 7 fathoms. Toward the head of the bight there is some protection from northerly winds. The other anchorage is in about 7 fathoms, anywhere in the bight southward of Cabugao Point, but preferably in the southwest part.

A shoal with a least depth of 3 fathoms lies nearly 1¼ miles northwestward of Cabugao Point, and a little over 2½ miles northeastward of the north point of Salomague Island.

Salomague Island lies about 8 miles southward of Badoc Island and just northward of the entrance to Salomague Harbor. It is separated from the mainland by a channel ¼ mile wide, with a least depth of 5½ fathoms, and is sometimes used by small steamers. Salomague Island is 110 feet high, very abrupt on the west side, and covered with brushwood and grass and a few trees. It is nearly surrounded by a narrow coral reef.

Salomague Harbor, (chart 4207), about midway between Port Currimao and Point Dile, is of little commercial importance, but affords anchorage with good protection from all but westerly and south-

westerly winds. It is used even during the southwest monsoon for handling Laoag and Vigan cargoes when it is too rough for the coasting steamers to work at those places. The points at the entrance are fringed with reefs. SALOMAGUE POINT, the north point, is a bluff table-land about 100 feet high. DARRENA POINT, the south point, is low and covered with brush and trees. The shores of the bay are fringed with coral reefs extending 100 to 500 yards offshore, except in two small coves on the north and east sides, where short stretches of sand beach afford a boat landing. The small town of Salomague lies at the head of the north cove, where there is a small wharf with about 3 feet at its outer end. This is used only by lighters and boats. An old, round, whitewashed tower with a grass roof is near the beach in front of the town.

The anchorage area is contracted by two shoals. NORTH SHOAL lies off the north point of the bay, a little less than ½ mile southwestward of the tower and generally shows a breaker. A small patch in the center is awash at high water. The shoal is steep-to on all sides and its southwestern extremity is marked by a black buoy.

MIDDLE SHOAL, about ½ mile from the southern and eastern shores of the bay, is shoalest in the center, where there are several coral heads with 4 feet over them at low water. A red buoy is moored in 2½ fathoms near its northwest extremity. Another and smaller shoal lies in the eastern part of the harbor, but is out of the way of the anchorage for large vessels.

Southwest from Darrena Point shoals and irregular bottom extend westward and southward, terminating in SOUTHWEST SHOAL, with 2¼ fathoms over it at low water, 2⅓ miles westward of the point. A smaller shoal, with 24 feet over it, lies ⅔ mile nearer Darrena Point on nearly the same bearing. MASBATE SHOAL, with 25 feet over it, lies 1⅜ miles west-southwestward of Darrena Point.

Approaching Salomague Harbor from northward or southward the best landmark is Salomague Island and, when close in, the light structure and the old stone tower. Darrena Point is not conspicuous and can not be made out until within a mile or two of the anchorage, when it shows as a white line of sand beach, covered above high water with green bushes and grass projected against the high land back of it.

From seaward the best marks are Mount Nagapu and Mount Bulagao.

MOUNT NAGAPU is dark, flat-topped, 4,183 feet high, 12 miles eastward of the southwest extremity of Salomague Island. Although the highest mountain in this vicinity, it is not very conspicuous, as it rises behind a high ridge nearer the coast.

MOUNT BULAGAO, of which the north peak is 3,688 feet high, lies 11 miles southeastward of the southwest extremity of Salomague Island. It is dark, and conspicuous on account of its comparative isolation. From northwestward it shows one rounded summit, but from southwestward it shows two summits of almost equal height and shape about ¾ mile apart.

There is a light about ⅛ mile southward of the village of Dadarat, on the eastern shore of Salomague Harbor.

DIRECTIONS.—Vessels from northward should pass about ½ mile westward from Salomague Island, and when the light bears 90° (90° mag.) it should be steered for. Good anchorage will be found

in 8 fathoms with the light on the above bearing and the old tower bearing 349° (349° mag.), distant about ½ mile. Small vessels can find better sheltered anchorage in 7 fathoms more to the northward and westward.

Large vessels from southward should keep Pinget Island bearing nothing westward of 180° (180° mag.) until the light bears 90° (90° mag.), when the previous directions should be followed. Small vessels and those having local knowledge, approaching from southward, may bring Salomague Point to bear 38° (38° mag.) and steer for it, keeping a good lookout for Southwest and Masbate Shoals; when the light bears 90° (90° mag.) they should steer for it and anchor as previously directed.

Too much dependence should not be placed on the buoys, as they are liable to drag in heavy weather.

Lapog Bay, immediately southward of Salomague Harbor, between Darrena and Lapog Points, affords protection similar to Salomague Harbor, but is more exposed. The southern part of Darrena Point is fringed by a coral reef, mostly bare at low water, extending 100 to 500 yards offshore. The eastern shore of the bay is a sand beach. The southern shore is fringed with coral extending 100 to 300 yards offshore, in which a break about 100 yards wide, terminating in a sand beach, leads to the small village of Saoang, the seaport for the town of Lapog, about 1 mile inland. This break is capable of accommodating three or four small craft. Several small villages are situated on the shores of the bay.

There are several shoals in the bay and its approaches. **Lapog Shoal**, about ⅝ mile southward of Darrena Point, has a least depth of 1¼ fathoms. Between this shoal and the reefs extending southward from Darrena Point is a channel about ¼ mile wide, with depths of from 7 to 14 fathoms. In the northern part of the bay, about ¼ mile offshore, is a reef, bare at low water. Small native craft anchor behind this reef, and a contracted anchorage in about 4 fathoms may be had by a small vessel north and west of it. Shoal water, with depths of from 2 to 3 fathoms, extends ½ mile westward of Lapog Point, and a small shoal with a least depth of 2¼ fathoms lies 1¼ miles westward of the point.

This bay is used almost exclusively by native craft with local knowledge. In view of its proximity to Salomague Harbor, and the fact that the latter affords better protection and holding ground, this anchorage is not recommended.

Pinget Island, about 6 miles southward of Salomague Island, is low, sandy, covered with brush, and fringed by a narrow coral reef. Its highest point, 20 feet, is near the southern end. It is about ½ mile offshore and is connected with it by a sand bar, covered by 2 feet at low water.

Anchorage may be made either north or south of the island, dependent on the weather. On the north side during the southwest monsoon good protection may be had in about 7 fathoms, 600 yards eastward of the point or closer in, depending on the size and draft of the vessel. On the south side a vessel should anchor in about 6 fathoms on a line between the south point and the old stone tower or fort on the mainland about ½ mile southward of the island. The water is deep up to the edge of the reef at the southern point of the island and shoals gradually toward the mainland.

A shoal with a least depth of 5 feet lies 1½ miles south of Pinget Island, and nearly 1 mile offshore at its outer edge. Between this shoal and the reefs making off from shore is a narrow channel about 300 yards wide with depths of from 5 to 6 fathoms; this channel should not be attempted without local knowledge.

With the exception of these reefs and some rocks making out from a point under the old fort, the coast is low and sandy from Pinget Island to Point Dile.

Point Dile, the most salient point on this part of the coast, projects well westward, but it is low and not prominent. There are no reefs off the point, but the 10-fathom curve is about ¾ mile offshore. Two miles north of Point Dile this curve is about 1 mile offshore. Discolored water, the discharge from the Abra River, may at times be seen off the point.

Vigan, an important town, is inland about 3 miles eastward of Point Dile. **Pandan,** the landing place, is about 3 miles southeastward of Point Dile, near one of the mouths of the Abra River. The channels leading into the river are constantly changing, both in position and depth, especially during the season of freshets and the southwest monsoon. At times 5 feet can be taken over the bar, but local knowledge is necessary.

Caoayan, a large village about 1 mile northeastward of Pandan, contains a large church with an iron roof, which formerly made a prominent landmark but has lately been reported hard to pick up.

The anchorage off Pandan is somewhat sheltered from northerly winds, but in strong northerly and northeasterly winds the ground swell works around the point, causing a heavy surf and making the landing of cargo difficult and at times impossible. At such times the anchorage is very uncomfortable, as with the northerly current vessels lie in the trough of the sea, and tide rips extend from the southern mouth of the river to beyond Point Dile, giving a dangerous appearance to the point.

A light is shown from a white concrete pillar on the beach near the town of Pandan.

There are three shoals in the approach to Pandan; the shoalest, with a least depth of 3¾ fathoms, lies about 2¼ miles southward from Point Dile and about ½ mile from shore. About ½ mile outside of this shoal is a 4½-fathom patch, and southward and eastward from these two shoals and 1 mile from shore is a 4½-fathom shoal. Caoayan church, or Pandan Light, bearing nothing eastward of 41° (41° mag.), clears the southeast side of these shoals, and Point Dile, bearing nothing westward of 355° (355° mag.), clears the western side.

Directions.—Vessels from northward should round Point Dile at a distance of 1½ miles and keep this distance offshore until Pandan Light bears 41° (41° mag.). The church at Caoayan should then be in range with a prominent shoulder on the west side of Bulagao Mountain. Anchorage in 6 fathoms, sandy bottom, will be found on this range, about ⅝ mile from shore, with Solvec Rock bearing 140° (140° mag.). The above range leads about ½ mile southeastward of the southern 4½-fathom patch. Vessels from southward should give the coast a berth of at least 1 mile until the church bears 41° (41° mag.), and then proceed as previously directed.

Vigan Gap is a marked cut or divide in the mountain range back of Vigan. It is about 8 miles eastward of Point Dile and is a conspicuous landmark for this vicinity.

Solvec Cove (chart 4208) is a small indentation in the coast about 10 miles southeastward from Dile Point. It is of little commercial importance, but affords protection in northerly weather to large vessels under the lee of Solvec Point, the north point at the entrance, in from 10 to 12 fathoms and to small craft farther in. The inner basin is formed by a reef, partially bare at low water, projecting about ¼ mile northwestward from the shore. The depths average about 5 fathoms, but the holding ground is poor, a thin layer of sand and mud over coral. A boat landing can be made on the sand beach at the head.

The location of the cove is well marked by **Mount Narvacan**, a solitary detached hill 858 feet high immediately southeastward of the cove, and by the long ridge extending southward from the prominent **Tetas de Santa** and terminating abruptly in Solvec Point.

Solvec Rock, square and about 30 feet high, lies about 200 yards off Solvec Point, to which it is connected by low rocks a few feet above high water. It is quite prominent from northward or southward; a rock awash lies about 50 feet westward of it.

The northern shore from Solvec Rock to the ruins of the old tower, about ½ mile eastward, should not be approached closer than ¼ mile by large vessels, as there are detached coral bowlders lying off it. The outer edges of the coral reefs on both sides of the cove bare in places at low tide and can generally be made out; they are steep-to on the outside, but not so much so inside the cove, and are surrounded by detached lumps of coral.

To enter the anchorage, bring the largest house in the village, conspicuous on account of a galvanized-iron roof, to bear 62° (62° mag.), when it should be directly under a rounded hill with two conspicuous trees on the summit about 8 miles inland. Steer in on this range and for the outer roadstead; anchor when Solvec Rock bears 315° (315° mag.) and the old tower on the north shore 23° (23° mag.) in from 9 to 10 fathoms. The same range held will clear the reefs on either side of the entrance to the inner cove, where smaller vessels may choose anchorage according to draft and depth.

Anchorage with some shelter for small vessels is found about 4 miles southward of Solvec Point off the mouth of the Mainganay River, where there is a small opening or pocket in the coral reefs; many of the native vessels enter the river. Although the depth is sufficient in the anchorage, there is no swinging room for large vessels.

Nalvo Bay is a small cove about 5 miles southward of Solvec Cove. A coral reef projects about ½ mile westward from the point on the north side, affording protection in northerly weather, but there is no protection from southward. It is a much safer anchorage than Port San Esteban during the northeast monsoon. The eastern shore is a sand beach, immediately back of which is a solitary sharp hill about 250 feet high, the southernmost of a series of similar higher and lower elevations immediately back of the coast line.

To enter, bring the sharp hill to bear 79° (79° mag.), when Santa Maria Church will be seen at the base of the northern slope. Stand in on this range until Solvec Rock is on with the point of land on the north side of Nalvo Bay, when anchorage may be had in from 5 to

6 fathoms, hard, smooth sand bottom. Small coasters discharge and load close in to the sand beach under the hook of the reef in the northeast part of the cove.

Suso Shoal is the only outlying or detached shoal on this stretch of coast. It is about ¾ mile north of San Esteban Point and about the same distance offshore. There is only slightly deeper water between it and the shore eastward. The shoalest water found was 3½ fathoms, and it probably breaks only in very heavy weather.

Port San Esteban, about 6 miles southward of Solvec Cove, is a small cove, open to the north and northwest, and is a dangerous anchorage in the northeast monsoon on account of the large swell rolling in. Suso Shoal, in the approaches, affords no protection, but, if anything, increases the swell. In the southwest monsoon it affords shelter to small craft that run in between the reefs and anchor or moor off the sand beach in front of the town at the head of the port. A quarry showing as two bare spots on the hillside about ⅔ mile northward of the landing, a stone tower on the western point, and a large stone building back of the sand beach are prominent in approaching.

To enter, bring the quarry to bear 90° (90° mag.) and stand in on this course until the large stone building bears 169° (169° mag.) and anchor in 8 to 9 fathoms, sandy bottom; or anchorage may be made farther out, when the stone tower bears 180° (180° mag.) in 8 to 10 fathoms.

Santiago Cove, 4 miles southward of Port San Esteban, affords fair shelter during the northeast monsoon, but is exposed in westerly weather. At the head of the cove is a bright sand beach on which is a small village. Behind the beach is a small stream that empties at its southern end. The town of Santiago is about 1 mile inland, and only the church and monastery are visible. The reefs at the entrance and along the shores are narrow and plainly marked.

To enter bring the church buildings to bear 67° (67° mag.) and steer for them on that bearing. Large vessels should anchor when the north point at the entrance bears about 320° (320° mag.), in 6½ fathoms, sandy bottom. In entering and after passing the point of the reef on the south side, it is better to favor this side and round-to northward. Good water is found close up to the reefs. Small vessels can go within ⅛ mile of the beach at the head of the cove and find good anchorage but contracted swinging room.

Candon Point, 8 miles southward of Port San Esteban, is low, heavily wooded with coconut trees, and fringed by a narrow reef. It projects about 1 mile from the general trend of the coast but is not prominent. Anchorage may be had south of the point in 5 to 6 fathoms west-southwestward of the stone house on the beach. Large vessels should anchor with Candon Point bearing 0° (0° mag.) in not less than 9 fathoms. The anchorage is somewhat protected from northerly winds, but in strong northerly and northeasterly winds the swell follows around the point, causing a heavy surf and making the landing of cargo difficult and at time impossible. The town of Candon lies about 1½ miles inland, southeastward of Candon Point, and is not visible from the sea.

A light, visible 9 miles, is shown from a white frame structure on the beach about ½ mile southeastward of Candon Point.

The coast from Candon Point trends southerly for 17 miles to the mouth of the Amburayan River, thence southwesterly for 7½ miles to Darigayos Point, which is low, covered with trees, and surrounded by a reef; thence it trends southward again for 12 miles to the entrance to San Fernando Harbor.

A number of small towns are scattered along this stretch, among them being Santa Lucia, Santa Cruz, Tagudin, Bangar, Luna, Darigayos, Bacotan, and San Juan. Santa Lucia, 6 miles southward of Candon Point, may be recognized by a large church with a prominent white dome. Tagudin, the port for the Mountain Province, lies near the mouth of the Amburayan River, about 9 miles southward of Santa Lucia. Luna, about 6 miles southwestward of Tagudin, has a church with three towers.

Tagudin light, a fixed red light, visible 7 miles, is shown from a white concrete pillar about ¼ mile north-northeastward of the northern entrance to the Amburayan River. This light steered for on a 135° (134° mag.) bearing leads to an anchorage in 8 fathoms, sand and mud bottom.

Darigayos Inlet is a slight indentation in the coast at the mouth of the river of the same name, 1 mile southward of Darigayos Point. Reefs on each side of the entrance extend out ⅓ mile. The entrance is about 300 yards wide, and from it the old stone warehouse bears 91° (90° mag.), and the old stone fort on the south point bears 147° (146° mag.). Farther in, 200 yards from the shore, there is anchorage for launches in 10 feet, sandy bottom. This anchorage is poorly protected and of no commercial importance. There is a narrow shore reef for several miles north and south of the inlet.

Caution.—During the northeast monsoon a strong current has sometimes been observed setting north-northeast along this coast. Vessels proceeding southward should be prepared for this current, or they may find themselves embayed in Lingayen Gulf.

LINGAYEN GULF,

on the west coast of Luzon, is open to the north-northwest. Eastward are lofty mountains, with Mount Santo Tomas rising to a height of 7,407 feet. The west coast is of moderate height and fairly level, gradually rising southward in a compact mountain mass. There is a chain of shoals with 3½ fathoms or more extending nearly halfway across the entrance from Cape Bolinao, with a clear channel about 13 miles wide west of San Fernando Point. On the eastern side of the gulf the shore is free from dangers, except the shoals near Santo Tomas and San Fernando. There is a continuous sand beach, with the foothills rising a short distance back. The shore around the head of the gulf is low, sandy, and free from danger.

On the western side from Santiago Island southeast the coast is fringed by an almost continuous chain of islands and rocks as far south as Cabalitian Island, just northward of Sual. The islands are, as a rule, low and wooded, and have shallow channels between them, used only by coasters.

The prevailing wind for the greater part of the year is southeast. During the northeast monsoon land and sea breezes become regular and blow freshly, with clear atmosphere, but are interrupted by

strong north and northeast gales. A bank of clouds seen in the north, with a clear sky and high barometer, is a certain sign of the commencement of a gale. In June the wind blows from southeast in the morning, with squalls off Mounts Santo Tomas and San Isidro; toward evening it dies away with heavy rain and thunder, and, clearing toward midnight, leaves a light wind from south which sets in from southeast at dawn.

From July to October there are usually gales from southwest to west, lasting from 3 to 15 days, accompanied by torrents of rain. The worst season in the gulf is from the middle of September until the end of October, when typhoons occur. The principal anchorages in the gulf are San Fernando, Santo Tomas, Dagupan, Sual, Cabalitian Bay, and Bolinao.

San Fernando Harbor (chart 4246), open to the north and northwest, is formed by a peninsula, San Fernando Point, projecting from the coast in a west and northwest direction. The harbor is about 1½ miles in diameter, but the entrance between the reefs extending from both sides is about ⅜ mile in width. Being open to the north and northwest, there is little shelter from those directions. In heavy northerly weather vessels anchor off Poro Sur, in the southwest part of the harbor, and ride easier than off San Fernando; the anchorage is within 200 yards of the beach in from 5 to 8 fathoms, muddy bottom and good holding ground.

San Fernando is on the eastern shore of the harbor, and is of considerable importance, being a regular port of call for the coastwise steamers. There are no wharves, all cargo being handled by lighters. There are the remains of an old pier used only as a boat landing. Just north of the town is the village of Carlatan, with a large warehouse and store. In the southwest part of the bay is the village of Poro Sur.

San Fernando Point rises gradually northwestward to a height of 84 feet. On its western side are white cliffs which are very prominent.

Fagg Reef, composed of rock and sand, nearly ½ mile in extent, with a least depth of 4½ fathoms, on which the sea breaks in heavy weather, lies about 2 miles northwestward from San Fernando Point. Vessels from southward and westward pass between Fagg Reef and the point.

Shoals.—From the eastern shore a shoal extends westward about ⅜ mile, its outer extremity being marked by a black can buoy moored in 31 feet.

From San Fernando Point an extensive rocky shoal projects northeastward for nearly 1 mile, its outer extremity being marked by a red buoy.

The channel in entering lies between the buoys, and is nearly ½ mile wide and deep enough for the largest class of vessels. A lighted range guides through the buoyed channel.

A light, visible 15 miles, is shown from a white cylindrical iron tower alongside a white dwelling near the bluff on the western side of San Fernando Point, about ⅗ mile south of the northern extremity of the point.

Directions.—Vessels from northward should bring San Fernando light to bear 181° (180° mag.) and steer for it until on the range, stand in on the range course 144° (143° mag.), passing between the

buoys, until San Fernando light bears 226° (225° mag.); then change the course to 158° (157° mag.) and anchor in from 8 to 9 fathoms. On the latter course an old iron boiler on the beach at the head of the harbor will be almost ahead.

Vessels from southward and westward should steer to pass 1 mile northward of San Fernando Point and steer 91° (90° mag.) until on the range; then proceed as directed above.

Research Reef.—A coral reef lies 1¼ miles south-southwestward of the southern extremity of San Fernando Peninsula and nearly 1 mile offshore and has a least found depth of 16 feet. A shoal with a least depth of 2¾ fathoms lies about ¾ mile southward of Research Reef and about ¾ mile southwestward from the next point southward of San Fernando Point.

Santo Tomas anchorage is on the eastern side of Lingayen Gulf about 25 miles southward of San Fernando Point, and is formed by a sand spit and bank extending southward from the shore. From the end of the exposed spit the submerged sand bank extends 4½ miles in a general southerly direction, its southern end being about 4 miles offshore. This bank has from 1½ to 2½ fathoms across it. It is abrupt on the inner side and at its extremity, deepening rapidly to 12 fathoms, but its outer slope is, as a rule, more gradual. It affords little protection. The best anchorage is about 1 mile southeastward of the exposed spit, in 7 fathoms, muddy bottom. The harbor is at present of no commercial importance, and no directions are considered necessary, the chart being a sufficient guide.

Dagupan River Entrance is about 12 miles south by west from Santo Tomas. The bar at the mouth shifts frequently, but generally has 6 feet on it at low water. After crossing the bar no trouble is experienced in going up the river, which generally has from 8 to 14 feet in the channel. Pilotage for all vessels of 5 register tons or over is compulsory, and pilots can be had by blowing the whistle. Anchorage may be had off the mouth of the river in 6 fathoms about 1 mile northwestward from the light. The town of Dagupan is about 2 miles from the bar.

A light, visible 9 miles, is shown from the top of a white concrete house on Guecet Point, on the east side of the entrance to the Dagupan River.

Port Sual is 11 miles westward of Dagupan, in the southwest part of the gulf, and has good anchorage for a small vessel, protected from all winds except from east-northeast to east-southeast. The available anchorage is narrowed by reefs to an area about ¼ mile in diameter. The land around Portuguese Point, on the northern side of the entrance, appears like an island from a distance of 7 or 8 miles. The point may be recognized by a small tower which forms part of an old fort. A reef extends about ⅕ mile southward from Portuguese Point. This is always covered and only breaks when the wind sets in.

Mangas Point, on the south side of the entrance, is surrounded by a reef extending out ⅛ mile, on the outer part of which, northward of the point, is a group of rocks, always exposed, and which may be approached to 100 yards.

Adela Rock, with 10 feet over it, and 4 to 6 fathoms all around, lies 1,170 yards eastward of Mangas Point. The sea breaks on this

rock in heavy weather. It is in range with the northern extremity of Mangas Point and the white warehouse in Sual.

DIRECTIONS.—Vessels from northward should pass about ¼ mile eastward from Portuguese Point and continue southward until the church in Sual bears 264° (263° mag.), when it should be steered for; when the rocks off Mangas Point are abeam the vessel should be hauled northwestward and anchored in about 6 fathoms, muddy bottom, with Portuguese Point bearing 46° (45° mag.) and Mangas Point bearing 158° (157° mag.). Small craft may anchor farther north-northwestward in a basin about ¼ mile in extent. If bound in from the southward and eastward the white warehouse on the southern shore well open of Mangas Point clears Adela Rock.

From Sual the coast trends northwesterly for 23 miles to the northern extremity of Cape Bolinao and is indented by deep bays and faced by numerous islands.

Cabalitian Island, 2 miles northward of Portuguese Point, is fringed with rocks, wooded, and 345 feet high in the southern part.

Cabalitian Bay affords good anchorage in 10 to 13 fathoms, protected from northeast winds by Cabalitian Island, which lies in its entrance. The anchorage may be approached either from north or south. Vessels entering this bay from the north should steer for Bangayao Point, the northern entrance point, on a 229° (228° mag.) course until abeam of an islet lying ⅛ mile northwestward of Cabalitian Island, then make good a 204° (203° mag.) course until abeam of the southwestward point of the island, passing 350 yards southwestward of Bangayao Point, then haul southwestward and select anchorage in about 13 fathoms, about ¼ mile southward of the southwest point of the island.

Calpay Shoal lies about ½ mile southward of Cabalitian Island. The southern end of the shoal is always awash, and is steep-to.

There is a deep channel, 200 yards wide, between the south side of Cabalitian Island and the northern extremity of Calpay Shoal, but it should not be used by a stranger. The best channel is south of the shoal and should always be used in approaching Cabalitian Bay from the eastward.

Pao Bay, northward of Cabalitian Bay, affords good, sheltered anchorage for small vessels in from 4 to 5 fathoms, but the entrance is contracted by a long reef lying southward of Bangar Point and a shoal patch in the middle of the channel with a least depth of 9 feet. The northern part of the bay is shoal. Vessels entering must be guided by the chart and proceed with caution.

Comas Island, northeastward of Bangar Point, is about ¼ mile from the shore, with which it is connected by a reef, dry in places.

Hundred Islands are a large group of small wooded islands lying 5 to 7 miles northwestward of Comas Island. Their bases are much underworn by the sea, making landing on them difficult. Good protected anchorage in 6 to 8 fathoms may be had westward of this group; vessels entering must be guided by the chart.

Cabarruyan Island, the largest island in the gulf, lies eastward of Cape Bolinao. It is of moderate height and covered with trees. **Tombac Bay,** the long inlet south of Cabarruyan Island, is quite shoal, the average depth being about 9 feet.

Siapar, Narra, Cangaluyan, and other small islands lie northward of Cabarruyan Island. These islands, from the north end of Santiago to the south end of Cabarruyan, are fringed by reefs, broken in places, where channels available for small vessels lead to anchorages among the islands. These reefs extend 2½ miles from the islands in places.

Santiago Island lies off the northeastern part of Cape Bolinao and forms the northern side of Bolinao Harbor. It is high and covered with trees. Its highest portion is visible about 18 miles.

Silaqui Islet is about 1 mile northward of Santiago Island on a reef which extends 2 miles northward of Santiago. It is 71 feet high at the southern end and appears wedge-shaped from westward.

There is a bank extending northeastward beyond the reef which surrounds Santiago Island, having a least depth of 3½ fathoms. The outer edge of this bank lies 8 miles northeastward of Silaqui Islet. There is another bank, having a least depth of 6 fathoms, 10 miles northeastward of the same point.

CAPE BOLINAO TO MANILA BAY.

Cape Bolinao is the name given to the northern end of that part of Luzon which forms the western boundary of Lingayen Gulf. It is of moderate height, thickly wooded, and slopes gently toward the sea.

Bolinao Harbor (chart 4238), on the northern part of the cape, is the most westerly port in Lingayen Gulf and is commercially of little importance. Bolinao, a small, unimportant town, is about ½ mile westward of the entrance to the harbor. Very little of the town is visible, the iron roof of the church being the only prominent object visible over the trees, a large number of which are coconuts. The harbor is formed by a strait between Santiago Island and Cape Bolinao. Silaqui Island, about 1 mile north of Santiago Island, is surrounded by reefs, and must be given a good berth. The principal value of this port is as a harbor of refuge, it being a perfect typhoon harbor for fair-sized vessels. The entrance is formed by a break in the coral reef, which extends 1 mile offshore north of the town and about 2 miles north of Santiago Island.

The channel in entering is marked by a red buoy, about ½ mile north of Trinchera Point, where the reef makes rather an abrupt trend southward, and a black buoy, a little farther in, marking the limit of the reef on the eastern side.

Native boats of light draft frequently take advantage of the narrow and winding passage leading to Lingayen Gulf from the head of Bolinao Harbor behind Narra, Siapar, and Cabarruyan Islands. The least depth is about 6 feet at low water, with 7 to 8 fathoms in places. Local knowledge is necessary for its use.

A fixed red light, visible 7 miles, is shown from a white concrete pillar supporting a square white day mark on the south shore of Bolinao Harbor.

Directions.—Vessels approaching Bolinao Harbor should not bring the tangent to Cape Bolinao to bear westward of 220° (219° mag.) until the light bears 152° (151° mag.), when it should be steered for; keep the light on this bearing, pass midway between the buoys, and when Trinchera Point is abeam keep in midchannel and anchor westward of Binabalian Point in 9 or 10 fathoms, muddy bottom. If

desirous of anchoring eastward of Binabalian Point, round it at a distance of about 400 yards to avoid the reef extending about 200 yards southward, and when the light is abeam steer a midchannel course and anchor either east or west of Riripayan Point as desired.

Balingasag Point, low and wooded, about 1 mile westward of the entrance to Bolinao Harbor, is the most northern part of the cape. From here the coast trends southwesterly for 7 miles to Piedra Point and is fringed with shoals and reefs.

Balingasag Bay is a narrow opening in the reef about 2 miles southwest of Balingasag Point. It affords a boat landing in smooth weather, and stores for Bolinao lighthouse are sometimes landed here when too rough to land at Piedra Point. The anchorage is contracted, with little turning room, and should be used with caution.

Piedra Point, about 12 miles southwestward of Silaqui Island, is the most westerly point on Cape Bolinao. It is rounding, rocky, and wooded to near the beach, and 240 feet high about ¾ mile from its western extremity. In smooth weather a boat landing can be made on the sandy beach immediately southward of the point. A group flashing white light, visible 24 miles, is shown from a concrete tower on a heavily wooded hill on Piedra Point.

From Piedra Point to Caiman Point, about 23 miles southward, the coast is rocky, bold, and wooded, and broken in many places by small sandy bights. At no place do the fringing reefs extend ½ mile, and the 100-fathom curve is generally found within 1 mile of the shore.

Olanin Bay is a small bight at the mouth of the Olanin River about 4 miles southward of Piedra Point, affording anchorage during the northeast monsoon in the middle of the bight, in about 7 fathoms, about ¼ mile offshore. There is a good boat landing, and fresh water may be obtained.

Agno Bay, about 10 miles southward of Piedra Point, is an open roadstead. The Balincaguin River empties near the southern part of the bay; the bar at its mouth has about 5 feet over it, but at high water vessels of 7 feet draft have gone up the river to the town of Agno, about 2 miles above its mouth. Fair shelter during the northeast monsoon may be had under Rena Point, the north point, or southward near the mouth of the river. From Saoit Point, the southern point, a sunken reef with about 2 fathoms over it, extends northwestward for a little over ½ mile.

Caiman Point is irregular and rocky with two outlying rocks, the outer of which, abrupt and about 15 feet high, is seen as detached, while the inner one is projected against the point. The point is fringed by a coral reef, which extends about ¼ mile southward from it and follows the shore round into Caiman Cove, lying eastward of the point.

Dasol Bay, between Caiman and Santa Cruz Points, contains no perfectly protected anchorages and is of little value to navigation. There are numerous reefs and shoals scattered throughout the bay, the positions of which will be best understood by reference to the chart. The shores are low and intersected by a number of small streams, and there are a number of small unimportant towns and villages, the principal ones of which are Santa Cruz, in the southern part, and Infanta, about 4 miles northward of it.

Caiman Cove, lying between Caiman and Balimanoc Points, offers good anchorage, sheltered only during the northeast monsoon. Ves-

sels seeking shelter in Caiman Cove should stand up the middle of the cove and anchor in about 16 fathoms.

Balimanoc Point is a rocky bluff surrounded by reefs which extend ½ mile southward from it.

Tambove Roads, lying eastward from Balimanoc Point, is a commodious anchorage sheltered from all except south and southwest winds. There are a number of dangers in the entrance, and in the absence of any aids to navigation or good natural marks it should be approached only in daylight and with caution.

Culebra Islet, lying 2 miles southward of Caiman Point, is very small, low, covered with bushes, and skirted by a sandy beach. It is surrounded by shoal water, which extends over ½ mile west-northwestward. The channel between it and Caiman Point is deep and clear.

Hermana Mayor, lying 6 miles southward of Caiman Point and 5 miles from shore, is partly wooded and 130 feet high near the center. It lies on a bank, covered by less than 10 fathoms, which extends 4½ miles northward, surrounding Culebra Islet, and nearly 2 miles southward. The shoalest spot on the bank southward from the island is a 3-fathom patch about ¾ mile south-southeastward from its south end. Shoal water extends ½ mile eastward and 1¼ miles northward from its north end. About 1½ miles northward from the island there is a reef, portions of which are above water. An occulting white light, visible 15 miles, is shown from a white concrete tower on the top of a cleared ridge near the center of the island.

Hermana Menor Island lies 2¾ miles south-southeastward of Hermana Mayor and 2 miles westward of Santa Cruz Point. It is smaller than Hermana Mayor, 54 feet high, has sandy beaches, and is wooded. It is surrounded by shoal water, which on the eastern and southeastern sides extends over ½ mile. Between this shoal water and the shoals westward of Santa Cruz Point is a good channel over ½ mile wide, but in the absence of any good leading marks it should not be used by a stranger.

Raton Islet lies 3½ miles eastward of the north end of Hermana Mayor and over 1 mile from shore. It is low, covered with bushes, and has sandy beaches. It is surrounded by reefs, parts of which bare at low water, and should not be approached nearer than 1½ miles.

Infanta, a small town on the south shore of a cove about 2 miles northeastward of Raton Islet, affords excellent anchorage, sheltered by reefs, in 7 fathoms, muddy bottom. The entrance is narrow and deep, with dangerous reefs on each side; with good light, the northern one usually shows brown. The town is far from prominent and no definite, well-defined marks can be picked up or described.

Santa Cruz (chart 4210) is a small town of little commercial importance in the southeastern part of Dasol Bay. There are several small, dangerous, detached shoals in the harbor and its approach.

Directions.—Vessels bound into Santa Cruz should bring Raton Islet to bear 46° (45° mag.) and steer for it, passing nearly midway between the Hermana Islands, but slightly nearer Hermana Mayor. Hold this course until the bell tower in the southern part of the town bears 97° (96° mag.), when it may be steered for. When Santa Cruz Point is abeam the vessel should be hauled southeastward until the bell tower bears 78° (77° mag.), where good anchorage for large

vessels will be found in 11 fathoms, muddy bottom, protected from all except westerly and northwesterly winds. Small vessels may steer for the bell tower when it bears 78° (77° mag.) and anchor in 5 or 6 fathoms, muddy bottom, with the bell tower on the above bearing, distant about ¾ mile.

Santa Cruz Point is low, covered with mangroves, and surrounded by reefs, which extend about 1 mile northward and 1¼ mile northwestward. About 1½ miles northwestward of the point is a small detached rocky patch with a least depth of 2½ fathoms.

From Santa Cruz Point the coast trends southeastward for about 3 miles to Naulo Point, a rounding, thickly wooded hill 151 feet high and the most prominent landmark in this vicinity. From this point the coast bends sharply eastward and then trends southward and westward to Arenas Point, about 7 miles southward of Santa Cruz Point. **Pulipo Islet**, about 1½ miles southeastward of Naulo Point and ½ mile from shore, is small, low, and wooded; it is not prominent from offshore. The large bay between Santa Cruz and Arenas Points is encumbered by numerous shoals and is of little value to navigation.

Sabalay Reef, lying in the entrance of the above-described bay, has a small sand cay on the northeastern part. The western tangent to Hermana Menor, bearing nothing westward of 1° (0° mag.), leads well westward of Sabalay and Tortuga Reefs.

Tortuga Reef lies about 1½ miles southwestward of Arenas Point. The least depth, 2¾ fathoms, is found over the eastern part. Vessels should not attempt to pass between Sabalay and Tortuga Reefs unless the discolored water on the reefs is visible, for there are no leading marks for keeping in the channel.

Arenas Point is low and sandy and is surrounded by shoal water which extends ½ mile westward. The town of **Candelaria** is about 1½ miles eastward from Arenas Point.

Bani Point, about 3½ miles southward from Arenas Point, has several rounded hills near its southern extremity. It is surrounded by a reef which extends ½ mile westward and 1½ miles south-southeastward. A detached reef, near the southern end of which is a group of rocks bare at low water and just awash at high water, lies about 1½ miles southward of Bani Point, narrowing the channel between the reef and Salvador Island to about ⅜ mile.

Ports Masinloc and Matalvi (chart 4266).—Between Bani Point and Matalvi Point, about 4½ miles southward, the coast recedes some 3 miles, forming a large bay, nearly blocked by islands and reefs, containing the sheltered anchorages of Masinloc and Matalvi and Oyon Bay.

Oyon Bay, immediately eastward of Bani Point, is a landlocked basin. Its shores are fringed by a wide reef, leaving an available anchorage space about 1 mile long and ½ mile wide, having depths of 7 and 8 fathoms over muddy bottom. Oyon Point, the eastern entrance point, is high and steep and surrounded by shoal water, which extends ⅜ mile northwestward. Oyon Bay should prove a good typhoon shelter in case a vessel could not get to Port Matalvi. There are no aids to navigation, but all the reefs are plainly marked by discolored water.

Salvador Island, the largest island in this vicinity, is about 1¼ miles in extent, thickly wooded, and has reefs extending ⅔ mile

to the northwest. The north side of the island is about 100 feet high, terminating abruptly at its northwest and northeast ends and sloping gradually southward. The northwest extremity, sometimes called Salvador Head, is steep, about 100 feet high, and covered with bamboo, forming an excellent landmark. The northern shore of the island, forming the south side of the channel into Port Masinloc, is fringed by reefs, partly bare at low water, for about ⅛ mile, widening toward the northeast point, where they extend nearly ¼ mile.

Port Masinloc, northeastward of Salvador Island, affords good shelter except in heavy northwesterly and westerly weather.

MASINLOC is a small town about 1¼ miles southeastward of Oyon Point at the mouth of the Lipay River. A reef, partly bare at low water, extends about ¾ mile westward from it. The church, a large stone edifice with a corrugated-iron gable roof, and the adjoining convent northward, a long, low, white building with a nipa roof, are prominent. The principal trade is nipa and firewood, handled exclusively by small sailing vessels. There is much valuable timber in this vicinity, and a number of small vessels are built here.

DIRECTIONS.—Vessels bound into Masinloc should, before crossing the meridian of Macalaba Island, bring Masinloc Church to bear 95° (94° mag.) and steer for it. When Salvador Head, the northwest point of Salvador Island, bears 157° (156° mag.) change the course to 141° (140° mag.), heading for the sandy beach just eastward of the point and to the right of the apparent middle of the island When the point is nearly abeam, distant about ¼ mile, haul up to 70° (69° mag.), heading for the first coconut grove northward of the town. On this course Salvador Head will lie nearly astern on the starboard quarter. Continue on this course until Oyon Point bears 9° (8° mag.) and anchor in 12 or 13 fathoms, sandy bottom, about ⅞ mile westward from the town.

Port Matalvi lies between Matalvi Island and the shore southward, which has an average height of about 250 feet. It affords protection in any weather, in 6 to 12 fathoms, muddy bottom. It is reported to be an excellent typhoon harbor and is important in being the only harbor of this class between Bolinao Harbor and Olongapo Harbor in Subic Bay.

MACALABA ISLAND, about ¼ mile west of Luan Point, is about ½ mile in extent, low, flat, and wooded, with a sandy beach except on its western side. A small group of native huts is on the sand spit at its eastern end. Sunken reefs extend nearly ⅝ mile northward and southward from the island.

LUAN ISLAND, about ½ mile long, lies northward from Matalvi Point, from which it is separated by a very narrow channel. On the north end of the island is a knoll 118 feet high; the southern part of the island is low and flat. A reef with a least depth of 1 fathom extends about ½ mile north-northeast from the north end of Luan Island. A red buoy is moored in 4 fathoms off the northern point of the reef.

MATALVI ISLAND, about 100 feet high and wooded, lies ½ mile eastward of Luan Island. Eastward of it, and connected with it at low water by a short reef, is another wooded island 88 feet high.

IAGAT ISLAND is a small, low mangrove island immediately north of Matalvi Island. It is included in the reefs extending nearly ⅝

mile northward from Matalvi Island. A beacon stands on the reef westward of Iagat Island.

DIRECTIONS.—Bring the beacon to bear 120° (119° mag.) and steer for it; this course leads clear of the reefs projecting from Salvador and Macalaba Islands and northward of the red buoy. When the 118-foot hill on Luan Island bears 225° (224° mag.) steer 195° (194° mag.) until Luan Hill is abeam and thence midway between the islands to an anchorage.

Anchorage may be found in 15 fathoms, muddy bottom, in the channel midway between Luan and Matalvi Islands or south of Matalvi Island. If the latter anchorage is selected, care must be taken to avoid the sunken reef making off about 300 yards from the south shore abreast of the eastern end of Matalvi Island. Small craft may continue the mid-channel course and anchor farther in, depending on size and draft.

Palauig Bay, about 2 miles southward of Matalvi Point, is formed by the projection of Palauig Point and the reef extending about ⅝ mile northward from it. It is about ⅜ mile wide at entrance and, while expanding slightly inside, is obstructed by shoals that reduce the available anchorage space to a diameter of ¼ mile. It affords good protection in southerly and westerly winds, but is open northwestward. The southeast shore of the bay is a narrow sand spit, forming the northern bank of the Salasa River, which empties into the southern part of the bay. The town of Palauig, of little commercial importance, is on the south shore.

The depth range from 12 and 13 fathoms at the entrance to 7 and 8 fathoms, sandy bottom, at the anchorage, ⅜ mile inside the point of the western reef.

A reef, about ⅝ mile long north and south, with a width of ¼ mile, lies ¾ mile northwest of the northern extremity of the reef projecting from Palauig Point and is separated from it by a narrow channel. The least depth over it is 3 fathoms.

Palauig Point projects about 1 mile from the general trend of the shore. It is low, rounding, and wooded, with a small detached knoll 49 feet high. Its western edge is fringed by reefs extending ¼ mile offshore and increasing to ⅝ mile off its northern extremity. An occulting white light, visible 12 miles, is shown from a white skeleton steel tower on the 49-foot knoll about ¾ mile inland on Palauig Point.

Palauig Reef, lying with its outer edge 1¾ miles west-southwestward of Palauig Point, is nearly awash and usually breaks heavily. There is a 2-fathom channel, ½ mile wide, between it and Palauig Point. From Palauig Reef a line of shoals, with 2 to 5 fathoms on them, extends southward for 3 miles, the southern shoal being 4 miles westward of the mouth of the San Agustin River. Inshore of this line of shoals are several other small detached shoals the positions of which will be readily understood by reference to the chart.

Kinabakbagan Reef lies about 3½ miles west-northwestward from Iba Point and nearly 3 miles from shore. It is about 1¼ miles in extent within the 5-fathom curve and is covered by a least depth of ¼ fathom. A small shoal with a least depth of 4¾ fathoms, coral bottom, lies 3¼ miles west-southwestward of Iba Point, and 2 miles

farther on in the same direction is a bank with 6¼ fathoms, coral bottom.

Iba Point projects slightly from the low sandy beach extending southward from Palauig Point, 8 miles northward. It is fringed by a coral reef a little over ¼ mile wide, bare at low water. The point is low and not prominent.

Iba, the capital of Zambales Province, is a small town of little commercial importance, about 1¼ miles inland, and is practically obscured by groves of coconut and bananas. There is one large iron roof, visible 5 or 6 miles, which forms a conspicuous landmark.

The anchorage for Iba, southward of the point of the same name, is sheltered only during the northeast monsoon; during the southwest monsoon landing is difficult and frequently impossible. The anchorage is an open roadstead and should be appreached by steering in for the coast with the canyon northward from Mount Botolan bearing 91° (90° mag.); when the iron roof in Iba bears 46° (45° mag.) it may be steered for. When the tangent to Iba Point bears 1° (0° mag.) it should be steered for and anchorage taken in 10 fathoms about ¾ mile from the landing which may be identified by a group of nipa houses and a white barrel on a pole. Small steamers usually anchor about ¼ mile southward from the landing in 3 fathoms, sandy bottom.

From Iba Point the coast trends southeastward for about 6 miles to Botolan Point; it is low and sandy and is broken by the mouths of the Bancal and Bucao Rivers. The valley of the Bucao River, northward from Mount Botolan, is a conspicuous feature from seaward and serves to indicate the anchorage for Iba.

Botolan Point, low and sandy, is immediately southward of a spur of Mount Botolan, which terminates at the beach in a bluff point 151 feet high. It is surrounded by a reef ½ mile wide.

Mount Botolan, about 1¾ miles eastward of Botolan Point, is 1,852 feet high, heavily wooded, and prominent.

From Botolan Point the coast trends southerly, with a slight curve easterly, for 21 miles to Capones Point. On this coast are a number of small, unimportant towns, lying on or near the shore. The shore line is formed by a steep-to sandy beach, off which there are a number of detached shoals. They are all well inside the usual track of navigation.

Capones Point is the most western point on this part of the coast. It is 1,090 feet high, bare, of reddish appearance, and when first seen from northwestward appears as an island.

Capon Grande, the largest of the Capones Islands, a group of three small islands, is a most conspicuous landmark and lies with its western point 2¼ miles west-northwestward of Capones Point. It is about ⅘ mile long in a west-northwest and opposite direction and has rocks around it. The eastern part is the higher and is sighted before the lighthouse is raised. Capon Grande is surrounded by deep water and there is no good anchorage off it. The other two islands, extending ⅗ mile north and south, lie ¾ mile northeastward of Capon Grande, between it and the coast.

A group flashing white light, visible 21 miles, is shown from a white square brick tower on the hillside near the western end of Capon Grande Island.

From Capones Point the coast trends southward for 8 miles to Port Silanguin. It is high and rocky and indented by three small bays, Calaguaguin, Talisain, and Nazasa. These bays are of little importance and could be used as anchorages only in the northeast monsoon, being open to the westward. They are easy of access.

Tabones Islets, lying about 1 mile from shore, midway between Talisain and Nazasa Bay, are two rocky islets whose bases are much underworn by the sea; the larger and higher is 129 feet high.

Port Silanguin affords tolerable shelter from all winds except those from west to southwest. The southern entrance point is formed by Silanguin Island, a bare, rounded island 705 feet high, joined to the land on the south side of the port by a rocky reef. The depth at the entrance is 30 fathoms, decreasing to 10 fathoms, which depth will be found close to the shore reef. The best anchorage is in from 17 to 20 fathoms abreast the sand beach within the south point of the mainland.

Los Frailes are a group of six small, rocky islets with sunken and other rocks around and between them, lying from ¾ to 1¼ miles southwestward of Silanguin Island. The eastern and largest islet is about 90 feet high. They are surrounded by deep water, and between them and Silanguin Island is a deep channel about ½ mile wide.

The coast from Silanguin Island to the entrance to Subic Bay, about 4½ miles eastward, is high and moderately steep-to. Sampaloc and Biniptican Points are the southernmost and most prominent points on this coast. **Sueste Point,** about 1 mile northeastward of Biniptican Point, forming the western entrance to Subic Bay, is high and steep. A light, visible 18 miles, is shown from a cylindrical iron tower painted white with dark trimmings on Sueste Point. A concrete dwelling with red roof stands about 50 yards westward of the tower.

Measured Mile.—A measured mile course for testing the speed of vessels has been laid off in the entrance to Subic Bay; particulars in regard to it may be obtained from the commandant of the naval station, Olongapo.

Subic Bay is an irregular-shaped body of water extending about 8 miles in a general northerly direction, with a width of about 3½ miles; its western shore is comparatively straight and bold with no dangers extending over ¼ mile from shore. The eastern shore is indented by numerous small bays which are of no importance, except the largest, Port Olongapo.

The bay affords good anchorage in several places, especially off Subic and in Olongapo, the inner harbor of which is a good typhoon shelter.

Subic, at the head of the bay, is a town of little importance. A small commercial steamer from Manila calls here weekly.

The United States naval station stands on the sandy spit between Port Olongapo and the inner harbor. The village of Olongapo is immediately westward of the naval station.

Grande Island divides the entrance to Subic Bay into two channels. It is about ⅜ mile in extent and 167 feet high. Chiquita Islet is a small, low islet lying about ¼ mile southward from Grande Island, with which it is connected by a reef. A shoal covered by a least known depth of 4 fathoms lies ¾ mile southward of Chiquita Islet.

The main channel, passing westward of Grande Island, is about 1¼ miles wide and is deep and clear; the channel eastward of Grande Island is narrow and tortuous and should not be used except with local knowledge.

Mayanga Island lies in the middle of the bay. It is very small, 38 feet high, and shoals extend northward ¼ mile and southeastward ⅓ mile, the end of the latter being marked by a black buoy.

Pequeña Island lies about 1¼ miles northward of Mayanga Island. It is 180 feet high and surrounded by shoals extending southward ½ mile toward Mayanga Island and over ¼ mile westward. Northeastward shoal water extends to the eastern shore of the bay.

Port Olongapo lies in about the middle of the eastern shore of the bay. In the northeast part is a small basin about ½ mile long and ¼ mile wide, with a narrow channel leading through the shoals southeast of Rivera Point. This channel is buoyed, and in addition two triangular white beacons have been placed on Magdalan Bluff to lead through. Good holding ground and shelter in any weather may be had in the inner basin.

Calaclan Point, the north point at the entrance, is low, but rises rapidly to a height of 354 feet. On its outer end is a star-shaped beacon painted white with a black center.

From Calaclan Point to Rivera Point, at the entrance to the inner harbor, the shore is low and sandy, with low, marshy ground behind it. The buildings of the naval station on Rivera Point are prominent.

Cubi Point, the south point at the entrance, is a bluff point 88 feet high. From it a shoal with depths of 1½ fathoms and less extends about ⅝ mile northwestward, its outer end being marked by a red buoy.

Pamocan Point, ½ mile southward of Cubi Point, is also bluff, and from it shoals extend westward for ⅝ mile. A small coral shoal, with 3 fathoms, lies 1 mile west-northwest from the point and is marked by a red buoy.

Caiman Shoal, lying near the middle of the outer harbor, is small in area and partly awash. A fixed red light, visible 7 miles, is shown from a truncated conical white stone tower on Caiman Shoal, and a red buoy marks the extreme northern edge of the shoal.

Carrasco Shoal is a small unmarked shoal patch lying about ¼ mile southward of Caiman Shoal light.

Directions.—By executive order of the President of the United States Subic Bay has been declared a closed port, and permission should be obtained from the naval authorities before attempting to enter. Vessels entering Subic Bay should pass midway between Grande Island and the land westward; if bound for Olongapo, when the north end of Grande Island is abeam steer northeastward, heading for the beacon on Calaclan Point and passing about ⅜ mile northwestward from the red buoys marking the detached shoal off Pamocan Point and the edge of the shoal water off Cubi Point. Hold this course until the conspicuous white spot, Mancha Blanca, on the next cliff eastward from Nagcaban Point is well open, then haul eastward so as to pass ¼ mile northward from Caiman Shoal lighthouse. Anchor southward from the navy yard in 12 or 13 fathoms, muddy bottom, with Caiman Shoal lighthouse bearing 271° (270° mag.) distant about ½ mile.

If intending to enter the inner harbor, after passing Caiman Shoal lighthouse, haul southeastward until on the range marks on Magdalan Bluff; then steer this range. The channel between the shoals into the inner harbor is narrow and marked by buoys. The range should be carefully held in case the buoys are gone or out of position. There is good anchorage anywhere in the inner harbor, near the navy yard. There are 2½ fathoms alongside the wreck of the *Marquis de la Victoria.*

If bound to Subic, when the north end of Grande Island is abeam, steer for Pequeña Island until Mayanga Island is abeam and then haul westward to give Pequeña Island a berth of not less than ½ mile. When the north end of Pequeña Island is abeam steer for the town of Subic and anchor off the mouth of the Guagadi River on the western side of the town. In anchoring care must be taken to avoid the shoals making out between Cabangan Point, at the mouth of the river, and Apalit Point, the next point westward.

Port Binanga is a small bay lying southward of the entrance to Subic Bay. There are short stretches of sand beach at the head of the bay on either side of the Dapua Point, a conspicuous point with vertical cliffs from 60 to 70 feet high. The remainder of the bay is bordered by a coral reef about 175 yards wide. Anchorage sheltered from all except westerly winds may be found in the middle of the bay in 4 to 6 fathoms, mud. To ENTER, bring Dapua Point to bear 90° (89° mag.) and steer for it. This course will lead southward of a 2½-fathom shoal in the entrance, lying about ¼ mile offshore.

From Buiong Point, the southern entrance point to Port Binanga, the coast trends southward for 2½ miles to Mayagao Point then southeastward for 5½ miles to Napo Point. The shore is low, wooded, and bordered by a reef. **Moron Shoal** lies about 1¼ miles west of Panibatujan Point and off the town of Moron. The least depth found was 5½ fathoms, with irregular bottom between it and the shore. Southeastward of Panibatujan Point the shore is sand beach, with several shoals close in. **Pandil Islet**, 42 feet high, is joined to Napo Point by a reef.

From Napo Point the coast trends eastward and then southward to Luzon Point, forming a large, open bay, with the town of Bagac lying on its eastern shore. Anchorage may be had off the town in 5 to 10 fathoms, taking care to avoid a 3-fathom shoal that lies ¾ mile westward of the town. This anchorage, however, is not sheltered, as the land breeze blows quite strongly off the Silanganan and Mariveles Mountains and the northeast monsoon draws through the low valley between them.

The coast from the head of Bagac Bay to Luzon Point and thence southeastward to Los Cochinos is indented by a number of small bays, several of which have sand beaches at their heads; the points are moderately high, rocky, and bordered by coral reefs. A rock baring at extreme low water lies about 400 meters southwestward of Guay Point. This was the only danger found off the shore reef. All the principal points may be rounded safely at a distance of about ½ mile. Guay Bay, southeastward of Guay Point, affords anchorage, sheltered from the northeast, for vessels waiting for a fair wind to enter Manila Bay.

Cochinos Point, the northern entrance point to Manila Bay, is the southeastern extremity of a small wooded peninsula, 313 feet high,

and is connected with the mainland northward by a low, narrow isthmus.

Los Cochinos are five rocks, 20 to 70 feet high, which extend nearly ½ mile south and southeast from Cochinos Point, and are steep-to.

Guardia Shoal is a very small, steep-to shoal, with a least depth of 1 fathom and surrounded by deep water, lying 350 yards southward of Monti Rocks, the most easterly of Los Cochinos. It is marked by a black gas buoy.

MANILA BAY

(Chart 4255) is about 30 miles long, north and south, and 22 miles wide in the middle. The entrance, between Cochinos Point northward and Limit Point southward, is 12 miles wide, and is divided into two channels by Corregidor and Caballo Islands. The depths range from over 30 fathoms in the entrance to 15 in the middle, decreasing gradually to the shores. The land on both sides of the entrance is high and covered with vegetation. At the eastern head of the bay is the city and harbor of Manila, with Cavite southward from it.

Winds.—The northeast monsoon blows strong out of Manila Bay at at times, accompanied by a cloud resembling smoke, which is driven out of the bay to the southwest and forms an arch in that horizon when the sky is otherwise clear; but sometimes sea breezes from the southwest blow into the bay in the northeast monsoon after midday, increasing in strength as you advance into the bay.

During the strength of the northeast monsoon, although the wind may be fresh in the entrance, it will frequently be moderate within the bay.

During the southwest monsoons, storms, known locally as collas, blow from southwest to west and are accompanied by violent squalls and much rain; they often last for several days.

Land winds, during the northeast monsoon, blow from east in the bay and from southeast on the west coast north of Fuego Point; they begin about 4 or 5 p. m., fall toward midnight, then set in again from north, changing to northeast during the day and east toward the evening. When strong north or southwest winds are prevalent there are generally no land winds.

Mariveles Harbor, immediately inside of the northern entrance point to Manila Bay, is an excellent harbor, easy of access, and affords good anchorage, sheltered from all but southeasterly winds. The harbor is free from danger, except at the head, where shoal water extends about ¼ mile. Vessels may anchor in 17 fathoms, with the quarantine wharf bearing 300° (299° mag.), or they may run farther into the bay, if necessary, the bottom being good holding ground and the anchorage safe.

One of the detention and disinfecting stations of the Quarantine Service is located in the northwestern part of the harbor and may be recognized by the prominent buildings and wharf alongside of which there is a depth of 25 to 28 feet. There is a green light on the end of the wharf, maintained by the quarantine authorities, and typhoon signals are shown when necessary. Fresh water is laid down on the wharf.

There is a black buoy southward from the wharf to mark the limit of the 4-fathom curve and a white mooring buoy 200 yards southeasterly from the north end of the wharf to assist vessels in leaving.

Sisiman Bay is a small bay lying eastward of Gorda Point, the eastern entrance point to Mariveles Harbor. The Matadero for Manila is located on the northwestern shore of this bay.

From Mariveles the shore trends eastward for about 3 miles to Lasisi Point, then northeastward for 4 miles to Lokanin Point and is composed of steep rocky bluffs of moderate height fronted by foul ground extending about 200 meters offshore. From Lokanin Point the shore trends in a north by westerly direction to the head of the bay. The shore for the first 7 miles to abreast Orion Hill continues to be rocky bluffs fronted by a gradually widening reef with occasional sand beaches between the points. From Orion Hill northward the country is generally low and fronted by shoal water, which increases in width from ¼ mile off Pandan Point to about 6 miles at the northwest head of the bay. The towns of **Lamao, Limay, Orion, Pilar, Balanga, Abucay, Samal,** and **Orani** lie on this section of the coast; they are of little commercial importance, but have regular steam communication with Manila. An agricultural experiment station is maintained at Lamao, and Limay is the headquarters of an important lumber company.

The shores around the northern head of the bay are formed by the delta of the Pampanga and other large rivers and are low and marshy. Several of these rivers are navigable and are used by small, light-draft steamers, with local knowledge, plying between Manila and the small towns on them, among which are Calumpit, Bulacan, Hagenoy, and Bacolor. Of the rivers emptying into the northern part of Manila Bay, only the Pasag and Orani may be entered at low tide by small vessels drawing about 5 feet. The shoalest part of the bar at the Pasag entrance is some distance from shore, and the channel is usually marked by poles. After crossing the bar there is a good channel for light-draft steamers as far as Guagua. The outlets of the Pampanga River can be entered only by very light-draft vessels. This river is now seldom used, as the railroad furnishes better transportation to the towns formerly dependent upon the river boats.

Limit Point, the southern entrance point to Manila Bay, is rocky, steep-to, and about 220 feet high. **Limbones Island,** 310 feet high, small and rocky, lies immediately northward of Limit Point. **Carabao Island,** 185 feet high, small and rocky, lies about 2½ miles northeast of Limbones Island, and between them is **Limbones Cove,** 2 miles long, deep and clear.

From Limit Point the coast is high, with numerous cliffs nearly to the Maragondon River which forms the eastern boundary of the high land on south side of Manila Bay, about 10 miles northeastward of Limit Point. Beyond Maragondon River the shores are low and marshy to and around the head of the bay. Along the southeastern shore are several small towns of little commercial importance, which are connected with Manila by rail. Among them are **Naic, Rosario, Cavite, Kawit,** and **Bacoor.**

Corregidor and Caballo Islands divide the entrance to Manila Bay into two broad, deep channels known, respectively, as North and South Channels. The passage between Corregidor and Caballo Islands is about ¼ mile wide and has a depth of 7 fathoms in the middle. A reef extends southward from the east end of Corregidor

and the tidal currents sweep through this channel with considerable velocity.

The North and South Channels are the ones used by vessels entering Manila Bay. There are practically no dangers for a steam vessel in the entrance to Manila Bay, as both the North Channel and the South Channel are deep and clear. Sailing vessels entering are advised to use the southern channel on account of its greater width, especially with an easterly wind, as the current has less velocity than in the narrow North Channel. Sailing vessels should be guided by the lead and chart in working in or out. Special customs regulations for entering Manila Bay are given in the Appendix, page 349.

Corregidor Island forms the south side of the northern channel into Manila Bay. It is 589 feet high in the western part. From Buri Point, the eastern end, a reef extends nearly to Caballo Island; close to the northwest side are Santa Amalia and Horadaba Rocks. In Corregidor Cove, on the north side of the island, there are two small wharves; a small red light is exhibited from the roof of the shed on the eastern wharf, but it is so low that it is frequently obscured by vessels lying at the wharf. The large buildings are prominent. A light showing white and red flashes alternately every 10 seconds, visible 33 miles, is exhibited 630 feet above high water from a white, round tower, with dwellings at its base, on the summit and southwestern part of Corregidor Island. This light is obscured when well in with the north side of the island. From a station near the lighthouse signals by means of the international code are received and sent; this station is connected by cable with Manila. There is also a radio station on Corregidor belonging to the United States Army.

Caballo Island is a bluff rocky island, 381 feet high and ¾ mile long, partly covered with verdure, lying about ¾ mile south of the east end of Corregidor. A reef extends ½ mile from its west end and about 400 yards from its east end.

A group flashing light, visible 15 miles, except where obscured by the island of Corregidor, is exhibited 319 feet above high water from the top of a concrete house on one of the higher points of Caballo Island.

Monja Island is a small rock 121 feet high, with deep water around it, situated 2½ miles westward from the west end of Corregidor Island. It is marked by a light.

Fraile Island, about 40 feet high, is a small rock completely covered with structures, and resembling a battleship, 3½ miles southward of Caballo Island and nearly 2 miles from the south shore of the bay. With the exception of a 6-fathom patch lying about ¼ mile southeastward of it, Fraile Island is surrounded by deep water.

San Nicolas Shoals lie about midway between Corregidor and Cavite and extend about 4½ miles from the south shore. The outer shoal is steep-to on the north and west sides. The least depth is 2 fathoms about 1½ miles southeast of the lighthouse. Monja Island, kept open northward of Corregidor, clears these shoals. After passing Corregidor or Caballo, San Nicolas Shoals constitute the only danger between the entrance and Cavite or Manila. The shoal is marked by a light shown from an iron tower on a masonry base on the northwest extremity of the shoal.

Sangley Point, northward of Canacao Bay, is marked by an alternating light, visible 12 miles, shown from an iron framework, with a concrete dwelling near the base. The towers of the Cavite naval radio station are situated about ¾ mile westward of the light. These towers are 600 feet high and form excellent landmarks for checking a vessel's position as she advances up the bay.

Manila, on both sides of the Pasig River, on the eastern shore of the bay, and about 25 miles from its entrance, is the largest city in the Philippines, and is the seat of government of the Philippine Islands.

For customs purposes all goods which are manifested or consigned for the port of Manila shall be discharged from the vessel within the prescribed harbor limits, unless permission to discharge outside of said limits be given by the collector of customs. For the harbor limits and boundaries, see Appendix, page 340.

All vessels with cargo for Cavite must enter Manila Harbor and obtain pratique and permission from the customs authorities before proceeding to Cavite to discharge.

Vessels which for any reason do not intend to enter the harbor or river immediately on arrival may anchor anywhere outside of the breakwaters, within the limits of the port, according to draft.

Quarantine regulations are strict, and are enforced by officers of the United States Public Health Service. All vessels entering Manila Harbor shall be considered in quarantine until boarded by the quarantine officer and given pratique by him. Until pratique has been given the customary quarantine flag shall be kept flying at the fore.

Pilotage in and out of Manila Harbor is optional, but into the Pasig River is compulsory. Pilots can be obtained by making the usual signal.

Manila Harbor (chart 4236), an artificial harbor about 1,200 acres in extent, is situated southward from the Pasig River, with which it is connected by a canal for lighters. The greater part of the harbor, northward of a line drawn from the west entrance to the Legaspi Landing, is kept dredged to a depth of 30 feet. There are wharf accommodations for vessels of the largest class and there are a number of mooring buoys belonging to the Government and the various steamship lines. Between the north end of the harbor and the 9-foot canal leading into the Pasig is a basin about 300 yards square for small craft. There is a marine railway on the north side of this basin.

Engineer Island is a small artificial island, about 250 by 150 yards in extent, westward from the above-mentioned canal and forming the south side of the entrance to the Pasig River. On it are the Government marine railway and repair plant.

Breakwaters.—From the south side of the entrance to the Pasig, the West Breakwater, convex to seaward, extends southward for 1 4/10 miles, and about 225 yards southeastward from its south end the South Breakwater begins and trends ½ mile southeastward. Between these breakwaters is the west entrance, about 200 yards wide, with a depth of 30 feet, and between the south end of the South Breakwater and the shore is the south entrance, about 1¼ miles wide. Back of the South Breakwater is a 24-foot channel, about ¼ mile wide, leading to the dredged area in the northern part of the harbor. From the eastern side of this channel the water shoals gradually to the shore.

Manila Harbor is well lighted and buoyed. For details consult chart 4236 or the List of Lights, Buoys, Beacons, and Daymarks of

the Philippine Islands. The latter is published by the Bureau of Commerce and Industry, Manila.

A horizontally striped buoy marks the end of a submerged breakwater on the northwest side of the channel leading to the Legaspi Landing. Vessels should not attempt to pass between it and the shore nor within 100 feet of it on either side.

A horizontally striped buoy in 1½ fathoms, about ⅝ mile westward of Pasig lighthouse, marks the sewer outfall. This buoy is moored about 75 yards outside the sewer outfall which is covered by 4½ feet.

Pasig River divides the city of Manila into two parts; its entrance, confined between two stone jetties extending westward from its north and south points, has a depth of 18 feet on the bar at low water and 18 feet in the river, with accommodations near the river walls for vessels that can cross the bar. These depths are continually changing and have to be maintained by dredging. The channel across the bar is marked by buoys. Navigation in the river for seagoing steamers is limited by the Bridge of Spain, 1 mile above the mouth of the river. There are a number of small steamers plying on the Pasig River between Manila and Laguna de Bay.

Telegraph.—Manila is connected with Guam, Honolulu, San Francisco, Shanghai, Hongkong, Iloilo, and Cebu by commercial cables, and the postal telegraph system extends to all places of importance throughout the islands. Time signals from the observatory are sent out daily on the telegraph lines at 11 a. m., standard time, one hundred and twentieth meridian, longitude east from Greenwich, which is the standard time used throughout the Philippine Islands.

A time ball on the observatory at Ermita and one on the semaphore tower at the mouth of the Pasig River are hoisted five minutes before noon and dropped at noon, Philippine standard time, equivalent to $16^h\ 00^m\ 00^s$, Greenwich mean time.

Typhoon signals are shown from a signal staff near the cathedral and from the semaphore tower at the mouth of the Pasig River in accordance with instructions received from the weather bureau. (See Appendix.)

Tides.—The tide tables published annually by the Coast and Geodetic Survey include predictions for each day of the year for Manila (Pasig River entrance). The tides at Manila are dependent mainly on the declination of the moon, and have little relation to the phases of the moon. The highest high waters occur near the time of the moon's greatest north and south declination, and at this period there is but one high and one low water during each 24 hours. The lowest high waters occur near the time of the moon's least declination, and at this period there are two high and two low waters during each 24 hours. The greatest range of tide occurs usually in June and December and the smallest range in March and September.

Cavite (chart 4236) is about 7½ miles southwest of Manila and is the site of the United States navy yard. The harbor is formed by a low peninsula, the north extremity of which, named Sangley Point, is reported to be extending at the rate of 35 feet per year. The buildings of the Cañacao Dock Co. and the coal bunkers, surmounted by a large water tank, are prominent features in identifying the point in daytime. This water tank should not be confused with the prominent water tower near the eastern end of the peninsula on which the

navy yard is situated. A time ball is dropped from a staff on the water tower at the navy yard at 11 a. m., one hundred and twentieth meridian standard time (longitude east of Greenwich). A channel leading to the coal bunkers has been dredged to 22 feet; the remainder of Cañacao Bay ranges from 18 to 19 feet to 12 and 13 feet within a short distance of the beach. Good shelter is afforded in south and southwest winds. Typhoon signals are displayed at the navy yard. Bacoor Bay, south of the naval station, is shoal.

REGULATIONS.—By act No. 238, United States Philippine Commission, that part of Cavite Anchorage southward of a line drawn from Sangley Point to Paranaque and for ½ mile north of this line has been placed under the police supervision of the naval officer in command of the Asiatic station, United States Navy, in so far as relates to the control of vessels in this harbor. Vessels are not allowed to berth within these limits without having first obtained permission, except when, by reason of stress of weather or any other urgent necessity, a vessel is obliged to enter Cavite Harbor. In this case she shall anchor temporarily in any open berth, but is required to keep steam up, ready to move until such anchorage is confirmed or the vessel is directed to another berth.

Compass Ranges.—The following bearings of easily distinguished ranges in Manila Bay are given for convenience in determining compass deviations:

La Monja Lighthouse to Corregidor Lighthouse, 85° 43′ (84° 48′ mag.).
San Nicolas Lighthouse to Sangley Point water tank, 67° 55′ (67° 00′ mag.).
San Nicolas Lighthouse to Mount Sungay, 139° 33′ (138° 38′ mag.).
Sangley Point water tower to Mount Sungay, 163° 34′ (162° 39′ mag.).
Pasig River Lighthouse to Malabon Church, northeast spire, 351° 58′ (351° 03′ mag.).
Pasig River Lighthouse to Tondo Church dome, 30° 04′ (29° 09′ mag.).
Pasig River Lighthouse to San Sebastian Church, northeast spire, 83° 25′ (82° 31′ mag.).
Pasig River Lighthouse to ice-plant stack, 93° 08′ (92° 13′ mag.).
Pasig River Lighthouse to cathedral dome, 111° 49′ (110° 54′ mag.).

The bearing of Mount Sungay when in range with San Nicolas beacon or Sangley Point water tank on top of the coal bunkers, will be found especially useful on account of the great distance of the peak (about 24 miles). A vessel may, after bringing either of these ranges on, when about 2 miles distant, steam around in a circle, going 200 yards from the range without altering the bearing of the peak more than ¼ degree. **Mount Sungay** is a moderately high (2,546 feet), sharp peak at the eastern end of the table-land southward of Manila Bay. It is prominent and readily distinguishable, but in case any doubt exists it can be settled by bringing either front object on the proper compass bearing and the peak will be seen in line with it, or nearly so.

MANILA BAY TO CAPE SANTIAGO.

From Limit Point, the southern entrance point to Manila Bay, the coast trends southward for about 6 miles to Fuego Point. It is high and rocky, irregular in outline, has several small islets off it and is very steep-to. It is indented by several small coves all of which afford anchorage sheltered from all except westerly winds.

Soundings off this part of Luzon are deep and irregular and afford little or no warning when approaching the dangers which have deep water close-to; consequently the navigator should approach this coast with caution.

Hamilo Cove (chart 4257) lies about 3 miles southward of Limit Point, between a small unnamed islet 97 feet high northward and Hamilo Point southward. In the eastern part of the cove there is a basin about ¼ mile wide at the entrance and about ¾ mile in extent. The head of this basin is shoal and fringed with mangroves, leaving a well-protected anchorage about ⅜ mile in diameter within the 3-fathom curve. The best anchorage is in the northern part of this basin in 6 to 8 fathoms, muddy bottom.

Hamilo Point is 360 feet high; an island, 120 feet high, lies immediately westward of it. About ¾ mile within Hamilo Point, and about 300 yards from shore, are some prominent pinnacle rocks 30 feet high.

Fuego Point, about 2 miles southward of Hamilo Point, is 70 feet high at the western extremity and has two small islets, the outer one of which is 93 feet high, lying immediately northward of it. Between these two points the coast recedes, forming three distinct bays, and about midway between the points are two small islets forming the southern entrance to Looc Cove, the middle one of the bays just mentioned.

Looc Cove is 2 miles long and ¾ mile wide; the shores are steep-to except toward the head, where the soundings decrease gradually to a sand beach backed by trees.

From Fuego Point the coast trends south-southeastward, with a curve eastward for 6½ miles to San Diego Point, forming Nasugbu Bay. From Fuego Point to Nasugbu Point, 4½ miles southeastward, the coast is high and wooded, but from Nasugbu Point to San Diego Point, 3 miles southward, it is low, with a dark sandy shore, which is wooded and steep-to. The Wawa River empties on the south side of Nasugbu Point and the Liang River about 1½ miles southward of it; both of these rivers have less than 2 feet on their bars at low water.

The town of **Nasugbu** lies about ¼ mile inland between the mouths of the Wawa and Liang Rivers. It has occasional steam communication with Manila. A light is shown from a white concrete pillar at the mouth of the Wawa River to mark the anchorage for Nasugbu.

About 1¼ miles south-southeastward of Fuego Point are two small islets, covered with grass and about 35 feet high; they are connected by a reef covered by 2 feet. About ⅓ mile northeastward of the larger islet are some rocks awash.

Pillar Rock is a prominent pinnacle rock, about 25 feet high and 15 feet diameter at the base, lying about 100 yards westward of Nasugbu Point. Nearly ¼ mile northwestward of Pillar Rock is a rock awash. A dangerous rocky shoal, on which the least depth near the center is 1¾ feet, lies with its eastern end nearly ⅜ mile southward of Pillar Rock and ½ mile from the shore eastward of the shoal. Good anchorage, protected during the northeast monsoon, may be found southward and eastward of the shoal just mentioned in 6 or 7 fathoms about ½ mile from shore. Small coasting steamers sometimes anchor between the shoal and Nasugbu Point, convenient to the mouth of the river.

Fortune Island, 390 feet high, lies 7½ miles west-southwestward of Nasugbu Point. It is partially wooded and steep-to. A light, visible 10 miles, is shown from a white concrete pillar on the highest point of the island.

Talin Bay, lying between San Diego Point and Talin Point, is open to the northwest and foul. Its shores are composed of alternate rocky cliffs and sandy beaches.

Talin Point is about 200 feet high, of rocks and short sand beaches, which serve as a base to several pyramidal hills very slightly wooded. It is surrounded by a reef 200 yards wide.

From Talin Point the coast trends southerly for 10 miles to Calatagan Point, thence southeasterly for about 3 miles to Cape Santiago. Northward of Calatagan Point the shore is very low, sandy, and covered with mangroves; it is indented by several estuaries and fronted by a reef which extends 1½ miles in places. Irregular bottom, with depths of 3½ to 7 fathoms, lies 2 to 2½ miles from shore between San Diego and Calatagan Points. Southward of Calatagan Point the land is higher and the shore reef narrows to a mere fringe. Between Calatagan Point and Cape Santiago the shore reef is steep-to and there are no detached dangers.

Cape Santiago, the southwestern extremity of Luzon, is 300 to 380 feet high, wooded, and surrounded by a reef which bares about 200 yards. The soundings at the edge of the reef are 4 and 5 fathoms, deepening abruptly to 40 and 60 fathoms at a distance of ½ mile. A group flashing light, visible 15 miles, is shown from a round, white tower on a low rocky promontory about 850 yards west-northwest of the southern extremity of the cape.

SOUTHWEST COAST OF LUZON.

BALAYAN BAY,

the great bay between Cape Santiago and Bagalangit Point is deep and clear of danger, with bottom of sand and mud, but the shores are so steep that a vessel must approach very close to get within 12 fathoms depth. The winds in this bay follow the monsoons generally; the land breeze blows nearly every evening. The flood stream sets northward and the ebb southward.

Pagapas Bay, between Cape Santiago and San Pedrino Point, is very deep and affords no good anchorage. The shore is fringed with a narrow reef, with deep water near its edge. There are two small breaks in the reef at the head of the bay, each about 250 yards in extent, where a small craft could find sheltered anchorage.

San Perdino Point is bold and 744 feet high about ¼ mile from its eastern extremity. It is well wooded and is encircled by a reef, which extends 100 yards from the shore.

The town of **Balayan** (chart 4257) lies on the shore about 5 miles northward of San Pedrino Point at the mouth of a small, unimportant river, having only 3 feet of water on its bar at high water. There is a coral reef extending over ¼ mile offshore in front of the town, on he ouer edge of which are several shoal spots that show at low tide.

A fixed red light is shown from a white frame structure on the beach at the eastern end of the town. The usual anchorage for large

vessels is in 10 or 12 fathoms, about 600 yards offshore, with the light bearing 329° (328° mag.), and the dome of the church bearing 295° (294° mag.). Small vessels drawing 10 feet or less anchor abreast of the east end of the reef in 5 to 7 fathoms, with the light on the same bearing about ⅓ mile distant.

Taal and **Lemery** (chart 4257) are towns 11 miles east-southeasterly from Balayan, on opposite banks and near the mouth of the Pansipit River. The **Pansipit River**, which flows from Lake Taal, enters the bay about ½ mile below the bridge which connects the two towns; there is 7 feet on the bar at high water, allowing small vessels and launches to enter. A fixed red light is established as a mark for the anchorage at Taal and Lemery. The usual anchorage for large vessels is about ⅜ mile westward of the light, in 15 or 16 fathoms. Small vessels anchor, according to draft, anywhere off the town of Lemery.

Bagalangit Point, the western point of Calumpang Peninsula, is a rocky bluff, 440 feet high, fringed by a very narrow reef, which extends around the southwest part of the peninsula nearly to Cazador Point. This part of the coast is clean, with soundings of 25 fathoms close-to.

Cazador Point is the southern point of the Calumpang Peninsula which separates Balayan and Batangas Bays. It is formed by a strip of land about 150 feet high, covered with trees; off the point and joined to it are some rocks, and a reef extends about 200 yards from its eastern side, deepening abruptly, with soundings of 70 to 90 fathoms at ¼ mile southeast of the point.

BATANGAS BAY,

between Cazador Point and Matoco Point, 9 miles east-southeastward, is clear and deep, with steep coasts. From Cazador Point to Maynaga Cove, 6 miles northward, the coast is steep, rocky, and wooded, and can be passed without danger at a distance of ½ mile. From Maynaga Cove the coast is low, with sand beaches cut by numerous small rivers.

Maynaga Cove, about 6 miles northward of Cazador Point, affords sheltered anchorage for small craft in heavy southwest weather in 10 to 16 fathoms, muddy bottom, with Montintubig Peak in range with a small wooded 210-foot hill bearing 280° (279° mag.).

Bauan, a small, unimportant town at the head of Batangas Bay, may be recognized by a conspicuous white church, which forms a good landmark for vessels entering the bay; it is connected with Manila by railroad.

From Bauan to Pinamucan Point, 3½ miles southward of Batangas, the whole coast is formed by sand beaches, and vessels of all sizes can anchor off it, but necessarily very close in on account of the great depth of water. Between Bauan and Batangas a depth of 12 to 14 fathoms will be found at less than 400 yards from the beach, and this anchorage is preferred by the small vessels that visit this coast on account of its good holding ground and proximity to these two towns. In case of necessity anchorage can be had east or west of the above roadstead, but very close to the beach and on bottom of gravel and rock.

Batangas (chart 4257), the principal town on the bay, is a coastwise port of considerable importance. It is about 3 miles southeastward

of Bauan, on the Calumpang River and about ¾ mile inland. The landing is marked by a dilapidated stone pier and the village of Santa Clara. A fixed red light is exhibited from a white wooden tripod erected on shore at the end of the pier. Small vessels steer for the pier on a 45° (44° mag.) bearing and anchor in 8 or 9 fathoms of water, allowing sufficient swinging room to clear some broken piles which were formerly part of a wooden extension of the pier. Large vessels find good anchorage in 15 to 18 fathoms southwestward of the pier.

From Batangas Pier the coast trends southerly for about 7½ miles to Matoco Point, the eastern entrance to Batangas Bay. The Calumpang River empties about 1½ miles southeastward of the pier; the bar is about 300 yards wide, and has very little water on it at low tide. From the Calumpang River to Naboled Point, about 4 miles southward, the shore is lined with sand and gravel, thence to Matoco Point it is lined with bowlders and fringed by a narrow, steep-to, coral reef. Soundings of 5 fathoms are found close to the shore, and off Matoco Point the 100-fathom curve approaches within ⅜ mile of the shore.

Maricaban Island, about 1½ miles southward of Cazador Point, is high and covered with trees. Near the eastern end, **Mount Casapao**, bare of trees and covered with cogon grass, rises to a height of 1,468 feet; near the western end is another mountain 1,005 feet high, terminating in a peak, which can be seen distinctly from the vicinity of Cape Santiago. The whole coast is bordered by rocks, and two rocky islets, Caban and Sombrero, lie off the northwest end, and two others, Culebra and Malajibomanoc, off the eastern end.

Caban Island, lying eastward of the northwest end of Maricaban, is 285 feet high and sparsely covered with trees and bushes.

Sombrero Islet, over ½ mile northward of the northwest end of Maricaban, is surrounded by a coral reef with some heads out of water and others awash. It is 142 feet high, covered with low bushes, and forms a very prominent landmark.

Sepoc Point, the northwestern point of Maricaban, is a steep, rocky headland 120 feet high; from a distance it appears to be an island, but it is connected with the mainland by a rocky isthmus 4 or 5 feet high.

A shoal about 300 yards in extent, with a least depth of 5 feet, lies 1 mile southwestward of Sepoc Point; between this shoal and the coast is a channel ¾ mile wide, with a depth of 20 fathoms in the middle.

Another shoal, on which the least depth is 13 feet, lies about ¼ mile northward of the north end of Caban Island.

A reef, with rocky heads awash and deep water alongside, is about 300 yards from the north shore of Maricaban Island, 1⅜ miles southward of Cazador Point.

Culebra Islet lies a little more than ¼ mile from the east end of Maricaban. It is about 60 feet high and covered with trees, the tops of which are about 95 feet high. The shore is rocky, bowlders and coral, except the most northern point, which is coral sand. The channel between Culebra and Maricaban has a width of about 200 yards and a depth of 6 fathoms.

Malajibomanoc Islet, lying nearly ¾ mile eastward of Culebra, is low and covered with trees, the tops of which are about 35 feet high.

In the channel between Malajibomanoc and Culebra depths of 8 to 20 fathoms are found.

Port Maricaban (chart 4257) is formed by the strait between Maricaban and Caban Islands and can be entered from either end, but the passage from the northward is preferable. It is sometimes used as a harbor of refuge for small vessels, which anchor off the village of Maricaban and moor to the shore and to each other to prevent swinging.

Maricaban Strait, between Cazador Point and Maricaban Island, is clear and safe, the only hidden danger being the shoal ¼ mile northward of Caban Island. The strait is used by the coasting steamers trading to Batangas. There is no good anchorage in it; small coasting vessels sometimes anchor near the island, if necessary; but the tidal streams run with considerable velocity, and the anchor must be let go so close to the rocks that there is danger of being swept ashore before it grips.

The passage south of Maricaban is deep and clear and is always used in navigating Verde Island Passage.

Verde Island, about 3½ miles from the coast, is triangular in shape, 1,311 feet high, and well wooded. There are two prominent peaks on it, reported visible over 40 miles. The island can be approached with safety, though there are some detached rocks close to the shore; off the southeast point are some rocks that uncover 200 yards from shore. On the north side is a bay in which the depth is from 10 to 7 fathoms near the shore, with a high wooded coast with occasional sand beaches, affording a shelter in southerly winds.

Verde Island Passage, lies between the south coast of Luzon and the north coast of Mindoro. It is divided into the North and South Passes by Verde Island; both passes are safe, but the northern one is preferred, as the southern is complicated by the Baco Islands.

MATOCO POINT TO BANTIGUI POINT.

Matoco Point, which forms the eastern entrance point of Batangas Bay, is high, wooded, and precipitous, with one low point to the southwest. The coast eastward is rocky for 1 mile as far as a sloping point (Ilijan); it then forms a slight indentation for 1½ miles eastward, ending in Arenas Point.

Arenas Point, the second point east of Matoco, consists of sand and stones, which serve to distinguish it. It is low and clean, and the tidal currents rush past it with great velocity. **Talaji Point,** 1½ miles east by north of Arenas, is not very prominent; it is rocky and wooded. Westward of the point good water can be obtained.

From Talaji Point to Rosario Point, 6 miles east by north, the coast is covered with trees and shows a sandy beach fringed by rocks close-to. Rosario River empties at the point of the same name. There is a bar at the mouth with 3 or 4 feet at low water. From Rosario River to Malabrigo Point the shore is sandy, wooded, and of regular height.

Lobo is about 1 mile inshore from the head of the bay, immediately westward of Rosario Point. Good anchorage may be had off Lobo in 12 fathoms, about 300 yards from shore. From this anchorage Malabrigo light, just showing over the shrubbery on Rosario Point, bears 118° (117° mag.), a prominent white house 36° (35° mag.), and Baco

Chico Islet 183° (182° mag.). Vessels should approach this anchorage cautiously, as the water shoals rapidly.

Anchorage can be found in northerly winds for vessels of all sizes between Matoco Point and Malabrigo Point, but the shore is very steep, and at less than 400 yards from it the depth is from 8 to 13 fathoms; bottom, coarse sand and gravel.

Malabrigo Point is the southwestern extremity of the broad headland formed by the spurs of Lobo Peaks; Punas is the central, and Malagundi the eastern, point of this headland. The coast between these points is of moderate height and well wooded, rocky between Malabrigo and Punas, and bordered with sand beach and rocks from there to Malagundi. Punas Point is noticeable because of some red patches at a short distance from the beach, and Lobo Peaks, 3,301 feet high, serve to indicate the position from the southeast.

A group flashing alternating light, visible 20 miles, is shown from a white cylindrical tower near the extremity of Malabrigo Point.

Locoloco Point is about 10 miles east-northeastward of Malabrigo Point. The coast is high as far as the western entrance point to Sigayan Bay, where the high land back of Punas Point terminates. Vessels of all sizes can anchor between Malagundi Point and Sigayan Bay, but close to the shore, which is very steep. The bottom is generally coarse sand mixed with gravel.

Sigayan Bay lies immediately westward of Locoloco Point. The northeast shore of the bay is fringed by a coral reef, covered at high water, and vessels should anchor well over in the western part of the bay.

From Locoloco Point to Bantigui Point, 4 miles northeastward, the coast hills are about 400 feet high and wooded. This vicinity appears sunk when seen from the vicinity of the southern part of Marinduque, there being high mountains on either side, but not behind, these points.

TAYABAS BAY.

Bantigui Point, the western entrance point of Tayabas Bay, is a wooded headland about 350 feet high and forms a prominent landmark when entering the bay. It is steep-to on its southern and eastern sides, but on its northern side a narrow coral reef begins, which gradually widens and fringes the shores of Coloconto Bay and extends around Subuquin Point.

Mount Banajao lies nearly north of Bantigui Point and about 12 miles from the coast. It is a truncated cone 7,066 feet high and is a conspicuous landmark when not obscured by clouds. It is about midway between Laguna de Bay and Tayabas Bay.

Coloconto Bay lies between Bantigui and Subuquin Points. A small inlet at the head of the bay serves as a shelter for small craft in southwest gales. There is a small islet covered with trees within it, and in the entrance there are several rocks, which are mostly bare at low water. Good anchorage in 15 fathoms, protected from southwest winds, may be found about ½ mile from shore with Bantigui Point bearing 125° (124° mag.).

From Subuquin Point the coast trends northward, with a slight curve westward, for 5½ miles to the mouth of the Nayon River, thence northeastward for 10 miles to the mouth of the Tayabas River.

It is low and wooded, and bordered by sand beaches which are intersected by small streams. Nayon River has about 3 feet of water on the bar, deepening inside to 9 feet; it affords shelter to small coasters.

Bolboc is a small town about 4 miles westward of the mouth of the Nayon River. The road leading to the town starts near the mouth of a small stream which empties about 1½ miles southwestward of the Nayon. Vessels can anchor off the coast between Coloconto Bay and the mouth of the Tayabas River, ¼ mile from the shore in 12 fathoms, mud bottom.

There are a number of shoals in the western part of Tayabas Bay which must be carefully avoided by vessels seeking anchorage. A small, dangerous coral reef, with a least depth of 1½ fathoms and surrounded by depths of from 10 to 15 fathoms, lies nearly 1 mile from shore south-southeastward of the mouth of the Nayon River. Nearer the shore and extending southwestward for nearly 2 miles there is a dangerous reef shoaling suddenly from 7 and 8 fathoms to 1¼ and 2 fathoms.

Another reef, covered by a least depth of ½ fathom, lies about 2½ miles northeastward of the mouth of the Nayon River and 1 mile from the shore.

The vicinity of these reefs should be avoided, as they are not visible because of the discolored water.

Tayabas River is about 150 yards wide at the mouth and has about 1 fathom on the bar at high water, increasing to 2 fathoms inside. The depths on the bar seem to be decreasing, and small boats can not enter the river at low tide. The point eastward of the mouth of the river trends southerly and forms a bight, where anchorage may be found in 5 to 7 fathoms, mud and sand bottom. This anchorage is further protected from northeast winds by a reef, on which are a number of small islets, projecting from the point just described.

Lucena, (chart 4267), a town of considerable importance connected with Manila by railroad, is about 2½ miles from the coast, between two small rivers, which form the Tayabas River.

A fixed red light visible 10 miles is exhibited from a white steel-frame tower on the beach near high water mark on the western side of the mouth of the Tayabas River. There are several shoal patches of from 2½ to 4 fathoms about 1¾ miles southward of the mouth of the river.

Directions.—Vessels approaching the anchorage at the mouth of the Tayabas River are advised to bring the light to bear 12° (11° mag.) when at least 2 miles distant; steer for the light on this bearing, and good anchorage will be found in about 7 fathoms with the eastern entrance point bearing 61° (60° mag.).

Leaving this anchorage, vessels should steer with the light over the stern bearing 12° (11° mag.) for at least 2 miles, when the course may be shaped as desired.

From Tayabas Point a great reef extends eastward and southward for nearly 7 miles, then curves around northward, leaving a channel about ¾ mile wide between it and Pagbilao Grande Island. On the eastern part of the reef are a number of spots which bare at low water. The south end of Pagbilao Chica Island bearing 74° (73° mag.) and the eastern entrance point to the Tayabas River bearing

288° (287° mag.) clear the southern side of this reef. A black buoy not set marks the extreme southern edge of the above reef.

Pagbilao Bay lies between Bocboc Point, about 6 miles east-northeastward of the mouth of the Tayabas River, and Pagbilao Grande Island; the available anchorage area is reduced by reefs and shoal water to a space about 1 mile in extent.

DIRECTIONS.—To enter Pagbilao Bay give the southwestern part of Pagbilao Grande a berth of about ¼ mile and steer for Angas Point, well open westward of Patayan Island, bearing 335° (334° mag.). Good anchorage will be found in 5 fathoms, with the hill on Patayan Island bearing 347° (346° mag.) and Bocboc Point bearing 230° (229° mag.). Light-draft vessels may anchor farther westward and obtain more shelter in southwest winds.

Patayan Island is about 90 feet high and quite prominent. Angas Point is about 25 feet high, has a bare surface, and is easily recognized. The church at Pagbilao is visible from a considerable distance and forms a good landmark.

Pagbilao Grande Island is of triangular form and nearly joined to the mainland, forming with it the bays of Pagbilao westward and Laguimanoc eastward. **Mount Mitra**, in the northeast part, is 530 feet high and is the highest point on the island. The southern side is steep-to, having a depth of from 12 to 14 fathoms, mud, at a distance of ¼ mile. This is the point to make for when entering Pagbilao Bay.

Pagbilao Chica Island, lying eastward of Pagbilao Grande, is joined to the larger island by a strip of sand. It is crescent shaped, forming westward the little bay of Capulaan, at the entrance of which the depth is 14 fathoms, decreasing to 5 fathoms at the edge of the shoal water that fills the head of the bay. Capulaan Bay affords good sheltered anchorage during the northeast monsoon, but is open to the southwest. **Mount Lipata**, near the southern end of the island, is 599 feet high and has a large white spot on the southwest side, near the top, that is very prominent and may be seen 20 miles in clear weather.

Mangayao Island is a small wooded island lying on the east side of the entrance to Laguimanoc Bay about 1¼ miles eastward of the middle of the eastern side of Pagbilao Chica Island; it is an island at high water only, being surrounded by mud flats bare at low water. The northern part of the island is fringed with mangroves; the southern part is a sand beach. A reef, partly bare at low water, extends 1¼ miles southward from it. Tubig Point, the western extremity of the island, is a low bluff surrounded by rocks, and there are also rocks off the southern point.

Laguimanoc Point, the western extremity of the land on the eastern side of Port Laguimanoc, is composed of low bluffs, fringed by rocks. It is well wooded and 137 feet high.

The small village of LAGUIMANOC, from which considerable lumber is shipped, lies on the point of the same name.

Port Laguimanoc (chart 4267), eastward of the Pagbilao Islands, is reduced by reefs and islets on both sides and at its head to a channel about ½ mile wide and 2½ miles long, in which the soundings gradually decrease from 11 to 2 fathoms, sand and mud. Great care must be taken to avoid the reefs, which extend from both sides of the entrance, narrowing the channel considerably, and also two shoals lying

on the western side of the channel. The southern shoal has a least depth of 2 fathoms and the northern one 1½ fathoms. HIGH ISLET, the first islet on the eastern side of the entrance, is small and 65 feet high; it is steep-to on its western side, but on the southern side a reef extends ¼ mile southward. CALABA ISLET, immediately northward of High Islet, is also small and about 40 feet high. TALABAN ISLAND lies across the head of the navigable channel, is small and wooded, and 39 feet high.

DIRECTIONS.—To enter Laguimanoc bring Calaba Islet and Laguimanoc Point in range bearing 357° (356° mag.) and steer in on this range. When Tubig Point is abeam, about ⅔ mile distant, the vessel will be past the shoals on the western side of the channel and should be headed for the west end of Talaban Island on a 338° (337° mag.) course, and anchorage taken up according to draft. Small craft can find good, protected anchorage immediately northward of Laguimanoc Point and also northward of Talaban Island.

From the entrance to Port Laguimanoc to Tuquian Point, about 29 miles southeastward, the coast is generally low, with a flat sand beach fringed with coral reefs of varying width and broken in places by mangroves. Inland the country is thinly wooded near the shore, with scattered patches of cultivated ground. At a greater distance back the low hills begin and are heavily wooded. Anchorage may be had nearly anywhere along this coast, but the principal places are **Unisan, Pitogo,** and **Macalelon.** Vessels not intending to make a stop are advised to give the coast a berth of 2½ miles, as dangerous detached reefs lie nearly that far out.

Malatandan Point, about 8½ miles east-southeastward of Port Laguimanoc, is bold, rocky, wooded, and formed by a hill 179 feet high, and is surrounded by low, level land. The western side of the point is steep-to, but from the southern part a coral reef extends southward to a distance of about ½ mile. About ¾ mile west-southwestward of Malatandan Point is the northeast extremity of a large, dangerous reef, partly bare at low water.

Calaylayan Bay lies immediately southeastward of Malatandan Point. The head of the bay is shoal, and a wide sandy beach is bare at low water. The town of **Unisan,** an occasional port of call for coasting steamers, lies at the head of the bay. The small river emptying at the town has very little water on its bar at low water, and small craft entering are dependent on the tide. There is a small shipbuilding plant.

The bay affords good anchorage, sheltered only during the northeast monsoon. To approach this anchorage vessels should bring the town to bear 35° (34° mag.) and steer for it, anchoring in 4 fathoms, soft muddy bottom, when Malatandan Point bears 332° (331° mag.).

Silancapo Point, about 2½ miles southeastward of Malatandan Point, is low and generally fringed with mangroves at its extremity, but rises to a height of 295 feet at a distance of a little more than 1 mile inland.

Mabio Point, about 4¼ miles southeastward of Silancapo Point, is low, covered with mangroves, and fringed with coral. Between those points the shore line is sandy beach alternating with mangroves; about midway a small stream empties, near the mouth of which are some conspicuous black rocks about 8 feet high. The most outlying

danger in the vicinity of Mabio Point is a small, 4-fathom reef 1¾ miles west-southwestward of Mabio Point. Several shoal reefs lie between this one and the shore.

Pitogo, the principal town in this vicinity, lies at the head of an irregularly shaped indentation, which is about 2⅓ miles wide between Mabio and Pagbabaugnan Points. It is built on a point of land between the mouths of Lagalag and Mayuboc Rivers, both of which are small and unimportant. The church is a prominent stone edifice with a tower on the eastern end; it forms a good landmark. Pitogo is visited weekly by a small coasting steamer. Good anchorage may be found by bringing the church to bear 45° (44° mag.), steering for it, and anchoring in 5 fathoms when the church is about ¾ mile distant. Small vessels and those having local knowledge may proceed closer in, care being taken to avoid a 1¼ fathom patch which lies eastward of the above course.

About 2 miles southward of Pitogo is the western extremity of a large coral reef, which bares at about half tide; about ¼ mile southward of the western extremity of this reef is a small 1½-fathom patch with deep water around it.

Macalelon is a small town at the mouth of the small river of the same name about 4 miles southeastward of Pitogo. It has weekly steamer communication. The reefs are very extensive in this vicinity, making off 1 to 2 miles. To vessels desiring to anchor off Macalelon no helpful directions can be given beyond the warning that a stranger should not go into less than 7 fathoms and should anchor with the large house in Macalelon bearing 46° (45° mag.).

A small, dangerous reef, with a least depth of 2¼ fathoms, lies 1¼ miles from shore 2¾ miles west-southwestward of the town of Hingoso.

Hingoso is a small village about 4 miles southeastward from Macalelon. Small steamers call here weekly. Vessels seeking anchorage off Hingoso should bring the town to bear 90° (89° mag.) and steer for it and anchor according to draft.

Southwestward and southward of Hingoso and 1 to 2 miles from shore is a chain of dangerous detached reefs and one rock awash, all of which can be cleared by keeping Tuquian Point bearing nothing southward of 130° (129° mag.).

TAYABAS BAY TO RAGAY GULF.

Tuquian Point is low, covered with mangroves, and not conspicuous from south or southeast; it is fringed by a reef, which extends ¼ mile westward and ⅝ mile southeastward. In the passage between Tuquian Point and Mompog Island the flood tide sets southeast and the ebb tide northwest.

From Tuquian Point the coast trends in an east-southeast direction for about 9 miles to Ajus Point. Between Tuquian and Ajus Points are two deep indentations in the shore line, Tagabas and Catanauan Bays.

Tagabas Bay, about 2 miles eastward from Tuquian Point, has a depth of 7 fathoms in the entrance, shoals very gradually toward the head, and affords the safest anchorage on the Luzon coast between Port Laguimanoc and Ragay Gulf.

Puting Buhangin Shoal is a detached coral reef topped by a small shifting sand cay which bares at about half tide; it is about ¾ mile west-southwest from the western extremity of Sandoval Point. Besides the main body of the shoal, which bares at extreme low water, shoal water extends farther eastward, between which and the point is a channel sometimes used by coasters. There is a 3-fathom patch about 1 mile west-southwest from Puting Buhangin Shoal, with deep water between it and the shoal. These shoals are dangers to navigation along this coast, but serve to partially protect Tagabas Bay from southwesterly seas.

Directions.—To enter Tagabas Bay bring the northern side of the western extremity of Sandoval Point to bear 90° (89° mag.) before Tuquian Point bears westward of 0° (359° mag.) and steer for it. When Puting Buhangin Shoal is abeam, haul northeastward and anchor according to draft.

Sandoval Point, separating Tagabas and Catanauan Bays, is low, heavily wooded, and fringed with mangroves. It is surrounded by reefs baring at low water, which at no place exceed ⅓ mile in width. Sandoval Point is nearly straight on its seaward side for a distance of 1⅓ miles and is connected with the mainland by an isthmus less than ½ mile wide.

Catanauan Bay, eastward of Sandoval Point, has an entrance between points fringed with coral reefs. The eastern extremity of Sandoval Point sends out a rocky reef to a distance of about ⅓ mile beyond the mangrove shore line; on this reef are several rocks which bare at half tide. From Pala Point, the eastern entrance point, the reef extends westward about ¼ mile. Inside the entrance points the bay widens slightly, the coral reefs narrow and finally disappear, leaving a clean, sandy beach along the shore of the bay. A depth of 10 fathoms is found off the entrance, and from there the water shoals gradually toward the head of the bay, where 3 fathoms will be found within ½ mile of the shore. There are no dangers in Catanauan Bay except the reefs fringing the shores. The Catanauan River, emptying into the head of the bay, affords shelter for small craft, but the entrance is obstructed by a sand bar, bare at low water.

Catanauan, the largest town in this vicinity, and a port of call for mail steamers, lies at the head of the bay at the mouth of the river of the same name. It contains a graystone church with a small dome, which forms a good landmark. No particular directions are needed for Catanauan Bay. Vessels entering usually bring the church to bear 23° (22° mag.) and steer for it, anchoring in 5 fathoms, sandy bottom, with the church on the above bearing, distant about 1 mile. The small coasting steamers usually anchor much closer in, according to draft.

Between the eastern entrance to Catanauan Bay and Ajus Point, about 2 miles east-southeastward, the fringing coral reef extends to an average distance of ⅜ mile from shore, outside of which is found sand bottom sloping rapidly to mud. Less than ½ mile southwestward of Ajus Point is a small detached coral patch bare at low water; this is the only outlying danger in this vicinity.

About 3 miles northward of Catanauan Bay is the beginning of a range of heavily wooded hills, extending in a south-southeast direction and gradually increasing in height to about 700 feet. These hills approach the coast near Ajus Point and border it as far as Ayoni Bay.

Between Mulanay and the mouth of the Mataha River the shore is steep-to, and the hills are 300 to 700 feet high, with their summits close to the beach. From Ayoni Bay southward the hills recede and the country is more open, wooded, and grassy, and 3 or 4 miles inland rises to a range of mountains, mostly wooded, 1,200 to 1,400 feet in height.

Mulanay is a small town at the mouth of the river of the same name, about 3 miles southeastward of Ajus Point. Between these points the shore reef is of irregular width, but in no place does it extend over ½ mile from shore. Good anchorage, protected only during the northeast monsoon, may be found in front of Mulanay. To approach it bring the church (a high, white tower) to bear 70° (69° mag.) and steer for it, anchoring in 5 fathoms, sandy bottom, about 800 yards from shore with a large bowlder on the reef on the port beam.

Mount Maclayao, about 2 miles eastward of Mulanay, appears as a broad, flat-topped, heavily wooded peak 1,240 feet high; it rises very little above the other hills in its vicinity.

Just south of Mulanay the shore reef extends about 650 yards, but thence to the mouth of the Mataha River, 5 miles southeastward, the reef is narrow and very steep-to. The land along this coast rises quickly to heights of from 300 to 700 feet. **Lipata Point**, about 2 miles south-southeastward of Mulanay, is not conspicuous as a point, but its white cliffs are prominent.

Ayoni Bay, about 6½ miles southeastward of Lipata Point, is an open roadstead affording good anchorage during the northeast monsoon. The water shoals gradually from 15 fathoms, muddy bottom, 1 mile offshore, to 5 fathoms, sandy bottom, ½ mile from the beach. A reef extends about ½ mile from the southern entrance point to the bay.

From Ayoni Bay the coast trends south by east, with a curve eastward for 7 miles to Subunguin Point, and is generally fringed with coral or rock, which extends in places slightly more than ½ mile. Small detached reefs, with depths of ½ to 5 fathoms, lie from ½ to 1½ miles from this coast. For lack of suitable landmarks only the more dangerous reefs will be described.

Bondoc is a small village of little commercial importance, partly obscured by trees, lying slightly back from the beach, about 4 miles southeastward of Ayoni Bay. The church, in the northern part of the village, is a long frame structure parallel to the shore, and is readily identified, being the largest building in the village. Good anchorage in the northeast monsoon may be found in 9 or 10 fathoms, mud and sand bottom, about ¾ mile from shore in front of the village of Bondoc. As the water shoals rapidly inside of the 5-fathom curve, vessels without local knowledge are advised to anchor in not less than 9 fathoms. Small vessels may anchor closer in by cautiously following the narrow channel through the shore reef.

Directions.—Vessels from northward should keep at least 1 mile from shore until the church at Bondoc bears 100° (99° mag.) and then steer for it, anchoring as previously recommended; vessels from westward should pass southward and eastward of Subunguin Reef and approach the anchorage with the church bearing 68° (67° mag.). These courses will carry a vessel well clear of the 5 and 4¾ fathom reefs, lying 1⅝ and 1⅛ miles westward of the church at Bondoc.

Subunguin Point, about 3 miles southward of Bondoc, is fairly prominent, well wooded, and about 250 feet high. It is fringed with mangroves and surrounded by a reef, which on the western side of the point is very narrow and steep-to.

Subunguin Reef, the most outlying danger in this vicinity, is a large detached reef partly awash at half tide. The middle of the reef is about 3 miles from shore and 2¾ miles northwestward of Subunguin Point. This reef is steep-to on its western side. Subunguin Point, bearing 148° (147° mag.), leads through a deep, clear channel 1 mile wide between Subunguin Reef and the reefs westward from Bondoc. Pinamuntangan Point, bearing nothing southward of 150° (149° mag.), leads ⅝ mile westward of Subunguin Reef.

Aguasa Bay is a small bay southward of Subunguin Point. The head of it is fringed by a wide coral reef bare at low water. Small vessels may find anchorage in the middle of the bay in 3 to 5 fathoms, sandy bottom. A small detached reef, with a least depth of 1¼ fathoms, lies off the entrance to Aguasa Bay about ⅞ mile south-southwestward of a bold cliff about 100 feet high, partly covered with vegetation, on the southwestern side of Subunguin Point.

Pinamuntangan Bay, immediately northward of the point of the same name, is of no commercial value. Several detached shoals exist in the northern part of the bay about ⅓ mile from shore and extending northward from a line drawn west from the middle of a small, sandy beach at the head of the bay.

Pinamuntangan Point, the western point in this vicinity, is heavily wooded, fringed with mangroves, and surrounded by a very narrow coral reef. From Pinamuntangan Point to Bondoc Point, 7½ miles southeastward, the coast is bold, clean, and steep-to.

Bondoc Point, the southern extremity of Bondoc Peninsula, is a formidable looking, redoubt-like formation of limestone and has a bluff 50 feet high, rising from a platform of old coral. The fact that this point appears like masonry, is grayish in color, and remarkably bold makes it easy to recognize. It is clean and steep-to and can be rounded in safety at a distance of ¼ mile.

Bondoc Head, about 1 mile northward from the point, is 1,329 feet high.

From Bondoc Point the coast trends in a northeasterly direction for 7 miles to Arena Point, the most easterly point of Bondoc Peninsula. This coast is clean and steep-to, with the exception of two small reefs off Pagsanhan Point, and can be skirted in safety at a distance of 1 mile. Eastward of Bondoc Point the hills progressively diminish in size and become more grassy until at Pagsanhan Point they trend away from the coast, opening the Pagsanhan and Talisay Valleys.

Pagsanhan Point, about 3 miles eastward of Bondoc Point, is low and wooded at its extremity and fringed by a very narrow coral reef. **Pagsanhan River**, the largest stream in this vicinity, with about 4 feet on its bar at low water, empties immediately northward of Pagsanhan Point.

Talisay River, emptying about 2 miles eastward of the Pagsanhan River, has coral before its entrance and is blocked with bowlders.

A small reef, with rocks awash at low water, lies ½ mile southeastward of Pagsanhan Point. Inside the reef are depths of 5 and 6 fathoms, gradually decreasing toward the shore. A small reef, with a least depth of ¼ fathom, lies about 600 yards from shore about ½

mile southwestward of Pagsanhan Point. These two reefs constitute the only offlying dangers between Bondoc and Arena Points.

MARINDUQUE ISLAND,

situated before the eastern entrance to Verde Island Passage, is nearly circular and has a greatest diameter of about 24 miles in a northwest and southeast direction. It is mountainous and well wooded. There are a number of prominent peaks, of which Mount Marlanga, in the southern part of the island, 3,877 feet high, is the highest. There are five towns, all of which are on or near the coast and off which sheltered anchorage may be found according to the season of the year. There are three harbors of refuge, **Port Balanacan, Santa Cruz,** and **Masagasai Bay,** where good shelter may be found. The soil of Marinduque is fertile and the principal exports are hemp, copra, and firewood.

San Andres Point, the northern extremity of the island, is a small, steep-to peninsula 886 feet high.

Between San Andres Point and Santa Cruz Point, about 8 miles eastward of it, the coast is rough and irregular. This coast is divided into two bays by Trapichihan Point. **Sayao Bay,** the western one, though fringed with rocks, is deep, having 22 fathoms in the middle. **Calancan,** the eastern bay, is foul and faced by the Banot Islands, of which Hakupan, the outer one, lying about 1 mile northeastward of Trapichihan Point, is high and bold, but of little value as a landmark except when close inshore. Firewood is exported from Lusok, a barrio on the southeastern arm of the bay.

Santa Cruz Point, the western point of the northern entrance to Santa Cruz Harbor, is over 100 feet high and fringed on its northern extremity by a narrow reef. In this vicinity there are no outlying dangers northward of a line running east and west through Santa Cruz Point, with the exception of a 2½-fathom patch about ½ mile northwestward of the point, beyond which the water deepens rapidly. Foul ground extends about 3 miles in an east-southeast direction from Santa Cruz Point and forms the western limit of the northern channel into Santa Cruz Harbor.

Santa Cruz Island, about 4 miles southeastward of the point of the same name, is fringed by reefs which, off the northwest point, extend about ½ mile in a northerly direction and off the southeastern point about ⅜ mile. The island is low and flat; the southwestern third of the island is mangrove swamp and the remainder coconut groves and cultivated land.

Santa Cruz Harbor (chart 4453), formed by the passage between Marinduque and Santa Cruz Islands, is safe and fairly roomy, has excellent holding ground, and is an important harbor of refuge. During flood tide a weak current sets in through the northern channel and out through the eastern channel; conversely during the ebb. Good, protected anchorage may be found in 9 fathoms, soft muddy bottom, with the south tangent to Santa Cruz Island bearing 91° (90° mag.) and the western tangent to the same island bearing 335° (334° mag.). A light is shown from a concrete pillar on the reef on the western side of Santa Cruz Harbor.

DIRECTIONS.—Vessels entering by the northern channel should not bring Santa Cruz Point to bear anything northward of 270° (269°

mag.) until the east point of Santa Cruz Island is well open of the north point of the same island bearing 130° (129° mag.) in order to give the foul ground on the western side of the entrance a good berth. When the southwest tangent of Santa Cruz Island bears 166° (165° mag.), with a bluff near the mouth of the Tagum River in range with it, haul southward and bring the light on the western side of the harbor to bear 189° (188° mag.) and steer for it until well inside, when a midchannel course may be kept to the anchorage. The eastern entrance is ½ mile wide at the narrowest part, and both sides are fringed with reefs. Vessels approaching it should bring the light to bear 282° (281° mag.) and steer for it on that bearing until Mango Point is abeam, when the course may be shaped for any part of the anchorage.

Santa Cruz River, emptying into the southwestern part of Santa Cruz Harbor, is very shoal and navigable only by small boats at high water.

The town of **Santa Cruz** lies about ¾ mile southward of the river of the same name, about 1½ miles above its mouth. There is a road leading from the town to the river, at the terminus of which are a warehouse and small wharf. Small coasting steamers call off the river mouth two or three times each week. The usual anchorage for small craft desirous of communicating with Santa Cruz is southeastward of Tabignan Point. Vessels drawing not over 7 feet may proceed between two rocky reef points south of Tabignan Point and anchor in 1½ to 2 fathoms, protected from all winds.

The **Tagum River**, which is larger and has more water inside than the Santa Cruz River, empties immediately eastward of that river. At the mouth, however, are extensive mud flats, bare at low water, with a channel having a depth of only 1 foot through them. It seems to be very little used even by native boats.

Maniuayan Island, nearly 1½ miles northeastward of Santa Cruz Island, is low and flat, given up exclusively to the cultivation of coconuts and surrounded by extensive reefs. In passing between Santa Cruz and Maniuayan Islands, Tagum Point in range with summit of the easternmost hill on Salomague Island bearing 159° (158° mag.) will carry a vessel through the middle of a channel ¾ mile wide with a least depth of 8 fathoms.

Mompog Island, 1¾ miles eastward of Maniuayan Island and 4¾ miles south-southwest of Tuquian Point, Luzon, is rugged and steep, rises quickly near the east side to a height of 282 feet, and then slopes gently to the westward. Mompog is fringed on its north, east, and south sides by a narrow, steep-to reef. On the western side the reef is wider, and in places it continues to Maniuayan Island. The channel between Mompog and Maniuayan Islands is over 1½ miles wide, and the least water found during the recent survey was 4½ fathoms, but because of the irregular rocky bottom vessels using this channel are advised to adhere closely to the following directions: The eastern tangent to Salomague Island bearing 184° (183° mag.) in range with slope of the third knoll on Salomague Point leads through a channel having a least depth of 7 fathoms. Vessels using this channel are advised not to open this range to the eastward in order to give the foul ground westward from Mompog Island a good berth.

Tagum Point, about 2½ miles southeastward of the eastern entrance to Santa Cruz Harbor, is clean and steep-to. It rises in a steep slope

to two hills known as Tagum Peaks, 532 and 584 feet high, respectively. From northward these two hills show as quite sharp; the easternmost and higher one is well defined and wooded and the inner one is covered with grass with a fringe of trees at its top.

Salomague Island lies midway between Tagum and Salomague Points and protecting Masagasai Bay. The northwest and southeast points are low, and there are hills in the center and southwest part. The highest point on the island, 242 feet, is near the center. On the southeastern part of the island is a brown, rocky cliff, 120 feet high, visible from seaward. The northeastern side of the island is fringed with reefs, nearly ⅜ mile wide at the northern end and tapering to almost nothing off the rocky cliff just mentioned.

Masagasai Bay (chart 4453) is a large, irregular indentation in the coast line that is nearly filled by Salomague Island. The passage between the island and the mainland is narrow and shoal in the middle, west of the center of the island, but expands at either end into irregularly shaped basins of considerable size and depth. The southern end, though having plenty of water, is not recommended because of its limited area and difficulty of access. It is possible to enter by following closely the edge of the reef around the south end of Salomague Island or by crossing the 2½-fathom reef which lies directly in front of the entrance. No directions can be given except to enter by chart and lead.

The northern end, however, offers a safe and fairly roomy anchorage for small vessels which is easy of access, as follows: Bring the sharp, conical 323-foot hill about 2 miles westward from the north end of Salomague Island to bear 260° (259° mag.), when it will be in range with a white stump in the foreground; steer in on this range or on the bearing for the hill, if stump can not be seen, until Tagum Point bears 17° (16° mag.) and then steer 197° (196° mag.) until the before-mentioned hill bears 284° (283° mag.); thence by chart and local objects to an anchorage in 4 or 5 fathoms.

Salomague Point, about 8 miles southward of the eastern entrance point to Santa Cruz Harbor, is the most eastern point on Marinduque. It is formed of low cliffs and is clean and steep-to.

From Salomague Point the coast trends southwestward, with a curve westward, for 11 miles to Marlanga Point and then curves round gradually southward and westward to Suban Point, the southern extremity of the island. This coast is bold, clean, and steep-to, and in most places the 20-fathom curve is found within ¼ mile from shore. A narrow fringe of coral about ⅕ mile wide begins just westward from Salomague Point and gradually decreases in width until it disappears in Marlanga Bay.

Torrijos Bay, about 4½ miles southwestward of Salomague Point, affords shelter for small craft except from southerly and easterly winds. The entrance point and the sides of the bay are fringed with coral, narrowing the entrance channel to about 300 yards and contracting the anchorage area to a width of about 250 yards. To enter, from a position about ½ mile offshore, bring the right hand of two native houses at the head of the bay, in range with a distant, dark-appearing, rounded hilltop that shows in a distinct notch in the grassy hills, to bear 318° (317° mag.) and enter cautiously. This range leads to an anchorage in 7 or 8 fathoms, sandy bottom, in the center of the bay.

Torrijos is a small town of no commercial importance lying on high ground on the western side of Torrijos Bay. The church and one other building have iron roofs which are visible in most directions from seaward.

Marlanga Bay, about 4 miles southwestward of Torrijos Bay, is of no commercial importance and is too deep to afford anchorage except in a limited space close to the southern shore, where anchorage may be found in 12 to 15 fathoms, sandy bottom, about 800 yards from the beach.

Marlanga Point, the southeastern point of Marinduque, is a bold, clean headland 920 feet high 400 yards from shore.

Suban Point, the southern extremity of the island, is bold and clean; back from the point the land rises rapidly toward Mount Marlanga.

Elefante Islet, ⅜ mile southward of Suban Point, is a small, round, rocky islet ¼ mile in diameter. It is sparsely wooded, 386 feet high, and is clean and steep-to on all sides. It forms a very prominent landmark, especially from eastward or westward. The tidal currents in the channel between it and Marinduque run with considerable velocity.

Anchorage may be found on a small shelf northward of the islet in about 13 fathoms, sandy bottom, with the eastern tangent to the islet bearing 180° (179° mag.).

From Suban Point the coast trends in a general northwesterly direction for 14 miles to Obung Point, thence northerly for 6½ miles to Lupac Point, and thence north-northeasterly for about the same distance to Silangan Point, the northwesterly point of Marinduque. The western coast of the island is, generally speaking, clean and steep-to, and there are no detached dangers with the exception of a small 4¾-fathom patch in the channel between the Tres Reyes Island and the mainland. On the western side of the island there is more level land than on the eastern, and most of the cultivation and the greater part of the inhabitants are consequently found there.

Tres Reyes Islands are a group of three small, heavily wooded islands, consisting of GASPAR (270 feet high), MELCHOR (250 feet high), and BALTASAR (355 feet high), lying in a west-southwest direction 2, 3½, and 5 miles, respectively, from the southwestern part of Marinduque. Their shores are clean and steep-to with the exception of Gaspar, which has a fringe of coral and rocks extending about ⅛ mile from its northeast point. Their shore cliffs are precipitous and underworn by the action of the sea, and are highest on the southwest side of each of the islands, where they are about 200 feet high. There is no fresh water on these islands, and they are uninhabited. The channels between Baltasar and Melchor and between Melchor and Gaspar are deep and clear; in the channel between Gaspar and Marinduque the least water found during the recent survey was 4¾ fathoms. The channel between Melchor and Gaspar seems to be given the preference by coasting steamers.

A small coral patch, covered by a least depth of 4¾ fathoms, lies about ¾ mile from shore in the channel between Marinduque and Gaspar, the eastern island of the Tres Reyes. The channel between this shoal and Gaspar is about ¾ mile wide and over 20 fathoms deep in the middle; the channel between the shoal and Marinduque is nearly ½ mile wide and has a depth of 16 fathoms in the middle.

The small and unimportant villages of **Buenavista** and **Daiquitin** and the town of **Gasan** lie on the coast between Suban and Lupac Points. A road begins at Buenavista and follows the coast northward through Daiquitin, Gasan, and Laylay, and terminates at Boac. This road forms an important avenue of communication and is extensively used.

Gasan is on a slight bluff 20 to 50 feet high, about 2 miles southeastward of Obung Point. The most prominent building in the town is a white coral warehouse with an iron roof; it is in the northern and lower part of the town, near the beach. Immediately back of the town is a hill upon which stands a ruined fort, on one of the walls of which is a conspicuous tree. Copra is the chief article of export from Gasan. Good anchorage, protected only during the northeast monsoon, may be found in 7 or 8 fathoms, sandy bottom, about ⅜ mile westward of the town; light draft vessels may anchor closer in.

Boac, the principal town on the island and the capital of the subprovince of Marinduque, lies on the left bank of the Boac River, about 1½ miles from the sea. It is connected with Gasan and Torrijos by telephone. The Boac River divides about 1 mile from the sea, the main stream flowing westward and emptying just south from Lupac Point, while the Laylay, the smaller branch, flows southwestward and empties at the village of Laylay, about ½ mile southeastward of the mouth of the Boac River. The Boac River is reported to vary greatly in the amount of its discharge and to be continually shifting its bed.

Laylay, a small village on the south bank at the mouth of the Laylay River, is the usual landing place for Boac, with which it is connected by a good road. Boats discharge on the beach in front of Laylay, or at high water enter the river and discharge inside.

A light is shown from a concrete pillar on the beach in front of Laylay. The usual anchorage for Boac is about ¼ to ⅓ mile westward of the light in 12 to 15 fathoms. This anchorage must be approached cautionsly, as the water shoals very rapidly. About 150 yards within the 20-fathom curve the bottom rises abruptly from 10 to 3 fathoms; the 3-fathom curve defines the outer limit of a sandy shelf rising gradually to the beach.

Lupac Point, the western extremity of Marinduque, is low, flat, and sandy and is fringed with coconut trees.

Ulan Point, the southern entrance point to the bay of the same name, is 3½ miles northeastward of Lupac Point. It is fringed by an extensive coral reef having a greatest width of about ⅓ mile. This is the widest reef on the western coast of Marinduque. Ulan Bay, between Ulan Point and Pamuntangan Point, about 1¼ miles northeastward, is nearly blocked by reefs bare at low water, and is of no value to navigation. The low land of the western part of the island terminates in the vicinity of Ulan Bay, and thence northward the hills lie close to the coast.

Pamuntangan Point, the southern entrance point to Port Balanacan, is clean, well wooded, and 320 feet high.

Port Balanacan (chart 4453), immediately northeastward of Pamuntangan Point, consists of two small but perfectly protected anchorages for moderate-sized vessels. It is surrounded by high hills on all sides, and, except for one reef in the entrance, is free from dangers. The entrance, nearly 1¼ miles wide between Antagtacan

Point northward and Pamuntangan Point southward, is nearly filled by Agpitan, Ataa, and Madumug Islands and the before-mentioned reef. About midway between the village of Balanacan, which lies on the eastern shore of the outer anchorage, and the entrance to the inner anchorage is a yellow bluff, about 25 feet high, which forms a useful mark for vessels entering the port. A light is shown from a white concrete beacon close northward of the yellow bluff.

Agpitan and Ataa Islands lie on the same reef and are about 3/8 and 1/2 mile, respectively, south-southwest of Antagtacan Point. They are dome shaped, about 50 feet high, and wooded at their tops. About 100 yards southwestward of Ataa Island, and near the outer edge of the reef projecting southwestward from it, is a prominent pinnacle rock about 8 feet high.

Madumug Island, on the northern side of the entrance, is small and wooded and 145 feet high. It is surrounded by reefs, which connect it with the land northward. On its western side is a light-brown cliff about 90 feet high. About 1/4 mile southwestward of Madumug Island is the outer edge of a detached reef, with a least depth of 1/4 fathom; this reef does not show well. The southeast point of Madumug Island, bearing 60° (59° mag.), clears the southeastern edge of this reef.

Salvaria Island, on the eastern side of the entrance to the inner anchorage, is a pile of rocks with a few trees growing on it. It is steep-to on its western side, but shoal water extends to the land southward and eastward.

Directions.—To enter Port Balanacan, pass about 1/8 mile northward from Pamuntangan Point and steer eastward until the yellow bluff previously mentioned bears 60° (59° mag.); steer for the bluff on this bearing until the west side of Salvaria Island in range with Pig Point, on the northern side of the inner anchorage, bears 19° (18° mag.); steer in on this range and anchor off the middle of the eastern side of Madumug Island in 11 fathoms, muddy bottom; or continue, passing close to Salvaria Island, into the inner anchorage, anchoring in 6 or 7 fathoms, muddy bottom, southeastward of Pig Point.

Antagtacan Point, the northern entrance to Port Balanacan, a little over 1 mile northward of Pamuntangan Point, is well wooded and 244 feet high.

San Andres Islands are two small islands, each about 130 feet high, extending about 1 mile westward from Silangan Point. They are fringed with a narrow steep-to coral reef, bare at low water. There is no channel between them, and at extremely low tides the reef which connects them with Silangan Point is entirely exposed.

RAGAY GULF,

between Bondoc Point to the west and Cabarian Point to the east, 43 miles apart, runs 60 miles inland to the northwest, and, with the river Vinas, which enters the gulf at its head, almost divides the island of Luzon at this point. Ragay Gulf is, in general, deep and clear. The shores are fringed by narrow coral reefs interspersed with sand and gravel beaches. The hills rise rapidly from the shore, and are generally wooded. The lower slopes and a few of the hilltops are covered with cogon and scattered trees. At the head of the gulf the land

slopes more gradually for 500 to 800 yards and then rises rapidly in ridges and valleys to the higher hills inland. The waters at the head of the gulf are generally muddy, due to the sediment carried down by the rivers emptying there. The most important ports are **Pusgo** and **Guinayangan** on the west side of the gulf; and **Ragay Bay, Caima Bay,** and **Pasacao Anchorage** on the east side; but anchorage may be taken up almost anywhere near the shore, but not too close in, as in places rocks awash lie off the shore reef. Burias Island, with the islands and shoals northward of it, divide the entrance to Ragay Gulf into two wide channels.

At Arena Point, the western entrance point to Ragay Gulf, the shore line makes a sharp turn to northward and extends for 18 miles in a general northerly and northwesterly direction to Port Pusgo. A sharp clump of trees on the first knoll northwest of Arena Point is the most prominent landmark in this vicinity. **Mount San Andres,** 1,320 feet high, and another peak 2 miles to northward, are also prominent, their tops being covered with cogon.

Sombocogon Bay, 3 miles northward of Arena Point, is much frequented by native coasters. It is of small extent, and a coral reef partly fills the head.

Alibijaban Island lies 3½ miles northeastward of Sombocogon Bay. The north and south ends of the island are both wooded and 160 and 65 feet high, respectively. The middle part is low and bordered by mangroves, which from a distance give it the appearance of two islands. Alibijaban Island is surrounded by a coral reef, which extends ¾ mile southward and ¼ mile northward. A part of the island is under cultivation, the natives coming over from San Andres on the mainland for the working season.

Palad Reef, 5 miles northward of Alibijaban Island, lies with its longer axis in a northwest and southeast direction. A cay, probably awash on the highest tides, lies near the center of the reef. The channel between the reef and the shore is 2 miles wide. Several banks with 5½ to 9 fathoms are shown; otherwise it is deep and clear.

Several detached coral shoals, with depths of from 1¼ to 4 fathoms, lie in an area 2 miles long and ¼ mile wide parallel to the shore, with the north end 2 miles south-southwestward of Palad Cay.

Port Pusgo (chart 4454) is a narrow inlet extending 5 miles to the northwest. The larger part of its area is shoal, having less than 2 fathoms. The entrance, carrying a depth of 5½ fathoms, narrows to about 110 yards opposite a prominent point of mangroves. Well-protected anchorage in 4 fathoms, mud bottom, may be found about ½ mile farther in. The barrio of Buhangin lies on the shore southeast of the anchorage, and the municipio of San Narcisco stands at the head of the port.

Pusgo Reef with 1½ fathoms lies in the approach to Port Pusgo, 1¼ miles south-southeastward of Pusgo Point.

Gorda Point, 1¼ miles northwestward of Pusgo Point, is high and steep. The reef, which fringes the shore from the interior of Port Pusgo, continues around Gorda Point to the northwest, extending 100 to 400 yards from shore. Two shoals, covered by 2½ fathoms and ½ fathom, lie 4¼ and 5 miles, respectively, northwestward of Gorda Point and 1 mile offshore.

Peris Bay, between Guinhalinan Point and Lian Point, extends 2 miles inland. The head of the bay is bordered by a shoal of mud

which considerably reduces the available space. Good anchorage in 4 to 6 fathoms, mud bottom, may be had in the northwest part of the bay. The **Peris River**, navigable for small boats for 7 or 8 miles, empties into the head of the bay. A coral reef, which reaches a width of ¼ mile off Lian Point, borders the north side of Peris Bay. **Lian Point** is very prominent and 300 feet high less than ½ mile from shore.

A shoal, with a least-known depth of 5½ fathoms and surrounded by deep water, lies 6¼ miles southeastward of Lian Point. A shoal with 2 fathoms over it lies 2 miles north of Lian Point and ½ mile offshore.

Capuluan Point, 5 miles north of Lian Point, is low and is bordered by mangroves; 400 yards offshore a prominent rock, bare except at the highest tides, marks the outer end of the shore reef. A shoal with ¼ fathom least water lies 1 mile eastward of Capuluan Point, and there is a 1½-fathom shoal between it and the point. The coves on both sides of Capuluan Point are shoal and of no importance to navigation.

Capuluan Reef lies 2 miles eastward of the point of the same name. The rocks are just covered at high water. The channel between the reef and the shoals off Capuluan Point is 1 mile wide, deep, and clear.

From Capuluan Point the coast trends northwestward to the mouth of the Viñas River. As far as the town of Guinayangan the shore is fringed with mangroves and the hills rise almost from the water's edge. North of the town to the Viñas River the land is low and flat for about 500 yards and then rises abruptly to 700 feet in a series of narrow ridges. The Viñas River is shallow and of little use to navigation.

Guinayangan is the largest town in Ragay Gulf. A pier at which lighters load lumber extends about 600 yards from shore. Good anchorage may be found just off the pier in 3 fathoms, mud bottom. The Guinayangan and Pasacao cable lands near the town.

Sibalun Island is a coral reef overgrown with trees, some of which are 40 to 50 feet high. At half tide the island is connected with the shore by a long, narrow sand bar.

Acha Reef, with ¼ fathom least water, lies 2 miles south-southeastward of a prominent zinc-roofed house on the shore north of Sibalun Island. Deep water surrounds the shoal, but shoal water extends over 1 mile from the shore northward, with ½ fathom at its end. Care must be exercised when navigating in this vicinity, as the water is often muddy and the shoals not visible.

Talcauayan Bay, between Ausan Point on the west and Mambulao Point on the east, extends 2½ miles northward. About half of its area is shoal. Good anchorage may be found just inside the entrance points in from 5 to 7 fathoms, mud bottom.

From Mambulao Point the coast trends in a general southeasterly direction for 22 miles to Bantuin Point, with indentations to northeastward forming **Catabanga, Ragay, and Caima Bays**. Between Mambulao Point and Quilbait Point, 3 miles southeastward, shoal water extends about ¼ mile. The Quilbait River empties into the gulf on the north side of the point of the same name.

Catabanga Bay, between Quilbait Point and Bagutayoc Point, 4 miles southeast, extends 1½ miles inland. The shores are fringed with coral, and there is a 6¾-fathom spot in the middle of the bay.

The Catabanga River empties into the head of the bay. Well-protected anchorage in from 6 to 8 fathoms, mud bottom, may be found in the mouth of the river.

Omon Point, the northwestern entrance point to Ragay Bay, lies 3 miles southeastward of Bagutayoc Point. It is high, clean, and steep-to. **Otoc Point**, the southeastern entrance to Ragay Bay, is the outer end of a small island, **Saboon**, which, with the adjacent mainland, is conspicuous on account of a chain of knolls or low hills that form their outline. Saboon Island is separated from the mainland by a shallow channel bare at low water. Shoal water extends ¾ mile westward of the island, with a rock awash near the outer end of the bank.

At the entrance points of **Ragay Bay** the shore recedes, greatly increasing the area of Ragay Bay, which is 3 miles wide between the entrance points and 2 miles deep. The Omon, Paculalin, Ragay, and Apali Rivers empty into the bay. These are all shallow, being nearly closed by sand bars at low water. There is good anchorage in Ragay Bay in from 6 to 10 fathoms of water.

Caima Bay is a large open area between Saboon Island and Bantuin Point. Most of its shore is fringed with coral, and a thin line of mangroves extends along the beach. Good anchorage may be found in the cove southwestward of Binahian barrio in from 5 to 8 fathoms, mud bottom, and also near Bantuin Point in 8 fathoms.

Bantuin Point appears as an island from a distance, as the narrow neck of land connecting it with the mainland is low. The point is high, with a peculiarly shaped sharp peak near its end. This peak is steep seaward. The point curves to northwestward and, with the islands **Carabang** and **Galvaney** lying off its end, affords protection against the southwest monsoon. **Carabang Island**, 195 feet high, lies 1 mile northwestward of Bantuin Point and is surrounded by deep water. **Galvaney Island**, 240 feet high, and a large rock 40 feet high, lie on the reef extending from Bantuin Point. They are steep-to on the gulf side, but the water is very shoal between them and the point.

Four miles southeastward of Bantuin Point and about 1 mile inland is a prominent peak, 1,620 feet high, with a white scar or spot on its side, visible from near Arena Point and from nearly all parts of the gulf northward.

From Bantuin Point the coast trends southeast for 17 miles to Pasacao Anchorage. The shore is steep-to, and the land rises rapidly to the first range of hills, which are over 1,000 feet high. The Tinalmud River enters the gulf near Wagas Point, about 2 miles southward of the 1,620-foot peak. Bagulaya Point, Buri Point, and Tanuan Point are on this coast. The town of Dalapaon lies on the beach between the latter two points. There is an anchorage off the town, but necessarily close in on account of the great depth of water.

Pasacao Anchorage (chart 4454) lies between Pasacao Point and Refugio Island. The cove is about 1 mile deep, but the shore is fringed by a reef, with sand and mud over it, which considerably lessens the available anchorage area. The anchorage is in 3 to 5 fathoms, mud bottom, but is exposed to the southwest. At times a choppy sea sets in and makes landing on the beach through the surf dangerous. The town of Pasacao lies at the head of the cove, in the valley leading through the high land to the town of Pamplona and

to the Bicol River valley. REFUGIO ISLAND, 200 feet high, is steep-to on the seaward side. A sunken rock lies off the shore reef about 175 yards north of Refugio Island, and a reef makes 550 yards offshore opposite the island, leaving an available channel about 300 yards wide.

From Pasacao Anchorage to Macoto Point the coast is high, steep-to, and generally bordered by a sand beach. **Sibono Point** is conspicuous on account of its two peaks standing out sharply from the higher background. **Tongon Point** has a precipitous bluff 200 feet high on its south side, the north side being low. Between these two points is **Jamuraon Bay**, an open bight with the town of Jamuraon at its head. Anchorage may be had close to shore in front of the town in 3 to 6 fathoms, but outside of this shelf the bottom drops away steeply.

Caurusan Point may be recognized by its pyramidal shape, the cogon on the south side of the extreme point and the steep valley southward of it. **Coguit Point**, a low brush covered point with a sandy beach, has a coral reef extending several hundred yards offshore. A conspicuous cogon hill lies between the point and the higher ridge back of the shore. **Bedal Point**, 2 miles southeastward of Coguit Point, is fringed by coral, and a coral reef awash lies 2 miles southward of it close to shore. This is the only danger along this coast northward of Pantao Bay. An outcrop of light-colored rock forming a vertical cliff about 118 feet high at the top of the cogon-covered ridge about 2½ miles northward of Pantao Bay is a good landmark for this vicinity.

Pantao Bay, between Sinlian and Caunbalan points, affords good anchorage exposed to northwestward. **Mount Pantao**, 1,510 feet high, is easily recognized and forms a good leading mark for entering the bay. Caunbalan Point is fringed by a coral reef. The point is high, with a number of large rocks at the foot of the cliffs. The first cliff, 90 feet high, is locally known as Seleselehan Point.

Apud Point is a low, rounding point covered with mangroves, brush, and scattered coconut trees. **Apud Reef** is a large rocky reef that bares over an area about 1 mile long north and south by ½ mile wide, with another rock awash at low water over ¾ mile northwest of the main reef. The channel between Apud Reef and Apud Point is about ⅓ mile wide, with a 2¾-fathom shoal in midchannel northward of the point, to which it is connected by a ridge covered by somewhat deeper water. The channel westward of the 2¾-fathom shoal has a depth of 8 fathoms. Fairly good protection is obtained behind Apud Reef, but vessels should anchor well toward the point.

Macoto Point, 5 miles southward of Apud Point, is bold and very prominent. The shore line consists of cliffs from 12 to 80 feet high. Three timbered hills on the point, highest 240 feet, and the low land back of the hills give the point the appearance of an island from northward or southward. A shoal with a least known depth of 2¾ fathoms lies almost 1 mile northwest of the point. **Bagadamolag Islet** lies southeast of the point just off the shore reef. **Cagmanaba Bay**, eastward of Macoto Point, affords protection from all seas, except from southward. A hill 105 feet high, close to the shore near the head of the bay, and **Mount Caburauan**, 1,540 feet high, 2 miles inland, are useful marks for navigation in this vicinity.

Cabarian Point, the eastern entrance point to Ragay Gulf, is fringed by a coral reef about 200 yards wide. A 10-fathom bank lies 1 mile westward of the point. The point itself is low and wooded, but it may be readily identified by a 307-foot hill about ½ mile northward and close to the coast.

BURIAS ISLAND,

lying in the entrance to Ragay Gulf, is 37 miles long northwest and southeast, 8 miles wide near the northwest end, and tapers to a narrow point at the southeast. The island is generally mountainous and thinly wooded. The coast is steep and generally bordered by coral reefs, with a few stretches of sand beach. The population is small, and the principal products are rice and hemp.

Several islands and reefs lie off the northern part of Burias Island. **Templo Island,** nearly 3 miles northwestward of Cueva Point, the northwest point of Burias, is 3 miles long northwest and southeast and ¾ mile wide. There are detached rocks on the reef that borders its southern shore and also on the reef that extends ½ mile to northeastward from its north end. **Sombrero,** 1¾ miles west of the south end of Templo, consists of two islets close together on a reef which extends a mile northwest and southeast. The small one is 107 feet high, but the larger one is low and covered with brush. **Arena Islet,** 7 miles southeasterly from Arena Point, Bondoc Peninusula, lies on a circular reef about ½ mile in diameter. Shoal water extends ½ mile northeast of the island and a bank with 8 fathoms over it 1 mile northward. **Inaguaran Shoal,** separated from Arena Islet by a deep channel over one mile wide, lies 1¾ miles northward of it. The least water found on it was 3¼ fathoms. **Busin Island,** off the north end of Burias, is 2 miles long, 1 mile wide, and 265 feet high. A coral reef borders the shore. The Tinalisayan Islets lie on a coral reef 1½ miles northwest of the western end of Busin Island. The channel between them and Busin Island has 7 fathoms of water. On the same bank lie several shoals and the little islet Tanguingui. The latter lies on a coral reef 1¼ miles north of Tinalisayan Islet, and 1 mile farther in the same direction is a 3½-fathom shoal surrounded by deep water.

A detached shoal with 1½ fathoms of water over it lies 2½ miles north of Colorada Point, the northern extremity of Burias. **Anima Sola** is a small island, 114 feet high, 4½ miles northeastward of Colorada Point.

Port Busin (chart 4454) is formed by a channel between Busin and Burias Islands. The western entrance is narrow and crooked and is very dangerous for sailing vessels. A large white cliff on the western end of Busin Island makes a good landmark when approaching this entrance. Keeping this cliff on a 70° (69° mag.) bearing will clear the reef that makes out on the west side of the entrance.

The northern entrance is preferable, being almost straight and its banks steep-to. This entrance may be easily recognized by Colorada Point, the north cape of Burias, which is higher than Busin Island and shows yellow patches among the trees that cover it. The coast near the entrance may also be known by the massive bluffs. To enter, round Colorada Point at a distance of ¼ mile and keep in mid-chan-

nel. The best anchorage is off **San Pascual**, about midway between the entrances, in 10 fathoms, mud bottom. Port Busin is the only typhoon anchorage on the north and west coasts of Burias Island. Between Port Busin and Port Busainga, 4 miles to the southeast, the coast forms **Laorente Bay**. The bay is open, with coral reefs and shoals extending ¾ mile offshore in the eastern part.

Port Busainga (chart 4454) is an excellent typhoon anchorage for small vessels. The channel leading into the inner anchorage is about 100 yards wide at its narrowest point. A deep but contracted anchorage for larger vessels is in 12 fathoms, mud bottom, about midway in the channel between South Point and Estero Point. To enter, bring Piedras Point to bear 270° (269° mag.). Steer for it until within 100 yards of the point and then follow a mid-channel course and anchor when the south tangent to Medio Island bears 253° (252° mag.). A rocky reef, bare at low water, extends 130 yards north of Medio Point. Vessels drawing up to 12 feet can pass into the lagoon by continuing the mid-channel courses until past Restinga Point. Then bring Cayman Point and South Boca Islet, at the entrance to the inlet, in range. Steer this range carefully to avoid the shoal 250 yards westward of Adentro Point. When past this shoal steer northwestward and anchor in 2 fathoms, mud bottom, about in the center of the lagoon. The larger of the Boca Islets is 56 feet high and wooded, the smaller one is 45 feet high and covered with cogon. They lie near the outer edge of the coral reef extending ⅓ mile offshore northward of Port Busainga.

Dampalan Bay, about 5 miles southeast of Port Busainga, is almost filled with coral reefs. The locality of the bay, with its reefs, can be easily recognized by the junction of the cogon-covered hills southward with the higher-timbered hills northward of Bagabarco Point. Southeastward of Dampalan Bay the coral reefs widen out to about ½ mile. At San Pinetan Point a coral reef extends 2 miles southeastward, and at Siargao Point a coral reef extends 2 miles northwestward. Between these reefs and between the reefs and the shore reef is an area in Nonoc Bay that affords anchorage in 13 to 14 fathoms mud. The junction between the cogon hills and higher-timbered hills should be brought to bear 225° (224° mag.) when not less than 2½ miles offshore. Enter on this course and anchor behind the reef either northward or southward of the entrance. The junction between cogon and timber is not well defined and great care should be used in entering the first time. The broad coral reef fringing the shore of Nonoc Bay continues around Siargao Point and as far as Madanlog Point. From Madanlog Point to Aguja Point, the southeast point of Burias Island, the coast is steep-to, with a narrow coral reef and sand beach.

Port Boca Engaño, about midway on this stretch of coast, is not recommended as an anchorage. The water is deep, bottom hard, and little swinging room. A coral shoal lies in the entrance, and a mud-covered reef fills the head of the bay. The land back of the bay is low, affording no protection from the wind during a typhoon. To enter bring the bold bluff of Castillo Point to bear 235° (234° mag.), and steer for it until within about 275 yards of the point; then run parallel to the shore and anchor in 16 fathoms, with the north tangent to Tres Marias Point bearing 90° (89° mag.).

Aguja Point is bold and free from danger, the land sloping gradually from **Mount Sagurun,** 725 feet high, about 3 miles northwest of the point.

From Cueva Point, the northwest point of Burias Island, the coast trends southward for 5 miles to Guinduganan Point. A 2¾-fathom shoal lies ½ mile southwest of Cueva Point and a 1¼-fathom shoal and a rock awash lie in the entrance to Alimango Bay. The coast is bordered by an irregular coral reef. There is an indifferent anchorage in Alimango Bay, but no protection from the sea. From Guinduganan Point the coast trends southeast for 33 miles to Agupa Point. The shore is steep and bordered by coral reefs interspersed with sand and gravel beaches. There are several small bays which offer but slight protection. **Guinduganan Bay,** just southward of the point of the same name, and **Ilog Bay,** 6 miles farther along, are the most important. **Mount Engañoso,** 1,403 feet high, the highest point on Burias Island, is about 12 miles from Aguja Point, and is the only good landmark for night work along this coast. **Nabasagan** lies at the head of a small bay southwest of Mount Engañoso. There is a group of shoals with a rock awash at low water 1 mile from shore, westward of Mount Engañoso; 2½ fathoms is shown ½ mile northward, 3 fathoms ½ mile westward, and 1 fathom ½ mile southwestward from the rock awash. There is a 7-fathom channel between these shoals and the shore but there is no occasion for using it. Vessels should keep well off shore when navigating in this vicinity. **Gorrion Islet** lies 4½ miles east-southeastward of Malapingal Point, the western point of Nabasagan Bay, and on the outer part of the shore reef, which extends over ¼ mile from the point. Both the cove to northward of the islet and that to the southward are foul. From Gorrion Islet the reef extends along the coast to the southeastward for about 4 miles and is over ½ mile wide in places, with shoals lying still farther offshore. The remainder of this coast, for 6 miles to Aguja Point, is steep and clear.

Caution.—When approaching Burias Island from the westward in thick weather, such as occurs in the southwest monsoon, the southern part of the island may be hidden and the slope of Mount Engañoso may be mistaken for the end of the island, a mistake which has caused the loss of several vessels.

SOUTH COAST OF LUZON.

From Cabarian Point the coast trends east-northeast for about 6 miles to the head of Panganiran Bay. **Solitario Island,** 34 feet high, lies about 2 miles eastward of Cabarian Point and ½ mile offshore, to which it is connected by a reef with very little water over it. Vessels should keep well southward of the islet to avoid the shoal water extending off this coast.

Panganiran Bay is a large bay open to southward. **Bagalayog Point** is prominent and affords a small amount of protection to a vessel anchoring close eastward or westward of it. A number of small barrios are scattered along this coast, of which Magradongdong is the largest.

Catundulan Point has bright sand cliffs varying in height from 60 to 110 feet. The point is wooded with the exception of one small patch of cogon near the cliff on the southwest side. Sunken coral

heads and a reef that bares extend about 220 yards off the point. **Tinangonan Bay**, eastward of Catundulan Point, has a flat sand beach that bares a considerable distance offshore. **Pangpang Point**, the eastern entrance point, is composed of light-colored cliffs about 40 feet high, but otherwise is not very prominent.

Donsol, on the left bank and near the mouth of the Donsol River, has a number of prominent, bright, galvanized-iron roofs. The mouth of the river is fronted by wide sand banks and fish traps are numerous ½ mile off the town. The bar at the mouth of the river is shoal, only about 2 feet at low water, but deepens inside to 6 feet and more. A light is shown from a wooden frame structure on the east bank of the Donsol River. Small boats usually land on the sand beach just northward of the light.

From Donsol to Port Putiao the coast is low with a continuous sand beach. The **Ogod River**, emptying about 1½ miles eastward of Donsol, is shoal at its mouth, but deepens to over 7 feet above the bridge on the Donsol-Pillar road. **Dumaquit Point**, the western entrance point to Port Putiao, is covered with cogon and small trees and shows a level profile almost to the 30-foot vertical cliffs at its end. A shoal with a least known depth of 4 fathoms lies 1 mile south-southwest of the point and rocks awash at low water lie about 650 yards eastward in the entrance to Port Putiao.

Port Putiao, between Dumaquit Point and Cutcut Point, extends 3½ miles northward, the northern part being known as Pilar Bay. The shores of Port Putiao are foul, and the entire bay is shoal. The Malbug River, emptying into the northeast part of Pilar Bay, is an important means of communication, and with its branches drains a prosperous agricultural country. Pilar is the most important town on the bay. It may be approached as follows: When well outside the line joining Dumaquit and Cutcut Points bring the point ¾ mile northward of Tingco Point to bear 29° (28° mag.) and steer for it until Doña Ana Island bears 314° (313° mag.); steer for the island, and when Quidavid Point bears 186° (185° mag.) round to northward and bring the church in Pilar to bear 30° (29° mag.); hold this course and anchor when Punahuan Island, the small islet southwest of San Antonio, bears 80° (79° mag.). These courses carry about 8 feet at low water, and the narrowest part of the channel is eastward of Doña Ana Island with about 425 yards between the 6-foot curves.

Port Panlatuan, between Cutcut Point and Bantigui Point, is nearly filled with banks and reefs. Mecapiot Bay, in the northwestern part of Port Panlatuan, is an excellent typhoon anchorage for vessels drawing up to 12 feet. To enter bring the east tangent of the point on which the town of Panlatuan stands to bear 20° (19° mag.) when well outside in order to clear the rocks awash at low water lying ⅝ mile southward of Cutcut Point. On this bearing a light-colored cliff or bank on Quiragosnos Point will be on range with the point; hold the range until within 325 yards of the point; then change course to pass through the narrow part in mid-channel. Round Panlatuan Point, keeping close to the point, and anchor in 2 fathoms, sticky mud bottom, about 550 yards northwestward of the point.

Bantigui Point is low, rocky, and wooded, with a shore composed of gravel and clay cliffs.

Sorsogon Bay is the largest and best harbor in southern Luzon and is a good refuge in case of a typhoon or colla and for effecting repairs. The entrance is divided into three channels by Malaumauan and Bagatao Islands. The channel between these two islands is the only one practicable for ordinary vessels; the others, between the islands and the coast, being narrow and shoal.

The depth at the entrance is 10 to 20 fathoms, decreasing gradually toward the head of the bay. The seaward faces of the islands on the north side of the channel are steep-to, and a vessel keeping in mid-channel is clear of all dangers. There are a number of towns on the shores of Sorsogon Bay, of which SORSOGON, the capital of Sorsogon Province, CASIGURAN, and CASTILLA are the most important.

MALAUMAUN ISLAND, at the western side of the main channel, is low, flat, wooded, and surrounded by white sandy beaches. A long, narrow spit extends northward from the island, leaving a narrow channel between it and the shoal water off the mainland. A rocky shoal, bare in places at low water, extends 1¼ miles southwest of the island. The bottom eastward of the island shelves gradually with a depth of 4 fathoms about 450 yards from shore. A black buoy, 1⅛ miles south of the south end of Malaumauan Island, marks the western edge of the main channel into Sorsogon Bay.

BAGATAO ISLAND, forming the eastern side of the main entrance, is of moderate height and wooded. The eastern end is 415 feet high. The coasts, except those of the southeast side, are clean and bold. A bank of fine, black sand, with soundings of from 10 to 16 fathoms, extends about 3 miles southwest of Bagatao Island and offers anchorage to vessels unable to reach the port. BAGATAO LIGHT, visible 17 miles, is shown from a white cylindrical iron tower with gray trimmings on the rocky headland forming the southern point of the western end of Bagatao Island. Bagatao light bearing between 350° (349° mag.) and 46° (45° mag.) carries a vessel clear of all shoal water in the approach to Sorsogon Bay.

SORSOGON LIGHT (fixed red) visible 6 miles, is exhibited from a white concrete pillar on the western end of Bagatao Island ¼ mile north of Bagatao light.

A cable-mark buoy showing the location of the Sorsogon-Masbate cable is moored in shoal water on the northern side of the bay, well out of the track of navigation.

Large vessels can find good, sheltered anchorage northward of Bagatao Island, abreast of a small sand beach immediately westward of Tinacos Island. Small vessels will find a good typhoon anchorage behind Sablayan Island. To enter bring Palinahuan Point to bear 316° (315° mag.) when well outside a line joining Macuhil Point and the north end of Sablayan Island and steer 136° (135° mag.) to an anchorage in mid-channel southwest of the sandy point. This channel carries about 9 feet at low water. MAGALLANES ROCK, awash at low water, lies 275 yards north of Macuhil Point and constitutes a serious danger to navigation in this vicinity. Anchorage may also be taken up anywhere in Sorsogon Bay according to draft.

The town of SORSOGON lies on the north shore near the head of the bay. The water off it is very shoal, the 3-fathom curve in the direction of the approach being nearly 3 miles from the town. There are ruins of two wharves which dry at low water. The hull of a sailing vessel is anchored 1 mile south of Sorsogon and used as a warehouse.

An anchor light is kept on this hull at night, but the wreck lying about 220 yards off the stone pier is unmarked and constitutes a danger to launches at night. Sorsogon is connected with Manila by cable and telegraph and with Masbate by cable.

DIRECTIONS.—Vessels bound for Sorsogon should pass ½ mile eastward of the black buoy southward of Malumahuan Island and steer 17° (16° mag.) for 1½ miles until ½ mile west-northwestward of Sorsogon light; then steer 64° (63° mag.) for 3¾ miles, heading for Macuhil Point, until ⅜ mile south-southeastward of Lavampa Island. Then steer 38° (37° mag.) for 1½ miles until ¾ mile northward of Macuhil Point, when a 66° (65° mag.) course leads a little southward of the town of Sorsogon. A depth of 2½ fathoms will be found about 1½ miles southwestward from the town and vessels should proceed cautiously and anchor according to draft. The water shoals gradually toward the head of the bay, the 3 and 5 fathom curves being found 3 and 7 miles, respectively, from the town of Sorsogon, and the bottom is soft mud.

Magallanes is a small port on a point of land abreast the east end of Bagatao Island. A narrow, deep channel leads to it from northward, but only 8 feet at low water can be carried across the bar southeast of Bagatao Island.

From Bagatao Island the coast trends southward for 8 miles to Inararan Point and is mostly sand beach shelving off gradually into deep water. The shore line is broken by numerous shallow tidal sloughs that may be entered by small boats only at high water. The country back of the beach slopes gradually to the foothills of Mount Binatacan and Mount Culangalan, and being intersected by numerous ravines has the appearance of a roughly rolling country partly cultivated and partly timbered.

Bulan, the most important town on this part of the coast, is on the right bank of the Sabang River northward of Sabang Point. Steamers to and from Manila make frequent calls, but there is no dock and no supplies are available. Hemp and copra are the principal exports. A light is shown from a white frame structure back of the beach. Vessels bound for Bulan usually bring the light or the church to bear 75° (74° mag.) and anchor in 3 to 5 fathoms.

Verde Hill, a green cogon covered hill 480 feet high, is 3 miles eastward of Bulan and stands out prominently against the darker timbered hills back of it.

Agnas Point is a conspicuous, flat-topped, cogon-covered bluff 120 feet high with almost vertical reddish slopes that are practically bare. The timber extends out within a short distance of the bluff and the skyline is ragged. **Utabe Bay**, the bend in the shore line between Agnas Point and Sabang Point does not afford any protection. Anchorage may be had anywhere off this coast.

Butag Bay, lying eastward of Agnas Point, is about ¾ mile wide and extends ¾ mile northeastward. The head of the bay is shoal, but practically protected anchorage may be had in 7 to 10 fathoms, mud bottom, in the middle of the bay. The shores are wooded, and much of the lumber used along this coast comes from this vicinity.

From Butag Bay the coast trends southeast for 5 miles to Sujac Point and then eastward for another 5 miles to Colasi Point at the entrance to Ticlin Strait. This part of Luzon is mountainous and heavily timbered. The summits of the main ridge are from 1,200 to

2,000 feet high. **Calomutan**, 1,940 feet high, and **Sujac**, 1,645 feet high, are prominent summits and are easily recognized. There are several points along this coast that are useful as landmarks. **Tagiran Point**, about 1 mile northeast of Sujac Bay, is a flat-topped, cogon-covered peninsula 30 feet high, projecting almost normal from the coast. **Langao Point** is a sloping cogon-covered point 20 feet high at the outer end and is composed of a dark-red conglomerate. **Hamorauan Point** is a bold reddish-brown bluff 70 feet high with a steep timbered slope rising above it. The curve in the shore line is small, but the low ground on either side makes the point stand out prominently. The bays between the several points along this coast are small and unimportant. Sinangatan, Ginablan, and Babatgun afford a small amount of protection to launches and small craft.

There are no dangers along this coast outside the points except for Hamorauan Reef and Calantas Rock. **Hamorauan Reef** is a continuous shoal of white sand covering an area about 550 yards square about ½ mile southwest of Colasi Point. The least water found, 2 fathoms, lies about ⅞ mile west-southwestward of Colasi Point. A shoal with a least depth of 4¾ fathoms lies ¾ mile south of the 2-fathom spot.

Calantas Rock consists of a pile of small rounded rocks projecting 4 or 5 feet above high water and are marked by a light. The shoal extends ¾ mile southeastward to the wreck of the steamer *Pharsalie*, which forms a dangerous obstruction to navigation. A considerable area southward and westward of Calantas Rock has from 5 to 10 fathoms of water; northward it drops off steeply into 30 fathoms.

Ticlin Strait (chart 4258) is the channel between the coast of Luzon and the islands Calintaan, Juac, and Ticlin. The tidal currents and eddies are very strong, and vessels should not attempt to go through on compass courses alone. Strong sets are especially to be looked for between Calantas Rock and Calayuan Point and Colasi Point and Burungan Island. To approach Ticlin Strait from westward bring the south tangent of Calayuan Point to bear 90° (89° mag.), and steer for it; when the sharp conical hill on Ticlin Island shows in mid-channel, Calantas Rock bearing 170° (169° mag.), distant ¾ mile, change course to 40° (39° mag.), heading for the hill, and steer a mid-channel course, being careful to avoid a set to westward of Burungan Island if the current is running north.

Calintaan and **Juac Islands** are hilly and covered with jungle and timber. Both have large lagoons and considerable mangrove. The inner shores are low and have coral beaches; the outer ones are alternately rocky bluff and coral beach. Outside the reef the water is deep and the bottom clean. **Juac Channel** is deep, but narrow and of little use.

Ticlin Island is 184 feet high. It is surrounded by a reef the greatest width of which is ⅓ mile.

Magtimua Rock, slightly above water, lies ⅗ mile southeastward of Ticlin Island. The passage between Ticlin and Juac Islands is obstructed by rocks and is not safe.

Matnog (chart 4258) is a small bay open eastward, fringed by a narrow reef, with 3 and 4 fathoms near the edge and 8 fathoms in the middle of the bay. When bound into Matnog bring the hill on Ticlin Island to bear 90° (89° mag.), and steer 270° (269° mag.);

the channel between the reefs is not very wide. The harbor is small, but well protected from all directions except eastward. Small vessels anchor in 3 fathoms ¼ mile from the beach.

There are no appreciable currents in Matnog Bay. The white iron roof of the church in Matnog is prominent.

San Bernardino Islands are two small islets lying nearly 9 miles eastward of the church at Bulusan. The south and larger island, on which the light is situated, is about ⅜ mile long north and south and ⅛ mile wide. It is sparsely wooded and 160 feet high. Two large rocks, about 10 feet high, lie about 400 yards eastward of the southern islet. The northern islet is about 300 yards long and has two hills 75 and 100 feet high, very rugged and entirely bare. The rock formerly shown on the chart as being approximately 1 mile north-northwestward of the light has been searched for unsuccessfully; tide rips and overfalls were seen in this locality and passed through, but no depths of less than 10½ fathoms were found. San Bernardino Islands are on the southern end of a bank having soundings of from 10 to 20 fathoms and extending about 6 miles northeastward, surrounded by much deeper water.

A group flashing light, visible 21 miles, is shown from a white tower on the summit of the southern island, eastern entrance to San Bernardino Strait.

San Bernardino Strait, the passage between Luzon and Samar Islands, is of much importance, as it is used by most of the coasting vessels bound for the east coasts of these two islands, as well as by some of the vessels crossing the Pacific and by those trading between Manila and Australia. The strait is wide and deep and free from dangers, except a few near the shores. The channels eastward and westward of San Bernardino Islands are 5 and 9 miles wide, respectively, with depths of from 30 to 70 fathoms. Heavy seas and tide rips are encountered during the northeast monsoon, but they are not reported during the southwest monsoon. The tidal currents in the strait are strong, being reported to be 4 to 8 knots; after passing the strait the currents spread out in either direction and lose their force. On the coast north of the strait the flood current divides somewhere westward of San Bernardino Islands, flowing northward off Gubat and southward into the strait.

At San Bernardino Islands the tide is semidiurnal; the mean high-water interval is 5 hours 33 minutes, and the mean low-water interval 11 hours 47 minutes. The mean range of tide during two months' observation was 2.6 feet and the maximum range about 4 feet.

EAST COAST OF LUZON.

CAPE ENGAÑO TO LAMON BAY.

Port San Vicente is described on page 45.

From Port San Vicente the coast trends easterly for 5 miles to Escarpada Point, the northeast point of Luzon. This coast is high and bordered by a reef with detached rocks. Palaui Island and adjacent islands and the eastern entrance to Port San Vicente are described on page 44. The shoal north of Escarpada Point is much more extensive than shown on most charts, extending in one place

2 miles from shore, with depths of 7 to 10 fathoms, sand and rock bottom.

From Escarpada Point the coast trends southeasterly for 12 miles to Iligan Point, the most easterly point in this vicinity; between these two points are numerous small coves, well sheltered but fit only for bancas.

From Iligan Point the coast trends south-southwest and then curves gradually around eastward for 72 miles to Palanan Point, the eastern entrance of Palanan Bay. Three mountains, the respective heights of which are 2,055, 3,399, and 3,917 feet, rise southward of Cape Engaño at the distances of 11, 16, and 22 miles and form fine landmarks in clear weather. It is reported that the general trend of the coast is fairly well shown on the chart, but that the entire coast line from Iligan Point to Divilacan Bay is 4 to 8 miles to the westward of the true position. Occasional rocks and shoals are found, none extending more than ¼ mile from the shore. The coast line forms a succession of small bays, all open to the sea from north-northeast to south-southwest, with small stretches of sand beach. Immediately back of the narrow strips of beach, steep, high mountains rise, showing no trails or passes available for transit into the interior. The whole appearance is that of an impenetrable barrier shutting off the east coast from the valley beyond.

Divilacan Bay, north of **Mount Moises** (4,209 feet), the highest and most eastern peak in this vicinity, is open northward; the shores are fringed by reefs, and there is a depth of 7 to 9 fathoms in the center of the bay. Fairly well sheltered anchorage may be found westward of Gay Island.

Port Dimalansan (chart 4265), southeast of Divilacan Bay, has Gay Island on the western side of the entrance and Estagno Island on the eastern, and penetrates 2½ miles southward; it is about 250 yards wide at the narrowest part and has a least depth of 1¾ fathoms. The banks are steep and heavily wooded. Considerable experience would be necessary to enter this bay, but with local knowledge small craft would find perfect shelter.

Aubarede Point is 7 miles southward of Estango Island, and forms the eastern side of Port Bicobian. Rocks and shoals extend nearly ¼ mile south of the point.

Port Bicobian (chart 4265) is an arm of the sea penetrating 2½ miles northward. At the head of the port there is a well-sheltered anchorage in a basin about 600 yards in diameter, having a depth of 10 fathoms, soft, sticky bottom. The plan of the port seems fairly correct, but two shoals near the western bank, halfway up the bay, do not appear on the plan. Several large rocks were found near the western side of the entrance, close inshore.

Palanan Bay, lying southward of Port Bicobian, is semicircular in form, about 6 miles wide and 3 miles deep. A small river empties into the south side of the bay, and about ¼ mile east of it a reef extends in a northwesterly direction for about ½ mile, behind which protection from the sea is found, with fair anchorage. Breakers extend about 1 mile northward and ½ mile eastward of Palanan Point. This point is easily distinguished by the saddle shape of the high land.

The coast between Palanan Bay and Inaguican Point, 158 miles southward, has not been surveyed, and the charts differ greatly.

The general trend of the coast is south-southwest for 73 miles, southwest for 52 miles, and south-southeast for 47 miles. It is stated in the Derrotero to be clean and steep-to and free from dangers. From Cape Engaño to San Miguel Bay northeast winds prevail from October to March, the monsoon here beginning with north winds, which are of short duration and soon pass into the northeast; in January and February the east winds begin and terminate the monsoon. The heaviest rains fall from October to January, and in October and other months of that part of the year typhoons sometimes occur. In March and April, and sometimes in the early part of May, variable winds blow, bringing in the southwest monsoon; but the dry season, of which April and May are the driest months, is uninterrupted by rain. Thunderstorms occur from June to November, most frequently in August. During the southwest monsoon the sea is calm, but the weather gets very boisterous during the middle of the northeast monsoon.

Dinapiqui Point, 43 miles southward of Palanan Point, is formed by a succession of six headlands, steep-to, without beach, affording no shelter. The general trend of the coast from Palanan seems to be properly charted. Successive open bights follow each other, with shoals here and there, close inshore. There are a few sandy strips of beach in the bottoms of the bights, but along the points high hills drop down to the water. In many places great caverns have been worn by the sea in the faces of these high rock masses. No shelter can be found along this stretch except for small native boats.

Dilasac Bay (chart 4265), included between Dinapiqui and Tarigtig Points, is 10 miles wide and 7 miles deep. There are two bights in the southwestern part of the bay, and the western one forms a fine harbor which affords excellent anchorage, completely landlocked, in 5 fathoms, with soft sticky bottom. Off the eastern entrance point of this bight detached rocks extend nearly ¼ mile northeastward. About 1 mile southwest from the eastern entrance point is a dangerous reef awash at low water; it is about 600 yards in extent northwest and southeast and about 350 yards in width. The narrow channel to the eastward of it is less than ¼ mile wide and has 4 fathoms; the passage to the westward is wide and clear, and 6 fathoms will be found close to the northwest end of the reef. The 5-fathom anchorage is off the southwest side of the reef about ¼ mile from it. The entrance to the anchorage presents no difficulty. A vessel should be steered midway between the two shores and hauled to the southward gradually to clear the shoal on the eastern side of the port. The rise and fall of the tide in this bight is about 8 feet. The eastern bight of Dilasac Bay is open during northeast monsoons and does not afford shelter.

From Tarigtig Point the coast trends southwesterly for about 24 miles to Cape San Ildefonso. This coast appears free from off-lying dangers.

Cape San Ildefonso is the southern extremity of San Ildefonso Peninsula, which forms the eastern side of Casiguran Sound.

Casiguran Sound (chart 4265) is a long arm of the sea extending for 10 miles in a northeast direction, beyond which is Casiguran Bay, a landlocked basin 5 miles long in a northeast and southwest direction and 2½ miles wide, which can be entered by a deep clear channel, ¾ mile wide. The eastern shore of the sound is clean and steep-to, and

can be approached to ¼ mile, except near Cape San Ildefonso. The depth in the middle of the sound generally exceeds 35 fathoms. The western shore is much shoaler than the eastern and in many places anchorage can be had in 20 fathoms. It is not safe to go inside of 20 fathoms, as the water shoals rapidly in many places.

DIRECTIONS.—In entering Casiguran Sound, the eastern shore should be given a berth of about 1 mile until abreast the highest point of San Ildefonso Peninsula; from here the low hill at the entrance of the bay should be steered for. This usually shows very plainly against the higher hills in the background. The entrance to the bay is nearly ¾ mile wide, deep, and free from danger. It is safe to approach either side to 50 yards with a vessel drawing 25 feet. Vessels of any draft will find the best anchorage in the northwest part of the bay. The depth in the middle of the bay is 20 to 22 fathoms, bottom soft clay or mud, decreasing toward the shore. The land at the head of the bay is low and heavily wooded. Shoal water extends a long way out, and the bank is very steep. The town of CASIGURAN, which is small and poor, is about 2 miles back from the beach, at the head of the bay, and is not visible. Vessels desiring to communicate with the town should anchor in 15 fathoms, about ½ mile from the shore, with Charleston Hill bearing 31° (31° mag.). It is not advisable to go closer in, as the depths decrease rapidly. Fresh water can be obtained on the northeast side of the bay from a small mountain stream almost hidden by trees.

Baler Bay (chart 4265), southward and westward of San Ildefonso Peninsula, can be recognized by the high land all around the bay and up the coast as far as Casiguran Bay. Encanto Point, at the entrance to the bay, has several islets and rocks that dry at low water extending about 1 mile. Baler Bay may be entered on a 260° (259° mag.) course, keeping 1½ miles from the south shore, the water gradually shoaling from 18 fathoms off the point of Los Confites Reef, to 4 fathoms off the reef, making out from the point to the eastward of the mouth of the Baler River. There is anchorage in from 8 to 10 fathoms, with the river mouth open and bearing about south. A green hill lies a little to the westward of the anchorage. The town of Baler is back from the shore and can not be seen when entering the anchorage.

In the southeastern part of Baler Bay is a cove affording partial protection to small vessels; to enter this cove bring a fresh-water stream in the bight to bear 149° (148° mag.) and stand in for it until in 5 fathoms, and anchor. This stream runs into the bay over a ledge of rock and can easily be picked up. Bearing about 40° (39° mag.) from this anchorage is a patch of rocks having 5 feet of water on them at low tide; these show dark on the surface of the water, and can be easily seen and avoided. The cove will not safely accommodate a vessel more than 200 feet in length, and only offers partial protection from the northeast monsoons. The bottom of Baler Bay is sand and rock, and is poor holding ground.

Between Encanto Point and Agria Point, the northern entrance to Dingalan Bay, the coast trends southwesterly for about 21 miles.

There is a ledge reaching out to the eastward from Dibayabay Point, and an islet close inshore in the bight between Dibayabay and

Distoring Points; a second islet off Distoring Point; a third islet between Distoring and Dicapinisan Points; and a fourth islet about 1 mile offshore, eastward from Dicapinisan Point.

Dingalan Bay is about 10 miles wide between Agria and Deseada Points, and about 5 miles deep. The relative positions of the points about Dingalan Bay seem to be fairly correct. The most distinctive mark for picking up the bay from seaward is a very plainly marked white band on the hills running down to the beach 5 or 6 miles to the southward of Deseada Point. **Agria Point** is bare, as is also the point just behind Los Carabaos Islets, this point at a distance having the appearance of a broad white roadway leading down to the beach. Anchorage may be found in the northern part of the bay, sheltered from the northeast winds, in 3 to 9 fathoms.

Prueba Rock is a small, low rock rising from a small coral reef surrounded by deep water; it lies about 1½ miles from shore, off Prueba Point, about 15 miles south-southeastward from the southern entrance to Dingalan Bay.

Inaguican Point, the northern entrance to Lamon Bay, is about 36 miles southwestward of Dingalan Bay. It is the most eastern point in this vicinity. It is low and heavily wooded, with large trees, growing to a height of about 50 feet, and having the appearance of solid land when seen from a distance. The shore for 6½ miles northwestward, to the mouth of the Agos River, is sandy.

From Inaguican Point a sandy shore trends westerly for 2 miles to the mouth of Misua Creek, an estuary making into the lowlands around the point. During the northeast monsoon vessels having cargo for Infanta anchor 1 mile to the southward of the mouth of Misua Creek in 7 fathoms or at Port Lampon, 5 miles farther to the southwest. Tide rips are formed off Inaguican Point to the southward and the water is highly discolored, giving the appearance of reefs; however, the waters in this vicinity are very bold and the point may be rounded close-to.

The flood tide in this locality sets in from the northward and is quite strong off the point.

Infanta (Binangonan de Lampon) is about 6½ miles northwestward of Inaguican Point and about 2 miles from shore. Vessels desiring to communicate with the town can find good anchorage during the southwest monsoon just southward of the mouth of the Agos River in 6 or 8 fathoms, about ½ mile from shore.

POLILLO ISLAND,

eastward of Inaguican Point, from which it is separated by a channel 10 miles wide, is about 25 miles long north and south and from 6 to 15 miles wide. It is hilly and well wooded. **Mount Malolo**, 1,130 feet high, the highest point on the island, is near the western shore about 10 miles from the southern end of the island. It is the most prominent landmark and is the first object seen when approaching from the east or northeast.

The north coast of Polillo is fringed by a wide coral reef which is steep-to. There are several breaks in this reef forming small bays which do not afford good anchorage. From offshore five hilltops, 300

to 600 feet high, stand out prominently and serve to identify the country generally. **Minayit Point,** the northeast point of Polillo Island, is easily recognized. It is a brown rock bluff 58 feet high and bare of trees, being separated from the wooded land back of it by a saddle only 20 feet high.

Pinavisagan Bay affords some protection from westward and southward, and may be entered by steering 206° (205° mag.) for a cluster of trees on the eastern shoulder of the hill southwest of the bay.

Bugwasan, Bonleo, and **Matancan Bays** do not afford anchorage even for launches. A break in the reef northwestward of Matancan Bay affords entrance to a good anchorage protected from heavy seas, the reef being awash about half tide. In entering, the eastern side of the channel, which is about 200 yards wide, should be favored. **Panampalan Point,** the northwest point of Polillo Island, is a low mangrove area with a coral reef extending about 1½ miles northward. There is an intricate channel, obstructed by shoals, through this reef about 650 yards north of the mangroves shore. A round-topped tree, 58 feet high, on the eastern side of the point, and a conical-topped clump of trees, 60 feet high, on the western side, serve as landmarks for this locality. A shoal with a least-known depth of 1 fathom is 1½ miles offshore west of the latter clump of trees. This shoal with a 2-fathom shoal lying ½ mile off the edge of the reef northwestward of Panampalan Point are the only dangers on this part of the coast outside the shore reef.

Lipata River has a fairly uniform depth of 1½ to 2 fathoms for 5½ miles. The rocky parts of the banks are heavily wooded, with nipa palms in other places. Fresh water is encountered about 5 miles from its mouth. A moderate amount of clearing of overhanging and fallen trees would make the river navigable for launches.

Pinagagan River consists of two salt-water bights, the western one being almost bare at low water. The southern bight affords a safe, landlocked shelter for small vessels not requiring more than 200 feet swinging radius. The entrance between the reefs is about 100 yards wide. In entering pass close to the spit (partly bare at all stages of the tide) which extends from the point between Pinagagan and Lipata Rivers. When about 100 yards west of the highest rock on the spit, head southeastward for the lowest gap on the west side of the river until the northerly edge of the mangrove on the east bank bears 91° (90° mag.) then head southeast by east to within 50 yards of the eastern shore, thence in mid-channel to an anchorage in 3 fathoms, sand and mud bottom.

Panangatan Point is a prominent landmark. The shore northward is rock-bound, consisting of massive granite outcroppings. The coral reef almost disappears and the point is clean and steep-to.

Hook Bay (chart 4265) is a small harbor of refuge about 1 mile eastward of Panangatan Point. It affords excellent protection for small vessels, being surrounded by high hills and completely landlocked. It is about 350 yards wide at the entrance, and extends about 1 mile northward and thence ¾ mile northwestward. When approaching from the southward the entrance is easily picked up, as the headland on the eastern side of the entrance is high and clearly defined against the background. Both sides of the entrance are fringed by well-marked coral reefs, narrowing the channel in one place to a width of

a little over 100 yards. No vessel should attempt to enter at night or in very thick weather.

DIRECTIONS.—Bring the entrance to bear 1° (0° mag.) and head into the bay, keeping in mid-channel until the narrows are passed, then head up the middle of the bay and anchor in the widest part, here about ¼ mile wide between the 5-fathom curves, in 10 fathoms, muddy bottom. There is room in the northwest section of the bay for two vessels of about 500 tons. To enter this anchorage, pass Elbow Point fairly close on the port hand and round handsomely into the center of the bay and anchor in 8 fathoms, muddy bottom.

Excellent anchorage may be found in the small bay westward of the western entrance point to Hook Bay. Vessels at this anchorage are protected from all winds from west through north to southeast. To reach this anchorage vessels should stand into the middle of the bay and anchor when the western entrance point to Hook Bay bears 91° (90° mag.) in 15 fathoms, muddy bottom.

From Hook Bay the coast trends south-southeasterly for 11½ miles to the entrance to Polillo Harbor and is fringed by a narrow, steep-to reef. Off Salipsip Point, 8 miles from Hook Bay, the reef extends ¾ mile, and 3 miles farther southeastward it extends about ½ mile, with a rock awash near its outer edge. Nearly 3 miles southward of Hook Bay a small detached patch, covered by 1 fathom, lies about ¾ mile from shore.

Polillo (chart 4265) is a small, unimportant town on the eastern shore of a semicircular bay about 15 miles southeast of Panangatan Point. It is surrounded by a dilapidated wall, well overgrown by shrubbery. It contains a prominent church with an octagonal tower roofed with nipa, which is visible a long distance. The town is very poor and has few resources.

The harbor formed by the bay is over 1 mile in extent and the available sheltered area is increased by a large reef which extends over 2 miles northward from Polillo Point. This reef, partly bare at low water, is as a rule steep-to and is marked by breakers and discolored water.

The head of the harbor is foul and several dangerous detached shoals lie from ½ to ¾ mile from the eastern shore. The shoalest and southern patch, covered by ¾ fathom, lies about ⅜ mile from shore 1 mile north-northwestward of the church. This shoal can easily be picked up by the discolored water, but the others, which are covered by 2 and 2½ fathoms, can not be detected until the bottom is seen by looking directly down on it. The discolored water observed from offshore when entering Polillo Harbor is due to the discharge from small streams.

A lighted range marks the clear passage into Polillo Harbor. The rear range is an inverted triangular-shaped day mark with a vertical stripe through the center placed on the old octagonal church tower in Polillo.

The front range is a white triangular day mark, point up, with vertical stripe through the center, on a post with concrete base, on the beach 350 yards from the rear mark. In entering Polillo Harbor bring the day marks or lights in range bearing 145° (144° mag.) and hold this course until Polillo Point is abeam; then change to 154° (153° mag.) for about 1⅜ miles, until the front range is abeam, and anchor in 9 fathoms westward of the church.

Extending 5½ miles northwestward from Polillo Point is a large bank on which are several detached reefs and much foul ground. Panangatan Point, the western extremity of Polillo Island, bearing 1° (0° mag.), will carry a vessel well westward of all the dangers on this bank. The channel between the bank and the coast of Luzon is 7 miles wide, deep and clear. **Yellow Rock**, the outer reef, showing a yellow rock awash at low water, lies on the northwest part of the bank 7¾ miles northeastward of Inaguican Point. **Union Reef**, with a least depth of 1¼ fathoms, lies about 1½ miles southeastward of Yellow Rock, near the edge of the bank.

DIRECTIONS.—Vessels from the south should not bring Panangatan Point, the western extremity of Polillo Island, to bear westward of 1° (0° mag.) until Mount Malolo bears 97° (96° mag.), when it may be steered for. When the church tower bears 144° (143° mag.), it should be steered for, keeping a good lookout for the shoals on either side, and enter on the range.

Agta Point, the southern extremity of Polillo Island, is low, heavily wooded, and fringed by a narrow, steep-to reef. At a distance of 1 mile southward from the point depths of over 20 fathoms are found.

From about 1½ miles west-northwestward of Agta Point a chain of detached reefs, with a least depth of 1¾ fathoms, extends nearly 1½ miles southwestward. The western side of these reefs may be avoided by keeping the tangent to the land nothing westward of 1° (0° mag.), and the southern side may be avoided by keeping the tangent to the land eastward nothing eastward of 80° (79° mag.).

Burdeos Bay is formed by Polillo, Palasan, Patnanongan, and several smaller islands. It affords a large area of available anchorage ground well protected from all winds and sea. The southern approach is filled with shoals and reefs, among which there are several long and tortuous channels. The channel westward of Cataoyan Reef is very narrow and should not be attempted. The channel eastward of Pacabalo Reef is apparently safe, but the one between the reefs is most frequently used. The following directions were used by the survey party and may be useful.

DIRECTIONS.—About 1½ miles from the south side of Patnanongan Island lies **Minasawa Island**; it is small, about 50 feet high, and is easily distinguished, being a brighter green than Patnanongan, which is much higher. Bring Minasawa to bear 18° (17° mag.) before Agta Point bears anything southward of 271° (270° mag.) and steer for it until 4⅝ miles from it and the southeastern point of Palasan Island bears 344° (343° mag.); then steer 331° (330° mag.) for 5¾ miles; this course will carry 5 to 20 fathoms of water and will take a vessel safely between Cataoyan and Pacabalo Reefs. By the time the vessel is between these reefs, Coccoc Rocks will be sighted against the Polillo shore; continue on this course until the Coccoc Rocks bear 282° (281° mag.) and then steer 1° (0° mag.) for 2⅜ miles, heading for the eastern point of Palasan Island; when the Coccoc Rocks bear 226° (225° mag.) steer 300° (299° mag.) for 4 miles, heading for Bini Island. Care should be taken in approaching Bini Island, as a coral reef, bare at low water, extends about ½ mile southeastward from it. A similar reef makes off southward from Palasan Island, leaving a channel about ⅜ mile wide between them. The tidal currents are strong

between these reefs. When ½ mile from Bini Island and the southwesterly point of Palasan Island bears 71° (70° mag.), change course to 330° (329° mag.) and pass about ¼ mile northeastward of Bini Island; continue this course for 2¼ miles until the northwest point of Palasan Island bears 60° (59° mag.) and the eastern sides of Icol, Aniroag, and Anawan Islands are in range, bearing 37° (36° mag.), then steer 226° (225° mag.), which will take a vessel well clear of the reefs northward of San Rafael Island. When the north end of San Rafael Island bears 118° (117° mag.) head down the bay and anchor in 8 fathoms, mud bottom, when the north point of San Rafael bears 91° (90° mag.). It is recommended that a stranger should wait for low water when entering.

Burdeos Bay may also be entered from the northeast. The channel between Icol and Cabaloa Islands is deep and clear. A 3½-fathom shoal lies in the eastern approach and the western end of Icol Island must be rounded close-to to avoid a 1¼-fathom shoal in Burdeos Bay. The channel between Cabaloa Island and Polillo is intricate, being narrowed to about 325 yards by reefs, and the strong tidal currents make it dangerous for large vessels. The narrow channels between Icol and Palasan and between Palasan and Patnanongan are deep and clear but subject to strong tidal currents, sometimes reaching at least 4 knots on spring tides.

The north, east, and south shores of **Palasan Island** are fringed by wide coral reefs. The island itself is moderately high with a narrow mangrove fringe along the shore. **Icol Island** has a coral reef extending off its northeast shore. **Cabaloa Island** is fringed by a coral reef that widens to ⅜ mile on the eastern side. A coral reef and shoal extends eastward and northeastward of **Anirong Island** almost to **Anawan Island**, leaving a channel about 100 yards wide close to the latter island.

Anibawan Bay affords well-protected anchorage and is easy of access. When coming from Burdeos Bay, the channel between Cabaloa and Anirong Islands is recommended. When approaching from northward or eastward the channel between Anawan and Bugnitay Islands should be used. A reef with two rocks awash at low spring tides lies about ¾ mile westward of Banla Point. The water deepens rapidly on all sides of this reef, which is about 325 by 450 yards in extent. A shoal of about the same area, with a least known depth of 2¼ fathoms, lies ½ mile north-northwestward of this reef. The best anchorage is westward of a north and south line drawn tangent to Cabungalunan Point, in from 6 to 17 fathoms, mud bottom. During stormy weather vessels of moderate draft can get well under the point and be free from all seas. If vessels desire to anchor near the Anibawan River, it should be noted that the mud flats extend ½ mile eastward of the river mouth, coming up suddenly from 5 fathoms to 1 fathom. The Anibawan River has about 3 feet on the bar at low water, with 8 feet inside for about 2 miles, where a gradual reduction in depths commences. Overhanging trees and sunken logs impede free navigation of the river.

Patnanongan Island, lying eastward of Burdeos Bay, is about 12 miles long, 5 miles wide, and 390 feet high. It is heavily wooded. The shores are fringed with coral and are lined with mangrove. The **Uala Islands** lies on a large reef separated from Patnanongan by a narrow tortuous channel impracticable even for a small boat at low water.

Kalongkooan Island marks the northern edge of this reef and the **Malaguinoan Islands** the western edge. **Ticlin Island**, 36 feet high, and the little island, 80 feet high, lying 1½ miles westward of the Malaguinoan Islands, are both steep-to. A shoal with a depth of 4⅓ fathoms lies ½ mile southeast of the 80-foot island. A shoal with a depth of 1⅓ fathoms lies ¾ mile farther in the same direction. The area between Palasan, Patnanongan, and the Uala Islands furnishes protection from the sea, but is not a desirable place to anchor on account of the strong currents.

East Ikikon and the **Catakian Islands**, eastward of Patnanongan Island, are very low and present no distinguishing features. The southwestern point of the larger Catakian Island is sand beach, but the remainder is rock and coral. The reef extends about 1 mile off the northern point of the island, leaving a narrow channel between it and East Ikikon. An anchorage protected from heavy seas, but not from the wind, may be found in a large area of 11 fathoms northwestward of Catakian Islands. Better protected anchorage may be found farther southward in 4 fathoms close to the island. The outer edge of the reef, on which East Ikikon lies, is about 6 miles northeastward of the Patnanongan shore and constitutes the outer limit of dangers off these islands.

Jomalig Island, low and heavily wooded, is separated from Patnanongan Island by a deep channel about 3 miles wide, with the deepest water on the Jomalig side of the channel. It is surrounded by a coral reef, bare at low water, which extends about 1½ miles from the eastern part of the island and surrounds the Malanat Islets and Lantao Rock. The west end of the island is moderately high, abrupt, and wooded. The tops of the trees are about 100 feet high and visible about 10 miles.

Malanat Islets are a group of three small islets and a number of rocks lying on the reef about ½ mile from the eastern end of Jomalig. The islets are wooded and 35, 42, and 56 feet high, respectively.

Lantao Rock lies about 2 miles northward from the east end of Jomalig, near the edge of the shore reef; it is bare and 6 feet high.

Lantao Islands are two small, bare rocky islets about 50 feet high, of a whitish appearance, lying close together about 4½ miles northeastward of the east end of Jomalig, and appear as one island from some directions.

LAMON BAY,

between **Inaguican Point** northwest and **Jesus Point** southeast, is partly protected during the northeast monsoon by Polillo and several smaller islands. **Balesin Island** lies in the middle of the bay, and farther in are **Cabalete, Baliscan,** and **Alabat Islands.**

Port Lampon, in the northwest part of the bay, is a small but well-sheltered port, except during southeasterly and southerly winds. It has a depth of 12 fathoms, sand and mud bottom at the entrance, decreasing gradually to 1½ and 2 fathoms off the village on the small island ¼ mile northward.

From the port five lagoons run into the lowlands, forming Inaguican Point, the largest of which, known as the Pulo River, is navigable for launches for 2½ miles from its mouth to the village of Pulo, from which place a path leads to Infanta, 2¾ miles distant. Good anchor-

age may be found in 5 to 7 fathoms inside Tacligan Point, the eastern entrance point. Directly opposite Tacligan Point is a mountain stream, affording good drinking water, which may be entered at half tide. Infanta is the nearest place in this vicinity where supplies of any kind can be obtained.

A rock about 40 feet high lies 11½ miles southward of Port Lampon and about ¼ mile from shore. It is connected with the mainland by a reef bare at low water. A reef extends over 300 yards eastward from the rock.

Cabalete Island, about 24 miles southward of Inaguican Point, is heavily wooded; there is a ridge about 100 feet high close to the northern shore. Reefs extend 1¼ miles from the southeast coast, and there are detached reefs, with 4 and 5 fathoms, 2½ miles from the same coast. The remainder of the island is fringed by reefs from 200 to 650 yards. The channel between Cabalete Island and Saley Point on the mainland is about 3 miles wide and over 50 fathoms deep in the middle. Vessels using this channel are advised to favor the Luzon shore.

Saley Point, 26½ miles southward of Inaguican Point, is the most easterly point between Port Lampon and Mauban. It is high, well wooded, and steep-to. About 6 miles northward of Saley Point is a large waterfall, pouring directly into the sea, under which small boats may be filled at half tide.

Malazor Point, about 2½ miles southwestward of Saley Point, is low and terminates in a wooded knoll higher than the rest of the point.

A coral reef extends over 100 yards eastward and southward. From here the coast trends westward, forming a bight, on the western side of which is the town of Mauban.

Mauban (chart 4265) is a small port of little commercial importance, copra being about the only article exported. No supplies are available. Good water can be obtained from a spring about 250 yards from the beach. The most conspicuous object in the town is a large galvanized-iron church, resembling a grain elevator, standing to the left of the center of the town alongside the ruins of an old stone church.

Anchorage may be found in 6 fathoms, with the church bearing 288° (287° mag.) and the eastern tangent to Malazor Point 31° (30° mag.).

From Mauban the coast trends southeasterly for 6½ miles to Petisa Point, thence 10 miles farther in the same direction to Atimonan. This coast is bold, with deep water close-to. The shores are generally sandy beaches fringed with coconut trees and backed by high, wooded hills over 1,700 feet high within a short distance. Twin peaks, 3½ and 4½ miles northwestward of Atimonan and 1¼ miles from the shores, 1,279 and 1,241 feet high, respectively, form conspicuous landmarks.

Atimonan, the principal town in this vicinity and a regular port of call for coasting steamers, lies on the right bank at the mouth of the Atimonan River, about 16 miles southeastward of Mauban. It contains a large church, the tower of which, resembling a white lighthouse, can be seen from a position near the north end of Alabat Island; the rest of the town is nearly concealed by coconut trees. Considerable copra and some hemp is shipped. There is a good road to Lucena, on the south coast of Luzon. The Atimonan River is small and has a depth of from 7 to 9 feet on the bar at high water.

Anchorage may be found off the river mouth in 10 fathoms, muddy bottom, with the church bearing 180° (179° mag.). Small vessels may anchor closer in, but they should not go inside of 6 fathoms, as the water shoals rapidly after that and the bottom, of hard sand, is poor holding ground. During the northeast monsoon this anchorage is sometimes untenable; at such times vessels seek refuge at Port Alabat or Sangirin Bay.

From Atimonan the coast trends east-southeastward for 12 miles to Laguio Point. This coast is fringed by a narrow reef and may be approached to within ½ mile at any place. The town of **Gumaca** lies in a bight just eastward of Laguio Point.

Lopez Bay lies between Laguio Point and Roma Point. Lopez River empties into the head of the bay; it is about 50 yards wide at the entrance and narrows down to 30 yards near the town of **Lopez.** Lorchas land at the town at high water.

The head of Lopez Bay and the north shore are fringed by extensive coral reefs; the small islands, **Niogan, Nagtaquin,** and **Manicnic,** 80, 75, and 57 feet high, respectively, are on this reef close to shore. A shoal about 450 yards long in a northerly direction and having a least depth of 1¾ fathoms, lies 1 mile south-southeastward of Niogan Island and ½ mile off the point of a reef extending from shore. Anchorage for deep-draft vessels may be found in the southern part of the bay in about 8 fathoms, mud bottom, about 1 mile off the entrance to the Lopez River.

Hondagua Harbor (chart 4273) is a secure anchorage, with good holding ground, in the northeast part of Lopez Bay. The Manila Railroad Co. has built a wharf with a depth of 30 feet alongside. They maintain a fixed red light on the wharf. Hondagua is connected with Manila by railroad, and a weekly steamer runs to ports on the east coast of Luzon between Polillo and Daet. Vessels going to the wharf at Hondagua should pass about ½ mile southward of Niogan Island before heading for the wharf. Fresh water may be obtained at the wharf and provisions in limited quantities are available.

Baliscan Island, lies 1⅝ miles west-northwestward of the north point of Alabat Island, is small and steep-to, with the exception of a reef with depths of 2 to 5 fathoms extending about ¼ mile southwestward. The island is a flat-topped rock, bare of vegetation, about 300 feet in extent, 20 feet high, and much underworn at its base by the action of the sea. A light visible 12 miles is shown from a white concrete pillar on the island. The channels on either side are deep and clear.

Balesin Island lies 11½ miles north-northeastward of Cabalete Island. It is low, flat, and wooded, and the general height to the top of the trees is about 78 feet. Its northwestern, northern, and northeastern parts are fringed with reefs bare at low water and foul ground exists westward and southwestward from it.

Tarlac Reef, with a least known depth of 4¼ fathoms, lies 2¼ miles southwestward of the south end of Balesin Island. The reported position of Tarlac Reef is shown on the present charts as a 2-fathom shoal marked "Position doubtful," about 2½ miles southward of Balesin Island.

Alabat Island is about 20 miles long in a northwest and southeast direction, 3 miles wide, and is easily distinguished. It is heavily wooded and has a ridge of moderate height running its whole length; on it are five peaks from 1,083 feet to 1,384 feet high, resembling islands from a distance of 30 miles.

The northwest coast of Alabat Island from Sangirin Point, the west extremity, to Gerardo Point, the north point of the island, trends northeastward and is fringed by a coral reef from 200 to 900 yards wide. Off Sangirin Point this reef extends about 540 yards westward; a smaller reef surrounds the north point of the island. The northeastern coast, from Gerardo Point to Silangan Point is, as far as known at the present time, clean and steep-to.

Sangirin Bay (chart 4268) lies eastward of Sangirin Point. The village of the same name lies on the eastern shore of the bay. This bay affords a small, well-sheltered anchorage in 7 or 8 fathoms, mud bottom. The land forming Sangirin Point and that surrounding the bay is low. About ½ mile southward of the mouth of the bay are two large reefs, bare at low water, which afford protection from southerly seas.

Directions.—When about 1 mile from Sangirin Point bring the town to bear 46° (45° mag.) and steer for it around the west point of the bay, favoring the western shore, and anchor in 7 or 8 fathoms, muddy bottom, in the middle of the bay, about 350 yards from the head.

Port Alabat (chart 4268), on the southwest side of Alabat Island and about 7 miles southeastward from Sangirin Point, is small, but has accommodations for three or four small vessels. It affords excellent shelter from northward and eastward, but can hardly be recommended as a typhoon anchorage. It is formed by a small bight in the coast about 1 mile across between the east and west points. Long reefs of rocks and sand extend off these points; about midway between these reefs and about ½ mile from shore is a reef of sand and rocks connected with the reef off the south point, visible at low water. The shore of the port is low, with an extensive sand beach. Fresh water may be obtained from a small stream on the north side of the port; boats can easily enter at high water.

The town of Alabat is on the eastern side of the port. The most conspicuous building in the town is the convent, a large, white, wooden building, with galvanized-iron roof. The town is poor and offers few resources.

Directions.—With the convent bearing 81° (80° mag.), a vessel can easily feel her way to an anchorage, the depth gradually decreasing from 18 fathoms south of the west point to 3 fathoms about ¼ mile from shore.

Silangan Pass (chart 4273) between the southeast end of Alabat Island and Roma Point, Luzon, is over ½ mile wide, but the navigable width is reduced to about 600 yards by the reefs fringing the shores on either hand. A light is shown 31 feet above high water from a white concrete beacon erected on the edge of the reef northward of Roma Point. The depths in the pass are very irregular, 2¼ to 15 fathoms being found. There is a rock with a least depth of 3 fathoms lying near the middle of the pass in a position from which the church at Quezon bears 14° (13° mag.), distant ⅜ mile. This is believed to be the principal danger near mid-channel, but it is possible other

isolated rocks may exist. There is a dangerous shoal in the western approach to Silangan Pass, partly bare at extreme low water, lying with its southeastern edge 232° (231° mag.) 1⅜ miles from the church at Quezon.

DIRECTIONS.—From westward, when about 2 miles from the village of Quezon, bring the southeast tangent to Alabat Island to bear 46° (45° mag.) and steer for it until the light on Roma Point bears 88° (87° mag.), when the course should be changed to 68° (67° mag.). When the pass begins to open, the course may be shaped as desired, giving the coast northward or southward a berth of at least ½ mile. From eastward steer in for the middle of the pass on a 248° (247° mag.) course until the light on Roma Point bears 88° (87° mag.) and the southeast point of Alabat Island bears 46° (45° mag), when the course should be changed to 226° (225° mag.) and held for 2 miles.

The peninsula between Lopez Bay and Calauag Bay, terminating in Roma Point, is covered with heavily wooded hills 200 to 500 feet high. The shore is fringed by a narrow reef, and anywhere between Roma Point and Dinampo Point, the western entrance to Calauag Bay, can be safely approached within ½ mile.

Calauag Bay is from 3 to 5 miles wide and extends 7 miles southeastward from Silangan Pass. The head of the bay is blocked by mud flats, partly bare at low water. A narrow boat channel, carrying a depth of about 2 feet of water at low tide, leads to the town of Calauag. Anchorage, sheltered from all except northwest winds, may be found in 5 fathoms, muddy bottom, 1⅕ miles north-northwestward of Calauag Church.

Port Apat (chart 4265), between Kugasinan and Dayap Points, is nearly closed by a reef, bare at low water, extending southeastward from Dayap Point. **Apat Island**, lying in the middle of the bay, is well wooded and the tops of the trees are about 75 feet high. It is clear on all sides except the western, from which a reef extends about 300 yards westward. Good anchorage may be found by steering 61° (60° mag.) for the middle of Apat Island and anchoring when Kugasinan Point bears 181° (180° mag.). Perfectly protected anchorage for a small vessel may be found about 140 yards from the south side of Apat Island in 3 fathoms. To approach this anchorage, continue on the first course, round Lungib Point at a distance of about 200 yards, and anchor as previously directed.

From Dayap Point, the northern entrance point to Port Apat, the coast trends northwestward for 11 miles to Pangao Point, thence northeastward for 7 miles to Dagdap Point. This coast, except in the immediate vicinity of Dagdap Point, is fringed with a low belt of mangroves. Like all mangrove shores, it is very irregular and indented by many small bights and by the two larger bays, Dayap and San Angel. From Dayap Point to Pangao Point the coast is fringed by reefs extending over 1 mile in places, and vessels bound for Apat and Calauag Bays are advised to give it a good berth. At Dagdap Point the shore line changes its character; the fringe of mangrove is narrower and often disappears entirely, showing a sandy beach; large rocks are also found outside of the mangrove.

Dayap Bay, immediately northward from the point of the same name, is very small, almost blocked by reefs, and of no value to the navigator.

Palupari Island, about 1 mile northwestward of Pangao Point, with which it is connected by a reef, is low, fringed with mangroves, and heavily wooded. The tops of the trees are about 80 feet high. Foul ground extends a long distance northward and northwestward from Palupari, and vessels rounding it are advised to give it a berth of 2½ to 3 miles.

San Angel Bay, eastward from Pangao Point, is shoal and of no value to navigation.

A shoal on which the United States Army transport *Sumner* struck is reported 5 miles from Pangao Point and the same distance from Dagdap Point, with the north end of Alabat Island bearing 261° (260° mag.) and Balesin Island bearing 321° (320° mag.). A shoal with a least known depth of about 5 fathoms lies 8 miles northward from Pangao Point, and there is another shoal with a least known depth of 6½ fathoms about 5 miles northward of Dagdap Point. In the absence of a thorough survey of this vicinity navigation should be conducted with caution.

From Lagichic Point, the eastern entrance to San Angel Bay, the coast trends northeastward for 4 miles and thence northward for 2½ miles to Dagdap Point. This elbow in the coast is nearly filled with a large coral reef, which bares about 3 miles at low water. There is a break, into which the Tinig River discharges, between the eastern side of this reef and the reef fringing the western side of Dagdap Point.

Dagdap Point is the northern extremity of a long peninsula which forms the western side of Basiad Bay. It is heavily wooded, about 180 feet high to the tops of the trees, and very prominent. Northwestward, northward, and northeastward from the point, an area about 2 miles wide, is marked "Not surveyed—reported foul," surrounded by a dotted line within which no vessel should venture.

Basiad Bay contains numerous detached shoals; its shores are generally fringed with reefs, and the head of the bay is shoal with mud flats bare at low water. The **Cabugon River**, which empties into the head of the bay on the eastern side of Bagolayag Point, is the largest river in this vicinity; it has 1 fathom on its bar at low water and deeper water inside. Good, sheltered anchorage for small vessels may be found southward of a reef bare at low water near the head of the bay, midway between Bagolayag Point and the point at the mouth of the Basiad River, in 3 fathoms, soft mud bottom, with plenty of room to the southward in gradually shoaling water. This anchorage may be entered by passing either side of the reef, which bares, but in the absence of any aids to navigation should not be attempted by a stranger unless the dangers are previously marked.

Puctol Point, the eastern entrance point to Basiad Bay, is formed by a prominent hill over 200 feet high. From here to Jesus Point, a distance of 11 miles, the coast trends northeasterly, with a curve northward, and is very irregular, being indented by numerous small, foul bays and fringed with wide reefs. The land at the back is hilly and heavily wooded. Vessels navigating this coast should keep at least 1 mile outside a line joining the several points.

Jaulo Island is a small, low mangrove island about 4½ miles westward from Jesus Point and 1 mile from shore, with which it is connected by a reef bare at low water.

LAMON BAY TO LAGONOY GULF.

Jesus Point, the most northern land in this vicinity, is a round-topped wooded hill over 100 feet high, connected with the mainland by a low neck of mangrove swamp, giving the point the appearance of an island when first seen from west or east. It is fringed by a narrow reef, on which the sea breaks heavily at times. A shoal with a depth of 5¾ fathoms lies 2½ miles north-northeastward of Jesus Point. A reef deepening gradually to 3¼ fathoms extends 1¼ miles northwestward from the first point west of Jesus Point.

Between Jesus Point and Pinandungan Point, nearly 9 miles eastward, the coast is very irregular, being indented by several bays and faced by a number of islands, reefs, and shoals. This coast is bluff, high, and heavily wooded.

Navigators not intending to enter any of the bays in this vicinity are advised not to come inside of a line drawn from 2½ miles northward of Jesus Point to a position 2 miles northward of Tabusao Island.

High Point, about 5½ miles east-southeastward of Jesus Point, forms the western entrance to Dahikan Bay. It is over 100 feet high, well wooded, and prominent. The northern and southern sides are fringed by a narrow reef, but the eastern extremity is clean and may be rounded at a distance of 200 yards.

Dahikan Islands, comprising **Entrance, Calalanag, Tabusao**, and **Palita Islands**, lie off the entrance to Dahikan Bay. **Entrance Island** lies close to the shore, about 1½ miles westward of High Point. It is about 150 feet high and is well wooded. It is surrounded by reefs which fill the passage between it and the mainland. **Calalanag Island** lies nearly 2 miles northward of High Point. It is small, low, and well wooded and surrounded by a white sand beach except on the northern end, which is composed of black rock. **Palita Island**, about 1½ miles northeastward of High Point, is low, wooded, and surrounded by a white sand beach.

Tabusao, the most northern of the Dahikan Islands, lies nearly 2 miles west-northwestward of Pinandungan Point. It is low and wooded and surrounded by a white sand beach. Soundings of 2¾ and 3½ fathoms are found about 1¾ miles north-northwestward from Tabusao, and vessels using the channel between Tanao Island and the mainland are advised to keep about 2½ miles northward of Tabusao Island.

Dahikan Bay affords good shelter for a small vessel during typhoon weather in a pocket in the reef southward of High Point. The anchorage area is very small, but the holding ground is good, and no sea can enter. The head of the bay is shoal and blocked by reefs, partly bare at low water.

Directions.—To enter, pass midway between Entrance and Calalanag Islands and steer to pass about 400 yards eastward of High Point. When High Point bears 271° (270° mag.) round up for the head of the bight and anchor in about 4 fathoms, muddy bottom, when Samur Island, about 16 miles northeast, shows midway between the south end of Palita Island and the main and High Point and the west end of Calalanag Island are in range. Small craft may anchor farther up the bight on the same range to Samur Island, but this should

not be done unless the reefs are visible, and it will be necessary to moor fore and aft.

A long, low point extends northward from the main and forms the eastern side of Dahikan Bay. Between this point and the point forming the western side of Port Mambulao are two large inlets which are blocked with mud and rocks and are of no value to navigation. **Calambayanga Island** is wooded, 230 feet high, and lies off the point forming the western side of Port Mambulao, with which it is connected by a reef bare at low water.

Port Mambulao, at the head of which is the town of Mambulao, is nearly 2 miles wide at the entrance between Calambayanga Island and Pinandungan Point and extends 3½ miles southeastward. The depth at the entrance is 10 fathoms, decreasing gradually off the town to a depth of less than 1 fathom. The port is clean, easy of access, and affords a large area of good anchorage ground in any depth desired; bottom soft sand. Considerable swell rolls in with northwesterly winds, and it can not be recommended as a typhoon shelter. Mambulao ships a good deal of hemp. No directions are needed.

Pinandungan Point forms the eastern entrance point to Mambulao Bay. It is a bluff, wooded point fringed by a steep-to coral reef about 200 yards wide. Mangrove Point, about 1 mile eastward of Pinandungan Point, is a low, mangrove-covered point fringed by reefs nearly ¼ mile.

Tanao Islands, comprising three small islands and a number of large rocks, are about 4 miles northward and northwestward of Pinandungan Point. PALUMBATO, the western island, is 49 feet high, bare and conspicuously flat on top. TAILON, the largest of the group, lies over 1½ miles east-southeastward of Palumbato; it is low, surrounded by white sand beach, and covered with bushes. A light is shown from a concrete pillar on Tailon Island. A ridge of shoals, over which the sea breaks in a northerly swell, extends between Palumbato and Tailon. Tanao Island, about ½ mile southeastward of Tailon, is small, 57 feet high, and wooded, and is the most prominent of the group. The two 32-foot rocks lying northeastward of Tanao are black and prominent. These rocks, with Tanao and Tailon Islands, all stand on the same reef, which bares at low water; the south side of Tanao Island has very little reef off it with deep water close-to. There is a small shoal patch, covered by a least depth of ¼ fathom, lying 1⅕ miles southeastward of Tanao Island.

Calagua Islands include six principal islands and a number of smaller islets and rocks in the eastern approach to Lamon Bay. The principal islands, from west to east, are MACULABO, SAMUR, TINAGA, GUINTINUA, INGALAN, and HUAG ISLANDS. Most of the group are bold, but of no great height, except Maculabo, 814 feet high. The two largest of the group, Guintinua and Tinaga, are joined to each other and to several of the smaller ones, the chief of which are Huag, Cagbalisay, the two Siapas and the Balagbag Islands, by coral reefs bare at low water. There are deep channels between this group of connected islands and all of the other islands, except the Pinacuapan Islands. So far as known no good harbor exists in the entire group.

Maculabo Island, the southwestern and most important island to the navigator, lies with its southern extremity 4¾ miles north-northeastward of Pulandaga Point, the nearest point of the mainland of

Luzon. It is 814 feet high, and is clean and steep-to, except for a narrow fringe of coral on its western side, which bares at low water.

Thurston Rock is a small rock, about 10 feet high, lying 7 miles north-northwestward of the north end of Maculabo. Lima Rock, lying 4 miles northward of Thurston Rock, has a least depth of ¾ fathom and is steep-to. The survey in this locality is not complete and mariners are advised for the present to avoid the locality northward of the Tanao Islands and Maculabo.

Samur Island, 3½ miles north-northeastward of the north end of Maculabo, is a small, round-topped islet, 306 feet high, which forms a prominent landmark.

Ingalan Island, 7½ miles eastward of the south end of Maculabo, is small, covered with grass, and 259 feet high. It is clean and steep-to on all sides.

In strong northeast winds good, protected anchorage may be found about ⅖ mile southwestward of the village of Banocboc on the south side of Guintinua Island. From this anchorage the west end of Ingalan Island should bear 181° (180° mag.), and the south tangent to Guintinua Island 93° (92° mag.). Small vessels may anchor closer in, but they should proceed cautiously, as the shore reef is steep-to.

Amalia, 92 feet high, and **Paquita,** 120 feet high, are two very small islets lying 4½ and 5⅛ miles, respectively, eastward of the east end of Ingalan Island. These islets, so far as known, are clean and steep-to.

Breakers are reported about 1 mile southeastward of Paquita Islet.

Roses Reef lies about 1 mile westward of Amalia Islet and has two dangerous rocks, with a depth of 5½ fathoms between them. These rocks, covered by ¼ and ¾ fathom, are ⅘ mile west-southwestward and 1 mile westward, respectively, from the center of Amalia Islet. To the north, west, and south of Roses Reef the depths increase rapidly to 20 fathoms or more, but eastward a coral bottom of unequal depths extends toward Amalia Islet.

Matandumaten Rock is a bare perpendicular rock, about 300 feet in diameter and 145 feet high, 5 miles east-southeastward of Paquita Islet. Close to it on the northeast, east, and southwest sides are rocks 40 to 50 feet high and southwestward of it are rocks awash. Matandumaten forms a prominent landmark, being visible 15 to 18 miles, and may be passed in safety at a distance of ½ mile.

Tanao Pass, the channel between a line drawn from the Tanao Islands to the south end of Maculabo Island and the mainland of Luzon, is 4 miles wide at the narrowest point, between Tanao Island and Pinandungan Point, and contains much foul ground.

Medio Reef, the most dangerous obstruction in Tanao Pass, is a large reef covered by a least depth of 3 fathoms, lying with its shoalest part nearly 3 miles west-southwestward of the south end of Maculabo Island. The widest and best channel will be found southward of it.

DIRECTIONS.—Passing 3 miles northward of Jesus Point, steer 93° (92° mag.) for 6¾ miles, heading for the south end of Maculabo Island. When 1¾ miles southward of Palumbato Island, the western Tanao Islet, steer 111° (110° mag.) for 8¼ miles, when the western ends of Maculbato and Samur Islands should be in range, bearing 21° (20° mag.). Then steer 94° (93° mag.), with Mangrove Point astern

for 4 or 5 miles, and then shape the course as desired. The latter course passes 1¼ miles southward of Medio Reef and about the same distance northward of Parcale Reef.

From Mangrove Point the coast trends in a general southeasterly direction for 25 miles to the mouth of the Daet River. From Mangrove Point to Bacacay Point, about 12 miles southeastward, the land is high, there are several prominent hills, and the entire section is heavily wooded. This coast is indented by a number of bays and the shores are fringed by a narrow steep-to coral reef. Between Bacacay Point and the Daet River the shores are low and sandy.

Gumaus Bay, lying between an unnamed point and Gumaus Point, 2¾ and 4¾ miles, respectively, from Pinandungan Point, is of moderate depth and clear, with the exception of a small shoal patch with a least depth of 2 fathoms lying over ½ mile northwestward from Gumaus Point. There are no villages on the shore of this bay.

Pulandaga Point, 2½ miles southeastward of Gumaus Point, is 50 feet high, well wooded, and fringed by a narrow coral reef.

Pulandaga Bay is a small cove lying on the west side of the point of the same name; its shores are fringed with coral. Anchorage for small vessels, partially protected during the northeast monsoon by the reef extending northward from Pulandaga Point, may be found toward the head of the bay in 5 fathoms. In the eastern part of the bay is a concrete pier extending into a depth of 15 or 16 feet.

Between Pulandaga Point and Tanoban Point, lying 3½ miles southeastward from it, is a bay which is divided into two smaller bays, Paracale and Malaguit, by Longos Point, a wooded promontory 200 feet high.

The town of **Paracale** and the village of **Malaguit** are on rivers of the same names which empty at the head of the bays also of the same names. Paracale River is of no value to navigation. Hydraulic dredging operations for gold are being carried on in Paracale River at present. Malaguit River mouth is wide, but choked by rocks. Good anchorage, protected during the southwest monsoon, may be found in either bay.

Gumaus, Pulandaga, Paracale, and **Malaguit Bays** are open northeastward and are frequently unsafe during the northeast monsoon.

Paracale Reef, a small reef with 4 fathoms, lies nearly 2 miles east-northeastward of Pulandaga Point.

A small reef with 4½ fathoms lies 3⅓ miles eastward of Pulandaga Point.

Tanoban Point is a rounded wooded point 280 feet high. It is fringed by a reef, bare at low water, and shoal water extends ½ mile eastward from it.

Bacacay Point rises to a wooded hill 370 feet high, marked by a prominent bare spot about ½ mile inland. It is fringed by a narrow, steep-to coral reef. A shoal patch with a least depth of 2½ fathoms lies about 1 mile eastward of Bacacay Point.

Indan Point is about 4½ miles southeastward of Bacacay Point; between these two points the coast recedes southwestward, forming a long bight with sandy shores, which are wooded nearly to the water's edge. The Indan River empties on the western side of the point; it is very shoal and of no value to navigation. Shoal water extends more than 1 mile northerly and easterly from the mouth of the river, and Indan Point should be given a good berth.

Quinamanuca Island lies 1¾ miles southeastward from Indan Point and about ¾ mile from shore. It is small, low, and heavily wooded, which makes it show well against the low country between the beach and Mount Bacacay. It is fringed on the eastern side by coral, beyond which shoal water extends nearly ½ mile. Mariners are advised to give it a berth of at least 1 mile in passing. There is a shallow channel between it and the shore, but it is of no value to the navigator.

Daet River empties about 8½ miles southeastward of Indan Point. Between these points shoal water extends off about 1¾ miles in places. A good range for a safe course along this coast is the southwest point of Canimo Island in line with the northeast tangent to Caringo Island, bearing 141° (140° mag.). Vessels leaving the Daet River for the westward are advised to hold this range until it becomes too faint to use; they will then find the vessel well up by the reef off Indan Point and heading for Maculabo.

There is a small bank with a least depth of 6¼ fathoms lying 2⅔ miles north-northwestward of the northwest point of Canimo Island. Another bank, larger in extent, with a least depth of 8 fathoms, lies 4⅓ miles northwestward of the same point.

Daet, the most important town in this vicinity, lies about 4 miles inland on the river of the same name.

Mercedes, the port of Daet, and connected thereto by a light street railway, lies at the mouth of the Daet River. It is composed principally of warehouses for hemp, rice, etc., with a small collection of native houses. It is not safe for vessels drawing more than 12 feet or over 180 feet long. The harbor is formed by the banks of the river, and a large reef across the mouth affords protection from the sea. The available navigable area is very small, and all vessels entering are obliged to moor to the wharves. The best way to lie at the wharves during the northeast monsoon is with the vessel's head to seaward, as the wind often approaches the force of a gale. The current in the river is strong, sometimes reaching a velocity of 6 or 7 knots, and good anchors should be used offshore. Turning on an ebb tide should not be attempted, as the vessel is liable to become unmanageable. Pilotage is not compulsory, but advisable. Pilots are always on the lookout and will go out if the bar is passable. The best anchorage for vessels awaiting a pilot is marked by a black buoy.

Regular steam communication is maintained with Manila and the ports of eastern Luzon, and considerable trade is carried on by sailing vessels with the ports in the immediate vicinity.

Directions.—To approach the mouth of Daet River bring the top of a high conical mountain about 8 miles southward of Mercedes to bear 200° (199° mag.) and steer for it. Vessels awaiting a pilot or not desirous of entering the river should anchor in 7 or 8 fathoms, sandy bottom, close northwestward of the anchorage buoy. Vessels entering the river should pass close westward of the channel buoys, and when nearly up to the last buoy round the sand spit to the westward sharply and moor the vessel according to wind and tide.

Canimo Island, about 2 miles eastward of the mouth of the Daet River, is fringed by a narrow, steep-to coral reef. It is 606 feet high in the northern part, and the northern and eastern slopes are covered with cogon grass to the summit, while the rest of the island is heavily wooded. An occulting white light, visible 15 miles, is shown from the top of a concrete house on the northwestern extremity of Canimo

Island. Good anchorage, protected from all winds except from northward, may be found westward of Canimo.

Canton Island is small, 355 feet high, and lies about 2 miles southeastward of Canimo. On the summit of this island is a conspicuous tree and in the southeastern extremity is a prominent, sparsely wooded bluff, which forms a good landmark for vessels approaching San Miguel Bay. Apuao and Apuao Grande Islets and several smaller islets and rocks lie between Canton and Canimo Islands. Canton and the smaller islets are connected and surrounded by reefs, partly bare at low water, leaving a narrow channel between a small, black, rocky islet lying on the western edge of them and Canimo Island.

Caringo Island, nearly 2 miles southward of Canton Island, forms the western entrance point of the main channel into San Miguel Bay. It is generally low and well wooded, but on its south side there is a bluff about 40 feet high. Its northeastern and eastern sides are fringed by a coral reef, parts of which bare about ⅔ mile.

Quinapagyan Island, about 1⅔ miles northwestward of Caringo Island and 1 mile eastward of Pambuan Point, Luzon, forms the eastern entrance point at the south end of Canimo Pass. It is low and heavily wooded and about ⅔ mile in extent. **Sand Point**, the western extremity, is a steep-to, prominent, sandy point. **Malasugue Island**, about midway between Quinapagyan and Caringo Islands, is small and low.

The area bounded by the Apuao Islands, Canton, Quinapagyan, and Caringa Islands is foul and should not be entered without local knowledge.

Canimo Pass (chart 4268), the western channel into San Miguel Bay, lies between Luzon and Canimo and Quinapagyan Islands. It is the usual route taken by small coasting steamers between Daet and Naga. Strangers are advised to take a pilot, who may be obtained at either Daet or Naga. For southbound vessels there are no difficulties until nearing Quinapagyan Island, where the channel is narrowed by reefs from the mainland and by a large reef making out from the north side of Quinapagyan Island, with 6-foot soundings ¾ mile northward of Sand Point. The greatest danger in this pass is, however, a large, rocky reef, bare at extreme low water and does not give any signs of its existence at other times. This reef lies about 700 yards west-northwestward of Sand Point and is marked by a red buoy off its eastern edge.

Directions.—Vessels from northward, from a position off Canimo light, should steer for Sand Point on a 159° (158° mag.) bearing; when drawing up toward Sand Point the vessel should be hauled southward to give Sand Point a berth of 200 or 250 yards. Colasi Point, a little open westward of Sand Point, clears some 8-foot spots on the eastern side of the pass.

San Miguel Bay is somewhat pear-shaped in general outline, extending 18 miles southward from the entrance between Caringo and Siruma Islands and varying in width from 5½ miles at this entrance to 16 miles at greatest width about 4 miles from its head. The navigable width of the entrance is contracted by **Bicol Rock**, awash at half tide, slightly over 1 mile westward of the west end of Siruma Island. Depths of from 6 to 8 fathoms will be found in the middle of the bay,

decreasing gradually toward the shore. The southern part of the bay is very shoal.

From Colasi Point, about 3½ miles southward of Caringo Island, the west shore of the bay trends a little east of south for about 5 miles to Magsatangi Point and is heavily wooded and mountainous. The shore is steep-to, and except for reefs off Colasi Point may be approached in safety within ½ mile. The village of Colasi, on a bluff about 2 miles northward from Magsatangi Point, is small and not readily seen from the sea.

Colasi Peak, close to the shore, about 4½ miles southward from Colasi Point, is a sharp, conical hill 1,275 feet high. This hill is only about one-half the height of the other peaks of the Colasi Hills, but it is conspicuously isolated from the rest of the high land and is readily identified from all directions except southeastward.

Magsatangi Point, the most eastern point on the western side of San Miguel Bay, is formed by the slope of Colasi Peak. From Magsatangi Point the coast trends generally south-southwestward for 7 miles to the mouth of the Manga River. Projecting from the south side of Magsatangi Point is a hook of land nearly 1 mile in length, inclosing a shoal basin which dries at extreme low water. The conspicuous part of this hook is **Tacubtacuban Hill**, a round-topped hill 340 feet high. The neck connecting this with the mainland and the curved hook projecting westward from its south side are low, narrow, sandy spits covered with mangrove. In heavy northwest winds good anchorage in 3 fathoms, muddy bottom, may be found ½ mile southward of the western extremity of this hook. Anchorage for larger vessels will be found a little farther out in 4 fathoms, with Tacubtacuban Hill in range with Colasi Point. The beach along this coast is generally rocky, though broken by occasional sand patches, and is timbered to the water's edge.

From the mouth of the Manga River the coast takes an abrupt turn to the east-southeastward and stretches in gently curving sand beaches 5 miles to the mouth of the Bicol River. The village of **Barceloneta** lies at the foot of a fairly conspicuous bluff, showing red soil in places and elsewhere grass covered, just south of the Manga River. The country back of the coast is low and flat.

Bicol River empties into San Miguel Bay about 5 miles from the western side and is navigable for small steamers drawing 9 feet to Naga, the capital of Ambos Camarines Province, an important town, 20 miles from the mouth of the river. A black buoy, 2½ miles offshore, in 3 fathoms, marks the anchorage for vessels waiting to enter the Bicol River. Buoys and range beacons generally mark the best water across the bar and the entrance to the river. Without them the bar is impossible of navigation by a stranger. Pilotage is not compulsory, but is advisable. Pilots are always in attendance at the village of Cabusao, at the mouth of the river. The least depth in the best channel approaching the bar at mean high water is 8¾ feet. The bottom at this place is soft mud, and a vessel just touching will usually proceed without stopping. On the bar proper is a depth of 9 feet, sand bottom, at mean high water.

From the mouth of the Bicol River the coast curves gradually eastward to **Tanglar Point**. The beach is low, flat, and muddy, and landing is impossible except at high water or at the mouth of the Cala-

banga River, 5 miles eastward of the Bicol River. The 2-fathom curve lies about 1½ miles from shore.

Tanglar Island, off the point of the same name, is small, bold, covered with small trees, and has rocks along its northern shore. A very small, round islet lies $\frac{6}{10}$ mile east of Tanglar Island.

From Tanglar Point the coast trends northeastward for 6 miles to the mouth of the Kalwan River. Kagsao and Bogui Points, midway on this stretch, are the principal breaks in a muddy or sandy beach. Back from the shore the land rises in irregular hills covered partly with timber and partly with grass. These are the foothills of Mount Isarog.

Mount Isarog, an extinct volcano, lies about 11 miles southeastward from Tanglar Point and is prominent. It rises to two peaks 6,255 and 6,482 feet high, respectively.

Cauit Island is a small island 145 feet high lying abreast of Kagsao Point and about 1 mile from shore. It has a light-colored bluff on the bay side and slopes gradually toward the eastern shore.

About ⅜ mile westward from Cauit Island is a sand shoal having a group of rocks awash at high water. Less than ¼ mile southeastward of these rocks there is a submerged rock with 5 feet at low water; this rock is covered by a growth of seaweed and sometimes appears to be bare at low water. These rocks constitute the only serious danger to navigation in San Miguel Bay proper.

Cabgan Island is a round-topped cone 170 feet high with an immense banyan tree on its summit. It is less than ¼ mile in extent and lies ¼ mile south of the west end of Cauit Island. There is a small warehouse on Cabgan and a larger one on the mainland opposite.

The area included between Cauit and Cabgan Islands and the mainland affords the only safe anchorage in the bay for vessels drawing less than 6 feet; the bottom is soft mud. The best anchorage is about midway between Cauit Island and the mainland with the rocks awash, showing midway between Cauit and Cabgan Islands. The passage between Cauit Island and Kagsao Point is clear and has 6 feet in it.

From the Kalwan River the coast trends north-northwest for 7 miles to Balocbaloc Point. For 4 miles the shore is low and mud bottom extends to the muddy or sandy beach; the 3-fathom curve is about 1½ miles from shore. For the last 3 miles the shore becomes more rocky and the bottom changes from mud to sand between 3 and 4 fathoms.

Tinambac is a small town about 1¼ miles northward of the mouth of the Kalwan River. It contains a church with a white cross, which is a good landmark when the light is right.

Kagliliog Point, about ¾ mile southward of Balocbaloc Point, is rocky and has a detached rock about 100 yards off its extremity. The bottom is rocky for some distance off, and this rock should not be approached closer than ½ mile.

Balocbaloc Point, the southern entrance point of the Looc River, is low and sandy and has a spit, covered at high water, extending ½ mile northward.

Looc River, about 1½ miles wide at the mouth, is the outlet of a large tidal lagoon. The shores of this lagoon are low and mostly mangrove covered; its greatest depth is about 1 fathom at low water, over a muddy bottom. There is a small islet in the center. The Looc River leaves this lagoon as a clean channel, 3 fathoms deep and ⅓ mile

wide, through which the tidal currents run with great velocity. This channel gradually widens and shoals 1 mile from the lagoon and becomes dangerously contracted by rocks on both sides. A channel carrying 10 feet at low water was developed, which, if well buoyed and entered for the first time in fine weather for the sake of local knowledge, would serve to take a vessel of that draft to an excellent harbor of refuge in the upper part of the river. This channel is impossible for a stranger or in thick weather.

From the Looc River the coast trends gradually northwest by west for 4½ miles to San Miguel Island and is irregular, having several shoal bays and rocky points. The bottom off this shore is hard sand, with rocks close inshore, to a depth of between 3 and 4 fathoms, outside of which the bottom becomes soft mud. Proceeding northward the 3-fathom curve, at first about 1½ miles offshore, gradually approaches the coast until outside of San Miguel Island, where the land is fairly steep-to; a depth of 5 fathoms is found less than ¼ mile from shore.

San Miguel Island is low and well wooded. Its shores are rocky, and at the east end it is connected with the main by a sand bar, bare at low water. Off the northwest end detached rocks extend about 300 yards; this point should not be approached closer than ⅓ mile. Vessels may anchor in 3 fathoms, sandy bottom, fairly sheltered from winds from northwest through north to southeast, about ½ mile southeast of the southeast end of San Miguel Island. Large vessels should anchor in 5 fathoms, muddy bottom, ¾ mile south of the same point. The approaches to this anchorage are clean and the bottom shoals gradually. There is a small anchorage in 3 fathoms, bottom sand, mud, and rocks, eastward of the north end of the island, about halfway between the point and the shore. This anchorage should be approached cautiously, as there are rocks, bare at low water, some distance off the shore of the mainland.

From San Miguel Island the coast trends northward for 2 miles to Quelun Point. About 1 mile westward of this point is a low, rocky islet with a few bushes on it, and ¼ mile northwestward of this islet is a long detached reef with a least depth of 6 feet on it. The vicinity of this islet and Quelun Point is foul and should be avoided.

Directions.—Vessels bound for the Bicol River should enter San Miguel Bay midway between Caringo and Siruma Islands and steer 189° (188° mag.); when Cauit Island bears 91° (90° mag.) they should anchor in 3 fathoms, in the vicinity of the anchorage buoy, to wait for the pilot, or for water on the bar, as may be necessary. Vessels bound for Cauit Landing (Cabgan Island) should, after entering the bay, bring the eastern end of Canton Island to bear 338° (337° mag.) and steer 158° (157° mag.) until the south side of Cabgan Island bears 91° (90° mag.), when it may be steered for.

Siruma Bay, between Quelun and Siruma Points, is filled with islets and coral shoals for the greater part of its area. There is a depth of 2½ fathoms at the entrance, decreasing gradually toward the head. The town of Siruma lies on the south shore, about 1 mile eastward from Quelun Point.

Siruma Island, the eastern entrance point of San Miguel Bay, is a small, low, wooded island about 50 feet high. It is surrounded by

a reef which extends nearly ¾ mile westward. The eastern end of Siruma Island is connected by reefs with Siruma Point, a long, narrow point projecting westward from the mainland. An islet lies on the reef about ¼ mile northward of the north end of Siruma Island.

Bicol Rock, a small, rocky ledge which is covered at extreme high water, lies $1\frac{1}{10}$ miles westward of the western end of Siruma Island. Between this rock and the reef extending westward from Siruma Island is a channel ¼ mile wide and 8 fathoms deep.

A rocky patch with a least depth of 1¼ fathoms lies ⅝ mile southward from the west end of Siruma Island. There are two shoals lying northwestward of Siruma Island which must be guarded against by vessels entering or leaving San Miguel Bay. One, with a least depth of 2½ fathoms, lies 1¼ miles westward of the north point of Siruma Island and the other, with a least depth of 3 fathoms, lies 1½ miles northwestward of the same point.

Sapenitan Bay, between Siruma and Sapenitan Points, affords good anchorage, sheltered from all winds except those from north and northwest, in 4 to 6 fathoms, muddy bottom, about ½ mile from the shore, between the mouths of two rivers which empty near the head of the bay.

Sapenitan Point is low and wooded at the extremity, but is 352 feet high about 2 miles inland. It is surrounded by a wide reef, partly bare at low water.

From Sapenitan Point to Quinabucasan Point, about 5 miles east-northeastward, the coast is very irregular and is indented by two deep bays, the western one of which extends 2 miles southeastward. The shores of this bay are fringed with coral reefs, leaving a deep pocket over 1 mile long and ½ mile wide between them. The eastern bay is entirely filled with reefs, upon which lie a number of small islets, the northwesternmost of which, lying about ½ mile southeastward of Butauanan Island, is 50 feet high and marks the southeastern side of the channel between Butauanan Island and Quinabucasan Point.

Butauanan Island, lying northwestward from Quinabucasan Point, from which it is separated by a deep, narrow, navigable channel having a least width of about 250 yards, is well wooded, and 763 feet high in its northern part. The northern coast of the island is clean and may be safely rounded at a distance of ½ mile. The western side is fringed by a coral reef, which at its southern end extends nearly ¾ mile westward. Shoal water, with one rock awash, extends over 1 mile westward of the south end of the island.

In strong northeast winds good anchorage may be found in 12 fathoms about ½ mile from the west side of Butauanan Island on the bearings: South end of Butauanan Island 130° (129° mag.) and the northwest point of the same island 334° (333° mag.). Another anchorage used by coastwise steamers is in 9 fathoms, muddy bottom, about ¾ mile southwestward from the south end of Butauanan Island. From this anchorage the 50-foot islet previously mentioned should bear 70° (69° mag.) and the northwest point of Butauanan Island 335° (334° mag.). When approaching this anchorage from the northwestward vessels should give the south end of Butauanan Island

a berth of about 1½ miles to clear the shoal water extending 1 mile westward from that point.

From Quinabucasan Point, the most northern point of Luzon in this vicinity, the coast trends in a general east-southeasterly direction for 40 miles to Caramoan Point, the northeastern extremity of the peninsula of the same name. This coast is very irregular in outline, being indented by deep bays and faced by numerous islands, between which and the mainland are several well-protected anchorages. The land rises rapidly from the shore line and is, as a rule, heavily wooded. There are no towns of any importance on this coast.

San Vicente Bay, 4½ miles southeastward of Quinabucasan Point, is nearly blocked by reefs, and the only available anchorage is in the entrance, southward of the northern entrance point.

Port Tambang, 4 miles southeastward of San Vicente Bay, is blocked by coral reefs almost to the entrance and is of no value to the navigator.

Lamit Bay (chart 4271), with its northern entrance about 16 miles southeastward of Butauanan Island and the same distance westward from Sugar Loaf Point, is the best typhoon harbor on the east coast of Luzon. It is formed by Sibauan and several smaller islands westward, the Lamit Islands eastward, and a bight in the shore line southward. It has an average width of 2½ miles and extends 4 miles southward; within this area there are a number of small islands, among which anchorage, protected from all winds and sea, may be found.

Sibauan Island, with the small adjacent islands Paniqui, Dinug, Naglaous, and Salobot northward, and Cagbinunga and Pagbocavan Islands southward, forms the western side of Lamit Bay. Sibauan Island is well wooded and 165 feet high near the southern end. Salobot Island, the northeastern of the group, lies about ¾ mile northeastward of the northeast point of Sibauan; it is very small, 90 feet high, and has a reef, with a rock awash at its extremity, projecting about ¼ mile eastward. This reef forms the western limit to the northern entrance to Lamit Bay. Paniqui Islands, the northeastern one of which is 202 feet high, are three small islands lying about ¾ mile northward of Sibauan Island; they can be safely passed at a distance of ¼ mile. Pagbocavan, the southern islet of the group forming the western side of Lamit Bay, lies with its southern extremity over 1 mile southward of Sibauan. It is well wooded and 240 feet high. The south end, which terminates in a large, dark-brown rock, may be safely passed at a distance of ¼ mile. The other islets of the group, previously mentioned, as well as several named and unnamed islets and rocks, do not require any detailed description, and their position will be best understood by reference to the chart.

Aguada Rock is a small, rocky ledge with a least depth of 2 fathoms surrounded by deep water, lying nearly 1½ miles northward of Paniqui Islands. Except under the most favorable conditions it can not be picked up by the color of the water, and it breaks only in bad weather.

Cimarron Islets are four small, high islets lying nearly 3 miles north-northwestward of the largest of the Paniqui Islands. The central and largest island, 160 feet high, presents a conical appearance from east or west, but from north or south it shows a short

ridge. This group is the nearest danger to the track to and from Maqueda Channel, and the course pursued by steamers passes over 2 miles northward of it.

LAMIT ISLANDS are two high, heavily wooded islands separated by a narrow, impassable channel. They are of very irregular shape; the northern island is 260 feet high and the southern 380 feet. The north shore of the northern island has bold, rocky points at either end, sloping downward to a low level ½ mile from the northwest point. Two small islets—PAWICAN, 60 feet high, and PULING, 50 feet high, both of which are clean and steep-to on their seaward sides, lie off the north end of the north island.

There are a number of small islands in Lamit Bay, the principal ones of which are the BANI ISLANDS, two in number, and ANCHOR ISLAND. The western Bani Island lies about 1 mile southwestward of the northwest point of the northern Lamit Island, and Anchor Island lies about 1 mile southward of the western Bani Island. Good anchorage will be found southward of the western Bani Island in about 8 fathoms, and also southward and southwestward of Anchor Island in 4 to 8 fathoms.

DIRECTIONS.—Vessels approaching Lamit Bay from westward should bring the opening between Pagbocavan Island and the main to bear 136° (135° mag.) and steer for it until the south end of Pagbocavan Island bears 125° (124° mag.), when the vessel should be hauled a little eastward to pass about ¼ mile southward of Pagbocavan; continue eastward and anchor anywhere southward of a line drawn between Pagbocavan and Anchor Island in 4 to 8 fathoms, sticky mud bottom.

Vessels from eastward usually enter Lamit Bay by the north channel. The water is deep close to Pawican Island, and it can be safely rounded at ¼ mile or less and the next point south on Lamit Island passed at the same distance. By favoring this side of the channel the reefs extending from Salobot Island will also be passed at a safe distance. The west end of the western Bani Island can be rounded at a distance of ¼ mile and good anchorage will be found southward of it in 7 or 8 fathoms, muddy bottom, about ¼ mile from the shore; if desirable, anchorage may be taken up farther southward, but not farther eastward, as there is a wide reef projecting from the eastern Bani Island, and also a shoal patch, with a least depth of 1 foot, ¾ mile southward of the east end of the western Bani Island. If proceeding to an anchorage nearer the head of the bay, pass about ¼ mile eastward of Anchor Island and haul southwestward, where ample space will be found for many vessels in 4 to 8 fathoms, as previously described. Instead of passing eastward of Anchor Island a southwesterly course may be continued from off the western Bani Island and the southwest point of Anchor Island rounded to an anchorage. From the latter point a long shoal projects, and the thoroughfare is still further obstructed by a coral shoal nearly abreast of the point and nearly in mid-channel, with ¾ fathom least water, and rarely shows any evidence of its existence. There is also a small patch, with 2 fathoms least water, lying about ¼ mile northwestward of the southwest point of Anchor Island, which further complicates this passage.

Should the weather be such that there is difficulty in recognizing the above-described entrance, a vessel should continue westward,

passing either side of the Paniqui Islands at a distance of ¼ mile, until the Cimarron Islets bear 1° (0° mag.), when the course should be changed to 181° (180° mag.) to pass ¾ mile westward of Sibauan Island; when the south end of Pagbocavan bears 125° (124° mag.) the course should be changed to pass about ¼ mile south of it, and the previous directions followed.

Binagasbasan Bay is a large, irregular-shaped bay lying between Lamit Islands and Quinalasag Island. **Malabungut Island**, lying on the edge of the shore reef, forms the head of the bay. This bay is open northward and is of no value to navigation, the anchorage area being exposed and encumbered by shoal patches. **Bacon Island**, 80 feet high, lies in the middle of the entrance.

Hervor Rock, with a depth of 2 feet at high-water springs, lies about 2½ miles northeasward of Cugun Point, the northeast extremity of the northern Lamit Island. It is surrounded by deep water, and a light swell sets up a continuous and well-defined breaker.

Quinalasag Island, with its northern extremity 3½ miles eastward of Cugun Point, makes a prominent landmark, as it is large, bold, heavily wooded, and irregularly shaped. Its ridges are much higher than those of the surrounding country, rising in places to nearly 800 feet. On the northern side there are several indentations, among them Masamat Bay, which would serve as a good typhoon shelter for small craft.

Bacacay Island is small, over 200 feet high, and lies immediately northward of the north point of Quinalasag Island, of which it appears to be an outlying point when seen from a distance from some directions. It forms an excellent landmark from eastward or westward, as it shows as twin peaks of nearly equal height. Projecting northward from it is a narrow dike-like ledge of rocks, the outer end of which, $\frac{4}{10}$ mile north of the island, can be closely approached, as there are no outlying submerged rocks.

Quinalasag Passage, southward of Lamit, Malabungut, and Quinalasag Islands, connects Lamit and Sisiran Bays. It is too shoal and obstructed by reefs to be used by anything but small boats.

Sisiran Bay (chart 4271), south and southeast of Quinalasag Island, affords good sheltered anchorage in 4 to 5 fathoms, in a bight on the southeast side of Quinalasag Island, and also in 7 fathoms southwestward of Tinajuagan Point, the eastern entrance point. The best channel into Sisiran Bay is between Quinalasag Island and **Laja Island**, a dark, bare rock, 20 feet high, lying in the middle of the entrance. There is a shoal which breaks in bad weather, with a least known depth of 4¼ fathoms, between Laja Island and Tinajuagan Point.

Caramoan Peninsula is the name given to that portion of Luzon lying between the Pacific and Lagonoy Gulf. It is 10 miles wide between Sisiran Bay and the head of Lagonoy Gulf, and extends about 15 miles eastward, terminating in a broad point facing Maqueda Channel. It is high and mountainous and well wooded.

Tagun Bay lies between Tinajuagan Point and Lahuy Island. The long tongue of land terminating in Tinajuagan Point, which separates Sisiran Bay from Tagun Bay, is formed of broad ridges covered with grass, with narrow, steep, wooded valleys between them. Broad coral reefs fringe the western shore of the bay and also obstruct its head. On the eastern side of the bay navigation is less dangerous

than on the western, as deep water can be carried closer to the islands and projecting points. If desired, anchorage can be found off the rocky bluff point on the west coast of Lahuy Island, a little over 2 miles south of Sugar Loaf Point. There are two small channels connecting the head of Tagun Bay with the Maqueda Channel, but they are too narrow and tortuous, in the absence of landmarks or aids to navigation, to be of any practical value.

Lahuy Island, with its northeast end 12½ miles north-northwestward of the northeast extremity of the Caramoan Peninsula, is about 5 miles long, north and south, and about 1 mile wide. There are a number of small islets and rocks lying off its western and northern sides and on the eastern side it is fringed by a wide reef, which near the northern end of the island extends nearly 2 miles eastward and surrounds Cotivas and Basot Islands. The interior of Lahuy is hilly; a ridge about 400 feet high extends north and south in the southern half, while the northern half is composed of a number of peaks covered with grass and a few trees. The northwestern part of the island terminates in a very conspicuous round-topped, steep, wooded peak, 325 feet high, known as the **Sugar Loaf**. The northern shore is formed by sandy beaches and rocky cliffs alternately, and there are a number of small rocks lying off the northeast point. Immediately northward of Sugar Loaf Point are two large rocks, 50 and 79 feet high, respectively.

Ocata Island lies about ½ mile northward from Lahuy Island. It is 81 feet high; the northern coast is rocky; the southern, sandy. A light, visible 12 miles, is shown from a white concrete pillar on the summit of Ocata Island.

About 200 yards westward of the southern part of the island there is a rock, covered by ½ fathom and surrounded by deep water. About ½ mile eastward of the north end of Ocata Island there are three rocks, each about 3 feet high, and ¼ mile southeastward of the same point there is a rock 7 feet high.

Masnou Island, lying 3¼ miles northwestward of Sugar Loaf Point, is covered with grass and 87 feet high.

Black Islet is a bare rock, about 50 yards in extent and 30 feet high, lying nearly 1 mile southeastward of Masnou Island. The channel between them is ⅞ mile wide and that between Black Islet and Sugar Loaf Point is over 2½ miles wide. Both are deep and clear; the northern channel between Masnou Island and Black Islet is the one generally used by coasting steamers.

Molar Rock, lying ¾ mile north-northwestward of Masnou Island, is about 20 yards in extent and about 20 feet high. About ⅓ mile north-northwestward from Molar Rock is a sunken rock, on which the sea breaks heavily in bad weather. About ¼ mile southeastward of Molar Rock is a small rock 15 feet high; between this rock and Masnou Island are sunken rocks, on which the sea frequently breaks.

Cotivas and **Basot Islands**, about 1 mile eastward of the northern part of Lahuy Island, lie close together and from a distance appear as one island. Basot is the most eastern island in this vicinity; its northeastern side is clear and may be safely passed at a distance of 1 mile; its shores are sandy beaches and rocky cliffs alternately. In the northern part of Basot there is a grassy peak 155 feet high and in the southern part a flat-topped hill 168 feet high. Basot Island is covered with grass, while Cotivas Island, lying immediately west

ward of the south end of it, is covered with trees. A coral reef extends ¼ mile from the west coast of Basot Island, leaving a fairly good anchorage, known as Pocket Bay, exposed to northeast winds, between it and Lahuy Island.

Lucsuhin Islands are several islands and rocks lying on a great reef between Lahuy Island and the Caramoan Peninsula. They are moderately high and covered with bushes, trees, and coconut palms. When seen from seaward they appear as one, but at high water a boat can pass between them. Northward and southwestward of the reef upon which they lie, parts of which are awash and bare at low water, are narrow, tortuous channels with depths of from 3½ to 12 fathoms, leading into Tagun Bay. In the absence of good landmarks and of any aids to navigation no directions for these channels can be given, and they should not be attempted without local knowledge.

Solodon Islet, the southeasternmost of the Lucsuhin Islands, is a large, barren rock, 91 feet high, and has a few bushes on its top; its sides are steep and rocky. It forms a useful landmark for entering Tabgon Anchorage. About 1 mile eastward of Solodon Islet is a 6-fathom shoal on which the sea has been seen to break in heavy weather.

From Tinajuagan Point the coast trends southeasterly for 12 miles to Yopoquit Point. This coast is faced by wide reefs, parts of which bare at low water and which at one point extend off 3 miles. The islands Quinabugan, Cocos, and Haponan, and a large number of small, high, unnamed islets and rocks, which do not require any special description, lie on these reefs.

Cocos Islet, mentioned because it is used as a range for entering Tabgon Anchorage and the best channel into Tagun Bay, lies on the above-mentioned reefs, 7½ miles southeastward of Tinajuagan Point and about 1½ miles from the mainland. It is small, regular in shape, coming to a rounded summit 127 feet high, and is entirely covered with coconut palms.

Tabgon lies on the shore about 9 miles southeastward of Tinajuagan Point, at the foot of a prominent hill 617 feet high. This hill, the highest in this vicinity, is very steep on the south side and has a ridge extending east and west; its southern side is covered with grass and the northern side is heavily wooded. The reef in front of the village extends over 1 mile. Tabgon is a port of call for some of the smaller coastwise steamers.

Tabgon Anchorage (chart 4268) is about 1½ miles northeastward from the village of Tabgon and westward and southwestward from Puling Island. It affords a fairly large anchorage area completely protected from outside seas, but exposed to northerly and northwesterly winds, and in a heavy blow it gets somewhat choppy in the more exposed parts. The depths are from 4 to 12 fathoms over a mud and sand bottom. Directions for entering will follow the description of the dangers at the entrance.

Haponan Island, lying about 2 miles eastward of Tabgon Village, is the most eastern island lying on the reefs which skirt the shore between Tinajuagan Point and Yopoquit Point. Reefs extend ½ mile northeastward and form part of the south side of the channel into Tabgon Anchorage. Haponan is composed of a number of small peaks, highest 202 feet; they are covered with grass, bushes, and

coconut palms. The shore is alternately sandy beaches and rather low, rocky points.

Puling Island, lying northward of Haponan Island, is fringed by a reef on its northern side, which forms part of the south side of the channel into Tabgon Anchorage. Puling, the highest island in this vicinity, is 298 feet high; it is well wooded except where it has been cleared on the northern part of the top and forms a good landmark from seaward.

There is a narrow, deep channel between Puling and Haponan, but it is seldom used, the northern channel being considered preferable.

South Islet is a small islet about 28 feet high, covered with trees, lying about 220 yards northward of Puling Island, near the edge of the reef.

North Islet, lying about 500 yards northward of South Islet, on the southern edge of the reef surrounding the Lucsuhin Islands, is very small, 14 feet high, and is covered with grass and small bushes.

These two islets mark the channel into Tabgon Anchorage which passes between them and is about 300 yards wide between the 5-fathom curves.

From Yopoquit Point the coast trends east-southeastward with a bend southward, forming Port Caramoan, for 4½ miles to Caramoan Point. Yopoquit Point is fringed by a reef over ½ mile wide; this reef gradually narrows to the coast about 2 miles southeastward. Port Caramoan is used as a landing place for the town of Caramoan during the southwest monsoon. The village of Paniman stands at the head of the port.

Malarad Islands are a group of small, high islets and rocks, partly wooded, with steep rocky sides, lying off Port Caramoan. For over 2 miles northward of Malarad Islands the bottom is very irregular, with depths of from 3½ to 21 fathoms. In heavy northeast weather the sea breaks on some of the shoaler patches, and this area should be navigated with caution.

Caramoan Point, the northeast extremity of the peninsula of the same name, is about 400 feet high. It has steep, rocky bluffs about 50 feet high and is very bold and steep-to. The interior back of the point is covered by innumerable small, heavily wooded peaks 600 to 1,000 feet high, the highest of which, a round-topped, heavily wooded peak, about 4 miles westward of Caramoan Point, is easily recognized and forms a good landmark.

Directions for Tabgon Anchorage.—Vessels bound into Tabgon Anchorage should, while still outside the danger line mentioned above, bring Puling Island to bear 267° (266° mag.) and steer for it. When about ½ mile southward of Solodon Islet bring the south side of the North Islet, lying on the north side of the channel, in range with the south side of Cocos Islet, bearing 279½° (278½° mag.). When on this range the 48-foot island eastward of Cocos Islet appears to be a lower prolongation of Cocos extending northward and the 5-foot rock westward of Cocos is entirely shut in. Stand in on this range, keeping a good lookout for the reefs on both sides. This range will clear them, but it is advisable, after passing the reef point on the south side, to open the range a little southward, thereby giving the reefs northward a wider berth. As the two islets are approached haul westward to pass midway between them; as soon as they are abeam haul a little southward, as there is a reef covered by

1½ fathoms lying about 400 yards southwestward of North Islet, and a reef with rocks awash extends about 200 yards westward of South Islet.

Anchorage may be found anywhere inside, but about the best place is west or southwest of Puling Island, close enough to clear the reef westward, which is about ¼ mile in extent, covered by a least depth of ¾ fathom, and lies about 700 yards westward of the west side of Puling Island. In the northeast monsoon vessels may anchor close to Puling Island, the water being deeper there than farther from shore.

From Caramoan Point the coast trends southeasterly for 5½ miles to Rungus Point, which forms the southeastern extremity of the Caramoan Peninsula. It is very rugged and irregular and is cut into by a number of small bays with sandy beaches and rocky bluffs. Several small islets and rocks lie about ¾ mile or less from shore. The rock on which the *Elcano* was wrecked lies almost ½ mile northeastward of Batobato Point. The interior is hilly, rising to heights of from 300 to 700 feet a short distance inland. There are no sheltered anchorages on this coast except Pitogo Bay, which is sometimes used as a harbor of refuge for small vessels.

Catanaguan Islands are two small islands lying about 2½ miles eastward of Caramoan Point. They are surrounded by deep water, with a deep, narrow channel between them. The northern island, about 85 feet high, is covered with bushes and grass; the northern part ends in a sharp point. About 400 yards northward of this island is a small rock about 3 feet high, and about 200 yards eastward of the island is a similar rock. A small, detached shoal, with a least depth of 5½ fathoms, lies about ½ mile westward of the northern island.

The southern island, about 102 feet high, is covered with trees and bushes; the shore line consists of sandy beaches and rocky points. Off the south end of the island is a bare, pyramidal rock, 72 feet high, which shows very plainly from east or west. A small, detached shoal, with a least depth of 3 fathoms, with deep water all around, lies about ⅜ mile west-southwestward from the south point of the southern island.

Taebun Channel, separating the Catanaguan Islands from the Caramoan Peninsula, is about 1 mile wide at the narrowest point. It is deep and is frequently used by vessels bound for the east coast of Luzon.

Pitogo Bay (chart 4268) is a very small, well-sheltered anchorage, facing Taebun Channel, about 1 mile southward of Caramoan Point. A bight in the shore line, with Pitigo Island in front of it, forms the harbor. It is surrounded with high, irregular hills covered with trees; the locality is hard to identify from a distance. There are two entrances, one on either side of Pitigo Island. The northern entrance is generally used, the southern one being nearly blocked by reefs, leaving a narrow, deep, impracticable channel between them.

Masters of vessels who use Pitogo Bay in bad weather state that a vessel can get far enough around behind Pitigo Island to get good protection from northeast winds and seas. The swinging room is very limited and it would probably be necessary to moor. Small steamers can find good shelter in typhoon weather in the northern bight, which is about 150 yards wide at the entrance and extends 300

yards northward; it will be necessary to moor bow and stern, as there is not room to swing.

Sombrero Islet, 3½ miles southeastward of Pitogo Island and 1¼ miles northeastward of Rungus Point, is a small, wooded cone, 265 feet high. It is prominent and, being higher than the adjacent coast, forms a good landmark for vessels approaching Maqueda Channel. Lauing Bay, back of Sombrero, is foul and does not afford anchorage. There are two large rocks, 35 and 40 feet high, respectively, lying about 600 and 1,100 yards southward of Sombrero Islet.

Rungus Point, the southeastern extremity of the Caramoan Peninsula and the western entrance point to the Maqueda Channel, is well wooded, of moderate height, and slopes gradually to the sea.

Maqueda Channel, separating Catanduanes Island from Luzon, is about 4 miles wide at the southern entrance, between Rungus Point, Luzon, and Sialat Point, Catanduanes. The southern entrance is divided by the Palompon Islands into two channels, both of which are clear and deep; heretofore, in the absence of a good survey, coasting vessels have generally used the western channel, which is about ⅞ mile wide and has a depth of over 40 fathoms in the middle.

In the northern part of Maqueda Channel there are a great many dangerous rocks and shoals, the westernmost of which, **Dagat Rocks**, are separated from Basot Island by a deep, clear channel over 6 miles wide. These dangers are fully described immediately after the description of the north coast of Catanduanes.

CATANDUANES ISLAND,

forming the eastern side of the Maqueda Channel, is about 35 miles long, north and south, and about 23 miles wide. It is traversed throughout its length by a mountain chain and is abundantly supplied with small streams. The northern side is fringed by reefs; the western side is, in general, steep and safe. The south side is fronted by a number of shoals and reefs; the east side contains three principal indentations which give rise to more or less definite headlands. The bold, rocky cliffs defining all exposed points, as well as the numerous small bights and bays, give this coast line a decidedly rugged and irregular outline. There are no outlying detached dangers off the east coast, and it can be safely navigated by keeping 1 or 1½ miles from the headlands. The flood stream sets to the northward, both on the east and west coast of Catanduanes Island, and to the westward along the part of the coast between Catanduanes and Polillo Islands.

Yog Point, the northern extremity of Catanduanes Island, is about 150 feet high, and is covered with grass and a few small shrubs. Immediately northward of the point is a small, grass-topped, rocky islet 144 feet high; on the northern part is a pinnacle rock about 120 feet high, which forms a very prominent landmark from east or west. This islet is steep-to and may be rounded in safety at a distance of ¼ mile.

From Yog Point the coast trends southerly and then westerly for 4½ miles to Pandan Point, forming Pandan Bay; thence westerly for 1 mile to Balangona Point, the northwest point of Catanduanes Island.

Abriop Bank is a large bank, with depths of 16 to 20 fathoms, lying 8 to 12 miles northward of Pandan Point.

Pandan Bay (chart 4269) is nearly blocked by reefs and islets. Near the middle of the bay a small peninsula, with two hills about 70 feet high on it, extends northward and divides the bay into two parts. This peninsula is fringed by a reef about ½ mile wide on the western side. The bay eastward of the peninsula is foul; that on the western side is used as the fine-weather anchorage for Pandan. On the reef in the western part of this bay are two small islets covered with coconut trees. Between the eastern of these islets and the peninsula there is a sandy beach intersected by two small streams.

There are two banks and one shoal in the approach to Pandan Anchorage; a bank covered by 7 fathoms lies 1½ miles northward of the western coconut-covered islet, a shoal covered by 5½ fathoms lies 1 mile northward of the eastern islet, and a 9-fathom bank lies ⅜ mile eastward of the 5½-fathom shoal.

PANDAN is a very small, unimportant town about ¼ mile inland from the head of the western bay. It is nearly hidden by trees, only the top of the church being visible on certain bearings.

DIRECTIONS.—Vessels approaching Pandan from the eastward should bring the eastern coconut-covered islet to bear 208° (207° mag.) and steer for it, anchoring when the northern extremity of the peninsula bears 85° (84° mag.) in 12 or 13 fathoms. Small vessels desiring to go closer in should steer 164° (163° mag.) from the above position and anchor in 9 fathoms with only room to swing clear of the reefs. Vessels approaching from the westward should bring the north end of the described peninsula to bear 102° (101° mag.) and steer for it until the eastern islet bears 208° (207° mag.) and then proceed as previously directed.

Pandan Bay affords no protection during the northeast monsoon; at that season Cobo Bay, 3 miles southward of Balangona Point, affords sheltered anchorage for vessels wishing to communicate with Pandan.

Palumbanes Islands are three islands and several islets and rocks 4 to 7 miles west-southwest from the northwest point of Catanduanes Island. **Porongpong**, the central and largest island of the group, is about 1 mile in extent, of irregular shape, covered with high trees, and 436 feet high. There is a small village on the eastern side. **Calabagio**, the eastern island, is small, wooded, and 184 feet high. Fair anchorage, approached either from north or south, may be obtained in 15 fathoms about ¼ mile westward of the south end of Calabagio. The western island of the group, about ¾ mile westward of Porongpong, is covered with trees and bushes and is about 55 feet high. The channel between this island and Porongpong has a depth of 6¾ fathoms.

Within a radius of 6 miles of the Palumbanes there are a number of rocks and shoals situated as follows:

Lane Rocks, the most northern dangers in this vicinity, are four or five rocks awash and lie 5 miles northwestward of the Palumbanes. They show well and can be seen at all times. They are surrounded by deep water on all sides except the northern, where at a distance of about ½ mile there is a 2-fathom patch. The channel between Lane Rocks and the shoal spot northward of the Palumbanes is over 3 miles wide, with depths of from 15 to 20 fathoms.

Northwestward and northward of the Palumbanes at distances of 1 to 1½ miles are small shoal spots covered by depths of 1½ to 3¼ fathoms, as shown on the chart.

Southwestward of the Palumbanes is a coral reef about 5 miles long north-northwest and south-southeast and ½ mile wide at the northern end, tapering to a point at the southern end. Near the northwestern part of this reef, 3 miles southwest of the south end of the western Palumbanes, are the Dagat Rocks, a cluster of rocks about 6 feet out of water. There is a 4-fathom patch about ½ mile northwestward of these rocks, but northward of them it is clear. About 1¾ miles south-southeastward of Dagat Rocks is a small patch where the reef is awash; in calm weather this spot can not be seen from any distance. Except in the vicinity of the places just described, the reef has from 4½ to 9 fathoms depth throughout the greater part of its length.

Sail Rock, about 1½ miles southeastward of Porongpong island, is 64 feet high and forms a prominent landmark. It is about 45 yards in extent and has a few small bushes on it. Northward of this rock and extending about 200 yards are several small rocks about 8 feet high, and about ½ mile southwestward is a 2-fathom spot. A small rock awash lies about 3 miles south-southwestward of Sail Rock. It can be seen at all times, but when the sea is smooth it is not very noticeable.

About midway between Calabagio Island and Catanduanes is a shoal about 2½ miles long, north and south, and ½ mile wide, with a rock awash near the northern end. This rock lies 1¾ miles east-northeastward of the northern end of Calabagio Island. About 300 yards eastward of the rock is a shoal spot which breaks with a light swell. The remainder of this shoal has depths of 2½ to 7 fathoms. The channel between the shoal and Catanduanes Island is over 1½ miles wide and has a least depth of 7 fathoms.

Balangona Point, the northwest extremity of Catanduanes Island, is 100 feet high, covered with grass, bold, and steep-to, with rocky bluffs.

From Balangona Point the coast trends south and then southwest for 25 miles to Sialat Point. It is, in general, bold and steep-to, the 10-fathom curve in no place being ½ mile from shore. There are no ports of consequence on this coast. The bay immediately southward of Balangona Point does not afford anchorage; it is shoal at the head and the area of deep water is somewhat restricted by the reefs which border the shore.

Cobo Bay (chart 4269), the next bay southward, is sometimes used by vessels desiring to communicate with Pandan during heavy northeast weather. The village of Cobo lies at the head of the bay, among the trees on the south side of a round-topped hill, and only one or two native houses are visible from seaward. Anchorage may be found in 15 fathoms, sandy bottom, with the round, timbered hill, 284 feet high, that stands at the southern end of the high land, about 150 yards from the beach, bearing 91° (90° mag.). This is not a good anchorage, as in heavy weather the swell follows around Balangona Point. Small vessels, not over 150 feet long, can find better-protected anchorage farther in, in a pocket in the reef, in 4 or 5 fathoms, sandy bottom.

Toytoy Point, forming the southern entrance point to Cobo Bay, is a prominent, sharp-pointed, partly wooded neck of land 73 feet high. Its shore is rocky, with a rocky bluff 50 feet high. About 275 yards south-southeastward of the point are two rocks, the higher of which is 18 feet high.

Caramoran is a small town, about 1 mile southward of Toytoy Point, on a slight elevation at the foot of two hills. The stone church forms a good landmark. The sandy beach in front of the town is bordered by a coral reef nearly 300 yards wide, on which the sea usually breaks, making landing difficult and at times impossible.

Port Manambrag (chart 4269) is a small bay lying on the south side of Manambrag Point, a rocky point about 100 feet high 6½ miles northeastward of Sialat Point. It is shoal and rocky at the head, and there are rocks awash just south of Manambrag Point. Steamers sometimes call here to load hemp. Anchorage may be found in 8 fathoms about 400 yards southward of Manambrag Point.

About 1¾ miles southwestward of Manambrag Point and nearly ½ mile from shore is a small shoal with a least depth of 4 fathoms. With the exception of this shoal, the coast between Port Manambrag and Sialat Point is clean and steep-to.

The small village of **Codon** is at the head of a small bay about ½ mile northeastward from Sialat Point. It is completely blocked by a reef, bare at low water.

Sialat Point, the western extremity of Catanduanes Island, is a high, bluff, rocky point with two or three rocks awash at high water off it to the southwestward. Except in the direction of those rocks the water off Sialat Point is very bold, the 20-fathom curve being only about ¼ mile from shore. A group occulting white light, visible 15 miles, is shown from a white structure on Sialat Point.

About 1¼ miles southeastward of Sialat Point, and about ½ mile from shore, is a small reef with a least depth of 1½ fathoms.

Agojo Point, about 4 miles southeastward of Sialat Point, is a mangrove swamp surrounded by a coral reef about ¼ mile wide. The bight northward of the point is filled with reefs.

Calolbong is a small town about 3 miles eastward of Agojo Point. Anchorage, protected from winds from west through north to east-southeast, may be found about ¾ mile from shore in 10 fathoms. The approach to Calolbong is clear with the exception of a 1¾-fathom patch lying ¾ mile southwestward of the landing place. Vessels bound to Calolbong usually bring the group of warehouses to bear 36° (35° mag.) and steer for them, anchoring as close to the edge of the reef as may be deemed prudent. The cable from Tabaco lands at Calolbong.

From Calolbong the coast trends southeasterly for 8 miles to Virac Point and is generally fringed by coral reefs, nowhere reaching ½ mile in width.

Tereso Bank is a small shoal lying 3 miles southward of Calolbong, with a least depth of 2 fathoms. It is about ½ mile in diameter and is surrounded by deep water.

Taguntun Bank is a small shoal whose greatest dimension is about ½ mile, with a least depth of 4¾ fathoms, lying 5 miles south-southeastward of Calolbong. Virac Point, bearing 90° (89° mag.), just clears the southern edge of this shoal.

Between the two last-described shoals and the shore there are several shoal spots, the location of which will best be understood by reference to the chart.

About 5 miles west-southwestward of Virac Point is a bank with a least known depth of 8 fathoms. Vessels rounding Virac Point will find a good channel northward of this bank and between the point and Pechili Reef.

Pechili Reef, on which the sea breaks in heavy weather, lies about 2 miles southwestward of Virac Point. It has a least depth of 2½ fathoms and is about ½ mile long, east and west, and ¼ mile wide.

About 1 mile southeastward of Pechili Reef is a small shoal patch over which the sea heaves up when there is much swell. The least depth found on it was 6 fathoms, but vessels would do well to avoid this locality. Virac Point and church in range pass over the eastern edge of this shoal.

Cabugao Bay (chart 4269) lies between Virac and Nagumbuaya Points. The shore of the bay in general is a gravel and sand beach, bordered much of the way by coral reefs, widest in front of the town of Virac. The Pajo River empties in the western part of the bay and the Cabugao in the northeastern. The town of Virac is in the northwest part of the bay and that of Cabugao near the mouth of the Cabugao River.

Johns Reef is a small, detached, coral reef that breaks heavily, lying about 2 miles east-northeast from Virac Point. The church at Virac, bearing 339° (338° mag.), clears the eastern side of Johns Reef and the southern extremity of Virac Point, bearing 260° (259° mag.), clears its southern side. There is a small, detached rock with a least known depth of 4¼ fathoms lying about 1 mile eastward of the middle of Johns Reef. There are a number of reefs between Johns Reef and the shore, but as they are out of the ordinary track of navigation it is not necessary to describe them.

Virac Bank is a large bank, on which the sea breaks heavily in bad weather, lying about 4 miles east-southeastward of Virac Point. It probably has not less than 5 fathoms of water on it.

Two-Fathom Patch is a small shoal with a least depth of 2 fathoms, about 1½ miles east-southeastward of the church at Virac.

One-Fathom Patch is a small, rocky shoal about 200 yards in extent, with a least depth of 7 feet about 1$\frac{4}{10}$ miles from shore, 3 miles eastward of Virac Church.

The town of Virac, about 4 miles northward of Virac Point, contains a large church which shows prominently from all parts of Cabugao Bay. Virac is of considerable importance, being the principal hemp-shipping port on the island. A light, visible 10 miles, is shown from a concrete tower on the shore about ⅓ mile northeastward of Virac Church. The usual anchorage for coasting steamers is in 8 or 9 fathoms, about ¾ mile southeastward of the church. **Pandaman Point**, about ¼ mile eastward of the light, is fringed by a coral reef which extends about ¼ mile southward, forming a basin westward from it, where small craft can find good anchorage about 300 yards from the sandy beach; the swinging room here is quite limited.

DIRECTIONS.—Virac light, steered for on a 344° (343° mag.) bearing, leads to the anchorage, passing westward of Virac Bank and

eastward of Johns Reef, or steered for bearing nothing northward of 327° (326° mag.) leads well eastward of Virac Bank.

The town of **Bato** is about 1 mile inland on the Cabugao River, which empties about 3 miles eastward of Virac. The large church forms a good landmark. The usual anchorage for Bato is in front of the village of Cabugao in 6 fathoms of water.

EAST COAST OF CATANDUANES.

At a distance of 1 mile east-northeastward of Yog Point is a small coral bank with a least depth of 7 fathoms. The channel between Yog Point and this bank is clear and has a depth of 16 fathoms in the middle.

Horadaba Rocks are three large bare rocks 4½ miles eastward of Yog Point. They lie close together and from most directions appear as one. The middle one is 105 feet high and has a light growth of brushwood on its summit.

Matulin Rock lies ⅗ mile east-southeastward of Horadaba Rocks; it is bare, slightly spherical in shape, and 40 feet high. Between Horadaba Rocks and Matulin Rock are four rocks awash and a number of sunken rocks.

From Yog Point the coast trends southeasterly for 7½ miles to Bugao Point and contains no specially prominent points, but has numerous cliffy projections distributed quite uniformly. This coast is fringed by a narrow, steep-to coral reef. Two small, unimportant coves, **Tabago** and **Miaili**, both blocked by reefs, lie 3 and 4½ miles, respectively, from Yog Point.

Tarahid Point, 5 miles from Yog Point, is a rugged point 50 feet high.

Purog Bay is a small bay about ½ mile southward of Tarahid Point. It is of no value to navigation, being almost blocked by reefs which leave two narrow boat channels to the head of the bay.

Minigil Island lies in the entrance of Purog Bay and is connected with the shore at the head of the bay by a reef which is awash at low water. This island is one of the most rugged in this vicinity. On all sides except the western it is composed of cliffs rising almost vertically to 140 feet. The summit and the western slope are covered with grass and bushes.

Minigil Point is high and rocky. A large reef, awash at low water, extends 1½ miles eastward and then, curving around southward and westward, approaches the shore southward of Bugao Point.

Bugao Point is low, sandy, and covered with bushes and small trees.

From Bugao Point the coast trends southward for 3 miles to the town of Bagamanoc and thence eastward for 4 miles to Anajao Point, but the regularity of the latter stretch is broken by a deep indentation southward at the mouth of the Oco River. This right-angled gap in the coast is partly filled by Lete, Panay, and other small islands, and between these islands and the coast are Port Bagamanoc, Babaguan Bay, and Port Anajao.

Tahidan Point, about 2 miles southward of Bugao Point, is a very conspicuous, red-faced point which rises almost vertically 112 feet and terminates at the top in a sharp, grass-covered point. The appearance presented is not unlike that of a cone. A large reef,

awash at low water, extends ¾ mile northeastward and ⅓ mile eastward from Tahidan Point.

Lete Island, lying nearly 1 mile eastward of Tahidan Point, attains a greatest elevation of 329 feet near its northern end. The northern and western sides of this island are bare, reddish-brown, vertical cliffs, the highest of which are about 275 feet high. The southern shore line is outlined by sandy beaches from which the slopes rise gradually to the center of the island.

Panay Island, the largest island off the east coast of Catanduanes, lies 9½ miles southeastward from Yog Point. It is very irregular in shape, partly wooded, and 453 feet high. On all sides except the southern it is fringed with coral reefs, and should not be approached closer than 1 mile.

Macarilan Islands are two very small islands lying close to Macarilan Point, the northwestern extremity of Panay Island. They are very rugged in outline, heavily wooded, and 90 and 139 feet high, respectively. They are surrounded by reefs, awash at low water, which connect them with Panay Island.

Arch Rock lying about 250 yards eastward of Ilihan Point, near the edge of the shore reef, is a reddish-brown stone arch about 60 feet high. The plane of the arch is nearly east and west, and it forms a very prominent landmark. There is a dangerous rock, with a least depth of 1 fathom, lying ⅔ mile north-northeastward of Arch Rock.

Port Bagamanoc (chart 4269) lies between Lete Island and the main. The anchorage area is very much restricted by reefs extending from Catanduanes and from Lete Island. It is open northward, and affords no protection during the northeast monsoon. The entrance channel runs between coral reefs awash at low water on the western side and a line of sunken rocks on the eastern side.

Directions.—Vessels bound into Port Bagamanoc should round the Macarilan Islands, off the northwest point of Panay Island, at a distance of about ½ mile, and after bringing the southwest point of Lete Island to bear 181° (180° mag.), should steer for it, keeping a good lookout for the rocks on the port hand, until Arch Rock bears 214° (213° mag.), when it should be steered for and anchorage taken up about ¼ mile eastward of it in 3 or 3½ fathoms, muddy bottom, and good holding ground. Arch Rock, bearing 214° (213° mag.), will carry a vessel halfway between the 1-fathom rock in mid-channel and the rocks westward of Lete Island.

Bagamanoc is a small town on the south shore of the port, back of a low ridge of gravel; along this ridge brushwood has grown until the town is nearly obscured. The church, with masonry walls, is the only permanent building in town.

Babaguan Bay is between Port Bagamanoc and Port Anajao. It is very shallow, especially in the southern part, where extensive mud flats uncover at low water. The Oco River, navigable for small boats only, empties into the southern part of this bay. A narrow channel, having a least depth of 6½ feet, connects Port Bagamanoc with Port Anajao. This channel follows the southwest side of Panay until Arch Rock is in range with the south end of Lete Island, and then trends westward into Port Bagamanoc. It should not be attempted by a stranger unless it is previously marked.

Port Anajao (chart 4269), between Panay and Catanduanes Islands, is a small but well-sheltered harbor of refuge. The anchorage is in

the mouth of Babaguan Cove, the second indentation from the entrance, on the south coast of Panay Island. The village of Babaguan stands at the head of this cove. The only entrance to Port Anajao is from the eastward; the western end is blocked by the shoal waters of Babaguan Bay and Minaaso Islet.

MINAASO ISLET is a small, heavily wooded islet lying at the head of Port Anajao. It is 81 feet high and entirely outlined by cliffs. A small rock about 12 feet high and numerous rocks awash at low water lie off the northeast side of the islet. Minaaso Islet is surrounded by a reef, which extends about 260 yards northeastward.

Several rocks, the outermost of which is awash at low water, extend 130 yards southward from the eastern entrance point to Babaguan Cove.

MANYAGUI ROCK is a dark-colored, irregular-shaped rock lying in the middle of the entrance to Port Anajao. It is 16 feet high, and just westward of the highest point there is a low level area about 5 feet high. Manyagui Rock is surrounded with deep water on all sides except the southwestern. It may be passed on either side, but the usual channel into Port Anajao is northward of the rock. This channel is ¼ mile wide and 15 fathoms deep in the middle.

LOLONG POINT, the southeastern extremity of Panay Island, forms the northern entrance to Port Anajao. It is 89 feet high, flat, covered with grass, and fringed with cliffs about 30 feet high. KOMAGAT ROCK is an irregular-shaped rock 18 feet high, about 100 yards eastward of Lolong Point. Numerous rocks, awash at low water, lie on all sides of this rock.

ANAJAO POINT, Catanduanes, forms the southern entrance point to Port Anajao; it is grass covered and 100 feet high. Two islets lie about 50 and 150 yards eastward of this point. The inner one is a bare rock 28 feet high; the outer one is covered with grass, brush, and a few small palms and is 58 feet high.

The shore line of Lolong Point, Anajao Point, and both sides of the channel through the narrow section of the port, is bold, well defined by low, rocky cliffs, and steep-to. On each side of the port, abreast the narrowest part, are heavily wooded hills from 400 to 500 feet high, the steep slopes of which showing against the hills back of Port Bagamanoc clearly define the entrance.

DIRECTIONS.—Vessels entering Port Anajao are advised to pass midway between the southeastern point of Panay Island and Manyagui Rock and to steer for the north side of Minaaso Islet, bearing 255° (254° mag.). On this course Minaaso Islet is just open off the shore southward of it. As the narrows are approached, keep in mid-channel; and when the village of Babaguan opens, steer for Omuntol Point, the western entrance point to Babaguan Cove, bearing 288° (287° mag.), and anchor in 3½ fathoms, muddy bottom, when the stone building in the village of Babaguan bears 1° (0° mag.).

From Anajao Point the coast trends southeast for 7 miles to Lictin Point, thence southward for 4 miles to Dalaynay Point, the northern entrance to Jimoto Bay. This coast is very irregular in outline, being indented by numerous bays and faced by a number of small islets and rocks. The land is high and bold, and fringed by narrow, steep-to, coral reefs. The bays are small and unimportant and of very little value to navigation; their shores are fringed with coral, leaving, in

most cases, a narrow, deep channel to their heads. They are all open northward and eastward and afford no shelter in the northeast monsoon. The islands and rocks all lie on the shore reefs. All headlands and islets between Port Anajao and Jimoto Bay can be safely passed at a distance of 1 mile.

Agutayan Island, 3½ miles southeastward of Anajao Point and close to the point of the same name, is small, 178 feet high, and almost entirely covered with grass. Numerous rocks, some awash and others varying in height from 5 to 64 feet, lie off the northern extremity of the island.

Sobog Bay lies westward of Agutayan Point and **Botinagan Bay** lies eastward of the same point.

Linampanan Island, lying off Sohoton Point, 1 mile southeastward of Agutayan Island, is a small, rugged, grass-covered island 139 feet high. A number of detached rocks, varying in height from 6 to 68 feet, lie north and east of this island. The easternmost rock, about 8 feet high, lies ¼ mile east-northeastward of the north end of the island.

Botinagan Bay lies between Agutayan and Linampanan Islands.

Lictin Point, 2½ miles southeastward from Linampanan Island, is rugged and irregular in outline and 140 feet high. The cliffs are about 75 feet high; the slopes leading to the 376-foot hill, ¾ mile westward of the point, are largely covered with grass and small trees.

Bocana Bay lies about midway between Linampanan Island and Lictin Point.

Bagalayag Point, about 3 miles southward from Lictin Point, is very conspicuous from north or south. It is composed of rugged cliffs about 75 feet high and is heavily wooded with the exception of a small, grassy area on the outer extremity. A series of rocks, 10 to 40 feet high, extends about ¼ mile eastward from the point.

Sigmil Bay and **Bedonogan, Sebonbon,** and **Seuron Coves** lies between Lictin and Bagalayag Points.

Pondanan Island, ½ mile northward of Bagalayag Point, is small, covered with grass, and 85 feet high. Numerous rocks, varying in height from 5 to 20 feet, lie southwestward of it.

A shoal, with a least depth of 2¾ fathoms, lies northward of Pondanan Island. The outer limit of the 10-fathom curve surrounding this shoal lies about 1 mile north-northeast from the island and the same distance from the shore.

Dalaynay Point, about ¾ mile southward from Bagalayag Point, is formed of low cliffs, as is also the coast between these two points. It is covered with grass and 310 feet high. The two headlands terminating in Dalaynay and Bagalayag Points unite in a heavily wooded hill 430 feet high, lying about ⅘ mile southwestward from the latter point.

Dalaynay Islets are two small, grass-covered islets lying close to the point of the same name. Rugged cliffs outline the northern and larger islet, which is 155 feet high; the southern and smaller islet, 78 feet high, terminates in a sharp, grass-covered point. A number of bare rocks ranging in height from 10 to 40 feet lie in the immediate vicinity of these islets.

Poro Island, ⅓ mile southeastward of the Dalaynay Islets, is one of the most conspicuous landmarks on this coast and marks the en-

trance to Jimoto Bay. Its sides rise abruptly to a comparatively flat top 189 feet high, giving the island the appearance of a truncated cone. A large lone tree stands on the summit. A narrow, steep-to coral reef surrounds the island on all sides except the eastern. There is a navigable channel about 100 yards wide between Poro Island and the Dalaynay Islets.

Macalanhag Island, nearly 1 mile southwestward of Dalaynay Point, forms the south side of Jimoto Bay. It is small, of irregular outline, heavily wooded, and 220 feet high. It is surrounded by a reef and is connected with the main island by a reef bare at extreme low water. The channel between the reefs surrounding Poro Island and those extending northeastward from Macalanhag Island is about ½ mile wide, deep and free from danger.

Jimoto Bay (chart 4269), formed by a curve in the shore line westward of Dalaynay Point, offers excellent anchorage for small vessels. Dalaynay Point and Macalanhag Island form the limits of the bay. The inner harbor is oval in shape, extends northwestward, and is outlined by a curved gravel beach. The village of Jimoto lies at the head of the bay. Coral reefs fringe both sides of the bay, but the beach at the head is clean. The coral reef from the north shore of the bay extends about 140 yards; that from the northwest point of Macalanhag Island about 280 yards, leaving a deep, clear channel 140 yards wide between them. From here the water shoals gradually to the beach at the head of the bay, and the holding ground is good anywhere.

Good anchorage may be found northward of the middle of Macalanhag Island in 9 fathoms, muddy bottom, but better protected anchorage will be found farther in toward the village.

Directions.—No directions are needed for the outer anchorage; it is easy of access at all times. To enter the inner anchorage, bring a sharp-pointed, distant hill seen over the northern part of the village of Jimoto to bear 285° (284° mag.) and steer for it, keeping a good lookout for the reefs on either side; when the western side of Macalanhag Island opens clear of the land to the southward the narrowest part of the channel will have been passed and a 271° (270° mag.) course will lead to a good anchorage in 3 fathoms, muddy bottom, in the middle of a basin about ¼ mile in diameter.

Unless the hill mentioned is positively identified, or the edges of the reefs can be seen, it is not safe to attempt to enter the inner anchorage.

Nagsilag Point, about 1½ miles southward of Jimoto Bay, is a round-topped, grass-covered hill 140 feet high, connected with the high land immediately westward of it by a neck of land about 50 feet high. **Sogocan Cove** lies northward from the point and **Diyoryan Cove** southward. A small, brush-covered, rocky islet, 80 feet high, lies over 200 yards southward from Nagsilag Point. Two small, bare rocks, 19 and 22 feet high, respectively, lie about ⅔ mile northeasterly and nearly ½ mile southeasterly of Nagsilag Point. Both are surrounded by deep water.

Vitaogan Point, about ¾ mile southward of Nagsilag Point, forms the eastern extremity of a heavily wooded, gradually rising ridge, extending westerly about 3 miles. This ridge is one of the most prominent headlands on this coast and can be clearly seen from the vicinity of Nagumbuaya Point. The western portion, including the 2,060

and 1,876 foot hills, is particularly prominent. Nagsilag Point also marks the extremity of another similar headland rising to a maximum height of 2,110 feet about 3½ miles inland. The valley between the above-described headlands is conspicuous from seaward. **Ginitligan Cove** lies southward of Vitaogan Point.

Balacay Islands, a small, heavily wooded island, 265 feet high, near its southwestern extremity, lies about 1¼ miles southward of Vitaogan Point. It is surrounded by and connected with the shore by reefs bare at low water.

Agban Bay is of moderate depths and affords sheltered anchorage during the southwest monsoon. It is somewhat protected from the northeast by Balacay Island and its surrounding reef.

Vinticayan Point, forming the south side of Agban Bay, is formed by high, rocky cliffs, with a grassy area on its eastern extremity. **Polalan Bay** lies on the south side of this point.

Binurun Point, about 6½ miles southward of Jimoto Bay, is formed by high, dark-colored, rocky cliffs. A wooded peak, 266 feet high, about 300 yards from the extremity of the point, shows well from northward or southward. **Gingaanan Bay** lies northward from Binurun Point.

Zayao Island, ⅗ mile northward from Binurun Point, is a bare rock 80 feet high; from northward it appears to form part of Binurun Point. Zayao Island is connected with the mainland westward by a reef which breaks in moderate seas.

A rock, 18 feet high, lies 360 yards south-southeastward of Tominongtong Point, the point 1 mile southwestward of Binurun Point.

Bandayanon Point, 2½ miles southwestward of Binurun Point, rises gradually on all sides to a height of 249 feet.

Pinohagan Island is a small wooded island, 51 feet high, lying close to the southwest side of Bandayanon Point, of which it appears to be a part when seen from southward or westward.

Jumbit Islets, consisting of seven small, grassy islets and several bare rocks grouped nearly in a north and south direction, lie from ⅓ to over 1 mile south by east of Bandayanon Point. The larger islets vary in height from 62 to 112 feet and are covered with grass and bushes. The smaller islets are mere rocks from 5 to 31 feet high. This group rises from a coral reef extending ¼ to ½ mile westward and ¼ mile eastward of the islets; good water is found close to the southern side of the 3-foot rock 100 yards southward of the southern islet. The only dangerous part of this reef is near its northwest corner, where depths of ¼ and ½ fathom are found ¼ mile westward from the 31-foot rock.

Kalapadan Bay (chart 4269), between Bandayanon Point and Taris Point, 2¼ miles southwestward, is bordered by wide reefs extending ½ mile in places.

Baras, the largest town on the east coast of Catanduanes Island, lies at the head of the bay between the mouths of the Macutal and Paniginhan Rivers. A white iron roof in the eastern end of the town forms a prominent landmark which can be seen from the vicinity of Sinalog Point.

Minabalay Island is a small island, 59 feet high and wooded almost to the water's edge, lying on the edge of the shore reef about ½ mile southward from the iron roof in Baras and about ⅔ mile

northwest from Bandayanon Point. The channel into the Paniginhan River passes close eastward of Minabalay Island.

A small detached reef covered by 3 fathoms and surrounded by deep water lies on the western side of the channel 7/8 mile south-southwestward of Minabalay Island. Another small patch of 5 fathoms lies about 3/8 mile southwestward from the 3-fathom shoal.

DIRECTIONS.—Vessels desiring to communicate with the town of Baras should bring the iron roof in the eastern part of the town to bear 1° (0° mag.) well open westward of Minabalay Island when well southward from the Jumbit Islands and steer for it, anchoring when Pinohagan Island bears 91° (90° mag.) in 9 fathoms, sandy bottom. Small vessels may anchor in 4 fathoms, mud bottom, midway between Minabalay Island and the land eastward.

Taris Point, the southwestern limit of Kalapadan Bay, is not particularly prominent. Maguinling Island, lying just north of Taris Point, is small, heavily wooded, about 40 feet high, and not readily distinguished from the shore in the immediate vicinity.

Kagaray Point, about 3/4 mile south of Taris Point, is a narrow, heavily wooded neck of land, outlined by bold rugged cliffs and about 85 feet high.

Kagaray Island, just north of Kagaray Point, is small, low, and grass covered.

Sinactan Point, about 1 mile south of Kagaray Point, is an irregular, heavily wooded neck of land 175 feet high and extending southeastward.

Sinalog Point, over 1 mile southward of Sinactan Point, is the most pronounced point between Kalapadan Bay and Nagumbuaya Point, and forms the northern limit of Locot Bay. The heavily wooded slopes rising from this point terminate in a hill 844 feet in height, 2/3 mile northwest from the extremity of the point.

Locot Bay, between Sinalog Point and Nagumbuaya Point, 1 1/2 miles southward, is fringed with coral reefs, which, near the middle of the head of the bay, extend eastward and surround the Locot Islands, thus dividing the bay into two smaller bays. **Buti Hill** is a heavily wooded hill, 454 feet high, resembling a truncated pyramid, lying near the western shore of Locot Bay. On its northwest slope is a well-defined hump which shows well from eastward or westward.

The **Locot Islands** are two small islands, 81 and 132 feet high, respectively, near the middle of Locot Bay. They are rocky and covered with bushes.

Nagumbuaya Point is a narrow strip of land extending from the southeast part of Catanduanes Island. It is extremely rugged, especially near the outer end, where sheer, rocky cliffs rise abruptly 100 feet or more. Near the eastern end of the point are four hills ranging in height from 211 to 276 feet; westward of these hills the land is low and wooded. From a distance northward or southward this low land disappears below the horizon and causes the outer part of the point to appear like an island. Deep water surrounds Nagumbuaya Point. A small, steep-to rock, 25 feet high, lies close to the eastern extremity of Nagumbuaya Point.

LAGONOY GULF,

between Catanduanes Island, Luzon, and the islands forming the north side of Albay Gulf, is about 21 miles wide at the entrance

between Nagumbuaya Point on Catanduanes Island and Rapurapu Island, and extends 48 miles in a northwesterly direction. The center of the gulf is deep and free from dangers. The coast of Catanduanes, bordering on Lagonoy Gulf, has already been described.

Palag Bay is a small, semicircular bay 2½ miles northwestward of Rungus Point. It affords good anchorage, sheltered from all except southeast winds. The entrance points are clear, but the head of the bay is filled by a reef rising abruptly from deep water.

Guijalo Bay lies about 4 miles westward from Palag Bay. The head of the bay is filled by a steep-to reef. Anchorage may be had, sheltered from northeast winds, but necessarily very close in, because of the great depth of water.

Port Minas is a small shipping port in a snug cove ½ mile southwest of Guijalo village. The anchorage is just off the cove; vessels should be careful not to get too far northward, as there are reefs in the bight and along the shore northward of Guijalo.

Alto Point, 19 miles westward of Rungus Point, is moderately high and steep-to.

Rosa Islet is a small, low, wooded islet ¾ mile east-southeast of Alto Point. It is surrounded by a reef extending ¾ mile eastward, ⅓ mile southward, and shorter distances westward and northward. The water is deep close up to the edge of the reef except for a small patch with 11 feet over it lying ¼ mile northward of the east end of the reef. The channel between this reef and the Luzon shore is deep and clear.

Alto Reef is a large, oval-shaped reef, part of which dries at low water, beginning ½ mile southwest of Alto Point, extending 1½ miles westward and ¾ mile wide. The channel between this reef and the shore is ½ mile wide, deep and clear. The channel between this reef and Rosa Islet is nearly 1 mile wide, and deep. Vessels passing northward of the reef and Rosa Islet should keep about ¼ mile from the shore of Luzon, which is clear and steep-to.

Sabang is at the mouth of the Lagonoy River, about 4 miles westward from Alto Point. There are several large warehouses, a large church, and an old stone fort 30 or 40 feet high. Sabang is the port for San Jose de Lagonoy, on the Lagonoy River, about 4 miles southwestward from Sabang. **San Jose de Lagonoy** is the center of a considerable hemp trade. Good anchorage may be found in 10 or 12 fathoms about ½ mile from shore, with the church at Sabang bearing between 1° (0° mag.) and 316° (315° mag.).

The coast from Sabang trends southerly for 7 miles to Sagnay Point, is low, sandy, and steep-to. From Sagnay Point a reef, on which is a small group of rocks, extends ½ mile northeastward.

Mount Isarog is an extinct volcano, 6,482 feet high, about midway between Lagonoy Gulf and San Miguel Bay.

Sagnay town is about 1½ miles westward of Sagnay Point. Vessels anchor about ½ mile northeastward of the village of Nato in 4 or 5 fathoms.

Atulayan Bay, southeast from Sagnay Point, has very uniform depths of 30 to 40 fathoms and is free from shoals or reefs except a narrow reef fringing the shore and widest in the western part of the bay. In the southern part of the bay good, well-protected anchorage may be found about ⅖ mile from the shore in 20 fathoms,

soft bottom, with Sagnay Point bearing 12° (11° mag.), northwest point Atulayan Island 40° (39° mag.), and the eastern entrance point of the bay 98° (97° mag.). Atulayan Bay may be entered on either side of the island, but if the northern entrance is used vessels must favor Sagnay Point to avoid a large reef lying northwestward of Atulayan Island. This channel is about ½ mile wide.

Atulayan Island, in the entrance to Atulayan Bay, sheltering it from northeast winds, is 693 feet high and a very conspicuous landmark, visible from all parts of the gulf. It is fringed by a narrow, steep-to coral reef. There are two reefs a short distance from shore, a small one ¼ mile long, with a least depth of 12 feet, lying parallel with the shore, about ¼ mile from the southwest side of the island. This reef must be avoided by vessels seeking an anchorage under the lee of the island and when entering from eastward. The second reef lies northwest of the island and is separated from it by a narrow channel 25 to 30 fathoms deep; this reef is about 1 mile long northeast and southwest by ½ mile wide and has a least depth of 7 feet. It reduces by one-half the width of the north entrance to Atulayan Bay. Fairly protected anchorage may be found off the west point of Atulayan Island in about 23 fathoms.

Tiwi Point, 8 miles southeastward of the eastern entrance of Atulayan Bay, is a rocky headland 438 feet high. The shores between Atulayan Bay and Tiwi Point are generally bold, rocky points or headlands with beaches of sand and gravel in the bights. There is very little coral reef along this stretch except near Tiwi Point. About 2½ miles southeastward of Tiwi Point is a small sandy cay surrounded by a bank which extends 2½ miles in a southeast direction and forms the northern side of the channel into Tabaco Bay. The same bank nearly joins the shore eastward of Tiwi Church, leaving a deep channel only ⅛ mile wide between the bank and the shore. A rocky patch with 3 feet over it lies $\frac{7}{10}$ mile west of the sand cay.

Tabaco Bay (chart 4237), a deep, capacious harbor, lies between the coast of Luzon and San Miguel and Cacraray Islands. These two islands are connected by a reef. San Miguel Point, the northwest point of San Miguel Island, is surrounded by a reef extending ¾ mile. A small patch, with 24¾ feet over it, lies 1 mile northwestward of San Miguel Point; with this exception the navigable channel into Tabaco Bay is nearly 1½ miles wide between the 5-fathom curves on either side.

Tabaco Bay is very deep, the shores on both sides are steep-to, and contains no reefs or shoals except near the head. The bottom is level, with depths of 50 to 60 fathoms. The town of Tabaco lies on the west side of the bay, about 3 miles southwest from San Miguel Point. It is of considerable commercial importance, large quantities of hemp being shipped. MALILIPOT and BACACAY are small towns 2½ and 5½ miles, respectively, southeastward of Tabaco. About 1 mile east of Bacacay a reef projects northeastward for about 1 mile, surrounding Buguias Islet and extending ½ mile beyond it. BUGUIAS ISLET is very small, low, and flat-topped. There are several small islets and shoals at the head of the bay beyond the track of ordinary navigation. PILIS BAY is a long lagoon extending from the southwestern part of Tabaco Bay almost to Albay Gulf. Its southern end is separated from Albay Gulf by a narrow, gravel bank about 6 feet high. This is

used as a portage by native bancas trading between Albay Gulf and Tabaco Bay.

A fixed red light, visible 7 miles, is shown from a concrete tower on the ruins of an old fort on the beach in front of the town of Malinao.

DIRECTIONS.—Vessels approaching Tabaco Bay should bring the light and the church in Malinao in range, bearing 236° (235° mag.), before Tiwi Point bears anything northward of 294° (293° mag.). The church is a prominent building with an iron roof, and under favorable conditions can be seen a long distance. Steer in on this range and the vessel should pass ⅜ mile from the reefs on either side; continue on this course until the church in Tabaco bears 186° (185° mag.), when the course should be changed to 167° (166° mag.); pass close to Baculud Point and anchor in 25 or 30 fathoms, sand and mud, off the wharves at Tabaco and about 200 or 250 yards from them.

San Miguel Island, forming the northeast side of Tabaco Bay, is about 300 feet high and heavily wooded. The southwestern side is fairly straight and steep-to; the northeastern side is very irregular in outline and is fringed by a reef extending in places to 1 mile. A shoal with a least depth of 37 feet lies 2 miles northward of Budias Point, the eastern extremity of San Miguel Island, close to the usual steamer track to and from Tabaco Bay.

Casolgan Pass, separating San Miguel and Cacraray Islands, is of no value, as it nearly dries at low water. There are four small islets in the pass, the southernmost being the largest.

Cacraray Island, southeastward of San Miguel Island, is of very irregular outline, very heavily wooded, and 1,250 feet high in the center. The north shore is faced by a wide reef, in which are two breaks, both too small to be of any value.

Sula Channel is a narrow crooked passage between Cacraray Island and Luzon. It is about 4 miles in length and practicable only for small craft. The least water found in this channel is 5 feet, and there are a number of crooked and difficult places. The tides meet in the middle of the pass and have considerable velocity.

Cacraray Pass, separating Cacraray and Batan Islands, is blocked by reefs. **Mango Islet** is small and lies in the middle of the pass.

Cagbulauan and **Guininyan** Islands are two small, wooded islands, about 250 feet high, lying in the northern end of Cacraray Pass. They are surrounded by reefs which extend ½ mile on the seaward side. Good, protected anchorage for small craft may be found southeast of Guininyan Island but local knowledge is necessary, as the entrance is narrow and bordered by reefs.

Batan Island, eastward from Cacraray Island, is high and heavily wooded. The north side, from the west end as far as Calanaga Bay, is fringed by a reef extending 1 mile in places. Coal of fair quality is found on Batan Island.

Gaba Bay, on the north coast of Batan Island about 1 mile eastward of Guininyan Island, is 1 mile wide and extends 2 miles southward. At first glance it appears to be a commodious harbor, but its available area is so restricted and the entrance so complicated by reefs that it would not be safe to seek shelter here without previous knowledge, or until it is well marked. A vessel once safely inside would find good, protected anchorage in 9 fathoms in a basin 700 yards in diameter.

Mount Bilbao, heavily wooded and 994 feet high, is the summit of the peninsula between Gaba and Calanaga Bays.

Calanaga Bay (chart 4259), about 2 miles eastward of Gaba Bay, is a small, well-protected harbor with anchorage space for one or two vessels. It is surrounded by wooded hills. More than half of the area of the bay is coral reef, leaving but a limited space for anchorage. The surf breaks heavily on the west side of the entrance, marking it distinctly. The limits of the reef on the eastern side are marked by stakes set at the edge. There are a few shacks on the low spit east of the entrance. The residence of the manager of the coal mines is on the eastern side.

The coal mines are ½ mile up the small stream at the southwest angle of the bay; little work is being done at present.

Directions.—Vessels entering Calanaga Bay should steer 181° (180° mag.) straight in, proceeding cautiously, giving the stakes on the eastern side a berth of about 200 yards and anchoring in 9 or 10 fathoms, midway between the fish traps and Sharp Point. Small craft may with care run up the arm eastward as far as the shacks or may proceed up the bay nearly to the manager's house.

From Calanaga Bay to East Point, the eastern extremity of Batan Island, there is no reef and the water is bold.

Rapurapu Strait (chart 4259), between Batan and Rapurapu Islands, is 5 miles long and ⅜ mile wide at the narrowest point. There is a good channel through the strait, but it is tortuous and complicated by numerous reefs and must be navigated with caution. It has a least width of ⅓ mile and a least depth of 3½ fathoms. Middle Reef, lying 1½ miles south-southwestward of East Point, Batan Island, is awash at low water and breaks heavily in the northeast monsoon. There is a small shoal spot with 22 feet over it and deeper water all around about 400 yards eastward of the north end of Middle Reef and about midway between Middle Reef and the reefs on the eastern side of the channel. Derickson Reef, covered by 1 foot and always visible, lies 1 mile southwestward of Middle Reef and ⅓ mile from the reef fringing the north shore of Rapurapu Island. Its southern edge is marked by a red buoy.

Two range marks on the northern side of Rapurapu Island mark the channel eastward of Middle Reef. These range marks in line bearing 186° (185° mag.) lead midway between Middle Reef and the reefs eastward of it.

Directions.—Vessels from northward should round East Point, Batan Island, at a distance of ½ mile, bring the beacons in line and hold the range until about ⅜ mile from the front beacon and Babayon Point, west end of Rapurapu Island, bears 243° (242° mag.). Steer for this point for 1¼ miles until close southward of the buoy on Derickson Reef, when the red buoy on Columbia Reef may be steered for or the west end of Rapurapu Island rounded at a distance of 300 yards; if the latter course is taken, the vessel, if bound westward, should stand southward for ½ mile before hauling westward, thereby giving Babayon and Columbia Reefs a good berth.

Rapurapu Island, lying eastward of Batan Island, is 1,745 feet high in the center; the west and east ends are 650 and 500 feet high, respectively. The northeastern coast is fringed by a narrow coral reef, bare at low water. Discolored water extends for about 2½ miles

off this part of the island; therefore it is recommended that vessels give this coast a wide berth.

UNGAY POINT, the southeast point of Rapurapu Island and the northern entrance point to Albay Gulf, is bold and prominent, 500 feet high a short distance from the shore. Several rocks about 20 feet high lie about 200 yards from the point. The water is very deep off Ungay Point, 100 fathoms being found within ½ mile from shore. An occulting white light, visible 15 miles, is shown from a white steel tower on Ungay Point. Owing to its great elevation, it is frequently seen a greater distance in clear weather.

ALBAY GULF,

bounded on the north by Cacraray, Batan, and Rapurapu Islands and on the west and south by Luzon, is about 28 miles long, east and west, and 6 miles wide at the entrance between Ungay and Bingay Points. The shores are in general steep and the water deep, with the exception of a number of dangerous reefs lying near the head of the gulf.

From Ungay Point westward the south coast of Rapurapu Island is clear, with the exception of a large shore reef lying in front of the town of Rapurapu. This reef extends along the coast for 2½ miles and projects ¾ mile southward. Abreast of the western end of the town are two conspicuous rocks, 20 and 30 feet high, on the southern edge of the reef. There is a small bay affording anchorage behind the eastern end of the reef, the reef affording protection from southwest winds. There is a small channel behind the reef, entered from the westward and used by small vessels, leading within ½ mile of the town.

Babayon Point, the western extremity of Rapurapu Island, is about 100 feet high and well wooded. It is fringed by a narrow reef, but may be safely rounded at a distance of 300 yards. **Babayon Reef** is a small reef, partly bare at low water, ⅓ mile west-southwestward of Babayon Point.

Columbia Reef is a small reef, with a least depth of 5 feet, 1 mile westward from Babayon Point. Its southeastern edge is marked by a red buoy.

The village of **Batan** is on the southeast coast of Batan Island, facing Rapurapu Strait. There is a long wooden wharf, with sufficient water at the end for lighters. **Batan Harbor** is easy of access and affords good anchorage, well protected from wind and sea. The entrance is marked by two red and two black beacons, and a black spar buoy marks a 7½-foot shoal off the wharf. To enter, pass midway between the beacons and anchor close eastward of the black buoy in 7 fathoms.

The shore of the south side of Batan Island is in general clear and steep-to. About midway on this coast there is a bight extending ¾ mile northeastward, where anchorage, sheltered from northerly winds, may be found. The head of this bay is filled by a reef, on the western edge of which there is a rock about 25 feet high. In approaching this anchorage care must be taken to avoid a small reef lying on the western side of the entrance.

Coal Harbor (chart 4237), forming the southern end of Cacraray Pass, extends nearly 2 miles northwestward, beyond which it is

blocked by reefs. A reef extends ¼ mile from the shore a short distance northwestward of Binalbagan Point, and farther northwestward another reef extends ½ mile from the Batan shore with a small, rocky islet in its center. Cacraray Point is surrounded by a reef extending ⅓ mile eastward, and a detached shoal, with 9 feet on it, lies ⅜ mile northeastward of Cacraray Point. The United States Government formerly mined coal from the west end of Batan Island and shipped it from a small stone pier near the village of Liguan. On the pier are prominent nipa warehouses and offices with iron roofs. Coal Harbor is sheltered from all winds except from southeast. The anchorage area available for large vessels is deep, 25 to 30 fathoms; muddy bottom. Small vessels can find good sheltered anchorage in 18 fathoms in a basin about 500 or 600 yards in diameter, surrounded by coral reefs, off the pier.

From Cacraray Point the coast trends southwesterly for 2½ miles to Cabadea Point, the eastern entrance to Port Sula, and is high and well wooded. The coast line is very irregular, being indented by several bays which are fringed with coral reefs.

Port Sula (chart 4237), formed by a slight enlargement of the southern part of the Sula Channel, is well sheltered, has good holding ground, and is used as a harbor of refuge for moderate-sized vessels. It is about ¼ mile wide at the entrance and carries that width for ¾ mile, when it narrows and shoals, rendering it unfit for navigation except by very small craft. The anchorage space is much reduced by reefs extending from both sides of the port, the width between the reefs being only from 200 to 300 yards; a vessel should keep midway between the points in entering. There is a stream with good fresh water in the northeastern part of Port Sula.

A fixed red light, visible 7 miles, is shown from a white post on the extremity of Cabadea Point.

Libog is a small town in the northwest angle of Albay Gulf, about 5½ miles westward from Port Sula. The large church forms a good landmark. A reef extends ¼ mile from shore.

A small reef, showing rocks awash at low water, lies about 1¼ miles north-northeastward of Legaspi light and ⅜ mile from the shore.

Legaspi, at the head of Albay Gulf, is the principal port in eastern Luzon, and one of the largest hemp-shipping ports in the archipelago. There are a number of small wharves with about 10 feet at their ends. The town of **Albay**, capital of the Province of the same name, is about 1½ miles westward of Legaspi.

The anchorage off Legaspi is bad, due to the great depth, 17 to 22 fathoms being found 300 yards from shore, and the bottom being irregular with volcanic sand, rocks, and mud in patches, affording poor holding ground.

This anchorage is open eastward, and the northeast monsoon sends in a heavy sea. Vessels intending to work cargo generally drop both anchors and back in until the stern is within 10 or 15 feet of the end of the wharf and pass all cargo to and from the ship by hand over a stage rigged from the wharf to the ship.

A fixed red light, visible 9 miles, is shown from a white steel frame structure near the beach and about ¼ mile northward of the town.

MOUNT LINGUION, a conical wooded hill with a flat top, is 555 feet high. It is about 1½ miles from the beach and northwestward of Legaspi and forms a prominent landmark.

CAPUNTUCAN POINT, about ½ mile southeastward of Legaspi, is a prominent point with a steep hill, 222 feet high, on its extremity; it is grass covered, and at a distance from the gulf appears as a conical, green hill. The Sabang River empties immediately northward of Capuntucan Point.

MAYON VOLCANO is the most conspicuous landmark in this part of Luzon. It rises from the plain about 7½ miles northwestward of Legaspi to a height of 7,943 feet. The volcano forms a perfect cone and at times gives off a considerable amount of vapor. It is prominent while navigating both coasts of Luzon.

There are a number of dangerous reefs off Legaspi. CATUBEG REEF, 3¾ miles northeastward of Capuntucan Point, is of oval form, about 300 yards greatest diameter, and has a least depth of 1¾ fathoms. It is marked off its northern end by a black buoy. BARAO REEF is 3¼ miles northeastward of Capuntucan Point, is nearly round, about 500 yards in diameter, with a least depth of ¾ fathom. DENSON REEF, 2 miles east-northeastward of Capuntucan Point, is about 500 yards in diameter, and has a least depth of ¾ fathom; it is usually plainly marked by discolored water. A red buoy marks the southern end. POLIQUI REEF, 3¼ miles eastward of Capuntucan Point, has a least depth of 2¾ fathoms. LEGASPI REEF, 1 mile eastward of Capuntucan Point, has a least depth of 2½ fathoms; the reefs off Luvas Point extend over ½ mile from shore, leaving a deep channel ¼ mile wide between them and Legaspi Reef.

DIRECTIONS.—The usual course taken by vessels bound to Legaspi is as follows: The north side of the gulf is skirted at a distance of at least 1 mile until the town of Legaspi bears 211° (210° mag.), when it is steered for. The anchorage may be approached directly by passing between Barao and Denson Reefs. The navigable channel is 1 mile wide and very deep, and the light steered for on a 254° (253° mag.) bearing should carry a vessel midway between these two reefs. In the daytime, the church at Daraga, which is very conspicuous, bearing 257° (256° mag.), just open northward of the light, is a good leading mark for this channel.

Some shipmasters enter and leave Legaspi by passing southward of the red buoy on Denson Reef.

Poliqui Bay, in the southwest angle of Albay Gulf, is about 5 miles wide at the entrance and extends about the same distance southward. The coves that indent its shores are filled with reefs, and the shore of the main bay is fringed with reefs which are comparatively narrow on the eastern side. The center of the bay is clean and very deep.

Cauit Point, at the eastern entrance to Poliqui Bay, is low, covered with mangroves, and fringed by a coral reel over ½ mile wide. **Manito Reef** lies with its northern edge about 1 mile west-northwestward of Cauit Point and has a least depth of 2 fathoms. There is an unnamed reef with rocks awash lying southward of Manito Reef. From Cauit Point the coast trends easterly for 2½ miles to Paron Point, thence southeasterly for 4½ miles to Gajo Point, with two small bays between, and thence southeasterly for 7 miles to the entrance to Sugot Bay. This coast is fringed by a narrow shore reef in no place extend-

ing over ½ mile. About 1¼ miles southward of Paron Point there is a hot spring near the shore. **Gajo Point** is clean and steep-to and prominent, being the termination of a mountain 3,606 feet high 3 miles back from the shore. **Bacon** is a small town 6 miles southeastward of Gajo Point. The country back of it is low and flat, forming a break in the mountains; there is a good road to Sorsogon, distant 5 miles. The cable from Legaspi lands at Bacon and the position is shown by a cable-mark buoy. The anchorage off Bacon is bad, being exposed to northeast and east winds and seas. Bacon contains a church with a dome, and about 1 mile westward of the town there is a hill 360 feet high near the beach, both of which are easily recognized. There is a break in the reef in front of the town affording a landing for small boats. Vessels usually anchor ¾ mile from shore, outside of the line of the reefs, in 12 to 15 fathoms, mud and sand bottom, with the church dome bearing 181° (180° mag.). Small craft may anchor closer in with the church dome bearing 181° (180° mag.) and about ¼ mile from shore in 5 fathoms; sandy bottom and indifferent holding ground. About 100 yards inshore of this position there is a small, dangerous rock nearly awash.

Sugot Bay is fringed with reefs, narrow on the eastern side, and widening to about ½ mile on the western side and at the head of the bay. The center of the bay is very deep. Anchorage may be found at the head of the bay, about 1 mile from shore, in 12 to 15 fathoms, mud bottom.

From Sugot Bay to Bingay Point the shore is fringed by a reef extending ½ mile in places.

Bingay Point is the southern entrance point to Albay Gulf. The reef extends about ¼ mile northward, and immediately south of the point the reef extends 1½ miles eastward. The reef continues of wide extent southward as far as Barcelona, south of Gubat, with breaks in it at several places. Its greatest width is about 5½ miles southward of Bingay Point, where it extends over 2 miles. This reef is always well defined by the heavy breakers on its outer edge. The water is bold close up to the breakers, and it is safe to run ¼ mile from the breakers.

Bingay Island is a rock about 15 feet high, lying ⅜ mile eastward of Bingay Point. From Bingay Island the reef extends 300 yards to the northward.

Port Gubat (chart 4258) is on the east coast of southern Luzon about 10 miles southward of Bingay Point. It is formed by an opening in the reef which extends along this coast and out to 1 mile from the shore in places. The port is composed of two bays divided by a coral reef extending ½ mile from the west shore. The south bay is the larger, but is never used, as it is open to northeast winds and sea and has poor holding ground. The north bay is smaller, and its northern part is shoal and only fit for small craft. This bay is open to the wind, but well sheltered from the sea by reefs and is a good anchorage for moderate-sized vessels. The reefs on either side of the entrance are easily seen and are bare at low water. A light, visible 7 miles, is shown from a concrete tower on the beach near the cemetery in the northern part of the town. A beacon, forming with the light tower a range for entering the north harbor, stands on the edge of the reef northeastward of the town. It consists of a concrete post surmounted by a white, triangular, steel daymark.

DIRECTIONS.—Vessels entering Gubat should bring the beacon and light tower in range bearing 298½° (297½° mag.) and steer in on this range, anchoring in 4 or 5 fathoms, muddy bottom, when the church bears 277° (276° mag.).

From Rasa Point, the southern entrance to Gubat, the coast trends southerly for 18 miles to Padang Point, the northern entrance to Matnog Bay. The coast reef, which extends about ½ mile eastward of Rasa Point, continues southward, gradually narrowing to a mere fringe. The town of Bulusan is about 10 miles southward of Gubat. Anchorage may be found here, off a break in the reef, in 12 to 14 fathoms, by bringing the church to bear 300° (299° mag.) and steering for it, anchoring about ⅜ mile from shore when Tang Point bears 10° (9° mag.). Considerable current is felt here, and the holding ground is not very good.

There are a number of unimportant towns on this coast, but vessels generally call only at Gubat and Matnog, to which the other places send their products for shipment.

Bulusan Volcano, 5 miles from the coast and nearly west of Bulusan town, is an active volcano 5,115 feet high. When not obscured by clouds it forms an excellent mark for making this coast, as it is visible over 60 miles. **Sharp Peak**, about 1 mile northeast of Bulusan Volcano, is 3,986 feet high; it appears sharp from eastward only.

Balusingan Bay is formed by a curve in the coast between **Pacahan** and **Padang** Points, northward of Matnog Bay. It affords anchorage in 10 to 15 fathoms, sand bottom, ½ to ¾ mile offshore, protected from westerly and southwesterly winds.

Matnog Bay and **Ticlin Strait** have already been described. The passage between Ticlin and Juac Islands is obstructed by reefs and is not safe. Ticlin Strait, the channel between the coast of Luzon and the islands of Calintaan, Juac, and Ticlin, is much used by coasting steamers. The currents in Ticlin Strait are strong, with eddies about the islands.

MINDORO AND LUBANG ISLANDS.

LUBANG ISLANDS

(chart 4338) are a detached group of six islands that front the southwest end of Luzon and the northwest end of Mindoro. The only safe anchorage for vessels during all seasons is the port of Tilig, on the northeast coast of Lubang Island.

Cabra Island, the outer, or westernmost, island of the group, is flat, wooded, and about 200 feet high. A reef projects 100 yards from its north and northeast sides. A group flashing white light, visible 21 miles, is shown from a white, square tower on the west angle of a white dwelling near the west end of Cabra Island. The light is visible around the entire horizon except where obscured by Lubang and Ambil Islands. The channel between Cabra and Lubang is 1½ miles wide and may be navigated with safety, as the reefs on the northwest end of Lubang always show. In this channel the flood sets northward and the ebb southward.

Lubang Island is the largest and most important island of the group. It is high in the middle, but low at each extremity. When coming from the southward, the northern extremity of the high land in the

center may be mistaken for the end of the island. Its coasts are fringed by a reef about ¼ mile wide; the southwest coast is rocky. On the eastern and northeastern sides are several bays, more or less protected, but difficult to make, owing to the shoals and reefs by which they are inclosed.

Lubang, the principal town, is on the north side of the island of the same name, about 2 miles from the western end. It lies in the middle of a fertile plain, facing the sea, and contains a prominent church and convent. Landing in front of the town is very difficult on account of the coral reef that fringes the shore. There is a break in the reef, westward of the church, through which small boats can pass in fine weather at certain stages of the tide. There is no good anchorage in front of the town. Vessels desiring to communicate with Lubang should stand in for the church, heading about 166° (165° mag.), and stop, about 1 mile from shore, as soon as the southwest point of Ambil Island begins to be shut in by the first point eastward of Port Tilig. The nearest available anchorages to Lubang are Port Tilig, 5 miles southeastward, and Tagbac Cove, 2½ miles southwestward.

Port Tilig, on the northeast coast of Lubang, is the only safe anchorage for vessels in all seasons; it is sheltered from all winds and is completely protected from the sea. The holding ground is excellent, but the anchorage area is sufficient only for small vessels. The entrance faces the north-northwest and is defined by reefs on which the sea breaks during rough weather. In the entrance there are depths of 10 to 14 fathoms in mid-channel, and the western shore can be approached until the anchorage in front of the entrance point is reached in 3½ to 5 fathoms, mud and sand. A shoal, showing at low water, divides the port into two small but excellent anchorages. The chart will be the best guide. Buoys mark the points of the reefs at the entrance and the municipality maintains a red light on the beach at the town.

Ingress and egress, unless in very favorable weather, are questionable for a sailing vessel, owing to its being a lee shore. Cattle, pigs, and poultry can be obtained at moderate prices; also a fair supply of water. There are no vegetables, and fruit is scarce.

Looc Bay, on the eastern side of Lubang Island, about 8 miles southeastward of Port Tilig, is a very snug port, which affords safe retreat in the event of an accident, the reefs protecting the inner anchorages from the seas even in easterly weather. It is rather free from danger at the mouth, and good holding ground will be found in depths between 10 and 20 fathoms. Within the former depth it suddenly shoals, and several lines of coral ledge bar the inner depths of the bay from direct access, although excellent shelter would be found by a vessel moored between these barriers. At the village a brisk rivulet supplies excellent water, but boats can fill only at high water. In approaching the bay caution must be observed, as there is a 3½-fathom patch, about 4 miles eastward of the southern entrance point of the bay. Water and wood are easily procurable, but the prices of bullocks, stock, vegetables, etc., are as high, or higher, than at **Manila**.

Tabajin Bay, on the south coast, near the eastern end of Lubang Island, affords sheltered anchorage for small vessels in heavy northeast weather and also for vessels desiring to communicate with Looc, or **San Rafael**, as it is locally known. Landing may be made

on a sandy beach at the head of the bay, whence a trail leads to the village, distant about 1¼ miles.

Tagbac Cove, small and open to the southwest, is near the northwestern end of Lubang Island. Vessels desiring to communicate with the town of Lubang can find good, sheltered anchorage during the northeast monsoon in 15 fathoms in a break in the reefs. The land is low and there are no prominent landmarks. The reefs show plainly, and no difficulty will be found in picking up an anchorage.

Ambil Island, lying eastward of Lubang, is formed by a conical mountain about 2,500 feet high. The northeast coast is high and rocky, with an open bay in which are depths of 10 to 12 fathoms, shoaling to 5 fathoms near the shore reef. The western shore is fringed with coral, and the bay south of the western point of the island is almost filled by reefs extending 300 to 600 meters offshore. A 2½-fathom shoal lies almost in the center of this bay, leaving very little room for anchorage. The passage between Ambil and Lubang is clear, but caution is necessary, as reefs contract the channel to one-half its apparent width. In this passage the flood tide sets south and the ebb north.

Malavatuan Island, about 3 miles northward of the east end of Ambil Island, is small and covered with brushwood. It is steep-to and has a passage 1½ miles wide between it and Mandaui Island, with depths of 15 and 18 fathoms.

Mandaui Island, lying ¾ mile north of the eastern part of Ambil Island is composed of two small hills of unequal height. On the southwest side is a shoal 200 yards from the shore, the other side being steep-to. The channel between Mandaui and Ambil is over ½ mile wide, and has depths of 5 to 12 fathoms.

A bank about 2 miles long in an east-northeasterly direction and about 1 mile wide, with depths of from 7 to 8 fathoms, lies nearly 4 miles north-northeastward of Malavatuan Island. A small bank with a least depth of 7 fathoms over it lies nearly 1¾ miles northeastward of Malavatuan Island. Another small bank, with a least depth of 6¼ fathoms over it, lies 1 mile northwestward of the same island.

A crescent-shaped shoal about 4 miles long in an easterly direction, with depths of 4¾ to 8 fathoms over it, lies between 3 and 4 miles northward of Ambil Island. The 4¾-fathom spot on this shoal lies 4 miles northward of the northernmost point of Ambil Island.

Ambil Shoal, lying about 1½ miles northwestward of Ambil Island, is about ¾ mile long in a northwesterly direction and has depths of 3½ to 5 fathoms. Between the shoal and Ambil Island are several shoal spots with 3¾ fathoms. Vessels of over 18 feet draft should not attempt to pass between Ambil Shoal and Ambil Island.

Afuera Shoal is about 1½ miles from the north side of Lubang and has depths of 1¼ to 4 fathoms. The south end of Mandaui Island, kept in line with the north point of Ambil Island on a 97° (96° mag.) bearing, clears the south side of the bank.

Simo Banks, about 15 miles northward of Ambil Island, consist of two banks with a least known depth of 6 fathoms. The western and shoaler bank extends 3 miles northeast and southwest and lies 12 miles westward of Fortune Island. The eastern bank, on which the least depth found was 8 fathoms, is about 1½ miles in diameter and

9 miles west-northwestward of Fortune Island. There are irregular soundings, 15 to 64 fathoms, eastward of these banks and deep water in other directions.

Golo Island is a long, high, narrow strip of land extending 8 miles west-northwest and east-southeast, with reefs off its northwest, east, and southeast points. The channel between this island and Lubang is about ½ mile wide, with rocks nearly awash in its center. In this passage the flood tide runs north and the ebb tide south.

NORTH COAST OF MINDORO.

Mindoro is an island of an oval form with a prolongation of the northern portion toward the west. It lies south of the western part of Luzon and is about 95 miles long by 50 wide, with an area of 3,851 square statute miles, making it the seventh island in size of the Philippine Archipelago. Though in sight of Luzon, this island is sparsely populated and little known and developed, being extremely mountainous, covered with dense forests, and in the more level parts near the coast full of marshes, and consequently unhealthful. The inhabitants of the coast are Tagals, but in the interior is a tribe, probably the aborigines of the island, called Manguianes, speaking a peculiar language and living in a very primitive manner on the products of a rude agriculture.

Mount Halcon, in the northern part of Mindoro, is 8,504 feet high and one of the highest mountains in the northern Philippines.

Mount Calavite is a large promontory, the western slope of which forms Cape Calavite and the northern slope Point del Monte; the summit, 4,990 feet high, appears dome-shaped from westward, but from north or south it shows a long ridge, fairly level; the western end of this ridge is the highest part.

Binuangan Point, 4 miles northward and eastward of Cape Calavite, resembles it in appearance and is bold, the few rocks interspersed along this coast lying close in. South of the point there is a small bight with a sand beach, in front of which is anchorage during the northeast monsoon in 5½ fathoms, sand, 300 yards from the beach. A rivulet of good water enters here. There is another anchorage immediately north of Cape Calavite, but it is not as good.

Point del Monte, about 6 miles east-northeast of Binuangan Point, is sandy, with a small 1-fathom shoal close to it. This is the most northern point of Mindoro.

Bagalayag Point, 9 miles eastward of Point del Monte, is a rocky bluff 35 feet high, with big rocks around it.

From Bagalayag Point to Bogio Point, 9 miles farther eastward, the coast line is very bold, especially between Baeto and Bogio Points, where it is almost precipitous. For about 1 mile eastward of Bagalayag Point the shore line continues rocky and then becomes sandy and continues so with a few small breaks of bowlders to Baeto Point. At this point for about 300 yards are very big rocks; then for 2 miles the shore line continues sandy again to Bogio Point. From Bogio Point to 1½ miles eastward of the mouth of the Matabang River is a big sand beach, very wide and low. At the mouths of the Cervantes and Matabang Rivers the lowland extends far back into the interior. Beyond this beach to the eastward, as far as the mouth

of the Camerong River, are many small hillocks rising abruptly from a rocky coast to heights of 300 or 400 feet and separated by sand beaches. Eastward of the mouth of the Camerong River to Talipanan Point the coast line again becomes bold, and almost precipitous at Talipanan Point; then another sand beach, with one small break, until Minolo Point is reached. Eastward from Minolo Point are small hills 200 or 300 feet high, rising abruptly from the rocky shore and interspersed with small sand beaches.

From Bagalayag Point to Baeto Point the mountains are from 2,000 to 2,500 feet high and are very steep and close to the shore. Between Baeto and Bogio Points there is a mountain 3,339 feet high. Eastward from the mouth of the Cervantes and Matabang Rivers is a fairly high range of front hills extending as far as the Camerong River. This range is backed by a higher range, which approaches the shore to the eastward. Mount Talipanan is a peak of this range and is very conspicuous, coming to a sharp point 3,826 feet high; this range is generally covered with clouds except in the early morning. The hills from Bagalayag Point to Bogio Point are heavily wooded. At Bogio Point the eastern slope of the 3,339-foot mountain up to 2,000 feet is covered with greenish-yellow grass; from the Matabang River to the Camerong River the hills are partly wooded and partly grassy; from the Camerong River to Port Galera the hills are heavily wooded, as are all the mountains in the background.

Between Bagalayag Point and Port Galera are a number of small rivers. The Cervantes and Matabang are probably mouths of the same river running out of the gap between the two high ranges of mountains. Only small boats can enter their mouths. The Camerong River is smaller than the other two, but also allows entrance for small boats.

Off the mouths of the Cervantes and Matabang Rivers shoal water, with 3 fathoms at its edge, extends 1/8 mile, beyond which the water deepens rapidly. Anchorage can be found, but necessarily very close in to the edge of the shoal water. This anchorage can be easily identified by the deep depression in the coast line. It affords shelter only with offshore winds, and good ground tackle must be used, as the squalls from the hills are very violent. The municipality of **Abra de Ilog** maintains a fixed red light at the anchorage.

Minolo Point, 3 miles westward of Port Galera, is covered with trees; on its eastern side is a beach before which anchorage can be had on sand and gravel. The shore is steep, and there are depths of 25 and 30 fathoms 600 yards from it.

About 3/4 mile eastward of Minolo Point is a small bay fringed by reefs, reducing the anchorage area to a basin about 250 yards in diameter. By keeping in the middle of the entrance 4 fathoms can be carried into the bay, where from 8 to 12 fathoms will be found. The swinging room is very limited, and it does not appear to be a good anchorage.

Port Galera (chart 4344) is formed by a promontory from the coast of Mindoro and the islets of Medio and Paniquian, westward of the promontory. The port is a sort of canal with two passages, one to the northward and the other to the northwestward, the opening between Paniquian and the coast not being navigable. The flood stream passes into the port by the Northwest Channel and out by the

North Channel, and then follows eastward, the reverse taking place with the ebb stream. This fact should be remembered in making the port.

PANIQUIAN ISLET is nearly ¾ mile in extent north and south; there is a narrow reef on the east side, and the soundings on it are 4 fathoms at less than 200 yards distant; the northwest shore is high and rugged; the southern part ends in a sandy point separated from Mindoro by a narrow channel closed by sand shoals.

MEDIO ISLET has a reef extending about 400 yards from the northeast shore. The north point, where there is a great tide race, is worn away and shows bare rocks; from it the coast trends south-southwest and is high and jagged.

TELEGRAPH POINT, the northwest point of the promontory, may be recognized by a signal post and a remarkable white patch, like a sail, on the fall of the point. From here to Escarceo Point, the eastern point of the promontory, the coast presents a uniform appearance.

Directions, Port Galera.—NORTH CHANNEL.—After clearing Telegraph Point keep in the middle of the channel, where the depth is 6½ fathoms; coarse sand and rock. It is 200 yards wide at the entrance, narrowing to 100 yards abreast of the east side of Medio, which is low and bordered by a sand bank. The tidal streams are strong enough to endanger a vessel unless carefully handled. A rocky patch 150 yards long east and west and about 40 yards wide, with a least depth of 10 feet, lies 150 yards east-southeastward of the southeast part of Medio Islet. The navigable channel at this point between the 3-fathom curves is about 100 yards wide.

NORTHWEST CHANNEL.—A range consisting of white triangular shapes with black vertical stripes through the center has been established on the bluff southeast of the south end of Medio Island. A fixed red light, visible 7 miles, is shown from the front range beacon. The range bearing 124° (123° mag.), leads in clear of all dangers. Vessels from westward should steer for the middle of Medio Island until on the range. The channel is narrowed at the entrance to 130 yards by the rocks off the southwest point of Medio, but it widens inside to 300 yards; the least depth is 6½ fathoms at the entrance, increasing inside to 14 fathoms. During the northeast monsoon the north channel may be used, but with a sailing vessel even that channel is dangerous, as calms or baffling winds may be met, when she would be at the mercy of the current. During that monsoon the anchorage at Varadero Bay is preferable, although sailing vessels going out would find it difficult.

The available space inside of the islands is considerably reduced by projections of lowland from the promontory, with shoal water between them, and by a shoal which extends from the southern part of the port, having on its northeastern end rocks that are awash at very low water. There is anchorage for small craft in a confined bight at the southern part of the port; at the entrance, which is 130 yards wide, the depth is 6½ fathoms, shoaling toward the town at the head. At 400 yards north of the entrance there is the northern extremity of another shoal with rocks awash at low water on its southern part. Between this shoal and the opening between Paniquian and the mainland is a space 400 yards wide, which would appear to afford better anchorage. The largest available anchorage

is east of Paniquian, and is about 650 yards in diameter, in about 12 fathoms.

Escarceo Point, so named from the tide rips off it, is of jagged rock, covered with trees; the shore between it and Boaya Point, 2 miles to the southwest, is clear, with deep water off it. The currents run here with great velocity, causing strong eddies. A light, visible 15 miles, is shown from the top of a white concrete house on Escarceo Point.

Varadero Bay is a deep indentation in the coast 2¼ miles southwestward from Escarceo Point. **Boaya Point**, the northern entrance point, is clear, but from Varadero Point rocks extend which dry at low water for 250 yards. The bay affords good anchorage for all classes of vessels in both monsoons, especially during the southwest season, when the heavy squalls pass northward of it. It is said to be decidedly better than Port Galera, especially in bad weather. A light is shown from a white concrete pillar on the hill at the western end of Varadero Bay. The best anchorage for large vessels is in 9 fathoms, with the light bearing 310° (309° mag.). During fresh northeast monsoon weather the wind sometimes hauls well eastward, and considerable sea is felt at this anchorage. Small vessels can find good anchorage, sheltered from all winds and sea, in 11 fathoms, in the cove immediately westward of Boaya Point. The western side of Boaya Point is bold and the anchor should be dropped about 200 yards from the shore.

Subaang Bay is an open bight; the shore is low and wooded and cut by several small streams. A shoal extends ¼ mile northeastward from the western entrance point of Subaang Bay. It hardly reaches out far enough to constitute a danger; in windy weather it is of a dull red color, due to the stirring up of the silt from the rivers along the coast.

From the eastern entrance point of Subaang Bay to Balete Point, the western entrance to Calapan Bay, 4 miles eastward, the shore is low and wooded and intersected by the delta of the Baco and other rivers. A shoal of coral covered with sand, bare at low water, lies with its northern edge about ½ mile westward of Balete Point. Balete Point is about 100 feet high and well wooded.

Calapan Bay (chart 4257), between Balete and Calapan Points, is an open bight 2½ miles wide and extends nearly ¾ mile southward. The town of Calapan, the capital of Mindoro Province, lies at the head of the bay; it is small and of little commercial importance. A municipal building and a wharf with about 10 feet at the end stand on the western side of Calapan Point. A light is shown from a white concrete pillar erected on the outer end of the wharf. Calapan is connected with Batangas and Boac by cable.

There is no good anchorage off Calapan. The recommended anchorage is in 7 to 10 fathoms, rocky bottom, with the church bearing 177° (176° mag.) and the tangent to Calapan Point 63° (62° mag.). The bottom is irregular and rocky and the edge of the shore reef is steep-to; this position should be approached with caution, owing to the rapidity with which the water shoals. If the wind freshens and has any northing in it, a nasty sea rises, landing is impossible, and the anchorage is unsafe.

With strong northeasterly winds a fairly protected anchorage may be found westward of Calapan Point, but necessarily very close in

because of the great depth of water. The southeastern part of the bay is shoal.

Calapan Point is wooded and 290 feet high. The western and northern sides are clear, but on the eastern side there is a narrow fringe of rocks with deep water close-to.

Silonay Islet is a small wooded islet, 350 feet high, lying about 1 mile northeastward of Calapan Point. Rocks extend about 100 yards northeastward and 150 yards eastward of Silonay, with deep water immediately outside of them. The channel between Silonay and Anaganahao Islets, about ½ mile southward, is narrowed by rocks to about ¼ mile between the 5-fathom curves and has a least depth of 7 fathoms. It is seldom used because of the small saving of distance and the great velocity with which the tidal currents sweep through it.

Anaganahao Islet, about ½ mile southward of Silonay and 1 mile east-southeastward of Calapan Point, is very small, 100 feet high, and surrounded by rocks, which extend to a considerable distance northward and southward of it. There is a narrow navigable channel with a depth of 6 fathoms between Anaganahao and the mainland, but it is used only by small coasting craft.

Baco Islands are three small wooded islands, with the southwestern and largest island 2⅝ miles 305° (304° mag.) from Calapan Point. The southwestern island is 295 feet high, the middle island 260 feet high, and Baco Chico Island, the northeasternmost of the group, 130 feet high. A reef, bare at low water, extends about ¼ mile eastward of the middle island. The channels between the islands are deep, but the strong currents should prevent a vessel from taking them.

A shoal, with a least depth of 1¼ fathoms, composed of coral and rocks covered with sand, lies about 1 mile southwestward of the southwestern island. The water southward of the 8-foot patch deepens rapidly, over 30 fathoms being found at a distance of ¼ mile.

From Calapan Point the coast trends southeasterly for 28 miles to Dumali Point. The first 13 miles of this coast—as far as the mouth of the Lumangbayan River—is low, heavily wooded, intersected by a number of small streams, and fringed by a gray sand beach. The villages of **Silonay** and **Navotas** lie at the mouths of the rivers of the same names, 2½ and 5½ miles, respectively, from Calapan Point. The village of **Canipisan** lies at the mouth of the Kawayan River, about 8 miles southeastward of Calapan Point. The Kawayan and Baluagan Rivers empty at the same point, and there is a small grassy islet at their confluence. This coast is clear and anchorage may be found in 15 fathoms, muddy bottom, at almost any point. The soundings decrease gradually and regularly, with the exception of the bar extending about ½ mile off the mouths of the Kawayan and Baluagan Rivers, where the depth decreases from 10 fathoms to 1 fathom in a distance of about 100 yards. Naguiba and Lagarian Points, 7 and 11 miles, respectively, southeastward of Calapan Point, are quite insignificant in regard to outline and appearance. Both are low and covered with light timber and brush. They are not prominent, and it is only when well inshore that it is possible to recognize them.

Naujan is slightly over 9 miles southeastward of Calapan Point, about 1 mile inland, on the west bank of the Baluagan River. The bar at the mouth of the Baluagan River, as well as the bars at the mouths of the other rivers in this vicinity, is nearly bare at low water

and the river can only be entered by pulling boats at a favorable stage of the tide. During falling tides the river current is very strong. The church steeple at Naujan is covered with galvanized iron and can be seen from some positions offshore, but not sufficiently well to be used for navigational purposes. Naujan is connected with Calapan by road and telephone. The village of **Estrella**, which is the seaport for Naujan, lies on the beach about ½ mile east-northeastward of the church at Naujan. The large warehouse shows well from seaward.

Anchorage, exposed to northeast winds, may be found about ⅓ mile northeastward from the warehouse in 15 fathoms; muddy bottom. The municipality of Naujan maintains a fixed red light at the anchorage.

Lumangbayan River, of which the Naujan River, flowing from Lake Naujan, is a branch, empties about 4 miles southeastward of Estrella; it is one of the largest rivers in northern Mindoro, and forms the dividing line between the lowland and the mountainous district around Pola Bay. The village of **Lumangbayan** lies on the beach northward from the mouth of the river.

From about 2 miles southeastward of the Lumangbayan River the coast trends eastward for about 4 miles and then southward for about 2 miles to Anahauan Point, the northwestern entrance to Pola Bay. This coast is very irregular, being composed of a series of small bights and points between them, pointing in every direction. The points, which are all outlined with cliffs, vary in height from 50 to 150 feet and are heavily wooded. None of them present any special features by which they can be readily identified from offshore. This section of the coast has the most rugged and broken shore line on the northeast part of the island.

The mountains, which approach close to the shore in this vicinity, are heavily wooded and range in height from a few hundred feet to a maximum height of 1,400 feet. Quite a number of these mountains terminate in well-defined peaks which appear prominent when inshore, but the majority lose their prominence when seen from a distance. Two of these peaks show well from seaward, and owing to their peculiar outlines, can not be readily mistaken.

Mount Naujan, the first of these peaks, is about 1½ miles southward of the Lumangbayan River and less than 1 mile inland. It is heavily wooded and 1,380 feet high. The summit is at the western extremity of a comparatively flat top, which slopes toward the north.

Dome Hill, the second prominent peak, is a rounded dome-shaped hill on the southern side of the Lumangbayan River, about 2¼ miles west-southwestward of its mouth. It is heavily wooded, detached from hills lying between it and the coast, and 845 feet high. Dome Hill, steered for on a 178° (177° mag.) bearing, will lead clear of the shoal water off the mouths of the Kawayan and Baluagan Rivers to the anchorage off Estrella.

Tajud Island lies about midway between Bagagay and Taguvan Points and about ¼ mile from shore. It is bold and steep-to on its seaward side but is connected with the mainland by a reef which bares at low water. It is very small, covered with light timber, 150 feet high, and is outlined by brown cliffs on all sides except the southwestern. A detached rock 15 feet high, surrounded by numer-

ous rocks awash at low water, stands about 100 yards southwestward from Tajud Island.

Balingauan Point differs from the neighboring points, for, instead of rising gradually and continuously from the cliffs toward the interior, it slopes down, forming a saddle which extends entirely across in an east-and-west direction at a very slight elevation above sea level.

Anahauan Point, the northwestern entrance to Pola Bay, is heavily wooded and outlined by low cliffs and bowlders. A reef on which there are seven rocks, 2 or 3 feet high and others awash, extends about 150 yards eastward from the point. This reef, largely bare at low water, continues southward for about ½ mile from the point and has a greatest width of less than ¼ mile. The rocks eastward from the point show well from northward or southward.

Pola Bay between Dayap and Anahauan Points, is deep and clear in the middle, and the shores are in general clean and steep-to. The Pola River, with 2 feet on the bar at low water, and the Pula River, with the bar bare at low water, empty into the head of the bay, and between them is a gray sand beach faced by shoal water from ¼ to ½ mile. A valley about 1¾ miles wide, the sides of which are defined by the Pola and Pula Rivers, extends several miles inland in a southerly direction. This valley is low and covered with light timber and mangroves. About 2 miles south-southwestward of Anahauan Point is a small indentation known as Tiguihan Cove. The head and sides of this cove are fringed with reefs, leaving a small area near the entrance where small craft find partially sheltered anchorage; this anchorage is so small that there is no swinging room, and stern moorings to the shore are necessary.

About 150 yards southeastward of the extremity of Tuntung, the rocky point forming the south side of Tiguihan Cove, near the edge of the shore reef, is a prominent rock 18 feet high inclined slightly southward. About 25 yards eastward of the above rock is a smaller rock about 3 feet high.

The town of Pola is in the southwest part of the bay on the western side of the entrance to the Pola River.

A large storehouse with a galvanized iron roof is the most conspicuous building from offshore. The eastern side of this building is painted black, with the exception of a large, unpainted door in the center, distinctly visible several miles from the northeastward. A fixed red light is maintained by the municipality.

The best anchorage for large vessels is ½ mile from shore in 15 fathoms, muddy bottom, on the bearings: Storehouse, 230° (229° mag.), and the 18-foot rock 282° (281° mag.). Small vessels may anchor closer in, in 10 fathoms, muddy bottom, with the storehouse bearing 248° (247° mag.), and the 18-foot rock 302° (301° mag.). At times during the northeast monsoon these anchorages are unsafe.

Dayap Point, the eastern entrance point to Pola Bay, is outlined by cliffs and huge bowlders and is clean and steep-to; it is formed by the northern extremity of a spur extending northward from a sharp wooded peak 1,400 feet high about 1¼ miles inland.

From Dayap Point the coast trends southeasterly, with a curve seaward for over 3 miles to Dumali Point, and is in general fringed

with a narrow coral reef, partly bare at low water. This coast is clean and steep-to and can be safely approached within ½ mile.

EAST COAST OF MINDORO.

Mount Dumali, in the northeastern part of the island, is 2,498 feet high and very prominent, due to its proximity to the coast and to the fact that there are no mountains in its vicinity approaching it in elevation. It is heavily wooded from base to summit.

Dumali Point, 240 feet high; **Pinamalayan Point,** 450 feet high, the most eastern point of Mindoro, 1⅜ miles southward of Dumali Point, and **Bugol Point,** 2½ miles southwestward of Pinamalayan Point, are formed by the northeastern, eastern, and southern shoulders of Mount Dumali. These points are bold and the shores between them are clean and steep-to.

From Bugol Point the coast trends southward with a succession of sweeping curves for 28 miles to Duyagan Point. This coast is low, flat, sandy land unmarked by any recognizable features. It presents a well-wooded shore, the trees being from 50 to 80 feet high. For 5 to 8 miles inland the land is only from 12 to 25 feet high. The four principal points are **Balete, Bonsod, Mayllague,** and **Quinidiagan.** They present no prominent features and are only recognizable as points when in the bights between them. At or near each point a river discharges; none are important or navigable.

Between Bugol Point and the mouth of the Sucol River, 19½ miles southward, the shores are clean and can be safely skirted at a distance of ¾ mile. Between the Sucol River and the Bongabon River, 6 miles southeastward, and between the Bongabon River and Duyagan Point, 4 miles southward, shoal water extends to a considerable distance and at one point the 5-fathom curve is nearly 1 mile from shore.

Pinamalayan is a small town close to the shore on the river of the same name, about 2 miles southwestward of Bugol Point. The Pinamalayan River, about ¾ mile southward from the town, has very little water on the bar at low water. In fine weather landing may be made on the beach in front of the town; when this is impracticable pulling boats may enter the river and proceed to the town.

Anchorage may be found about ⅜ mile from shore in 13 fathoms, with the middle of the town bearing 271° (270° mag.) and the tangent to the land northeastward 52° (51° mag.) or slightly closer to the shore in from 4 to 10 fathoms, sandy bottom. A fixed red light is maintained by the municipality.

Leaving Pinamalayan bound for Bongabon a 180° (179° mag.) course, with Mount Dumali directly astern, will carry a vessel clear of all danger to a position from which the town of Bongabon steered for on a southwesterly bearing will lead to the anchorage. If bound southward of Duyagan Point, Mount Dumali, kept nothing northward of 351° (350° mag.), will carry a vessel over 2 miles from Duyagan Point.

Duyagan Point is low, sandy, and steep-to. It is covered with trees about 90 feet high and is not conspicuous except from northward or southward. A true north-and-south line, passing about 1 mile eastward of the point, clears all shoal water northward of it. At

times discolored water from the numerous streams is found at a considerable distance seaward.

From Duyagan Point the coast trends southwesterly for 7½ miles to Balanga Point and is similar in appearance to the land northward. From Duyagan Point to Ticlin Point, 4 miles southwestward, the shores are clean and steep-to. Ticlin Point is surrounded by shoal water, which extends nearly ½ mile eastward and over 1 mile southward. **Balanga Point**, the first elevation near the coast southward of Mount Dumali, is formed by a hill 252 feet high, the seaward cliffs of which have a reddish appearance.

Langauin Reef is a large dangerous reef, composed of large coral bowlders, one of which is awash, and others, covered by very little water, lying about 2 miles southward from Ticlin Point and 3 miles eastward from Balanga Point. Between the reef and the shore, northwestward and southwestward from the rock awash, there are detached patches with depths of 2½ and 3¾ fathoms.

Maestre de Campo Island open eastward of Duyagan Point, clears Langauin Reef, and the 305-foot hill on Bugton Point on the south side of Mansalay Bay, bearing 263° (262° mag.), clears the southern end of the reef and also the 3¾-fathom patch lying southwestward of the rock awash.

Mansalay Bay, between Palaypay Point, about ½ mile westward of Balanga Point and Bugton Point, affords good shelter from all winds except between east and south. **Palaypay Point**, on the northern side of the entrance, is surrounded by a reef near the southern extremity of which, about 300 yards from shore, is a prominent pinnacle rock about 25 feet high. Foul ground, on which is a rock awash, extends about ½ mile from shore between Balanga and Palaypay Points. **Bugton Point**, on the south side of the entrance, is clean and steep-to. It is formed by a round-topped hill 305 feet high, wooded to the water's edge; a similar hill 280 feet high lies about ½ mile southward.

Mansalay is a small, unimportant village at the head of the bay. The whitewashed gable of the church, on a cogon-covered elevation about 65 feet high, is a good landmark.

Directions.—Mansalay Bay may be entered by steering for the church, bearing between 310° (309° mag.), and 338° (337° mag.), but vessels from the northward usually keep Duyagan Point bearing nothing eastward of 23° (22° mag.) until Bugton Point bears 271° (270° mag.), when it should be steered for and given a berth of about ¼ mile and the vessel hauled northwestward for the church. Good anchorage will be found in 7 fathoms, muddy bottom, about ⅜ mile from shore, with the church bearing 316° (315° mag.) and the pinnacle rock off Palaypay Point 91° (90° mag.), or closer in if the draft will permit.

Cogolong Bay, immediately southward of Mansalay Bay, offers excellent anchorage in westerly winds for vessels of any size, in 5 to 10 fathoms; sand and mud bottom. Vessels seeking shelter should stand in for the middle of the bay and anchor according to draft.

Mansiol Point, about 2 miles southward of Mansalay Bay, is a bold rocky point surmounted by two grassy hills, 350 feet high. Off its eastern side are numbers of rocks awash, the outer one, awash only at extreme high water, is about ⅛ mile from shore. The pinnacle rock off Palaypay Point, on the northern side of the entrance to Mansalay

Bay, bearing 1° (0° mag.), will clear all dangers off Mansiol Point by nearly ½ mile.

Mansiol Bay, between Mansiol Point and Colasi Point, about 1½ miles southwestward from it, is deep and free from danger.

Colasi Point is a rocky point on which are two hills, 121 and 145 feet high, respectively. It is fringed by a steep-to coral reef less than ¼ mile wide.

Colasi Bay, southwestward of Colasi Point, is a semicircular, sandy bight with a small stream emptying at the head. It affords anchorage, sheltered from westerly winds, for small vessels in 5 to 10 fathoms; sandy bottom.

From the village of Colasi, in the southern part of Colasi Bay, the shore is fringed by mangroves nearly to Pocanil Point, a distance of about 2 miles. This coast is bordered by a coral reef about ¼ mile wide, outside of which the water deepens gradually.

Pocanil Point, about 3 miles southward of Colasi Point, is formed by a prominent hill 515 feet high. Its shore line on the eastern and southern sides is formed by a sheer yellow limestone cliff.

Pocanil Islet is a small, precipitous, wooded islet, 154 feet high, about 400 yards eastward of Pocanil Point, with which it is connected by a reef bare at low water.

Pocanil Rock is a sharp, bare, pinnacle rock 35 feet high, about 300 yards eastward of Pocanil Islet. The eastern side of the rock is clean and steep-to, but the channel between it and Pocanil Islet is foul.

Pocanil Bay, southward of the point of the same name, is a small bight which affords easy and convenient anchorage in the middle, in 10 to 12 fathoms; soft sticky mud bottom.

Buyallao Peninsula, between Pocanil and Soguicay Bays, is high and heavily wooded. Its shores are rocky and steep and faced by deep water.

Mount Namalayan, in the middle of the peninsula, about 1⅓ miles from its southeastern extremity, is heavily wooded with dark trees and 885 feet high and is prominent.

Buyallao Island, just northward of the eastern part of Buyallao Peninsula, is heavily wooded and 531 feet high. Its two eastern points are sheer cliffs 150 feet high with deep water close-to. Off the northern side are two large rocks, the outer one 112 feet high and the inner one 53 feet high. They are connected with the shore by reefs, but just outside of the outer one the water is deep.

Buyallao Pass, between the island and peninsula of the same name, has a least navigable width of about 300 yards, with a 2-fathom coral patch in the middle of the narrowest part. This may be avoided by following the southern shore. Anchorage in this pass is not recommended, the space being limited and the bottom hard sand and coral, affording poor holding ground.

Buyallao Point, the southeastern extremity of the peninsula of the same name, slopes down gradually from Mount Namalayan and terminates in a low, rocky shelf, which is clean and steep-to.

From Buyallao Point the coast trends westward for 4 miles, forming the south side of Buyallao Peninsula and then southward for 5 miles to Pandan Point, forming a large elbow, in the northwest angle of which is Soguicay Bay.

Soguicay Bay (chart 4339) is fringed with mangroves, reefs, and mud flats and contains four detached reefs bare at low water. Sogui-

cay Island lies across the mouth of Soguicay Bay. The northern part is composed of mangroves and the entire island is fringed by reefs, partly bare at low water, and foul ground extends about ½ mile southward from it.

Soguicay Bay affords the best typhoon anchorage on the coast of Mindoro Island, considering the shelter, holding ground, and swinging room. Excellent anchorage may be found anywhere westward or west-northwestward of the island and clear of the four detached reefs in 12 to 20 fathoms, soft sticky mud, and well protected all around. About 1 mile south of the south end of Soguicay Island is a large shoal covered by depths of from 4½ to 9 fathoms, which is difficult to avoid in entering from southward; the passage north of the island, between the two northern reefs, is narrow and deep.

DIRECTIONS.—Vessels entering Soguicay Bay from the northward should bring Panangiran Peak (a high sharp peak about 7 miles inland) to bear 286° (285° mag.) and steer for it, passing midway between the north end of Soguicay Island and the shore; when northward of the north end of the island steer 255° (254° mag.) for ¼ mile, heading about 100 yards southward of the village of Soguicay, a small group of houses on a small sand beach on the west side of the bay, and pass midway between the northeastern two of the four shoals previously mentioned, which are about 550 yards apart; then steer 226° (225° mag.) and anchor in 14 fathoms, muddy bottom, when the north point of the island is in range with the southern shore of Buyallao Peninsula.

To enter from southward, from a position about ¾ mile off Pandan Point, steer 342° (341° mag.) and pass about ¼ mile from Cabug Point, the point northward of Pandan Point. This course will carry a vessel across the southern end of the shoal lying south of Soguicay Island, and the bottom will probably be seen; when the south end of Soguicay Island is in range with Buyallao Point, Cabug Point should bear 168° (167° mag.), and the course should be changed to 348° (347° mag.) and be held until the anchorage previously recommended is reached.

Pandan Point is a rocky, precipitous headland covered with grass and is 460 feet high. About ⅜ mile southeastward of Pandan Point is a dark coral reef about ¼ mile in extent, with a least depth of 1¼ fathoms. Between this reef and Pandan Point is a narrow, deep channel.

From Pandan Point the coast trends northwestward for about 1 mile, thence south-southwestward for the same distance to Badian Point, and thence in a general north-northwesterly direction for 3 miles to the head of Bulalacao Bay. This coast is formed by steep, rocky cliffs with heavily wooded slopes. The tops of the hills, which are about 500 feet high, are covered with a scrubby growth of timber.

Pandan Bay is a small bay, lying westward of Pandan Point, near the head of which it is possible to anchor in from 6 to 20 fathoms, sand and mud bottom, protected from northeast winds. Vessels intending to anchor here should not stand too far northward, as the head of the bay is foul.

Tambaron Pass (chart 4339), between Badian Point and Tambaron Island, is deep, narrow, and tortuous, having at the eastern entrance a navigable width of only 75 or 80 yards. This pass is of little value to navigation except for small craft.

Tambaron Island, south of Badian Point, Mindoro, is of irregular shape, heavily wooded with dark timber, and 470 feet high in the center. Its shores are clean and steep-to.

Masin Pass, between Tambaron Island and Masin Island, is a narrow straight channel having a least navigable width of about 120 yards. It is of little value to navigation.

Masin Island is on the south side of Masin Pass; on the ends are hills 200 and 251 feet high, giving it a saddle-shaped appearance from east or west. Masin Point, the southern extremity of Masin Island, is steep and rocky, about 75 feet high, and has a few ragged trees on it. This point and Tambaron Point, the northwestern extremity of Tambaron Island, also steep and rocky, form an excellent range for passing up Bulalacao Bay.

Bulalacao Bay is free from dangers, and the shores are clean, with the exception of a part of the northeast corner, where shoal water extends about ⅓ mile. It affords good anchorage toward the head in 5 to 20 fathoms, mud and sand bottom, with shelter except from winds between south-southeast and southwest. The usual southwest monsoon enters with much force, and it is hardly possible to anchor close enough to the western shore to be protected from it, since the wind and sea follow around Tambi Point. The bottom off the head of the bay, which has a low, sandy shore, is flat and sandy, with small scattered pieces of soft, gray coral to depths of 5 fathoms, where the mud begins. A number of small rivers of no value to navigation drain the mangrove swamps at the head of the bay.

Bulalacao is a small town in the northwest corner of Bulalacao Bay; it is of very little commercial importance and is seldom visited by steamers. The usual anchorage is southeastward of the town, according to draft. From an anchorage in 6 fathoms the western tangents of Tambaron and Masin Islands are in range and also the eastern tangents of Tambi Point and Alibatan Island.

Lagara Cove, a small, deep inlet on the eastern side of Bulalacao Bay, about 1 mile northward of the western end of Tambaron Pass, affords good, sheltered anchorage for small craft. Near its inner end is an anchorage space about 300 yards wide, with a depth of 12 fathoms, muddy bottom, in the middle. The two arms extending northward and eastward from this anchorage are shoal and of no value, the northern arm being a mud flat and the eastern one a reef, both with mangrove shore lines. All the points are high and steep, and the inlet is entirely inclosed by hills except for a low neck of land to the southeastward.

Tambi Point, the western entrance to Bulalacao Bay, is a black-and-yellow bluff about 50 feet high, covered with ragged trees and bushes and is clean and steep-to. Northwestward of the point the land rises gradually and is 570 feet high less than 1 mile inland.

From Tambi Point the coast trends westerly for about 4 miles and then southward for about the same distance to Buruncan Point. From Tambi Point to abreast of Aslom Islet is a sand and mangrove shore with thickly wooded hillsides close behind it. It is fringed by a narrow reef, partly bare at low water, and outside of which the water deepens gradually. From Aslom Islet to Buruncan Point, forming the eastern side of Buruncan Peninsula, the shores are bluff and rocky and generally clean and steep-to.

Buruncan Peninsula, terminating in Buruncan Point, has several high ridges in a north and south direction with many small peaks 150 to 250 feet above the general level and rising as high as 1,200 feet above the sea. The sides of the hills and ridges are covered with thick, dark forests.

Buruncan Point is a low limestone bluff much underworn by the sea. It is free from danger and can be passed close-to.

Aslom, Silat, and **Alibatan Islets,** and a cluster of rocks between the first two, lie in a north-and-south line off the eastern side of Buruncan Peninsula. All of these islets have steep, rocky shores, are surrounded by reefs, and have bushes and small trees on their summits.

Aslom, the northern islet, is 105 feet high at the north end and has a narrow channel between its north point and the shore. The bight off which it lies has mangroves at its head and shoal water outside the mangroves. Fairly good anchorage may be found westward from Aslom Islet in 12 or 13 fathoms; sand and mud bottom.

Silat Islet, about 1 mile south-southeastward of Aslom Islet, is very small, has a ragged profile, and is 45 feet high at the south end. A cluster of rocks about 15 feet high lies about ⅓ mile northwestward from Silat Islet; between these rocks and Aslom Islet is a good, deep channel ¼ mile wide.

Alibatan Islet lies over 1½ miles south of Silat Islet. The channels between Silat and Alibatan and between Alibatan and the shore are deep and clear. Alibatan is 90 feet high, and on its south end has two summits formed by sharp, rock pinnacles. A bank covered by from ¼ to 9 fathoms extends nearly ½ mile south-southeastward from Alibatan. The least water, ¼ fathom, is found about ¼ mile from the islet.

Bula Shoal, about ¼ mile in extent, with a least depth of 4 fathoms, is about midway between Tambi Point and Alibatan Islet.

Masin Bank is a small coral bank with a least depth of 7 fathoms about 2 miles westward of Masin Point, Masin Island.

SEMIRARA ISLANDS,

lying off the southeastern part of Mindoro Island, form a part of that Province. **Semirara,** the largest of the group, lies about 8 miles southeastward of Buruncan Point. It is divided into two parts by a mangrove swamp and low neck of land about 2 miles from the north end. The town of Semirara lies on the east side of the island on the low neck, and the villages of Tinabooc and Alegria lie on the southeast and southwest coasts of the island, respectively. The island is poor and has few resources; it is seldom visited except by the provincial authorities. On the northern portion of the island are a number of hills, highest 313 feet, almost bare of trees, and covered with a thin growth of cogon grass, generally of a yellowish or brown color. The southern part of the island is formed by a ridge of hills extending from the low neck to Talisay Point, at the south end of the island; about 2½ miles northward of Talisay Point it is 568 feet high. Tungao Point at the north end and Talisay Point at the south end are clean and steep-to. The eastern side of the island is fringed by a reef partly bare at low water, which at one place, abreast of Alimanga Point, extends nearly 1½

miles. There is no good anchorage off the town of Semirara, as the edge of the reef is very steep-to, and vessels desiring to communicate with that place usually anchor on the west side of the island. The western side of the island is generally fringed by a wide reef, partly bare at low water; immediately southward of Semirara Anchorage this reef extends 1¼ miles. About 2 miles from the north end of the island is a large indentation; **Ilogao Bay**, at the head of this indentation, is filled with coral, mostly bare at low water, and is of no value to navigation. The remainder of this indentation is nearly blocked with islets, rocks, and shoals, leaving a small anchorage, known as **Semirara Anchorage** (chart 4337), which is well protected except from southwestward and westward. This anchorage may be used in any except the worst weather, and a landing may always be made in small boats. There are several passages between the islets northward of Semirara Anchorage, but they are too dangerous for any but small craft.

Directions.—To enter Semirara Anchorage, bring the north point of Ilogao Bay, which is high and dark and forms an excellent landmark, to bear 60° (59° mag.) and steer for it, anchoring in 15 fathoms when the tangent to the land northward bears 347° (346° mag.). Small vessels may proceed farther in on the above course and anchor in 12 fathoms abreast Twin Rocks, each about 6 feet high.

Libagao Island, about 4 miles southeastward of Masin Island and 6½ miles northeastward of Tungao Point, Semirara, is 240 feet high at three summits in the eastern part, while the western part is a low, flat, sandy point. It is covered with low, dark, scrubby trees and is fringed by reefs which at no point extend to a distance of ⅜ mile. There are a few inhabitants.

Nagubat Islet, about midway between Libagao and Semirara and 3 miles from each, is a low sand and limestone islet surrounded by a reef. It is covered with dark trees about 60 feet high and has a few inhabitants. About 1 mile east-northeastward of Nagubat is a coral reef about 1½ miles in extent within the 10-fathom curve, with a rock covered by ¼ fathom on the northern part. Between this shoal and Libagao Island is a channel over 1 mile wide, deep and clear, with the exception of a small coral patch with 9 fathoms in the middle. The channel between the reefs fringing Nagubat and those fringing Semirara is over 2 miles wide and is deep and clear with the exception of a small 7-fathom patch 1½ miles southward of Nagubat.

Sibolon Island lies 10½ miles eastward of Alimanga Point, Semirara. It is formed of sand and limestone, low, and covered with dark trees about 130 feet high. Around the western point and the northwest and south sides is a sand beach and off it a reef ¼ to ⅓ mile wide, with 30 to 40 fathoms at its edge. The eastern side has rough limestone cliffs 20 to 30 feet high and no fringing reef. The only anchorage near it is in 10 to 25 fathoms, sand and coral bottom, among large black coral heads, with the west tangent bearing 30° (29° mag.) and the south tangent 68° (67° mag.).

Caluya and Sibaton Islands lie 8 miles southeastward from Semirara; they are ½ mile apart, and are connected by reefs except for a narrow channel 1½ fathoms deep near the south point of Sibaton. Caluya has a large, round, cogon-covered summit 558 feet high near the southern end; from this summit the land slopes regularly to the

northern point. Sibaton is a low sand and limestone islet covered by light, scrubby trees. The northern shore consists of low black limestone cliffs and on the east and west sides near the southern end are sand beaches. All around Caluya the points are of this same limestone and are generally rounded and indefinite; there are sand beaches in all the bights. The shore reef extends all around the two islands, except at the north end of Sibaton and the northeast point of Caluya, and is more than 1 mile wide at both ends of the passage between the two; off the southeast point of Caluya the reef is about ¼ mile wide and is to be avoided in passing here.

The town of **Caluya** lies on the west side, the village of Imba on the north point of Caluya, and Sibaton on the southeast shore of Sibaton. The only communication is by the provincial launch which calls monthly.

The best anchorage in the northeast monsoon is in 5 to 10 fathoms off the western side of Caluya, with the town of the same name bearing 91° (90° mag.) and the tangents to Caluya and Sibay Islands open 6° to 8°. In bad southwest weather anchorage may be found near the edge of the reef in 16 fathoms off the bight near the middle of the eastern side of Caluya.

Sibay, the southern island of the group, lies 2¾ miles southwestward of Caluya and 7¼ miles south-southeast of Talisay Point, Semirara. Its sky line is remarkably regular and level, 130 and 185 feet high at the west and east ends, respectively, and about 200 feet high in the middle. The summit, 217 feet high, is on the north coast and is covered with dark undergrowth, with steep, black cliffs in front of it. Except for some small, dark trees at the ends, the island is entirely bare and only cogon grass, corn fields, a few houses, and large, solitary trees can be seen from the sea. The shores are generally fringed by a very narrow, steep-to reef; at the southeast end of the island this reef extends nearly ½ mile and on the south side of the island, near the western end, it extends nearly 1 mile. There are a number of small villages on Sibay. With the exception of the provincial launch, which calls monthly, Sibay has no communication. It is almost impossible to anchor anywhere around Sibay Island except on the spits at the southeast and northwest points, both of which are equally exposed in both monsoons and are of hard sand and large coral heads.

Panagatan Cays are three small cays on an oval-shaped reef lying 5 to 8 miles westward from Sibay Island. The whole area is more or less bare at low-water springs, with several heaps of broken coral on it; at the eastern end, the edge of the reef is steep-to, but around the other sides is a longer slope, and anchorage may be found in 10 to 20 fathoms. The largest cay, lying on the western end of the reef, is low and flat and has small trees, bushes, and pandanus, mostly dead or dying upon it. The two smaller cays on the northeast part of the reef are similar to the large one and have a few bushes growing on them. The three can be seen about 7 miles in daylight from a height of 20 feet, but are not visible at night until close aboard. The south side of Sibay Island, bearing 86° (85° mag.), will carry a vessel well clear of the south side of Panagatan Reef.

Dominga Shoal consists of coral heads and white sand, with a least depth of 4 fathoms, lying 12¾ miles west-southwestward of Semirara Island.

MINDORO STRAIT,

a wide strait, separating the Calamianes from Mindoro Island, was formerly much frequented by sailing vessels which left Manila for Europe and the eastern ports of the United States toward the end of April and throughout the southwest monsoon period and at all times of the year from the ports of China for Australia. It is now frequently used by steam vessels trading between Manila and the southern islands and Palawan. It is divided into two passes by Apo Island and Reef.

Apo Island is about ½ mile in extent, low, covered with trees, and visible about 10 miles. White, sandy beaches front its east and south sides, and the reef surrounding the island extends to ½ mile in places. There is no good anchorage off Apo; the lighthouse tender, in fine weather, anchors eastward of the island in 35 to 50 fathoms with barely swinging room to clear the reef. Apo Island is separated from Apo Reef by a narrow, deep channel. The island is about 23 miles from Mindoro and about 20 miles from Nanga and Tara Islands, the nearest of the islands off Busuanga on the western side of the channel. An alternating light, visible 17 miles, is shown from a round, black, steel tower on the northeast part of Apo Island.

Apo Reef is about 10 miles in length in a north-northwest and opposite direction by about 6 miles in breadth. Near its western edge, about 1½ miles eastward of Apo Island, is **Menor Islet**, a wooded islet similar to Apo but smaller. Toward the eastern edge of the reef are rocks above water, visible some miles off. At low water many small rocks are dry on the reef, particularly along its north side. The whole of the reef is steep-to.

Apo East Pass is 15 miles wide between Apo Reef and the nearest part of the coast of Mindoro, and, with the exception of Discovery Bank, the pass is quite clear.

Directions.—Vessels navigating Apo East Pass should follow, both day and night, the recommended track, which leads about 4 miles off Cape Calavite, about 4 miles westward of Dongon Point and the Pandan Islands, and about 2 miles westward of Ambolon Island. Apo Reef should be avoided, as the lead gives no warning of approach to it and the sea does not always break.

Discovery Bank, with a least depth of 9 fathoms, is in the fairway of Apo East Pass. The sea does not break on the bank, nor is it marked by any discoloration of the water.

Sarraceno Bank is about 1¾ miles in extent, with a least depth of 14 fathoms, and lies 16 miles west-southwestward of Mount Ilin. The shallow part is red coral, but as the depth increases the character of the bottom alters, and at 50 fathoms it consists of coarse sand and gravel.

Leonidas Bank is composed of coarse sand with shells and coral. From the position of least depth, 8 fathoms, Mount Ambolon and Mount Ilin are nearly in line, bearing 38° (37° mag.), the former distant 14 miles.

Kambal Reef, with a least depth of 5¼ fathoms, lies 17 miles southwestward of Ambolon Island lighthouse. A bank with 7 fathoms over it lies 1½ miles southward of the 5¼-fathom shoal.

Apo West Pass is 8 miles wide between Apo Island and the islands lying off Busuanga and is deep throughout the fairway. Hunter and Merope Rocks lie in the northern entrance.

HUNTER ROCK, on which the sea breaks, consists of a rocky ledge 400 yards in extent with a least depth of 1¼ fathoms on its southern edge, and with depths of 18 to 40 fathoms around.

MEROPE ROCK, on which the sea breaks, lies 5½ miles northeast of Hunter Rock, and consists of a ridge 1⅓ miles in extent north and south and ½ mile wide. The least depth is 2¾ fathoms, with no bottom at 90 fathoms within ¼ mile.

WEST COAST OF MINDORO.

From Cape Calavite to Buruncan Point, a distance of about 93 miles, the west coast has a general south-southeasterly trend. It is in most part bold, the only important outlying shoal being Mamburao Reef, which extends 3¼ miles offshore. With this exception all dangers may be avoided by giving the coast a berth of at least 2 miles.

There are no harbors or anchorage on this coast that afford shelter during all winds. The beach is for most part low and sandy, rising gently to the mountain range behind.

Cape Calavite, at the foot of the slope of Mount Calavite, forms the northwestern extremity of Mindoro. **Mount Calavite** is described on page 161.

From Cape Calavite the coast trends southeasterly for about 7 miles to Pantocomi Point, the western entrance to Paluan Bay. There are few outlying reefs, and by giving the coast a berth of over 1 mile all dangers may be avoided.

Paluan Bay, between Pantocomi and Camtas Points, is free from all dangers. The entrance points are fringed by a reef which bares nearly ¼ mile at low water, and by giving them a berth of at least ½ mile all dangers will be avoided. The town of Paluan is on the northeast shore of the bay, on the east bank of the Paluan River. The barrio of Lipa, where considerable boat building is carried on, lies on the opposite side of the river. There are some prominent black rocks off the mouth of the Paluan River, from which a reef projects nearly ¼ mile in a westerly direction.

The best anchorage is in the northern part of the bay in 14 fathoms (to which the water suddenly shoals from 20 fathoms) with the northern black rock at the river mouth bearing 90° (89° mag.), distant 1½ miles and about 1 mile from the beach; the bottom is sticky, black mud. More convenient anchorage may be had with Paluan Church, showing between the black rocks at the river mouth, bearing 100° (99° mag.) in 9 fathoms; mud bottom.

There is fairly protected anchorage for a moderate-sized vessel during the southwest monsoon in 14 fathoms, mud bottom, in Pamatusin Cove, in the western part of the bay.

Caution.—Care must be taken by sailing vessels when working into Paluan Bay, for the squalls come violently off the high land, are very sudden, and at night do not give the least warning.

A shoal, about ¼ mile long north and south, with a least depth of 4 fathoms, lies 2½ miles northwestward of Binarera Point and 1½ miles from shore.

Binarera Point, about 7 miles southward of Paluan anchorage, is high and rocky and has good water close to it.

Tubile Point, southward of Binarera Point, is prominent. It is a heavily wooded peninsula, connected with the mainland by a low isthmus. Reefs project some distance southward from the point, but by giving it a berth of from ¾ to 1 mile all dangers will be avoided.

From Tubile Point the coast trends easterly for about 5 miles to Caranisan Point, then south-southeasterly for 24 miles to Sablayan Point, and is for the most part a low, sandy beach.

Mamburao Bay, between Tubile Point and Mamburao Reef, affords good anchorage, except during the southwest monsoon, in 5 fathoms, about ½ mile off the barrio of Mamburao. In entering the bay care should be taken to give Mamburao Reef and the 2¾-fathom shoal lying 1 mile west of Caranisan Point a good berth. Mamburao River empties into Mamburao Bay about 3¾ miles eastward of Tubile Point; depths of 2 to 3 feet at low water can be carried over the bar at the entrance.

The town of **Mamburao** is on level ground on the east bank of the Mamburao River. It consists of a few nipa houses and the ruins of a church. The galvanized-iron roof of the bell tower is all that remains of the church, and resembles a white triangle from a distance. Good anchorage, sheltered from northerly and easterly winds, may be found off the mouth of the river in 5 fathoms. The river is easily picked up, and the mouth when open bears 0° (359° mag.). Vessels bound to or from Mamburao should keep the town bearing between 24° (23° mag.) and 67° (66° mag.) to avoid the foul ground off the points westward and Mamburao Reef eastward.

Mamburao Reef extends 3¼ miles southward from Caranisan Point, and near its outer end has a least depth of 1¾ fathoms.

Pandan Islands are two small islands about 1 and 2 miles northward of Sablayan Point; they are moderately high and densely wooded. The channel between them is clear, but vessels should not attempt to pass between the southern island and Sablayan Point.

Pandan Bay (chart 4337), eastward of the Pandan Islands, affords good protection during the southwest monsoon. Anchorage may be found in the southern part of the bay in 7 to 14 fathoms, mud bottom, on the northeast side of the southern island about ¼ mile from it.

A reef about ⅛ mile in diameter, with a least depth of 1¼ fathoms, surrounded by deep water, lies ½ mile northeastward of the southeasterly end of the southern Pandan Island; another reef, covering about the same area, with a least depth of 4½ fathoms, lies nearly ½ mile northeastward of the northern point of the same island.

Sablayan Point is a small peninsula, extending about ½ mile southwest and terminating in a wooded knoll 120 feet high. It forms the western side of a bay about ¾ mile wide, but considerably reduced by reefs on both sides, and the northern part filled by reefs inclosing a small lagoon 4 to 5 fathoms deep, to which there is a narrow entrance. Many rocky heads show above water in the northern part of the bay. The town of Sablayan lies on the west side of the bay. The church, in the southern part of the town at the foot of the wooded knoll, is prominent. Landing by ship's boats is almost impossible at low water in front of the town on account of the numerous coral heads; at this stage of the tide landing can be made at the river mouth at the head of the bay.

Anchorage may be had about ¼ mile from the church in 16 fathoms, rocky bottom, with the point bearing 270° (269° mag.). The river is not shown on the chart, but is about in the position shown by the break in the shore reef in the northern part of the bay. Small craft with local knowledge can enter the lagoon.

Vessels are advised not to bring Sablayan Point to bear southward of 270° (269° mag.), as the bottom is rocky and uneven and the depth decreases rapidly toward the reefs. The chart shows a good anchorage for small vessels north of a 3¾-fathom shoal with the church bearing west.

From Sablayan Point the coast trends south-southeastward for 7 miles to Dongon Point, which is low and sandy. There are but few outlying reefs, and by giving the coast a berth of over 1 mile all dangers will be avoided. **Dongon Bay**, 2 miles eastward of Dongon Point, affords good anchorage during northerly and easterly winds.

From **Dongon Point** the coast trends southeastward for 13½ miles to the Lumintao River. There are a few outlying reefs, but by giving the coast a berth of over 1 mile all dangers will be avoided.

Iriron Rock, 8 miles southeastward of Dongon Point and ¾ mile offshore, is a jagged rock about 40 feet high, surrounded by a coral reef about ⅛ mile in diameter. A coral reef ⅛ mile in diameter and bare at low water lies ¾ mile northward of Iriron Rock and ¾ mile offshore. Another reef, with a least depth of 2 fathoms, lies 1¼ miles northward of Iriron Rock and ½ mile offshore.

Iriron Bay, 1⅜ miles southeastward of Iriron Rock, affords good anchorage for small vessels during the northeast moonsoon.

Lumintao River empties 15 miles southward of Dongon Point; it is shoal and of no value to navigation.

From the Lumintao River the coast trends south-southeastward for 7 miles to the mouth of the Bugsanga River and thence southeastward for 5 miles to Bubug Point at the entrance of Mangarin Bay. This coast is a uniform, low, steep-to, sandy beach, and back of the high-water line there is a sandy terrace 6 to 12 feet high. The vegetation is scrubby timber 20 to 60 feet high, and in places cogon grass extends directly to the beach. There is no coral fringing this part of the coast except at Bugsanga Point, south from the mouth of the river of the same name, where there is a small shore reef about 100 yards wide, with a sand and coral spit with depths of from 6 to 8 fathoms. The Bugsanga River has very little water on its bar and is of no value to navigation.

About 1½ miles northward of Bubug Point and ¼ mile from shore there is a peculiar rocky ledge about ½ mile long and less than 10 yards wide, with a least depth of 1¼ fathoms, and surrounded by depths of 5 fathoms; sandy bottom. This ledge runs in a straight line in a northwesterly and opposite direction, nearly parallel with the shore. To avoid swinging on to the ledge a vessel should not anchor in less than 7 fathoms when in its vicinity.

Mangarin Bay (chart 4340), formed by the coast of Mindoro and Ilin Island, is easy of access and affords good anchorage for all classes of vessels at most seasons of the year. It may be entered from northward or westward or through Ilin Strait. The village of Pandarochan, the seat of government of the municipality of San Jose, about 1½ miles southeastward of Bubug Point, contains several low,

iron-roofed buildings and long, wooden barracks. Mangarin Point is a long, low point extending southeastward near the head of the bay. The area between it and the coast of Mindoro is shoal and of little value to navigation. The village of Mangarin lies on the shore about 1½ miles northeastward of the extremity of Mangarin Point and is only accessible by light boats.

Dongon Reef is a large, dangerous, coral reef, lying about 2¾ miles southwestward from Bubug Point, in the entrance to Mangarin Bay. Dongon Cay is a shifting strip of broken coral and sand on the northern end of Dongon Reef. The channel between Dongon Reef and Manadi Islet, 2 miles eastward from it, and also the channel between Dongon Reef and Ilin Island is deep and clear.

Clearing Marks.—The western tangent to Ambolon Island, bearing 175° (174° mag.), will carry a vessel well westward of Dongon Reef and also well westward of Sardine Reef on the south side of the western channel into Mangarin Bay.

The end of Mangarin Point, bearing 91° (90° mag.), and the same point, bearing 74° (73° mag.), will clear the northern and southern sides, respectively, of Dongon Reef.

Manadi Islet is a small sand cay with a few bushes on it, 2⅜ miles west of the end of Mangarin Point and about 1½ miles from shore. It lies on the eastern part of a shoal, partly bare at low water.

Cajui Reef, lying about ⅞ mile eastward of Manadi Islet, is bare except at extreme high water, and is surrounded by coral rocks awash at low water. About ¼ mile northeastward from its center there are small detached patches, with 1½ and 2 fathoms, leaving a channel between them and Mindoro about ¼ mile wide, with a depth of 6½ fathoms in the middle. A small, rocky patch, with a least depth of 3¼ fathoms, lies about 1⅛ miles northward of Manadi Islet and ⅝ mile from shore. Ilin Rock is a small, rocky patch with a least depth of 2½ fathoms and surrounded by deep water, lying ¾ mile from the northern part of Ilin Island. Liscum Reef, a small, detached, rocky patch, lies near the northern entrance to Ilin Strait, on the eastern side of the channel, about 1⅜ miles south-southwestward of the end of Mangarin Point; it is marked on its northwesterly side by a red buoy. Vessels should not attempt to pass eastward of Liscum Reef buoy. A small shoal, with 3¼ fathoms over it and surrounded by deeper water, lies ½ mile south-southwestward of the wharf at Mangarin Point. There are also two small, detached patches with depths of 1½ fathoms over them a short distance south-southeastward from the shed on the wharf; these shoals are each marked by a black buoy. There is a mooring buoy off the end of the wharf.

The channel between Liscum Reef and Ilin Island is about ¾ mile wide and has a depth of 24 fathoms in the middle. Large vessels should not attempt to dock at the wharf on Mangarin Point unless the two 1½-fathom patches described above are marked.

A substantial wharf extends east-southeasterly from the extremity of Mangarin Point. At the time of the survey there was 20 feet at its end at low water. There are several prominent warehouses at the head of the wharf. A plantation railway extends northwestward from the wharf. A depth of 23 feet at low water may be carried on various courses to a point 50 yards off the end of the

wharf, where there is a space, about 250 yards across, for turning. In the absence of any aids to navigation this channel should not be attempted by a stranger, as at one point it is only 40 yards wide. A better channel for approaching the wharf, carrying 21 feet, may be found eastward of the eastern of the 1½ fathom patches previously described, but even this channel should not be used unless the 1½-fathom patch is marked.

DIRECTIONS.—Vessels from northward should round the western and southern side of Manadi Islet at a distance of about ¾ mile, and when the end of Mangarin Point bears 65° (64° mag.) it may be steered for and anchorage taken up according to draft. Good anchorage will be found with the end of the point on the above bearing, distant about ¾ mile, in 6 fathoms; muddy bottom.

Vessels entering Mangarin Bay by the western channel should not bring the western tangent to Ambolon Island to bear southward of 175° (174° mag.) until the northern tangent to Ilin Island bears 85° (84° mag.) or the end of Mangarin Point bears 65° (64° mag.) in order to give Sardine Reef, lying off the northwest coast of Ilin Island, a good berth. When Mangarin Point is on the latter bearing it may be steered for and the previous directions followed.

Vessels entering Mangarin Bay from Ilin Strait should steer for Manadi Islet when it bears 311° (310° mag.) in order to give Liscum Reef a good berth. When the end of Mangarin Point bears 30° (29° mag.) the vessel should be hauled northward until the end of Mangarin Point bears 65° (64° mag.) and the previous directions followed.

From Bancal Point, Mindoro, the coast trends southeastward for 3 miles, forming the northeastern side of Ilin Strait, and thence east-southeastward for 8 miles to Buruncan Point, the southern extremity of the island of Mindoro.

Caguray Point, about 1 mile southward of Bancal Point, is low, covered with mangroves, and surrounded by shoal water extending about ⅛ mile. Caguray River, on the north side of the point of the same name, is navigable by pulling boats to the village of Caguray. Good, protected anchorage may be found in Ilin Strait, in 14 to 16 fathoms, muddy bottom, about ⅛ mile from the beach on the Mindoro side and abreast a remarkable, high, feathery-topped tree about ½ mile northward of the Caguray River. From this anchorage Manadi Islet will be seen open of the northeast point of Ilin Island and the southeast point of Ilin Island open of Caguray Point.

Lalauigan Bay, between Caguray and Lalauigan Points, is very shoal and of no value to navigation. The village of Santa Teresa, formerly Lalauigan, lies on the beach about ½ mile southward from Lalauigan Point; shoal water extends about ⅜ mile offshore in front of the village.

Cominauet Point, the eastern entrance of the southern end of Ilin Strait, is a low, rocky bluff faced by shoal water to a considerable distance, the 3-fathom curve being about ⅝ mile southwestward from it. This fact must be borne in mind by those entering or leaving the southern end of Ilin Strait.

Santa Teresa Hill is a prominent, round-topped hill 400 feet high, 1 mile northward of Cominauet Point.

Pandarochan Bay is at the southern entrance to Ilin Strait, between Mangsoagui Point, Ilin Island, and Buruncan Point, Mindoro. The northern shore is low and sandy with mangroves and scrub timber back of it. Four or five small rivers, with bars, nearly bare at low water, empty into the northern part of the bay.

Buruncan Point, the southern extremity of Mindoro, is free from danger and can be passed close-to. It is composed of low limestone cliffs, much underworn by the sea. The land back of the point rises rapidly, being 253 feet high ⅓ mile inland.

Garza Island, about 2½ miles westward of Buruncan Point, is a small sand and coral cay covered with mangroves and small trees, some of which are 60 feet high. It is surrounded by a coral reef bare at low water. Shoal water extends ¼ mile northward from the islet, and from its southern side a shoal, somewhat wider than the islet, extends about 2 miles southward. This shoal is covered by irregular depths of 3½ to 9 fathoms. Between Garza Island and Mindoro is a good deep channel about ½ mile wide between the 5-fathom curves.

Ilin Strait, between Mindoro and Ilin Islands, is straight, deep, and clear. Owing to the prevalence of light airs it should not be attempted by a sailing vessel unless the wind is fair.

Directions.—Vessels entering the strait from the northward should keep Manadi Islet astern, bearing 311° (310° mag.), in order to give Liscum Reef a good berth. In passing through the straight the Ilin Island side should be favored, as the water shoals suddenly on the Mindoro side. After clearing the strait it should be kept open astern until the south end of Garza Island is in range with Buruncan Point, when the course should be changed to 125° (124° mag.) and held until Garza Island bears 1° (0° mag.). This course will give the dangers southward from Garza Island a good berth, and the course may then be shaped as desired.

Vessels entering the strait from the southward and eastward should pass about 2½ miles southward of Garza Island and stand westward until the strait is well open and then haul up for it.

Ilin Island, separated from the southern part of Mindoro by Ilin Strait, is high, narrow, and wooded. The highest points are Mount Ilin, 762 feet at the northern end, and Mount Natangdol 790 feet near the southern end. **Mount Natangdol** is the summit of a sharp ridge running in a north-northwest and opposite direction and is the most prominent feature of the island from all directions except the north. The northern and eastern sides of Ilin Island are fringed by narrow, steep-to reefs. On the western side, near the northen end, a wide reef, partly bare at low water, extends about 1 mile. The remainder of the western side of the island is fringed by reefs which at no place are over ½ mile wide.

Sardine Reef is a small coral reef, with a least depth of 2¼ fathoms, and surrounded by deep water, lying 1¾ miles westward of Ilin Island and 2½ miles northward of Ambolon Island. The western tangent to Ambolon Island, bearing 175° (174° mag.), leads well clear of the western side of this reef, and the tangent to the north side if Ilin Island, bearing 80° (79° mag.), leads well clear of its northern side.

Ambolon Strait, between Ilin and Ambolon Islands, is comparatively straight and free from danger and of little value to navigation.

Ambolon Island, forming the western side of Ambolon Strait, is hilly and well wooded and in its northern part is 567 feet high.

Bognao Inlet, making into the western side of Ambolon Island, has a narrow entrance, inside of which is a circular lagoon about ½ mile in diameter. There is a depth of 1 fathom in the entrance and a small area of deeper water inside. The remainder of the lagoon is blocked by reefs. **Cucurrayan Inlet** is a square inlet making into the southeastern part of Ambolon. It is about ¾ mile in extent, and its entrance is nearly blocked by Buri Islet and its surrounding reefs. There is a narrow channel, eastward and northward of Buri Islet, leading to a very contracted anchorage having a shoal spot toward its northwestern side. **Lininob Rock** is a prominent rock, 25 feet high, with a tree on it, on the shore reef on the northern side of the entrance to Cucurrayan Inlet. Shoal water extends about 300 yards southward from it.

A group occulting white light, visible 15 miles, is shown from a white-framed structure about 650 yards from the western side of Ambolon Island. In addition to the visible arc, shown on the chart, a vessel when within 2 miles of the coast of Mindoro may see the light over an arc of 9° between 168° (167° mag.) and 177° (176° mag.).

Ambolon light, owing to its great elevation, has frequently been reported as visible considerably over 15 miles.

Baniaga Reef, about ⅞ mile southeastward of the southern point of Ambolon Island, is covered by irregular depths of ¼ to 5 fathoms. **Baniaga Rock,** a flat rock about 15 feet high near its southern edge, sufficiently marks it. There are several rocks awash at low water along the western edge of the reef, between which and Ambolon Island there is a good channel. About 1⅝ miles east-northeastward of Baniaga Rock is a small, detached, rocky patch with a least depth of 4¾ fathoms.

Silong Bay is between Ambolon and Ilin Islands. In the northeast part of the bay there are several detached patches with ¼ to 2¾ fathoms. Silong Bay furnishes a convenient anchorage, with poor holding ground, in northerly weather only.

VISAYAN ISLANDS AND WATERS.

SIBUYAN SEA

is that large body of water lying southward of Luzon and eastward of Mindoro. The route from Verde Island Passage to San Bernardino Strait crosses the northern part of this sea. The following notes on the winds, weather, and tidal currents along this route may be of value to navigators:

The southwest monsoon generally begins about the middle or end of April, with winds from southwest and west, which at times blow freshly, alternating irregularly with northeast winds. They are first felt in the part included between Verde Island Passage and the meridian of Marinduque Island, and in this part they blow stronger than the variable winds from north to south through east that are experienced farther eastward and which are accompanied by thick weather and heavy squalls.

In April and May the winds are variable from north to south through east, with occasional thick weather, heavy squalls, and calms; this weather continues through June until the southwest monsoon becomes established in the vicinity of Verde Island Passage.

In general, the southwest monsoon becomes established during June and blows from south-southwest to west, reaching at this time as far eastward as Marinduque Island. These winds bring rain at Manila and on the west coast of Luzon.

In some years the southwest monsoon is limited to the few gales from westward, alternating with the variable winds from eastward, which facilitate entering San Bernardino Strait from eastward. In other years it attains its full force in May, and in this case the southwest winds are less permanent from June to September and are replaced by longer periods of variable breezes.

The northeast monsoon begins toward the end of September or beginning of October. During September the winds blow alternately from northeast, southeast, or southwest, but with more persistence from southwest; during the interval of change there are light winds, calms, and tornadoes.

During October, November, and the early part of December, the monsoon blows with strength from north and northeast, accompanied by thick weather and rains. This is the worst season of the year for navigating the strait, on account of the bad weather and the occurrence of typhoons. After the middle of December the gales cease and the winds blow strongly from northeast, east, and east-southeast, with much thick weather and rain until the March equinox, from which time until the monsoon ends the winds vary from north to south through east, sometimes blowing with force, and at other times light with variable airs and calms. Typhoons are more prevalent in the months from June to November, inclusive, and one-fifth of all the typhoons occur in September.

In the absence of more definite information, the points on which pilots are mostly agreed are: That from the eastern entrance to San Bernardino Strait to about the meridian of Bondoc Point (122° 36′ E) the flood stream sets westward and the ebb eastward; that from that meridian to the Verde Island Passage the reverse of this takes place; that from the eastern mouth of the strait to the above meridian the flood current runs longer than the ebb in the northeast monsoon, the reverse being found in the southwest monsoon, and the opposite condition to this is found from Bondoc westward.

Maestre de Campo, about 17½ miles southward of Baltasar, the southwestern islet of Tres Reyes, and 9½ miles eastward of Balete Point, east coast of Mindoro, is generally sparsely wooded. The summit, from eastward or westward, appears like a ridge with three distinct hills, the highest of which, near the northern part of the island, is 1,130 feet high. The coast line is rugged and rocky and in places the cliffs are 50 and 100 feet high. The shores are steep-to, and the island may be safely approached at any point within ¼ mile. The numerous bights in the coast line afford anchorage and protection to small craft. The island is extremely poor; copra and tobacco are raised in limited quantities; there is an abundance of fresh water.

La Concepcion, on the eastern shore of Port Concepcion, contains most of the inhabitants of the island. Maestre de Campo is part of

the Province of Mindoro and forms the municipality of La Concepcion.

PORT CONCEPCION (chart 4453), an indentation on the southeast side of the island, is the principal anchorage. It is very small and deep, but easy of access, and affords protection, except from easterly and southeasterly winds. Anchorage may be found in the middle of the port, southward of the village, in 16 to 20 fathoms, rock and sand bottom; small vessels may anchor farther northward off the village. During the northeast monsoon heavy squalls come off the hills. This port is of no commercial importance and is seldom visited by steamers.

BIDOOS BAY, immediately eastward of Port Concepcion, from which it is separated by a narrow tongue of land, and ABATANG BAY, on the south side of the island, are the principal breaks in the shore line outside of Port Concepcion. They are open southward, fringed with coral, and only fit for small craft.

Dos Hermanos; Carlota, and **Isabel** are two small islets, about 11 miles south-southwestward of Elefante Islet, off the south point of Marinduque. They are the summits of twin peaks, about 1 mile apart east and west, surrounded by about 250 fathoms, and about 150 feet above the sea. From a distance the two present a similar appearance, both showing a uniform straight and level sky line dropping to the water in a terrace at each end. The shore line presents on all sides forbidding cliffs, from 20 to 80 feet high, and underworn by the sea in some places to a distance of 40 feet, making landing difficult anywhere except in the best of weather. On the north side of each island is a narrow fringe of coral bare at low water, and northeast from Carlota is a narrow coral spit sloping gradually to 25 fathoms at a distance of ½ mile. Both islands are thickly covered with small timber and bushes, the tops of which are 195 feet high on Carlota and 213 feet on Isabel. On Carlota there are three or four families of fishermen living on the north shore, where a small valley runs a short distance inland, and there is a small piece of coral beach; Isabel is uninhabited. The best anchorage in this vicinity is on the coral spit northeastward of Carlota.

Banton Island, 14 miles southward of Elefante Islet, consists of a central ridge 2,016 feet high at the northern end and occupying the larger part of the island. From east or west the full length of the ridge may be seen, regular along the summit, with a slight dip to the south, while from north or south the crest appears as a small cluster of several very sharp peaks, rising steeply to the east, covering more than one-half the width of the island. The northern and eastern sides are nearly straight with no special features; the western side is broken by two points, between which lies Mainit Bay and on each side a smaller bight. None of these are of any importance, being too deep and exposed to afford anchorage. The shores are formed of dark limestone cliffs 40 to 80 feet high and coarse sand beaches with many large bowlders. There is a narrow, steep-to, coral reef fringing the entire island except the northeast and southwest points, where the cliffs come down sheer into deep water. Inland the vegetation is mixed; occasional patches of small trees, thin cogon grass, and a few cultivated fields appear from seaward, but in many places the hillsides show only bare broken rocks and ledges. The town of Banton lies on the eastern shore, in a little elbow of

the hills, fronted by an open shingle beach. It contains a large stone church and fort. Communication is irregular, and steamers never call unless special arrangements are made. Only a precarious anchorage may be found off Banton Island, either off the point southward of the town or on a coral shelf off the southeast point, both in 15 fathoms. Landing is difficult in any but the smoothest weather and is dangerous when there is any surf.

Bantoncillo is a small, steep-to islet lying 3 miles southwestward of Banton Island. There is a bare pinnacle rock 87 feet high close to its southwest point. Of the two summits, the northern is flat, grass covered, and 142 feet high; the southern is thickly covered with trees and bushes and is 320 feet high. The shores are coarse shingle beaches and limestone ledges, fringed by a narrow, steep-to, coral reef.

Simara Island, 4 miles southward from Banton Island, is 755 feet high. The shores are bold with no deep bights except at the southwest end, where there is a mangrove swamp, recognizable only when close inshore, occupying the center of the low western spit, and entirely closed by reefs. The northern or northwestern shore is low throughout and fringed by large bowlders along the edge of the narrow shore reef, 50 to 100 yards from shore. The usual low, rough cliffs and coral beaches are found, but at the northeastern point the face of the cliff is 60 feet high, with no reef at its foot. Round the south point are coarse shingle and sand beaches; off the town and westward the reef is widest, having immense coral heads along its edge and slightly deeper water inside. Landing is possible only in fair weather, or on the sheltered side of the island, and should not be attempted when there is any surf.

Corcuera lies on an open sand beach just west of the southern point and is visible from the usual steamer track. Its church is a large nipa building, and there is a ruined fort on the hill back of it. There is no regular communication and no trade. There is no anchorage where swinging room may be found, because of the great depth of water close to the edge of the reefs.

Ranger Reef is a small coral reef, covered by a least depth of 2 fathoms and surrounded by deep water, lying 2⅕ miles east-southeastward of the peak of Simara Island. It is only occasionally visible by the color of the water. The south end of Simara Island kept on a west bearing will carry a vessel southward of it and the northeast point of Simara, steered for on a 12° (11° mag.) bearing, leads through a good channel between it and Simara Island. Anchorage may be found midway between this course and the land in 11 to 14 fathoms with the peak on Simara bearing between 315° (314° mag.) and 300° (299° mag.).

TABLAS ISLAND

lies about 27 miles eastward from the southern part of Mindoro. A heavily wooded central range of hills traverses its length. Tablas Summit, at the northeastern extremity of the island, is 2,284 feet high. There is no good harbor except Looc Bay, a large indentation on the west side; but sheltered anchorage may be found on either side of the island, according to the season of the year. Tablas contains no towns of importance and has no regular communication with the

other islands of the group. The usual steamer track between Manila and the principal southern ports passes north and east of Tablas, and is wide, deep, and clear.

Guindauahan Islet, 480 feet high, and **Origon Rock,** having two pinnacles 110 and 40 feet high, lie off the north end of Tablas. A shoal about ¾ mile in extent, composed of sand and coral and with a least depth of 4¾ fathoms, lies 2 miles westward of Guindauahan Islet. Cobrador Islet, open of Guindauahan Islet, leads well northward of this shoal.

The west coast of Tablas is formed by the western slope of the central mountain ridge, which is narrow and well defined; the summits in the middle of the island are 1,600 to 2,000 feet high. In the center of the island is Bitaogan Peak, 2,164 feet high, which appears as a rounded knob from east and west and sharp from north and south. Mount Lunas, back of Looc Bay, is a black ridge 1,556 feet high, long and rounded from east and west and sharp from north and south; with it the range breaks off to the low pass from Looc Bay to the village of Alcantara on the east coast. The southern part of Tablas is a group of many sharp conical hills, all bare and grassy except Malbug Hill, 904 feet high, and Calaton Point, 835 feet high, on the east coast, which are dark and wooded. The shore line is largely mangrove, with many beaches of coral sand and some limestone cliffs. The shore reef is continuous except off Guinauayan Point, and is from ⅛ to ⅗ mile wide. There are no offlying dangers, and this side of the island can be safely navigated by keeping about 1 mile outside of the salient points. There are a number of small, unimportant villages on the west coast, off which anchorage may be had during the northeast monsoon.

Looc Bay (chart 4339), one of the best harbors of refuge in the archipelago and the only sheltered anchorage on the west coast of Tablas during the southwest monsoon, is about 9 miles northward of the south end of the island. It affords 4 square miles of anchorage in 11 to 18 fathoms; sticky mud bottom. All around the bay the shores are generally mangrove, with sand beaches at Looc and in the eastern bight. The shore reef is ⅛ to ⅓ mile wide all around and steep-to at its edges, except on the northern and northwestern shores, where 5 fathoms are found ⅓ mile offshore and 10 fathoms at a distance of ⅗ mile. The southern and eastern bights each have a detached reef in them close to shore and well out of the way of vessels. The best place for anchoring when seeking shelter is in the southern arm, with the tangent to Agoho Point bearing 320° (319° mag.) and Looc Church tower bearing 5° (4° mag.) in 17½ fathoms. On the northern side of the bay the bottom shows more sand mixed with the mud and is poorer holding ground. The small and unimportant town of Looc stands inconspicuously on a low, sandy shore in the northern part of the bay at the western end of a large coconut grove; it is marked by a four-sided iron roof on the church tower.

Cauit Point, the northern entrance point, is low and bordered by mangroves; there are two conical hills about ½ mile northward of the point, 164 and 203 feet high, respectively, the southern hill being the higher. Cauit Point is fringed by a reef, partly bare at low water, which extends about ½ mile southward into the entrance to the bay. Agoho Point, the southern entrance point, is 89 feet high, with black bluffs and mangrove at the shore line. It is sur-

rounded by a reef which extends about ⅛ mile northward, leaving a deep channel about ⅜ mile wide between it and the reef extending southward from Cauit Point. Looc Reef, about 800 yards in extent, awash at half tide and surrounded by deep water, lies ¾ mile within and before the entrance to the bay. The church tower at Looc, bearing 55° (54° mag.), leads well northward of it, and Cauit Point, bearing 326° (325° mag.), and the church tower, bearing 15° (14° mag.), lead well westward and eastward, respectively, of it.

Directions.—Vessels from northward approaching Looc Bay should pass about ⅜ mile westward of Guinauayan Point, bring the 20-foot rock on the reef southward of Agoho Point to bear 147° (146° mag.) and steer for it; when Agoho Point bears 91° (90° mag.) steer for it until the church tower and the summit of Mount Lunas (1,556 feet high and 3 miles in the interior) are in range, bearing 55° (54° mag.); steer in on this range, which leads through the middle of the channel in 25 fathoms. When Cauit Point bears 331° (330° mag.) the vessel may be hauled southward with the point astern for the recommended anchorage at the entrance to the south arm; if intending to anchor off the town vessels should hold the range until Cauit Point bears 294° (293° mag.) and then steer 114° (113° mag.), anchoring in 11 fathoms, sand and mud, when the church tower bears 29° (28° mag.), or closer in, if desired.

Vessels from southward should bring Agoho Point to bear 91° (90° mag.) when about 1 mile distant and steer for it; when the church tower and Mount Lunas are in range, bearing 55° (54° mag.), they should be steered for and the previous directions followed.

From Agoho Point the coast trends southward, with a curve eastward for 3 miles to Tuctuc Point, and consists of sand and mangrove, changing to rocky cliffs at Tuctuc Point. The bight between these points is fringed by a reef ¼ to ½ mile wide, with a rock 20 feet high on it about 1 mile southward of Agoho Point. This coast is best passed on a 1° (0° mag.) and opposite course, giving Tuctuc Point a berth of about ½ mile.

Tuctuc Point, the most western point southward from Looc Bay, terminates in a dark sugar-loaf-shaped rock 115 feet high; it is clean and steep-to.

From Tuctuc Point to Capid Point, about 2 miles southward, the points are high cliffs, with sandy beaches in the bights. The shore reef is about ⅛ mile wide, with deep water close-to.

Capid Point is 222 feet high and is easily seen at night when in profile. It is fringed by a narrow reef, outside of which a bank of sand with a least depth of 17 fathoms extends about ¾ mile southward, and from here to Cabalian Point, 4 miles southeastward, the depths are very irregular for ½ to 1 mile from shore.

The shores are mangrove from Capid Point to Santa Fe and sandy from there to Cabalian Point, with low rocks and bowlders at all the points. The hills show many rounded summits with only a few trees and bushes on them.

Santa Fe is a small village, at the head of a small, deep, narrow bight, 1¾ miles eastward of Capid Point. It contains about 40 houses, one of which has a conspicuous iron roof. The anchorage is just inside the entrance, in 14 fathoms, mud bottom, with Canaio and Capid Points in range, the iron roof bearing 65° (64° mag.) and a large bushy black tree on a dark hill at the head of the bight

bearing 46° (45° mag.); the latter bearing is a very convenient one for entering. At this anchorage there is about 200 yards swinging room.

Cabalian Point, the southern extremity of Tablas Island, is low and sandy and hard to distinguish at night. A flat, steep-to, limestone ledge on which there are rocks about 6 feet high extends over 100 yards from it. Extending southerly and south-southeasterly from Cabalian Point for a distance of 5½ miles is a bank of coral and sand with depths of 6½ to 17 fathoms. By giving the south end of Tablas a berth of ½ mile all dangers will be avoided.

The east coast of Tablas has a general northerly and southerly trend and, except off a few of the points, may be approached close-to. By giving this coast a berth of 1½ miles all dangers will be avoided.

Cabahan Island, lying close to the shore, about 3 miles north-northeastward of Cabalian Point, is wooded and 277 feet high. Its south and east shores are formed by red, rocky cliffs, and its west and north shores are bordered by mangroves. A rocky islet about ¼ mile eastward of Cabahan is joined to it by a reef and about ¼ mile south-southeastward from the southeast point of Cabahan is Pez Rock, a red pinnacle 70 feet high, between which and Cabahan the water is deep.

Calaton Point, about 6 miles northward of Cabalian Point, is formed by a black, heavily wooded promontory 835 feet high, which projects 1½ miles eastward from the coast; it shows a regular, half-oval profile from all sides. Its shores are steep black cliffs with large bowlders at the water line.

About 6 miles northward of Calaton Point and 1½ miles from shore there are shoal patches of sand and rock of 6 to 10 fathoms. A shoal with a least depth of 2 fathoms lies about 1¼ miles south-southeastward of Tugdan Point.

A reef, nearly dry at low water, extends for nearly a mile northeastward from Tugdan Point. This reef is steep-to all around its outer edge.

Carmen Bay, southward of Tablas Summit, the northeastern promontory of Tablas, affords anchorage open only to the southeastward, in 12 fathoms, mud bottom, with Tablas Summit bearing 23° (22° mag.), and the tangent to Bailon Point bearing 90° (89° mag.). The shore for 5 miles south of Carmen Bay is bordered by reefs.

Carabao Island, 3½ miles southwest from the southern end of Tablas Island, is hilly and 693 feet high. Its shores are clean and steep; the rocks that fringe it are very close; on the east side there is a sand beach off which vessels can anchor in 5 fathoms. There is also anchorage in 10 fathoms, bottom sand and bowlders, eastward of the village of Taft, 1½ miles northward of the south point of the island, and in 6 fathoms, sand bottom, west-southwest of the village of Cogon, 2 miles southeastward of West Point. The channel between Carabao and Borocay Islands, off the northwest part of Panay, is clear, but tidal streams are very strong. The flood makes to the east and the ebb to the west.

Borocay Island lies ½ mile northward and westward of Potol Point, the northern extremity of Panay; the summit is 285 feet high; the shores are safe. On the west side there are 5½ fathoms, where anchorage can be had if required; the channel between Borocay and

Panay is clear, but there are rocks on both sides of it, and the tidal streams rush through it with great force.

ROMBLON ISLAND.

The channel between Tablas and Simara is 6½ miles wide, and between the northeast point of Tablas and the island of Cobrador 3½ miles wide; both are free from danger. The flood stream sets eastward between Tablas and Simara and southward between Tablas and Romblon. The north coast of Tablas is clean and steep-to; the track passes nearly 2 miles outside the islets off the north point.

Romblon Island, 6 miles eastward of the northeast part of Tablas, is hilly and is composed chiefly of quartz, marble, and slate. Off the northwest part are Cobrador, Alad, and Lugbung Islands; the last lies before the small but sheltered port of Romblon.

Cobrador Island, about 4 miles eastward of the northeast point of Tablas Island, is clean and steep-to except on the southwest side, which is bordered by a reef less than ¼ mile wide. It is well wooded and 799 feet high. It is marked on the western side by a bight.

Alad Island, ¾ mile from the northwest coast of Romblon, is clear and steep-to, 700 feet high, covered with trees, and shows many outcroppings of marble or limestone. The Islet **Tinang**, consisting of two rocks about 30 feet high, on which there are a few scrubby bushes, lies ¼ mile south of the southern point of Alad (Bombon Point), to which it is joined by a reef.

Lugbung Island has a hill 300 feet high at each end. It is fringed by reefs, which, at the northeast and southwest points, extend off for ⅛ mile.

Bangud Islet is 175 feet high and covered with trees and is connected by a reef with Romblon.

Port Romblon (chart 4453), on the western side of Romblon Island, between Sabang and Rosas Points, is divided into two parts by Agbatan Point. Reefs project from these points as follows: From Sabang ⅖ mile south and west; from Agbatan, ⅕ mile westward; and from Rosas and the next point farther in (Binagon), about ⅛ mile northward. The northern anchorage is the larger, and is well protected from all except southwest winds. The southern anchorage in front of the town, though very confined and deep, is the one generally used, affording good protection. The entrance to the southern anchorage is barely 250 yards wide. The edges of the reefs can generally be distinguished by the color of the water.

The town of Romblon, capital of the Province of the same name, lies on the eastern side of the southern harbor. There is a small pier in front of the town, off which vessels lie by using offshore moorings. Few stores are available; a supply of coal is kept by the Government; water may be obtained from a pipe on the pier.

A light, visible 12 miles through all channels approaching Romblon, is shown from a small concrete tower just north of a dwelling about 325 yards from the extremity of Sabang Point. This light, together with a beacon on the extremity of the reef off Sabang Point, and two lighted beacons at the entrance to the southern bay mark the approach to this anchorage.

Directions.—Vessels bound into Romblon approach the entrance to the port by the channels between Romblon and Alad, Alad and

Lugbung, or Lugbung and Romblon Island. Steer to pass about 100 to 150 yards southward from the red-lighted beacon on Agbatan Point and the same distance off the green-lighted beacon off Binagon Point; when abreast of the latter beacon, haul southward and proceed to the wharf or anchor in the middle of the harbor in 14 or 16 fathoms, muddy bottom.

From Bangud Islet the coast runs 2½ miles southward, forming three bays; the first two are foul, but in the southern one there is anchorage in 6½ to 10 fathoms 200 yards from shore. From the northern point of this bay a reef extends south for ⅖ mile. From San Pedro Point, the southern point of this bay, the coast trends south-southeast for 3 miles to Apunan Point, the southwest point of the island, which forms two bights; the northern of these is shallow and foul; the southern one has a depth of 5 fathoms 200 yards from the beach. The shore from Apunan Point around to the south and east is clear and steep. North of Calabago Point, on the east coast, is a large bay with an islet, 198 feet high, near the point. A reef extends ½ mile north-northwest from the islet. The rest of the northeast and north coast is clear, and, like the whole coast of this island, can be approached to ½ mile.

SIBUYAN ISLAND

is southeastward of Romblon, from which it is separated by a deep channel 6½ miles wide. It is extremely mountainous, there being no less than eight distinct peaks. **Mount Guitinguitin**, in the center of the island, is 6,750 feet high. **Mount Nailog**, 2,619 feet high, is separated from Mount Guitinguitin to the eastward by a deep pass which makes an excellent landmark, visible when the higher mountains are in the clouds. **Mount Conico**, 2,510 feet high, in the southern part of the island, also makes a good landmark on account of its symmetrical shape. The mountains are covered with forests of hardwood, and the soil in the lowlands is extremely fertile.

The land along the shore line is mostly low. There are many coconut trees near the coast and a narrow fringe of underbrush extends along the shore. From Ipil Point, on the northwest coast, around the south and east coasts to Cambulayan Point, the beach is composed of sand and gravel. Mangroves line the remainder of the shore line except in a few places, where there are short stretches of sand beach. From Cambulayan Point around the north coast to Ipil Point, on the northwest coast, coral reefs, bare at low water, extend from 100 to 300 yards from the shore. Cabodiangan Point is the most western point of Sibuyan Island. From it the coast trends southeast for 3½ miles to Bolaboc Point, then almost east for 2½ miles to the town of España. This town is connected by a road and trail with Magallanes on the north coast. About 1 mile southeast of España are the headquarters of a lumber company. Vessels can anchor off the mouth of the river, taking care to avoid the reef and rock awash that make off ½ mile from the south side. Anchorage may also be taken in front of España. The only obstruction to the approach to this anchorage is a shoal, with 1½ fathoms over it, lying about ½ mile southwesterly from the town. There are several shoals with 2¼ to 4½ fathoms northward and westward of Cantingas Point, 5½ miles southeast of España. They lie about ¾ mile off-

shore, and, while there is deeper water inside, vessels should keep at least 1 mile offshore when navigating in this vicinity. Corol reefs extend 400 to 500 yards offshore at the town of **San Fernando**, 2 miles eastward of Cantingas Point.

Cauit Point is the most southern point of Sibuyan Island. The water is deep close to the point, but heavy tide rips occur at and near the spring tides. The town of **Azagra** lies ½ northward. **Prueba Reef** is a large shoal lying 1 to 3 miles southward of Cauit Point. There are two spots about 1½ miles from the point that bare at low water and a spot with 2 fathoms on it at the southern end of the reef. From Cauit Point to Cambulayan Point the coast is clean and steep-to. The town of **Cajidiocan** lies 2 miles southward of Cambulayan Point. From Cambulayan Point northward, the coast is fringed with coral and mangroves. There are a few short stretches of sand and gravel beaches where a landing can be made. There is a chain of shoals lying from 1 to 1½ miles off the northeastern coast, with a deep channel between them and the shore. The southern end of the shoals lies about 1 mile northward of Cambulayan Point. There are several breaks or passages into the channel, the most important of which lies opposite Cambalo Point and town. A rock awash, lying 1½ miles northeast of Canloay Point, marks the northern shoal. The northwest channel should not be used by strangers when going to Cambalo, as it is narrow and long and extensive reefs make out from shore. The north coast of Sibuyan Island is fringed by a broad coral reef. About 2¼ miles west of Canloay is a break in the reef which affords anchorage and some protection for small vessels in front of the village of Silom. A coral reef and shoal with ½ fathom at the end extends ½ mile northeast of Consumala Point, the most northern point of Sibuyan Island. Shoal water extends the same distance northward and westward of the point.

Magallanes is a town on the west bank of the river of the same name, 2 miles westward of Consumala Point. On the east side of the river is a large house with a white roof that makes an excellent landmark for approaching the anchorage off the town. There is a rock awash north of the town, 1½ miles north-northwestward of the white roof. Shoals extend ½ mile northwestward and southward from the rock with 3 fathoms and 2¾ fathoms over the outer ones, respectively. There is a shoal with 1 fathom on it 1½ miles northeastward of the rock awash.

Directions.—The anchorage off Magallanes may be approached either from northwest or northeast. Vessels from northward and westward, when about 2 miles northward of Cangouac Point, should steer for a large white house on the east bank of the Magallanes River, bearing 149° (148° mag.); this course will lead to an anchorage in 6 to 9 fathoms; sandy bottom. Vessels from eastward should keep 1½ to 2 miles offshore until Ipil Point bears 245° (244° mag.); steer in on this course until the mouth of the river bears 186° (185° mag.); then steer 197° (196° mag.) to clear a 2¾-fathom patch. This latter course will lead to the anchorage northwest of the entrance to the river. Ipil Point is prominent only on the above bearing. It is about 70 feet high and separated from the main shore line by lower land. The coast between Magallanes and Ipil Point is fringed with coral and mangroves, and shoal water extends some

distance offshore. A 3-fathom patch lies about ½ mile northeast of Cangouac Point.

The channel between Sibuyan and Masbate is about 30 miles wide, but contains numerous shoals and reefs surrounded by deep water. The channel may be roughly divided into three main passages, of which the western one is the easiest to navigate. It lies between Sibuyan Island and Prueba Reef westward and a line of reefs lying 6 miles southeast of Sibuyan Island. The narrowest part of the passage, between Prueba Reef and Cresta de Gallo Island, is 4 miles wide and is deep and clear.

Cresta de Gallo Island lies 6 miles southeastward of Cauit Point, Sibuyan Island. The southern part of the island has two peaks, the northern and higher one 94 feet high, making an excellent landmark for navigating in this vicinity. The northern part of the island is a low sand spit almost awash at very high tides. A coral reef, bare at low water, extends ¾ mile northeastward, and shoal water extends the same distance eastward and southeastward of the island.

Romero Reef lies 2 miles southeastward of the island, and **Aubarde, Roda, Perseus,** and **Cervera** Reefs lie northeastward, as shown on the chart. Between this line of reefs and a group of reefs consisting of **Roldan, Anda, Pineda, Carrasco, Arana,** and **Reynoso** Reefs, is a deep, clear channel. Between these reefs and extensive reefs and shoals extending from the Masbate shore, including **Bennet, Gamma, Tuma,** and **Montero** Reefs, is a deep channel, but Montero Reef lies in the middle. This channel is difficult, due to the irregular currents, and should not be used, the westernmost channel being preferable.

WEST COAST OF MASBATE.

Southward of the southeast part of Luzon is the eleventh island of the Philippines in point of size, having an area of 1,236 square statute miles. It is irregular in shape and very mountainous, there being a high central chain which follows a semicircular direction and terminates at the southwest and southeast points of the island, throwing out spurs northwestward which form Bugui Point. The highest point of the island, 2,073 feet, is probably about 19 miles southeastward from Bugui Point. The island is well wooded and watered, and in the southeastern part are extensive grazing lands. The island is sparsely inhabited; the towns are small and of little commercial importance.

Bugui Point, the northwest point of Masbate Island, is moderately high, rugged, and steep-to and may be passed close to in 6 to 7 fathoms. It is marked by a flashing white and red light, visible 21 miles.

The coast from Bugui Point to Bagupantao Point, 9 miles southward, is moderately high and steep-to as far as the barrio of Mataba. At Mataba and southward a shelf or bank makes off from shore with several dangerous shoals upon it, the outer one with 1½ fathoms over it lying southwestward of the town and 1 mile from shore. Vessels should not venture among these shoals.

Beta Reef, with 1½ fathoms least water, is small in extent and steep-to. It lies 4½ miles north-northwestward of Gato Island.

Gato Island, 2¾ miles west-southwestward of Bagupantao Point, on the outer edge of the bank making off from the coast of Masbate, is 188 feet high, small in area, may be approached close-to, and makes a good landmark for navigating in this vicinity. A shoal with 3 fathoms lies 2½ miles northward of Gato Island and several shoals with slightly deeper water lie between this shoal and Gato Island.

From Bagupantao Point to Mariveles Point, 13 miles southward, the coast is lower and forms shallow bays fronted by the islands Majaba, Nabugtut, Bagumbanua, and Napayauan. There is sheltered anchorage northward of Majaba Island in 3 to 5 fathoms; mud bottom. The approach to this anchorage is contracted by a 1½-fathom shoal lying $\frac{4}{10}$ mile southward of Bagupantao Point and by a 1¾-fathom shoal lying the same distance northward of Majaba Island. The channel between these two shoals is about ¼ mile wide and 7 fathoms deep. Good anchorage may also be found southeastward of Majaba Island in 4 to 5 fathoms, sandy bottom, by passing between Majaba and Nabugtut. **Bagumbanua** is a small mangrove island lying on the same reef with Napayauan Island. There is no passage between these islands and the shore of Masbate, the water being shoal with coral heads bare at low water in places. Two reefs southeast of Napayauan Island almost close the approach to an anchorage in 4 fathoms, mud bottom, back of that island. The best channel, about 400 yards wide, is between the shoals and the coast of Masbate. About 1¼ miles southwest of Napayauan is the outer end of a large coral shoal making off from the coast of Masbate. It is very irregular and has depths of from 1 to 2½ fathoms over it, with a long coral reef at its shore end, with several rocks awash. **Tumalaytay Island**, 214 feet high, lies on the shore reef off the point of the same name. A shoal with 4¼ fathoms over it lies 1¼ miles north-northwestward of the western end of the island.

Nin Bay (chart 4455), 1½ miles southeastward of Mariveles Point, between Pagbulungan Point northward and Talisay Point southward, is divided into two parts by Camasusu and Carogo Islands. The northern part, or Nin Bay proper, is safe and well sheltered, with good holding ground. Argos Reef, 3¼ fathoms, and Romulus Reef, 1½ fathoms, are the northernmost of several reefs that obstruct the southern approach to the anchorage in this bay. The channel between them and Pagbulungan Point is over 1 mile wide, deep and clear. The head of the bay is somewhat shoal, the 3-fathom curve being about ¾ mile from shore. Perfectly protected anchorage for small vessels may be had in Alas Bay just inside the narrow channel connecting that bay with Nin Bay. The little town of Mandaon, on the peninsula separating the two bays, is of no commercial importance.

Looc Bay, the southeastern part of Nin Bay, is separated from Nin Bay proper by Camasusu and Carogo Islands, both of which are high and wooded. Camasusu is steep-to on all sides and there is a narrow, deep channel between it and Carogo Island. The channel east of Carogo Island and the entire eastern part of Looc Bay are shoal. Coral reefs and shoals make offshore over ½ mile from the southern side of the bay, leaving a small area of good anchorage, east of the peak on Camasusu Island. Tandao Rock, a rock awash lying ¾ mile north-northwestward of Talisay Point, is the only danger in the entrance to Looc Bay.

A shoal with 3¼ fathoms least water lies 2¼ miles west-northwestward of Camasusu Island peak. There are a number of shoals and banks with 3½ to 10 fathoms lying off this part of the coast, as shown on the chart.

From Talisay Point the coast trends south-southwestward for 13 miles and then southeastward for 2 miles to Pulanduta Point, the southwest point of Masbate. The land along the shore is low except at Tumatum Point, where the hills approach close to shore and form low, rocky bluffs. Coral reefs and sand beach fringe the shore. **Talisay Reef,** parts of which are awash at low water, lies 1¾ miles southwest of Talisay Point and about 1 mile offshore. Aside from this reef, the coast can be navigated with safety at a distance of 1 mile from shore.

Pulanduta Point is the extreme southwest point of Masbate Island; eastward of the point there is anchorage in 5½ fathoms; sand.

Jintotolo Island, 2¾ miles south-southwestward of Pulanduta Point, is about 120 feet high, well wooded, and fringed by a sand beach. It is surrounded by a reef which extends nearly ½ mile on the eastern and western sides, with 2½ fathoms on its eastern edge and 4½ fathoms on the western.

A light (flashing white and red), visible 20 miles, is shown from a tower 51 feet high, on the southern and highest part of Jintotolo Island. The lighthouse is visible before the island is raised and is prominent when approaching the island.

The channel between Pulanduta Point and Jintotolo is clear, with 14 fathoms in the middle.

Circe Bank, about 10 miles east-northeastward of Jintotolo light, is about 1 mile in extent, composed of coral, with a least depth of 3¼ fathoms, surrounded by deep water.

SOUTH COAST OF MASBATE.

Asid Gulf, which forms the south side of Masbate Island, is over 50 miles wide at the entrance between Pulanduta Point and Caduruan Point, and extends some 23 miles northward. The gulf contains a large number of shoals, reefs, and small islands, as shown on the chart.

From Pulanduta Point the coast trends in a northeast direction for 24 miles to the head of the gulf. The coast for the first 20 miles is steep-to and fringed by a narrow coral reef with sand beaches at the high-water line in places. Moderately high land, covered with trees, comes close to the water's edge as far as Jangan Point. North of this point the hills recede from the shore, giving place to a low, grass-covered plain with numerous small rivers. A coral reef, which bares at low water, lies ¾ mile off the mouth of the Bangad River, and shoal water extends from the reef to the shore. From this reef to the head of the gulf and along the eastern shore to the town of Placer shoal water extends a considerable distance, the 3-fathom curve being 1½ miles offshore at the town of Milagros. The shore is mostly a gently curving sand beach, with a fringe of trees fronting a grassy plain. This coast is devoid of prominent landmarks. Vigia Hill, 330 feet high, lying just back of Buri Point, is the most prominent one; Balabao Point, though extending out from the general direction

of the shore line, is not prominent from offshore, and the islands in the gulf are low and covered with bushes.

Naguran is a small and low islet lying 5¼ miles south-southwestward of the town of Milagros, at the head of the gulf. From it a line of shoals extends 12 miles southwestward. There is a channel 2½ miles wide between this line of shoals and the shoals that fill the eastern part of Asid Gulf, but as there are no leading marks, it can not be recommended. Vessels from westward and southward, bound for Milagros, should pass eastward of the 3½-fathom shoal lying 3¼ miles east-northeastward of Pulanduta Point, eastward or westward of the ¼-fathom shoal lying 3½ miles southward of Cinamongan Point, and westward of the 1½-fathom shoal lying 3½ miles eastward of Cinamongan Point, and proceed to an anchorage midway between Naguran Islet and Milagros in 5 fathoms, mud bottom, or closer to shore, according to draft.

Vessels from the southeastward bound for Placer can pass either eastward or westward of Guinauayan Island. A reef with rocks bare at low water near the outer end extends 1½ miles eastward of the island, leaving a channel about ¾ mile wide and 5 fathoms deep. There is a 3¾-fathom shoal 3 miles southward of the highest part of Guinauayan Island and another 3¾-fathom shoal 4 miles southeastward of the same place. There are rocks awash ½ mile southeastward of Nauco Point. These are the only dangers in the approach to the town of Placer.

Vessels bound for Milagros from the southeast have a choice of several channels among the islands; probably the best one is east and north of Naro, Pobre, Namatian, Manoc, and Guinluthagan islets, all of which are low. Pina Islet, on the north side of this channel, lies on a coral reef separated from the shore of Masbate by very shoal water. This reef dries at low water for 2 miles south of Pina Islet and shoal water extends the same distance westward. A dangerous reef, partly dry at low water, lies 2 miles west of Balabao Point and 2½ miles northeastward of Guinluthagan Island.

Gorriti Shoal, with a least depth of ½ fathom, lies 4½ miles south-southwestward of the south end of Naro Island.

Caduruan Point, the southeastern extremity of Masbate, is long and sharp; shoal water extends about ¼ mile southward from it, outside of which it appears to be clear, with a depth of 5 fathoms close-to. The point is formed by rocky bluffs separated by short stretches of sand beach. Back from the shore the hills rise between 200 and 300 feet and are very uniform, showing no prominent peaks. They are covered with a fairly heavy growth of timber and brush with occasional clearings near the shore.

ISLANDS SOUTH OF MASBATE.

Manocmanoc Islets are three flat-topped, vertical-sided, uninhabited rocks lying on a reef about 8 miles southward of Caduruan Point, Masbate. The reef between them shows bare sand spits at low water. The northern and largest is 29 feet high; the middle one 48 feet high, and the southern and smallest is 54 feet high. Foul ground exists about ¼ mile westward from them, and they should be given a berth of at least ½ mile.

Carnasa Island, lying about 4 miles southeastward of Manocmanoc Islets, consists of a group of low, round, wooded hills, 140 feet high, in the northeast part of the island. On the eastern side the cliffs are about 60 feet high. Lying close to the south end of the island is a detached rock 43 feet high. The island is fringed by a very narrow reef and may be safely rounded at a distance of about ½ mile. There are a few inhabitants on the southwest side of the island.

Maria Islet is a very small, rocky, steep-to islet, 58 feet high, about ⅞ mile southeastward of Carnasa Island. The channel between it and Carnasa Island is over ½ mile wide and 12 fathoms deep in the middle.

Gato Islet, lying 8 miles northwestward of the north end of Malapascua Island, is a precipitous rock, 321 feet high, which forms a very prominent landmark. It has a few bushes on its top. The cliffs are underworn by the action of the sea, making landing almost impossible.

Vessels from Jintotolo Channel bound for Cebu pass about 2 miles southward of Gato Islet, if going northward of Malapascua, and about 5 miles southward of it if intending to pass between Malapascua and Cebu Islands.

Tanguingui Islet, lying 23½ miles east-southeastward of Gigantes light, is a low, flat, sandy cay. The highest point of the cay, near the base of the lighthouse, is 22 feet high. A group flashing light, visible 17 miles, is shown from a black steel tower on Tanguingui Islet.

A large coral reef with a least depth of 1½ fathoms lies about 5 miles southward of Tanguingui Islet and about the same distance northward of Bantayan Island.

NORTHEAST COAST OF MASBATE.

Bugui Point and light have already been described. The coast from Bugui Point to Port Barrera is steep-to, and there are no offlying dangers. The shore reef extends from 100 to 450 yards offshore. Diablo is a small islet lying on the shore reef 4 miles eastward of Bugui Point.

Port Barrera (chart 4455) lies 9 miles east-southeast from Bugui Point and has large, well-protected anchorage areas with good holding ground. The surrounding land is mountainous, of a reddish color, and furnishes good timber for building purposes; the shores are lined with mangroves. COLORADA POINT, the western entrance point, is a succession of small hills about 200 feet high, ending in a bluff about 50 feet high. It is marked by a light. A coral reef bares about 225 yards eastward of the point, and shoal water extends about 550 yards farther. CATBATAN POINT, the southern and eastern entrance point, is mountainous and wooded, and a coral reef extends 450 yards northward, with a prominent rock on the outer end. The depth of water in the middle of the port is 16 to 30 fathoms, mud bottom, but westward it decreases and becomes rocky. Reefs bare about ⅖ mile offshore at Matalan Point and about half that distance in the bay northward of the point. The south shore of the outer harbor is fringed by a broad reef broken only at the town of Aroroy.

There is good anchorage in 22 fathoms, coarse sand and mud, off the inner side of the sand beach of Colorada Point, also in the en-

trance of the port with the point bearing north, but the best-protected anchorage is in the arm extending about 2 miles southward of Amoron Point, off the Guinobatan River or northwestward of Magaguilan Island. A coral reef, about 450 yards in extent, with a least known depth of ½ fathom, and surrounded by deep water, lies in the approach to this anchorage. A red buoy marks the south side of this reef. A coral reef with 1 fathom least water lies 650 yards eastward of Amoron Point and its western side is marked by a black buoy. By steering a southwest by south course for the prominent white spot on CLIFF POINT both shoals will be cleared. The anchorage, ¼ mile northwest of Magaguilan Island, is marked by a black buoy. The head of the bay is shoal. The Lanan River has 2 fathoms inside, but the approach is blocked by mud flats. The Guinobatan River affords a landing for small boats carrying supplies to the mines back of Aroroy, and supplies a good quality of fresh water. The rivers emptying into the head of the bay cause a strong northerly current during ebb tide in the inner anchorage with practically no current during flood.

AROROY, the only town of importance in Port Barrera, is a port of call for commercial steamers and is the shipping place for the mines of this vicinity. All the houses have nipa roofs and are not prominent. A black buoy is moored on the edge of the reef about 650 yards north of the town. Mount Bagadela, marked by a large cogon patch on the western slope, and Mount Canatonatoan, are useful as landmarks in approaching Port Barrera. These two mountains are close together just south of Aroroy and are conical in shape, whereas the higher mountains inland are decidedly irregular.

Pasil Bay (Port Magdalena), 9 miles southeast of Port Barrera, is very small and open to northward. Good anchorage in 7 to 8 fathoms, mud, may be had in midstream, between the prominent sand spit on the northwest side and the old church in Magdalena. Good protection may be obtained by going farther into the bay and mooring in about 3 fathoms.

Bagubaut Point, eastward of Pasil Bay, is easily recognized, being bold and prominent. The other points along this part of Masbate are inconspicuous. The coast is steep-to, and there are no dangers outside the shore reef.

Masbate Harbor (chart 4455), about 6 miles southeast of Bagubaut Point, is easy of access, deep, and well sheltered from all winds. The town of Masbate is on a bluff on the eastern side of the harbor. Steep-to reefs, extending in places ⅜ mile, lie along the northern and western sides of the harbor. The head of the harbor is shoal. A number of rivers flow through the mangrove swamps that line the shore.

The entrance channel is about 325 yards wide. A light, visible 9 miles, marks the southern end of the western entrance point. A red buoy marks the edge of the reef extending northeastward of Northwest Point. A black buoy marks the edge of the reef northwestward of the town of Masbate.

DIRECTIONS.—Approaching the entrance to Masbate Harbor, when about 1 mile from the light, bring it to bear 226° (225° mag.) and steer for it. When nearly up to it, haul southward to give it a berth of about 225 yards; continue southward, keeping a good lookout for the reefs eastward, and anchor off the wharves about 275

yards from shore in 16 to 17 fathoms; mud bottom. The private wharf, in the northern part of the town, has 18 feet at its end. The wreck of the steamer lying off the old pier is in deep water and is no obstruction to navigation. The schoolhouse at the eastern end of the town has an iron roof which shows prominently from all directions.

Mobo Bay, between Baybay Point and Sagausauan Point, is foul and of little importance to navigation. **Buntud Reef** lies in the middle of the bay, and with the reefs making 325 yards off Baybay Point is a serious danger to vessels approaching Masbate Harbor from the southeast. **Tacu** and **Mobo Shoals** lie northward and northwestward of Sagausauan Point. The anchorage is back of these shoals off Mobo, a town of little importance.

Gorda Point, 2 miles southeast of Mobo Bay, is composed of large bowlders from which a steep, wooded slope rises 246 feet to a bench and then another 200 feet to the top of the hills near the shore. This makes the point readily recognizable from up and down the coast, but not when abreast of it.

Uson Bay lies 6 miles southeast of Gorda Point, between Paniqui and Tabunan Points. The head of the bay is filled with sand and mud and mangroves. Uson lies on the eastern shore, has no important industry, and no supplies of any kind are obtainable.

Naro Bay, between Tabunan Point and Cadulan Point, 4 miles to the eastward, is clear and deep and affords good protection except from the northwest. The town of **Dimasalang** lies on the beach at the head of the bay. It is connected by telegraph with Masbate and Palanas and has a weekly mail service, but no supplies are obtainable. Naro Bay affords excellent anchorage in bad weather in case a vessel is unable to reach Masbate Harbor.

Cadulan Point, the eastern entrance point to Naro Bay, is an eroded bluff, covered with jungle and with a narrow ledge at the base. **Cudao Islet** is a low rock, 66 feet high, lying ¾ mile westward of the point. The water is deep to westward, but shoal to northward and eastward of the rock.

TICAO ISLAND

is 23 miles long northwest and southeast, 6½ miles wide near the northern end, and narrows toward the extreme southern point, San Rafael, from which a chain of islands and rocks extends toward Cadulan Point, Masbate. The island is mountainous and but thinly populated. The east coast of the island presents many small bays, open eastward, in four of which good anchorage may be found, as well as on the bank that extends 1 mile off the shore near the southern end of the island. The west coast is steep and rugged, and has no good anchorage. Tatus Island, ½ mile westward of San Rafael Point, and Bujo Island, about 1 mile southward of Togoron Bay, are the only offlying islands along the west coast. The former has 11 fathoms in the channel between it and the shore of Ticao and the latter 2½ fathoms. Togoron Bay is open to southward and southwestward, has very little swinging room, and is not recommended as an anchorage.

Port San Miguel (chart 4454), between Northwest Point and Tabunan Point, is open to northwestward, but an excellent typhoon anchor-

age may be found off the barrio of Pandan in the southeast arm of the bay, where the reefs break the seas. To enter from midway between Catpatin Island and the east shore of the bay steer for the head of the small bay eastward of the rounding point until within 225 yards of that point; then turn sharply to westward and follow the edge of the reef southward. This reef is steep-to, and can readily be seen. Anchor in 6 fathoms, mud bottom, just inside of the sandy point on which Pandan stands. There is very little swinging room, but lines can be made fast ashore on both sides. The reefs in the head of the bay are hard to see on account of muddy water, and vessels should not go south of the recommended anchorage. The channel abreast Mapusa Point is only about 200 yards wide, being contracted by reefs that extend 325 yards off the point and about 200 yards off the shore on the eastern side.

Pilar Bay, the southwest arm of Port San Miguel, is lined with mangroves and almost filled by reefs. A narrow channel leads southward of the reef on which the Puro Islets are situated, but the place is not recommended as an anchorage. **Mount Pandan**, 765 feet high and oval-shaped, is on the peninsula southward of Northwest Point and forms an excellent landmark.

Catpatin Island is heavily wooded and very steep with jagged rocky shores. The west side has bold, vertical cliffs about 150 feet high. **Yeso Island** is brush covered and has very jagged underworn shores. A fine sand beach lies on the mainland southeast of Yeso Island. **Faltaban Island** has a vertical rock cliff on its northwest side. The shore is honeycombed and much underworn. **Bagababoy** is wooded, steep-to, and three low places near the center divide it into a series of knolls. The east side of the island is deeply indented; the western has several high vertical cliffs. **San Miguel Island**, the northernmost of the islands northward of Ticao, is almost divided, the two parts being connected by a low sand spit. The southern part is very similar to Bagababoy in formation. San Miguel light, visible 15 miles, is shown from a concrete tower on the northern part of San Miguel Island.

Vessels should give these islands a good berth, as the tidal currents are very strong in their vicinity. Marcos Pass, between Bagababoy Island and Nunun Point, the northern point of Ticao, is narrow but deep and clear, and affords a considerable saving in distance for vessels running between Bulan and Masbate.

Taclogan Bay (chart 4454), on the east shore of Ticao, 7 miles southeast of Nunun Point, is open to northeast, but the reefs protect it from the sea. A reef with a least known depth of ½ fathom lies in the middle of the entrance, with a 200-yard channel with a depth of 4 fathoms separating it from the reefs extending off the western entrance point and a deep, clean channel southward of it. A shoal marked by a fish trap in 1½ fathoms extends off the southern shore. The anchorage is west of this shoal northward of the barrio of Rizal in 10 to 12 fathoms; mud bottom. There is not much swinging room, but very good holding ground. A narrow channel leads into a basin in a large, shallow lagoon that affords a perfectly landlocked anchorage for launches and small vessels.

Port San Jacinto (chart 4454) affords good anchorage, well protected except from the east, with ample swinging room. The town

of **San Jacinto,** on the southern shore back of San Jose Point, is the most important town on Ticao. It is partly obscured by trees, but the place may be recognized by several conspicuous cogon hills, 200 to 400 feet high, back of the town. A light, visible 7 miles, is shown from the top of a concrete house on San Jose Point. Commercial steamers calling at San Jacinto usually anchor northward of the light in front of the town. Vessels intending to anchor inside the bay should enter midway between Cosme Point and the town on a 262° (261° mag.) course and anchor in 7 to 10 fathoms with Cosme Point, bearing about north. The head of the bay is shoal, and mud flats bare a considerable distance offshore.

Ticao Bay, 5½ miles southward of Port San Jacinto, affords good anchorage, but no protection except from the west. **San Fernando** lies on the western shore. Approach the town with the church bearing 258° (257° mag.) and anchor in 6 to 12 fathoms. Launches can enter the lagoon at the head of the bay at high water only.

Batuan Bay, 4 miles southward of Ticao Bay, has a small, partly protected anchorage. A wide reef extends 550 yards offshore east of the town and another reef extends off the southern entrance point. Small stakes usually mark the edge of the latter reef. The entrance may be made by keeping 50 to 100 yards northward of these stakes and changing course to west near the fish trap on the south side of the channel and anchor in 3 to 4 fathoms, mud, southward of the town. If the stakes are not in place, bring a small conical hill on the south shore to bear 225° (224° mag.) and change to 270° (269° mag.), when a depth of 5 fathoms is reached.

Biton Bay is foul. Shoal water with depth of 3 and 4 fathoms extends from 1 to 1½ miles eastward of San Rafael Point and of the islands southward. Deep channels exist between the several islands, but the ones usually used are Black Rock Pass and the channel between Deagan Island and Cadulan Point, Masbate.

Matabao Island is separated from San Rafael Point, Ticao, by a narrow passage with a depth of 11 fathoms in the channel between the shoal areas eastward. The tidal current does not set fair with this channel, and compass courses must not be depended on when using this channel. Its use should be avoided if possible. The south and west side of the island is steep-to and may be passed at a distance of ¼ mile. A light, visible 7 miles, is shown from the top of a concrete house on Argos Point, southern end of Matabao Island.

Black Rock Pass, between Argos Point and Magearagit Island, is over 2½ miles wide and is divided into two channels by **Black Rock** and its surrounding shoals. The rock itself is low and usually hard to see. At high-spring tides it is covered, and from a distance appears as a black log. It is marked by a white beacon in a conical concrete base. Both channels are deep, but the irregular bottom and strong tidal currents cause very heavy tide rips, swirls, and eddies. During spring tides these effects are intensified and result in disturbances equal to that in San Bernardino Strait.

Three wooded hills on the islands southward of the pass make excellent marks for cross bearings, that on Dakit Island being the most conspicuous. Vessels using the channel north of Black Rock when going east should bring the lighthouse on Argos Point to bear 70° (69° mag.) and not more than 1 mile distant; then steer 90° (89°

mag.), making an allowance for current, which has a strong tendency to set down on the rock during ebb; when the summit of Dakit Island bears south the course may be set as desired. When bound west bring Dakit Island summit to bear south and the lighthouse 280° (279° mag.) and then steer 270° (269° mag.) until the lighthouse is on the quarter, when the course may be changed as desired.

Vessels passing south of Black Rock should steer a mid-channel course, ½ or ¾ mile northward of Magearagit Island, until the middle of the cliff of Deagan Island bears south when bound eastward; and when bound westward, hold the mid-channel course until the lighthouse on Argos Point bears north.

The passage between Cadulan Point and Deagan Island is about ¾ mile wide, with depths of 6 to 11 fathoms in the middle, but shoals on either side contract the channel to about ¼ mile between the 5-fathom curves. Some masters prefer this channel to the Black Rock passages, claiming that the tidal streams run less strongly than in those passages.

Vessels using this passage, bound eastward, should give the south point of Deagan Island a berth of about ¼ mile and steer out 68° (67° mag.) for about 2 miles, when the course may be shaped as desired. When bound westward, bring the middle of the passage to bear 248° (247° mag.) when about 2 miles distant and steer for it, giving the south point of Deagan Island a berth of about ¼ mile.

EAST COAST OF MASBATE.

The coast of Masbate from Cadulan Point to Caduruan Point, a distance of about 32 miles, is clear, with depths of 4 to 8 fathoms close to the shore except in the vicinity of Kansuriao Point, where the reef makes off about ½ mile.

Port Cataingan (chart 4455), about 20 miles southeastward of Cadulan Point, is a clean and capacious harbor, open southeastward, of good depth and good holding ground; it is 1¼ miles wide at the entrance and extends 4½ miles northwesterly in the direction of Tetas de Cataingan, two prominent rounded hills at the head of the port. On the seaward side of the peninsula, forming the eastern side of the port, the 5-fathom curve is about ½ mile from the coast. The shores of the port are fringed with reefs and shoals from ⅛ to ¼ mile, and there are three isolated shoals with little depth on the eastern side, as shown on the chart. The head of the port is sandy on the western side; the northern part is shallow with regularly decreasing soundings, and at the head there are mud flats which bare about ⅜ mile. Perfectly protected anchorage may be found near the head of the port in 4 to 5 fathoms, about ½ mile southeastward from the town of Cataingan; another recommended anchorage is in the bight on the western side of the port, about ¼ mile northwestward from Mintag Point.

Dumurug Point, the eastern entrance point, is fringed by a reef which extends about 300 yards southward.

Baslay Island, ¾ mile south-southeastward from Dumurug Point, is very small, surrounded by a narrow reef, and has a shoal extending about 1¼ miles southward, at the extremity of which there is a depth of 1 fathom.

Ordoñez Bank, with a least depth of 5½ fathoms, is a small bank lying about 1 mile southwestward of Dumurug Point and less than ½ mile from shore. The channel between Dumurug Point and Baslay Island is ½ mile wide and 10 fathoms deep in the middle and that between Baslay Island and Ordoñez Bank is nearly 1 mile wide and over 20 fathoms deep.

Bugtung Island, about 5 miles south-southeastward of Dumurug Point, is fringed by a narrow reef and is 343 feet high. Its southeastern extremity is formed by a hill 295 feet high.

Balanguingue Island, about 2½ miles south-southeastward of Bugtung Island, is very small and is fringed by a narrow reef which extends about ⅛ mile northwestward. The channel between these islands and Masbate appears to be deep and clear.

Caduruan Point, the southeastern extremity of Masbate, is long and sharp; shoal water extends about ¼ mile southward, outside of which it appears clear, with a depth of 5 fathoms close-to. The point is formed by rocky bluffs separated by short stretches of sand beach. Back from the shore the hills rise between 200 and 300 feet in height and are very uniform, showing no prominent peaks. They are covered with a fairly heavy growth of timber and brush, with occasional clearings near the shore.

ISLANDS BETWEEN MASBATE AND SAMAR.

Naranjo Islands, lying close together about 7½ miles southward of Luzon, comprises a group of six small islands, San Andres, Rasa, Medio, Darsena, Aguada, and Escarpada. Their slopes are very abrupt, being steeper near the shores. The islands are almost bare of heavy timber, though practically the whole group is covered with brush and jungle. There are no important towns on the islands. The best anchorage is in Sabariog Bay, north of Darsena Island. In northeast weather anchorage may be taken up on the southwest side of Escarpada Island. Ternate Bay, between Darsena and Aguada, affords good anchorage, but is subject to strong currents at times. The flood generally sets southwest, but in the channel between Aguada and Escarpada it sets northwest and between Rasa and San Andres northeast, causing heavy tide rips where they meet the southwest current.

Destacado Island, lying about 3 miles southeast of the Naranjo Islands, rises steeply from the water on all sides and is clean, with the exception of a reef making offshore from the middle of Lode Bay. The anchorage in Lode Bay, southeastward of Isioc Point, is good in all but southwest weather.

Capul Island is hilly, with several sharp cone-shaped summits along the sky line, but the highest, near the southeast end, is flat-topped. The slopes are steep and heavily timbered except on the northeast side, where a valley makes inland and a number of clearings are found. **Capul** is the most important town on the island. A church with prominent bell tower is conspicuous. In fair weather anchorage may be had northeastward of the town, but this coast is exposed to the full force of the tidal currents through San Bernardino Strait. **San Luis,** in San Luis Bay, is a small fishing village. A good road leads from the bay to the lighthouse on Totoog Point. Capul light,

visible 18 miles, is shown from a round, white tower, with dwelling at the base on Totoog Point.

Dalupiri Island is smoothly rounded on top and partly wooded. There is some heavy timber near the north-central part, but the island is being cultivated more each year. Both east and west sides of the island are clean and steep-to, but extensive shoals extend northward and southeastward. Anchorage may be taken anywhere along the coast, but necessarily close in, as the water is deep everywhere except on the shoals projecting from the north and south ends of the islands.

The channels between Luzon, Capul, Dalupiri, and Samar are all subject to strong currents, tide rips, whirlpools, and eddies. The shores along Capul Island show evidence of extremely heavy wave action during the northeast monsoon. No detailed observations were made for currents. The following notes are based on the experience of the survey vessel during April, May, and June, working under the best conditions obtainable, and the intensifying effect of heavy weather on the strength and direction of currents should be borne in mind.

Dalupiri Pass, between Dalupiri Island and Samar, is the safest and should be used by all vessels bound to or from the south. Tide rips and whirlpools will be found about 2 miles north of Igang Point and 1½ miles southeast of Minangas Point. The current generally sets fair with the channel, with a counter current close inshore.

Capul Pass, between Capul Island and Dalupiri Island, should be avoided as much as possible, and especially by vessels bound north, as there is danger of being swept on DIAMANTE ROCK. This rock is composed of sharp, black rocks, bare or almost bare at low water. RUBI SHOAL, lying 1½ miles westward of Diamente Rock, is also composed of sharp, black rocks, with a least depth of 3¼ fathoms. Both of these dangers are steep-to and hard to pick up, while large eddies, sometimes a half mile or more in diameter, are liable to sweep the vessel off her course.

Through Capul Pass the current floods south on the west side and in the center and north along the Dalupiri Island shore causing a long line of rips and small eddies with a great deal of foam that gradually works across the pass with the stage of the tide. The ebb flows north in the entire pass, coming from westward over Rubi Shoal, while the flood is still running southeastward of Diamante Rock.

Naranjo Pass, between the Naranjo Islands and Capul Island, is wide and deep. Tide rips extend from Totoog Point for over a mile northward. The main current floods southwestward past the point, while a counter current runs northward on the east side of the point at the same time. Numerous swirls and eddies are formed in the channel between Capul and Luzon, the water seeming to boil up from beneath, the center of the eddy in some cases appearing to be at least a foot higher than the edge. Vessels bound southward through this channel should pass about 1 mile westward of Totoog Point and the same distance eastward of Destacado Island. Vessels bound westward with the current are likely to be carried southward toward San Andres Island unless special precautions are taken to avoid it. In the night or during stormy weather vessels from southward would

do well to keep close to the Masbate shore and pass northward of the Naranjo Islands, getting their positions by the aid of Matabao and Capul lights.

Tagapula Island, about 8 miles northeastward of Dumurug Point, is clean, steep-to, and 1,470 feet high. **Sibugay** is a small islet, 428 feet high, ½ mile from the northern side of Tagapula, with a deep channel between them. **Espana Shoal**, 1 mile eastward from the northeast point of Tagapula Island, has a least depth of 2 fathoms and is surrounded by deep water.

Camandag Island, about 11 miles east-southeastward of Tagapula Island and 7 miles southwestward of Jibatan Point, Samar, is clean, steep-to, and 1,408 feet high.

Almagro Island lies about 8 miles southeastward of Tagapula. The northern part is 1,295 feet high and the southern part has a flat summit 1,824 feet high. The town of Almagro is at the head of Almagro Cove, a large indentation at the southwest end of the island. **Cabilison** is a small high islet about ½ mile southward from the southwest point of Almagro Island.

Santo Nino Island lies southeastward from Camandag, separated therefrom by a deep and clear channel 1½ miles wide. The island is 1,550 feet high, clean, and steep-to. **Santo Nino Harbor**, on the north side of the island, is an excellent typhoon refuge for vessels not more than 150 feet long. Its entrance is only about 20 yards wide, with a depth of 1¾ fathoms, leading into a roughly circular basin 200 yards in diameter. A sunken rock, covered 2 feet at low water, lies on the west side of the channel, about 18 yards east of some bare and awash rocks. The shingle spit on the east side of the channel is covered at high water, but the edge is easily visible and should be passed close-to on a 158° (157° mag.) course, which leads to an anchorage in 5¾ fathoms, mud bottom, about in the center of the basin. The town of **Santo Nino** lies on the western shore of the harbor, near its head.

About 1½ miles east of the northeastern point of Almagro Island lies the small island of **Karikiki**, 668 feet high. Between Karikiki and Almagro are three islets called **Rough, Little Karikiki, and Sayan.** The first of these is very small and is close to the middle western point of Karikiki. Little Karikiki is 221 and Sayan 75 feet high. One mile west-northwest of Cambia Point on the northwestern side of Santo Nino Island is **Pilar Islet**, 145 feet high. All of these small islands are clean and steep-to except for short reefs making out westward of Karikiki and eastward of Pilar. The channels between the larger islands and the coasts of Masbate and Samar are wide and deep and the tidal currents run with considerable velocity.

Maripipi Island, about 5 miles southward of Almagro, is nearly round and covered with trees and is 3,020 feet high near its center. The shores are clean and very steep-to.

Sambauan Islets are four small and rocky islets, close together, surrounded by a shoal of sand, about 3½ miles west-southwestward of Maripipi summit and 2 miles from the shore of that island.

Buga Rock, 8 feet high, lies about ¾ mile northward of the most northern of the Sambauan islets and over 1 mile westward of Maripipi.

WEST COAST OF PANAY.

Panay Island is southeastward of Mindoro. It is the fifth in size of the Philippine Islands, having an area of 4,611 square miles. Its shape is an irregular triangle, with its western side trending nearly north and south, its northern side about west-northwest, and the southeastern side about northeast and southwest. The smaller island of Guimaras, separated by a narrow strait from the southeastern coast of Panay, may have been at one time connected with the larger island. Near the western coast of Panay a chain of mountains extends in a curve from the northwestern to the southern promontory, and from the middle of this chain another range branches off to the northeastern promontory of the island, which is thus divided into three natural districts, which form the Provinces of Antique, Capiz, and Iloilo. Panay is exceedingly fertile, being watered by numerous mountain streams, and it supports a large population, composed mostly of Visayans, with a few Negritos in the mountains. The island produces rice, sugar, cotton, coffee, tobacco, pepper, and cacao. Ebony and sapan wood are obtained from the forests, while pearl shells, tortoise shell, and trepang are found on its coasts. It is one of the most densely populated and highly cultivated islands of the archipelago, having a population of about 743,000. It has three large towns, Calivo, Capiz, and Iloilo, the latter a port of entry and one of the largest places in the Philippines, with an extensive foreign and interisland trade. There are no volcanoes on Panay.

The mountain mass, 2,973 feet high, which forms the northwestern promontory of the island, terminates in a clear and steep coast, of which the principal salients are Nasog and Pucio Points.

Nasog Point, the northwestern extremity of Panay, is a wooded bluff 160 feet high, with a clean and steep-to shore; on its northern side there is good anchorage; off the Malay River there are 5 fathoms, sand bottom, but a 3¾-fathom shoal lies 1$\frac{1}{10}$ miles off the mouth of the river and 3$\frac{3}{10}$ miles northeast of Nasog Point.

Pucio Point, 8 miles south-southwestward of Nasog Point, which it resembles, is 596 feet high and is girt with rocks, which project some distance from it.

The anchorage off Buruanga is between the two points in a little bay, with a depth of 3½ to 5 fathoms, off a beach near the mouth of a small river. West of the town a 2-fathom shoal extends ¼ mile from shore. Between Buruanga and Pucio Point the coast is fringed with detached coral rocks. Above these rocks the coast presents high, rocky cliffs with cascades falling over them.

From Pucio Point the coast trends eastward and is safe, with good depth near it and generally bordered with sand beaches, but a 2¾-fathom shoal lies ½ mile to the southward of the small town of San Roque and a 2-fathom shoal ½ mile south-southeastward of Tingib. Two lines of hills run parallel to the coast; their slopes are cultivated and are dotted with churches.

Pandan Bay is safe, steep, and deep, but offers little shelter except during the northeast monsoon. The town of **Pandan** lies in the bend of the coast and 2 miles southeastward from the Bugan River. There is good anchorage in 7 to 10 fathoms off the town of Pandan.

Sebaste Shoal, with a least depth of 4 fathoms, lies about 5 miles westward of the village of Sebaste.

Maniguin Island, lying 13 miles southwestward of Pucio Point, Panay, has a narrow ridge 110 feet high across its southern end, but the remainder of the island is low and wooded, and not more than 15 feet high. It is fringed with coral reefs with deep water at their edges. The northern and western points should not be approached closer than ½ mile, and the southern point should be given a berth of at least 1 mile. The eastern side of the island is bold. A group flashing light, visible 20 miles, is shown from a gray, concrete tower near the southeastern point of the island. The only anchorages, and those but indifferent ones, are in 15 to 25 fathoms, close to the edge of the reef, northeastward or southwestward of the northwest point of the island, according to the season. The last-mentioned anchorage is the better one.

From Pandan the coast trends a little west of south for about 17 miles to Lipata Point, forming several bights of no great depth, separated by rounding points. The largest of these bights is north of Lipata Point. It is about 5 miles across from the mouth of the Bacalan River to Lipata Point and about 1½ miles deep. This coast is broken by numerous small rivers, none of which have any commercial importance, and has many small towns and villages. The shore is generally clean and is free from danger at a distance of ½ mile from the beach. The only off-lying danger is Sebaste Shoal, which has been described.

Lipata Point is a low, wooded tongue extending about 1 mile west-northwestward of the general trend of the shore. It is fringed by a narrow steep-to reef on the north and the south sides, while at the end of the point the reef extends nearly ½ mile in a northwesterly direction. Northward from the point, in uneven depths of from 5½ to 23 fathoms, is the best anchorage in this vicinity during the southwest monsoon. The village of Lipata lies on the point, but is nearly hidden by surrounding coconut trees.

Batbatan Island lies 7½ miles westward of Lipata Point. About 1 mile from its western end is a hill, 550 feet high, with sides sloping regularly to the shores, which are generally cliffs from 20 to 50 feet high. About 80 yards south of the west end of the island is a small coral islet 10 feet high. A reef less than ¼ mile wide fringes the southern shore, and shoal water extends a short distance from each end of the island and from a point on the north side near the village. The cliff formation of the shore is broken in a few places by sandy beaches, on which it is possible to land in fine weather. Of these, the beach at the eastern end of the island is that commonly used by the natives. It is in a small cove protected by a sand spit which extends ⅛ mile southward from the eastern end of the island. From this landing a footpath crosses the island to the village of Batbatan, on the north shore, about ¾ mile from the east end. Batbatan is well cultivated nearly to its summit, the principal crops being rice and corn. The passage between this island and Panay is deep and clear, except for the shoal west of Maralison Island, to be noted later.

Seco Island is small and composed of low, shifting sand hills, resting upon a coral reef which is steep-to all around.

About 2½ miles northeastward of Seco Island is a shoal of moderate extent with a least known depth of 3¼ fathoms.

Carmen Bank, lying about 5 miles northwestward of Seco Islet, is composed of sand and coral, and has a least known depth of 2½

fathoms. About 2 miles south of the 2½-fathom spot and about 4 miles from Seco Islet is a bank with 9 fathoms over it.

Sultan Bank, lying westward of Carmen Bank, is two separate shoals. The outer one has a least depth of 7 fathoms and lies about 13¾ miles west by north from Seco Islet and 10½ miles from Carmen Bank. About 3¼ miles east-northeastward of the 7-fathom bank is the shoaler spot, with a least known depth of 3¾ fathoms. This shoal lies 11¼ miles west-northwestward of Seco Islet and 7½ miles from Carmen Bank. All of the shoals just described rise abruptly from deep water.

Maralison Island, about 3½ miles south-southwestward of Lipata Point and 1½ miles from shore, is 285 feet high; with the exception of the flat, sandy point at the eastern end it consists of a group of smaller peaks rising rapidly from the shores. The usual landing place is behind a sand spit at the eastern end. A small islet, 135 feet high, lies close to its western side and is connected with it by a reef bare at low water.

A rock awash lies about midway between Maralison Island and Panay. Another rock awash lies 1 mile south-southeastward of the east end of the island. A shoal having a least depth of 2 fathoms, with 10 fathoms in the channel between it and the island, lies ¾ mile westward of the west end of Maralison Island. There is deep water between these rocks and between the rocks and the island.

Sombrero Rock, 27¾ miles northwestward of Nogas Island light, shows as two black rocks of about the same height, each appearing no larger than a big boat. A recent report states that Sombrero Rock was seen from a distance of 10 miles with an elevation of the eye of 43 feet and when approaching it from northward it first appeared in two parts, of which the western (about 20 feet high) was the higher.

The town of Culasi lies on the coast about 2½ miles southward of Lipata Point. From this place southward the coast is steep, while the shores are composed of sand and an occasional narrow, coral reef. The town of Tibiao lies just southward of the rounding point and the river of the same name. A coral reef awash at low water lies ½ mile northwest of the town of Barbaza and about $\frac{3}{10}$ mile offshore; a 1-fathom patch lies about 1 mile northward and another 1-fathom patch ¾ mile southward of the reef awash, both being about ½ mile offshore.

Southward from Barbaza the coast continues clear and steep-to. There are a number of small unimportant villages on this coast. The Sibalom River, which empties through two mouths about 4 miles northward of Dalipe Point, has very little water on its bar. The town of Sibalom lies about 5 miles up the river. South of the river mouth a shelf or bank extends about 1 mile from shore with 9 fathoms near the outer edge, outside of which the water deepens rapidly.

Dalipe Point, about 21 miles northward of Naso Point, is the most western point in this vicinity; it is low, wooded, clean, and steep-to.

Tubigan Point, about 1¾ miles southeastward of Dalipe Point, is low and fringed by a narrow strip of rocks; it may be recognized by an old fort with a roof standing on the southern part. A light, visible 9 miles, is exhibited from a concrete pillar on top of the fort.

San Jose de Buenavista, the capital of Antique Province, is at the head of a cove lying eastward of Tubigan Point. It is small and of little commercial importance, and is almost hidden by large trees, only a few iron roofs being visible. The cable from Cuyo lands here, and there is telegraphic communication with Iloilo. Anchorage exposed to all but northeast winds may be found southward of the town in 6 or 7 fathoms, irregular rocky bottom, with the fort bearing 345° (344° mag.). Strangers are advised not to go too close in, as there are a number of sunken rocks and the bottom is foul.

A small coral reef about 20 yards in diameter, with a least depth of 3¼ fathoms and surrounded by deep water, lies ¾ mile southeastward of the old fort on Tubigan Point.

The town of **Antique** is about 3½ miles southeastward of San Jose de Buenavista, near the mouth of the Antique River.

The **Malandoc River,** with 6 feet on its bar at low water and 18 feet inside, empties about 1¾ miles southeastward of Tubigan Point. From the mouth of the Malandoc River to Naso Point the coast is very steep, with sandy beaches, except at Sandual, Jaldan, and Bayo Points. **Jaldan Point,** about 5¼ miles northward of Nogas Island light, is a sharp, bold, rocky point 90 feet high, projecting prominently into the sea. The rivers, with the exception of the Malandoc and Antique, have very little water on their bars. There are several villages and towns along the shore, the principal one, **Dao,** may be recognized by a prominent church with a square, iron-covered tower. Dao lies near the mouth of the river of the same name, about 2 miles northeastward of Jaldan Point.

Naso Point, the wide southwestern extremity of Panay, is abreast a high prominent detached ridge. It may be readily recognized by the town of **Aniniy,** which contains a large, white-stone church with an iron roof, which is very prominent from seaward. A small vessel can anchor eastward of Aniniy in the northeast monsoon in 1½ fathoms; sandy bottom.

Nogas Islet, about ⅝ mile south-southwestward of Aniniy, is low, flat, and wooded, and surrounded by a reef. Between it and the coast is a narrow channel sometimes used by coasters. In the middle of the western entrance is a reef of 50 yards extent with 2½ fathoms on it. A light, visible 15 miles, is shown from a steel-frame tower in the center of Nogas Islet.

SOUTH COAST OF PANAY.

Juraojurao Islet, 2¼ miles eastward of Nogas, is small, low, wooded, and surrounded by reefs. There is no channel between Juraojurao and the mainland. It is not advisable to anchor between Nogas and Juraojurao Islets, as the bottom is rocky.

The south coast of Panay from Naso Point trends northeastward for 16 miles to Talisaya Point and is high, clear, and steep-to. **Cresta de Gallo,** a saw-toothed ridge about midway between Aniniy and the town of San Joaquin, is a prominent landmark. From Talisaya Point the coast trends east-northeast for 21 miles to the town of Oton; this part of the coast is low but free from danger until near Oton Bank. From Oton to Iliolo, a distance of 5½ miles, the shore continues low and is fringed with coconut trees.

Oton Bank is a bank of soft muddy sand which begins about ⅛ west-southwest of Fort San Pedro and extends about 8 miles in a west-southwest and southwest direction. It is composed of shifting sand and said to be extending westward; vessels should not attempt to cross it. There is a narrow channel between it and the Panay Shore, sometimes used by coasting vessels, but the main channel into Iloilo lies between the bank and Guimaras Island. The western limit of the 5-fathom curve surrounding Oton Bank lies on the line bearing 204° (203° mag.) from Oton Church and the southern limit 260° (259° mag.) from **Muhuy Point**, the rugged point, 240 feet high, about 1 mile southwestward of Cabalic Point.

The channel into Iloilo eastward of Oton Bank is marked as follows: A black buoy marks the southern edge of Oton Bank; a black buoy and a red gas buoy mark the channel eastward of the bank.

Iloilo (chart 4448) stands on a low, sandy flat at the mouth of the river of the same name on the western side of Iloilo Strait. It is a port of entry and has considerable commerce. At the southern extremity of the flat on which the town stands is a large prominent fort with deep water close-to. Extensive harbor improvements are nearing completion; stone jetties have been carried out from both sides of the river entrance and retaining walls are under construction. The lower reach of the river, from the strait almost to the new customhouse, has been dredged to a depth of 22 feet and a width of 500 feet. Supplies of all kinds are available. There are machine shops capable of making all ordinary repairs. There is no dry dock; there is a small railway capable of hauling out vessels 120 feet long drawing not over 6 feet forward and 11 feet aft.

Iloilo is connected with the other ports of the archipelago by telegraph cables and has frequent steam communication with all points. There is a railway from Iloilo which extends northward as far as Capiz on the north coast of Panay. Typhoon signals are shown from the pilot's watch tower in accordance with instructions received from the Weather Bureau. Typhoons are not of frequent occurrence, although few years pass without their effects being felt here.

PILOTAGE (see Appendix) is compulsory for all foreign vessels. Pilotage through Iloilo Strait to and from the harbor (see Appendix for harbor limits) or for shifting or changing berth is optional for vessels holding Philippine licenses and compulsory for all other vessels. Pilotage in the Iloilo River is compulsory for all vessels of 100 tons gross or more, except coastwise vessels when commanded by officers licensed for this district, in which case they pay 25 per cent of the regular river-pilotage fees.

The entrance to the river is marked by two flashing lights (green on the north jetty, red on the south jetty). The lights are exhibited 15 feet above high water from square, concrete pillars erected on the ends of the jetties. Iloilo City light, an electric arc light formerly shown from the pilot's watch tower, is now shown from the cupola of the new customhouse.

The spring tidal currents have a maximum velocity of 3 to 4 knots. The flood tide sets northeastward and the ebb southwestward following the general trend of the shore. Abreast the fort the eddies are strong and irregular on the flood. The two tides of the day are generally unequal, the inequality varying with the moon's declina-

tion. The greatest range of the tide is 6½ feet, occurring usually about two days after the moon's greatest northern or southern declination.

DIRECTIONS—SOUTHERN ENTRANCE.—Vessels approaching Iloilo from the southward should bring Bondulan Point to bear 36° (35° mag.) and steer for it, pass Cabalic Point at a distance of about ⅛ mile; when Muhuy Point is just open of Cabalic Point change course to 5½° (4° mag.), heading for the twin spires and white dome of the church in the town of Molo or at night with the 230-foot hill southward of the Tetas de Guimaras astern. When the fort is open of Bondulan Point it may be steered for. The best anchorage for vessels that can not enter the river is northward of the mouth of the river in about 15 fathoms, sandy bottom, about ¼ mile outside the line of the cable-mark buoys.

Directions for entering Iloilo from the northward are given below.

Iloilo Strait, separating Guimaras from Panay, is 4½ miles wide at the northern entrance between Dumangas Point, Panay, and Nabalas Point, Guimaras. This entrance is divided into two channels by **Iguana Bank,** a large sandy shoal with a least depth of ¾ fathom. There is a good channel on either side of Iguana Bank and Siete Pecados lighthouse. As a matter of convenience the northern channel is the one generally used. A third channel, sometimes used by small vessels, is northward of the bank and southward of the lighthouse and thence around the northern end of Guimaras.

Siete Pecados are a cluster of small, rocky islets, covered with small trees and bushes, lying in mid-channel between Panay and Guimaras, westward of Iguana Bank. The only submerged dangers in the vicinity of Siete Pecados is a rock covered by 2 fathoms lying 425 yards northward of the lighthouse and another rock covered by ¼ fathom lying about 600 yards southwestward from the same point. A light with a red sector, visible 15 miles, is shown from a white, iron lighthouse extending above the keeper's dwelling near the middle of the largest islet of the Siete Pecados group. The red sector covers an arc of 30° in the direction of Iguana Bank.

The northern approach to Iloilo Strait is buoyed as follows: A red buoy marks the edge of the shoal water off Dumangas Point; a black buoy marks the northeastern limit of Iguana Bank; a black buoy marks the western limit of Iguana Bank; a red buoy marks the southern limit of Iguana Bank.

DIRECTIONS—NORTHERN ENTRANCE.—Vessels from the northward should bring the lighthouse on Siete Pecados to bear 274° (273° mag.) and steer for it passing about ¼ mile northward of the black buoys; when up with No. 3 black buoy the vessel should be hauled northward to round the Siete Pecados at a distance of ⅜ to ½ mile, and when Jaro Church, which is very prominent, bears 247½° (246° mag.) it should be steered for. When Fort San Pedro and Bondulan Point are in range, bearing 220° (219° mag.), the vessel should be hauled southwestward to pass midway between Dapdap Point, Guimaras, and Jaro Point, Panay, and thence to the anchorage previously recommended. The least water found on this track is 3½ fathoms, abreast of No. 1 black buoy; better water may be found by rounding No. 4 red buoy close-to and following the edge of the bank extending from the Panay shore.

Small vessels frequently pass close to black buoy No. 3 and thence southward of the Siete Pecados, care being taken to avoid the ¼-fathom rock lying 600 yards southwestward from the light and the shoal water off the north end of Guimaras.

Vessels intending to enter the strait by the channel southward of Iguana Bank should bring the lighthouse to bear 314° (313° mag.) and steer for it, pass ½ mile south of it, round the north end of Guimaras at a distance of ½ mile, and proceed as previously advised.

Guimaras Island, in front of Iloilo, forms with Panay Island the strait of Iloilo and with Negros Island the strait of Guimaras. It is moderately high and hilly, especially in the eastern part, where there are hills 600 to 700 feet high. The western coast is clean and free from danger; the south and southeast coast is faced by a number of small islands with navigable channels between and behind them; the east coast is clear, depths of 4 to 6 fathoms being found 1½ miles from it.

Cabugao Point, the northwestern extremity of Guimaras, has some detached rocks off it; there are no dangers extending more than ¼ mile offshore in this vicinity.

From Cabugao Point the coast trends southwest for 7½ miles, forming points and coves, to Bondulan Point. There are shoal patches of 8 to 10 feet lying about ¼ mile from shore between Estampa Point and the town of Buenavista with a 2-fathom channel inshore of them; pilots take vessels drawing not over 13 feet to the pier at Buenavista.

Bondulan Point, opposite Iloilo, is 447 feet high, almost perpendicular, and steep-to. It forms a very prominent landmark when approaching Iloilo from southward.

A shoal with a least depth of 1½ fathoms lies 1¾ miles south-southwestward of Bondulan Point; there is a narrow, deep channel between this shoal and Guimaras. The southwestern end of the shoal is marked by a red buoy. Bondulan Point in range with the fort at Iloilo clears the shoal westward.

Cabalic Point, 230 feet high, clear and bold, lies 3½ miles south-southwestward of Bondulan Point; this point should be passed close-to when taking the channel south of the Oton Bank, which is here less than ½ mile wide. From the westward Cabalic is not easily distinguished, being no higher than the rest of the coast, and in fact is not so conspicuous as Muhuy Point, 240 feet high, about 1 mile southward and westward of it, which is also clear and steep-to.

Naburul Island, 152 feet high, is about 3 miles southward of Cabalic Point. It lies close to the shore, with which it is connected by a reef, and shows as a high, black bluff, apparently part of the mainland. It is bold and steep-to seaward.

Santa Ana Bay, about 2 miles southward of Naburul Island, is a little port, clear and deep, open to the west and easy to make; the entrance is ¼ mile wide. On the north side of the entrance is Lauy Point, with an islet northwestward of it. Latest surveys show a depth of 8 fathoms 150 yards south of this point. The anchorage is in the middle of the port in 6 fathoms of water.

IGAN BAY, just south of Santa Ana, is clear with a depth of 11 to 13 fathoms in the middle and 2½ fathoms at the edge of the bank that borders the shore.

LUSARAN POINT, the western extremity of Guimaras Island, is a bold, prominent point, easily recognized by the white lighthouse and dwelling on the cliff. It is clean and steep-to, the 10-fathom curve being less than ¼ mile from the shore.

An alternate group flashing light, visible 16 miles, is shown from a white tower with gray trimmings close to the edge of the cliff on Lusaran Point.

From Lusaran Point the coast trends southeastward for 5 miles to South Point, on a small islet lying close to the southern extremity of Guimaras. TANDOG ISLAND, immediately northward of South Point, lies close to the shore; the channel between it and Guimaras is blocked by reefs and in the bay northward of it are a number of small islets.

A small, detached shoal with a least depth of 14 feet lies about ¾ mile westward of the south point of Tandog Island. When rounding South Point it may be avoided by bringing Lusaran Point to bear 351° (350° mag.) or nothing westward of that bearing before hauling northward.

PANUBULON and GUIUANON are two flat-topped islets about 50 feet high lying 1 to 2 miles southward of Guimaras; the former is surrounded by a reef on which there are several smaller islets, but the latter is clear. The best achorage in this vicinity may be found in the bay westward of Cabalagnan Point, about 1½ miles northward of Panubulon Island.

A shoal about 1 mile in extent, partly bare at low water, lies about 2½ miles southward of the middle of Panubulon Islet. The bottom between Panubulon, and this shoal is very uneven, the depths varying from 3½ to 10 fathoms.

UNISAN ISLETS are a group of rocky islets surrounded by reefs lying about 3½ miles southward of the west end of Guiuanon Islet. The central and largest is 93 feet high and partly covered with coconut trees; the others are merely large rocks. There is 9 fathoms in the channel between the Unisan Islet and the shoal just described.

Guimaras Strait, between Guimaras Island and the west coast of Negros, has a least width of about 6 miles, but the navigable channels are narrowed by islets and shoals.

INAMPULUGAN ISLAND is the largest and most prominent in the strait. It is hilly, the highest point, 634 feet, being in the eastern part of the island. On the eastern point there is a hill with a rocky bluff on its eastern side; this hill is connected with the rest of the island by a low strip of land. The shores of Inampulugan are clean and steep-to, with the exception of the northern point, where the shore reef extends about 600 yards.

ROSARIO ROCK, with a least depth of 3¼ feet and surrounded by depths of 5 and 7 fathoms, lies a little more than ½ mile southward of the middle of Inampulugan Island.

SUSAN and five other small, rocky, partly wooded islets lie westward and southwestward from Inampulugan. There are good channels either side of Susan Islet, but they must be navigated with caution, as there are several dangers in their northern approach.

NALUNGA ISLAND, northward of Inampulugan, is small, covered with grass, and 427 feet high. There is a small islet off its northern side, with which it is connected by a reef, and also a small islet off its northeast side. Shoal water extends nearly 1½ miles southward of Nalunga, narrowing the channel between it and Inampulugan to ½ mile; this channel is further complicated by a small shoal bare at low water, lying about ½ mile from the northeast coast of Inampulugan.

NADULAO ISLAND lies nearly 1 mile northeast of Nalunga. It is small, grass-covered, and nearly cut in two by a bay bare at low water on its northeast side, in which there is an islet. There is another small islet about ⅓ mile northward of Nadulao. The northwestern and southeastern parts of Nadulao, 213 and 190 feet high, respectively, are connected by a narrow isthmus. The channel between Nadulao and Nalunga is clear and has a least depth of 7 fathoms.

IOGIOG BANK, forming the eastern side of the main channel through Guimaras Strait, is a large shoal formed of hard sand which rises in lumps like submerged sand dunes. There is a spur of the bank on which the least water is 14 feet, making off northwestward toward Nadulao Island, leaving a deep channel about ¾ mile between the island and the bank.

The main channel through Guimaras Strait lies between Nadulao and Inampulugan Islands and the Iogiog Bank; the eastern channel lies between the Iogiog Bank and Pandan Point; there are several good, narrow channels westward of Inampulugan used by the regular traders, which must be navigated with caution by a stranger, as there are dangers in their northern approach.

DIRECTIONS.—Vessels approaching Guimaras Strait from northward or southward should bring the eastern points of Nadulao and Inampulugan Island in line on a 197° (196° mag.) or 17° (16° mag.) bearing and steer for them, hauling off when approaching them to give them a berth of ¼ to ½ mile in passing; both points are steep-to.

Vessels bound northward may shape their course as desired as soon as they have passed Nadulao; those bound southward should continue their course until Guiuanon Island bears 270° (269° mag.) and then haul a little westward to give the shoal water off the west coast of Negros a good berth.

Vessels approaching the east channel through Guimaras Strait from the north should bring Pandan Point to bear 169° (168° mag.) and steer for it; the shoalest part of the channel on this course (20 feet) will be found about 1 mile northward of the point. As soon as the water deepens the vessel should be hauled southward to give the point a berth of about ¼ mile in passing. When the point bears 20° (19° mag.) steer 200° (199° mag.) until the hill on the eastern point of Inampulugan bears 271° (270° mag.), when the vessel should be hauled westward to give the shoal water off the west coast of Negros a good berth. Vessels from southward intending to use the east channel should bring the middle of Inampulugan to bear 1° (0° mag.) and steer for it; when drawing up toward it haul eastward until Pandan Point bears 20° (19° mag.) and steer for it, passing it as previously directed, and then steer 0° (359° mag.); after having gone 1½ miles beyond the point, the course may be shaped as desired.

NORTH COAST OF PANAY.

Nasog Point, the northwestern point of Panay, has already been described.

Potol Point, the extreme northern point of Panay, is flat and sandy with a few trees on it; the coast between this point and Nasog Point is clear, with the exception of a 3¾-fathom shoal lying 1⅛ miles from shore midway between these points. The channel between Potol Point and Borocay Island is narrow and deep, the only dangers are the 2½-fathom shoal extending southward of Borocay Island and a 1¾-fathom detached shoal lying westward of the south end of the island.

A group of rocks and islets lie about ½ mile northeastward of Potol Point; small craft can pass between them and the coast of Panay by passing close southward of the westernmost and midway between the two eastern ones. A coral reef, reaching a width of ¼ mile, fringes the shore of Panay as far eastward as Saboncogon Point.

From Potol Point the general trend of the coast is about east-southeast for 74 miles to Bulacaue Point, the northeast point of Panay; the shore for the most part is sand, and the coast in its neighborhood is low.

Saboncogon Point, 3½ miles eastward of Potol Point, is high and clear, and can be approached to within a short distance. From it to Ibajay Point, 11 miles east-southeastward, the coast is clear and steep.

Ibajay Point is sandy and flat; on it is the town of the same name. Northeast of the town there is good anchorage sheltered from southerly winds, but during the southwest monsoon the wind often shifts suddenly to the northwest, and Pontud Bank would then be to leeward, and a large vessel could not remain here with safety.

Sigat Point, 3½ miles eastward of Ibajay Point, and **Apga Point,** 2½ miles farther on, are both high and surrounded by reefs 200 yards wide, with 8 fathoms at the edge. Between them is a little bay, open to the north, and fronted by Pontud Bank.

Pontud Bank lies northward of Sigat and Apga Points. The group of shoals lying from 1½ to 3½ miles northward of Apga Point has several separate heads upon it, with depths ranging from ¼ fathom to 3½ fathoms. The channel between the shoals and Apga Point is ¾ mile wide with depths of from 5 to 8 fathoms. The channel between these shoals and the shoal northwestward is 1½ miles wide, with depths of 14 fathoms and over. This latter shoal has a least depth of 1 fathom.

A shoal with 2 fathoms least water lies ½ mile north-northwestward of Apga Point.

Aclan Point and River are 7½ miles east-southeastward of Apga Point. The point, which is flat, is formed by deposits from the river which flows out to the west of it. On the bar there is ordinarily 5 feet, and with fresh northeast winds the sea breaks heavily on it.

Calivo, one of the most important commercial towns in Capiz Province, lies on the eastern bank of the Aclan River, about 2 miles above its mouth. The river not being navigable, Calivo transacts all its business through the port of New Washington, with which it is connected by road.

New Washington, formerly Lagatic, is about 5 miles above the mouth of the Lagatic River, which empties into Port Batan. There are a number of warehouses and two wharves here. It is reported that 12 feet can be carried from Port Batan to the wharves. There is regular steam communication maintained between New Washington and Manila and a coastwise trade with Iloilo and way ports.

A black buoy marks a 6-foot shoal in the mouth of the Lagatic River; vessels bound to New Washington should leave this buoy close aboard. A shoal is reported to be forming over a balsa sunk about 160 yards southeast of the 6-foot shoal.

Good anchorage may be had during the southwest monsoon outside of the peninsula on which New Washington is situated. The peninsula at this point is less than ¼ mile wide.

Port Batan, about 10 miles southeastward of the mouth of the Aclan River, is a deep bay surrounded by lowland cut into by several large arms. The entrance is open to north-northeast and may be recognized by PILOT MOUNT, a prominent peak 867 feet high, about 6 miles southward of the bar. OCBOC HILL, about 2 miles eastward from Port Batan, is a prominent, steep, rocky mound lying close to the beach; it is 154 feet high and about 275 yards in diameter. FLORIPON POINT, the western entrance point to Port Batan, is heavily wooded and steep-to on the eastern side. Both entrance points have sand shoals which extend northward for 1½ miles, leaving a channel ¼ mile wide between them. The bar fronting the channel has at the present time 4 fathoms on it, but it is liable, as well as the shoals from the entrance point, to shift with the freshets. There is no other danger than these shoals; if the channel buoys are gone or out of position their limits are shown by the color of the water and at times by tide rips. The tidal currents run with considerable velocity in this vicinity.

An occulting white light, visible 10 miles, is shown from a white concrete house on Floripon Point. Two red buoys and one black buoy mark the channel into Port Batan.

DIRECTIONS.—Vessels bound into Port Batan should steer for the light on Floripon Point on a 195° (194° mag.) bearing, keeping a good lookout for the banks and guarding carefully against the effects of the tide. The southern part of Floripon Point should be rounded at a distance of 250 yards and anchorage taken up anywhere southward of the peninsula which forms the north side of Port Batan. The village of Batan, on the eastern shore of the port, is in ruins, only a few nipa houses being visible.

A coral shoal with a least depth of 4 fathoms lies about 6 miles northward of Ocboc Hill. A coral shoal with a least depth of 5¼ fathoms lies 2¾ miles northeastward of Ocboc Hill. A coral shoal with a least depth of 1 fathom lies 3¼ miles east-northeastward of Ocboc Hill. A small coral shoal with a least depth of 2¾ fathoms lies 3 miles eastward of Ocboc Hill and over 1 mile from shore.

Baquiao Point, about 5 miles eastward of Port Batan, is very foul.

Sapian Bay, between Baquiao Point and the Sapian Peninsula, is clear and free from danger, having 5 fathoms in the middle of the entrance and 3 fathoms in the center of the bay, decreasing gradually toward the head. It is protected from all winds except from northward. SAPIAN PENINSULA, on the east side of the bay, termi-

nates in two points 1¼ miles apart—MARANCALAN westward and NAILON northeastward.

Mobay Islet, about 1 mile northward of Marancalan Point, is a rocky islet, partially wooded, 75 feet high.

About ½ mile northwestward of Mobay Islet is a shoal with a least depth of 9 feet with a 5-fathom channel between it and the shoal water off Mobay Islet.

Between Mobay Islet and Marancalan Point are a number of small rocky islets with trees upon them.

Tuad Islet, 1¼ miles northeastward of Nailon Point, is a small, partly wooded, rocky islet 44 feet high. It lies near the northern part of a shoal of sand and coral heads, which extends about 800 yards southward. There is a small coral patch having 2 fathoms least water and 5 fathoms around lying ¾ mile eastward of Tuad Islet.

Capiz Bay, between Nailon and Kulasi Points, is shoal at the head of the bay and intersected by several streams. The Panay River, one of the most important rivers in the island, empties about 1½ miles southward of Colasi Point. The headland forming the northern side of the entrance to the river is high and well wooded; there is an old fort on the top of it which is 125 feet above the sea and forms a prominent landmark. A light, visible 12 miles, is shown from the roof of a white concrete house on Kulasi Point.

Capiz, the capital of the province of the same name, is situated on the north bank of the Panay River, about 3 miles from the mouth. It is connected with Iloilo by rail and has occasional steamer communication with Manila and Iloilo. The bar at the mouth of the river is constantly changing, and it is reported that at the present time vessels of 8 feet draft can enter the river at high water and go to the center of the town. Vessels unable to cross the bar or go to the wharf at Libas, anchor about 1 mile southwestward from Kulasi Point, in 3½ fathoms, muddy bottom, or closer in if the draft will permit.

The village of **Libas** lies on the south side of Libas Cove, a large, shallow indentation southward of Kulasi Point. There is a small wharf here with 8 or 9 feet off it and a good wagon road from the wharf to Capiz, 2 miles distant. The channel approaching the wharf, through Libas Cove, is narrow and tortuous.

Kulasi Point is 222 feet high, wooded, and steep.

Nipa Point, ⅝ mile eastward of Kulasi Point, is steep-sided and rocky, and 90 feet high. The cove between these two points has a sandy beach and large coconut groves at either end. Kulasi Hill, back of Nipa Point, is 340 feet high, and the foot of it comes to the water's edge midway in the cove just mentioned.

A very small pinnacle rock, with a least known depth of 8 feet, lies about ¼ mile southwestward of Capiz lighthouse.

There is a submerged rock covered by 4¾ feet lying ½ mile west-northwestward of Nipa Point and the same distance northward of Kulasi Point.

A large flat rock about 50 yards in diameter, about 1 foot above high water, and surrounded by rocks awash lies about ½ mile northward from Nipa Point. Midway between this rock and the shore

there is a pile of rocks which are awash at high water; a big round bowlder marks the center of the pile.

From Nipa Point to Pirara Point, 7 miles eastward, the coast is flat with long sand beaches fringed with coconut trees and nipa houses. The cable hut, where the cable from Milagros, Masbate, lands, is a low brick structure close to the beach, 2 miles eastward of Nipa Point.

Mantalinga Islet is a small, circular, wooded islet, 75 feet high, lying 1⅝ miles eastward of Nipa Point. The channel between the islet and the coast is ½ mile wide and 20 feet deep, but the islet is too small to afford protected anchorage.

Nagtig Islet is a very small islet lying about 1 mile northwestward of Pirara Point and 650 yards from shore; it is thickly covered with brush and small trees, the tops of which are 82 feet high. A small group of rocks, bare at high water, lies about 100 yards northeastward of Nagtig Islet.

Olutaya Island lies nearly 1 mile northward of Nagtig Islet; the channel between them is deep and clear. It is sparsely wooded and 372 feet high. Three small wooded islets lie off the main islet; one to the northward, 62 feet high, another to the westward, 49 feet high, and one off the southeast point of the islet; the latter islet is connected with the main islet by a reef which bares at half tide. There is a small bay on the southeast side of the island which affords good anchorage for small vessels.

Pirara Point is low and sandy and covered with bushes and coconut trees. A river which empties just south of the point forms a shoal sand bar which extends ¾ mile seaward.

From Pirara Point the coast trends southeastward and then northeastward to Bulacaue Point, forming **Pilar Bay**. The head of the bay is shoal. There are no detached dangers in the bay with the exception of Tucat Reef. It contains no sheltered anchorages and is of little value to navigation.

From Pirara Point to Buncayao Point, the western entrance to Tinagongdaget Inlet, the shores are low and sandy, interspersed with stretches of mangroves. From Pinamijagon Point, the eastern entrance to Tinagondaget Inlet to the town of Pilar, 4½ miles eastward, mangroves line the shore for the first half of this section, and thence to Pilar a low sand beach fringed with shrubbery and coconut trees. About ¾ mile east-southeastward of Pilar is a very conspicuous limestone cliff about 410 feet high, visible from the entrance to the bay. **Banogay Islet** is a small, low, rocky, wooded islet lying about 1 mile northeastward of Pilar and 150 yards from the main shore line; it is connected with the mainland by a sand bar bare at nearly low water. From Pilar to Bulacaue Point, 11½ miles distant, the shore is sandy, interspersed with stretches of rock. On this coast are a number of small, unimportant villages. From the village of Carles, nearly 2 miles southwestward of Bulacaue Point, to the point the shore is rocky and fringed with brush and trees. Between Carles and the point are two small prominent hills. The southwestern hill, about 1½ miles southwestward of Bulacaue Point, is 183 feet high and wooded; the northeastern hill, about ¾ miles southwestward of Bulacaue Point, is 163 feet high and grass-covered.

Tucat Reef, the only detached danger in Pilar Bay, lies about 3 miles northward from Banogay Island. It is formed of sand and coral and bares at very low tides. It is not readily detected by the color of the water, as the water in Pilar Bay is more or less muddy from the numerous rivers emptying into it. Vessels bound into Tinagongdaget Inlet will pass well westward of Tucat Reef by bringing the limestone cliff eastward of Pilar open westward of Banogay Islet on a 175° (174° mag.) bearing and steering for it.

Tinagongdaget Inlet, a large irregularly shaped shoal body of water in the southwestern part of the bay, is the common mouth of a large number of small streams. It is entirely fringed with mangroves except at the end of Manapao Point, which extends into the middle of the inlet. This point is rocky, covered with coconuts, and is 163 feet high to the tops of the trees. When entering the inlet Manapao Point appears to be an islet.

NASUNDA ISLET, near the head of the inlet, is small and covered with mangroves. The bar in front of the entrance has a depth of 1½ fathoms at low water, deepening to 6 and 8 fathoms inside. Tinagongdaget Inlet affords good shelter for small vessels.

DIRECTIONS.—About 7 miles southwestward of the entrance is a prominent, sharp-topped hill 257 feet high. This hill, open southward of Buncayao Point, the western entrance point, bearing 237° (236° mag.), forms a good leading mark for the best water crossing the bar. When abreast Buncayao Point the vessel should be hauled a little southward and Pinamijagon Point rounded at a distance of ⅜ mile and anchorage taken up southwestward from it in 4 or 5 fathoms, muddy bottom.

Bulacaue Point, the northeast extremity of Panay, is a spur from Mounts Sibala and Agudo, 1,903 and 2,736 feet high, respectively. The point is low and terminates in a sand spit with rocks at the end which extend less than ⅓ mile and uncover at low water.

Zapatos Islets are three small islets lying on a bank, composed mostly of coarse, white sand, which lies about 12 miles northwestward from Bulacaue Point. **Zapato Mayor,** the northeastern and largest islet of the group, is fringed by a reef on its western and southern sides, is sparsely wooded, and 187 feet high. It is inhabited and well cultivated. **Zapato Menor Islet,** nearly 3½ miles southwestward of Zapato Mayor, is smaller, well wooded, clean, steep-to, and 171 feet high. **Chinela Islet,** less than 1 mile north-northeast of Zapato Menor, is small, rocky, covered with brush, and 47 feet high. It is surrounded by a rocky ledge about 50 yards wide, bare at half tide.

Tidal Streams.—In the sea north of Panay the flood stream enters from westward by the passages between Panay, Carabao, and Tablas, and also by the passages between Tablas, Romblon, and Sibuyan. This last stream passes along the southwest coast of Sibuyan and between Cauit Point and Cresta de Gallo with great force, but on the east coast of Sibuyan it meets the flood stream from eastward by the Strait of San Bernardino and loses its force. The ebb stream moves in the reverse direction and by the same passages, and is not felt on the southwest coast of Sibuyan. The strength of the stream at full and change of moon is 3½ knots between Panay and Tablas and 2 knots between Tablas and Sibuyan.

Jintotolo Channel is the passage between Masbate and Panay. Jintotolo Island and the Zapatos divide the channel into three passages; that between Jintotolo Island and the Zapatos is generally used.

Cucaracha Shoal, lying about 4½ miles north-northeastward of Manigonigo Lighthouse, is composed of coarse, white sand and is clearly indicated by the color of the water. The least depth on the shoal is a small patch with 1¾ fathoms. The remainder of the shoal is covered by depths of 3 to 10 fathoms.

The currents in this vicinity set eastward with the flood and westward with the ebb tide. There are eddies and confused currents around Olutaya Island, and small tide rips have been observed just westward of the passage between Olutaya and Nagtig Islands when the current was running at its full strength.

EAST COAST OF PANAY.

From Bulacaue Point, the northeastern extremity of Panay, the coast trends in a general southerly direction for about 26 miles to Mount Apiton on the north side of Apiton Pass. This coast is faced by a number of islands, between which are good, sheltered channels. There are no ports of importance nor any thoroughly protected anchorages.

Manigonigo Islet lies about 1⅝ miles eastward of Bulacaue Point, on the northeast extremity of a shoal with depths of from 2¼ to 3 fathoms, which extends from the coast of Panay. It is small, flat, and surrounded by rocks to a distance of 200 yards on all sides but the south, where they extend to 400 yards.

A light, visible 14 miles, is shown from a white, cylindrical tower on the summit of Manigonigo Islet.

Anegada Rocks are two small rocks covered by ¾ and ¼ fathoms lying ⅞ mile south-southwestward of Manigonigo Islet.

Nabunut Island, 2 miles east-southeastward of Manigonigo Islet, is wooded and about 100 feet high. It is fringed by a narrow reef and connected with Tulunanaun Island, 2 miles southeastward of it, by a shoal with depths of 1 to 3 fathoms.

Tulunanaun Island is a small, narrow island having a hill 131 feet high near its northern end. The sides of Tulunanaun Island are fringed with reefs, partly bare at low water to a distance of about ¼ mile.

The bank on which Nabunut and Tulunanaun Islands lie is covered by depths of 2 to 5 fathoms; it extends about 4½ miles eastward of Manigonigo Islet and forms the western side of the channel westward of Balbagon Island.

Balbagon Island, 3½ miles eastward of Nabunut Island, is narrow, low, with a little sandhill at its southern end and covered with trees about 100 feet high. It lies on a bank about 4 miles long north and south and 2 miles wide. It is surrounded by reefs bare at low water, widest at the northern end, where they extend nearly 1 mile. The western limit of the shore reefs lies ¼ mile westward of the north end of the island. **Ojastras Islet**, a small, sandy cay, lies ½ mile southward of Balbagon, with which it is connected by shoal water. **Turnina Islet** is a small islet lying on a detached reef about ¾ mile eastward of Balbagon.

Tacut Reef, bare at low water, lies nearly 1½ miles eastward of Ojastras Islet on the eastern edge of the bank on which are Balbagon, Ojastras, and Turnina Islands. At a distance of ⅝ and 1¼ miles south-southeastward of Ojastras Islet are two small 3-fathom patches.

Channels.—The channel westward of Balbagon Island is the one generally used by coasting steamers. It has a navigable width of over 1 mile and is deep and clear. The western hill on Sicogon Island, 1,129 feet high, just open eastward of the summit of Cañas Islet, bearing 183° (182° mag.), leads through the middle of it. When the south end of Tulunanaun Island is abeam, all dangers will have been passed and the vessel may continue, passing either side of Cañas Islet, thence through Sicogon Channel, between Sicogon and Calagnaan Islands; or when the south end of Tulunanaun Island is abeam she may haul southeastward until Baliguian Island bears 180° (179° mag.), when it may be steered for. The channel between Tucat Reef and South Gigante Island is also recommended. Dapdap Point, the western extremity of South Gigante Island, is clean and steep-to and may be passed at a distance of ¼ mile. After passing this point the course should be continued southward until Antonia Islet bears 90° (89° mag.), and then hauled southeastward until Baliguian Island bears 180° (179° mag.).

Gigante Islands are a group of two high islands and several islets and detached rocks lying about 10 miles eastward of Bulacaue Point. The group is clear on the northern side, and the reefs and shoals on the other sides do not extend over ¾ mile.

North Gigante Island is wooded and 758 feet high near the northern end. It is fringed by reefs, partly bare at low water, which extend about ½ mile east and west from it. The northern point of the island is marked by a light.

About ¾ mile eastward of its north end lies **Uaydajon Islet**, small, clear, and steep-to, well wooded, and 263 feet high to the tops of the trees. The channel between it and North Gigante is clear and has depths of 7 to 9 fathoms in it. On the southeastern edge of the reef surrounding North Gigante Island are three small, rocky islets, Gigantillo, Gigantuna, and Bulubadiang.

South Gigante Island, ½ mile south of the northern island, is well wooded and 763 feet high near the southern end. On the northern side there is a wide reef, bare at low water, between which and the reef on the south side of the northern island is a channel with a least depth of 1½ fathoms. About 1 mile southeastward of South Gigante Island are three small islets, **Bantigui**, **Cabugao**, and **Antonia**, all lying on the same reef, 60, 357, and 322 feet high, respectively. About ½ mile eastward of Antonia, the southern islet, is a small shoal with a least depth of 2¼ fathoms. The channel between these islets and South Gigante is over ½ mile wide and has depths of 7 and 9 fathoms.

In the northeast monsoon vessels can anchor off the southwest coast of South Gigante in a depth of 7 fathoms; muddy and sandy bottom. In the southwest monsoon very small vessels can anchor in the channel between the islands. A shoal covered by 4 fathoms lies 3½ miles north-northwestward of Gigantes light; 5½ miles northward of the same point is a 4¼-fathom shoal; 5 miles east-northeastward of the same point is a 4-fathom shoal, and 7 miles east-southeastward of the same point is a small, 3½-fathom shoal. These shoals are the

only shoals within a radius of 8 miles from Gigante light with a depth less than 5 fathoms. There are numerous other shoals in this vicinity whose locations will be best understood by reference to the chart.

Bancal Bay, between Blanca Point 2 miles southeastward from Bulacaue Point, and Gogo Point is fronted by Binuluangan and several smaller islands. The shore is low and intersected by a number of rivers. This bay is very shoal, and at low water sand banks block the passage to the rivers emptying into it. This shoal water extends around Blanca Point northward and surrounds Manigonigo Islet.

Binuluangan Island is fringed with reefs on which lie the islets Tabugun and Tabugun Chico off the north end, Nilidlaran off the east side, and Adcalayao and Himamylan off the southeast side. Binuluangan is well wooded and rises in hills 160 to 198 feet high.

Gogo Pass, between the southwest point of Binuluangan Island and Gogo Point, is shoal and of no value to navigation.

Nilidlaran Pass, between Binuluangan and Calagnaan Islands, is divided into two channels by Labno Islet, a small, wooded islet lying about 400 yards southeastward from Himamylan Islet; the western channel has a width of 150 yards and is the one generally used. Both channels have a depth of a little over 2 fathoms, but are narrow and tortuous and, in the absence of any aids to navigation, should not be attempted by a stranger.

Calagnaan Island, lying southeastward of Binuluangan Island, from which it is separated by Nilidlaran Pass, is well wooded and 1,112 feet high. The east and south coasts are clean and steep-to, while the west and northwest coasts are fringed with reefs. On the northwest coast are two bays blocked by reefs and of no value to navigation.

Cañas is a small, high, clean, and steep-to islet lying about ¾ mile from the eastern coast of Calagnaan Island. It is 310 feet high in the eastern part. Shoals covered by depths of 4¾ and 5 fathoms lie ¼ mile from the southwest and northeast points of the islet. A pinnacle rock, about 30 feet in extent, covered by ½ fathom, lies about 650 yards northeastward of the eastern end of Cañas Islet.

Sicogon Island, southeastward of Calagnaan, is 1,142 feet high in the southeastern part. In the northwestern part of the island is a hill, 1,128 feet high, which forms, with Cañas Islet, a good range for navigating the channel westward of Balbagon Island. The northeast side of Sicogon is fringed by a wide reef, bare at low water, on the eastern edge of which is Tumaguin Islet, a small prominent islet 369 feet high. The southeastern side of Sicogon is clean, while the western side is fringed by a reef nowhere exceeding ½ mile in width. About 2½ miles eastward of Tumaguin Islet is a small 4-fathom patch surrounded by deep water.

Carmencita Shoal, small and composed of sand and rock, has a least depth of ½ fathom and deep water around it. It lies 1 mile southeastward of Cañas Islet. The navigable channel between it and Cañas Islet is ¾ mile wide and that between it and Sicogon is ⅜ mile wide.

Sicogon Channel, between Calagnaan and Sicogon Islands, is over ½ mile wide and has a depth of 12 fathoms in the middle. It is clear and free from danger and is the channel usually used by coasting vessels.

Between Gogo Point and Salong Point, 6 miles southward, is a large bay fronted by Loguingut, Bolubadiang, Bayas, Maliaya, and Magalumbi Islands.

Estancia is a small town on the northwest shore of the bay. It contains two large houses with iron roofs visible a considerable distance. A small steamer which plies between Capiz and Iloilo occasionally calls, and some fish, sugar, and rice are shipped. Good anchorage may be found between Estancia and the Bayas Islets in 5 fathoms; muddy bottom. This is the only place in this vicinity where anchorage, protected at all seasons, may be found. A small, rocky shoal, with a least depth of ¾ fathom, lies about midway between Bayas and Loguingut Islands. This shoal constitutes the only danger in the anchorage.

Bayas Islets are a group of four islets lying 3 to 4 miles southeastward of Gogo Point. **Bayas**, the eastern and largest islet, is 216 feet high; **Manipulon**, lying immediately westward of Bayas, from which it is separated by a narrow 5-fathom channel, is 168 feet high. The others are small and low. They are surrounded by sand banks and rocks, and there are no channels between them. There is a 4½-fathom channel nearly ½ mile wide between Pangalan, the western islet, and the island of Panay. A rock awash lies ⅝ mile southward of Pangalan Islet and 1⅛ miles westward of the south point of Bayas Islet.

Magalumbi Islet is a small islet 159 feet high lying about ½ mile northeastward of Salong Point. It is surrounded by reefs which narrow the channel between it and the mainland to about 200 yards.

Culebra Islet, 4 miles east-southeastward of Magalumbi Islet, is very small and 116 feet high. A reef, partly awash at low water, extends ½ mile westward.

A small rocky shoal, with a least depth of 4¼ fathoms, surrounded by deep water, lies 2 miles southwestward of Culebra Islet. Northeastward and southeastward of Culebra Islet are six shoals with depths of 2½ and 3 fathoms and surrounded by deep water as shown on the chart.

Malpal Point, about 3 miles southwestward of Magalumbi Islet, is a bold, round, steep-to headland 1,151 feet high. Immediately northward of Malpal Point is Odiongan Bay, the head of which is blocked by reefs; the village of **Odiongan** lies on its north shore. Bagacay Bay lies just southwestward of Malpal Point. The head of this bay is also blocked by a large reef bare at low water; the village of **Bagacay** lies near the shore at the head of the bay. From Malpal Point to the village of **Concepcion**, 8 miles southward, the shore is fringed by reefs, outside of which shoal water extends to a considerable distance.

San Dionisio is a village lying in a slight indentation in the shore line 5 miles southwestward of Malpal Point. Two small islets, Matagda and Lacdian, lie ¾ mile eastward and east-southeastward from San Dionisio.

About 1½ miles northeastward of Matagda Islet and about 1 mile from shore is a large coral reef bare at low water. Depths of 1½ to 2½ fathoms lie between this reef and the shore. The channel between this reef and the reefs northwestward of Tago Island is about 1 mile wide and 4½ fathoms deep.

Pan de Azucar, about 2½ miles from the coast of Panay, is the largest of a group of islands at the northern entrance to Iloilo Strait. It has two remarkable peaks; the southeastern and highest is 1,881 feet high. The southeastern side of the island is clean and steep-to; the remainder is fringed with reefs on which there are several islets and rocks.

Naburut Islet is a small islet, 143 feet high, lying on the reef off the northwest point of Pan de Azucar. **Magaisi Islet** is a small islet, 232 feet high, lying on the shore reef off the north coast. **Bocot Islet** is a small islet lying ⅜ mile northward of the northeast point of Magaisi Islet, from which it is separated by a narrow channel 6¾ fathoms deep.

Sombrero Islet is a round, conical-shaped islet lying less than ¼ mile from the southeast side of Pan de Azucar, with which it is connected by a sand bar bare at low water. It is about ⅜ mile in extent, well wooded, and 459 feet high.

Botlog Island, 372 feet high, about ¾ mile southward of Pan de Azucar, is clean and steep-to. It is covered with large, straggling trees and divides the passage between Pan de Azucar and Igbon Island into two good channels. The coasting steamers usually take the channel between Botlog and Igbon Islands.

Tago Island, lying immediately southwestward of Pan de Azucar, from which it is separated by a narrow, impassable channel known as Pan Pass, is 557 feet high in the southern part. Its entire shore line is fringed by reefs which are gradually steep-to on the eastern side, while those on the western side are faced by shoal water. Nearly ½ mile from the southeast point of Tago is a rock awash, and 200 and 350 yards from the southern end are dangerous sunken rocks. A large coral reef, bare at low water, lies ⅝ mile northward of the northwest point of Tago.

Concepcion Bay, between Panay and Tago Island, is of little value to navigation. Its area is greatly reduced by reefs and shoal water. The small and unimportant village of Concepcion lies at the head of the bay. A small steamer which occasionally runs between Capiz and Iloilo sometimes calls, but most of the trade is carried on by small, native craft.

Tago Pass is a very narrow channel between the reefs extending from Panay and those from the south end of Tago Island. It has a general width of 250 yards between the 1-fathom curves, a depth of 1½ fathoms at the northern entrance, deeper water in the main body of the pass, and 3¼ fathoms at the southern entrance. Tago Reef, at the northern entrance to the pass, and the sunken rocks lying off the south end of Tago Island, are the principal dangers. The tides run with considerable velocity in Tago Pass, and, as there is no particular advantage in using it, it should not be attempted without local knowledge.

Tago Reef is a small dangerous coral reef bare at low water. It lies about ¼ mile westward of the southern part of Tago Island and forms the western entrance point to the northern approach to Tago Pass.

Bagabu Islet is a small, low, wooded islet lying ⅞ mile southeastward of the south end of Tago Island. A sand spit, bare at low water, extends nearly across to a prominent green point on Panay, leaving a narrow 3¼-fathom channel between them.

Malangaban Island, about 2 miles southeastward of Pan de Azucar, is wooded, 785 feet high, and clean on all sides except the southwestern, where a reef, bare at low water, extends nearly ½ mile seaward and surrounds the small islet Chico.

Agho is a small islet lying in the middle of the channel between Malangaban and Igbon Islands. It is fringed by a narrow reef and surrounded by deep water.

Igbon (Balubadiangan) Island lies about 2 miles eastward of the south end of Tago Island. It is well wooded and 774 feet high. The northern and southwestern parts are fringed by steep-to coral reefs; the remainder of the shore line is clean and steep-to.

Bulubadiangan and **Dunao** are two small islets lying off the south end of Igbon Island. Bulubadiangan, the western islet, is 220 feet high, and Dunao, the eastern one, is 92 feet. Between these two islets good but contracted anchorage may be found for small craft.

Baliguian Islet is a small, low, heavily wooded islet lying 9 miles eastward from Igbon Island. It is fringed by a narrow reef and surrounded by deep water. It is thickly covered with trees, the tops of which appear like solid land from a distance. This islet is a good natural mark for vessels making Iloilo Strait from northward or eastward to clear the numerous shoals along the route. A light, visible 15 miles, is shown from a white, steel tower on the northwest point. There is a small, 2-fathom patch surrounded by deep water 2 miles southward of the islet.

Apiton Pass is the southern termination of the inside route to Iloilo from the northward. It is clear and deep, with the exception of a small 3¼-fathom patch, and the shores on either side are steep-to. **Mount Apiton,** forming the northern side of the pass, is a bold, round headland 1,416 feet high. A small 3¼-fathom shoal lies in the northern end of Apiton Pass 1 mile westward of the south end of Bulubadiangan Islet.

Tagubanhan Island, lying a little less than 1 mile southeastward from Mount Apiton, forms the south side of Apiton Pass. It is well wooded and 980 feet high. The shores are fringed by a very narrow steep-to reef. A small 3½-fathom shoal lies 1 mile south-southwestward of the south end of Tagubanhan Island. There is a good, deep channel between this shoal and Tagubanhan Island.

Anauayan Islet, nearly 2 miles eastward of the southern end of Tagubanhan Island, is very small, clean, steep-to, and 178 feet high. The channel between it and Tagubanhan Island is deep and clear.

Binanan Island, just southwestward of Mount Apiton, is nearly round and 440 feet high. It is connected with the mainland by extensive mangrove swamps and mud flats bare at low water. Apiton Cove, on the eastern side of the island, is small and shoal and of no particular value. The southern side of Binanan Island is clean and steep-to.

From Binanan Island the coast trends westward for 4 miles and then curves southward for 4½ miles to Malauig Balas Point, forming a large shoal bay, the head of which is known as Ajui Bay.

The village of Ajui lies in the northwest angle of Ajui Bay, about ½ mile above the mouth of the river of the same name. Shoal water

extends 2 miles southeastward from the mouth of the Ajui River and surrounds Salog Islet.

Salog Islet, lying in the entrance to Ajui Bay, is very small and wooded, 175 feet high, and surrounded by a large reef bare at low water.

Buri Islet is a small islet, 160 feet high, ½ mile southward, and similar to Salog Islet. There are a few inhabitants on both of them. The pearl banks of Ajui are off these islets, and during the season large numbers of divers make their headquarters here.

Nasiducang and **Bayang** are two small unimportant islets lying 1½ and 2¼ miles southwestward of Buri Islet and 1 mile from shore; they are both surrounded by reefs.

Nasidman Island, 138 feet high, is a narrow island ¾ mile from shore at the southern entrance to Ajui Bay. It is surrounded by a reef, leaving a 6½-fathom channel between it and the Panay coast.

Calabazas Island is a small, wooded island lying ¼ mile eastward from Nasidman Island.

A group flashing light, visible 16 miles, is shown from a white, cylindrical tower with gray trimmings on the southern end of Calabazas Island.

Pepitas Rocks are a cluster of black rocks 2⅛ miles southwestward of Calabazas lighthouse. They are nearly always visible, but are covered at the highest tides. They are covered by the red sector of Calabazas light.

Turia Rock is a small, dangerous rock with ½ fathom 5 miles east-southeastward of Calabazas lighthouse. This rock does not show except when close to it, and the sea does not break over it any heavier than for several miles around it. It is marked off the northern side by a horizontally striped buoy. Vessels should give this buoy a berth of about ½ mile.

A small, rocky patch, with a least depth of 2¼ fathoms, lies ¼ mile northeastward of Turia Rock.

From the southern entrance to Ajui Bay the coast trends southwestward for 14 miles and then southward with a curve eastward for 12 miles to Dumangas Point, on the northern side of the entrance to Iloilo Strait. The first half of this section is indented by five bays, Culasi, Pedada, Cañas, Barotac, and Banate, all of which are shoal and of little value to navigation. These bays are separated by high, prominent headlands, which are clean and steep-to.

Culasi Bay, westward of Nasidman Island, between Bugtung Bato and Danao Points, is very small and shoal. The village of Culasi lies at the head of Culasi Bay.

Pedada Bay, just southwestward from Culasi Bay, between Nautin and Pedada Points, has a depth of 3 fathoms at the entrance and shoals gradually toward the head. There are no villages on the shore of this bay.

Mount Bayang, 728 feet high, is the summit of a peninsula separating Pedada and Cañas Bays. This peninsula is connected with the mainland by a mangrove swamp, through which is a boat channel passable at high water.

Cañas Bay, between Bayang and Bubug Points, has a depth of 5 fathoms at the entrance and shoals gradually toward the head. The villages of San Fernando and Santiago lie on the shore of Canas Bay.

Mount San Nicolas is the summit of the headland separating Canas and Barotac Bays. It is well wooded, 1,063 feet high, and is prominent.

Barotac Bay, immediately westward of Mount San Nicolas, between Bagalayog and San Juan Points, is 5 fathoms deep at the entrance and shoals gradually toward the head. The village of Barotac Viejo lies on the Barotac River, about 1 mile inland from the head of the bay, and there are several small, unimportant villages lying on its shores.

San Juan Point, the southwestern entrance point to Barotac Bay, is a small, prominent headland 197 feet high. About 5/8 mile southwestward of San Juan Point is a rock 2 feet high lying on a small shoal, with depths of 2¼ to 3½ fathoms.

Banate Bay is a large shoal bay lying southwestward of San Juan Point. The town of Banate lies at its head. There is a depth of 3 fathoms 1 mile southward from the town, from which position the water shoals gradually toward the shore.

From Banate Bay to Dumangas Point the shores are low, fringed with mangroves, intersected by a number of small, unimportant streams and fronted by shoal water to a distance of 2½ miles.

A red buoy marks the eastern edge of the shoal water about 2¼ miles southeastward from Bacay Point.

Tomonton Shoal, off Tomonton Point, Negros, extends 3 miles northwestward and has little depth. A black gas buoy marks its northwestern extremity. Immediately inside of the buoy is a depth of 1½ fathoms.

The flood tide in Iloilo Strait passes to the north as far as Pan de Azucar, approximately, where it meets the other branch of the flood tide coming from northward. The ebb stream runs in the opposite direction—i. e., southward in Iloilo Strait and northward, north of Pan de Azucar. The velocity in the strait reaches 3 to 4 knots at spring tides. Between Tomonton Point and Iloilo Strait a slight westerly set at all seasons is reported.

NORTH COAST OF NEGROS.

Negros, between the islands of Panay and Cebu, is 118 miles long in a north and south direction and varies in width from 22 to 49 miles. It is the fourth in size in the Philippines, having an area of 4,881 square statute miles and is divided into two Provinces, Occidental and Oriental Negros. Its coast is very little broken by bays or inlets and contains no harbors suitable for large vessels. The rivers are small and unfit for navigation except by small craft. A central chain of mountains runs through its entire length. Canlaon Volcano, about 20 miles southeastward of Bacolod, is 7,995 feet high, and is probably the highest point on the island. This island is reported to produce the best cacao grown in the Visayas, also sugar, tobacco, rice, and lumber, but owing to the lack of good harbors most of the produce finds its way to market through Manila, Iloilo, and Cebu.

Extending from Sagay Point, the northeast extremity of Negros, for 25 miles in a northeast direction, is a chain of 36 islands. The greater part of these islands lies on one great reef, leaving two good

channels between them and Negros. In addition to this reef are several detached reefs which are described on the following page.

Bantayan Island, the largest and northern island of the above-mentioned group, lies with its southern extremity 17 miles northeastward of Negros. It is fringed on all sides by reefs, outside of which are several detached shoals. From the southern extremity of the island reefs baring at low water extend 10 miles and surround numerous small islands. Bantayan Island for the first 3 miles southward from its northern end is level and only about 20 feet high, then rises abruptly to 295 feet, and then slopes gradually toward the south end. Bantayan and adjacent islands are practically self-supporting and have little intercourse with the remainder of the Philippines. Fish are plentiful and, together with corn, are the main support of the people; very little rice is imported and scarcely any grown.

Bantayan, the largest town on the island, is on the southwest coast on a point of land projecting southward; it is separated from the main shore by a mangrove swamp. It can not be approached within less than 1 mile except at high water, and then only by small native sailing craft drawing less than 6½ feet, which is the range of the tide. The prominent marks of the town are the church, detached bell tower, and the municipal building; the church shows red and the two latter white.

Directions.—Vessels desiring to communicate with the town of Bantayan can find good anchorage in 2½ to 3 fathoms with the church bearing 115° (114° mag.), distant about 1⅝ miles. The principal obstruction in the approach to this anchorage is **Perla Reef,** a small coral reef which bares about 1 foot, 2¾ miles west-northwestward of Bantayan Church. It is steep-to and may be passed on either side at a distance of ¼ mile. Bantayan Anchorage may be entered by steering 130° (129° mag.) from a position 2 miles westward from Patao Islet, keeping the middle of Panangatan Islet, the nearest islet to the town, in range with a large tree on Bantayan Island. This range carries a vessel about ⅜ mile eastward from Perla Reef, and the least water found on it is 2½ fathoms. When Perla Reef is visible, vessels may pass southward from it, anchoring in 4½ fathoms when it bears 316° (315° mag.), or proceed farther eastward and anchor as previously recommended.

Don Islands are a group of five small islands, Botiquis, Doong, Lipayran, Mambacayao, and Yao, which begins about 3½ miles southwestward of Bantayan Island and extends in the order named 6½ miles in a southwesterly direction. All of these islands with the exception of Yao lie on the same reef, parts of which bare at low water. Between the Don Islands and Bantayan are 15 or 16 small islands which lie on the same reef as the Don Islands. There are no navigable channels between them.

Yao Islet, the southwestern of the Don Islands, is very small and heavily wooded with large trees, the tops of which are 120 feet high. It is clean and steep-to and can be rounded in safety at a distance of ¼ mile. The channel between Yao and Mambacayao, the next island eastward of it, is about ¼ mile wide and has 8 and 9 fathoms in the middle. The channel between Yao and Molocaboc Island, lying 4 miles southward of it, is deep and clear. Yao Islet forms

a very prominent landmark for vessels passing northward of Negros and westward of Bantayan. Kept on a 91° (90° mag.) bearing, it leads nearly midway between Maca and Panal Reefs and kept on a 181° (180° mag.) bearing it leads ½ mile eastward of Doong Reef.

Doong Reef is a large reef, which bares about 2½ feet at low water, lying 3½ miles west-southwestward of Lutungan Island. The channel between Doong Reef and the reefs extending westward from Lutungan Island is about 1 mile wide between the 5-fathom curves and has a depth of 10 fathoms in the middle.

A small, dangerous, coral patch with a least depth of 1¾ fathoms and surrounded by deep water lies 2 miles southeastward of Yao Islet. A rock awash lies about 1¾ miles southwest of the town of Santa Fe and about ¾ mile offshore.

Silion and **Jilantangan** are two small islands off the east coast of Bantayan Island. They are fringed by narrow reefs, leaving a good channel between them and also between them and Bantayan. Silion Island, the northern and smaller island, is low and flat, 20 feet high, and uninhabited. Jilantangan is 140 feet high and steep at the northern end and slopes away to the southern end, where there is a small village; it is covered by a few large trees and by cornfields.

Doha Shoal is a small shoal with a least depth of 2 fathoms and surrounded by deep water, lying about midway between Jilantangan and Guintacan Islands.

Molocaboc, Diutay, and **Matabas** are three small, low, wooded islands lying on the same reef about 2½ miles northeastward of Sagay Point. The reef bares at low water and is steep-to. Molocaboc, the eastern and largest of these islands, contains three villages; the other islands are uninhabited.

Asuncion Pass, the channel between Sagay Point and the above-described group, has a navigable width of over 1 mile and a depth of 15 fathoms in the middle.

Sagay Point, the northeastern extremity of Negros, is low and composed almost entirely of mangroves; there is a little solid ground on the eastern side of the point at the village of Panalsagon. Sagay Point is fringed by a reef baring at low water ¼ mile on the northern side and over 1 mile on the eastern.

Mount Solitario, 8 miles southward of Sagay Point and about 6 miles westward of the mouth of the Danao River, is a prominent, conical-shaped, wooded peak 1,119 feet high. It forms a good landmark, being easily recognized and visible from northward and eastward of Negros. Mount Solitario and the Pan de Azucar are very valuable landmarks for vessels navigating the reef-strewn water northward from Negros.

From Sagay Point the coast trends in a general west-by-north direction for 19 miles to Ilacaon Point, the northern extremity of Negros. This coast is low, generally fringed with mangroves, intersected by a number of streams, and faced by dangerous shoals and reefs, partly bare at low water.

Talusan Bay is an open area in the mangrove swamp on the southwest side of Sagay Point, which can be entered by light-draft vessels at high water. There is a narrow basin in the southwest part where small craft lie while loading firewood.

Tabanon and **Bulanan Rivers**, about 2 miles southwest of Sagay Point, are of little commercial importance, although considerable quantities of firewood are cut along their banks. A fairly good channel for small craft at high water leads across the bar at their common mouth.

Suyac Island is a small low island lying 3 miles west-northwestward of Sagay Point and 1 mile from shore. It is surrounded by a reef, bare at low water. Between it and the land there is a narrow channel with a depth of 1½ fathoms.

Sagay is on the coast 5 miles westward of Sagay Point. It has several stores and a fairly good market.

Carbin, Panal, and **Maca** are three large dangerous reefs northward of Suyac Island. They are all extensive areas of sand and coral and have shifting sand cays on them; these reefs are usually plainly visible. Steamers passing northward of Negros generally pass between Maca and Panal Reefs. This channel is over 2 miles wide and has a depth of 12 fathoms in the middle. Northward of Maca Reef are numerous reefs and shoal patches, as shown on the chart.

Himugaan River (chart 4466), the largest river in northern Negros, empties on the eastern side of Himugaan Point, about 2 miles westward of the town of Sagay. At its mouth are numerous sand banks, bare at low water, and a tortuous channel with ¼ to ½ fathom on the bar at low tide, during the southwest monsoon in 1907, when the survey was made. This bar is liable to change and is entirely unprotected during the northeast monsoon. The best water across the bar is generally marked by private beacons and buoys, and are liable to be shifted. A private fixed red light marks the vicinity at night. The bar is passable by small vessels of 8 or 9 feet draft at high water and the river navigable for a distance of 7 miles to several lumber mills. In the fine-weather season vessels lie outside the bar and load from lighters. Fresh water can be obtained a short distance below the lumber company's wharf.

At Pandanan Point, about 1½ miles westward of Himugaan Point and for a short distance either side of the village of Tiglauigan, about 1 mile westward of the point, is a rocky bluff 30 feet high, behind which the country is higher, and grassy in places.

The town of **Cadiz** lies on the coast 4½ miles westward of Himugaan Point at the mouth of the river of the same name. It is nearly obscured by a fringe of coconut palms. The bar of the Cadiz River is nearly bare at low water, but at high tide small craft cross it and lie aground at the end of a small, wooden wharf in the middle of the town. A private light is maintained at the mouth of the Italom River.

The village of **Sicaba** lies on the north side and close to the mouth of the Sicaba River, which empties on the south side of Sicaba Point, about 5 miles northwestward of Cadiz. The Sicaba River, while fairly wide and deep inside the mouth, is of little commercial value, due to the bar and shoals at the entrance, except for small craft, which can enter at high water. There is a bar in the middle of the river abreast the town, and the bottom of the river on the north side is rocky. Considerable lumber, sugar, and firewood is shipped from here.

Talaban Grande River, 2 miles eastward of Sicaba, is similar to the Sicaba River as regards the bar at its mouth and class of traffic.

Talaban Chico River, 4 miles eastward of Sicaba, is of no value, being only a passage through a mangrove swamp.

Carmen Shoals are a number of small shoals covered by depths of from 1 to 2¾ fathoms. There are large bowlders on all of these shoals. A horizontally striped buoy marks the center of Carmen Shoals. Vessels should give the buoy a berth of at least ¾ mile.

Daga Reef is a small coral reef which bares at low water, lying 2¼ miles northward of the western entrance point to the Cadiz River.

Sacramento Rock is a small shoal covered with bowlders with a least depth of ½ fathom, 4¼ miles northwestward of Carmen Shoal.

Sicaba Reefs are two large coral reefs baring at low water, lying over 2 miles northeastward of the mouth of the Sicaba River. The water between these reefs and Sicaba Point is shoal. About ⅝ mile northeastward of the northeastern extremity of Sicaba Reefs there is a small detached ¼-fathom patch.

Ilacaon Point, the northern extremity of Negros, is low, rounded, and sandy. Shoal water extends about 1¾ miles northward from the point. The village of Cadiz Viejo lies in a grove of coconut trees on the eastern side of the point.

Ilacaon Island, 2¼ miles northward of Ilacaon Point, is a small, low island 6 feet high. It has some coconut trees, bushes, and grass on it and is inhabited by a few fishermen. It is surrounded by an extensive reef, baring at low water, which extends 1½ miles east-northeastward, ¼ mile northward, and ¾ mile westward; the reef on the southern side of the island is narrow. There is a good channel with a depth of 3½ fathoms for small vessels southward of Ilacaon Island; vessels using it should steer 91° (90° mag.) or 271° (270° mag.), giving the island a berth of 300 or 400 yards. Anchorage, good only in the northeast monsoon, may be found southward of the island in 3 fathoms.

Ilacaon Channel is about 4½ miles wide between the reefs fringing Ilacaon Island and Anauayan Island. With exception of Ilacaon Reef, lying nearly in mid-channel, it is free from danger and has nowhere a depth of less than 4½ fathoms.

Ilacaon Reef is a small reef of coral bowlders and sand, with a least depth of 1¾ fathoms and surrounded by deep water, lying about 2 miles north-northwestward of Ilacaon Island.

East Rock is a small coral patch with bowlders, with a least depth of ¼ fathom, lying 3 miles eastward of Ilacaon Island.

From Ilacaon Point the coast trends southwesterly for 9½ miles to the mouth of the Victorias River and thence westerly for 6½ miles to Tomonton Point. The coast line is low and flat, bordered by a fringe of mangroves, trees, bushes, etc., and the interior is mostly open country with patches of trees and cultivated land and considerable uncultivated land, grown up with bushes and grass, extending back for several miles. The land slopes gradually from the coast to the base of the mountains. This section of the coast is faced by shoal water, which extends 2 miles in places, and near the edge of the 3-fathom curve are several small, dangerous, detached reefs.

Balaulan Reef is a small reef with a least depth of ¼ fathom with 4½ fathoms immediately northwestward of it. It lies about 1¾ miles from shore, 3 miles southwestward of Ilacaon Island.

Salong Reef is a small reef, bare at low water, lying 1½ miles northward of the mouth of the Manapla River.

Manapla, the principal town on this part of the coast, lies at the mouth of the Manapla River, about 5 miles southwest of Ilacaon Point. Coral reefs extend a considerable distance from both sides of the river mouth, and the bar is nearly dry at low water. Small craft can enter the river at high water. Anchorage in 3 fathoms may be found 1¾ miles northward of the mouth of the river.

The town of **Victorias** is just inside of the mouth of the river of the same name which empties about 4½ miles southwest of Manapla. The river has a narrow channel with about 1 foot on the bar. It can be entered by small craft at high water.

Cambanog Shoal is a small shoal which bares at low water, lying 1¼ miles from shore, 3 miles northeastward of Tomonton Point.

Cambanog Shoal and Salong and Balaulan Reefs lie close to the edge of the 3-fathom curve, and inside of them the water shoals gradually toward the shore.

Saravia lies about 1 mile from the coast at the head of the Madalag Daco River, a small river about 4½ miles westward of the Victorias River. The Madalag Daco River is navigable by small craft at high water to the bridge at Saravia. The town is not visible from the sea, being inside the mangrove marsh which extends along the shore. There are good roads between Saravia and Silay and Victorias.

Tomonton Point, the northwest extremity of Negros, is low and swampy and covered with mangroves to about 1 mile inland. The point is surrounded by shoal water, which extends 3 miles in a northwest direction. This shoal is marked at its northwesterly end by a black gas buoy. (For a description of Tomonton Shoal see page 227.)

WEST COAST OF NEGROS.

From Tomonton Point the coast trends south-southwesterly with a curve eastward for about 24 miles to Pandan Point, forming a wide bay which extends 5 miles eastward. The entire shore of this bay is faced by shoal water which extends in places 2½ miles, and vessels navigating it should not cross the 5-fathom curve unless they are bound into one of the various ports. From Tomonton Point to Calubcub Point, 4 miles southward, the shores are fringed with mangroves; thence to Pandan Point it is low and sandy and fringed with coconut trees. The towns of Silay, Talisay, Bacolod, and Bago lie on the shores of this bay.

Silay is about 6 miles southward of Tomonton Point and about ½ mile inland. There is a small, wooden wharf, the outer end of which is dry at low water, at the terminus of the road which leads to the town. Small steamers from Iloilo call two or three times a week. There is a large, long, prominent church with a dome in the middle. A narrow, tortuous channel leads across the flats by which small vessels with local knowledge can approach within ½ mile of the town wharf. To approach the anchorage at Silay the church should be brought to bear 100° (99° mag.) and steered for, anchoring according to draft. This course will carry a vessel northward of two 1-fathom patches, lying near the edge of the 3-fathom curve, 2 miles

westward and 2½ miles west-southwestward, respectively, of the wharf.

Talisay lies on the coast nearly 4 miles southward of Silay and shows well from seaward. The 3-fathom curve is over 2 miles from shore in this vicinity.

Bacolod, the capital of Occidental Negros and the largest town on the island, lies 4 miles southward of Talisay. It contains a large iron-roofed church and a number of other prominent buildings. There is a cablemark buoy about 2 miles northwestward of the church, and vessels are cautioned not to anchor on this line to avoid damaging the cable.

Bago lies on the east bank of the Lagason River, just inside its mouth. The large, iron-roofed buildings of the town show well through the opening in the trees at the mouth of the river. The Lagason River empties on the northern side of Pandan Point, about 10 miles southwest of Bacolod; it is quite broad, but its mouth is obstructed by a sand bar with little depth. Small vessels enter the river at high water.

Pandan Point, the most western point of Negros in this vicinity, is low, sandy, and covered with coconut trees; it is quite prominent from north or south. On both sides of the point the water is shoal, but the western extremity is clear and steep-to, 5 fathoms being found within 200 yards of the shore. The channel between Pandan Point and the Iogiog Bank is about ½ mile wide.

From Pandan Point the coast trends southerly for 28 miles to the village of Suay. It is low, intersected by numerous rivers navigable for small craft, and fringed with coconut trees; from Suay the coast curves westward and increases in height. The town of Pulupandan lies on the south side of Pandan Point. Farther southward on or near the coast are the towns of Valladolid, San Enrique, Pontevedra, Miranda, Hinigaran, Binalbagan, and Himamaylan. The shoal water which borders the south side of Pandan Point extends about 11 miles in a south-southwest direction to about 9 miles westward of the town of Pontevedra; from here it narrows in toward the coast near Maquiliquily Point, where a depth of 3 fathoms is found about 1 mile from the beach. There are channels by which small craft can approach the mouths of the various streams, but they should only be attempted by those having local knowledge.

The Binalbagan, Himamaylan, and Ilog Rivers are important commercially because they afford transportation by lorchas to and from the many plantations in this part of Negros. They have about ¼ fathom on the bar at low tide with 1 to 3 fathoms inside and are navigable for a considerable distance from their mouths.

Himamaylan (chart 4466) lies at the junction of the Himamaylan and Bingig Rivers, about 1 mile above the bar at the entrance. **Suay**, a barrio of the municipality of Himamaylan, on the Suay River, is of no commercial importance. **Ilog** lies about 4 miles up the Ilog River and is a town of considerable importance. Vessels desiring to communicate with any of the towns in this vicinity can anchor anywhere along the coast from 1 to 2 miles offshore in 3 to 5 fathoms, mud bottom, but there is no protection except from south and east.

From 4 miles southwestward of the mouth of the Ilog River westward to **Sojoton Point**, the coast is moderately steep-to and the high-

land approaches close to the shore. **Mount Malapantao,** 2,030 feet high, and **Mount Tantauayan,** 1,475 feet high, make good landmarks for navigating in this vicinity. About 3 miles eastward of Sojoton Point is a deep valley leading inland, and off of this valley are the only dangers outside the shore reef. They are a coral reef that bares at low water lying 3¼ miles east-northeastward of Sojoton Point, and a 2¾-fathom shoal 1 mile westward of the reef, both lying less than 1 mile offshore. Gihulngan, Cauayan, Isio, Tuyum, and Caliling are small towns close to the shore along this part of the coast.

Sojoton Point, outside the shore reef about 300 yards wide, is steep-to. The land rises rapidly from the shore to a height of 520 feet less than ½ mile inland. The point is an excellent landmark when approaching from northward or southward, appearing as a step from the shore to the higher plateau farther inland.

SOUTH COAST OF NEGROS.

At Sojoton Point the coast makes a sharp bend southward. **Maquiliguian Point,** 1¼ miles southward of Sojoton Point, extends about ½ mile outside the general trend of the coast and is over 100 feet high near the outer end. A reef, bare at low water, fringes the point on all sides, extending ¼ mile northward and the same distance southwestward. A landing may be made on either side of the lower neck of land back of the point on which the town of Linaon stands. From Maquiliguian Point the shore trends south-southwestward for 8 miles to Binigsian Point and consists of alternate coral reefs and bright, sand beach. About 1¼ miles south of Linaon is a precipitous bluff 205 feet high. A deep valley lies back of the town of Inayauan, 2 miles southward of the bluff.

A reef with ¼ fathom least water lies 1 mile south-southwestward of Maquiliguian Point. Depths of 3½ and 4¾ fathoms are shown about ½ mile westward and northward, respectively, of the ¼-fathom reef.

A reef awash at low water lies 2¼ miles south-southwestward of Maquiliguian Point and over 1 mile from shore. There are several detached reefs, with depths of 1 to 3 fathoms, between the reef awash and the shore, and vessels should not attempt to pass inside of it.

Danjugan Island, 255 feet high, lies 2 miles northward of Binigsian Point. It is surrounded by a coral reef which bares at low water and is steep-to on all sides. Northwest of the island on the edge of the shore reef are two islets or rocks, the outer one of which is 27 feet high.

Agutayan Island, 315 feet high, lies ½ mile southeastward of Danjugan Island. It is surrounded by a broad, coral reef. The channel between the islands has 7 fathoms and that between Agutayan and the shore reef, 6½ fathoms. Both channels are narrow, being only about ¼ mile wide.

Binigsian Point is fringed with coral, which extends ¼ mile southwestward. The point forms an excellent landmark as it may be easily recognized by a scar caused by a landslide on the 120-foot hill on the point.

Anajauan Island, 230 feet high, lies ¾ mile southwestward of Binigsian Point and is surrounded by a coral reef that extends ¼

mile northward. Near the northern end of the reef are several islets, the largest of which is 118 feet high. The channel between the reef off Anajauan Island and the reef off Binigsian Point is very narrow but deep and clear. A reef with 1½ fathoms least water lies ½ mile southward of Anajauan Island.

One mile southward of Binigsian Point the coast recedes to eastward, forming **Cartagena Bay**. It is of small extent; coral reefs extend about ¼ mile off the points, and there is a 1¾-fathom reef almost in the center of the bay. A sand beach at the head affords a landing in front of the town of Cartagena. Between Buluguisan Point, 3 miles southward of Binigsian Point and Bulubadian Point, 3 miles farther, is a sand beach back of which is the long valley of the Sipalay River. Southward the coast continues high and rugged as far as Obon Point.

Matatindoc Point, with the large rock lying on the reef in front of it, makes a good landmark for vessels coasting in this vicinity.

Campomanes Bay, the only well-protected anchorage on this coast, lies 9 miles southward of Binigsian Point and almost midway between Matatindoc and Obon Points. The head of the bay is sand beach, but the sides are fringed with coral. The reef extends about ⅓ mile northwestward of the southern entrance point and has several large rocks upon it, the largest of which is wooded and about 90 feet high. The center of the bay is very deep, but anchorage may be taken up in 12 to 15 fathoms, mud bottom, about 450 yards southward of the river that empties into the head of the bay or farther southeastward, as desired.

Nabulao Bay, between Obon Point on the north and Catmon Point on the south, is partially filled with reefs and shoals. A broad reef fringes the shore, and a coral ridge having a width of from ½ to ¾ mile with a large unnamed island upon it, projects 1½ miles from the head of the bay, dividing it into two parts. The northern part of the bay is almost filled with shoals, and rocks awash lie 1 mile east-southeastward of the highest part of the unnamed island on the reef. The southerly part of Nabulao Bay affords anchorage protected in northerly and easterly weather, in 9 to 14 fathoms, mud bottom, eastward of the island ½ mile from shore and about 300 yards outside the shore reef.

Catmon Bay, southeastward of Catmon Point, is small and exposed to westerly wind and seas.

From Catmon Bay to Cansilan Point, 20 miles southeastward, the coast is quite regular, steep-to, and has few dangers outside the shore reef. The high land approaches closer to the shore, leaving only a narrow coastal plain with a fringe of coconut palms along the shore. Just southward of Catmon Bay is a stretch of sand beach about 1 mile long, near the middle of which lies the town of Jinabayan. A 3½-fathom shoal lies about ½ mile off the southern end of this beach 2¼ miles south-southeastward of Catmon Point. At Bolila Point the shore reefs widen, extending over ¼ mile southward of the point. Bolila Island lies on the shore reef between Bolila Point and the town of Asia. Partially protected anchorage may be found between Bolila Island and a reef that bares at low water, lying ½ mile southeastward of the island. At Doog Point the hills come close to the shore, giving this point its prominence. Calipapa and

Basay are two small towns on the coast between Doog Point and Cansilan Point. At Cansilan Point the coast turns eastward, then southeastward and finally southward to Cauitan Point, forming Tolong Bay.

Tolong Bay is open and exposed. The eastern part, off the mouth of the Tolong River, is deep, but westward of that river the bottom slopes off more gradually to the 10-fathom curve. Both the Bayuan and San Sebastian Rivers are closed to all except the smaller boats, though they have a good depth inside. Tolong, at the mouth of the Bayuan River, is the most important town in the bay. Vessels can find fair-weather anchorage in front of the town ½ to 1 mile offshore in 4 to 7 fathoms; mud bottom. A trail and telephone line follows the shore around the south end of Negros to Dumaguete on the east coast.

From Cauitan Point to Siaton Point, the southernmost point of Negros, the shore is steep-to and fringed by a narrow coral reef. Between Giligaon Point and Siaton Point strong tidal currents may be expected, the ebb flowing northwestward and the flood in the opposite direction. Some heavy tide rips have been encountered off this coast. At **Giligaon Point** the land rises steeply from the shore and with the lone coconut palm on the top makes this point an excellent landmark. **Dome Peak,** 2,775 feet high, and **Sharp Peak,** 2,815 feet high, also make good marks. The towns and rivers on this part of the coast are unimportant.

Siaton Point, the southern extremity of Negros, is clean and steep-to. It is the end of a long mountain ridge extending northwestward; its coast line is an abrupt cliff 60 feet high, which extends around the point.

From Siaton Point the coast trends eastward with a curve northward for about 7 miles to Bombonon Point. This coast is generally low and sandy and fringed with coconut trees and is clean and steep-to. It forms the foot of a large valley which trends a long distance northward.

Siaton River is a small, unimportant river which empties about 1 mile northeastward of Siaton Point. The town of Siaton is about 1 mile inland on the east bank of the river and is not visible. The Canauay River, another small and unimportant river, empties about ¾ mile eastward of the Siaton.

Off the mouths of the above rivers are sand bars which extend about ¼ mile from shore, outside of which the water deepens very rapidly. An indifferent anchorage may be found off the mouth of the Canauay River in 15 fathoms, sandy bottom, about 300 yards from shore.

Bombonon Point, clean and steep-to, is the end of a long ridge trending northerly. A cliff about 40 feet high extends around the point. Back of the cliff the land rises rapidly, attaining a height of over 200 feet at a distance of ½ mile inland.

Port Bombonon (chart 4466) is a small inlet making into the south end of Negros, which affords perfect protection for small craft at all times. Its entrance lies about ¾ mile nortwestward from Bombonon Point. The channel is about 50 yards wide at the narrowest point and has a least depth of 3 fathoms. The best anchorage is in 5 fathoms, muddy bottom, off the mouth of the Talocoy River, where there is a width of about 300 yards.

DIRECTIONS.—As the reefs on both sides of the channel show plainly, Port Bombonon is comparatively easy of access in the daytime. The northern side of the eastern entrance point is clean and steep-to and may be passed close aboard. After passing this point the southern side of the port should be favored, as a small reef, generally marked by a fish trap, makes out from the first point on the northern side. From here the shores of the port are clean and steep-to.

From Bombonon Point the coast trends in an east-northeast direction for 5 miles to Zamboanguita Point. This coast is generally low and sandy and fringed by a very narrow, steep-to, coral reef. Between Bombonon Point and Port Siyt the sandy beach is broken by a number of steep cliffs.

Port Siyt (chart 4466), about 2½ miles northeastward of Bombonon Point, is somewhat similar to Port Bombonon and affords good shelter for small craft. The narrowest part of the channel has a width of only 40 yards and a least depth of about 6 fathoms. The best anchorage is near the head of the harbor, where there is a width of about 300 yards, in 7 or 8 fathoms; soft, muddy bottom. As the reefs at the entrance are plainly visible, access is comparatively easy.

Zamboanguita Point is flat and sandy; shoal water extends nearly ¼ mile southward from it. The town of Zamboanguita, concealed by coconut trees, lies on the point.

Apo Island lies about 4 miles east by south of Zamboanguita Point. Rocks awash extend about ⅛ mile southward from it. The remainder of the shores of the island are clean and steep-to. The north end is a gently sloping table-land 393 feet high, which drops off abruptly on all sides. The southern end is about 150 feet high, and between these two parts the land is low and flat and under cultivation. A light, visible 16 miles, is shown from a small, round, concrete tower on the northern end of Apo Island. In the channel between Apo Island and the coast of Negros the current flows constantly from north to south with variable velocity.

From Zamboanguita Point the coast trends northeast by north for 6½ miles to Dauin Point and thence north-northeast for 7½ miles to Dumaguete. This coast is clean and steep-to, and the bank is too steep to afford anchorage. The coast is formed by coral-sand beach terminated at high water by coconut trees or grass. The country for ½ mile inland is practically flat and then rises gradually to the high mountain range which marks the southeastern part of Negros.

Dauin Point is sandy and flat and covered with trees somewhat higher than those generally found in this vicinity. It is clean and can be passed close-to.

Dauin is a small unimportant town just westward from the point of the same name and about 200 yards from the beach. It contains a large, prominent, stone church standing on a slight elevation and the ruins of two stone forts.

Bacong is a village lying on the coast about 4 miles north-northeastward of Dauin Point. It contains a large, prominent church.

Cuernos de Negros are three very prominent peaks 8 to 10 miles northward of Zamboanguita Point. The highest peak is conical in shape and 6,244 feet high. They are well wooded, and on their eastern side a deep valley makes out to the coast at Dumaguete.

Dumaguete Point is a flat, salient point of sand. The Dumaguete River empties close to the point.

Dumaguete (chart 4466), the capital and largest town of Oriental Negros lies in a slight bend of the coast immediately northward of the point and river of the same name. It is connected with Oslob, Cebu, and Misamis, Mindanao, by telegraph cables which land on the northern side of the mouth of the Dumaguete River. The town presents a prominent appearance from the sea. Its exports are hemp, copra, and some sugar. A light, visible 7 miles, is shown from a white, concrete beacon close to the beach in the northern part of the town.

The anchorage off Dumaguete is bad; the bank being steep-to and the holding ground poor, vessels are liable to drag off into deep water. It is open eastward and during the northeast moonsoon is frequently unsafe, and landing at times is dangerous and even impracticable. Vessels usually anchor east-northeastward of the light in about 15 fathoms.

Another anchorage recommended is with the bell tower, southward of the church, bearing 240° (238° mag.), in 25 to 10 fathoms, according to the size of the vessel. A little outside of the line joining Dumaguete Point and the point northward of the town, 25 fathoms will be found; inshore of this the soundings decrease rapidly. A medium-sized vessel anchoring here with 45 fathoms of chain will have 5 fathoms of water under her stern as she tails inshore and straightens her cable. The best boat landing is on the beach in front of the band stand; the beach is sandy with coral bottom a short distance from the shore line, but a boat will usually go over the coral unless too heavily laden.

From Dumaguete the coast trends northward for about 2 miles to Calongcalong Point. This coast is low and sandy and fringed by a narrow, steep-to, coral reef. About 100 yards northeastward of Calongcalong Point are two small sandy cays lying on the edge of the shore reef.

Tañon Strait, between Negros and Cebu Islands is about 90 miles long, north and south, 3 miles wide at the southern entrance, and 15 miles wide at the northern. The middle of the strait is deep and clear. On the Cebu side there are no off-lying dangers, and the water is deep close up to the shore reefs. On the Negros side the same statement holds true, with the exception of a few detached reefs, none of which lie more than 2 miles from shore. There are no harbors suitable for large vessels on either side of the strait. The currents in the southern part of the strait are strong and complicated and at spring tides attain a velocity of 5 or 6 knots, with strong races and eddies; at neap tides the velocity is 2 or 3 knots. The tidal current runs with considerable velocity over the whole width of the strait, but decreases rapidly as the strait widens out. During the southwest moonsoon the wind is usually fresh from the northward, drawing down the axis of the strait.

EAST COAST OF NEGROS.

From Calongcalong Point the coast trends in a general northwesterly direction for about 16 miles to Canamay Point, the southern entrance point to Bais Bay. From Calongcalong Point to Amblan

Point, a distance of 9 miles, the shores are generally clean, steep-to, sandy beaches with very little coral; between Amblan and Canamay Points there is a steep-to coral reef which extends ½ mile in places. From Calongcalong Point to within 3 miles of Amblan Point the land is low and covered with coconut trees with an occasional rocky bluff; thence to Amblan Point low hills about 100 feet high lie close to the shore. From Amblan Point to Canamay Point the land is low and the shore line is partly mangroves and partly sandy beaches. There is a fair road skirting the shore as far as Tanjay, but most of the bridges are down. There are a number of small, unimportant towns and villages on this coast, off which anchorage may be found in fine weather, but usually very close in because of the great depth of water.

Amblan Point is low, sandy, and steep-to, covered with coconut trees and marked by a light. The town of **Amblan** lies just west of Amblan Point. It may be identified by the large brick wall, the remains of a burned church. This wall is circular at the top and surmounted by a cross. Anchorage in 10 fathoms, sandy bottom, may be found off the town.

A shoal with a least known depth of 1 fathom lies about 2 miles west-northwestward of the light and ⅗ mile offshore.

The town of **Polo** lies at the mouth of the river of the same name, which empties about 3 miles westward of Amblan Point. The Polo River is very small and can only be entered by a pulling boat at high water.

The town of **Tanjay** lies on the south side of the river of the same name, about 1 mile above its mouth. The Tanjay River, which empties about 1 mile southward of Canamay Point, is small and shoal. The bar at the mouth is nearly bare at low water. The shore reef in this vicinity is about ½ mile wide, and anchorage, protected only during the southwest monsoon, may be found outside of it in 10 fathoms; muddy bottom.

Canamay Point, the southern entrance point to Bais Bay, is low and covered with mangroves. It is surrounded by a reef, bare at low water, which extends ¼ mile.

Bais Bay (chart 4466), between Canamay Point and Campoyo Point, about 5½ miles northward, is divided into two smaller bays, known as North and South Bais Bays, by Daco Island. The shores of both bays are low and fringed with mangroves, back of which is a large area of fertile land devoted to the cultivation of sugar cane. Both bays afford good, sheltered anchorage for moderate-sized vessels, but are so encumbered with reefs as to make them difficult of access, especially in bad weather. The entrances are between extensive reefs, partly bare at low water.

Daco Island lies with its southern end about ¾ mile northward of Canamay Point. The southern end is low and covered with mangroves, while the northern end is 547 feet high. There is a narrow boat channel with a depth of 1 fathom at high water between it and the mainland.

On Guindung Point, which extends southward from the northwest point of Daco Island, is a stone pier about 30 yards long, on which is a concrete building with a nipa roof visible from all parts of South Bais Bay. Reefs, partly bare at low water, extend over 1 mile from

the northeast point of Daco Island and form the southern side of the channel into North Bais Bay.

South Bais Bay, southward and westward of Daco Island, is generally shoal. Anchorage may be found southward of the south end of Daco Island in 9 fathoms or westward of the same point in 3½ or 5 fathoms. There is a dangerous reef, partly bare at low water, lying about ¼ mile southwestward of Arboles Point, the southwest extremity of Daco Island; its southwest end is marked by rocks, which are generally visible. The channel between this reef and the reefs fringing Arboles Point is less than 100 yards wide and has a depth of 6 fathoms. It is generally marked by stakes and is used by small local traders. The channel generally used by strangers is westward of the rocks marking the western extremity of the reef just described; it has a width of about 350 yards and a depth of 6 fathoms. On the western edge of this channel is a small rocky patch with a least depth of ¾ fathom.

Directions.—Good anchorage may be found by bringing Arboles Point to bear 306° (305° mag.) and steering for it, anchoring in 9 fathoms when Banlas Point, the southeast point of Daco Island, bears 58° (57° mag.). Vessels desiring to enter the bay should pass about ¼ mile southward of Banlas and Arboles Points and through the staked channel previously described or continue westward, keeping a good lookout for the reef northward, and when the wharf on Guindung Point bears 352° (351° mag.) it should be steered for. Anchorage in 3¼ fathoms may be found with the wharf on the above bearing and Arboles Point bearing 91° (90° mag.), or as much farther northward as the draft will permit.

North Bais Bay, northward of Daco Island, is nearly blocked by reefs, through which there are narrow, tortuous channels where good anchorage may be found, but in the absence of any aids to navigation they are impracticable without local knowledge, except at low water, when the reefs are visible. Extensive reefs, partly bare at low water, extend over 1 mile northeastward of Daco Island and nearly 2 miles southeastward from Campoyo Point, leaving a narrow, deep entrance channel about 350 yards wide between them into the interior of the bay. Diutay Islet is a small cultivated islet 208 feet high nearly in the middle of the bay, on an extensive reef, largely bare at low water.

The town of Bais, the principal sugar-shipping port in this vicinity, lies on the shore in the southwestern part of North Bais Bay. About 1 mile northward of the town is a wooden wharf with 14 feet at its end. This wharf is at the head of a long, narrow, tortuous channel between the reefs. From the wharf is an embankment of stone and earth about 1 mile long, built over the mud flats, to the main road, which passes through Bais.

Another wharf, with a depth of 18 feet at its end, extends about 600 yards northward from the north side of Daco Island. This wharf is also connected with the town of Bais by a good road. Five white, concrete beacons about 15 feet high, erected on the edges of the reefs, mark the channel to the wharf.

Vessels entering North Bais Bay should pass midway between Nos. 1 and 2 beacons on a 270° (269° mag.) course; when abeam of No. 2 beacon haul northwestward for No. 4 beacon; round No. 3 beacon

at a distance of about 200 yards and steer southwestward, with No. 6 beacon slightly open on the starboard bow; when abreast No. 6 beacon steer for the wharf, keeping a good lookout for shoal water northeastward of it.

CAMPOYO POINT, the northern entrance point to North Bais Bay, is a narrow strip of lowland on which there are a few coconut trees and grass. Reefs, bare at low water, extend 1 mile eastward and 2 miles south-southeastward from it.

Manjuyod Point, about 4 miles northward of Campoyo Point, is bold, with rocky bluffs from 20 to 100 feet high for 1 mile on either side of it. It is clean and steep-to. The town of **Manjuyod** lies in a bend in the coast about midway between Campoyo and Manjuyod Points, just north of the mouth of the river of the same name.

From Manjuyod Point the coast trends northerly for about 4½ miles to the village of Tinaogan and thence in a north-by-east direction with a curve westerly for 8½ miles to Tayasan Point. Between Manjuyod Point and Tinaogan a narrow, fringing reef and shoal water extends about ¼ mile in places.

Immediately northeastward from Tinaogan, and connected with the shore is a circular ridge of coral varying in width from 100 to 500 yards and with depths over it from bare at low water to 10 fathoms and inclosing within it an area about 1 mile in diameter, with depths varying from 11 to 18 fathoms. This narrow, coral ridge bares at low water at the center of its outer or eastern edge, which lies nearly 1½ miles from shore. The ridge is steep-to on all sides, the lead giving no warning of its vicinity. While it is possible to cross the ridge in some of the deeper places, it is not considered advisable to do so. A good range for passing well eastward from this reef is Diutay Island, Bais Bay, in range with Manjuyod Point, bearing 190½° (189° mag.).

Calagcalag Bay (chart 4466), about 3 miles northward of Tinaogan, is a reef harbor where good shelter for small vessels can be found in either monsoon. It is divided into two sections; the outer part is formed by coral reefs bare at low water, and affords an anchorage area about ¼ mile wide. The inner part is formed by two mangrove-covered points and is fringed almost throughout by coral. This inner section is merely a narrow, well-defined channel between reefs bare at low water. The channel is curved and varies in width between the reefs from 150 yards at its narrowest part to approximately 200 yards near its head. The channel is clear, with muddy bottom shoaling gradually from 15 fathoms at its entrance to 3 fathoms about 100 yards from a causeway which crosses its head.

DIRECTIONS.—In the absence of any aids to navigation it is difficult to give directions for Calagcalag Bay. The outer anchorage should be approached on a 270° (269° mag.) course, keeping about 250 yards south of the reef, which forms the northern side of the anchorage and anchoring off the entrance to the inner section in 15 to 20 fathoms, muddy bottom, with the rocky point covered with scraggly mangroves, which forms the northern side of the inner section, bearing 21° (20° mag.). Small craft intending to enter the inner section should stand northward from the above-described anchorage, keeping a good lookout for the reefs on either side, until a prominent culvert in the causeway at the head of the bay bears 287° (286°

mag.), when it should be in range with a conspicuous notch or cut in a prominent cluster of bamboos on the top of a hill several hundred feet high. Stand in on this range and anchor in 4½ fathoms, sticky mud bottom, about 250 yards from the causeway.

Tayasan Point is a steep-to rounded point, low, flat, and well cultivated, and forms a prominent projection from the general coast line. The town of Tayasan lies on the south side of Tayasan Point on the eastern side of the Tibiauan River. Good anchorage, fairly protected in both monsoons, may be found off the elbow in the coast about ¾ mile southwestward of Tayasan in 22 fathoms, muddy bottom, about 250 yards from the beach. The shore in the vicinity of Tayasan Point is remarkably steep-to.

Jimalalud is a small town about 3½ miles north-northeastward of Tayasan Point, immediately northward of Dalungan Point. It may be recognized by a prominent, iron-roofed convent. Anchorage may be found eastward of the convent in 15 fathoms, muddy bottom, about 300 yards from the shore.

Pasil Point, about 5½ miles northeastward of Tayasan Point, is low, flat, and well cultivated. The Magingin River, which is small and of no value to navigation, empties through Pasil Point.

Libertad River, which empties 1½ miles northward of Pasil Point, although appearing large, is completely blocked by a reef bare at low water. Outside the reef the bottom drops off abruptly into 20 fathoms. Small native craft enter this river at high water.

Guijulngan is a small town about 7½ miles north-northeastward of Pasil Point. It contains several good stores, and a company of constabulary is stationed there at present. Small coasting steamers call regularly. The mouth of the large river emptying northward of the town is closed by a bar, and all cargo is handled on the beach in front of the town. Off the town the water deepens gradually to depths of 3 and 4 fathoms about ⅜ mile from the beach, and then drops off abruptly to 12 fathoms, muddy bottom, and deepens rapidly to over 50 fathoms a little more than ½ mile from shore. The usual anchorage is in 12 to 15 fathoms, muddy bottom, with the church bearing 290° (289° mag.).

From Guijulngan the coast trends in a general northerly direction for about 20 miles to the Mainit River at the southern entrance to Refugio Pass. This coast presents no points or indentations of any importance; the hills approach close to the shores, which are fringed with steep-to reefs, off which the water is generally too deep to afford good anchorage. The rivers are small and of no value to navigation. This part of the island is well populated, and there are numerous villages scattered along the shore.

A small reef having three coral heads awash at low water and surrounded by deep water lies ⅗ mile east-southeastward of Jilaitan Point. Between this reef and the shore reef is a clear, deep channel about 200 yards wide. With the exception of this reef there are no off-lying dangers in this vicinity.

Vessels occasionally anchor off the town of Vallehermoso. A sandy flat with an average depth of 3 fathoms along its outer edge extends about 300 yards from shore in front of the village, and immediately outside of this flat the water deepens abruptly to 10 fathoms. Anchorage may be found just outside the edge of this

flat in 10 fathoms, muddy bottom, with the Vallehermoso convent, near the shore, and the largest and most prominent building in the village, bearing 271° (270° mag.).

About 1½ miles northward of Vallehermoso and directly off the De la Vina sugar hacienda, anchorage may be had, well protected during the southwest monsoon and also from southerly and southeasterly winds by a detached coral reef which runs parallel with the shore and bares in two places at low water. To approach this anchorage, the prominent, iron-roofed dwelling should be brought to bear 226° (225° mag.) and steered for, anchoring in 5 fathoms, muddy bottom, when the mouth of the small stream on the northern side of the hacienda bears 271° (270° mag.). A small, detached, 2¼-fathom patch lies off the northern entrance, about 400 yards from the shore, between which and the shore is a narrow 11-fathom channel. From this patch the iron-roofed dwelling bears 218° (217° mag.) and following the previously recommended course should be passed on the starboard hand at a distance of about 150 yards when approaching the anchorage from northward.

The channel between the shore and the southern end of the detached reef which protects the anchorage is foul and irregular and should not be used, as there is a small 1¼-fathom coral patch lying directly off it, from which the iron-roofed dwelling bears 318° (317° mag.), less than ½ mile distant.

From the mouth of the Mainit River the coast trends northeasterly for about 6 miles to Talabe Point, forming the western side of Refugio Pass. This coast is generally fringed by mangroves and faced by a narrow, steep-to reef. The town of San Carlos and a number of villages lie on this coast. There are a number of sugar estates in this vicinity off which anchorage may be found.

Refugio Island, forming the eastern side of Refugio Pass, is nearly flat, the highest point, in the eastern part, being about 50 feet. It is surrounded by reefs partly bare at low water, which extend ½ mile northeastward and over 1 mile southwestward from it; the reef on the northwest side is narrow and steep-to. Its shores are low and rocky except for a stretch of sand beach on the east side and another on the southwest. It is thickly populated and well cultivated. It is marked near the northern end by a light.

Ermita Rock, composed of coral heads with a least depth of ½ fathom and surrounded by deep water, is a dangerous reef lying about 1 mile east-southeastward of Ermita Point, the southern extremity of Refugio Island. There is a deep channel ½ mile wide between Refugio Island and Ermita Rock.

Refugio Pass (chart 4466), separating Refugio Island from Negros, is about 6 miles long and has a least navigable width, abreast San Carlos Point, of ¾ mile. Near the southern end of the pass are seven separate detached shoals lying on the western side of the channel, the outermost of which, a 3-fathom patch, lies nearly ¾ mile from the coast of Negros, leaving a deep channel 1 mile wide between it and the reefs fringing the western part of Refugio Island. The positions of the shoals and the various small anchorages between them will be best understood by reference to the chart.

San Carlos, the most important town in this vicinity, lies on San Carlos Point, a low, sandy point extending from the coast of Negros

into Refugio Pass abreast the northern end of Refugio Island. The town is nearly obscured by trees, only a few houses being visible. There is a small wharf at San Carlos Point and another built out to deep water about ½ mile northward of the town. San Carlos has regular steamer communication with Iloilo, and considerable sugar and tobacco is shipped.

A light, visible 10 miles, is shown from a white, concrete beacon about 50 yards north of the inner end of the wharf at San Carlos Point.

Good anchorage may be found 400 or 500 yards southward of San Carlos Point in from 5 to 8 fathoms; muddy bottom. In approaching this anchorage from the northward care must be taken to give the eastern side of San Carlos Point a berth of about ½ mile as a shoal, sandy flat covered by ½ to 2 fathoms extends nearly ⅜ mile in that direction and is not usually visible owing to the muddy water.

Talabe Point, the western entrance point to the northern end of Refugio Pass, is about 2 miles northeastward of San Carlos Point. It is low and flat and covered with mangroves and coconut trees. The Talabe River discharges through the point. Shoal water surrounds this point about ⅜ mile.

A small, detached, coral reef with a least depth of 2½ fathoms and surrounded by deep water lies ⅝ mile east-southeastward of Talabe Point. This reef constitutes the outer danger on the western side of the northern approach to Refugio Pass.

Pinabuntan Point, about 1½ miles northeastward of Talabe Point, is low and covered with mangroves which extend about ½ mile outside the solid shore line.

Ticlin Reef is a detached coral reef, partly bare at low water, lying about ¾ mile south-southeastward of Ticlin Island. On the southern part of the section which bares at low water is a shifting sand cay awash at about half tide.

Paulino Point is about 1½ miles northeastward of Pinabuntan Point. The head of the identation between these two points is filled by an extensive mangrove swamp which extends from ¼ to ½ mile inland.

Ticlin Island, a little over ¼ mile southward from Paulino Point, is a small islet mostly covered with mangroves. It is surrounded by a reef bare at low water.

Anchorage may be found in 8 fathoms ¼ or ⅜ mile southwestward of Ticlin Island. Better-protected anchorage for small vessels may be found in a basin about ¼ mile in extent in 6 fathoms, muddy bottom, about 300 yards northwestward of Ticlin Island, with the southwest point of that island in range with the sandy cay on Ticlin Reef, bearing 155° (154° mag.).

Two channels lead into this anchorage; the northern one is better. In rounding the northern end of the reef fringing Ticlin Island, the depths decrease from 15 fathoms outside to 5 fathoms just before the anchorage on the previously described range is reached. The southern channel leading around the western side of the island is narrow. By keeping in the best water 2¼ fathoms may be carried, but this channel should not be attempted under unfavorable light conditions or unless previously staked.

From **Paulino Point** the coast trends north-northeasterly with a curve westward for 16 miles to Ocre Point, on the south side of the entrance to the Danao River. This coast is fringed by a narrow, steep-to, coral reef, with no detached dangers excepting a small patch, partly bare at low water, lying about 1 mile northeastward of Paulino Point and ¾ mile from shore, and a small 1½-fathom reef lying about ¾ mile southeastward of the village of Salamanca. Both of the above-mentioned reefs are inside the ordinary track of navigation.

Calatrava is a small town, of little commercial importance, on the south side of the mouth of the Calatrava River, about 3 miles northward of Paulino Point. In passing along the coast it may be recognized by a large, iron-roofed convent near the beach, nearly in the center of the point on which the town is situated. This convent and an old, abandoned schoolhouse are the only buildings visible from the sea.

Anchorage may be found off the southern side of the point on which Calatrava lies in 12 fathoms, about ¼ mile from the shore, with the point bearing 13° (12° mag.).

Ocre Point, the southern entrance to the Danao River, is about 50 feet high and is formed by yellow clay and rock.

Mount Solitario, described under the northern coast of Negros, lies 5¾ miles westward of Ocre Point; is the only high land in its vicinity; is of regular, conical shape, 1,119 feet high; and is a useful landmark for making the mouth of the Danao River.

The **Danao River** (chart 4463), which empties between Ocre and Mocaboc Points, has a least depth of 12 feet on the bar, deepening inside to 10 and 12 fathoms. The channel across the bar is narrow and tortuous and has a least width of 100 yards between the 2-fathom curves. The river is about 600 yards wide at the mouth, but soon narrows to 200 yards and varies in width from 100 to 200 yards for a distance of 4 miles. The general course of the river is from west to east, the banks are steep-to and good; protected anchorage may be found anywhere inside the bar. On the north bank of the river, about ½ mile inside the bar, is a dilapidated wharf, immediately back of which is an iron-roofed shed which forms a prominent landmark. From the landing at the ruins of the wharf a road runs to Escalante. No water is obtainable nearer than a spring 8 miles up the river. Danao River affords a fine harbor of refuge for small vessels.

Directions.—There are no aids to navigation and vessels entering Danao River should proceed cautiously. The anchorage space off the ruins of the wharf is only about 100 yards wide between the 2-fathom curves, and considerable difficulty is found in turning, especially on an ebb tide.

The mean time of high water is $11^h\ 36^m$ after the moon's meridian passage. Springs rise $5\frac{8}{10}$ feet.

Mocaboc Point, about 2 miles northward of the Danao River, is about 40 feet high and is formed of yellow clay and rock. It is surrounded by a fringing reef which extends ¼ mile northward and continues along the shores of Escalante Bay.

From **Mocaboc Point** the coast trends west-southwestward for about 2 miles and then north-northwestward for 6 miles to Bito Point, forming **Escalante Bay.** This bay is fringed by wide coral

reefs, bare at low water, and faced by Bagunbanua Island and a number of large dangerous reefs, partly bare at low water. The village of **Escalante** lies on the western side of Mocaboc Point. Owing to the fact that reefs extend nearly ½ mile from the village, vessels rarely anchor in Escalante Bay. Vessels desiring to communicate with Escalante enter the Danao River or anchor outside, northward of the bar, in 2 or 2½ fathoms, and land on the beach, where a trail leads to the village.

Panalsalon Reef is a large reef, partly bare at low water, lying with its southwest extremity about 1 mile northward of Escalante. On the part baring at low water are large bowlders awash at high water. There is a deep channel ¼ mile wide between Panalsalon Reef and the reefs fringing Escalante Bay.

Bagunbanua Island lies on the southwest angle of a large triangular reef, bare at low water, 1⅝ miles northward of Mocaboc Point. It is very small and covered with bushes. A reef, bare at low water, extends over ¾ mile northward and the same distance eastward from it.

Between Bagunbanua Island Reef and the reefs fringing the shores of Escalante Bay is a deep channel over 1¼ miles wide, but there are a number of small, dangerous, rocky patches covered by depths of 1½ to 3 fathoms, as shown on the chart.

A large detached reef, bare at low water, lies ½ mile southeastward of Bagunbanua Island, between which and Bagunbanua Island Reef is a narrow pass with a depth of 2½ fathoms. Between this reef and Panalsalon Reef there is a deep channel ¼ mile wide.

Pamaaun Reef is a large reef lying with its southwest extremity about 1¾ miles northward of Bagunbanua Island. An area about ⅜ mile in extent bares at low water and on the southwest part of this area there is a small, sandy cay awash at high water.

Nearly midway between Pamaauan Reef and the eastern extremity of Bagunbanua Island Reef is a large, rocky shoal bare at extreme low water. There is a deep channel between this reef and Bagunbanua Island Reef and also between it and Pamaaun Reef.

From Bito Point to Sagay Point, about 2½ miles northward, is very little solid land, mangroves covering the reefs ½ to 1 mile from shore. This coast is fringed by a reef bare at low water over 1 mile outside the mangroves.

ISLANDS OFF THE NORTH END OF CEBU.

Guintacan Island lies about 6¼ miles west-northwestward of Bantigui Point, the northwestern extremity of Cebu. The top of the island is a fairly level plateau covered with low trees, bushes, and grass, and is 167 feet high. The island is bounded on all sides by rocky cliffs ranging from 100 feet high at the northern end to 40 feet at the southern and is clean and steep-to. There are four small villages on the island and it is well cultivated; there is no fresh water. There is great difficulty in anchoring off Guintacan because of the great depth of water. Indifferent anchorage may be found in 16 fathoms, sandy bottom, about ⅜ mile from shore, off the village of Pasil, on the southeast coast and off the village of Langob on the southwest coast.

Chocolate Islet, a little over 1 mile northward of Bulalaqui Point, the northeastern extremity of Cebu, is a small, wooded islet 138 feet

high. It is clean and steep-to and forms a prominent landmark for navigating the channels between Cebu and Malapascua Islands. Chocolate Islet, bearing between 266° (265° mag.), and 330° (329° mag.), will carry a vessel clear of the rocks southwestward of Malapascua and reefs between Bulalaqui and Campatoc Points. Good, temporary anchorage in moderate depths may be found anywhere in the vicinity of Chocolate Islet.

Malapascua Island lies with its southern end 3¾ miles northeastward of Bulalaqui Point. It is marked near the northwestern point by a light. Its northern, eastern, and southern coasts are fringed with reefs and shoals for about ½ mile. It is covered with small trees and bushes and is 78 feet high in the northeastern part. Its shore line is very irregular, being a succession of rocky headlands connected with the shore by narrow ridges and with many outlying pinnacles of rock. There is a small, rocky islet 18 feet high close to its northwestern extremity, a rock 1 foot high ½ mile northward of the same point, and a rock awash nearly ½ mile eastward of the 1-foot rock. About ⅜ mile southwestward of the southwest point of the island is a small islet 25 feet high and several rocks 5 to 16 feet high. Good anchorage may be found in the northeast monsoon in 10 fathoms about ½ mile southwestward of the light.

Monad Shoal is an extensive shoal lying with its shoalest part, 5¾ fathoms, about 4½ miles east-southeastward of the southeast point of Malapascua Island. It consists of coral bowlders and sand.

WEST COAST OF CEBU.

Cebu Island is between Negros on its western side and Leyte and Bohol on its eastern. It is long and narrow, 122 miles north and south, and its greatest width is 20 miles. A chain of mountains containing beds of coral, traverses the entire length of the island. Cebu is the ninth island of the group in point of size, having an area of 1,762 square statute miles, and is thickly populated. The rivers are small and numerous, and generally unfit for navigation or irrigation. With the exception of a few fine valleys, the cultivation is confined mainly to the seaboard. The principal exports are hemp, sugar, and tobacco.

Bulalaqui Point, the northern extremity of Cebu, is formed by a cliff 90 feet high, back of which the land rises rapidly to a height of 140 feet. It is clean and steep-to on its northern side.

Tapilon Point, about 2¼ miles westward of Bulalaqui Point, is rocky and 124 feet high; between these two points the shore is low and fringed by a narrow reef. The village of Tapilon lies on the beach about ¼ mile eastward of Tapilon Point. Some sugar is shipped to the city of Cebu in small sailing craft. Anchorage may be found about ½ mile northward of the village in 7 fathoms; sandy bottom.

Bantigui Point, 1¾ miles west-southwestward of Tapilon Point, is low and sandy, fringed with coconut trees, and surrounded by reefs and shoal water for ½ mile. Between Bantigui and Tapilon Points the shore curves southward, forming a small bay, which is blocked by reefs. The Cortejan River empties through a salt marsh at the head of the bay.

Daan Bantayan, locally known as Candaya, is a small town of little commercial importance, lying 1¼ miles south of Bantigui Point, at the mouth of the Dalingding River. There is a large prominent church. A small steamer calls weekly, and the mail is also sent overland to Cebu. Anchorage in fine weather may be found about ½ mile westward of the town in 9 or 10 fathoms; muddy bottom.

From the town of Daan Bantayan the coast trends southwesterly for 5 miles to Cauit Point. This coast is low and sandy and fringed by a reef which extends nearly ½ mile in places.

Cauit Point is low and flat, covered with coconut trees, and fringed by a very narrow strip of steep-to coral reef. Back of Cauit Point the land rises gradually, and about 2 miles inland is 470 feet high. The village of Cauit, on the point, contains a prominent church.

Jibitnil Island lies 1 mile westward of Cauit Point. Its shores are clean and steep-to and its top is a well-wooded table-land 110 feet high. The channel between it and Cebu is clear and has a depth of 13 fathoms in the middle.

Hagnaya Bay (chart 4465).—From Tajad Point, about 2 miles southward of Cauit Point, the coast trends southeastward for 2½ miles, thence southward for 2 miles, and thence northwestward for 2 miles more to Sabil Point, forming a large, irregularly shaped bay. The entire bay, eastward of a line drawn between Tajad and Sabil Points, is foul, being filled with reefs and shoals, the greater part of which bare at low water. The shores of the bay are generally fringed with mangroves. There are several small rivers emptying into the bay through shallow channels through the reefs. There are several small and unimportant villages lying on the shores of the bay. The town of Medellin is at the mouth of the Dagosungan River in the northeastern part of the bay. There is a narrow, tortuous channel beginning about ½ mile northeast of Sabil Point and leading to Medellin, through which about 10 feet can be carried at high water to within less than ½ mile of the village, but in the absence of any aids to navigation it should not be attempted by a stranger.

Anchorage for small vessels may be found in 8 fathoms about ½ mile north-northeastward of Sabil Point. The country is flat and furnishes no distinctive leading marks, and there are no aids to navigation.

Daijagon Canal, connecting Hagnaya Bay with Bogo Bay on the east coast of Cebu, bares for about 1 mile near the middle of its length, where a flat, rock ledge rises through the mud of the mangrove swamp. It traverses the level stretch of land which occupies this part of the island and is about 4 miles long from Sabil Point to Bogo Bay; both sides are bordered with mangrove swamps for ½ to 1 mile. This canal is passable by small boats at extreme, high tides.

Sabil Point, the southern entrance to Hagnaya Bay, is low and not conspicuous; there are a few coconut trees and bushes growing on it. It is surrounded by a reef which extends about ½ mile northward and ¼ mile westward.

From Sabil Point the coast trends south-southwestward with a curve eastward for 5 miles to Mangcao Point and thence southeastward for 2 miles to Bangtad Point, at the entrance to the Lambusan

River. From Sabil Point nearly to Mangcao Point the coast is fringed by a narrow, steep-to, coral reef, partly bare at low water. Between Sabil Point and the village of San Remigio are a number of small, rocky islets, 6 to 10 feet high, lying on the shore reef 100 to 300 yards from the shore.

San Remigio is a small, unimportant village lying about 1½ miles southward of Sabil Point. There is a large, white, stone church, which is prominent.

Anchorage for small craft, with barely swinging room to clear the reef, may be found in 15 fathoms by steering for the church on at 91° (90° mag.) bearing and anchoring when the outer two of the rocky islets on the reef northward are on the tangent to Sabil Point.

Mangcao Point is clean and steep-to and can be safely passed at a distance of ½ mile. The extremity of the point is formed of low cliffs, back of which the land rises gradually to the summit of the Guintorijan Hills, 270 feet high, over 2 miles east-northeastward. About 1 mile southeastward of Mangcao Point the fringing reef appears again and gradually widens until at Bangtad Point it extends about ¾ mile southward.

At the mouth of the Lambusan River (chart 4465), between the long reef extending southward from Bangtad Point and the reef fringing the shore of the mainland, good anchorage for small vessels may be found in 6 fathoms; muddy bottom. Good protection will be found from all winds except from the southwest. In the absence of any natural or artificial aids to navigation it is impossible to give any directions for approaching this anchorage.

From Bangtad Point the coast trends south-southwestward for 16 miles to Bagasaui Point at the entrance to Tuburan Bay. This coast is fringed by a steep-to reef nowhere exceeding ¾ mile in width.

Casimon Point, about 10 miles southward of Mangcao Point, is formed of dark rocks much underworn by the currents. It is surrounded by a reef for about ¼ mile, the greater part of which bares at low water. On this reef is a small, wooded islet and a number of rocks.

Batauang River, the largest river in this vicinity, empties about 2½ miles southward of Casimon Point. It is about 3 miles long, is fed by two large springs near its source, and is fresh for a short distance below the springs. The mouth of the river is a small bay in the rocky shore which has a depth of 2 fathoms, but is too small to be of any value to navigation. The large village of **Taboilan** lies on the shore about ½ mile southward of the mouth of the Batauang River.

Tuburan Bay (chart 4465) lies between Bagasaui and Languyon Points. Bagasaui Point is low and fringed by reefs for ½ mile; Languyon Point is also low and wooded, but clean and steep-to. In the center of the bay are a number of reefs, some bare at low water and others with very little water over them.

Tuburan is a small town on the western side of the mouth of a small and unimportant river of the same name at the head of the bay. There is a large church and convent, which form good landmarks. The Tuburan River can be entered by small craft at high water.

The best anchorage for large vessels will be found by bringing the bell tower on the southern end of the church to bear 142° (141° mag.) and steering for it, anchoring in 5 fathoms, muddy bottom, when Languyon Point bears 229° (228° mag.). This course will carry a vessel about 1/8 mile northeastward of a 2½ fathom spot 13/16 mile northwestward of the church.

Small vessels may proceed farther in on the same bearing, anchoring according to draft. The usual anchorage for small vessels is with the church bell tower on the above bearing and Languyon Point 240° (239° mag.), in 2 fathoms, muddy bottom, between two small coral reefs which bare at low water. On the southern reef there is a prominent limestone bowlder, bare at half tide, which forms an excellent beacon.

From Languyon Point the coast trends southwestward for 11 miles to Asturias Point and thence southward for 3½ miles to Balamban Bay. From Languyon Point to Macalbang Point, which is low, sandy, and steep-to a distance of 6½ miles, the shore is fringed by a narrow, steep-to, coral reef. In the bight between Macalbang Point and Asturias Point the shore reef is somewhat wider than that between Languyon and Macalbang Points.

The town of **Asturias** lies on the northern side of the point of the same name. It contains a large, prominent church. The shore in front of the town is fringed by a reef about 3/8 mile wide.

Asturias Point is low and fringed by a reef which extends 1/4 mile northwestward. The bight between Asturias Point and Uag Point, 1½ miles southward, is blocked by shoal water which extends ½ mile outside a line drawn between the points.

Balamban Point, about 2 miles southward of Uag Point, is low, heavily wooded with coconut trees, and terminates in a sandy spit, bare at low water, outside of which are several dangerous, rocky patches. From the outer two rocky patches, covered by 1¾ and 3 fathoms, respectively, the seaward gable of Balamban church bears 100° (99° mag.), distant 7/8 mile, and 92° (91° mag.), about the same distance. The Baliuagan River discharges through Balamban Point.

Balamban Bay (chart 4465) lies between Balamban and Mambocayan Points. Although the indentation in the coast line is slight, the protection which this anchorage affords is increased in the northeast monsoon by the sandy spit and reefs extending from Balamban Point. On the southern side of the bay an extensive, dangerous, coral reef extends from Mambocayan Point in a northwesterly direction for a distance of 1 mile, on which are numerous shoal patches with depths of 1/4 to 3 fathoms. From the edge of the 3-fathom curve around the northern edge of this reef Balamban church bears 77° (76° mag.), distant 1¼ miles.

Balamban is a small, unimportant town on the northern shore of the bay. It contains a large, prominent church and convent, with some long low barracks northward of them.

Directions.—Vessels bound into Balamban should bring the seaward gable of the church to bear 83° (82° mag.) and steer for it, anchoring in 9 fathoms, muddy bottom, about 3/8 mile from the beach, in front of the church. Steering for the church on the above bearing will give the dangers on either side a berth of only 1/8 mile; therefore caution must be observed.

From Mambocayan Point the coast trends southwestward for 11 miles to Tajao Point and thence south-southwestward for 14½ miles to Barili Bay. Between Mambocayan and Tajao Points is very little coral, and the shores are generally clean and steep-to, no dangers being found more than ½ mile from shore.

Toledo, the only town on this coast, is small and unimportant. A good road about 30 miles long connects the west coast road with the city of Cebu at this place.

Tajao Point is low, clean, and steep-to. Tajao Reef is an extensive, detached, coral reef, bare at low water, lying about 3 miles southwestward of Tajao Point and ¾ mile from shore. A shifting sand cay covers a small part of this reef. There is a channel, about ⅜ mile wide at the narrowest point, between Tajao Reef and the reefs fringing the shore, through which 6 fathoms may be carried.

The outer edge of the reef is very steep-to.

Pinamungajan is a small town on the coast about 5 miles southward of Tajao Point, off which anchorage may be found in a break in the reef in 18 fathoms, muddy bottom, about ¼ mile from shore, with a church, which stands on a slight rise and shows a white gable end to seaward, bearing 78° (77° mag.). By anchoring nearer the southern side of the bight off a small indentation in the reef fairly good shelter will be found during the southwest monsoon.

Aloguinsan is a small town at the mouth of the river of the same name about 3½ miles southwestward of Pinamungajan.

Gorda Point, 3 miles south-southwestward of Aloguinsan and 4 miles north-northeastward of Barili Bay, forms but a slight projection from the general shore line and derives its name more from its prominence. It is clean and steep-to and rises directly from the sea to a flat crown 704 feet high.

Japitan Point, about 3½ miles southwestward of Gorda Point, forms the northern entrance point to Barili Bay. It is a high, rocky point with vertical cliffs, covered on top with grass and light brushwood and fringed by a reef and shoal water for about 200 yards.

Barili Bay (chart 4465).—The head of the bay is filled with mangroves, through which is a canal, passable at high water by small boats, to the town of Barili. A coral reef, bare at low water, fringes the southern side of the bay, and the head of the bay outside of the mangroves is filled with an extensive mud flat which bare at low water for 200 to 500 yards. Barili Bay may be recognized from northward by a large, conspicuous, white landslide on its southern side.

The town of **Barili,** an important center for the well-cultivated district surrounding it, lies ½ mile back of the mangrove swamp at the head of the bay and is not visible.

Barili is connected with Carcar on the east coast by a good road, and from Carcar is a railway to the city of Cebu. This road extends along the coast southward from Barili.

The village of **Guibuang** lies on the south shore of the bay. It contains a large, white dwelling house which forms a good landmark and a small stone mole accessible to small boats at high water.

Anchorage for small vessels, in 19 fathoms, muddy bottom, may be found by bringing the white house to bear 144° (143° mag.) and steering for it, and anchoring when a small, prominent rock on the reef off **Tayong Point** bears 226° (225° mag.).

Tayong Point, the southern entrance point to Barili Bay, is a rocky, vertical cliff about 60 feet high, similar to Japitan Point. It rises, at a distance of 1 mile south-southeastward, to the height of 693 feet. Tayong Point is surrounded by a reef and shoal water for about 300 yards. Near the outer edge of this reef, 120 yards from the shore, is a small, round rock 5 or 6 feet high, much underworn by the sea and very prominent.

From Tayong Point the coast trends southwestward for about 3½ miles to Tangil Point at the entrance to Dumanjug Bay. This coast is fringed by a narrow, steep-to, coral reef with very deep water a short distance outside of it.

Tangil Point, about 3½ miles southwestward of Barili Point, is low, covered with mangroves, and surrounded by a narrow reef.

Dumanjug Point, 1⅝ miles southwestward of Tangil Point, is high, fringed with mangroves, and surrounded by a reef about 100 yards wide. A depth of over 30 fathoms is found within ½ mile of Dumanjug Point.

Dumanjug Bay (chart 4465) lies between Tangil and Dumanjug Points. The head of the bay is shoal, obliging vessels to lie at a considerable distance from shore. The village of Tangil lies in the northeast corner of the bay and the town of Dumanjug on the south shore. Tangil contains a hemp press and a few warehouses; there are two old stone moles which may be approached by a small vessel to within 150 or 200 yards.

DUMANJUG, one of the largest and most important towns on the west coast of Cebu, contains a large, prominent church. Owing to the fact that it has no wharf and that the shore in front of the town is faced by a reef which bares at low water, most of its business is done through Tangil. Dumanjug is connected with Tangil northward and Moalboal southward by a good road. Between Dumanjug and Tangil the road is carried over the reefs on a stone causeway in which is a conspicuous iron bridge.

Anchorage may be found anywhere in Dumanjug Bay, according to draft. Mariners are cautioned to approach an anchorage slowly, as the depths decrease rapidly, and allow sufficient swinging room when anchoring. A good anchorage for a large vessel will be found in 20 fathoms with the bridge in the causeway bearing 110° (109° mag.) and Dumanjug church 197° (196° mag.). The best landing for boats is on the beach at the mouth of the Dumanjug River, about ¼ mile eastward of the church.

From Dumanjug Point the coast trends southward with a bend westward for 4 miles to Libao Hill and is fringed with a narrow, steep-to reef. Between Dumanjug Point and the village of Santa Cruz, 2½ miles southward, there is a long ridge known as **Camboan Hill**, which has a flat top and smooth, regular outlines, making it a good landmark. With this exception the country in this vicinity is low and flat. The entire section is well cultivated, principally with corn.

Libao Hill, 4 miles southward of Dumanjug Point, is a small, heavily wooded hill 475 feet high and forms a conspicuous landmark. It may be seen from a long distance, and vessels from the southward have mistaken it for Pescador Islet.

Copton Bay lies between Copton Peninsula and the mainland of Cebu. Almost the entire bay is blocked by mud flats and reefs bare

at low water. There is a narrow, tortuous channel, outlined by reefs, through which ¼ fathom can be carried at low water as far as the village of Alcantara, on the eastern shore of the bay. Off the entrance to this channel the bottom drops off abruptly to 25 fathoms.

Copton Peninsula is a large, low, flat peninsula covered with coconut trees and brush, which forms the western side of Copton Bay, and is connected with the mainland at its southeast extremity by an isthmus about ½ mile wide, on the south side of which is the town of Moalboal. It is from 25 to 50 feet high and uncultivated. The western side facing Tañon Strait is generally formed by a yellow, steep-to, sandy beach.

Copton Point, the northern extremity of Copton Peninsula, is a rocky bluff about 15 feet high, much underworn by the sea. It is fringed by a narrow, steep-to reef, on which are four detached, peculiarly shaped rocks, 10 to 15 feet high, lying 20 to 50 yards from shore.

Tongo Point, the southern extremity of Copton Peninsula, is low, covered with coconut trees, and terminates in a rocky bluff about 20 feet high.

Badian Bay lies between Tongo Point northward and Badian Point southward. Its shore from just eastward of Tongo Point to the middle of Badian Island is fringed by a steep-to reef, which extends ⅜ mile in places. The middle of the bay is deep and clear.

Pescador Islet, lying in the entrance to Badian Bay, is a small, flat, rocky islet about 30 feet high, has a few bushes on it, and is clean and steep-to. It is marked by a light.

Moalboal (chart 4465) is a small town in the northeast corner of Badian Bay, about 1 mile eastward of Tongo Point. The convent, church, and bell tower are prominent, showing white and in a group westward of the town. The shore in front of the town is faced by a wide reef, bare at low water, over which a dilapidated stone mole more than ¼ mile long extends south-southwestward.

Anchorage, protected only during the northeast monsoon, may be found off the end of the mole in from 20 to 8 fathoms; muddy bottom.

Badian Island, in the southern part of Badian Bay, lies less than ½ mile northward of Badian Point, with which it is connected by a reef bare at low water. It is largely cultivated with corn and 356 feet high. The southern two-thirds of the area between Badian Island and the mainland is blocked by reefs bare at low water. There is a small boat channel over these reefs at high water to the town of Badian.

Badian is a small town in the southeast corner of Badian Bay. It contains a church and bell tower, but they do not show well from seaward. Badian is of little commercial importance because of its inaccessibility from the sea.

Anchorage, protected during the southwest monsoon, may be found eastward of the north end of Badian Island in 20 to 10 fathoms, muddy bottom, about 1¼ miles northwestward of the town.

From Badian Point the coast trends in a general southerly direction for about 28½ miles to Liloan Point, the southwestern extremity of Cebu, and is fairly straight and free from bays and points of any prominence. It is bold, with hills of moderate height lying

close to the shore, and the valleys and rivers are small. The land is cultivated with corn, and coconut trees grow to the tops of the hills. The shore line is fringed by a sand beach, and there is a narrow coral reef for practically the entire length, the edge of which is so steep-to that anchorage can only be found in a few places where there are towns. A number of small towns and villages are scattered along this section of the coast.

Alegria is a small town about 8½ miles southward of Badian Point; it contains a prominent church.

Malabuyoc, 13 miles southward of Badian Point, has a large, white church with two square, sharp towers which form a good landmark.

Ginatilan, 18 miles southward of Badian Point, may be recognized by a large, white church with a high tower.

Samboan, 20½ miles southward of Badian Point, contains two white houses and a church, with two towers, erected on the side of a hill about 150 feet above the sea, from which there are stone steps leading down to the beach. Samboan church is quite conspicuous and is the most prominent artificial landmark in this part of the strait.

Colasi Point, about 3½ miles northward of Liloan Point, forms but little projection from the general coast line. It is the most western point of Cebu and is low, white, and rather craggy.

Liloan Point, forming the northern entrance to the southern end of Tañon Strait, is the terminus of a spur from the main range of hills and can be easily recognized by its position and also by an old, white fort standing on its western side. It is about 50 feet high and sparsely wooded. Between Liloan Point and Tañon Point, about 1¾ miles eastward of it, during flood tide an eddy current in the opposite direction passes close to the coast.

Tañon Point, the southern extremity of Cebu, is low and sandy and surrounded by a reef a little over 200 yards wide. Between Liloan and Tañon Points the coast consists of sand beaches with a depth of 5 fathoms very close-to and 17 to 20 fathoms at a distance of less than ¼ mile.

Santander, on high ground back of Tañon Point, is quite prominent. It contains a large, white church with a tower which is very conspicuous and has stone steps leading down to the beach.

EAST COAST OF CEBU.

From Bulalaqui Point, which has been previously described, the coast trends south and then east to Campatoc Point, 1¾ miles southward of Bulalaqui Point, forming a bay which is completely blocked by reefs, the greater part of which bare at low water. The shore reef, which begins on the east side of Bulalaqui Point, extends in nearly a straight line to about ⅜ mile eastward of Campatoc Point.

Campatoc Reef is a large reef with a least depth of 1 fathom. It begins about 1¼ miles southward of Campatoc Point, extends southward for a distance of 1½ miles, and is about ¾ mile wide. Its inner edge lies from ¾ to 1¼ miles from shore, and between it and the reef fringing the shore of the mainland there is a channel ¼ to ½ mile wide, with a depth of 8 fathoms in the middle. Bulalaqui Point, open of Campatoc Point, bearing 343° (342° mag.), and Tindug Point bearing 210° (209° mag.), clear the eastern edge of Campatoc Reef.

From Campatoc Point the coast trends south-southwestward for 7 miles to Malontod Point, the northern entrance point to Bogo Bay. This coast is generally low, fringed with mangroves, and fronted by a reef which extends ¾ mile in places.

Bogo Bay (chart 4465), between Malontod and Nailon Points, is nearly filled with reefs, the greater part of which are awash at low water. From Malontod Point to Tindug Point, 1¾ miles southwestward, there is a bluff, rocky shore line, the bluffs being generally about 15 feet high. From Tindug Point the remainder of the shores of the bay are generally mangroves. The entrance is a break in the reef about 1⅞ miles north-northwestward of Nailon Point. At the entrance there is a width of about 400 yards and a depth of 26 fathoms. From the entrance the channel trends westward for ¾ mile and then divides, one arm, of no value to navigation, extending northwestward, and the main channel, extending southwestward for ¾ mile, where it again divides, one arm extending toward the entrance to the Daijagon Canal and the other extending southward and gradually shoaling toward the town of Bogo, where there is a stone pier which can be reached by ship's boats at high water. In the middle of the reach trending southwest and northeast is a small coral patch with a least depth of ½ fathom, which should be passed on the port hand in entering. There is a fairly good anchorage southwest of the above-mentioned shoal about 1¼ miles northward of Bogo, where the channel widens to about 400 yards, in 5 or 6 fathoms, muddy bottom, well protected from heavy seas, but open to the wind between north-northeast and east-southeast.

On a clear day, at low water, the reefs are plainly defined, showing a bright green, but with the sun in the west and the tide high it is hard to distinguish the reefs at the entrance. A square, concrete beacon with red, diamond-shaped marks on three sides facing the channel and seaward is on the north side of the channel to mark the entrance. A light, visible 9 miles, is shown from this beacon. A wooden beacon, painted white, with a black square in a 3-foot-square target, stands on the edge of the reef at the south side of the channel about ¾ mile from the entrance, and a similar beacon marks the small, coral shoal near the anchorage. Small steamers trading here make the entrance in the morning when the sun is in the best position for seeing the outlines of the reefs and if leaving at night send boats ahead to mark the channel with torches. There are numerous fish traps on the reefs, but as they are frequently moved they are of little assistance to the navigator. During the northeast monsoon, when the wind is strong, there is a heavy sea running, which, combined with the tide which runs down the coast with considerable velocity, makes it hazardous to attempt to enter without good way on the vessel.

Nailon Point is low and wooded and fringed by a narrow, steep-to reef. It may be passed at a distance of ½ mile.

From Nailon Point the coast trends in a general southerly direction for 40 miles to Bagacay Point, at the northern entrance to Cebu Harbor. This coast is very little indented by bays, and the rivers are small and of no importance to navigation. The shores are generally fringed by narrow, steep-to, coral reefs, nowhere exceeding ½ mile in width. Discolored water has been seen at various times off

Managao and Catmon Points and off Liloan, giving the impression of shoal water, but the survey failed to develop any indications of this kind. Fair anchorage may be found off Borbon, Catmon, Luyang, Danao, and to the north of Liloan. These anchorages are exposed to the full force of the northeast monsoon and are generally very close in because of the great depth of water.

Saac Point, 4 miles southward of Nailon Point, is a low, steep, wooded bluff, clean and steep-to. Back from the point the land rises to a height of about 400 feet at a distance of less than 1 mile inland.

Capitancillo Islet, 4½ miles eastward of Saac Point, is of coral formation, and about 15 feet high. It is steep-to on the western side; reefs extend about ½ mile northward and southward and a short distance eastward. It is marked by a light. The channel between Capitancillo Islet and Cebu is deep and clear.

About ¾ mile northward of Capitancillo Islet is the southern end of a reef which extends about 1 mile northward. This reef has a least depth of 2½ fathoms and is surrounded by deep water.

Ormoc Shoal, 3½ miles northeastward of Capitancillo light, should be avoided, as there may be coral heads on it with less depth than charted.

Calangaman Islet lies 11½ miles northeastward of Capitancillo light. It is small, low, about 10 feet high, wooded, and surrounded by reefs partly bare at low water. Shoal water extends ½ mile westward from it. During the northeast monsoon good anchorage sheltered from the sea may be found off the south side of Calangaman Islet in 8 fathoms.

Nuñez Shoal, 2 miles southwestward of the western end of Calangaman Islet, is a small coral patch with a least depth of 3 fathoms.

Pamoboan Point is about 2½ miles southward of Saac Point; between these points the coast line is irregular and consists of a bold, rocky ledge from 20 to 30 feet high, back of which the land rises rapidly.

Bantulin Point, 2½ miles southward of Pamoboan Point, is a steep clay bluff about 50 feet high, back of which the land rises to a height of over 400 feet within ½ mile of the point. The shore line between these two points is broken by several small, foul bays of no importance. The town of Tabogan lies about midway between the points; the water off Tabogan is too deep to afford anchorage.

Managao Point, about 2 miles southward of Bantulin Point, is low, rocky, and steep-to. The hills come down to the shore here and rise gradually to heights of 300 and 400 feet at a distance of 1 mile inland. Managao Point is the most easterly point on Cebu and is very prominent from north or south. South of Managao Point the coast trends westward for ⅓ mile, forming a small cove, which affords anchorage for small, native craft.

Borbon is a small town in a bend in the coast, at the mouth of the Jimuguit River, about 3 miles southward of Managao Point. A church with a galvanized-iron roof, standing on an elevation south of the town, is a good landmark. The Jimuguit River is small and can be entered only by pulling boats at high water. The shore reef northward and eastward of Borbon is quite extensive and backed by a thick growth of mangroves. The usual anchorage is about 250 yards off the edge of the shore reef in 20 fathoms, muddy bottom, with the church bearing 294° (293° mag.).

Bingkay Point, about 5 miles southward of Managao Point, is a rocky bluff about 20 feet high, covered with small trees and brush. A series of these bluffs with an occasional short strip of white sand beach form the coast line for 1 mile on each side of this point, the central and most prominent being the point proper.

Sogod Bay lies between Bingkay Point and Catmon Point, 4 miles southward. About 2 miles southwestward of Bingkay Point is a very peculiar, steep-sided gulch from 30 to 40 feet deep that extends inland for nearly 1 mile and up which the tide backs for about 300 yards. About ½ mile southward of this gulch is a prominent cliff 56 feet high. A reef from 100 to 300 yards wide fringes the coast from here to the town of Sogod and 1 mile southward from it.

SOGOD, at the head of Sogod Bay, shows well, being built on a slope and having but few trees to hide the houses. The church, on an elevation back of the town, has a galvanized-iron roof and is prominent from northeast and east. There is a small stone pier with a depth of 3 or 4 feet at its outer end. There is considerable trade between here and Cebu carried on by native craft.

Catmon Point is low and composed of dark sand and gravel and is formed by discharge from the Bau River, which empties through the point. Thick coconut groves line the shore on both sides of the point.

The town of **Catmon** is on the shore about ¾ mile southward of Catmon Point. It is almost entirely concealed from seaward by coconut trees. The church at Catmon stands on an elevation about 60 feet high, about ½ mile southward of Catmon Point. It is very prominent, having a red tile roof with a prominent tower surmounted by a dome at the southern extremity of the building.

Binongcalan Point, 6 miles southward of Catmon Point, is low and composed of dark rock and is steep-to. The village of Binongcalan, on the slope immediately west of the point, is composed of a cluster of brown native houses and shows well from seaward. Between Catmon and Binongcalan are a number of small, unimportant villages.

Luyang, a good-sized village, lies at the mouth of the river of the same name in a bend of the coast 1¾ miles southward from Binongcalan Point. The bar of the Luyang River is shoal and can only be crossed at high water by small native craft.

From the Luyang River the coast trends southerly for 1½ miles, forming a low, narrow peninsula which terminates in Poo Point; this peninsula forms the eastern side of the small, well-protected anchorage of **Port Carmen**.

Port Carmen (chart 4465) is nearly filled with reefs and mud flats and affords a very limited anchorage area consisting of a channel about 600 yards long and 100 to 150 yards wide, having a depth of 3 fathoms or more. The edges of the reefs fringing the anchorage are steep-to. The entrance, which has a width of about 250 yards and a depth of 7 to 9 fathoms, is at the southern extremity of the reef which extends about ⅓ mile southeasterly from Poo Point. From the middle of the entrance the church at Carmen, the top of which is visible over the trees, bears 294° (293° mag.). A rocky ledge, awash at low water, extends from the shore toward the middle of the entrance and forms the southern side of Port Carmen. On the south side of this ledge there is a narrow, tortuous channel leading southward, which is

of little value to navigation, being passable only by small craft. The channel northward of this reef has a least width of about 150 yards and leads to the anchorage of Port Carmen. A prominent clump of mangroves stands on the edge of the reef southward from Poo Point, and immediately westward from it there is a noticeable sand spit which is covered at half tide, but may usually be recognized by the color of the water; this sand spit may be rounded close-to by vessels entering. Inside the port the water is usually muddy, and only at low water do the reefs show plainly. Fish weirs are scattered over the shoal parts of the port and along the reefs. There are no aids to navigation nor prominent landmarks, and a stranger should enter cautiously, being guided principally by the color of the water on the reefs, which are steep-to.

Good, protected anchorage may be found westward of the above-mentioned clump of mangroves in 5 fathoms or about 200 yards farther northward in 4 or 4½ fathoms.

The town of CARMEN lies on the western side of the port at an elevation of about 40 feet and is nearly concealed by trees. The church, of wood and mortar construction, with a nipa roof, may be seen over Poo Point from seaward and also from the entrance to the channel, but is obscured from the anchorage; it is not prominent at any time. There is a small, stone pier which is awash at ordinary high water.

The village of COGON lies at the head of the port about ½ mile northward of Carmen, and the villages of DAUIS and VILLA HERMOSA lie on the shore ½ and 2 miles, respectively, southward of Carmen. At these places are small stone piers where small boats can land at high water.

Catadman Point, about 2 miles southward of Poo Point, is formed by the wide shore reef, heavily overgrown with mangroves, giving it the appearance of solid land. This point is quite conspicuous from northward or southward. The reefs for 1 mile north and south of Catadman Point are thickly covered with mangroves and their edges are steep-to.

Danao, the largest and most important town in northern Cebu, is situated about 2 miles southward of Catadman Point. It is the terminus of the railway from Cebu. It contains a prominent church standing on low ground near the beach, with a cemetery with a stone wall around it a short distance north. The church and surrounding buildings form a large group with red tile roofs, but, owing to the thick coconut groves north and south of it, is only visible between 222° (221° mag.) and 350° (349° mag.). Between the church and the cemetery is a ruined wharf, with about 6 feet off the end. The beach in front of the town is dark sand and there is no coral. Anchorage, exposed during the northeast monsoon, may be found eastward of the church, about ¼ mile from the shore, in 20 fathoms; muddy and sandy bottom.

Danao Point, about ½ mile southward of Danao, has a bare and steep appearance. The railway connecting Danao and Cebu passes around this point on an elevated curve about 30 feet above the sea, and the embankment is prominent. Deep water is found close up to the fringing reef, which is of dark rock and moderate width.

The village of Compostela lies on the beach about 3 miles southward of Danao Point. It contains a ruined church, which stands on

the beach and faces eastward. It is visible only between 294° (293° mag.) and 350° (349° mag.), being shut out from other directions by thick coconut groves which line the shore all along this part. A railway bridge, having two arches, ½ mile north of Compostela shows plainly from eastward. The shore for 3 miles northward and for 1 mile southward of Compostela is fringed with a narrow, steep-to, coral reef almost without interruption. There is little sand beach; the rest of the shore line is mostly gravel, with a few stretches of rocky ledges.

Kotkot Point, 5 miles southward of Danao Point, near the mouth of the river of the same name, is low and not prominent except from northward. It is fringed by a very prominent beach which extends as far southward as Liloan. In the vicinity of the mouth of the Kotkot River shoal water extends about ½ mile.

The town of **Liloan** lies in a bend in the coast about midway between Kotkot and Bagacay Points. It has a large church with a galvanized-iron roof standing close to the beach. The town is small and lies behind the church and along the side of a channel known as the Liloan River, which connects Silut Lagoon with the sea.

A small reef with a least depth of 2 feet lies about ⅓ mile northeastward of Liloan Church and 275 yards from shore.

Silut Lagoon is a shallow body of water lying southward of Liloan. The greater part of this lagoon has a depth of 1 or 2 feet at low water, and a large portion of it bares at low water and is covered with mangroves. It is connected with the sea by a narrow channel having rocky sides covered with sand through which the tide rushes with considerable velocity. Sand bars exist at both ends of this channel. At low water 3 feet may be carried over the outer bar; the inner bar bares in spots at half tide, and at low water not more than 1 or 2 feet can be carried into the lagoon.

Bagacay Point, the northern entrance point to the northern approach to Cebu Harbor, is low, rugged, and surrounded by rocks for about 200 yards. It is marked by a light. The point is about 25 feet high at the extremity and rises gradually to about 100 feet about ½ mile inland. There is a small wharf on the north side of the point for landing lighthouse supplies.

Cansaga Bay is a large, shallow bay of no value to navigation on the north side of the northern entrance to Cebu Harbor. There is a fringing reef between Bagacay Point and Cansaga Bay, which attains its greatest width, ½ mile, about 3 miles southwestward of Bagacay Point.

Cebu, the capital of the province of the same name, is near the middle of the eastern side of Cebu. It is built on a large plain at the foot of the mountain chain which traverses the length of the island and faces the strait which separates it from Mactan Island. It is a port of entry and probably the second town in importance in the Philippines. It is connected with Danao northward and Argao southward by railways and with all parts of the archipelago by numerous lines of coasting steamers and telegraph cables. Its principal articles of export are hemp, copra, and sugar; most of the hemp raised in Bohol, Leyte, Camiguin, and northern Mindanao finds its way to Cebu for export. The town is fronted by a substantial sea wall about 985 yards long off which are depths of 3 to 4 fathoms.

The greater part of the shipping, both foreign and domestic, is berthed alongside this wall. At times, during the southwest monsoon, these berths are untenable, and vessels are obliged to anchor in the stream.

REPAIRS.—There are a number of machine shops where ordinary repairs can be made. There is a small marine railway on Mactan Island, about ¼ mile southwestward of Opon, capable of hauling out vessels of not over 200 tons, drawing 9 feet aft and 6 feet forward.

SUPPLIES.—Coal, water, ice, and stores of all descriptions may be obtained.

CEBU HARBOR (chart 4447) is one of the finest in the Philippines, being formed by the strait between Cebu and Mactan Islands. The channel is narrow, but comparatively straight, and is well marked and lighted. The harbor can be entered by all classes of vessels either from northeastward or from southward. The northeastern channel has a least navigable width of 220 yards, and the southern approach is about ½ mile wide at the narrowest point. Off the town the harbor has a width of from 500 to 650 yards.

PILOTAGE for Cebu is optional, but vessels that do not employ a pilot are required to pay berthing fee in case they moor at the sea wall. Pilots may be obtained at Bantolinao Point, at the northern entrance. No pilots are stationed at the southern entrance.

The usual anchorage for large vessels is in mid-channel abreast the town in 6 to 10 fathoms. In the southwest monsoon good anchorage may be found northeastward and eastward of the fort. The holding ground is good in most parts of the harbor, but just south of the fort the ground is hard and anchors are liable to drag.

A horizontally striped buoy, moored 580 yards east-southeastward of Fort San Pedro lighthouse, marks the center of a rocky patch, on which the least depth is 3¼ fathoms. This shoal is the only dangerous detached patch in Cebu Harbor.

The current runs northeasterly during flood and southwesterly during ebb and is quite strong in the channel; during flood tide there is a strong eddy off the fort.

Cebu Harbor is well marked with aids to navigation. Having two entrances, the head of the harbor is considered to be off Fort San Pedro, and buoys and beacons painted accordingly—that is, red buoys or beacons—will be found on the starboard side of both channels as far as the fort, and black buoys or beacons will be found on the port side of both channels. For detailed description of these aids see List of Lights, Buoys, Beacons, and Daymarks published by the Bureau of Customs, Manila, P. I.

TYPHOON SIGNALS are displayed from the signal station in accordance with instructions received from the Weather Bureau.

Mactan Island, forming the southeastern side of Cebu Harbor, consists of an old coral reef raised for the greater part of 8 or 10 feet above the present sea level. It is well populated; the town of Opon stands on the northwestern side, and there are a number of villages facing Hilutangan Channel. The shores are generally fringed with mangroves, and the remainder of the island is devoted principally to the cultivation of coconuts. From **Bantolinao Point**, on the northern part of the island, a reef extends about 1 mile east-northeastward and is marked at the outer edge by a beacon. The edge is

also generally marked by fish traps. From Bantolinao Point to about ¾ mile southwestward of Opon, the shore is fringed by a very narrow, steep-to reef. Eastward of Bantolinao Point is Magellan Bay. The head of this bay is blocked with reefs, and there are a number of shoal patches in the middle. **Panguian Point**, the northeastern extremity of Mactan, is clean and steep-to, as is also the southeast side of the island to the village of Marigondon, where the shore reef begins to widen and continues southwestward for about 4½ miles and then curves northwestward surrounding Lauis Ledge.

The southwestern part of the island has been worn away by the sea, leaving a large reef which extends about 2½ miles southwestward. On that portion of the reef immediately fronting the town are a few pillar-like blocks which are very conspicuous from the anchorage. The surface of the reef is scooped out into irregular basins and sharp projecting pinnacles and covered with mud. The remainder of the reef is bare almost to the edge of deep water at extreme low tides. At high water it is covered, and only a few mangrove-covered islets, some fishermen's huts built on great rock piles, the discolored water, and the numerous fish traps indicate the presence and the limits of the reef. There is a dwelling on the northern edge of the reef which is quite prominent. The southwestern part of the reef, known as Lauis Ledge, is marked by a small, coral islet on which is generally one or two fishermen's huts. About $\frac{6}{10}$ mile west-southwestward of this islet, near the outer edge of the reef, **Lauis Ledge lighthouse**, in 8 feet of water, and 54 feet high, forms a prominent landmark. From Lauis Ledge lighthouse the edge of the reef extends northerly with a curve easterly for a distance of 3 miles to the beacon which marks its northwestern extremity and is generally steep-to.

Directions, northern approach to Cebu.—To enter by the northern approach from a position 1½ miles eastward of Bagacay Point light, steer 229° (228° mag.) for Bantolinao Point light, passing about ¼ mile south of red buoy No. 2 and the same distance north of the beacon marking the point of reef northwestward of Bantolinao Point; when abreast the beacon, steer to pass about ¼ mile northward of the light and steer on between the beacons and buoys. The practicable channel is about 200 yards wide in the narrowest part, which is southeast of Mandaue tower, and the depth here is 9 to 10 fathoms. The towers of Mandaue on the Cebu side and Opon on the Mactan side are painted white and are prominent landmarks. When abreast of Opon tower and about 200 yards from it, a 236° (235° mag.) course, with San Pedro Fort light a little on the starboard bow, will take the vessel to the anchorage.

Dangers, southern approach to Cebu.—Lipata Bank lies in the middle of the southern entrance between Lipata Point, Cebu, and Lauis Ledge, off the southwest point of Mactan Island. It is partly bare at low water. Its eastern edge is marked by a black buoy about ¼ mile eastward of the part which bares.

Narvaez Reef lies about ¼ mile west of Lipata Bank; it is coral, covered with 3 feet. There is a clear channel between these two banks. Both of these dangers and also the edge of the reef off Mactan Island are marked by fish traps, but as they are being constantly shifted too much confidence must not be placed in them as marks for the edges of the reefs.

About 1 mile south of the town of Talisay and 2 miles southwestward of Lipata Bank are three shoals stretching nearly east and west for about 1 mile. On the southeastern edge of the eastern shoal, Bogo, is a black buoy. There are no dangers outside of this buoy. The channel between Bogo and Osteng is quite narrow, but that between Osteng and Lagundi is ⅓ mile wide and deep.

Campanario Shoal lies 1 mile north-northeast of Lipata Bank, and has 2 feet on it, with good depths all around.

Cauit Island is a small, low island, with a grove of coconuts, which was formerly connected with the mainland. Off the northeast point is the ruin of an old fort or castle, 12 or 15 feet high, on a great, concrete foundation, which has been partly undermined and thrown out of level.

The quarantine station for Cebu is on the north side of Cauit Island, and the approach to it is marked by a yellow buoy, about 275 yards northeastward of the northwest point of the island, and a yellow buoy about 275 yards northward of the northeast point of the island.

Vessels approaching the quarantine station from southward should give the ruin of the old fort northeastward of Cauit Island a berth of about 325 yards, and continue northward until the eastern buoy bears 271° (270° mag.) or southward of that bearing before hauling westward, because of the shoal water northeastward of the island. There is a substantial wharf, with a depth of 18 feet at low water at the end, extending northward from the quarantine station.

Directions, southern approach to Cebu.—The best channel for entering Cebu from southward is that between Lipata Bank and Lauis Ledge. The channels north of Bogo, Osteng, and Lagundi Shoals, and west of Lipata and Campanario are not recommended.

Vessels from southward should bring San Nicolas Church red light to bear 5° (4° mag.) and steer for it, passing midway between Lauis Ledge light and the black buoy off Lipata Bank, giving them both berths of about ⅓ mile; continue this course, guarding against the effect of the tide, and pass the ruin of the old fort off Cauit Island at a distance of about ⅓ mile; when San Pedro Fort red light bears 58° (57° mag.) it should be steered for and anchorage taken up as previously recommended.

Olanga Island, 2¼ miles southeastward of Mactan Island, is 4¼ miles long northeast and southwest, of irregular shape, low, and cultivated. Mabini Point, the northeastern extremity, is clean and steep-to. The western and eastern sides are fringed with reefs, and from the southern side a wide reef, bare at low water, extends southwestward for 4½ miles, and surrounds Sulpa, Camungi, Hilutangan, Panganan, Caohagan, and Lassuan Islets, which are simply continuations of Olango. On Olango Island, half of the east, the north, and most of the west shores are overhanging bluffs of porous, sharp, jagged coral. Most of the south shore is exposed coral rock with occasional deposits of sand in which grass and a few scattered mangroves have taken root. The villages of Santa Rosa and Poo lie on the west side of the island. Olango is the only island of this group which has a supply of water. Hilutangan Islet, lying about 2½ miles southwestward of Olango, is rocky and about 7 feet high on the western part; the eastern part is low and sandy and covered with co-

conut trees. Except at low water, Hilutangan provides, on the north side, a much-used shelter for bancas during rough weather. LASSUAN ISLET, 1 mile southeast of Hilutangan, is the smallest and most southern islet of this group. It lies close to the edge of the reef and is composed of sand, with a partly exposed coral foundation. A group of tall coconut trees is conspicuous.

Hilutangan Channel, separating Olango Island from Mactan Island, is over 2 miles wide, straight, deep, and free from obstruction.

Olango Channel, separating Olango Island from the reefs surrounding Danajon Bank and the reefs southwestward of it, is about 2 miles wide at its narrowest part, between Caohagan and Cabulan Islets, and is deep and clear.

From Lipata Point, at the entrance to Cebu Harbor, the coast trends southwesterly, with a bend northwestward for 15 miles to Carcar Point. The towns of **Talisay, Minglanilla, Naga,** and **San Fernando** and a number of villages lie on this coast. The interior is of rocky coral formation and is broken and rough but is nearly all cultivated. The hills have been eroded into steep gullies whose general direction is at right angles to the coast. Much of the shore is bordered by mangroves which in places give way to mud and the mud to grass and cultivated land without any definite high-water mark. Most of the coast is fringed with steep-to coral reefs, and there are a few places where a small boat can land at low water in rough weather.

Bogo, Osteng, and Lagundi Shoals in the entrance to Cebu Harbor have already been described. From Lipata Point to a point just southward of Tinaan Anchorage are numerous detached reefs lying from 1 to 1½ miles from shore, and this part of the coast should be given a good berth. In front of the town of Minglanilla are numerous passages between the reefs, but the bottom is very uneven and the channels too narrow and tortuous to be of any value. Southward of Tinaan Anchorage the shore reef is narrow and steep-to until Carcar Point is reached, and there are no off-lying dangers.

Naga is a small town about 7 miles west-southwestward of Lipata Point. It may be recognized by a prominent church with a large tree in the plaza in front of it. Anchorage may be had here in 15 fathoms, sandy bottom, about ⅜ mile from shore, with the church bearing 271° (270° mag.). There is a ¼-fathom patch lying ½ mile northeastward of the church and patches of 2½ and 4¾ fathoms southeastward of the same point.

Tinaan Anchorage, about 1 mile southward of Naga, is formed by a bight in the coast and a large reef lying about ½ mile southeastward of it. The reef which protects the anchorage is largely bare at low water. There are depths of 11 and 12 fathoms, sand and mud bottom, in the middle of the anchorage, decreasing to 3 fathoms ¼ mile from the head of the bight. At low water the reefs are prominent and are a guide for entering. There are no aids to navigation nor prominent landmarks by which directions can be given.

San Fernando, a small town about 4 miles southwestward of Naga, contains a prominent church. The shore reef in front of the town is narrow and steep-to. Anchorage for small vessels, with sufficient

swinging room in fine weather, may be had in front of the town in 20 fathoms; sandy bottom. There are the remains of a small jetty which does not extend to the low-water line. **Sangat Cove,** about 2½ miles southwestward of San Fernando, is small and shallow and the entrance is narrow. It is used only by small sailing craft.

Carcar Point is formed by a right-angled elbow of the coast; it is low, covered with coconut trees, and fringed by a narrow, steep-to reef which on its eastern side extends about ⅜ mile.

Carcar Bay (chart 4465) lies about 1½ miles westward of Carcar Point. There is a small, low islet on the western side of the entrance connected with the shore by a reef bare at low water. The shores are low and fringed with mangroves, and reefs extend from both entrance points and from the shores of the bay, leaving available a small anchorage area well sheltered from the sea by the reefs and the small islet.

Carcar is a small town standing on slightly rising ground about a mile north-northwestward of the head of the bay. It is on the railway between Cebu and Argao and is connected with Berili on the west coast and with the towns northward and southward by good roads. It contains a prominent church. A causeway extends through the mangrove swamp between the town and the bay and continues out to the edge of the reef in the northern part of the bay. Since the construction of the railway this causeway has been but little used and is out of repair.

The entrance to Carcar Bay is deep and clear. It should be approached by bringing the end of the jetty in range with the Carcar Church, bearing 334° (333° mag.), before Carcar Point bears eastward of 63° (62° mag.), and steering in on this range. The best anchorage will be found in 6 or 7 fathoms, muddy bottom, on a line from the eastern side of the islet to the end of the jetty.

From the western side of Carcar Bay the coast trends southward to Argao Point and is mostly mangrove, with fringing coral reef. There are numerous small, detached shoals between Sibonga and Cerro Point, none of which lies over ¾ mile from shore. There are no bays nor rivers large enough for a pulling boat on this coast.

Sibonga is a small town 5½ miles southward of Carcar; it contains a prominent stone church. There is a stone jetty with a house on the end of it; this jetty is partly sheltered by a reef, but has not sufficient water at its end at low tide to float the small, native craft.

Argao Point, about 13 miles south-southwestward of Carcar Point, is low, flat, and heavily wooded. It projects over a mile eastward, is clean and steep-to, and very prominent from northward or southward. Small vessels can load here in either monsoon, choosing their anchorage northward or southward of the point, as more convenient, but necessarily very close in because of the great depth of water.

The town of **Argao** (chart 4465) lies between Argao Point and the river of the same name which empties about ¾ mile northward of the point; it is the terminus of the railway from Cebu and contains a large, conspicuous church. The cable from Loon, Bohol, lands here.

The beach may be approached very closely off Argao and anchorage found either eastward of the town in from 15 to 20 fathoms, sandy bottom, with the church bearing 316° (315° mag.) or southward of the point in 10 to 15 fathoms, sandy bottom, according to swinging room desired.

In the wide indentation in the shore line just southwestward of Argao Point the shore reef has a width of 300 to 650 yards, while the bay in front of the village of Kauayan, about 3 miles northward of Dalaguete Point, is faced by reefs which extend a long way out and have deep water close to their edges. The reef narrows from here and disappears at Dalaguete Point.

Dalaguete Point, about 8 miles southwestward of Argao Point, is flat, sandy, heavily wooded, and steep-to.

Dalaguete, the leading town in this vicinity, lies on the north side of Dalaguete Point. The town and church are visible from northward, but are obscured by trees from southward.

Anchorage may be found in 15 to 20 fathoms, sandy bottom, close in shore, with the church bearing 316° (315° mag.), or southward of Dalaguete Point in 10 to 15 fathoms, sandy bottom, about 200 yards from shore.

The coast from Dalaguete Point to Cayangon Point, 10 miles south-southwestward, is low, with steep sand beaches interrupted by rocky bluffs. The town of Boljoon and a number of villages lie on this coast.

About 3½ miles south-southwestward of Dalaguete Point and ⅜ mile from shore there are several small, detached patches with a least depth of 1¼ fathoms.

Mambagi Reef lies about 5 miles south-southwestward of Dalaguete Point, with its outer edge about ½ mile eastward of the village of Mambagi. It is composed of rock and sand, and the greater part bares at low water. There is a narrow, deep channel between it and the coast of Cebu. Dalaguete Point, bearing 18° (17° mag.), leads clear of the eastern side of Mambagi Reef. Temporary anchorage for small craft may be found inside of Mambagi Reef, but it is not recommended, as the entrances both from north and south are very narrow, the anchorage area limited, and the holding ground poor. The southern entrance is the better unless the reefs are showing well, in which case they can be closely approached.

The town of **Boljoon** is on a small, deep cove about 1½ miles northward of Cayangon Point. It may be recognized by the white cliffs on Ili Point, on the north side of the cove, which are about 100 feet high. There is no anchorage off the town, but temporary anchorage for small vessels may be found off the mouth of the Losapon River, just south of the town and about 100 yards from shore, in 20 to 25 fathoms.

Cayangon Point is 110 feet high and skirted by a reef, partly bare at low water, extending about ¼ mile eastward.

Iuisan Point, 2½ miles south-southwestward of Cayangon Point, is low and ends in sand and rocks close to the shore.

The village of Caceres, on the south side of Iuisan Point, is small and unimportant; it may be identified by the slender, red-domed church tower.

Iuisan Shoal is a large shoal with depths of 1 to 5 fathoms, with one spot near the center bare at low water, lying about 1 mile southward of Iuisan Point and ½ mile from shore. The church at Caceres, bearing 336° (335° mag.), clears the eastern side of this shoal. The channel between it and the shore reef fringing Santa Monica Point is about 400 yards wide and has a depth of over 20 fathoms.

Oslob Point, about 3 miles southwestward of Iuisan Point, is low, sandy, and well wooded. On its extremity is a conspicuous, white, stone fort. The point is surrounded by a steep-to reef which extends about ¼ mile southeasterly.

The town of **Oslob**, small and unimportant, stands on Oslob Point; it is scattering and nearly concealed by trees. The church, a large, imposing structure with a red tile roof, forms a prominent landmark. The telegraph cable from Dumaguete lands ½ mile southward of Oslob Church. Anchorage may be had on the south side of Oslob Point in 4 to 9 fathoms.

From Oslob Point to Tañon Point, the southern extremity of Cebu Island, the shore line consists of sheer, white cliffs from 10 to 120 feet high, alternating with sandy beaches. This coast is clean and steep-to.

Sumilon Island lies 3½ miles 69° (68° mag.) from the south end of Cebu and over 1 mile from shore. It is wooded and 103 feet high in the northern part. Near the southern end of the island is a prominent stone tower 22 feet high, the top of which is 103 feet above the sea. Sumilon Island is surrounded by a narrow, steep-to reef bare at low water. The channel between it and Cebu is 1 mile wide, deep, and clear.

NORTH COAST OF BOHOL.

Bohol is of oval form, 48 miles long in a northeast-and-opposite direction, and 34 miles wide north and south. It has an area of about 1,441 square statute miles and is the tenth island in the Philippines in point of size. It is well populated. The southern part is hilly and rocky, but in the northern part are fertile valleys and good tracts of level land. The highest point on the island (2,630 feet) is in the southeast part, about 5 miles northwestward of Nauco Point. Mount Cogton, in the northeast part of the island, is a prominent, grass-covered, double peak 1,505 feet high. Bohol contains no good harbors, and its rivers are generally small and of little value to navigation.

Lapinin Island, lying close to the northeast point of Bohol, is generally low, but of rugged appearance. It is a wide, rice-cultivated flat, broken by low, conspicuous hills covered with grass. A well-defined hill 422 feet high, near the southern point of the island, is probably the highest point. Its shores are indented by numerous bays, fringed with mangroves, except in a few places where there are small stretches of sand beach and faced by reefs. There are no rivers, the openings in the mangroves being only esteroes extending a short distance inland. Three small islets, **Bonoon**, **Budlaan**, and **Pamasaun**, lie close to the north side of the island.

Tinuibo Island, 2 miles southeastward of the northeast point of Lapinin Island, is small, clean, steep-to, and 397 feet high. The east side is very bold, but the west side has a low, sandy spit about 4 feet high extending a short distance. Tinuibo Island is prominent. The channel between it and Leyte is about 7 miles wide and is deep and clear.

Basiao Channel, separating Lapinin Island from Bohol, is a winding channel about ½ mile wide, with Lapinin Chico Islet at its

northern end. **Lapinin Chico Islet** is a small islet 107 feet high, fringed with mangroves, lying about 5/8 mile westward of Lapinin Island. From the eastern entrance to Basiao Channel a mid-channel course is safe, and a depth of 3 fathoms can be carried to within 1 mile of Lapinin Chico.

About 3/4 mile southeastward of Lapinin Chico is a sand bar which bares at 3/4 tide, and is connected with the islet by a sand spit. The channel divides and passes on each side of this bar, and through each branch about 2½ fathoms can be carried at low water. About 300 yards from the south side of Lapinin Chico is a rock awash at high water, with 2½ fathoms close to its south side, and on the opposite side of the channel, about 550 yards southward of this rock, is a small rock covered by 1½ fathoms at low water. The channel east of Lapinin Chico lies close to the sand bar southeastward of the islet, is about 400 yards wide, and has a north-and-south direction along the east side of the islet. There are two 1½-fathom spots near the sand bar at the end of the spit, one about 250 yards east-southeastward and the other 400 yards northeastward from the bar, both over a sandy bottom.

Basiao Channel affords excellent but limited anchorage in 3 to 5 fathoms; sand and rock bottom.

From Centinela Point, at the northern entrance to the Basiao Channel, the coast trends in a general west-northwesterly direction for 14½ miles to Tabon Point, the northern extremity of the island, and thence westerly for 8 miles to Corte Point. This coast is very irregular in outline, generally fringed with mangroves, and faced by shoal water to a considerable distance. The rivers are small and unimportant, with the exception of the Ipil, which empties about 4½ miles southeastward of Tabon Point. The river is navigable by small craft drawing not over 5 feet for 2½ miles to the village of Ipil. The towns of **Ubay, Talibon,** and **Getafe** and the villages of **Pangpang, Bahabaha,** and **Bagacay** lie on or near this stretch of coast. They are all very small and of no commercial value at the present time, there being practically no commerce. A little copra and fish are occasionally sent by small, native craft to Cebu.

East of the Cogton Mountains lies a large valley extending westward along the coast to the Ipil River and southward between the Cogton Mountains and Mount Batuanan. This latter mountain, 1,118 feet high, is the eastern termination of the long east-and-west ridge southwest of the Cogton Mountains, descending with a clifflike abruptness to the eastward and forming an easily distinguished landmark.

Westward of the Ipil River a belt of gently rolling country extends back from the coast from 1 to 3 miles, narrowing to the westward. Southward of this belt are rounded hills 600 to 900 feet high. The most valuable as landmarks are **Cantamulig Hill,** 2¾ miles southwestward of Tabon Point, and **Mount Corte,** 1¾ miles southwestward of Corte Point. Cantamulig Hill is not easily distinguished from the northward, being only 377 feet high, but from the eastward or westward it is very noticeable, as it is the most northerly of the hills in that vicinity and has a long, sloping shoulder extending north-northwestward from its summit. Mount Corte, at the northwest extremity of Bohol, is a round-topped hill 580 feet high, covered with

grass and dotted with bushes. It has a long shoulder extending about 1 mile southward and terminating abruptly at the village of Corte in a cleft which separates it from a heavily wooded hill about 190 feet high. At the time of the survey there was an umbrella-shaped tree with a long slender trunk, conspicuous from the north and southwest, on the west flank of Mount Corte.

DANAJON BANK

is a large bank about 40 miles long and from 5 to 14 miles wide extending from the north side of Bohol Island. Its northern limit is marked by a chain of steep-to coral reefs ½ to 2 miles wide, which begin at Pandanon Islet, lying about 5 miles northwestward of Mount Corte, and sweep around northward and eastward to within about 6½ miles of the coast of Leyte. The only islets on these reefs are **Pandanon**, at the western extremity; the two **Caubyan Islets**, about 8 miles northeastward of Pandanon; **Danajon Islet**, about 27 miles eastward of the Caubyan Islets; and the **Tood Islets**, three in number, about ½ mile within the eastern end of the bank. On the western side of Northeast Pass on to the bank is a small, sandy cay which bares at about ¾ tide. Pandanon Islet is low and sandy, small, and covered with coconut trees; Caubyan Islets are small, low, and partly wooded; Danajon Islet is very small; Tood Islets are small, sandy islets with a few bushes on them. The greater part of these reefs bare at low water and, being composed mainly of coral sand, are usually easily seen. Danajon Bank may be approached either from west or east or through a number of breaks in the outer reefs. Good anchorage, protected from the sea, may be found in many places on the bank.

Danajon Bank is studded with numerous small, low, wooded islets, and there are a great number of reefs on it, some submerged and others bare at low water. Between these islets and reefs are numerous intricate and tortuous channels. The shoal places and coral reefs on the bank are not indicated by a change in the color of the water, and in the most favorable light show only as brown spots, which can scarcely be distinguished from cloud shadows. This seems due in part to silt in the water and in part to absence of coral sand on the reefs. This and the strong variable currents make the greater part of Danajon Bank unsafe for anything but very small vessels. The towns facing the bank are small and unimportant, and the little commerce is carried on by small, native sailing craft, the masters of which are familiar with the dangers.

Islands on Danajon Bank.—LAPININ ISLAND, off the northeast coast of Bohol, marks the eastern limit of Danajon Bank. It is the most noticeable of the islands of the bank, being the largest and the only one of any elevation and has been described. BAMBANON ISLAND lies on the shore reef off Tabon Point; JANDAYAN ISLAND lies northward of Corte Point and is separated from Bohol by a narrow, intricate channel. In addition to these there are a number of small, unimportant islands lying close to the coast, inside of which there are no channels. The remaining islands may be roughly arranged in three belts extending parallel to Bohol. Nearer Bohol and separated from it by channels navigable by small vessels, going westward from

Lapinin, are BANTIGUI, BUTAN, MACAINA, MALINGUI, CABANTULAN, JAU, TAMBU, MAHANAY, BANACON, and MASINGIN islands. Near the northern part of the bank are GAUS, JINUTANGAN, BILANBILANGAN, NUNU, CALITUBAN, and CAUBYAN Islands, while MAUMAUN, SAGASAY, TALABAN, SAAE, BASAAN, and GUINDACPAN may be considered to form the intermediate belt. This, however, is a very artificial division, as these middle islands are not always clearly separated by channels from those of the other groups.

All these islands are low and more or less wooded. Jinutangan, Nunu, Malingui, and Guindacpan bear coconut groves of various sizes, and scattered palms are found on some of the others. The outer islands, as a rule, have sandy beaches, while those closer to Bohol are usually fringed with mangroves. Since fishing is the greatest industry in this vicinity, almost all of the islands have some inhabitants, but the largest villages are on Gaus, Jinutangan, Nunu, Guindacpan, Calituban, and Caubyan Islands. The village of Tugas, at the northeast extremity of Lapinin Island, is the largest on that island.

Reefs on Danajon Bank.—Aside from the fringing reefs around the islands which extend to a greater or less distance, this area shows a fairly even bottom and, with the exception of two 1½-fathom spots lying 1 and 1½ miles, respectively, northward of Butan Island, may be considered free from dangers. On the large shoal between Gaus and Jinutangan nothing less than 3 fathoms is found. Jinutangan Island is surrounded by a reef for about 600 yards, leaving a narrow, 4½-fathom channel between it and Bilanbilangan Island. The reef surrounding Bilanbilangan extends 1 mile northwestward from it and nearly to a line drawn between Northeast Pass and Nunu Island.

The area bounded roughly by Talaban, Nunu, Maumaun, Macaina, and the east ends of Jau and Saae Islands should be considered a dangerous area, navigable only by small craft by the exercise of great caution. While narrow channels, deep enough for fairly large vessels may be found, leading in many directions, the numerous reefs, clouded water, and strong currents render it unsafe to use them, with the exception of the channel west of Malingui and Maumaun and south of Sagasay Islands. Extending southeastward from Nunu Island for about 2 miles, foul ground and several small patches bare at low water exist, leaving a channel about ¾ mile wide between their southern extremity and the reef surrounding Sagasay Island. From the east end of Jau Island a large shoal, with several patches bare at low water near its northern and eastern limits, extends about 2 miles. Between Limosoc Reef, the eastern limit of this shoal, and Macaina Island there is a good channel about 1 mile wide.

There are fairly good channels between Basaan and Saae Islands and also between Basaan and Guindacpan Islands. Basaan Island should be given a good berth when rounding it, as foul ground extends for a considerable distance south and southwestward; a rock awash lies nearly 1 mile southwestward of Basaan. Northward of Basaan and separated from it by a narrow, tortuous, and foul channel is a large reef about 2¼ miles long east and west and ¾ mile wide, which bares at low water; there are a few scattered mangroves growing on this reef. Eastward of Calituban Island, between Calituban Reef and the reef just described, is a channel through which

7 fathoms may be carried and which connects with the channel between Basaan and Guindacpan Islands.

CALITUBAN REEF, beginning about 1 mile northeastward of Calituban Island and extending in a west-southwest direction for 12½ miles, is a large reef similar to the reef fringing the northern edge of Danajon Bank and roughly parallel to it. Its southwestern limit lies about 1 mile southeastward of Pandanon Island on the north side of Northwest Pass. It shows well in most lights because of the coral sand, and as a rule the water deepens abruptly from its edge to 10 to 15 fathoms. The only islands on Calituban Reef are Calituban, Banacon, and Masingin. Between Calituban and Banacon Islands long sand banks bare at low water, and along these are many fishing huts built on piles. There is a good, deep channel between Calituban Reef, and the reefs on the outer edge of Danajon Bank, but it is encumbered with several reefs which bare at low water, and there are several shoal spots covered with 1 to 2½ fathoms. In the absence of any aids to navigation and any good landmarks it is impossible to give any directions for this channel, and its use is not recommended.

Channels.—Danajon Bank may be approached by the Basiao Channel; the channel northward from Lapinin Island; Northeast Pass, a break in the outer reef; Middle Pass, a smaller but similar break; and Northwest Pass, between the reefs fringing Pandanon and Cabulan Islands. There is a small, narrow channel through which 2½ fathoms may be carried on to the bank about 1 mile northwestward of Northeast Pass, but because of its little value and proximity to Northeast Pass it need not be described. Basiao Channel has already been described; the channel northward of Lapinin Island is about 7½ miles wide, deep and clear, and does not require any further description.

NORTHEAST PASS is a break in the reef fringing Danajon Bank about 12 miles westward of Canigao Island.

DIRECTIONS.—Vessels approaching the Northeast Pass should steer between 227° (226° mag.) and 177° (176° mag.), and when Nunu Island bears 227° (226° mag.) steer for it. If bound for the town of Ubay, when Jinutangan Island bears 145° (144° mag.) steer 133° (132° mag.) until abeam of the east end of Jinutangan, round Jinutangan at a distance of ½ or ¾ mile, and when the west end of Jinutangan bears 0° (359° mag.) steer 180° (179° mag.), passing about 1 mile eastward from Maumaun Island and the same distance westward from the two 1½-fathom spots lying about 1 and 1½ miles northward of Butan Island. When Ubay is sighted, it should be steered for and anchorage taken according to draft. When the summit of Lapinin Chico is abeam, a depth of 3 fathoms will be found about 2 miles from shore. Small vessels anchor in 2 fathoms about ½ mile from shore.

If bound for Talibon, a vessel should, after clearing the pass, steer 247° (246° mag.), heading for Guindacpan Island. This course will carry her well clear of the reef which extends about 1¼ miles northwestward of Bilanbilangan Island and midway between the reefs surrounding Talaban Island and a detached shoal, about 1 mile in diameter, lying about 3 miles west-northwestward of Nunu. This shoal bares at low water and shows well in the sunlight. The western edge of the reefs westward of Talaban Island is marked by Talibon

Church in range with the east tangent to Saae Island. When Talaban Island is abeam, a mid-channel course between Saae and Basaan Islands will carry good water, and when the church at Talibon bears 180° (179° mag.) it may be steered for and anchorage taken according to draft. The water in front of the town shoals gradually, with mud bottom. If bound for Getafe, the above directions should be followed until the church at Talibon bears 180° (179° mag.) and the north side of Tambu Island bears 270° (269° mag.), when the vessel should be hauled westward to pass about ½ mile northward of Tambu and Mahanay Islands. Steer midway between Banacon Island and the northwest part of Mahanay Island; midway between Banacon and Jandayan Islands and when the house on the wharf at Getafe bears 135° (134° mag.) steer for it and anchor in 4 fathoms off the end of the wharf. Getafe Harbor, between Jandayan Island and Corte Point, is well sheltered from all directions and has a depth of from 4 to 11 fathoms; muddy bottom.

Middle Pass, about 12½ miles westward of Northeast Pass, is about 300 yards wide, and 4 fathoms can easily be carried through it at low water. No easily identified range can be given, but at the outer entrance Mount Batuanan bears 159° (158° mag.) and is nearly midway between Calituban and Guindacpan Islands. Unless familiar with the channel it should not be attempted when the reefs do not show well. The deeper water will be found on the western side of the channel, though spits make out a short distance from the western reef at both the inner and outer entrances to the channel.

Vessels approaching the Northwest Pass should bring Mount Corte to bear 119° (118° mag.) when about 1 mile outside of a line drawn between Pandanon and Cabulan Islets and steer for it. This leading mark will carry a vessel through a channel ⅝ mile wide and 28 fathoms deep between the reefs fringing Pandanon and Cabulan Islets, both of which are low and covered with coconut trees. An excellent range to mark the limit of safety of both of these reefs and the extremity of Calituban Reef, southwest of Masingin Island, is to keep the center of Lassuan Island in range with the conspicuous, sharply conical peak which shows against the sky line on Cebu Island, bearing 288° (287° mag.). Holding this range, a vessel passes about 275 yards from the edge of the Cabulan Islet reef and 500 yards from the reef around Pandanon Islet, while it clears the end of Calituban Reef by about 450 yards. This range is strong enough to make it perfectly safe, although it does not pass through mid-channel. When the north tangent to Jandayan Island bears 72° (71° mag.), the vessel may be hauled eastward for Getafe or other ports on the north side of Bohol.

The above directions are all that can be given for crossing Danajon Bank; there are a great many other channels, but they are narrow and tortuous and in the absence of local knowledge should not be attempted. The above courses must be followed with great caution and particular attention paid to the lookout and lead.

WEST COAST OF BOHOL.

From Corte Point the coast trends in a general southwesterly direction for about 30 miles to the town of Loon. This coast is low,

generally fringed with mangroves and intersected by a number of small rivers, and faced by shoal water. The small towns of **Inabanga**, **Tubigon**, and **Calape**, and a number of villages lie on this coast.

Mount Corte, the northwestern extremity of Bohol, has already been described. Beginning at Mount Corte and extending southwestward with a curve southeastward are a series of hills ranging from 400 to 1,500 feet in height. Along the shore is a narrow coastal plain, and between this plain and the hills just mentioned the country is a mass of hills and ridges of varying heights, divided by valleys and gorges running in every direction.

Corte is a small village of 25 or 30 houses lying at the head of a small cove with a sandy beach, about 1 mile southwestward from Mount Corte. Some copra is shipped.

Pampang is a small village standing on an elevation about 40 feet high, 3½ miles southwestward of Mount Corte. It contains a conspicuous stone church with a nipa roof. Pampang is faced by shoal water and is not easily approached even by a pulling boat except at high tide.

Inabanga River, which empties about 5 miles southwestward of Mount Corte, is the only river of much importance in this vicinity. It is of large volume and moderately strong current. The bar at the entrance can only be crossed by pulling boats at high water. From the mouth of the river to the town of Inabanga the banks of the river are low and muddy and fringed in many places by nipa. Just above the town the first bluffs appear, and about 1 mile higher up the dense coconut groves give place to open cornfields.

Inabanga is a town of comparatively little importance lying on both sides of the Inabanga River, about 3 miles above its mouth. It contains a large, stone church, with a square tower, which stands on a hill at the river's edge. This tower forms a good landmark, being visible from seaward as far north as Coamen Islands. The village of Tungud is on the coast about 1 mile westward of Inabanga, with which it is connected by a good road. The water in front of Tungud is very shoal, the 3-fathom curve being about 1 mile from shore.

The town of **Tubigon**, on the coast, about 8½ miles southwestward of Inabanga, is the most important town on the northwest coast of Bohol both because of the resources of the surrounding country, which are above the average, and because its products could be made accessible to small steamers. It contains a large church and convent, which form good landmarks. A dilapidated stone pier extends about 400 yards northwestward from the town.

Anchorage may be found about ¼ mile from the end of the pier in 3 to 5 fathoms; muddy bottom. The edges of the muddy shoals around the pier are usually marked by fish traps.

Between Tubigon and Calape, 6½ miles southwestward, the foothills at several places rise to conspicuous summits of characteristic formation. The most prominent of these is **Mount Ilihan**, about 2 miles south-southwestward from Tubigon. It is 730 feet high, with steep, almost blufflike, sides, is heavily covered with bushes and is prominent against the higher land of the interior. The main range rises in two places, **Mount Tanauan** and **Mount Candungao** (respectively 1,454 and 1,574 feet high), to great prominence. From Mount

Alimono, an oblong, steep, wooded hill, 3½ miles southeastward of Cabagan Island and eastward of Mount Tanauan, the ridge is marked by a range of peaks of similar height and appearance. From Mount Tanauan to the western of these peaks the ridge disappears, merging into a soft, indefinable mountain complex which to the north terminates in two prominent hills 720 and 752 feet high, respectively, and to the west in three peculiar peaks 981, 1,027, and 1,180 feet high, respectively.

Mount Tanauan is an oblong, even, grass-covered hill, while **Mount Candungao** is a long, sharp ridge with bushy, almost blufflike sides. Both are prominent landmarks, rising as they do several hundred feet above the surrounding country, but Mount Candungao is especially prominent because of its greater height and bluff appearance. From Mount Tanauan and southwestward the ridge presents a monotonous appearance, declining gradually in height until it finally joins the foothills about 3 miles southwestward of Calape.

Calape is a small town lying at the head of Calape Bay, a small, rocky bay about 6½ miles southwestward of Tubigon. Calape Bay is inaccessible from the westward except to very small craft at high water. With local knowledge the southern entrance, southward of Pangangan Island, could be used by a small launch; the channel is very rocky and dangerous.

The northwest coast of Bohol, between Corte Point and Abucayan Point, at the western entrance to Calape Bay, is fronted by **Northwest Bank**, an extensive bank which extends 6½ miles seaward and on which are numerous small islands and reefs. The outer edge of this bank is steep-to and faced by deep water, marked by a chain of islets and reefs between which are a number of channels leading on to the bank. Cabulan Islet, previously described as forming the southern side of the Northwest Pass on to Danajon Bank, is the northeastern of these islets. Extending southwestward from it are **Coamen, Magcalingao, Mocaboc,** and **Bagambanua Islets.** Coamen Islets are two small, sandy islets covered with coconut trees; they are inhabited principally by fishermen. Magcalingao is a small, bare, sandy cay. Mocaboc and Bagambanua are small islets similar to the Coamen Islets. From Cabulan Islet as far as Magcalingao Islet the reefs around and between these islets are partly bare at low water. Between Magcalingao and Mocaboc and between Mocaboc and Bagambanua Islets are depths of 3¾ to 7 fathoms. Over 2 miles southwestward of Bagambanua Islet is a reef bare at low water; between this reef and the reef surrounding Bagambanua Islet is a good channel, having a depth of 28 fathoms in the middle. Extending about 3 miles southwestward from the above-mentioned reef, are shoal patches with depths of 2½ to 4½ fathoms. Between the 2½-fathom patch and Mantatao Islet, 2½ miles southward from it, is a wide, deep channel on to the bank.

In the middle of the area included between the above-described islets and reefs and the coast of Bohol are the islets **Ambugan, Bugatusan, Batas, Pangap, Catang, Inanoran,** and **Mantatao** and numerous reefs, some of which bare at low water; their size and location will be best understood by reference to the chart. Between the above-mentioned islets and reefs and the shore are the islets **Panga, Silo, Tabaon, Maagpit, Cancostino, Cabgan, Hayaan, Budlanan,** and **Basihan**

and numerous reefs and rocks, some of which bare at low water. Most of the inner group of islets are covered with mangroves.

The following is a brief description of some of the more important reefs and shoals on the Northwest Bank, which lie in or near the more generally used channels. The largest reef off the northwest coast of Bohol lies with its center about 2½ miles westward of Mount Corte. It is about 1½ miles long in a north-northeast-and-opposite direction and nearly 1 mile wide. It begins to bare at about half tide, and a sand bar near the southern end bares about the time the first rocks begin to show.

About 1 mile southward of the above reef is a small reef which bares at low water. About 1¼ miles southwestward of the same point is a small 3½-fathom, rocky patch, and about ¾ mile northwestward from the northwest side of the large reef is a small shoal with a least depth of 2½ fathoms. When in mid-channel, between this shoal and the large reef, Mount Ilihan shows over the eastern part of Panga Islet bearing 214° (213° mag.).

Extending southwestward from the 2½-fathom shoal and parallel with the outer edge of the bank is a chain of detached reefs which bare at low water and show a small sand bar abreast the Coamen Islets.

Tambolian Reef is a large reef separated from the above chain by a deep channel 1½ miles wide. It is about 2 miles long in a northeast-and-opposite direction and ½ mile wide. It bares at low water and shows a small sand bar 1½ miles southward of Mocaboc Islet.

About 1 mile westward of Panga Islet is a small 3½-fathom, rocky patch, with a clear, deep channel between them.

The ½ to 1¾ fathom patches northeastward of Bugatusan, Tangaon Shoal, and the shoals northeastward and westward and west-northward of Tubigon will be mentioned in the description of the coastwise channel.

There are rocks awash about ½ mile southward of the west end of Budlanan Islet, and vessels passing southward of that islet should favor the islet side of the channel. The remainder of the area of the Northwest Bank is encumbered with large, dangerous reefs and shoals, but as no stranger should venture among them it is not necessary to describe them; their positions can be best understood by reference to the chart.

Directions.—GETAFE TO MANTATAO ISLET.—In going southward along the coast the large reef about 2½ miles westward of Mount Corte is usually visible and may be passed on either side; if the channel westward of it is used, care must be taken to avoid the 2½-fathom patches lying westward of the reef. Panga Islet may be passed close-to, when a course shaped and made good toward the middle of the bay eastward of Silo Islet will clear the reefs lying 1 mile northeastward of Bugatusan Islet. When Bugatusan bears 270° (269° mag.), the course should be changed to 228° (227° mag.) to pass about midway between Batas and Silo Islets, both of which are fairly steep-to on their channel sides. This course should be held until the church at Tubigon bears 135° (134° mag.), when it may be steered for and anchorage taken up as previously described. The above-described track carries a vessel outside of Tangaon Shoal and the foul ground northeastward of it. TANGAON SHOAL, with a

sand cay which covers at high water, is 1 mile northward of the church at Tubigon and west-southwestward of the south end of Cabgan Islet. At distances of ¾ and 1 mile northeastward of Tangaon Shoal are small, dangerous patches with depths of ¼ and 2¾ fathoms, respectively. The middle of Hayaan Islet, the first islet southwestward from Tubigon, bearing 242° (241° mag.), clears these patches by ¼ mile.

In going southward along the coast from Tubigon, from a point about ¼ mile from the end of Tubigon pier, steer 238° (237° mag.) until the middle of Hayaan Islet bears 283° (282° mag.), and then head directly for it. These courses, if made good, will carry a vessel about midway between two small reefs about ½ mile apart which bare at low water, the one to be left on the starboard hand lying 1⅖ miles eastward of Hayaan Islet. If this outer reef is visible, it may be passed close southward of by keeping close to the larger fish traps usually at a short distance southward of it. Hayaan and Inanoran Islets may be passed close-to on their southern sides. When midway between Inanoran and Budlanan Islet, the course should be shaped to pass about ¼ mile southeastward of Mantatao Islet. From here the course may be shaped to pass about ½ mile northwestward of Pangangan Island.

Entrance to Tubigon.—The direct approach to Tubigon is difficult owing to the numerous reefs and absence of good landmarks. While there are many places where Northwest Bank may be crossed, the uneven bottom makes it more advisable to approach the bank between Mocaboc and Bagambanua Islets, where 3¾ fathoms may easily be carried through at low water. The ridge fringing the bank at this point is coral and sand, with a few coral heads, but on the edges of the bank, in deeper water, the bottom is uneven with large bowlders. The channel from this point, though narrow in places and somewhat tortuous, is deep. Owing to swift and variable currents and the many courses the following directions should be used only as a rough guide:

After crossing the ridge midway between Mocaboc and Bagambanua Islets continue on southeastward until Mocaboc Islet bears 30° (29° mag.), when the course should be changed to 210° (209° mag.), and held until Bagambanua Islet bears 348° (347° mag.), when the course should be changed to 168° (167° mag.), bringing Bagambanua astern and Catang Islet, a small, sandy cay, in range with the eastern end of Hayaan Islet, directly ahead. Make this course good until Pangap Islet, also a small, low, sandy cay, bears 90° (89° mag.), when it should be steered for. When within 1 mile of Pangap Islet, haul a little southerly to pass about ¼ mile southward of it. The reef which surrounds Pangap extends nearly ¼ mile westward from it, bares at low water, is usually visible, and is steep-to. It should be favored in order to avoid a small 1-fathom patch lying ½ mile southwestward of the west end of Pangap Islet. When abreast of Pangap, the course may be shaped for Tubigon church.

Pangangan Island is a large, low, well-cultivated island about 2 miles westward of Calape. Its northwestern extremity is clean and steep-to; the remainder of its shores are fringed with wide reefs. A long, mangrove-covered point extends from the eastern part of the

island, which, together with the mainland, form Calape Bay. The high-water line of Pangangan is marked partly by sand, partly by a bluff about 10 feet high around Magtung Point, the northwest point, and partly by mangroves at Lungboy Point, the southeastern point. Lungboy Point, Pangangan, and Abucayan Point, Bohol, mark the only entrance to Calape Bay for all except small, native craft.

Sandingan Island lies close to the northwestern extremity of Bohol, with which it is connected by an extensive mangrove swamp. It is well wooded, principally with coconut trees, and 265 feet high. The western shores are fringed by a narrow, steep-to reef, and the high water line is marked partly by a 10 to 20 foot bluff, partly by sand and partly by mangroves.

Cabilao Island, separated from Sandingan and Pangangan Islands by a deep channel, ¾ to 1¼ miles in width, known as Sauang Pass, is well wooded and 112 feet high in the southeastern part. The western side is fringed by a narrow, steep-to reef with deep water close-to. Cabilao Island is the most western island off the west coast of Bohol and forms a prominent landmark for vessels bound to or from Cebu. The flood stream makes northward and the ebb stream southward in this vicinity with considerable velocity.

From Sandingan Island the coast trends southward for 6 miles to Cruz Point, thence eastward for 3½ miles to the town of Maribojoc, and thence southward for 6 miles to the western entrance to Tagbilaran Harbor. From Sandingan Island to Maribojoc the coast is fringed by a steep-to reef nowhere over ½ mile wide, and there are no off-lying dangers. From Maribojoc southward the reef widens until, at the entrance to Tagbilaran Harbor, its outer edge is about 2 miles from the town of Tagbilaran. The shore line is marked partly by mangroves, partly by a bluff, and partly by short stretches of sandy beach. The main range of hills, which extends parallel to the northwest coast, continues southward and about 1 mile south of Sandingan Island merges over into a rugged table-land. About 3 miles southward of Sandingan Island, the range rises steeply and, joining the southwestward-trending arm from the interior, runs south and out on the big peninsula terminating in Cruz Point. From Maribojoc inland the land forms the valley of the Abatan River. Northward this valley is terminated by the before-mentioned mountain complex and southward by the range running eastward from Tagbilaran toward Loay. The bottom of this valley is low and rugged and here and there rises in rounded, bushy hills. The country is partly cultivated with corn, rice, and sweet potatoes, the main part being covered with bamboos and bushes. The towns of Loon, Maribojoc, and Cortes and a number of villages lie on this coast.

Loon, about 2½ miles southward of Sandingan Islands, is on the western slope of the Canmanoc Hills and is prominent. It contains a large church and convent on a plateau about 75 feet high, approached by a long, wide flight of steps cut in the rocks. A stone mole, accessible only to small boats, extends 300 yards westward from the foot of the steps. Loon is of little commercial importance. The cable from Argao, Cebu, lands about 75 yards southward of the mole.

Temporary anchorage for small vessels may be found in 4 to 8 fathoms, with the end of the mole bearing 97° (96° mag.), distant about 450 yards. Care must be taken in anchoring, as there are several large coral heads in this vicinity with 4 to 8 feet over them.

Canmanoc Hills, 2 miles southeastward of Loon, rise to a height of 1,461 feet in a cluster of peaks and slope down to the sea in a succession of rounded ridges, forming a bold rounded promontory at Cruz Point.

Cruz Point, the extremity of the peninsula between Loon and Maribojoc, is 20 to 30 feet high, rocky and underworn by the sea. It is well wooded with coconut trees and ½ mile inland is 500 feet high. There is a prominent stone watchtower on its extremity.

Maribojoc Bay is an elbow in the coast eastward of Cruz Point. It is foul and lined with a steep-to reef extending 1 mile at the mouth of the Abatan River, whence it continues southward and joins the reef extending from Panglao Island.

Maribojoc is a fairly prosperous town lying at the head of Maribojoc Bay. It stands on slightly elevated ground and contains a large church visible from all parts of the bay. There is a good mole which extends 420 yards southwestward between the reefs. Maribojoc is the headquarters for a large number of small trading craft which visit the coastwise villages and barter with the natives.

Good anchorage, sheltered only in the northeast monsoon, may be found in front of the town of Maribojoc. To approach this anchorage, bring the house on the mole to bear 53° (52° mag.) and stand in for it until the desired anchorage depth is reached, 6 to 10 fathoms, mud bottom being found about ¼ mile from the end of the mole on that bearing. The edges of the reefs are usually marked by fish traps, and the northwestern side of the entrance is the safer and more uniform in depth. Small craft of not more than 8 feet draft can stand in through a short, winding channel to within a few yards of the mole.

Abatan River, 2 miles southeastward of Maribojoc, has 3 feet on its bar at low water and deeper water inside. It is navigable by small craft above the town of Cortes, where it is spanned by a steel bridge.

Cortes is a small town of no commercial importance on a bluff on the east bank of the Abatan River, about 1¾ miles from its mouth.

Paminuitan Hill is a conspicuous, round-topped hill about 1½ miles southward of the Abatan River and about ½ mile inland. It is well wooded and 326 feet high.

Good anchorage and fair shelter may be found by anchoring about ½ mile off shore, with the low, wooded point which marks the southern limit of the flats at the mouth of the Abatan River bearing 100° (99° mag.), Paminuitan Hill 125° (124° mag.), and a conspicuous, bushy tree on the reef near the mouth of the Abatan 18° (17° mag.). The anchorage is muddy bottom, shoaling gradually from 15 to 4 fathoms.

A small reef consisting of sand and coral, with some small coral heads, with least depth of 2 feet, lies nearly on the course from Tagbilaran Harbor to Maribojoc, 2⅜ miles westward of Paminuitan Hill and 1¾ miles from shore.

Tagbilaran, the seat of the provincial Government of Bohol, is a small town at the southwestern extremity of Bohol Island. With a

harbor navigable with difficulty by small craft, no water supply, and in a district with few resources, it has little to recommend it. It contains a large stone church, which forms a good landmark.

There is no good anchorage off the western entrance to Tagbilaran Harbor. Vessels desiring to communicate with the town may find temporary anchorage in 15 to 20 fathoms close to edge of the reef, with the church at Tagbilaran bearing 122° (121° mag.), distant 2 1/16 miles. Small vessels can cross the reef and approach within about 7/8 mile of the town. About 400 yards eastward of the above-described anchorage is a large coral head on the narrowest part of the outer reef, with a least depth of 1 foot. This rock is usually marked by a stake, and the channel, which is very narrow and lies immediately south of it, has a depth of 7 feet. Small craft can cross the reef at this point and steer in in a general 124° (123° mag.) direction for the church, keeping a good lookout for reefs on both sides, and anchor in a pocket in the reef in 14 fathoms with the church on the above bearing, distant 7/8 mile.

Fair anchorage may be found in the bay southeastward of Tagbilaran. Flats bare at low water extend about 1/2 mile southeastward from the causeway connecting Panglao Island with Bohol; and nearly in the middle of the bay is a pinnacle rock, with a least depth of 1/2 fathom, 5/8 mile southeastward of the bridge in the middle of the causeway and about the same distance from both shores. About 5/8 mile from the causeway and 400 yards from the edge of the flats, as marked by the fish traps, is a line of coral reefs with depths of 3 to 7 fathoms, and between these reefs and the edge of the flats anchorage may be found for small vessels in 12 fathoms, about 650 yards from the Panglao shore, on the bearings: Tagbilaran Church steeple 321° (320° mag.), the small chapel on Panglao, 285° (284°), and a round-topped hill on Bohol 29° (28° mag.).

Large vessels should anchor in 19 or 20 fathoms, about 1/4 mile southward of the previously described 1/2-fathom rock, on the following bearings: Mount Biquin 248° (247° mag.), Tagbilaran Church 317° (316° mag.), and the round topped 475-foot hill on Bohol 13° (12° mag.).

Panglao Island, off the southwest extremity of Bohol, is almost joined to Bohol, as the harbor of Tagbilaran that separates them is only about 1/4 mile wide at the narrowest point and nearly dries at low water. From the village of Dauis, at the northeast end of the island, a causeway in which there are three gaps, spanned by bridges, for the passage of boats, extends to the Bohol shore. Near the eastern end of Panglao are two hills covered with coconut trees and grass, the eastern and higher of which, **Mount Biquin**, is 646 feet high. A third hill, thickly covered with coconut trees, is in the southern part of the island and rises abruptly from the sea, back of the village of Bohol, to 319 feet. The rest of the island is fairly level and covered with scattered groves of coconut trees, bushes, and small patches of cultivated ground. The northern shores of Panglao are fringed with a very narrow steep-to reef, but from the southwest end is a large reef, bare at low water, extending about 3 miles in a southwest direction. There are two small, wooded islands, Pungtud and Gakang, lying on this reef. The town of Panglao, which is accessible by only small craft at high water, lies

at the head of Panglao Bay facing this reef. Panglao is connected with Dauis by a good road.

Balicasag Island, 4 miles southwestward of Taburuc Point, the southwestern extremity of Panglao Island, is low, flat, and surrounded by a narrow, steep-to reef. It contains the ruins of an old fort, some 12 or 15 houses, and is cultivated with corn and sweet potatoes. The channel between Balicasag and the reefs extending southwestward from Panglao Island is 1¾ miles wide and over 200 fathoms deep in the middle. A light, visible 12 miles, is shown from a concrete tower on the ruins of the old fort.

Cervera Shoal, composed of coral and sand, with a least depth of 3½ fathoms surrounded by deep water, lies 4½ miles westward of Pamilican Island. It can be distinguished by the color of the water and is usually marked by tide rips.

Pamilican Island, 7 miles from the coast of Bohol and 14 miles eastward of Balicasag Light, is a small island, over 50 feet high in the western part. The northern extremity is clean and steep-to, but the remainder is fringed by a reef which in places extends about 400 yards. There is a small rock with bushes on it lying about 180 yards from its southeast side. Pamilican is well cultivated with coconuts, corn, and some maguey.

SOUTH COAST OF BOHOL.

From the eastern entrance of Tagbilaran Strait the coast trends eastward, with a bend southward for 31 miles to Nauco Point, the western entrance point to Guindulman Bay. This coast is remarkably regular in outline, there being no bays or points of any prominence. The rivers, with the exception of the Loay, are small and of no value to navigation. The shore reef varies in width from 200 to 600 yards, is very steep-to, and is usually plainly marked by the change in color of the water. Outside of the reef the water deepens so abruptly that anchorage is afforded in only a few places. There are no off-lying dangers, and the south coast of Bohol may be safely navigated at a distance of ½ mile. The country in general is roughly rolling, broken by many deep valleys and gorges, and rising gradually with interspersed high hills and ridges to the 2,000 to 2,500 foot mountains on the central plateau of the island. There are three prominent hills; the first is the round-topped hill 475 feet high, about ½ mile from shore, northward of Tagbilaran eastern anchorage; the second is Tayong Peak, a conical peak 1,659 feet high in a group of hills back of Tayong village, between the towns of Loay and Dimiao; and the third is Gorda Point, the 1,076-foot hill on the point near the coast separated from the higher ridges lying a short distance inland. The towns of Baclayon, Albuquerque, Loay, Dimiao, Valencia, Garcia Hernandez, Jagna, and a number of small villages lie scattered along this coast.

The only harbor of any value along this entire section of the coast is at the town of Loay, inside the mouth of the Loay River. Temporary anchorage may be found outside of the bar in 8 to 15 fathoms. Anchorage may be found by small craft in the little bay a few hundred yards westward of the town of Dimiao, fairly sheltered from all winds except from the southwest; at Valencia in 8 to 10

fathoms, sandy bottom, but without shelter; and at Garcia in 6 to 15 fathoms, sandy bottom, also unprotected. These temporary anchorages are usually indicated by fish traps extending some distance from shore.

Baclayon is a small unimportant town about 3½ miles eastward of Tagbilaran. It contains a large, stone church, a long, low, schoolhouse, tribunal, and market, and shows well from seaward.

Alburquerque is a small town about 3 miles eastward of Baclayon and contains a large, prominent, stone church.

Loay River, 8 miles eastward of the eastern entrance to Tagbilaran Strait, is navigable for 5 miles, as far as the town of Loboc, by any vessel that can cross the bar at its mouth. From Loay to Loboc the river is very tortuous and generally fringed with nipa swamps. It is spanned at Loay and Loboc by frail bridges supported by bamboo pontoons.

The town of Loay, on the eastern side of the mouth of the Loay River, owes its commercial importance partly to its harbor and partly to the Loay River, which serves as an outlet for the products of the interior. Most of the town is built on low, flat ground; on a small hill overlooking the rest of the town is a large church and convent, the iron roofs of which form prominent landmarks. Loay River, here about 150 yards wide, forms a good harbor, and there are two good wharves. There is a least depth of 1¼ fathoms on the bar at low water and a rise and fall of about 3 feet. The entrance is very narrow, but well marked by stakes. Temporary anchorage may be found outside the bar in 8 to 15 fathoms. A small steamer makes regular fortnightly trips to Cebu; other steamers occasionally call, and small quantities of hemp and copra are exported.

Loboc is a small town 2½ miles northeastward of Loay and about 5 miles by river. There are a number of small stores.

Lila is a village about 5 miles eastward of Loay. It contains a stone church with a nipa roof, the south gable of which is prominent.

Dimiao is 4 miles eastward of Lila. The peaked roof of the church forms a good landmark.

Valencia is a small, unimportant town about 3 miles eastward of Dimiao.

Gorda Point, 3 miles eastward of Valencia, forms no projection from the general coast line, but derives its name from the height and prominence of Mount Gorda. The coast in this vicinity is clean and steep-to.

Mount Gorda is a narrow, steep ridge about 1½ miles long in an east-northeast and opposite direction. Its summit, 1,076 feet high, is about 600 yards northward of Gorda Point. With its blufflike, tree-covered sides, it looms up plainly against the range farther back in the interior and makes an excellent landmark. The northeast end of Mount Gorda is connected by a low saddle with the southward trending arm of the coast range.

Garcia Hernandez is a small town about 3 miles eastward of Gorda Point; it contains a large, prominent stone church.

Canopao Point, 6½ miles eastward of Gorda Point, and **Cantagay Point,** about ¾ mile northeastward of Canopao, with a small bay between them, are formed by bluffs 30 to 50 feet high.

Jagna is a small town on the bay of the same name about ⅝ mile northward of Cantagay Point. The shores of Jagna Bay, lying

northeastward of Cantagay Point, are fringed with reefs, baring at low water, leaving an anchorage area about ¼ mile in extent for small vessels in 14 to 18 fathoms. This anchorage is protected from south through west and north to northeast.

Nauco Point is a sharp elbow in the coast 2 miles eastward of Jagna Bay. It is clean and steep-to and rises almost vertically to a height of 75 feet, then gradually to over 100 feet within 150 yards of the shore.

From Nauco Point the coast trends northward for 3½ miles to the town of Duero and thence with a sharp turn eastward for 2½ miles to Cabantian Point. In the vicinity of Nauco Point the hills are low and irregular, a group of promiscuously placed, knoblike mounds converging to a center of three peaks between 700 and 800 feet high. Just northward of Nauco Point the valley of the Alihauan River extends into the hills as a narrow, deep gorge. Next comes the valley of the Cabantian River, about 1¾ miles eastward of Duero, also long and narrow but less canyonlike than the Alihauan, and bordering it on the east are another group of hills similar in character to those of Nauco Point. These hills gradually lessen in height toward the east until after an extent of about 3 miles they give place to low, flat country which extends northward and northeastward, back of the peninsula which is surmounted by Mount Pugatin, giving a broad expanse of cultivated land.

Duero is a small town about 3½ miles northward of Nauco Point. Fairly good anchorage may be found off Duero in 15 fathoms, eastward of the church and about 400 yards from shore.

Guindulman Bay is 4 miles wide at the entrance between Cabantian and Napacao Points and extends about 3 miles northward. At the entrance to the bay the water is very deep, but shoals rapidly toward the head, and the shores are fringed with a narrow, steep-to reef. The only detached danger in the bay is a ½-fathom patch in the northeast corner, about ¼ mile off the mouth of the Tabahan River.

Guindulman is a small town at the head of the bay just westward of the mouth of the Tabahan River. Most of the town is concealed by coconut trees, and, although the tower of the church is visible above them, it is generally inconspicuous. A small steamer from Cebu calls at irregular intervals at Guindulman and Jagna. Good anchorage may be found outside the fish traps which line the shore in front of Guindulman, according to draft. The bottom is mud and sand.

From Napacao Point, at the eastern entrance to Guindulman Bay, the coast trends eastward for 3½ miles to Quinali Point, thence northeastward for about 2 miles to Agio Point, thence northward for 2¾ miles to Lamanoc Point, and thence west-northwestward for 4½ miles to the village of Cogton, forming a large, prominent peninsula. The eastern side of this peninsula rises, at distances of 1 and 1½ miles from the coast, to heights of over 1,000 feet and then slopes gradually westward to heights of about 800 feet and then abruptly to the low, flat land previously mentioned as lying between Guindulman and Cogton Bays. **Mount Pugatin**, on the eastern part of this peninsula, consists of two peaks 1,230 and 1,280 feet high, respectively, lying about ½ mile apart in a north-and-south direction; the northern peak is the higher.

Anda is a small town on a sandy point running parallel with the coast about 1 mile northeastward of Quinali Point; it contains a large,

white church, which is prominent. Between the point on which the town is situated and the mainland is an extensive mangrove swamp. A precarious anchorage for small craft may be found in 12 fathoms, close to the edge of the reef, southeastward of the north end of the point.

Agio Point, the southeastern extremity of the island of Bohol, is low, but rises rapidly to a height of 535 feet within less than ½ mile back from its extremity. It is fringed with a narrow, steep-to reef with a scattered growth of mangroves.

EAST COAST OF BOHOL.

Between Agio Point and Lamanoc Point, 2¾ miles northward, the shore line recedes westward, forming a bight blocked by reefs on which is a scattered growth of mangroves. The outer edge of the reefs forms a nearly straight line between Agio and Lamanoc Points.

Lamanoc Point is composed of low, rocky cliffs and forms a very prominent projection from the coast line. Off the point there are three rocky islets lying on the shore reef. The shore reef off the eastern end of Lamanoc Point is very narrow, and the outer of the three islets may be passed at a distance of ½ mile.

Cogton Bay, between Lamanoc and Cabulao Points, is nearly blocked by Lumislis, Catiil, Tabangdio, and Calangaman Islets, all low and covered with mangroves and connected with the shore by reefs bare at low water. A reef, awash at low water, ⅜ mile northward of Tabangdio Islet is the only detached danger in the bay. The head of the bay is shoal, with mud and sand flats and reefs fringing the shore which bare at low water. The shore line is generally composed of mangroves. The town of Mabini and the village of Cogton lie at the head of the bay. Good anchorage, sheltered from all winds except from the southeast, may be found in an area about ¾ mile in extent, south and southwest of Lumislis Islet, where there is a depth of 10 fathoms, muddy bottom, at the entrance, gradually shoaling to 2½ fathoms.

From about 1¼ miles north-northwestward of Lamanoc Point, a chain of reefs extends northward for about 5 miles. These reefs are covered by varying depths, from awash at one point to a depth of 5 fathoms, and with local knowledge, may be crossed in a number of places. The best way to enter Cogton Bay from eastward is by a channel through the reefs about 2 miles northward of Lamanoc Point, which is about ⅜ mile wide and has a depth of 29 fathoms in the middle, or from the northward past Cabulao Point. To enter from eastward, the north side of Catiil Island should be steered for on a 270° (269° mag.) course, with the houses at Cogton open northward from Catiil. After clearing the outer reef the vessel should be hauled northward to clear the reef previously mentioned as lying northward from Tabangdio Islet and anchorage taken up in 4 or 5 fathoms, ⅜ mile northwestward of Catiil Islet.

To enter from northward, Cabulao Point should be approached to within about ½ mile, keeping it bearing between 270° (269° mag.) and 230° (229° mag.) to avoid the reefs eastward from Cogton Bay and those northeastward from Cabulao Point, which will be de-

scribed later. From a position about ½ mile eastward of Cabulao Point a 187° (186° mag.) course will carry a vessel about ½ mile eastward of the reefs connecting Lumislis Islet with the main and also Lumislis Islet, which should be rounded at the same distance, the previous caution in regard to the reef northward from Tabangdio observed, and anchorage taken up as previously recommended.

Cabulao Point, dividing Cogton and Cabulao Bays, is a bold wooded promontory 475 feet high, ¼ mile inland. It is clean and steep-to seaward, but its northern and southern sides are fringed with reefs which gradually widen as the bays are entered.

Cabulao Bay lies between Cabulao and Huagdon Points. Both the bay and its approaches are encumbered with reefs, and the entire shores of the bay are fringed with mangroves. **Tintiman Island**, 138 feet high, lies in the northern part of the bay. Its shores are fringed with reefs, which, from the south end, extend about 400 yards. A rock awash lies about 600 yards westward from its northern extremity. **Limaiag Reef**, on which there is a lone bush, is a large reef bare at low water, lying nearly 1 mile southward of Tintiman Island. There is a small reef with a least depth of 1½ fathoms 1¼ miles north-northeastward of Cabulao Point. A large reef, the southern part of which bares at low water, lies with its northern end 1 mile eastward of Tintiman Island. In addition to the above there are a number of other shoal patches in the approach to Cabulao Bay, the positions of which will be best understood by reference to the chart.

Good anchorage may be found westward of Tintiman Island, to approach which the summit of Tintiman Island should be steered for, bearing 353° (352° mag.), 330° (329° mag.), or 240° (239° mag.). The first course will carry a vessel from a position about ¼ mile eastward of Cabulao Point through a channel ½ mile wide and 11 fathoms deep in the middle between Limaiag Reef and the 1½-fathom reef previously described. The second course will carry a vessel from a position 1¼ miles east-northeastward of Cabulao Point midway between the 1½-fathom patch and the large reef, bare at low water, lying southeastward of Tintiman Island; this channel is ⅝ mile wide and has a depth of 15 fathoms in the middle. The third course will carry a vessel through a deep chanel over 1 mile wide between a 3-fathom spot eastward of Huagdon Point and the northern limit of the large shoal southeastward of Tintiman Island. The southern end of Tintiman Island should be rounded at a distance of ⅜ mile and anchorage taken up in 8 fathoms, muddy bottom, about ⅜ mile from shore westward of the summit of the island. This anchorage may also be approached by passing northward of Tintiman Island, care being taken to avoid the rock previously mentioned as lying westward of the north end of it.

Huagdon Point is the southeastern extremity of a large peninsula having two hills 445 and 375 feet high, the southern being the higher. The eastern side of this peninsula is clean and steep-to, but ⅜ mile southeastward and ¾ mile eastward of Huagdon Point are 3-fathom patches.

About 3½ miles eastward of Huagdon Point are a number of reefs with depths of 3¼ to 5 fathoms as shown on the chart.

Between the northern extremity of the peninsula on which Huagdon Point is situated and the eastern entrance to Basiao Channel, a

distance of 3 miles, the shore is low and fringed with mangroves. The water off this coast is shoal, and there are a number of small patches with 1¾ to 5 fathoms and a rock awash lying about ⅞ mile from shore, all of which may be avoided by keeping Tinuibo Islet bearing nothing eastward of 20° (19° mag.) until the 422-foot hill on the south end of Lapinin Island bears 285° (284° mag.).

CHANNEL BETWEEN DANAJON BANK AND LEYTE,

separating Danajon Bank from Leyte, is over 6 miles wide, but is divided into several passes by Cain, Adam, and Eve Reefs, and Canigao Island. The pass between Canigao Island and Leyte is nearly 1 mile wide, has a depth of 10 fathoms, and is the one generally used.

Canigao Island, over 1 mile from the coast of Leyte, is low, flat, and heavily wooded. Its eastern side is clean, but the northern, western, and southern sides are skirted with reefs which extend about ¾ mile from the southwestern point. The northeast point is marked by a light.

Cain Reef is a small reef with a least depth of 4 fathoms lying 1¾ miles west-northwestward of Canigao Island.

Adam Reef, with a least depth of ¼ fathom, lies with its center 2½ miles westward of Canigao Island and 2½ miles southeastward of the eastern edge of Danajon Bank. Tinuibo Island, bearing 196° (195° mag.), leads through the channel between the Danajon Bank and Adam Reef in nothing less than 6 fathoms.

Eve Reef, 1½ miles west-southwestward of Canigao Island, is of small extent and has a least depth of 3¼ fathoms.

Abel Reef is a small reef with a least depth of 3¾ fathoms lying 1¾ miles southward of Canigao Island.

In Mindanao Sea, between the south point of Panaon Island (south of Leyte) and the north point of Camiguin Island, is a constant current westward, with varying velocity, according to wind and tide, in both monsoons. Vessels approaching Surigao Strait from westward should keep well over toward Panaon Island to avoid being set toward Camiguin Island. In the southern part of the sea, on the north coast of Mindanao, there appears to be hardly any tidal stream, and the currents follow the direction of the wind in both monsoons. There appears to be a constant current southward between Cebu and Bohol and between Negros and Siquijor. It would be better for sailing vessels to work up on the north coast of Mindanao and make Bohol east of Siquijor Island.

The current produced by the tidal wave that enters by the Strait of Surigao and passes between the Islands Panglao and Siquijor divides into two branches. The northernmost flows to the northwest and strikes against the southeast coast of Cebu about Dalaguete Point, spreading north and south along the coast, so that a vessel off Dalaguete Point has a flood favorable for going to Cebu or to enter Tañon Strait. The stream that flows northerly passes through the channel between Cebu and Bohol, and 5 or 6 miles south of the Camotes Islands it meets the opposite flood tide coming south between the northern part of Cebu and Leyte. The ebb tide sets in the reverse direction. The second branch flows westward, and, striking the Negros coast off Dumaguete, divides into two other arms,

one of which enters Tañon Strait with great force, while the other turns south between Siquijor and the coast of Negros until, off Bombonon Point, it meets the flood from around the south end of Negros and the united waters take a southeasterly direction toward Silla and Tagolo Points in Mindanao.

SIQUIJOR ISLAND,

about 10 miles eastward of the southern part of Negros, is a subprovince of Oriental Negros. Its surface is high and broken, and **Mount Malabahoc,** near the center of the island and 2,060 feet high, is the highest point. **Mount Cudtingan,** about 5 miles northeastward of Mount Malabahoc, is 1,530 feet high; its sides form Sandugan and Daquit Points. The entire island is fringed by a narrow, steep-to, coral reef off which the water is generally too deep to afford anchorage. With the exception of the west end of the island, where the shore reef extends nearly 1 mile, Siquijor may be safely rounded at a distance of ½ mile. The only protected anchorage on the island is the little port of Canoan on the northwest side. Anchorage, sheltered during certain seasons, may be found in Maria and Lazi Bays. Siquijor is one of the most thickly populated islands in the archipelago, and produces corn, hemp, tobacco, and cocoa. There are a number of towns and villages on its shores, but they are of little commercial value.

Port Canoan (chart 4466) is an indentation in the western shore about 3 miles southward of Sandugan Point. It is very small, but offers fair shelter for small craft in all weather. Mud flats at the head of the port and fringing reefs on either side reduce the available anchorage space to an area about 400 yards long and 200 yards wide. Both sides of the entrance are marked by low, yellow bluffs and fringed by reefs which extend about 200 yards.

Larena stands on a slight elevation on the south side of the port. A stone pier, with a house on it, at which launches can berth, extends about 70 yards north-northwestward from the foot of the bluff in front of the village.

Two fixed red lights are shown from range beacons at the head of the port. These lights, in range bearing 115½° (114° mag.), lead through the channel to the anchorage. The front light is shown from a triangular beacon, apex upward, painted white with a vertical black stripe through the center, just north of the bridge at the head of the port. The rear light is shown from a triangular beacon, apex downward, painted white, with a vertical black stripe through the center, on a bare slope 195 feet high, about 850 yards from the front beacon. Vessels bound into Port Canoan should bring the beacons in range and enter cautiously. The best anchorage is in 9 fathoms, muddy bottom, on the range, with the end of the pier bearing 181° (180° mag.), distant about 100 yards. It is reported that bad weather from any direction sends considerable sea into Port Canoan.

Siquijor, the largest town on the island, is about 5 miles southwestward of Port Canoan. It contains a large church and other prominent buildings, all with nipa roofs and painted white. The water in front of the town is too deep to afford safe anchorage, and Siquijor

does most of its business through Port Canoan, with which it is connected by a good road.

Tonga, Pasigajou, Tambisan, and **Paliton** Points, forming the western part of the island, are low, well wooded, principally with coconut trees, and surrounded by a reef, partly bare at low water, which extends nearly 1 mile. This reef shows prominently, and its edge is generally well defined by fish traps.

San Juan is a large town on the coast about 3 miles southeastward of Tambisan Point, the extreme western point of the island. It contains a large prominent church. The shore in front of the town is fringed by a narrow reef, outside of which the water deepens rapidly.

Lazi Bay, on the south side of Siquijor, about 9 miles southeastward of the town of San Juan, lies between Canaba and Carigan Points. Carigan Point, forming the eastern side of the bay, is a prominent table-land over 400 feet high. The town of Lazi, standing on the elevation at the head of the bay, contains a very prominent church and convent. Anchorage, well protected during the northeast monsoon, may be found by bringing the church to bear 317° (316° mag.) and steering for it, anchoring in 18 to 20 fathoms; muddy and sandy bottom. Inshore of this position the water shoals very rapidly. With the exception of the narrow reef fringing the shore, Lazi Bay is free from dangers.

Minalulan Bay, eastward of Lazi Bay, is blocked by reefs and is of no value to navigation. The point forming the eastern side of the bay is moderately high and well wooded.

Minalulan Point, the southeastern extremity of Siquijor, is moderately high, well wooded, and very prominent.

Maria Bay lies northward of Minalulan Point, between Minalulan and Daquit Points. Maria is a large town at the head of the bay. It contains a large prominent church. Anchorage, well protected during the southwest monsoon, may be found off the sand beach just southward of the river which empties on the south side of the town, in 20 fathoms, sandy bottom. No coral is found off this beach, but immediately northward of the bluffs, on the northern side of the river mouth, coral reefs extend about ⅛ mile. With the exception of the fringing shore reef, Maria Bay is free from dangers.

Daquit Point, the northern entrance to Maria Bay, is formed by a hill over 200 feet high, at a distance of about ½ mile inland, from where it slopes gradually toward the sea, terminating in low, rocky bluffs. There is an islet lying close to the point with which it is connected by a reef.

Daquit Reef is a large, circular, coral reef, with a least depth of 1½ fathoms and surrounded by deep water, about 2½ miles northward of Daquit Point and 2 miles from shore. It is usually marked by discolored water.

Talingting is a large village on the shore about 4½ miles northwestward of Daquit Point. It contains a large prominent church and other buildings. The shore in front of the village is fringed by a narrow reef with deep water close-to.

Sandugan Point, the northern extremity of Siquijor, is low and gradually rises to a hill 530 feet high less than 1 mile southeast from it. It is fringed by a reef, bare at low water, about ⅛ mile wide, with deep water close-to.

NORTH COAST OF SAMAR.

Samar is the third island of the Philippines in size. It has an area of 5,031 square statute miles and a general shore line of 358 miles (412 statute miles). It is about 136 miles long in a northwest-and-southeast direction, and its greatest width is 51 miles. Samar is moderately high, heavily wooded, and well watered. It is sparsely populated, and but a small part of the island is under cultivation. The principal export is hemp. There are no ports of entry, and most of the business is carried on through Manila.

From Balicuatro Point, the northwest extremity of Samar, the coast trends in a general easterly direction for about 50 miles to the eastern entrance to Port Palapag and is faced by numerous islands, banks, and shoals. This coast is exposed to the full force of the northeast monsoon which blows at times with the force of a gale and is accompanied with much rain and a very heavy sea; at this season of the year there is no safe anchorage between the Biri Channel and Port Palapag, and it is frequently impossible to communicate with the towns of Bobon and Catarman.

Balicuatro Islands are a group of islands lying north of the northwest part of Samar. **Biri Island**, the largest and most northern of the group, lies with its northwest extremity about 8 miles northeastward of Balicuatro Point. It is generally high (280 feet in the center) and heavily wooded. **Biri Head**, the northwest point, is a rocky, perpendicular bluff 200 feet high, clean and steep-to, and is a conspicuous landmark when approaching San Bernardino Strait from northeastward. About ¼ mile eastward of Biri Head a steep-to coral reef begins which continues along the northeast and east sides of the island and also surrounds all the islands lying east and southeast of Biri Island. On the outer edge of this reef, which bares at low water, are a series of islands of limestone formation, 10 to 120 feet high, which are distinctive features. With the exception of the two ends of the island and these outlying islands on the northeast and east sides, the shore line is low and fringed with mangroves. On the west side is a low bluff and gravel beach most of the way. The interior of the island is covered with heavy timber. Most of the inhabitants are on the west side of the island.

About ½ mile east-northeastward of Biri Head is a rock 20 feet high, and about ¾ mile southward of Biri Head and ⅜ mile from shore is a rock 15 feet high surrounded by a small coral reef.

Macarite and **Cagnipa** are two small islands southwest of Biri Island, from which they are separated by narrow channels; their interiors are made up of detached hills of moderate height. Protected anchorage may be found in about 20 fathoms between the north end of Cagnipa and Macarite. This anchorage is not recommended, the bottom being rocky and the tidal current strong.

Talisay, Magesang, Makadlao, Tinau, and a number of small, unnamed islands and rocks lie east and southeast from Biri Island; they and Biri Island all lie on one great reef largely bare at low water.

There is a small but well-protected anchorage between the south end of Biri Island and Makadlao Island. To approach it from Biri Channel, pass about ¼ mile westward of a small, bright, sandy cay lying about ¾ mile off the western end of Makadlao Island, stand

northward, and anchor between the reefs in 15 to 20 fathoms. The edges of the reefs marking this anchorage show plainly, are steep-to, and in many places are marked by fish traps.

Between the Balicuatro Islands and those nearer the coast of Samar is Biri Channel, generally used by coasting vessels bound for ports in northern and eastern Samar.

In Biri Channel and the other channels in this vicinity there are strong tidal currents, the flood flowing westward and the ebb eastward, the change of current occurring about four hours after high water and low water, respectively.

San Juan and **Bani Islands**, on the south side of Biri Channel, are a group of five heavily wooded islands, closely joined, and appear as one island. They are **San Juan, Elonbachid, Nagnasa, Maravilla**, and **Bani**. The first four are separated only at high tide. The outer shores are well defined, usually bold, and fringed by a narrow coral reef; the interior shores are largely mangrove swamps.

Bani Channel is a narrow passage between Bani Island and Samar sometimes used by coasting vessels. There are two shoals of 1½ and 2½ fathoms, lying ½ mile from the west coast of Bani Island.

Balicuatro Point, the northwest extremity of Samar, is clear and steep-to, the reef which fringes it on both sides being narrow. The point rises to a hill 700 feet high about 1 mile from shore and is covered with heavy timber.

Cocoanut Island, the first island eastward of Balicuatro Point, lies near the shore and is low and covered with coconut trees. The coast from Balicuatro Point to Cocoanut Island is high and covered with heavy timber, the points are rocky, and in most of the bights there are beaches.

Lavezares, a small town, lies at the head of a bight southward and eastward of **Cocoanut Island**. This bight is shoal and nearly blocked with reefs, but there is a narrow boat channel between them to the beach. Good anchorage for small craft, protected from westerly winds, may be found northward of Lavezares; this anchorage is bad in northerly and northeasterly gales or when a swell sets in from the Pacific.

Directions.—Bring the church in Lavezares to bear 181° (180° mag.) and steer for it; pass in between the reefs and anchor in 2 or 3 fathoms. The swinging room is limited but the holding ground is good. Sometimes there are two large stakes on the edges of the reefs in 2 fathoms; small vessels should anchor outside of them. Anchorage for large vessels will be found farther out with the church bearing 181° (180° mag.) and the detached shoal eastward of the entrance 91° (90° mag.).

The coast from **Cocoanut Island** to **Baird Point** is low and largely mangrove swamp, with the exception of Cave Point, which is about 300 feet high. **Baird Point** is on the northern part of Gilbert Island; it is clean and steep-to. From here to the village of Caranian the shores are low and fringed with mangroves. **Gilbert Island** is well wooded and separated from the mainland by a narrow boat channel.

Cabaun Island, the most eastern island in this vicinity, is low, fringed with mangroves, and surrounded by a reef, which extends ½ mile from the northeastern side. The channel between the south end of

the island and the reefs surrounding Bat Island is over ¼ mile wide, deep, and free from danger.

Ugamut Island is a small, low, mangrove-covered island lying close to the southwest side of Cabaun Island, from which it is separated by a narrow, impracticable channel. The region northwest of Ugamut is full of reefs.

Green Island, small and about 100 feet high, lies between Gilbert and Cabaun Islands. It is surrounded by a reef, and north and east of it the ground is foul.

Foot Island, between Ugamut Island and Samar, is a small island about 10 feet high and surrounded by a reef. There are a number of dangerous, detached reefs between it and Green Island.

Bat Island is a small, low island surrounded by a wide reef lying between the south end of Cabaun Island and Samar. The usual track of vessels is northward of Bat Island.

Caranian Channel is a narrow channel sometimes used by coasting vessels which usually pass south of Green and Foot Islands and north of Bat Island. The part of the channel southeastward of Foot Island has very irregular bottom, the least water found being 4 fathoms. The channel is contracted by reefs extending from the islands and the coast of Samar. All the channels in this vicinity are subject to strong and irregular tidal currents.

Caranian, a regular port of call for coasting steamers, lies on the eastern shore of a small cove on the coast of Samar facing Foot Island. This cove is nearly blocked by reefs, leaving a narrow boat channel to the shore.

There is a range of hills nearly reaching the coast just eastward of Caranian, which is the only high land in this vicinity. From the beginning of the bay southward of Bat Island to Bobon Point the short line is low and has a sandy beach, outside of which is the usual coral reef.

A rock about 10 feet high lies on a shoal, bare at low water, 1⅓ miles west-northwestward of Bobon Church.

Bobon is a small town 4½ miles eastward of Caranian, on the west side of Bobon Point, at the mouth of the river of the same name. Reefs project from both entrance points to the river, leaving a narrow boat channel to the beach in front of the town. The usual anchorage in fine weather is in 6 to 8 fathoms with the church bearing 120° (119° mag.), distant ¾ mile. A rock, bare at low water, lies ⅔ mile westward of Bobon Church.

A number of shoals and banks lie northward of this part of Samar. **Fitzgerald Banks** are three banks with 10, 6½, and 6½ fathoms, respectively, lying 5, 7, and 10 miles east-northeastward of the highest point of Biri Island. These banks, clearly indicated by their color, are of coral formation, and an examination indicates that the above are the least depths. The northeastern two probably break in heavy weather, but no reports of their doing so have been received.

Wright Shoal is a large shoal on which the sea breaks heavily in bad weather, lying with its center 15 miles eastward of the highest point of Biri Island. This shoal is about ¾ mile in extent and has a least depth of 6 fathoms.

A small shoal covered by an approximate depth of 5 fathoms lies about 1½ miles southward of Wright Shoal.

Fisher Shoal, on which the sea breaks in bad weather, lies 5½ miles northward of Bobon Church. This shoal is about 1 mile in extent and has a least depth of 5 fathoms.

Catarman Shoal, on which the sea breaks in moderate weather, lies 4½ miles northward of Catarman Church. This shoal is about ⅝ mile in extent and has a least depth of 1 fathom.

The town of **Catarman** is about 5 miles eastward of Bobon on the west bank of the Catarman River. It lies about ½ mile back from the beach and is nearly obscured by trees, only the roofs of the houses being visible. The western side of the river mouth is formed by a long sand spit, which is reported to shift considerably during the northeast monsoon. From the shore immediately eastward of the river mouth two coral reefs, partly bare at low water, extend about ¼ mile north, leaving a break between them where small boats may land when it is too rough to enter the river or land on the beach in front of the town. **Maguran Reef,** a large coral reef, bare at low water, lies northward of the above break and protects the landing in bad weather. The channel across the bar into the river is very narrow and has a depth of 7 feet at low water, and there is very little water in the river. In fine weather small launches may enter at high water by keeping close to the end of the sand spit westward and turning sharply southwestward when it is abeam to avoid rocks eastward and inside the entrance.

The usual anchorage is in about 5 fathoms, sandy bottom, about ½ mile northwestward of the mouth of the river. To clear Catarman Shoal bring Catarman Church to bear 187° (186° mag.) when about 5 miles distant and steer for it. This anchorage is frequently unsafe during the northeast monsoon, which sends in a heavy sea.

From the mouth of the Catarman River to Livas Point, the western entrance to Laoang Bay, the coast presents few distinctive features. It is heavily wooded to the water's edge and traversed by low ridges seldom over 300 feet high. There are no prominent peaks and very few landmarks. Little or no cultivation is visible from the shore. From the Catarman River to Bugtu Point the shore is faced by numerous coral reefs. The village of Cawayan lies on the eastern side of the mouth of Catarman River, and the village of Maquinalo, the town of Mondragon, and the village of Bugtu, all of which are small and unimportant, lie on this coast. The Bugtu River, a small stream, empties just westward of Bugtu Point.

Bugtu Point is fringed by coral, bare at low water, which extends nearly ½ mile northward. From Bugtu Point the coast trends easterly and then curves around northerly and northwesterly to Oot Point, forming Bantayan Bay. The villages of Bantayan and Lauangan lie on the shores of this bay.

Oot Point is a long, low, sharp point projecting in a northwest direction. Its extremity is a mangrove swamp bordered by a reef for nearly ⅜ mile. From Oot Point the coast trends eastward with a curve southward for about 6 miles to Livas Point.

The town of **Pambujan** lies at the mouth of the river of the same name about 2 miles southwest of Livas Point. The church at Pambujan is prominent and forms a fairly good landmark. Anchorage may be found off Pambujan in about 6 fathoms, sandy bottom, about ½ mile northward of the church. To approach this anchorage

bring the church to bear 181° (180° mag.) when about 3 miles distant; steer for the church on this bearing and anchor according to draft.

Livas Point, the western entrance to Laoang Bay, is low, wooded, and fringed with reefs. A large detached reef, bare at low water, lies with its northern extremity 1¼ miles northwestward of Livas Point.

Hirapsan Island, about 3 miles east-northeastward of the mouth of the Catarman River and 1 mile from shore, is 10 or 12 feet high, but the trees are tall and dense, giving it the appearance of being more elevated than it is.

Palijon Island, about 1 mile northwest from Hirapsan Island, is a mangrove swamp, all of the ground being covered at high water. Hirapsan and Palijon lie on a reef 2 miles long in a northwest-and-southeast direction; between the two islands the reef bares at low water. Fairly good anchorage, protected during the northeast monsoon, may be found westward of Hirapsan Island.

Cajoagan Island is a small island about 3 miles northwestward of Oot Point. It is surrounded by a reef, beyond which shoal water extends 1 mile from the island.

Within an area bounded by Hirapsan, Palijon, and Cajoagan Islands and Bugtu Point are a number of dangerous reefs and shoal patches whose position will best be understood by reference to the chart; this area must be navigated with caution.

Villalobos Reef, with a least depth of 4½ fathoms, breaks heavily in the northeast monsoon. It is about ½ mile in extent and lies with its center 6 miles northward of Pambujan Church.

Laoang Bay (chart 4449) lies between Livas Point and Laoang Island. The depths decrease regularly from 10 fathoms at the entrance to 2 fathoms about 1 mile from the head. It offers good anchorage in ordinary weather in 5 to 7 fathoms, muddy bottom, sheltered from all winds except from north to west. In heavy northerly weather the sea breaks in 5 fathoms; at such times good protected anchorage may be found in Port Palapag.

Laoang Island, lying close to the coast of Samar, is heavily wooded and 214 feet high in the southern part. The western side is fringed by a reef ¼ mile wide.

Dernasan Island, between Laoang Island and Samar, is a low, wooded island formed by the delta of the Catubig River. Laoang Channel, between Laoang and Dernasan Islands, is impassable except by bancas at high water.

Catubig River.—The main branch of the Catubig River empties into Laoang Bay, widening near the mouth and forming Laoang Harbor. The eastern branch, known as Palapag Channel, empties into Port Palapag. At high water small launches may proceed from Laoang to Port Palapag by ascending the Catubig River and passing through the Palapag Channel. The Catubig River is navigable for small steamers and launches drawing 10 feet to Catubig, 10 miles inland. The village of Tagabiran lies about 6 miles above Catubig.

The town of Laoang stands on a slight eminence on the southwest part of Laoang Island. It is the principal port of northern Samar, and considerable hemp and copra are shipped. The harbor is narrow, being only 150 yards wide between the 2-fathom curves. There is

a light wharf about 120 yards long with 9 feet at the end extending from the eastern part of the town. At high water vessels drawing 14 or 15 feet may enter the harbor, but are obliged to moor off the wharf as the swinging room is very limited.

A black buoy marks the western edge of the 6-foot patch off Maculmacul Point and another marks the wreck of a steamer on the northern side of the entrance.

Directions for computing the times of high water are given on the chart, and they may also be found in the Tide Tables, published annually by the Coast and Geodetic Survey. The two tides of the day are generally unequal, the inequality varying with the moon's declination. The greatest range of the tide is $6\frac{6}{10}$ feet, occurring usually about two days after the moon's greatest northern or southern declination.

DIRECTIONS.—Rocky patches extend nearly ¼ mile westward from Maculmacul Point and form the northern side of the channel into the harbor. About 350 yards from the above point there is the wreck of an iron vessel, nearly submerged at high water and difficult to pick up. It is marked by a black buoy. The range formed by this wreck and a large, conspicuous tree northward from the town on a 68° (67° mag.) bearing marks the best water in the channel into Laoang. Vessels bound for Laoang should stand up the middle of the bay, and when the buoy is sighted, steer for it; round it close southward, and steer eastward until on the range; hold the range closely, proceeding slowly, and guarding against the effect of the tide. After passing close southward of the wreck steer for the wharf a little open on the port bow and anchor about 100 yards from the end of the wharf in 3 fathoms. On entering there are sand bars on the southern side of the channel, and inside the line of the end of the wharf are rocky reefs.

Cahayagan Island is northward of Laoang Island, separated therefrom by a channel having a least depth of 3¾ fathoms, but too narrow to be navigated by a vessel of any size. Cahayagan is moderately high and heavily wooded. It is surrounded by a reef, narrow on the east and south sides and widening on the north and northwest sides. The reef from the northwest part of the island extends about 1 mile and surrounds Macan Islands, a group of rocky islets, partly covered with brush, the highest of which are 18 and 21 feet.

Batag Island, the largest and most eastern of the islands forming Port Palapag, is surrounded by reefs, which, from the northwest part of the island, extend over ½ mile into the northern entrance channel to Port Palapag. The large indentation on the west side of the island is nearly blocked by reefs. Batag is heavily wooded and 220 feet high.

A group flashing light, visible 25 miles, is shown 313 feet above high water from a concrete tower 101 feet high on the summit of Batag Island. The keeper's dwellings, of concrete, stand just south of the tower.

Port Palapag (chart 4449), formed by the channel between Cahayagan and Laoang Islands and Batag Island, is partly sheltered from all winds and affords good anchorage in 5 to 9 fathoms. The northern entrance is the best, having a straight, navigable channel ⅝ mile wide. The western entrance is narrow, with a least depth of

3¾ fathoms, and the tide runs through it with considerable velocity. The eastern entrance contains a number of small, rocky patches with little depth, and in the absence of any aids to navigation should not be attempted by a stranger.

Good anchorages for moderate-sized vessels may be found westward of the southeast point of Cahayagan in 5 fathoms, mud bottom, or southeastward of Leung Point, Batag Island, in 6 fathoms. Large vessels should anchor about ½ mile southeastward of Cahayagan in 8 fathoms or farther southward off the southwest point of Batag, taking care to avoid a 15-foot rocky spot about 1 mile southeastward of Cahayagan.

Directions.—Vessels entering from northward should favor the western side of the channel as the reefs from Cahayagan do not extend as far out as those from Batag. The southeast point of Cahayagan and Leung Point, Batag, are bold and may be rounded close-to and anchorage taken up as previously recommended. Vessels entering from westward should favor the Laoang side until the southeast point of Cahayagan bears 84° (83° mag.), when it may be steered for and anchorage taken with the point on this bearing, distant ¼ mile, in 5 fathoms.

Bacan Island lies close to the Samar coast, about 2 miles eastward of the eastern entrance to Port Palapag. It is generally low and wooded except near the center, where there is a grassy hill 170 feet high, with a few scattered trees. It is fringed by reefs for ½ mile. About ¾ mile northwestward of the north end of Bacan there is a shoal patch with a least depth of 14 feet.

About 2 miles northward and 1¼ miles northeastward of Bacan are rocky patches with 4 and 5 fathoms, respectively. About 2½ miles eastward of the north end of Bacan Island and about 3 miles eastward of the south end of the same island are banks with least depths of 6 and 8 fathoms, respectively. The water in this vicinity is very clear, and bottom can frequently be seen in 10 fathoms. With the exception of the above-described shoals and banks the northeast coast of Samar from Bacan Island to Sila Point is clear and can be safely navigated at a distance of 1 mile.

EAST COAST OF SAMAR.

From Bacan Island the coast trends in a general southeasterly direction for 11 miles to Manjud Point. From Bacan to Oacan Point it is low and has a narrow, fringing, coral reef above which is a thin line of sandy beach broken in many places by mangroves growing out on the reef. There are a few low rocks on this stretch. Oacan Point does not show as a point unless a vessel is close inshore under Cape Espiritu Santo. It is low, but the coast immediately southeastward rises rapidly to the summit of the cape and is steep toward the sea. There is a narrow strip of rocky beach running along the base of the cliffs, which are covered with trees and bushes to the water's edge. At 5 miles southeastward of Bacan Island, close inshore and under the cliffs and connected with them at low water, lies the first high pyramidal rock of the many which give distinctive character to the coast to Manjud Point and which are 10 to 184 feet high. When close inshore at either end of this stretch of coast these

rocks present a very imposing appearance. Some of them are located just within the shore line and have bushes clinging to their almost perpendicular sides, but most of them lie a little distance from the beach and have their sea faces worn in fantastic shapes by wave action.

Cape Espiritu Santo forms no projection from the general shore line, but derives its name from its height. It rises to its highest point about 4½ miles southeastward of Bacan Island and nearly ½ mile inside the shore line and is densely wooded to the water edge. From northeastward two summits of nearly equal height, 1,457 and 1,481 feet, the southern one higher, are prominent.

Palapag Mesa is a long, flat-topped, wooded ridge 1½ miles long northeast and southwest with a greatest elevation of 1,229 feet. Its northern extremity, 1,226 feet high, lies 5 miles south-southwestward of Cape Espiritu Santo. It is prominent when off the north coast of Samar, more from its shape than from its height, which is less than that of the cape and the high mountains westward of it, as seen from the vicinity of Laoang. From a vessel rounding Batag Island and coasting southeastward, Palapag Mesa is entirely hidden before Bacan Island is reached by the mountainous country, terminating in Cape Espiritu Santo, and can not be seen again until 2 or 3 miles southeastward of Sila Point.

Dapdap Bay is an indentation at the opening of a small valley abreast Cube Rock about 5½ miles northwestward of Manjud Point. The shores are fringed with coral, and it does not afford anchorage. There is a village at the head of the bay.

Facing Dapdap Bay are three outlying rocks in a northwest and opposite direction. The northwestern one lies ⅝ mile northeastward of the northwestern entrance to Dapdap Bay, is 5 feet high and surrounded by deep water. The middle rock, also 5 feet high and surrounded by deep water, lies nearly ½ mile from the northwestern one, nearly in the middle of the mouth of the bay. **Cube Rock**, the southeastern of the three, lies ⅜ mile from the middle rock and nearly ⅜ mile northeastward of the southeastern entrance to Dapdap Bay. It lies on the edge of the shore reef, is 27 feet high, and steep-to on its seaward side.

Mapanas Bay lies 1½ miles northwestward of Manjud Point at the foot of a small valley opening from the southwest. The entrance is contracted by offlying rocks from both points; inside the entrance reefs from both sides almost meet, leaving a very narrow channel to the widening bay at the head, where small craft can find shelter. There is a sandy beach at the head of the bay, through which two small streams empty, and a small village. Small sailing vessels trade here.

Manjud Point is formed by a spur running northeastward from the interior mountain chain. The extreme point has a perpendicular face over 50 feet high with deep water close-to. A short distance northwestward of the point are some high rocks, and extending over ½ mile eastward from Sonatao Point, ⅔ mile south-southeastward of Manjud Point, are low rocks and a rock awash with a sunken rock a short distance northward of it.

Sacamalig Bay is a large, open bight between Manjud Point and Sila Point, 4¾ miles southeastward. The **Canmanai Rocks**, two moder-

ately high rocks, lie in the northern part of the bay, about ⅓ mile from shore. The northern and southern thirds of the shore line of the bay are fringed with coral; the middle third is bright, sandy beach. Anchorage may be found off the sandy beach in 10 fathoms, sandy bottom, about ½ mile from shore.

Sila Point, the most eastern land in this vicinity, appears like three pyramidal hills from northwest or southeast. The hill on the extreme point is 195 feet high, the second 332 feet, and the third and westernmost 554 feet. Northward of the point, on the reef which fringes the point about ¼ mile, is a high rock, just outside of which rise several needle-shaped rocks. East-southeastward of the point are rocks extending nearly ¼ mile.

Sora Cay, just open eastward of **Higunum Rocks,** bearing 149° (148° mag.), forms a good range for clearing all dangers off Manjud and Sila Points.

Between Sila Point and Hiuinatungan Island, about 8 miles southeastward of it, the coast recedes southwestward about 5 miles, forming **Gumay Bay,** which is full of coral reefs and dangerous to navigate. The shores of the bay are indented by a number of smaller bays, the dividing points of which are skirted by coral reefs, bare at low water, and are helpful; many sunken reefs, with 1 to 2 fathoms over them, which do not break in ordinary weather, constitute the dangers to a stranger.

Higunum Rock is a flat, rocky ledge about 26 feet high, over which the sea breaks in heavy weather, lying in the entrance to Gumay Bay, 1½ miles southeastward of Sila Point. It is steep-to on all sides.

Sora Cay, on which the Coast Guard cutter *Masbate* was wrecked, is a low, bright, sandy islet, which changes its shape with every gale, lying 3¾ miles southeastward of Sila Point. It is on the range formed by the summit of Cape Espiritu Santo and the highest point of Sila Point and lies on a reef about 2½ miles long southeast and northwest. Vessels passing eastward of Sora Cay should give it a berth of at least 1 mile. The wreck of the *Masbate* is prominent.

There is an unnamed low sand cay 4 miles south-southwestward of Sila Point; it is surrounded by a reef bare at low water.

Canabayon Island is a low, wooded island with sand beach, 4½ miles south of Sila Point. It is surrounded by a coral reef except on the south side, where the sand beach reaches the water's edge even at low tide, and it is the only island of its kind in the bay.

The village of **Gumay** lies at the mouth of the river of the same name about 2½ miles southwestward of Sila Point. Good anchorage may be found off Gumay during the southwest monsoon, but with a swell from eastward it is not safe. Vessels bound for Gumay should pass either side of Higunum Rock, and when the small unnamed sand cay previously described bears 211° (210° mag.) steer for it; when the large arch rock in the Labunglaion Islands, a line of rocks projecting southeastward from the northern entrance to Gumay River, is abeam, alter the course to 271° (270° mag.) and anchor in 8 fathoms, muddy bottom, with the southern entrance point to the river bearing 335° (334° mag.), distant nearly ¾ mile. Small vessels may anchor closer to the river mouth.

Cagamotan, Saonloc, and **Lapinig Bays** lie southward of Gumay in the order named. They are open eastward and afford no protection

from that direction. There are no villages of any importance on their shores.

Helm Harbor, separated from Lapinig Bay by Barabod Point, a low, mangrove-covered point with scattered trees near its northern extremity, is the largest indentation in Gumay Bay. Although neither large nor deep it affords good anchorage for moderate-sized vessels, perfectly protected from all wind and sea. From abreast Barabod Point it runs south 2 miles, then southwest 1 mile, northwest ½ mile, and finally southwest again ½ mile to the head. Only a small part of it, about 1½ miles from the entrance, is available for anchorage because of shoal water and reefs baring at low water. There are no aids to navigation, and this harbor should be entered by a stranger at low water or when it is so rough that all the shoals in Gumay Bay are breaking and courses and ranges carefully noted.

DIRECTIONS.—When 2 to 3 miles southward of Sora Cay bring Barabod Point to bear 275° (274° mag.); pick up a range on the hills behind it and steer in on it. When the eastern entrance point is abeam, haul gradually southward and when a brown landslide on a prominent bluff on the south side of the harbor bears 170° (169° mag.) steer for it and anchor when in 4 fathoms. The first course passes between the extremity of the reef extending northward from the eastern entrance point and a sunken reef with a least depth of ¾ fathom midway between the extremity of the shore reef and NANUNTUGAN REEF; a large reef bares at low water about ½ mile northward of the edge of the shore reef. The channel here is barely ¼ mile wide, and a good lookout must be kept on both sides. On the next course, when nearly up to the eastern entrance point, the channel again narrows to less than ¼ mile, and great care must be taken. Should the weather be such that Barabod Point can not be made out, the best way is to follow the edge of the shore reef on the port hand at a distance of ¼ mile, which is safe, and round the edge of it close aboard; then endeavor to follow the previous directions. Helm Harbor may be approached from northward by bringing the east side of Canabayon Island to bear 181° (180° mag.) and steer for it until within ½ mile of it; then haul eastward until Sila Point bears 350° (349° mag.); bring Sila Point astern on this bearing and follow the previous directions, keeping a good lookout for a small ½-fathom patch lying nearly 1 mile southeast of Canabayon Island.

Nabugtusan Island, the eastern side of Helm Harbor, has moderately high land with large trees on it, but the part which forms the eastern entrance to the harbor is low and covered with mangroves. At high water there is a channel between Helm Harbor and San Ramon Bay, passable by boats.

Binarayan Island, immediately eastward of Nabugtusan Island, from which it is separated at high water by a narrow, tortous boat channel, is all low coral covered with mangroves. Both of these islands are bordered on the north and east sides by a broad coral reef with two or three coral bowlders near the edge. This reef has deep water close to it, bares before low water, and can generally be seen and used as a guide to San Ramon Bay and Helm Harbor.

San Ramon Bay has its entrance between Binarayan Island on the west and Hiuinatungan Island on the east side. It runs in a south-southwest direction for over 2 miles, and about halfway in a branch

runs to the west-northwest, which forms a large bay at high water, but is nearly filled with reefs bare at low water. In the northern part of this branch there is a contracted but absolutely safe typhoon anchorage for small vessels, considered by some to be equally as good as Helm Harbor and much easier of access.

The village of San Ramon, consisting of a few native houses, is on the western shore at the head of the bay. Hiuinatungan Island, on the eastern side of the entrance, is low and covered with mangroves and difficult to make out from seaward.

Directions.—To enter San Ramon Bay, pass ¼ to ⅜ mile eastward of Binarayan Island on a 204° (203° mag.) course, continue on keeping a good lookout for the reefs on both sides and anchor in about 5 fathoms, muddy bottom, when the first low point westward is abeam. If intending to enter the typhoon shelter southwest of Binarayan Island, round the south end of the island at a distance of less than ¼ mile and steer northwestward; go slowly with the lead going; keep a good lookout for the points of the two long reefs making out from the southwest shore of this branch and anchor in about 4 fathoms, muddy bottom, about 150 yards from the mangroves northeast and 200 yards from the bushes northwest. Vessels should moor with about 45 fathoms of chain, with the starboard anchor northward, where the first blow comes from, and the port anchor southward.

From Hiuinatungan Island the coast runs in a general southeast direction for about 8 miles, then south 1½ miles to Bunga Point. The immediate shore line is mangrove, but a short distance inland the solid land rises gradually to a uniform, level-appearing, high-wooded ridge. The coast is bordered by a broad coral reef which bares at low water and has deep water close to its outer edge. It is 1½ miles wide at the northwest end and gradually narrows down to ¾ mile at the southeast. The northwestern point of this reef bears 142° (141° mag.) from Sora Cay and distant nearly 4½ miles from it. From a position 1 mile northeastward of Sora Cay, a 136° (135° mag.) course will keep a safe distance from it. It can be approached anywhere within ½ mile, and the outer edge is constantly showing breakers. There are four breaks in this reef, leading to small bays and streams in the coast line. All these openings are exposed and of no value to navigation. The first, opening into San Ramon Bay, is unnamed and is immediately eastward of the great reef reaching northeast from Hiuinatungan Island and following around it and into San Ramon Bay; **Panablijon Bay**, the second opening, is 7 miles from Sora Cay; **Pangpang Bay**, the third opening, is 9 miles from Sora Cay; **Alugon Bay**, the fourth opening, is 10 miles from Sora Cay.

Bunga Point, the most eastern point in this vicinity, is not prominent, being overshadowed by Apiton Island, immediately southeastward of it. It is low and bordered with mangroves, but rises northward to a ridge 50 feet high and covered with trees, principally coconut palms. The point 1¼ miles northward of Bunga Point, is easily identified by a group of large coral bowlders lying on the reef over ¾ mile eastward of it. They constitute a very prominent landmark for vessels approaching from northwest or southeast by reason of their jagged outlines and apparent long distance from shore when first raised.

Apiton Island, ½ mile southeastward of Bunga Point, is 113 feet high at its southeast end and slopes gradually to the northwest. It is densely covered with coconut trees except on the high, rocky southeast end, where other trees prevail. It is surrounded by a large reef, on which, eastward and southward of the island, are many large prominent rocks. Between the edge of the reef northwestward of the island and the reefs off Bunga Point there is a narrow boat channel. Off the southeast point of the island there is a prominent rock 63 feet high, which is steep-to on its southern side. Anchorage, protected from easterly winds and seas, may be found in 10 fathoms, muddy bottom, off the western side of Apiton Island.

A group of islands consisting of **Tubabao, Hilaban, Sibay, Linao, Fulin**, and several smaller ones lie in a north-and-south direction on the western edge of a great reef beginning about 2½ miles south-southeastward of Apiton Island and extending about 8 miles southward. The reef is very narrow at the northern end and gradually widens until at the southern end it extends more than 1 mile eastward and southeastward of Fulin, the southern island of the group. This long reef, bare at low water, protects a large area of water and coast from easterly seas and affords a smooth passage, inside of the islands, 2½ miles wide at its narrowest point.

The channel between the 63-foot rock off Apiton Island and the pyramidal rock off the north end of Tubabao Island is over 2½ miles wide, deep, and free from danger with the exception of a small coral shoal, with a least depth of 3¼ fathoms, lying with its center about 1 mile south-southeastward of the 63-foot rock off Apiton Island. In bad weather the sea breaks heavily on this shoal.

Tubabao, the northernmost of the group, lies southeastward of Apiton Island. Off the northwest point is a pyramidal rock about 30 feet high, connected with the island by a reef bare at low water. Tubabao consists of a flat-topped rocky ridge 103 and 106 feet high at the northwest and southeast ends, respectively, and is entirely covered with coconut trees. On the western side is a strip of low land on which is a good-sized village.

Hilaban, the next large island southward of Tubabao, is the longest of the group, being over 2 miles long north and south. It is very narrow, slightly curved with the concave side toward the coast, low, and entirely covered with coconut trees, the tops of which are about 55 feet above the sea. At the southern end there is a large village to which a narrow opening in the reef gives access and good shelter to small craft.

Kaybani Island lies near the eastern edge of the great reef eastward of Hilaban and 1¾ miles southward of Tubabao. It is narrow, with a ridge over 50 feet high running nearly its entire length, and is covered with trees, mainly coconuts.

Luctaban, Nabalicad, and **Cancahinibing** Islets are three small unimportant islets lying southward of Tubabao. Luctaban, about ¼ mile southward of Tubabao, is low, round, about 350 yards in diameter, and covered with trees, mainly coconuts. Nabalicad lies ½ mile northward of Hilaban; is a small and almost bare rock with a few bushes on it and is about 40 feet high. Cancahinibing Islet is a small, round-topped islet, 42 feet high, covered with bushes, lying 150 yards westward of the north end of Hilaban. The best anchor-

age in this vicinity during the northeast monsoon is off the middle of the west side of Hilaban, in about 10 fathoms, muddy bottom, with Nabalicad and Luctaban Islets in range just filling the opening between Cancahinibing Islet and the northwest point of Hilaban Island. Good anchorage may also be found off the west side of Tubabao, but necessarily in deeper water, as the bank is much steeper.

Sibay, Baohan, Linao, and **Fulin** are four small coconut-covered islands lying southward of Hilaban Island, which appear as one island on all bearings except east and west, where the clefts between them open out.

Pasig Islet is a small sand cay about 6 feet high, about 3 miles south-southwestward of the south end of Fulin Island. At present there are a few bushes growing upon it. The cay stands on the western side of a reef over 1 mile in diameter. The larger part of this reef bares at low water, and on it are a number of scattered bowlders that are never covered. The channel between the reef extending southeastward of Fulin Island and the reef surrounding Pasig Islet is 2 miles wide, clear and deep, with the exception of a small shoal lying near the middle of it, which has a least depth of 6½ fathoms.

From Bunga Point the coast trends in a general southwest direction for 5½ miles to the head of Oras Bay, thence southeasterly for 5½ miles more to Cabra Point, 6¾ miles southward of Bunga Point. This large bay is indented by a number of small bays separated by points, which are low, covered with mangroves, and fringed by coral reefs, and there are many detached offlying sunken reefs, some of which lie 1 mile from the nearest point of the coast. Coconut trees lie behind the mangroves, and the high land is covered with dense forests. None of the bays, with the exception of Bactol Bay, afford perfectly sheltered anchorage, and none of them, with the exception of Oras Bay, are of any commercial importance.

San Policarpo Bay, between Bunga and Binugayan Points, is a small cove. The shores are fringed by reefs, baring at low water, and there are many sunken coral heads throughout it. The entrance is obstructed, and in heavy seas the cove is protected by a reef with 1 fathom, the center of which lies about ½ mile southeastward of Binugayan Point. The best channel into the bay is westward of this reef, and the best anchorage will be found nearly in the middle of the bay, in about 5 fathoms, muddy bottom, with the eastern entrance point in line with the north end of Apiton Island.

Binugayan and **Lipusan Bays** lie between Binugayan Point and Ludo Point, 1¾ miles southwestward of it; both of these bays are foul and of little value to navigation. Extending in a general southeast direction from the point separating them is a line of sunken reefs, the outermost of which, with 2½ fathoms, lies 2¼ miles westward of the large rock at the south end of Apiton Island. Vessels navigating in this vicinity are advised to give the outlying points a berth of at least 1 mile.

From Ludo Point the coast trends southwest, southeast, and then northeast to Bankari Point, forming **Oras Bay,** a shallow, circular basin over 2 miles in diameter, in the northwest part of which is the mouth of the Oras River. The entrance points are fringed with reefs, but the rest of the bay is of moderate depth and clear with the exception of a sunken rock with 2 fathoms, lying about ¾ mile from the northern shore of the bay.

Oras is a small town on the river of the same name, about ½ mile from its mouth. There is a buoyed channel for small craft drawing not more than 5 feet. Vessels bound into Oras Bay should bring the north end of Tubabao Island to bear 91° (90° mag.) and steer 271° (270° mag.) for the middle of the entrance, giving Bankari Point, the southern entrance point, a berth of about ¾ mile; when the small bushy islet in the mouth of the river bears 316° (315° mag.), it should be steered for and anchorage taken up according to draft. A depth of 4½ fathoms will be found about ¾ mile southeastward of the bushy islet.

From Bankari Point the coast trends southeasterly for about 4 miles to Cabra Point and is very irregular, being indented by bays, the entrances to which are blocked by reefs and islets. **Uguis Islets**, ¾ mile eastward of Bankari Point, is a small, round, wooded islet showing sand below; it is surrounded by a reef which extends ⅜ mile eastward of it. **Bactol Bay**, about 1 mile southward of Uguis Islet, affords good anchorage for small vessels drawing less than 12 feet, in 3 fathoms; mud bottom. Bactol Island and surrounding reefs protect this anchorage from eastward. The approaches to this anchorage, either from northward or eastward, are intricate, and should not be attempted without local knowledge unless the reefs are visible.

Cabra Point is very prominent, clear, and steep-to. There is a dangerous shoal, with a least depth of 1¼ fathoms, lying about 1 mile northward of Cabra Point; it can be avoided by keeping the point bearing nothing southward of 185° (184° mag.).

From Cabra Point the coast trends southwesterly for about 11 miles to Tugasan Point, at the mouth of the Tubig River. For the first 7 miles it is low, straight, and clean, the 5-fathom curve being about ½ to ¾ mile from shore. Between Ulut River and Tugasan Point the land is higher and heavily wooded, with mangroves along the shore line. From a position about 1 mile southward of the mouth of the Ulut River to Tugasan Point the shore line is very irregular and fringed with reefs. The only outlying dangers are a small ½-fathom coral patch southward of the mouth of the Ulut River and ¾ mile from shore and a large coral shoal with a least depth of 1¾ fathoms 2½ miles northeastward of Tugasan Point and 1½ miles from shore.

Dolores River, which empties about 2½ miles southwestward of Cabra Point, has about 2 feet of water on its bar at low water. There is a 7-foot channel across the bar at high water, marked by stakes, and it is reported that small launches drawing 6 feet can ascend the river for a distance of 32 miles. The town of Dolores lies on the northern bank of the river just inside the bar.

Ulut River, which empties 3 miles southwest of Dolores River, has very little water on the bar, which can be crossed only by small boats.

Tugasan Point, forming the northern side of the entrance to Tubig River, is low and fringed by a reef which extends ½ mile eastward of it.

Taft is a small town on the southern entrance point to Tubig River. The **Tubig River** has a depth of 6 feet on the bar at low water and deeper water inside. The usual anchorage for Taft is in 10 fathoms,

muddy bottom, with the town bearing 270° (269° mag.) and Pindilin Point 181° (180° mag.). This anchorage is frequently untenable in the northeast monsoon; at such times fairly protected anchorage may be found in 9 fathoms about ⅜ mile westward of Makate Island. Small vessels drawing not over 12 feet can find good anchorage in 3 to 4 fathoms in a basin about 600 yards in diameter southeastward of the town; anchorage should be taken about ¼ mile northwestward of a small, sandy cay, which is always visible and in a line between the cay and the town. A pilot for this anchorage and also for the river can be procured if desired.

Caution.—Vessels leaving Taft are advised if bound northward to keep the town bearing 271° (270° mag.) until Cabra Point bears 23° (22° mag.) before hauling northward; if bound south to keep the town bearing 271° (270° mag.) until Cabra Point bears 6° (5° mag.) before hauling south. Cabra Point on the former bearing clears all dangers northeastward of Tugasan Point and on the latter bearing clears the dangerous, rocky shoal northeastward of Makate Island.

From the mouth of Tubig River the coast trends east-southeastward for over 2 miles to Pindilin Point. The immediate shore line in this vicinity is a sandy beach backed by coconut trees. From Pindilin Point it curves around southeast and northeast to Taig Point, forming Sulat Bay. **Sulat Bay** is fronted by **Makate, Macalayo, Catalaban,** and **Anajao** islands, all of which are surrounded by reefs, leaving narrow boat channels between them and also between them and the adjacent coast. The reef surrounding Makate Island extends about ⅝ mile northeastward and that around Catalaban is widest on the eastern side, where it extends about 800 yards seaward.

Makate Island, the northernmost of the above mentioned, is small, low, covered with coconuts, and fringed with mangroves. There is a small, dangerous, rocky patch lying 1¼ miles northeastward of Makate Island. The least water on this shoal is 3¼ fathoms, and it breaks heavily in bad weather. Between the reefs extending northeastward from Makate and this shoal is a deep, clear channel over ½ mile wide.

Macalayo Island, ¾ mile southwestward of Makate, is an irregularly shaped, low, wooded island nearly ¾ mile in extent; on the southern extremity is a hill 84 feet high.

Catalaban, the largest and most prominent of this group, is nearly divided by indentations on both sides; the western and eastern ends are about 100 feet high and are connected by a low isthmus covered with coconut trees. The village of San Vicente lies on the south side of the island.

A rock awash lies about ¼ mile southeastward of Catalaban Island with the east tangent of that island bearing 1° (0° mag.). This rock, steep-to on its southern side, marks the northern side of the channel into Sulat Bay.

Anajao Island, south of the west end of Catalaban, is triangular in shape, nearly ½ mile in extent, low, and covered with coconut trees.

Sulat Bay is a deep indentation in the coast open to the northeast. The head of the bay is shoal, otherwise Sulat Bay is free from danger with the exception of a small coral patch, covered by a least depth of 3 feet, lying ¾ mile southeastward of Anajao Island. A heavy

sea sets into Sulat Bay during the northeast monsoon, and during that period better anchorage may be found off the village of San Vicente, south side of Catalaban Island.

TAIG POINT, forming the southern shore of Sulat Bay, is prominent only because of the long and broad reef, dry at low water, which extends 1¼ miles northeastward of it, with a uniform width of ½ mile, upon which lie four small, rocky islets, the northern one, AGAUAN, 16 feet high. The point is fringed with mangroves, behind which are coconut trees among which rise rocky outcroppings almost hidden by the tall trees. The town of SULAT is built on the east side of the river of the same name, which empties just westward of Taig Point. The stone walls of a large, ruined church, within which is erected a nipa edifice, is the most prominent building in town.

DIRECTIONS.—Vessels entering Sulat Bay should bring the south end of Anajao Island, the southern island in the bay, to bear 260° (259° mag.) and steer for it; this course should take a vessel about ¼ mile southward of the rock awash southeastward of Catalaban Island and about the same distance off the reef on the south side of the entrance. When the ruins of the church bears 195° (194° mag.) they should be steered for and an anchorage taken up in 5 fathoms, muddy bottom, about ¾ mile northward of Taig Point; inside of this position the water shoals rapidly.

Paninihian Point is the projection of the coast separating Sulat Bay from Port Libas. The reef from Taig Point continues southward and fringes Paninihian Point for over ¼ mile in places; it has many large bowlders upon it, a smooth outline, and deep water close to its edge.

Port Libas is between Cannomanda Point on the northern and Najibil Point on the southern side. Reefs from both entrance points narrow the channel to about ⅜ mile. The interior of the bay has a very irregular shore line, broken up into five projecting points with as many bays between them, all of which are shoal and of no value. The village of REMEDIOS lies at the head of one of these bays on the north side of the port. SAN JULIAN, the largest town, is southwest of the southern entrance point. Nearly all the points in the bay have reefs, baring at low water, projecting from them, and in the southern part of the port are many detached patches, some of them with mangroves growing on them. Only a small area of this port is available for anchorage, about 1 mile from the entrance and ½ mile north and south. MAGNANA POINT is the most conspicuous and readily identified point in the port and bears about 244° (243° mag.) when first opened southward of Cannomanda Point. Immediately behind Magnana Point the land rises into steep conical hills, the highest of which, MOUNT MAGNAGUA, affords a good range for entering the port between the reefs contracting the channel.

PALAN POINT is the western side of the southern entrance point where the coast turns sharply southward; the town of San Julian is immediately southward of this point. Tubigan Point is the second point inside the entrance on the north side of the port; it forms the western side of the bay on which the village of Remedios is situated.

DIRECTIONS.—From a position about 1 mile offshore bring Mount Magnagua to bear 250° (249° mag.), when it should be under the depression between the horns of a saddle-shaped mountain in the

interior, a little nearer the southern and higher horn, and steer in on this range. This course will carry a vessel midway between the reef extending from the northern entrance point and the limit of the foul ground outside of the reef on the southern side. When San Julian begins to open westward of Palan Point, haul northwestward for Tubigan Point and anchor about 3/8 mile eastward of it in 5 fathoms. In smooth weather small vessels can go much farther in and anchor between Tubigan and Magnana Points in 16 feet, sandy bottom.

From Najibil Point the coast trends south-southeastward 5½ miles to Anitaguipan Point, and is low, covered with coconut trees, and fringed with mangroves. The shore reef which fringes Najibil Point continues southward with several breaks nearly to Anitaguipan Point. A line from Najibil Point to Anitaguipan Point runs tangent to Haravis, Macatucas, and Guinanug Points, all nearly equidistant from each other and from the terminals. The three bays formed by the four southern points are nearly blocked by reefs and of little value to navigation.

Anitaguipan Point is a bold, rocky, steep-to headland, 282 feet high, and well wooded with coconut trees. The shore reef fringing the coast from Port Libas ends a short distance northward of the point, leaving it exposed to wave action, which has so undermined the base that the upper part overhangs the sea.

From Anitaguipan Point the coast trends southwestward for nearly a mile to Capinas Point, thence curves around westward and southward, forming a large bay with a very irregular coast line to Lalauigan Point, about 5 miles south by west from Anitaguipan Point. Andis Island lies in the middle of the entrance to this bay, dividing it into two parts. **Napla Bay**, the northern part, on the indentations of which are several villages, affords good anchorage in a basin about 1 mile in diameter. This anchorage is not recommended in the northeast monsoon as easterly winds send in a heavy sea.

Andis Island lies 1½ miles southwestward of Anitaguipan Point. **Amogotada Point**, the northeast extremity, is a bold rocky headland over 100 feet high. The south point is also rocky, but not so high. A coral reef fringes the east coast, but does not reach either point. The northwest point is low and sandy and a narrow reef, bare at low water, borders the western side of the island. There is a narrow boat channel between the northwestern extremity of Andis Island and the reefs extending from the mainland.

Port Borongan is between the south point of Andis Island and the north side of Divinubo Island. The channel between the shoal spot southwest of the south point of Andis Island and the reefs northward of Divinubo is 1½ miles wide, clear, and deep. At the head of the port there is a point projecting eastward beyond which extends a narrow reef, bare at low water, which divides the head of the port into two bays; the northern one only is used. The Borongan River empties into the northwest part of the northern bay. There is a small landing pier on the eastern side of the river mouth. About ½ mile eastward of the mouth of the river there is a small, low, bushy islet surrounded by a reef about 400 yards wide. The Oom River empties about 1 mile southward of the Borongan River, just northward of

the point which divides the head of the port. Between the two river mouths there is a slightly curving sand beach backed by coconut trees.

A small, rocky shoal, on which the sea breaks in bad weather, with a least depth of 2½ fathoms, lies about 400 yards southwest of the south point of Andis Island.

About 1⅓ miles west-southwestward of the south point of Andis Island is a small steep-to rocky shoal, with a depth of less than 1 foot. This shoal is marked by a breaker when there is the least sea.

The best typhoon shelter in this vicinity is reported to be westward of the northern part of Andis Island. To approach this anchorage, round the southern part of Andis Island at a distance of ½ mile, haul northwestward and anchor in 10 or 12 fathoms, muddy bottom, about 600 yards from shore, with Anitaguipan Point just open of the northwest extremity of Andis Island.

Divinubo Island lies nearly 2 miles south-southeastward from the south point of Andis Island. It is almost round, of moderate height, and appears almost flat. Its northern and eastern sides are fringed by a reef for about 400 yards. Divinubo is almost connected with Lalauigan Point, ¼ mile westward from it by reefs, bare at low water, on which are the Coco Islets and a number of large bowlders. It is marked by a light at the eastern end.

Borongan, the most important town on the east coast of Samar, lies near the mouth of the Oom River. The town is obscured by coconut trees. A fixed red light, visible from seaward, between Andis and Divinubo Islands, is shown from a concrete pillar on the beach about ⅝ mile southwestward of the mouth of the Borongan River.

The usual anchorage for Borongan is southwestward of the small low bushy islet previously described and off the mouth of the Borongan River. Under the lee of this islet there is usually some protection from the easterly swell which beats on the sand beach at the head of the bay, especially during the northeast monsoon. The southern bay is never used for anchorage.

Directions.—Vessels for Borongan should bring the red light on the beach to bear 271° (270° mag.) and steer for it, passing about midway between Andis and Divinubo Islands and anchoring ½ mile from shore, with the light on the above bearing, in 5 fathoms, mud bottom, or farther northward as previously recommended.

The coast from Lalauigan Point trends south-southeastward, with a slight curve westward for 7½ miles to Minasangan Island, at the entrance to Cabay Bay. The first 4 miles southward of Lalauigan Point is sandy beach, broken through in many places by rocky bluffs reaching to the sea. Thence to Maiduun Islands the shore line is more irregular, with rocky points bordered by coral reefs and having short sand beaches between them. Thence to Minasangan Island the shore line is low and bordered by a wide reef which continues to the eastern end of Minasangan Island and begins again on the south side of the island and borders the shore into Cabay Bay.

Suribao River, with about 2 feet of water on its bar at low water and deeper water inside, empties about 3 miles southward of Lalauigan Point. It is about 250 yards wide just inside its mouth and is separated from the sea by a low, sandy point running from the bluff on

the north side to within a short distance of the rocky bluff on the south side and confining the river to a narrow channel between them. The village of Suribao lies on the north side of the river, just inside of the sandy point at the entrance. The 10-fathom curve is a good distance from shore off this river and the beaches on either side of it.

Maiduun Islands, about 5 miles southward of Divinubo Islands, are two small wooded islands at high water only, being surrounded by a broad coral reef reaching out from the mainland inside of them. This reef bares at low water for ½ mile northeastward of the islands, then turns northward for about ¼ mile, and thence continues northward as a sunken reef for about ½ mile farther; it should be given a wide berth.

Maydolong is a small village on the mainland about 1 mile westward of Maiduun Islands, at the head of Maydolong Cove, an opening between the shore reef and some detached reefs lying outside and eastward. A small but fair anchorage may be found here by bringing the west side of Divinubo Island in range with Anitaguipan Point, bearing 356° (355° mag.), and standing in with this range astern, keeping a good lookout for the reefs on both sides, until a large coral bowlder in a small bight on the mainland bears 248° (247° mag.), where anchorage will be found in about 10 fathoms, muddy bottom. Vessels from southward should not haul in for the range until they are about 2 miles northward of Maiduun Islands; then pick up the range and proceed as previously directed.

Minasangan Island, close to the land at the northern side of the entrance to Cabay Bay, as well as the coast behind it, is covered with coconut palms with some large trees scattered among them. The eastern extremity of the island is a shelving rock, with deep water close-to, on which the sea breaks heavily even in moderate weather. The south side of the island is steep-to.

Cabay Bay lies immediately southwestward of Minasangan. The shores are fringed by a narrow reef, leaving plenty of available anchorage space, which, however, is exposed to northeast winds and seas. The village of **Cabay** lies at the head of the bay.

From the south point of Cabay Bay the coast trends in a general southeasterly direction for about 9 miles to Tugnug Point. This coast is indented by several bays, is fringed by coral reefs, and faced by a number of islands.

Minanut Island lies about 2 miles southeastward of the southern entrance point to Cabay Bay and about ⅜ mile eastward of San Miguel Point. It is three-cornered in shape, with sharp points projecting southeast and southwest and a blunt point northward. The northern point is clean and steep-to; the rest of the island is surrounded by a reef. The north and northeast face of the island consists of perpendicular cliffs nearly 100 feet high. The southwest point is low and sandy, and behind it the lowland rises to a ridge and is densly covered with coconut trees.

Minanut Anchorage is a cove formed by a bend in the coast southward of San Miguel point; the shore is fringed with coral. Minanut Island, lying in the entrance, affords protection from northeast winds and seas. This anchorage is not recommended during the typhoon season nor even in strong northeast monsoon weather, because with a heavy northeast sea, while the cove is absolutely smooth, the

breakers from the reefs at the northern entrance fill it with foam and cause a strong current from that direction which quickly reverses with the receding waters. These changing currents keep a vessel sheering about and bring heavy and sudden strains on her cable.

DIRECTIONS.—The northern entrance is not recommended, as it is nearly blocked with reefs, leaving a narrow, deep channel between them. From southward pass about 600 yards southward of Minanut Island, keeping a good lookout for the reefs on either side; as soon as San Miguel Point opens westward of Minanut haul northward and anchor in the middle of the cove in 9 or 10 fathoms, muddy bottom, with San Miguel Point bearing 350° (349° mag.) and the southeast point of Minanut Island open southward of the southwest point.

There is a good boat landing in a break in the reef just southeast of a bright-faced, rocky bluff with a deep cave on the northwest side, situated on the southwest shore of the cove. A trail from this landing runs to the Lanang River opposite Llorente, where a small boat ferry is maintained.

The **Lanang River** empties about 1 mile southwest of the southeast point of Minanut Island near a rocky point fringed with mangroves and surrounded by a reef to a distance of about 250 yards. The south side of the river is a low sand point and the shore is a sand beach for 1 mile southeastward; a rocky point extends ¾ mile eastward from the end of the sand beach. From the extremity of the latter rocky point the north end of Iniyao Island lies about ½ mile eastward and between the two is the mouth of a bay extending about 1 mile southwestward, whose shores are fringed with coral. **Iniyao Island** is very small, 90 feet high at the northern end, looks like the other high rocky points on this coast, and is connected with the shore by a reef which bares at low water.

Llorente lies on a low grassy flat on the south side of the entrance to the Lanang River. The ruins of a church and some buildings show seaward and in front of them is a tall flagstaff, which is the most conspicuous object. The town is small and offers few resources. Coasting steamers call and some business is done in hemp and copra.

The usual anchorage is in 10 fathoms about ½ mile eastward of the river mouth; small vessels can anchor in 7 fathoms closer to the town. These anchorages are untenable at times during the northeast monsoon.

From Iniyao Island to Tugnug Point, nearly 5 miles southeastward, the coast consists of rocky cliffs 40 to 90 feet high, with deep indentations filled with coral reefs. This coast is fringed by steep-to coral reefs, in some places to a distance of nearly ¼ mile; these reefs gradually narrow to the coast and finally disappear at Tugnug Point. The cliffs are nearly perpendicular and the tops are covered with bushes and small trees; a short distance inland the land rises to a height of from 300 to 500 feet and is heavily wooded.

Immediately southward of Tugnug Point is a small cove about ¼ mile in extent. This cove is very deep and the head is filled with coral. From this cove the coast runs southward for nearly 1 mile to Agdan Point, and consists of perpendicular steep-to cliffs, whose bases are much undermined and whose faces are worn into fantastic shapes by wave action. The tops of these cliffs are 25 to 50 feet

high, and are in general sparsely covered with thickets and shrubs. This bluff headland is very prominent from north or south, as it rises at a short distance back of the cliffs to a height of about 200 feet to the top of the trees.

From Agdan Point the coast curves around west, south, and east to Panadlihan Point, forming **Nagaha Bay**. The shores are mostly low and fringed with coral. In the northeast corner of the bay is a small beach with a coconut grove behind it, where landing could probably be made at any time. Anchorage in fine weather may be found in 16 fathoms, in the middle of the bay, about ¼ mile southwestward of Agdan Point.

Panadlihan Point, about ½ mile southwestward of Agdan Point, is a nearly round, sparsely wooded peninsula about ¼ mile in extent. It is faced by cliffs 30 to 40 feet high and 50 feet high in the center.

Between Panadlihan Point and Bura Point, about 1½ miles southwestward, the coast recedes for about ⅜ mile, forming a bay which is entirely filled with coral, bare at low water, with the exception of a small break ½ mile northward of Bura Point, leading to the mouth of the Hernani River. The village of Hernani lies about ¼ mile westward of Panadlihan Point. The shores of this bay are low, and the land rises in a gentle slope to the foothills of the high, wooded ridge in the interior.

Bura Point is low and wooded but prominent, terminating in a line of black rocks 20 to 30 feet high. From northward or southward it appears dangerous to approach, but there are no sunken rocks outside of the visible ones, and it has been passed in safety at a distance of ½ mile.

Pambujan Harbor (chart 4467), between Bura Point and Matarinao Point, nearly 5 miles south-southwestward, is the largest, best protected, and most accessible harbor on the east coast of Samar. Both sides of the entrance are formed by broad reefs, leaving a deep narrow channel between them which leads to the various anchorages within the bay. The reefs, partly bare at low water, are generally marked by breakers and are readily discernible at all times. There are a number of villages on the shores of the bay, of which PAMBUJAN, westward of the south end of Anahao Island, is the only one of any importance; some hemp and copra are shipped.

There are a number of islands in the northwest part of the bay, all surrounded by wide reefs, bare at low water. LALAUIGAN ISLAND, 2¾ miles southwestward of Bura Point, is 266 feet high, and can be seen over Bura Point when off Panadlihan Point. The reefs surrounding Lalauigan Island extend nearly 1½ miles southward and form the northwest side of the channel into the bay. ANAHAO ISLAND is the largest and most southern of the group just mentioned; it is low and covered with mangroves. When entering the channel between the reefs the south point appears like a low point projecting from the land.

Other prominent islands in the bay are Minadion, Minaloa, Linoa, Kanadag, and Pou Rock. MINADION ISLAND, about 1¼ miles southward of Anahao and ⅝ mile from shore, is a small, low, rocky, flat-topped islet covered with dark trees, which make it show up well against the mangrove-lined shore behind.

MINALOA ISLAND, about ¾ mile east-northeast from Minadion, is the highest of the group lying in the opening of the bay. It has a

rounded, wooded top 143 feet high and a low extension southward upon which there is a grove of coconut palms. It makes a prominent landmark. LINOA ISLAND, 3/8 mile northwestward of Matarinao Point, has a more irregular summit than Minaloa, is also heavily wooded and 81 feet high. KANADAG ISLAND, 1/3 mile southward of Linoa and the same distance westward of Matarinao Point, is a small, low, flat island covered with brush and some coconut trees, showing a bright, sandy beach beneath them. POU ROCK is a small black rock about 12 feet high lying on a bright sand cay almost awash at high water; it is 1/2 mile west-northwestward of Kanadag Island.

The usual commercial anchorage for large vessels is in 7 fathoms, muddy bottom, about 1/2 mile southwest of the south end of Anahao Island; small vessels can anchor farther northward in not less than 5 fathoms, as the reefs are very steep-to. This anchorage is well protected, but better anchorage in typhoon weather can be found in Matarinao Bay, 3/8 mile westward of Kanadag Island, in a basin about 700 yards in diameter. The southern part of the bay offers a large area of well-protected anchorage, but it is encumbered by a number of small reefs which bare at low water, and also a number of dangerous shoal patches, which make it difficult of access.

DIRECTIONS.—When well outside of the reefs bring Minaloa Island to bear 218° (217° mag.), and steer for it; when Kanadag Island is well open west of Linoa Island, and the south end of Anahao Island bears about 257° (256° mag.), the vessel will be in the entrance to the channel; from here steer 249° (248° mag.), heading about 1/4 mile southward from the south end of Anahao Island, and keeping a good lookout for the reefs on either side. When Pou Rock is abeam, the narrowest part of the channel (about 3/8 mile) will be passed, and when Minaloa Island is abeam the vessel may be hauled westward for the anchorage off the south end of Anahao Island.

If intending to anchor westward from Kanadag Island, having brought Pou Rock abeam on the track just described, steer for Minaloa Island, bearing 198° (197° mag.), and when Pou Rock is abeam change the course to pass midway between the reefs surrounding Minaloa Island and Pou Rock, and when Pou Rock is again abeam haul gradually eastward and anchor in 7 fathoms, muddy bottom, with the south end of Kanadag Island bearing 91° (90° mag.), and Pou Rock 350° (349° mag.).

In approaching this anchorage there is a dangerous shoal with a least depth of 1 fathom 730 yards south-southwestward of Pou Rock, and another shoal with a least depth of 1/2 fathom 950 yards south-southeastward of Pou Rock.

From Matarinao Point the coast trends southeasterly for about 27 miles, forming a narrow peninsula between the Pacific and the shoal bay westward of Guiuan. A chain of islands consisting of Calicoan, Lelebon, and Candolu extend southeastward, forming a prolongation of this peninsula and from a distance appear part of it. The passages between the peninsula and the islands and also those between the islands are narrow and shoal and bare in places at low water.

The most prominent feature of this section of the coast is a bold coral ridge about 400 feet high that reaches from Matarinao Point to Sungi Point, the southern extremity of Candolu Island. At several

places it is broken by steep gaps and at one place it disappears for over a mile, but the general impression is one of uniform height, smooth, even, sky line, and vertical sea faces over 300 feet high, usually covered with bushes, but sometimes entirely bare. This ridge is remarkable for its length, its narrowness, being only 300 to 650 yards wide, and its abrupt, steep face, both in front and where it is broken by passes through it. On the western side the slope is gentle. There is a belt of low, level ground between the ridge and the sea. The shore line is made up of high sand beaches and coral bluffs alternately, the latter averaging about 20 feet in height. In most cases these bluffs do not extend more than 300 or 400 yards; in some cases they are merely the foot extensions from the high cliffs farther inshore. The storm beaches are from 8 to 10 feet high and indicate severe wave action during the northeast monsoon. They show well out to sea.

Asgad and **Pananamitan Points**, 5 miles and 7½ miles, respectively, southeastward of Matarinao Point, are fairly prominent. **Hagnaya** and **Bagtong Points**, 1 mile and 5 miles, respectively, southeastward of Pananamitan Point, are not distinguishable from the sea, being merely bluffs 20 or 30 feet high along a concave coast. From just northward of Asgad Point to Hagnaya Point the coral cliffs are vertical, mostly bare, and very prominent. The ridge south of Hagnaya Point is broken into heavily wooded hills. The bluff at Bagtong Point is practically vertical, 408 feet high, and is the most noticeable one in this peculiar ridge. From this point to Luyong Point, 2 miles southeastward, the ridge is one vertical wall of coral rock, with a few bushes on its face and a covering of bushes and shrubs on its top. From Matarinao Point to Luyong Point the coast is fringed with a coral reef to an average distance of ⅛ mile; from Luyong Point to Calicoan Pass, 1½ miles southeastward, it widens to about ⅓ mile.

Calicoan Pass, between the peninsula and the north end of Calicoan Island, is passable by small boats at high water, but is partly bare at low tide.

Calicoan Island, the first island southeastward from the peninsula, is about 7 miles long and 1¼ miles wide. It contains a ridge of hills, similar to those on the peninsula, averaging 250 to 350 feet in height. The bluff facing Calicoan Pass is nearly vertical, but soon loses this appearance and changes into moderate slopes. For 2½ miles southeastward from the pass there is no shore reef, and the shore line is formed of coral rock about 20 feet high. From here a fringing reef begins which extends along the remainder of this island and all the eastern coasts of Leleboon and Candolu Islands, gradually widening to ½ mile, and continues around Sungi Point into Guiuan Bay. There are several villages on the west coast of this island.

Leleboon Island, immediately southward of Calicoan, is very small and about 200 feet high. The village of Salanga is on the west side.

Candolu Island, the southern islet of the chain, immediately southward of Leleboon, is well wooded and 188 feet high in the northern part.

SOUTH COAST OF SAMAR.

Sungi Point, the southeastern extremity of Samar, forms the southern end of Candolu Island. It is about 150 feet high and surrounded by reefs for about ½ mile; soundings of 19 and 26 feet are shown on

the chart about 1 mile southward of Sungi Point, and there is a 2½ fathom patch about 1 mile southeastward of the same point. The channel between Sungi Point and Handig Point, the northwestern extremity of Homonhon Island, 9 miles southwestward, is clean and deep, not less than 9 fathoms being found in it. The water is clear and the bottom may frequently be seen; this, added to the presence of tide rips and overfalls, has probably led to the reports of dangers in this channel.

The reefs which surround Sungi Point continue westward to within 1 mile of Manicani Island and then curve northeastward toward the town of Guiuan. They are very extensive, many places baring at low water and having between them numerous deep channels in which good anchorage, protected from the sea, may be obtained, but owing to the absence of any aids to navigation they are not available without local knowledge.

Directions.—Vessels from the eastward should give Sungi Point a berth of at least 1½ miles, and if bound for San Pedro Bay or intend to enter Guiuan by the southwest channel, steer 275° (274° mag.) until the southwest tangent to Manicani Island bears 320° (319° mag.), when the course may be shaped as desired.

Manicani Island, about 12 miles west-northwest of Sungi Point, is 534 feet high. It is surrounded by a reef less than ½ mile wide on all sides except the northwest, where it extends 5 miles northwestward with a greatest breadth of 2 miles and has on its end the islets Baul and Binabasalan.

Between the island and reef of Manicani and the main coast reef is a deep channel running about 8 miles northwest and southeast with several islets and shoals in it. Vessels of all sizes by carefully avoiding the coral patches can find anchorage in this channel under the lee of the islets. The southern entrance to this channel is between the southeast point of Manicani Island and a small shoal which is awash, lying a little more than 1 mile from it, and has depths of 12 and 14 fathoms.

At ¾ mile northeast of Manicani Island is a rock which dries at low water and which can be passed on either side, but the best course is to leave this rock and Cambasingan and Cabalarian to the southwest and Caninoan Islet to the northeast. Good anchorage may be found off the northeast side of Cabalarian Islet in 12 or 14 fathoms.

The northern entrance, between Balinatio Islet, near the north shore, and Baul and Binabasalan Islets, is ¾ mile wide and 18 to 20 fathoms deep. There is a small shoal with a least depth of 1½ fathoms and surrounded by deep water midway between Balinatio and Binabasalan Islet; in the channel between the reef ½ mile eastward from Binabasalan and the anchorage there are a number of shoal coral patches which are generally visible. The small islets in this vicinity are all white sand below and wooded above except Cambasingan, which is formed of sand and low rocks nearly awash.

Guiuan (chart 4467) is a small town on the mainland of Samar, about 10 miles northwestward of Sungi Point. The anchorage, though small, is well sheltered from southerly and southwesterly seas, but is exposed to the winds from these directions. Guiuan may be approached by two long, straight channels which join about 1½ miles southward of the town, whence to the anchorage the channel

is rendered narrow and tortuous by numerous reefs and shoals. There are a number of aids to navigation marking the dangers along these channels; their positions will be best understood by reference to the chart.

SOUTHEAST CHANNEL.—A beacon to be left to the eastward in entering marks the southwest side of a small reef bare at low water. It consists of a post surmounted by a square daymark painted white, with a 3-foot red square in the middle and is about 5 miles west-northwestward of Sungi Point.

A beacon to be left to the westward in entering marks the northeastern side of a large reef partly bare at low water. It consists of a post surmounted by a diamond-shaped daymark painted white, with a 3-foot black diamond in the middle and is about 6 miles west-northwestward of Sungi Point. This beacon should be given a berth of at least 300 yards.

A beacon to be left to the westward in entering marks the eastern side of a small, detached reef lying nearly 1 mile southeastward of Bar Islet. It consists of a post surmounted by a diamond-shaped daymark painted white, with 3-foot black diamond in the middle and is 1¼ miles west-southwestward of Raton Islet.

A black buoy moored in 9 fathoms immediately southeastward of a rock covered by 7 feet, lying $1\frac{7}{10}$ miles southwestward of the church at Guiuan, marks the junction of the southeast and southwest channels.

SOUTHWEST CHANNEL.—A beacon to be left to the northwestward in entering marks the southeastern edge of a large reef lying about 2 miles northeastward of Manicani Island. It consists of a post surmounted by a diamond-shaped day mark painted white, with a black diamond in the middle and is about 2 miles southwestward of Guiuan Church.

INNER CHANNEL.—A red buoy marks the extreme northwest edge of a large reef lying over 1 mile southwestward of Guiuan Church. Vessels entering must pass close northwestward of this buoy to avoid a small rock lying about 200 yards northwest from it.

A beacon to be left to the southeastward in entering marks a small rock on the south side of the channel. It consists of a post surmounted by a square day mark painted white, with a red square in the middle.

A black buoy marks the eastern side of a small shoal patch on the western side of the channel.

Directions.—Vessels entering from the eastward should round Sungi Point at a distance of not less than 1½ miles, and when it bears 91° (90° mag.), distant 1½ miles, steer 314° (313° mag.) for 3¾ miles, heading for the first beacon; pass it at a distance of about 200 yards and steer for the second beacon, 1 mile westward, which should be given a berth of not less than 300 yards, and steer for the beacon southeastward of Bar Islet, 2½ miles northwestward, which may be passed at a distance of 100 yards, and steer for the first black buoy, 1½ miles northwestward, thence close northwestward of the red buoy and beacon with the red center and southeastward of the second black buoy and anchor in 4 fathoms when the end of the wharf bears 91° (90° mag.), distant ½ mile.

Vessels from the westward should pass about ½ mile southward of Manicani Island and bring Guiuan Church and the highest point

on the range of hills behind it in line, bearing 48° (47° mag.), and steer in on this range, keeping a good lookout for the reefs on both sides, which partly bare at low water and at other times are generally marked by breakers. Pass ¼ mile southward of the beacon with a black diamond in the center, and when up with the first black buoy follow the previous direction.

Caution.—Strangers entering Guiuan are advised to take a pilot in case the buoys or beacons should be gone or out of position. Vessels should proceed slowly and cautiously, depending more on a good lookout and careful navigating than on the lead, as most of the dangers are steep-to.

Salcedo is at the head of the bay, about 9 miles northward of Manicani Island. The approach is narrow and intricate because of the numerous coral patches.

Quinapundan Bay, northwestward of Manicani Island, between Gigoso Point and Balinatio Islet, contains numerous islets and reefs, among which good, protected anchorages may be found; the best and most easily accessible appears to be in the eastern part of the bay. Vessels seeking anchorage are advised to pass about 600 yards westward of Balinatio and steer 348° (347° mag.) for about ¾ mile and good anchorage will be found in 12 or 14 fathoms; muddy bottom. Perfectly protected anchorage may be found farther northward by continuing on the same course, keeping a good lookout for reefs on both sides. When about 1¾ miles northward of Balinatio Islet the channel contracts to a width of about 400 yards with mangrove islets on either side and then widens out to a basin about ¾ mile in extent, having depths of 10 to 14 fathoms over a muddy bottom. Caution must be used in entering this anchorage, as the reefs are steep-to and the lead does not give any warning of their proximity.

Walker Shoal is a dangerous shoal with a least depth of 2 feet lying about 4 miles south-southeastward of Gigoso Point. It can be distinguished by the light-green color of the water.

Gigoso Point, 8 miles northwestward of Manicani Island, is low but rises to a height of 408 feet about ¾ mile inland.

From Gigoso Point the coast trends westward for 16½ miles to Capines Point, the eastern entrance to San Pedro Bay, and forms between these two points deep bays, with reefs and shoals surrounded by deep water in them. The villages along this coast offer few resources.

Sua Bay is 2 miles westward of Gigoso Point, between Cagbanilio Point and Sua Point.

Cablagna Point, 6 miles westward of Gigoso Point, is low and wooded.

Lucson Point, 2½ miles northwestward of Cablagna Point, is prominent and 400 feet high.

Lauaan Point, 3½ miles northwestward of Lucson Point, is low.

Capines Point is clear and steep-to and rises to a height of 400 feet within ¼ mile of the sea.

Alabat Point lies 1 mile west-northwest of Capines Point.

San Pedro Bay is described on page 337.

There are a number of dangerous shoals lying between Gigoso and Capines Points. A line drawn from 1 mile south of Manicani Island to 1 mile south of Capines Point, running 285° (284° mag.) and 105°

(104° mag.), will clear them all. The principal ones are Walker Shoal (previously described), one southward and one westward of Cablagna Point, and Calianan Shoal, extending 2 miles southward from Lauaan Point, about midway between Cablagna and Capines Points.

An extensive coral reef nearly awash lies nearly 1 mile southward of Cablagna Point. Gigoso Point, bearing 80° (79° mag.), clears the southern edge of this reef.

A shoal with a least depth of 1 fathom lies about 1 mile westward of Cablagna Point.

Calianan Shoal, with rocks awash, extends 2 miles southward from Lauaan Point. Cablagna Point, bearing 88° (87° mag.), clears the southern side of this shoal.

Homonhon Island, 9 miles southwestward of Sungi Point, is a crescent-shaped island with the concave side facing northeastward. The northwestern part of the island is 1,120 feet high and the southeastern 700 feet. The narrowest part of the island is near the middle, where it is 1¼ miles wide and 170 feet high. From a long distance southward Homonhon appears as two islands. The island is heavily wooded with small trees, with a narrow fringe of coconut trees along the shore where it is not too steep for them to grow. Homonhon is fringed by reefs for 50 to 100 yards except in Casogoran Bay, which is the large bay on the northeast side of the island, where they are 350 to 600 yards wide. There are no outlying dangers beyond a distance of ½ mile, and Homonhon Island can be skirted in safety at a distance of 1 mile. The island is very sparsely populated. Most of the inhabitants live in the village of Homonhon, at the head of Casogoran Bay. The chief product of the island is copra.

Montoconan Islet is a small, low islet covered with coconut trees, about ½ mile from the western shore of Homonhon, with which it is connected by a reef, part of which bares at low water. There are two small hills on the western side 95 and 109 feet high, respectively. Lying on the same reef and about 400 yards northeastward of Montoconan is a small islet with a few small bushes on it.

Homonhon Island offers no good anchorages and is seldom visited except by the smaller native craft. Vessels desiring to communicate with the village of Homonhon can anchor in 23 fathoms, coral and sand bottom, about 1 mile eastward of the village and ⅓ to ⅜ mile from shore. This is only a fair-weather anchorage; easterly swells roll in heavily, but it is partly protected from southeast swells. Landing may be made in a break in the reef in front of the village. Better landing can be made in a break in the reef about 1¼ miles northwestward of Homonhon; in this break there is a rock with 1 foot on it, marked by a wooden post, which should be left to northward in entering.

The best anchorage in the vicinity of Homonhon Island is eastward of the south end of Montoconan Islet, in the middle of the bight, in 6 to 11 fathoms; sandy bottom. Vessels will find shelter here from all winds except from south to southwest. The clearest approach to this anchorage is found by following the western shore of Homonhon at a distance of ¼ mile.

Suluan Island lies 10 miles southeastward of Sungi Point, Samar. Situated as it is—to windward during the northeast monsoon, at the

entrance to Surigao Strait, and being conspicuous—it is a good point to make for when approaching the strait from the Pacific. Near the northwest point are two hills, 178 and 204 feet high, respectively, and the eastern side is formed by a high coral ridge which attains a greatest elevation of 410 feet. This ridge has the same characteristic features as the long ridges from Matarinao Bay to Sungi Point. The southwestern half of the island is a low plain covered with coconut groves. From the northwest point a reef, partly bare at low water, extends ¾ mile in a southwest direction, and a similar reef, not so prominent, extends from the village of Granadas to the southern point of the island and has a general width of ½ mile. The coast on the north and east sides of the island are free from dangers and a vessel may approach within ½ mile with safety. There are eight small islets ranging in height from 7 to 163 feet lying close to the main island, with which they are all, with the exception of the southern two, connected by reefs. The village of Granadas lies on the western shore.

The only partly sheltered anchorage is off the southwest coast in 6 or 7 fathoms, sandy bottom, about ½ mile southward of the 204-foot hill on the northwest point and the same distance westward of the village. This anchorage is protected from winds from northwest through north and east to southeast. The best and about the only landing is on the shore line inside of the above-mentioned anchorage.

A group flashing light, visible 28 miles, is shown from a cylindrical concrete tower on the summit of Suluan Island, about ½ mile northward from the southeastern point.

The channel between Sungi Point and Suluan Island has depths of 10 to 25 fathoms, the deeper water being found nearer Suluan. The channel between Suluan and Homonhon is about 7 miles wide, and the bottom consists of a number of parallel ridges running north and south, which are covered with depths of 7 to 13 fathoms and have depths of 18 to 23 fathoms between them. In this channel the deeper water is also found nearer Suluan. With a smooth sea and a high sun these ridges are readily distinguished by the lighter color of the water and by the tide rips which they cause.

Surigao Strait is famous for having been traversed by Magellan when he crossed the Pacific Ocean and discovered the Philippine Islands in 1521. The strait is now less frequented than San Bernardino Strait, which is more to windward in the northeast monsoon. It is, however, more direct than that strait, but it obliges sailing vessels that take it, if they are bound for Manila, to work up the west coast of Negros and Panay and the east coast of Mindoro. It is of advantage to vessels going to the southern Philippines or to the Sulu Sea. The main strait is safe and deep throughout its length, and the shores of the islands that border it are steep-to.

WEST COAST OF SAMAR.

Balicuatro Point, the northwest point of Samar, is clean and steep-to.

From Balicuatro Point the coast trends south and west for 2½ miles to **Malalimon Point**, thence south and east for 31 miles to **Jibatan Point**. This coast is fairly clean and bold, the chart showing no dangers more than ½ mile from shore.

Lipata Point, 1½ miles southward of Malalimon Point, is high and rocky and bordered by a reef of sand and rock.

Burobodiongan Point, 3½ miles southward of Lipata Point, is covered with high trees. The tidal streams, which run 7½ knots at springs and 4 knots at neaps, strike the point with great force, producing violent eddies.

There is good anchorage in the northeast monsoon in the open bay of **Quinaguitman,** about 1 mile southeastward of Lipata Point; the depth of water in the northern part is 27 to 13 fathoms, and in this part of the anchorage there is a good stream from which water may be obtained. Vessels may also anchor off the ruins of the town of Allen, formerly La Granja, about 1 mile to the southward of Quinaguitman Bay, ½ mile out from shore, in 10 fathoms, sand bottom, with patches of coral. This is not a good heavy-weather anchorage.

The mouth of the Mauo River is about 2 miles southeastward of Burobodiongan Point. The shore between these two points is bordered with rocks, extending in places ¼ mile from shore. The entrance to the river is rocky, and the channel is close to the wooded bluff northward. It is about 20 yards wide between the inner end of the bluff and long reef to the southward, and there are 2½ fathoms at low water. Inside, a shoal which has 6 feet on its outer edge makes out from the village on the north bank. A sharp turn to the right as soon as the bow is inside of the reef is necessary to clear it. Above the reef there are 3 to 5 fathoms, but only 2½ can be counted on 50 yards above. This is a snug anchorage for vessels drawing 9 feet and 140 feet long, but in protracted storms with much rain, stumps and big trees may be looked for from upriver. Two fathoms may be carried to the falls 1 mile up, where boats may water very expeditiously. Large vessels may anchor outside. The best place is with the river well open; soundings less than 20 fathoms should be approached carefully. The ground is foul, both north and south of the bank about the mouth of the river, which is very limited in extent.

From Mauo River the coast trends south and east for 4 miles to Looc Point, the westerly entrance point to Looc Bay. This part of the coast forms the base of a high range of mountains covered with dark-green trees; the shore consists of sand and rock, covered with mangroves down to the water's edge. At ⅓ mile from the shore the depth is 7 fathoms, sand and rock.

Looc Bay is about ½ mile wide and ¾ mile deep, with 5 fathoms in the center; there are rocks off Looc Point, and the upper part of the bay is filled with reefs. **Canaguayon Islet** lies ¾ mile southward of Looc Point. Vessels of any size can find sheltered anchorage between it and the coast of Samar in good depth of water and good holding ground, but the space is limited.

The coast trends southerly 3 miles to Sojoton Point, just to the northward of which is a small steep-sided cove with a depth of 4 fathoms near the shore at the mouth of the Palanit River.

Sojoton Point is high and jagged, and has an islet of the same name off it at a distance of 50 yards.

From Sojoton Point the coast trends south and east for 7½ miles to **Malayoc Point**; for 1½ miles southward, as far as **Maglagabon**

Point, it is rocky, and from there to Malayoc it is steep-to. From Malayoc Point the coast trends southeastward for 10 miles to Jibatan Point; this part of the coast is high and clear. From Jibatan Point the coast trends easterly for about 3 miles to the mouth of the Calbayog River. **Binalio Point,** 5 miles from Malayoc Point, has a small reef about ¼ mile westward, and the small islet **Binalio** is ½ mile southwestward from the point.

Daraga Islet, 2½ miles farther on, is connected with the shore by a reef.

Damita Islet lies on the edge of a shoal 1½ miles west-northwestward of Jibatan Point and about ½ mile offshore. There are 6½ fathoms outside of it, and inside there are 2 and 4 fathoms, decreasing regularly to the shore. A bank begins at Jibatan Point and widens out to about 1 mile off the mouth of the Jibatan River, and then narrows down to about ¼ mile off the mouth of the Calbayog River.

Jibatan River (chart 4456), with 2 feet on the bar at low water and 6 to 12 feet inside, empties immediately eastward of Jibatan Point. Trinidad is on the east bank of the river about 1½ miles from the sea. From the mouth of the Jibatan River the coast trends easterly for about 3 miles to the mouth of the Calbayog River.

Calbayog, the largest town and principal hemp-shipping port on the island, is on the eastern side of the Calbayog River. The ruins of a long, wooden wharf extend southward of the town and form a prominent landmark. There is little water on the bar at the mouth of the river at low tide and about 5 feet at high tide and only small lighters can enter. Improvements to the bar are contemplated.

There is a light on the beach at the mouth of the river at the western end of the town of Calbayog.

Shoal water extends off some distance in front of the town, the 5-fathom curve being more than 1 mile southward of the light. Large vessels are advised not to go closer in, as the depths are irregular and in places the water shoals rapidly. Sailing vessels wishing to keep away from a lee shore during the southwest monsoon seek a sheltered anchorage in 12 or 14 fathoms in a bay on the north side of Libucan Daco Island and transfer their cargoes by small sailing lighters. Launches sometimes seek shelter here and also in the small harbor of Santo Nino, 12 miles southwestward of Calbayog.

From Calbayog the coast trends southeastward for 24 miles to Catbalogan, and is broken into bays with little depths in them and exposed to southwest winds. From Calbayog for 12 miles southeastward the shore is low and intersected by small streams. The **Gandara River,** the largest and most important river on the west coast of Samar, empties about 9 miles southeast of Calbayog. It is open to navigation at high water for launches under 90-foot length and 6-foot draft as far as the fork just above the town of Gandara. Launches of 2-foot draft can proceed to Peña Plata and to San Miguel on the north and south branches, respectively. The northern entrance carries the deepest water, 3 feet at low water, into the river. Inside the bar the depth is from 2 to 5 fathoms. The currents in the river are ordinarily small. Local fishermen can usually be obtained as pilots. The lower end of the **Sondara River** is an excellent harbor for small craft; otherwise it is of little importance,

its branches being narrow and crooked and navigable by small boats only. **Napalisan Island,** 161 feet high, lies on the western edge of the shoal water extending northwest of Palanas Point, and forms a good landmark for the entrance to the rivers.

There are a number of small towns along this coast, of which **Santa Margarita** and **Tarangnan** are the most important. **Tarangnan Point** is a prominent headland with the Tagdaranao Islands, 190 and 268 feet high, lying westward of it. Sheltered anchorage for small vessels may be found at the head of Cambatutay Bay and in Silanga Bay eastward of Buri Island. In fair weather anchorage may be had anywhere along this coast. The channel between the coast and the Libucan and Canahauan Islands is nearly 2 miles wide in the narrowest part and is moderately deep and free from danger. It is regularly used by the local traders.

Libucan Islands are a group of three islands and several smaller islets about 4 miles off the coast of Samar. Libucan Daco, the largest of the group, is 528 feet high. There is good anchorage in a bay on the north side of the island in 12 to 14 fathoms, soft mud, and vessels on the coast make for this anchorage when the southwest gales called collas begin to blow. Tangad Libucan and Libucan Gutiay are two small islands lying less than 1 mile northwestward of Libucan Daco. Kawayan, Moroporo, and Nagsanga are three small, rocky islets lying about ½ mile from the southwest side of Libucan Daco. Layalaya Islets are two rocky islets connected by a reef which dries at low water, lying 1 mile southeastward of Libucan Daco.

Lunod Rock, awash at low water, lies $\frac{9}{10}$ mile west-southwestward of the southeast point of Libucan Daco Island. **Uaray Vanoa Rocks,** awash at low water, lie ¾ mile southwestward of Libucan Gutiay Island. **Dapdap Reef,** awash at two points, with only a few feet between them, lies 1 mile southward of the Layalaya Islets. **Cambidsos Rocks** are two large, moderately high rocks lying 1 mile north of Canahauan Daco Island.

Canahauan Islands are a group of two large islands and several smaller ones about 4 miles from the coast of Samar. The Canahauan Islands offer good anchorage among them, sheltered from all winds, that of Port Aguirre affording excellent refuge during typhoon weather. As these islands lie 12 miles from Catbalogan and 15 miles from Calbayog, both towns on an open coast, this anchorage offers safe refuge for both. The inner anchorage area between Canahauan Daco and Timpasan is very small and the channel is narrow and crooked. The best entrance is from eastward, passing northward of Poro Island and westward of the two small islands lying southward of Canahauan Daco, anchoring in 9 to 11 fathoms in the center of the basin. This basin may also be approached from northward by small vessels drawing not over 10 feet. Protected anchorage may also be found between Batgongon and Timpasan Islands, and for large vessels in the area northward and eastward of Poro Island in 15 to 16 fathoms of water. The channel between Batgongon and Balading Islands is easily picked up at night and is deep and clear except for a rock lying about 60 yards west of the south end of the latter island. The passages between these islands are safe and deep. Vessels from northward should pass eastward and southward of Canmamot Island to avoid the rocks awash at low water lying about

¼ mile westward and northwestward of that island. A shoal with a least known depth of 4¼ fathoms lies ¾ mile westward of the south end of Boloang Island. The channel between this shoal and Bolo Rock northward of Cambaloi Island is ½ mile wide, deep and clear. Borobaloto Rock, the westernmost of the Canahauan Islands, is almost ¾ mile northwest of the western point of Timpasan Island, and is about 2 feet above high water. The channels between it and Timpasan and Tangad Islands are deep and clear.

Cagdullon Islands are two small, wooded islands lying about 1¼ miles westward of the south end of Buri Island. The western island is 90 feet high and the eastern 122 feet high. They can be rounded at a distance of ¼ mile, and the navigable channel between them and the reefs off the southern part of Buri Island is about ½ mile wide and 8 to 11 fathoms deep.

Buri Island is a small, irregularly shaped island about 1 mile in extent lying on the north side of the northern channel into Catbalogan; it is separated from Samar by a narrow channel nearly bare at low water. Buri is covered with grass and palms and broken up into several small hills, the highest of which, 243 feet, is on the eastern side.

Marisan and **Candongos Reefs** are two detached reefs, bare at low water, lying in the channel between the southern part of Buri Island and the Cagdullon Islands.

Silanga Bay, between the eastern side of Buri Island and Samar, affords excellent anchorage in from 3 to 5 fathoms, muddy bottom, sheltered from all except southerly winds. By keeping about 200 yards from the eastern side of Buri small craft can proceed farther north and find good shelter from all winds in 2½ fathoms; muddy bottom. This inner anchorage is much used by boats and small steamers from Catbalogan.

Lutao Reefs, lying in front of Catbalogan Harbor, are three dangerous, rocky ledges, the western one of which is covered only at extremely high tides; the others bare at low water and half tide. The northern extremity of the western reef, about 2½ miles westward of Catbalogan light, is marked by a red buoy. The eastern edge of the shoal on which these reefs lie is marked by a black buoy.

Pamuntangan Reef is a small reef, partly awash at low water, lying with its western edge about ¾ mile westward of Aguada Point; there is a 1½-fathom channel between this reef and the shore reef extending from Aguada Point. A red buoy marks the western edge of Pamuntangan Reef.

Quinituay Reef, partly awash at low water, lies ⅝ mile northwestward of the northern Darajuay Island. A red buoy marks the northern edge of Quinituay Reef.

Catbalogan, the capital of the Province of Samar, stands at the head of a small bay at the mouth of the Catbalogan River. It is small, of little commercial importance, and offers few resources. The harbor, which is simply an open roadstead exposed to the southwest, has a depth of 7 fathoms, shoaling gradually toward the shore. The western side of the mouth of the Catbalogan River is marked by a light.

Directions.—Vessels anchor anywhere in front of the town according to draft; a depth of 4½ fathoms is found about ½ mile from

shore. Vessels may approach the anchorage off Catbalogan by the channels north or south of the Lutao Reefs or by the channel between Darajuay Islands and the mainland. The channel northward from Lutao Reefs has already been described. To approach by the channel south of Lutao Reefs, Catbalogan light should be brought to bear 63° (62° mag.) before the larger Cagdullon Island bears anything westward of 316° (315° mag.). Steering for the light on this bearing a vessel should pass midway between the black buoy on Lutao Reefs and the red buoy on Pamuntangan Reef, giving them both a berth of about ⅛ mile. To approach by the Darajuay Channel, vessels should pass about ¼ mile eastward from the Darajuay Islands and steer 322° (321° mag.) until the light bears 52° (51° mag.), when it may be steered for and anchorage taken in any desired depth.

TYPHOON SIGNALS are shown from the signal station about ⅛ mile southward of the lighthouse.

Darajuay Islands are two small high islands lying about 1½ miles southwestward of Catbalogan. Between them and Samar there is a good, navigable channel about ½ mile wide which affords fairly sheltered anchorage. Little Darajuay, the northern island, is 168 feet high and wooded. Darajuay, the southern and larger island, is 312 feet high. It is grass covered with a few scattered palms; the northeastern side is partly wooded. There is a small sand spit on the northern side; elsewhere the shore line is a rocky ledge.

Maqueda and **Villareal Bays** are two large indentations lying southward of Catbalogan; they are shoal and of little value to navigation. Their shores are generally fringed with mangroves, and at their heads mud flats bare at low water to a considerable distance. The town of **Wright,** accessible only by small coasters, lies at the head of Maqueda Bay, and there are a number of small unimportant villages on the shores of both bays.

Majaba Island, off the entrance to Maqueda Bay, is clean and steep-to and 301 feet high.

Basiao Islands are three small islands lying about ¾ mile southeastward from Majaba Island. The northern island, 190 feet high, is wooded; the middle one, 131 feet high, is wooded along its eastern edge, and the southern and smallest one is low and covered with bushes and vines. Except at extreme high water the northern and middle islands are connected by a narrow shell beach and between the middle and southern islands there is a rocky ledge which bares at about half tide. On the eastern side of the northern and middle islands there are conspicuous, white, coral cliffs from 30 to 80 feet high, along the base of which are jagged rocks. A long, narrow, rocky ledge extends nearly 300 yards westward from the southern island, and from the middle island a shoal with a least depth of 2¾ fathoms extends about ½ mile northwestward, narrowing the channel between Majaba and the Basiao Islands to a width of about ⅓ mile. This channel is frequently used by coasting steamers.

A small shoal with a least depth of 2 fathoms lies about ¼ mile south-southwestward of Bonbon Point, the southeast end of Majaba Island.

Cambalot Reef, covered only at extremely high water, is a sharp, rocky ledge lying ⅝ mile southwestward of the western part of Majaba Island. The channel between Cambalot Reef and Majaba

has a depth of 15 fathoms, and that between Cambalot Reef and Buad Island a depth of 5 fathoms.

Parasan Island, about 7 miles west-southwestward of Catbalogan, is about 2 miles in extent and 446 feet in height; off the northern part there is a remarkable peninsula connected with the remainder of the island by a very narrow isthmus. Parasan Island is clean and steep-to on all sides and is separated from Daram Island by a very narrow channel, which has a least depth of 2½ fathoms at the narrowest point.

Parasan Harbor, on the south side of the island of the same name, is a well-sheltered harbor with depths of 10 to 15 fathoms; muddy bottom. This anchorage can be easily approached from the eastward; the western entrance is only about 75 yards wide and 2½ fathoms deep.

Taratara Island is a small island surrounded by deep water, lying about ½ mile from the northeast point of Parasan Island.

Daram Island, southward of Parasan Island, is very irregular in outline, the shore line being cut up by numerous bays, in some of which can be found good sheltered anchorage, according to the season of the year. The land immediately north of the isthmus is 622 feet high and that southward 1,258 feet. Lying close to the shore of Daram Island are a number of small, high, unimportant islands.

Buad Island, eastward of Daram Island, is well wooded and hilly, rising in the southeastern part to a height of 1,174 feet. **Zumarraga**, at the southwest end of the island, is sheltered by high hills and has roomy anchorage for all classes of vessels; this anchorage can be approached only from the northward by heavy-draft ships. There are a large number of small islands lying close to Buad Island, the location of which can be best understood by reference to the chart.

Zumarraga Channel, between Daram and Buad Islands, has a least depth of 5¾ fathoms.

Buad Channel, eastward of Buad Island, is the chnnel usually taken by coasting vessels between Catbalogan and Daram Channel.

Aocon Islets are two small wooded islets, connected by a sand spit, lying at the head of Daram Channel, about ¾ mile eastward from the southern part of Daram Island; the northern islet is 225 feet high. The usual channel for coasting vessels lies eastward of Aocon Islets. A red buoy is moored in 4 fathoms, coral bottom, 300 yards 61° (60° mag.) from the southeast point of the northern islet.

Daram Channel, lying between the south end of Daram Island and Samar, has a least depth of 3 fathoms, immediately northward from the Aocon Islets.

Bacsal Islands are two small high, clean, wooded islands lying close to the south end of Daram Island. The channel between them and Daram is clear with the exception of a small 2½-fathom patch lying about ¼ mile northeastward from the western island.

From Dulugdug Point, the eastern entrance to the southern end of Daram Channel to Diutay Point, the northern entrance point to Janabatas Channel, the distance is about 2½ miles. The coast line is very irregular but the shore is clean and bold.

Janabatas Channel (chart 4464), between Samar and Leyte, is 2¾ miles wide at the entrance between Diutay Point, Samar, and Baluarte Point, Leyte, and extends about 8 miles eastward to Santa Rita

Island, at the northern end of San Juanico Strait. The land on both sides of the entrance is high and well wooded. **Mount Busay**, about 2 miles southeastward of Baluarte Point, is 1,830 feet high, and forms a prominent landmark to steer for in making the entrance to the channel. The shore line on both sides of the channel is very irregular, being indented by a number of bays into which small streams discharge; they are all shoal and of little value to navigation. Numerous small villages lie scattered along the shores, of which **Santa Rita**, on Samar, and **Babatngon**, **Samputan**, and **Malibago**, on Leyte, appear to be the most important. There are a number of islets and much shoal water in the channel, the depths varying from 5 fathoms at the entrance to 2 fathoms northeast of Navahay Island.

Diutay Point, on the northern side of the entrance, is formed by a small islet 82 feet high which lies close to the shore, about 1 mile southeast of Nabatas Point. This islet is clean and steep-to on its seaward side but is connected with the land by a reef bare at low water.

Baluarte Point, on the southern side of the entrance, rises at a distance of ½ mile inland to a height of 470 feet. It is clean and steep-to and may be rounded at a distance of ¼ mile with safety.

Calaguan Island, on the northeast side of Baluarte Point, is fringed with mangroves and 188 feet high; it is connected with Baluarte Point by a reef mostly bare at low water.

Canauay Island, on the south side of the channel, about 2 miles eastward of Baluarte Point, is about ¼ mile in extent and 117 feet high in the northwest part. It is covered with trees except on the northern slope of the 117-foot hill, which is cultivated. There is a light on the north side of Canauay Island.

Pilotage for vessels passing through San Juanico Strait is optional. The rate is ₱2 per foot, and vessels employing them are not required to pay the berthing fee at Tacloban, which is otherwise compulsory. Pilots may be obtained at Canauay Island and at Tacloban, and strangers are advised to employ them.

Ivantacut Island, about 1½ miles east-northeastward of Canauay Light, is small, low, rocky, covered with bushes, and is steep-to on its northern side. The usual track of vessels lies about ¼ mile northward from it.

Small craft sometimes use the channel southward of Ivantacut, but the bottom is very uneven and rocky and, as little is gained by going through it, its use is not advised.

Dabun Island is a small islet less than ⅛ mile in extent, lying about 1½ miles eastward of Ivantacut. It is wooded, 112 feet high, and is clean on its southern side, but care must be taken to avoid the long northwestward extension of the rocky ledge westward from it which bares at low water. About ¾ mile westward of this island and northward of the high hill at the northern extremity of Caltagan Island is a rocky spot covered by 1½ fathoms.

Caltagan Island lies about 1 mile southwest of Dabun Island close to the shore of Leyte, from which it is separated by a narrow boat channel. Caltagan Island is fringed with mangroves and 179 feet high near its northern end.

Navahay Island, with its northern end over ¾ mile south-southeastward of Dabun Island, is wooded and 111 feet high. A small, rocky

patch, with a least depth of ½ fathom and surrounded by depths of 2 and 2½ fathoms, lies ¾ mile eastward of the northern end of Navahay Island.

Samputan Pass, between Samputan Point and Navahay Island, has a least depth of 3½ fathoms, and at the narrowest point is about 200 yards wide between the 3-fathom curves. Two sets of range marks formed by three beacons on Samputan Point indicate the mid-channel courses through Samputan Pass. The range marks for the southeastern reach when in line bear 146° (145° mag.), and those for the southwestern reach 251° (250° mag.).

The rear beacon for both ranges is a steel column on the hillside 200 feet above high water, carrying daymarks facing both reaches of the channel.

These ranges lead through the middle of Samputan Pass in not less than 3½ fathoms of water. Samputan Point should be given a berth of 200 to 250 yards when changing from one range to the other.

Santa Rita Island, at the head of Janabatas Channel, is small, over 100 feet high, clean on the southern side, but surrounded on the other sides by a narrow reef, widest on its northwestern side. It may be recognized by an old fort and some houses on it.

Bacol Island, lying close to the coast of Leyte, from which it is separated by a narrow boat channel fringed with mangroves, is about 1½ miles in extent and composed of low, wooded hills and mangrove swamps. A red buoy lies about 400 yards northward of the northern end of Bacol Island to mark the southern side of the entrance to San Juanico Strait. The channel between Santa Rita Island and this buoy is about 400 yards wide.

Nababuy Island lies at the head of San Juanico Strait and divides the entrance into two channels, of which the channel northward and eastward of it is generally used. The channel southward of Nababuy is sometimes used by small vessels when the tide serves, care being taken to avoid a rocky ledge which bares at half tide, southwestward of Nababuy, and the fringing reefs off Bacol Island.

Anajao Island is a small island 54 feet high, lying about 400 yards southeastward of Santa Rita Island. Its northwest extremity should be given a berth of about 150 yards.

San Juanico Strait, connecting Janabatas Channel with Tacloban Harbor, is about 12 miles long in a general north and south direction. It has an average width of from ¼ to ½ mile, reduced in two places to barely 200 yards, and carries a varying depth of from 5 to 15 fathoms. The shores are low and fringed with mangroves. A multitude of islets and shoals confine the channels. The flood tide sets north and ebb tide south, and at times attains a velocity of from 4 to 5 knots in some parts of the strait, forming violent eddies and tide rips. There are a number of small villages on both sides of the strait.

Dangers.—To attempt to describe the dangers in detail, in absence of any well-defined landmarks, would only cause confusion. The tracks and the dangers on both sides of them can be best understood by reference to the chart. Only the aids to navigation and a few of the more prominent dangers will be mentioned.

Silaga Beacon marks a small, rocky patch, which bares at low water, lying ¼ mile southwest of the mouth of the Silaga River and ⅓ mile eastward of Nababuy Island. About ¼ mile southward of

Silaga Beacon is a dangerous, rocky patch with a least depth of ¼ fathom.

Uban Point Beacon marks the dangers on the eastern side of the channel nearly opposite Uban Point. The channel which lies between this beacon and a small reef, bare at low water, westward from it, is only about 200 yards wide.

Cauayan Point Beacon marks a dangerous reef lying about 200 yards southeastward of the smaller Bagasumbut Island. Vessels passing this beacon should favor the Samar side of the channel, where the best water is found.

A black can buoy in 5 fathoms, about 1½ miles southward of Cauayan Beacon, marks the western limit of a dangerous reef, with a least depth of ¼ fathom. The channel between this buoy and a 2¾-fathom spot lying southwestward of it is about 300 yards wide.

A small, rocky patch, with a least depth of 2¾ fathoms, lies in the middle of the channel, about 700 yards north-northwestward of the north end of Lazaretto Island. Tacloban light, bearing 139° (138° mag.), carries a vessel in the best water between this rocky patch and the shoal water on the Samar side.

NORTH COAST OF LEYTE.

Leyte, situated between Cebu and Samar, is generally mountainous, but contains several large and fertile valleys. It is the eighth island in the archipelago in point of size and has an area of 2,722 square statute miles. The prevailing geological formation is volcanic, and several of the mountains are the extinct craters of volcanoes. The mountains are covered with forests. The climate, though hot, is healthy. Typhoons occur and do great damage. The rivers are small and unfit for navigation, but are extensively applied to irrigation. The chief products are hemp and copra. Tacloban, the capital and principal port, is on the eastern coast at the southern entrance to San Juanico Strait, which separates Leyte from Samar.

Between Baluarte Point, the southern entrance point to Janabatas Channel, and the eastern entrance to Biliran Strait, 20 miles westward, the coast recedes southward about 9 miles, forming **Carigara Bay**. The shore in the eastern part of the bay is faced by shoal water extending ¾ mile in places. The western shore of the bay is clean and steep-to. The entire bay is clear and deep and the charts show no danger more than ¾ mile from shore, with the exception of a small shoal patch, with a least depth of 2½ fathoms, lying 1 mile north-northwestward of Jalaba Point, in the southeast part of the bay. There is a rock awash about ¼ mile inshore from this shoal.

Barugo is a small town about 8 miles southwestward of Baluarte Point. Anchorage can be found in 8 fathoms about 1 mile from shore, with a large, white storehouse bearing 170° (169° mag.). Shoal water extends about ¾ mile from the western end of the town.

Carigara is at the head of the bay. Vessels are obliged to anchor about ¾ mile from shore because of shoal water in front of the town. The cable from Catbalogan lands at the river mouth near the light structure. A fixed red light, visible 9 miles, is shown from a white concrete pillar on the sand spit between the river and bay.

From Carigara the coast trends northwestward with a curve westward for 11½ miles to Talairan Point and thence west-northwestward for 4 miles to the entrance to the Biliran Strait. This coast appears to be clean and steep-to. **Pacdahauan Peak**, 2,088 feet high, about 1¼ miles westward of Talairan Point, and another peak, 1,871 feet high, lying close to it, form excellent landmarks.

Calumpijan Islet is a small steep-to islet about 100 feet high lying nearly 1 mile eastward of Talairan Point, from which it is separated by a deep, clear channel.

Biliran Strait, separating Biliran Island from Leyte, will be described in connection with Biliran Island.

From the south side of Biliran Strait the coast trends southwestward and southward for 5 miles to the mouth of the Palapay River and thence northwestward for 7 miles to Uson Point forming Leyte Bay. The town of **Leyte** stands near the head of the bay. There is a stone mole extending about 400 yards westward from the town with sufficient water at high tide at its end for small craft. The greater part of **Leyte Bay** is filled with shoal water, leaving a narrow, tortuous channel having a least depth of 1¼ fathoms leading to the mole at the town of Leyte.

From Uson Point the coast continues northwestward for 7½ miles to Rabin Point, and is generally clean and steep-to and free from offlying dangers.

Rabin Point, the northwestern extremity of Leyte, is the termination of a high, wooded promontory. A bank with 7 fathoms at its edge extends nearly ¾ mile northward from it.

BILIRAN AND ADJACENT ISLANDS.

Biliran Island, off the northern coast of Leyte, from which it is separated by Biliran Strait, is of oval shape, about 20 miles long in a northwest-and-southeast direction and 11 miles wide. It is very mountainous and the hills and peaks are heavily wooded. **Mount Suiro**, the highest point on the island, is in the southeastern part and 4,265 feet high. **Mount Naliwatan**, in the northeastern part of the island, is 4,230 feet high and is very prominent, having the shape of a cone as seen from the westward. There are a number of small islets and banks off the northwest part of the island. The entire coast of Biliran is clean and can be approached anywhere to ½ mile except in Biliran Strait.

Tagampul Islet, lying about 2 miles north of Buhoc Point, the northwestern extremity of Biliran, is very small and apparently clean, with the exception of some rocks ¼ mile northeastward of it.

Remus Rock lies about ½ mile northward of Tagampul Islet. It is of small extent and has a least known depth of 1½ fathoms.

Tomasa Islet lies about ⅗ mile southeastward of Tagampul Islet; it is very small and has a shoal off its northeast side.

Genuruan Islet lies about 1½ miles eastward of Buhoc Point and less than ½ mile from shore.

Buhoc Point, the northwestern point of Biliran Island, is clean, steep-to, and 360 feet high. From Buhoc Point to the village of Telegrafo, ¾ mile southward and eastward and for ¼ mile beyond, the shore line is rocky. Just westward of Telegrafo there are some conspicuous reddish-brown bluffs about 200 feet high.

From Buhoc Point the coast trends southeastward for about 15 miles to Biliran Strait, and is generally low, with rocky points and gravel beaches in the coves between. Beyond Saban Point the shore line is straighter and is broken with shingle beaches alternating with small mangrove coves. The town of **Naval** and the village of **Almeria** and a number of smaller villages lie on this coast.

Tincansan Islet lies about 300 yards westward of Buhoc Point; the channel between them is clear and has a depth of 16 fathoms in the middle. It is about ½ mile long northwest and southeast and 260 feet high.

Calutan Islet lies about 2½ miles southward of Buhoc Point and 1 mile southwestward of Agta Point. It is very small, bold, and rocky, and 126 feet high.

Caygan Islet is a small, bold, rocky islet lying about ¾ mile westward of the village of Almeria. It is about ⅜ mile long east and west, narrow, and rises at its western and eastern extremities to hills 133 and 123 feet high, respectively. The channel between it and the shore reef in front of Almeria is over ¼ mile wide and has a depth of 18 fathoms in the middle.

Pilar Rocks are a mass of rocks, the highest about 6 feet, about ½ mile westward of Caygan Islet.

A small, detached shoal with 2½ fathoms lies about 1 mile southeastward of Saban Point and ½ mile from shore.

Biliran is a small town on the south side of Biliran Island, about ⅜ mile westward of the strait. A steep-to bank covered by 1 fathom or less, with 5 fathoms at the outer edge, extends about 1 mile southward from the town.

Culajit Islet, lying about ⅜ mile southward from the town of Biliran, is less than 100 yards in extent, rocky, and covered with mangroves. It is surrounded by depths of 3½ to 7 fathoms.

Anchorage for communicating with Biliran may be found in 3 fathoms, muddy bottom, about ¼ mile westward of Culajit Islet. It is not prudent to anchor farther northward, as the depths decrease rapidly.

Poro Islet lies less than ¼ mile southward of the southern extremity of Biliran Island, with which it is connected by a reef partly bare at low water. It is about ¼ mile in extent, rocky and bold on the southern side, and has a fringe of mangroves on the northeastern side. It is planted with hemp and cocoanut trees.

Lagnay Islet is a very small rocky islet covered with bushes, lying on the reef about ¼ mile northeastward of Poro Islet.

Biliran Strait (chart 4456), between Poro Islet and the island of Leyte, is in the narrowest part only 118 yards wide from shore to shore. At this point a sharp-pointed reef extends 45 yards from the Leyte side, narrowing the channel to about 75 yards. The best water, 2¾ fathoms, is found within 50 yards of Poro Islet. Outside of the eastern entrance to the strait the Leyte side should be favored to avoid the reef and shoal water off the southeast end of Poro Islet. Caution must be exercised in using this strait, as at times the tide runs through it with considerable velocity.

Magbagun Cove, about 1½ miles northeastward of Poro Islet, affords good sheltered anchorage in 11 fathoms, muddy bottom. A small patch with 1 fathom lies about ½ mile southwestward of Mag-

bagun Point, on the eastern side of the entrance; between this patch and the reef extending southward from Magbagun Point there is a deep channel 400 yards wide.

The eastern and northern sides of Biliran are steep-to and free from dangers. A number of towns are on this coast, of which **Caibiran** and **Culaba** are the principal ones. They are ports of call for several small steamers that carry the hemp and copra produced on the island to Iloilo or Cebu.

An abundant supply of good water may be obtained from a spring on the east coast about ¼ mile southward of Gamay Point. The locality may be identified by a white beacon, visible about 3 or 4 miles. The water is brought from the spring by 2½-inch piping, terminating near the beacon. To water, vessels should steer for the beacon on a 293° (292° mag.) course, anchor in 20 fathoms, and haul the stern into a depth of about 3 fathoms by means of stern lines to the shore. From this position about 300 feet of hose will be required to reach the pipe.

WEST COAST OF LEYTE.

The west coast of Leyte is in general safe and steep-to, the fringing reefs in no place exceeding ½ mile in width, excepting between Canaguayan Point, at the entrance to Port Palompon, and Duljugan Point, 8 miles southward, where they extend about 2 miles and surround several small mangrove-covered islets. A chain of mountains runs parallel with the coast about 5 miles inland. The highest point in the island is probably **Mount Majuyag**, a peak 12½ miles eastward from Ormoc, which is 4,422 feet high.

Gigantangan Island, westward of Rabin Point, is wooded and 150 feet high in the center. It is fringed by a very narrow steep-to reef. The channel between it and Leyte is 1½ miles wide, deep, and clear.

From Rabin Point the coast trends southwestward for 2 miles to Dungun Point and is low and sandy, and thence southeastward for about 8 miles to Matung Point, at the entrance to San Isidro Bay, and is generally fringed by a narrow steep-to reef. **Taglauigan, Daja**, and **Tinago** are small coves blocked with reefs on the latter section of the coast; villages of the same names as the coves lie at their heads.

San Isidro Bay lies southward of Matung Point; the middle of the bay is deep and affords good anchorage during the northeast monsoon, but the head is filled with shoals and mud flats bare at low water. The town of San Isidro, at the head of the bay, has a long, stone mole extending from it.

From Sangabon Point, the south entrance to San Isidro Bay, the coast trends southward with a curve eastward for 20 miles to Canaguayan Point, at the entrance to Port Palompon. Between Sangabon Point and Canapog Point, 10½ miles southward, there are four small bays and a number of coves. These bays are quite conspicuous, the entrances being generally marked by bluffs from 50 to 75 feet high.

Arevalo Bay, about 2 miles southward of San Isidro Bay, is nearly blocked with reefs and shoal water; the village of the same name lies in the southeast part of the bay.

Pulingbato Hill, 2½ miles southward of Arevalo Bay and ¾ mile from the shore, is 750 feet high and forms an excellent landmark.

The bluffs and rocks westward from it are higher and steeper than those at the entrances to the bays.

Tabango Bay, about 4 miles southward of Arevalo Bay, is nearly blocked by reefs; the village of Tabango lies at its head.

Campopo Bay lies about 1 mile southeastward of Tabango Bay, from which it is separated by Liog Point, over 100 feet high. More than half of this bay is filled with reefs and shoal water. The village of Masisi lies at its head.

Dauajon Islet is a small islet 84 feet high, nearly 1 mile southwestward of Burabud Point, the southern entrance point to Campopo Bay and ¾ mile from shore. The channel between it and Leyte is deep and clear. It is steep-to except to the northwest, where 4½ fathoms is found at a distance of ¼ mile.

Silad Bay, about 3 miles southward of Campopo Bay, is about ¾ mile in extent, and its shores are fringed by a wide reef bare at low water. The village of Silad lies on the southern shore of the bay.

From Canapog Point to Canaguayan Point, a distance of about 10 miles, the shore line is more regular. There are no off-lying dangers, and this coast can be safely navigated at a distance of ½ mile.

Canaguayan Point, the northern entrance point to Port Palompon, is the most salient point in this vicinity. It is broad, flat, and low, covered with coconuts and fringed with mangroves. It is surrounded by reefs for $3\frac{8}{10}$ miles, and from the northwestern part a bank with 3¼ fathoms at its edge extends about ⅝ mile northwestward.

Palompon (chart 4456) is a small town on the eastern side of Port Palompon, about ¾ mile southeastward of Canaguayan Point. There is a limited anchorage in front of the town, protected from westerly winds and seas by Taboc Island and its surrounding reefs. The entrance to Port Palompon, between the reefs surrounding Taboc Island, which extend about ½ mile northwestward from it and those surrounding Canaguayan Point, is about ¼ mile wide, which width is gradually reduced to ⅛ mile in front of the town. The depth at the entrance is over 20 fathoms, and it decreases gradually until off the wharf, the best anchorage, where there is 9 fathoms. From this point southward the depth gradually decreases, and off Gumalac Island there is only 2 fathoms. A light, visible 8 miles, is shown from a white, concrete pillar on the beach in front of the town northward of the church.

Directions.—To enter Port Palompon, the church, which is very prominent, should be brought to bear 114° (113° mag.) when well offshore and steered for until Canaguayan Point bears 46° (45° mag.). From this position steer 105° (104° mag.), heading for the light and keeping a good lookout for the reefs on either side, which show up well at low water and are generally marked by fish traps and bamboos with bushy tops. This course should carry a vessel about midway between the reefs surrounding Canaguayan Point and Taboc Island. When the wharf at Palompon bears 161° (160° mag.), it should be steered for and anchorage taken up in mid-channel in 9 fathoms, mud bottom, 100 to 150 yards westward of it.

Taboc Island, and **Gumalac Island** southward of it, are low, wooded islands lying on the same reef which extends over ½ mile westward of the islands in places.

Cabgan is a similar but smaller island lying southward of Gumalac; it is also surrounded by reefs which extend over ½ mile seaward.

The reefs which surround the above islands and fringe the shore continue southward to Duljugan Point, 8¾ miles southward of Canaguayan Point. These reefs attain their greatest width, about 2 miles, northwestward of Duljugan Point. A number of vessels have struck on this reef, and, to avoid accidents, mariners are advised when rounding it to keep Canaguayan Point bearing nothing northward of 14° (13° mag.) and Duljugan Point nothing southward of 111° (110° mag.).

Duljugan Point, the southwestern extremity of the land in this vicinity, is low and flat. The reef which fringes the coast from Taboc Island terminates here and the south side of the point is clean and steep-to. Mangroves grow out on the reef westward of Duljugan Point and surround a small islet lying about ¾ mile from the land, giving it the appearance of forming part of the point.

Dupon Bay, 2 miles eastward of Duljugan Point, is a spacious harbor. The depth at the entrance is 31 fathoms, decreasing toward the head, which is foul. The village of Quiot lies on the eastern shore of the bay. Good anchorage may be found in 8 fathoms about ½ mile off the western shore.

Matlang Bay, about 1 mile eastward of Dupon Bay, is small and well sheltered from all except southerly winds. The anchorage area is restricted by reefs from both sides and at the head. The village of Matlang lies on the eastern entrance point.

Catunangan Point, 4 miles eastward of Matlang Bay, is low, flat, fringed with mangroves and skirted by a very narrow, steep-to, coral reef. The shores in this vicinity may be safely approached to a distance of ½ mile.

Tidal currents.—The flood stream from the northward passes from west to east in the channel between Ponson Island and Catunangan Point, and curves around the island to the southward. The flood stream from the southward, which has entered by Surigao Strait, meets the flood stream from the northward about 5 miles south of the Camotes Islands.

The **Camotes Islands**, consisting of Ponson, Poro, and Pacijan Islands and the small islet Talong, lie southward of Catunangan Point. They are, as a rule, fringed with narrow steep-to coral reefs with deep water close up to them. The channel between them and the coast of Leyte is deep and clear. There are no good anchorages in the entire group.

The Camotes Islands form part of the Province of Cebu and have a population of about 21,000, distributed among four small towns and a number of villages. They are very poor and of little commercial importance, only a few small sailing craft calling at the larger towns.

Ponson Island, the most northerly island of the group, lies with its northeast extremity 4½ miles southeast of Catunangan Point. It is 726 feet high. The reef which fringes its coasts is nowhere over ¼ mile in width, except in one place, on the southeast coast, where there is a small bight from which the reef extends ¾ mile. The town of Pilar is on the northeast end of the island. A stone mole, 400 feet long, with a small house at the end, extends off in front of the town; there is a depth of 5 feet at the end of it. In fine weather an indifferent anchorage may be found off the end of the mole in 19 or 20 fathoms.

Cauit is on a conspicuous sandy beach on the southwest point of the island. Anchorage may be had off Cauit, but necessarily very close in because of the great depth of water; this anchorage should be approached cautiously as the bank is very steep. In case of necessity anchorage may also be found off Linao and Dapdap on the northwest coast.

Cauit Strait, between Ponson and Poro Islands, is about 2 miles wide, but its navigable width is reduced to about 1 mile by Poro Shoal, which extends 1½ miles northward from Poro Island. The channel, which runs immediately southward of Ponson Island, is clear and deep. At times the tidal currents run with a velocity of 2 to 3 knots, the flood stream setting southeast and the ebb northwest.

Poro Shoal is a large coral reef extending about 1½ miles from the northeast coast of Poro Island. With the exception of three small patches of 1¼, 1½, and 2¾ fathoms, the average depth over the shoal is 3 to 5 fathoms. Small vessels will find a good 4-fathom channel between the shoal and Poro Island by keeping about 600 yards from the coast.

Hermosa Bank is a very small detached bank, with a least depth of 6½ fathoms and deep water all around, about 1 mile eastward of Hermosa Point, the eastern extremity of Poro Island.

Poro Island lies about 2 miles southwest of Ponson Island. **Mount Three Peaks,** near the south side of the island, nearly midway between the ends, is 1,282 feet high. The coasts of Poro are fringed by a narrow, steep-to coral reef, except on the northeast side, where Poro Shoal extends into Cauit Strait, and on the western end, where it is connected with Pacijan Island by coral reefs bare at low water. Tudela and Poro, 3½ miles westward of it, are on the south side of this island. The best anchorage in the group will be found off Tudela in 7 to 15 fathoms; mud and coral bottom. A similar anchorage will be found off Poro; both of these anchorages are exposed to southerly winds.

Pacijan Island lies immediately westward of Poro Island. The southern part of the island is 811 feet high, and near the northern there is a small flat hill 335 feet high; between these hills is a large brackish lake with a depth of about 2 fathoms. The town of San Francisco lies on the eastern extremity of the island; it is connected with Poro Island by a bridge. The bays formed north and south of the town by the east end of Pacijan and the west end of Poro are nearly blocked by reefs which bare 1 mile from the bridge in either direction. Cargo for San Francisco is usually landed in front of a small, white house on Puertovillo Point; a wagon road leads from there to town, distant about 1½ miles.

Talong Islet is a small, irregularly shaped islet 75 feet high, about 600 yards northward of the northwest point of Pacijan Island. The navigable channel between it and Pacijan is reduced by reefs on either side to a width of about 300 yards.

Ormoc Bay, eastward of Catunangan Point, is deep and free from dangers, the narrow reefs which fringe the shores being steep-to. Anchorage may be found all around the shores of the bay in 8 to 15 fathoms with good holding ground. Excepting off the delta of the Bao River and in the bight of Port Bello the shores may be approached to ¼ mile by vessels of any draft.

The town of **Ormoc**, in the northeastern part of the bay, at the base of a slope gradually ascending eastward, is the largest town of western Leyte and a place of some commercial importance. The cable from Cebu lands here. A fixed red light, visible 7 miles, is shown from a white concrete pillar just back from the beach at Ormoc.

The usual anchorage for Ormoc is in front of the town in 15 fathoms, hard bottom, about 600 or 700 yards from the beach; inshore of this the water shoals rapidly.

Port Bello, in the northwest part of Ormoc Bay, affords an anchorage in the southwest monsoon in 9 to 12 fathoms; mud bottom. The village of **Biasong** lies at the head of the port.

From Ormoc the coast trends southeasterly, with a bend eastward for 22 miles to the town of Baybay. This coast is low and consists of steep beaches of cobblestones and small bowlders, with deep water close-to. Near the coast are heavily wooded hills from 1,000 to 2,000 feet high, and immediately back of them is a mountain range from 3,000 to 4,000 feet high, running parallel to the coast.

Baybay is a small town near the mouth of the Pangbaganan River; it is a port of call for the coasting steamers. Anchorage, protected from all winds except from the westward, may be found in 12 to 15 fathoms, muddy bottom, about ½ mile westward of the town.

From Baybay the coast line curves to form a bay about 1 mile deep between Baybay and the reefs off Catarman Point, 2½ miles southwestward. A noticeable hill, 316 feet, stands on the eastern shore of this bay.

A small coral reef with a least depth of 1 fathom lies 1¾ miles south-southwestward of Baybay. There is good anchorage back of the reef and also off the village of Pumpungan, at the head of the bay, in 6 to 10 fathoms; muddy bottom.

Catarman Point is fringed by a reef which extends nearly ½ mile northwestward. From this point the coast trends southward with a bend eastward for 10 miles to Amogotada Point. From Catarman Point to the village of Guadalupe, 6 miles southward, the coast is coarse-gravel beach backed by hills from 600 to 2,000 feet high. The water is deep close to shore.

A reef covered by a least depth of 1½ fathoms lies west-southwestward of the village of Guadalupe, and another reef, bare at low water, lies 1 mile southwestward of the same point and ½ mile from shore.

Inopacan is a small town, 8½ miles southward of Catarman Point, on the north side of Amogotada Point.

Amogotada Point is a low, flat point fringed with mangroves and covered with coconut trees. It is skirted by reefs to a distance of nearly 800 yards with deep water close up to them. **Mount Bontoc**, a very conspicuous, steep, flat-crowned hill, 665 feet high, lies immediately south of Amogotada Point; when first seen from northward it appears as an island and is liable to be mistaken for the point, which is quite low.

Cuatro Islands are a group of four islets lying west and northwest of Amogotada Point. The channels between the islands and between them and the coast of Leyte are deep and clear. **Himuquitan Islet**, the southern and largest, lies 2½ miles westward of Amogotada

Point; it is 328 feet high, very conspicuous, and fringed by a narrow, steep-to, coral reef. **Apit Islet** lies 1½ miles north of Himuquitan; it is 150 feet high and fringed by a narrow reef. **Mahaba Islet** lies about 2 miles northwest of Apit; it is 137 feet high and fringed by a reef which on the south side extends to a distance of nearly ½ mile. **Daquio Islet** lies about 1½ miles north-northwest of Apit. It is low and sandy and 40 feet high to the tops of the trees; it is surrounded by a reef which on the northwest end extends over ¼ mile.

From Amogotada Point the coast trends southward for 4½ miles to Binobolang Point; thence continues with a deep curve eastward for 15 miles in the same direction to Green Point, the southwestern extremity of Leyte. Along this coast the bottom shelves off more gradually, the 10-fathom curve being found in some places more than ½ mile from the shore.

Hindang is a small town about 3 miles southward of Amogotada Point. The shore reef widens in this vicinity to about 600 yards. The usual anchorage for Hindang is about ½ mile from shore in 7 to 10 fathoms, with the church bearing 141° (140° mag.).

The small and unimportant towns of **Hilongos, Bato, Matalom,** and **Cajagnaan** lie between Hindang and Green Point.

Canigao Island lies about 1 mile from shore and 6 miles northwestward of Green Point. It is about 600 yards in extent, low, and covered with coconut trees. It lies on the northeastern edge of a reef 1 mile long north and south and nearly ½ mile wide at the southern end. There is a light on the northeast point of the island.

The channel, between Canigao Island and Leyte, is nearly 1 mile wide, clean, and has depths of 9 to 14 fathoms in it.

Abel Reef, with a least depth of 3¾ fathoms, lies 2 miles southward of Canigao Island. Adam and Eve Reefs and Cain Shoal, lying between Canigao Island and Danajon Bank, have already been described.

Carmen Shoal, on which the steamer *N. S. del Carmen* was reported to have struck in 1891, formerly shown on the charts about south by west, distant 4 miles from Canigao Island, and marked "position doubtful", does not exist in that position, the least water in that vicinity being 9½ fathoms. The sunken rock reported by the U. S. S. *Bennington* as lying ¼ mile from the shore off Green Point has been investigated and found to be the termination of the shore reef; it has ½ fathom of water over it and 6 fathoms immediately outside. The natives of the neighboring village of Guadalupe state that this is the rock on which the *N. S. del Carmen* struck. No other shoal water was found in this vicinity, and the southwest coast of Leyte may be rounded safely at a distance of ¾ mile.

SOUTH COAST OF LEYTE.

From Green Point the coast trends easterly for 6 miles to the town of Maasin and thence southeasterly for 13 miles to Taancan Point. All this part of the coast is formed by rocky points and small sand beaches off which the water is too deep to afford good anchorage. The town of Macrohon and a number of villages lie on the coast between Maasin and Taancan Point.

Maasin is a small town on a sand beach from which a coral reef, bare at low water, projects about 400 yards southward. Good anchor-

age will be found off the eastern end of this reef in 5 or 6 fathoms. Small craft can anchor closer in, off the northeast point of the reef, in 3 to 4 fathoms; sticky bottom.

A fixed red light, visible 7 miles, is shown from a platform on a white, wooden post 200 feet northwestward of the boat landing. This light, steered for on a 328° (327° mag.) course, will lead to an anchorage in 5 or 6 fathoms.

Taancan Point, the southern extremity of Leyte, is low and formed of rock underworn by the sea, giving it the appearance of a rampart. It is fringed by a narrow, steep-to reef, outside of which the water deepens rapidly, a depth of 10 fathoms being found within ⅓ mile of the point. Taancan Point is the southern termination of a low, wooded peninsula about 1½ miles long northwest and southeast and ½ mile wide. The northern part of this peninsula is formed by a mangrove swamp through which there is a passage known as Santa Sophia Canal, used by native sailing craft at high water. Parts of this passage bare at low water, and in one place it is only 30 yards wide.

Limasawa Island, southeastward of Taancan Point, from which it is separated by a clear, deep channel 3 miles wide, is well wooded, and 719 feet high in the northern part. The western part is well populated, and a considerable part of the land is planted with hemp and coconut trees. Limasawa is fringed by a narrow, steep-to reef off which the water is too deep to afford good anchorage for large vessels. The only detached danger off this island is a small coral reef with a least depth of 4¾ fathoms lying about ⅛ mile from the eastern shore and about 1 mile northward from the south end. The tidal currents run with great velocity here, the flood stream to the northwest and the ebb to the southeast.

Sogod Bay is between Taancan Point, Leyte, and Ilijan Point, Panaon Island. It is deep, free from danger, and contains no good harbor. The shores are clean and so steep-to that there are very few places where anchorage with sufficient swinging room, except for the smallest class of vessels, can be had. The towns of Malitbog and Sogod and a large number of villages lie on the shores of the bay. Hemp is the principal product of this vicinity, all the more accessible hills being planted with it. Considerable copra is also made, but except for the strip of land along the beach the country is not adapted to the growing of coconuts.

Malitbog is a small town on the western shore of the bay, about 9 miles northward of Taancan Point. It has regular steam communication with Manila and Cebu and there are a number of small steamers trading in the bay with Malitbog as their headquarters. Malitbog has a good wharf with a depth of 12 feet at its end, and there are two mooring buoys maintained for the use of vessels lying at it. Fresh water may be had from a pipe on the wharf. The best anchorage for vessels not using the wharf is just northward from it in 15 fathoms; hard sand bottom. A fixed red light, visible 7 miles, is shown from the top of the jail.

Anchorage may be found in a bight just northward of the village of **Banday,** 9½ miles northward of Malitbog in 17 fathoms, sand and coral bottom. Immediately northward of the village of **Bontoc,** 3 miles northward of Banday, there is a bight in which many of the

coasting steamers and small sailing craft seek refuge in typhoon weather, preferring it to Port Liloan.

Sogod and **Consolacion**, at the head of the bay, do considerable trade, but afford no anchorage except for small craft, which anchor in very deep water and just clear the shore reef in swinging.

Panaon Island, separated from Leyte by Panaon Strait, is mountainous and is divided through its length by a ridge which rises near the northern end to a height of 2,600 feet and terminates southward in a peak 2,323 feet high, which forms the south end of the island. The entire coast of this island is clean and steep-to, and there are no offlying dangers. With the exception of Liloan Bay there are no good anchorages.

Liloan Bay is a small, semicircular cove about 3/8 mile in extent, making into the northwest part of Panaon Island at the western entrance to Panaon Strait. The town of Liloan lies on the southwest shore of the bay. Good, sheltered anchorage for small vessels may be found about 1/8 mile northeastward of the church in 7 fathoms; sand and coral bottom. Liloan Point, the western entrance point to the bay, may be rounded at a distance of 1/8 mile or less and the vessel then hauled southward to the recommended anchorage. A fixed red light, visible 7 miles, is shown from a white frame structure on Liloan Point.

Panaon Strait, between Leyte and Panaon Islands, is about 90 yards wide at the narrowest point, where the depth in the middle is from 6 to 7 fathoms. On account of the strong tidal currents no sailing vessel should attempt this passage except in a case of necessity. The tidal currents run with a velocity of 3 to 4 knots at spring tides with strong eddies and whirlpools at either end. The flood tide sets west and the ebb east. The eastern entrance is the shoaler, having a least depth of 9 feet at a point about in mid-channel, 1/4 mile eastward from the narrows. Coasting steamers passing through the strait usually pass southward from this 9-foot spot and favor the Panaon side to avoid the stronger current and whirlpools on the Leyte side.

The only danger in the western entrance is a detached, rocky shoal with a least depth of 11 feet and surrounded by deep water, situated 1/4 mile east-northeastward of the western entrance to Liloan Bay. Vessels should pass southward of this shoal, as foul ground lies between it and the Leyte shore.

EAST COAST OF LEYTE.

Mangayao Point, immediately northward of the eastern entrance to Panaon Strait, is formed by a little, rocky promontory, precipitous at its outer end, about 50 feet high, and wooded on top; it is clean and steep-to. A shoal about 1/3 mile long northeast and southwest and with a least depth of 3 1/2 fathoms lies about 3/8 mile eastward of Mangayao Point. The channel between it and the shore is over 1/4 mile wide, deep, and clear.

From Mangayao Point the coast trends northerly for about 6 miles to the mouth of the Himbangan River. The long peninsula, terminating at Panaon Strait, is traversed by a range of heavily wooded hills broken up into little peaks. They approach close to the eastern shore of the peninsula and form a series of steep, rocky bluffs, interspersed with short sand beaches.

Marangay Point, about 1¾ miles northward of Mangayao Point, is the most prominent point on this coast. It is formed by a bold, wooded bluff descending steeply from a height of 200 feet to the rocks at its foot. Two rocky islets on the outer edge of the reef, off the village of Molopolo, 1 mile south of Marangay Point, are prominent.

From the Himbangan River the coast trends easterly, with a bend southward for about 7 miles, to Magusan Point, and thence northward, with a bend eastward for 8½ miles, to Pandan Point, forming a large promontory, which is dominated by Mount Cabalian. **Mount Cabalian**, which is the most prominent mountain in the vicinity of Surigao Strait, is 3,100 feet high about 2 miles inland. It is cone-shaped, with the upper part broken off and ending in three main peaks, the central one being the highest. The land rises gradually at first and is well cultivated for quite a distance up the slopes, only the upper portion of the mountain being wooded.

The shores as far as the village of Anajauan, about 1 mile northeastward of Magusan Point, are formed by a steep, cobblestone beach with deep water close-to; from Anajauan northward to Pandan Point there is a narrow, fringing reef. The shore is lined with coconut groves and thickly settled.

Himatagon, just eastward of the mouth of the Himbangan River, and **Cabalian**, about 2½ miles eastward of Himatagon, are the principal ports between the Himbangan River and Magusan Point. The water off both these places is very deep, and the anchorages are only tenable during the northeast monsoon. The small vessels trading on this coast anchor with a light anchor and line and seldom remain overnight, preferring to run to Liloan and return the following day.

Magusan Point is low and rounding and covered with coconut trees; it is clean and steep-to.

Hinundayan Cove, a small indentation in the coast line about 6 miles northward of Magusan Point, is very much exposed in the northeast monsoon. Anchorage in the fine-weather season may be found in 7 fathoms about 400 yards from shore, with the church bearing 243° (242° mag.) and the tangent to Bogho Point 26° (25° mag.). A detached reef with a least depth of 3¾ fathoms lies in the southern part of the cove about ⅜ mile from shore.

Bogho Point, the northern entrance point to Hinundayan Cove, is low and rounding and fringed with a narrow reef; the land rises steep and wooded at the back.

Pandan Point is very prominent; it is composed of weathered coral rock 12 to 15 feet high and wooded on top. The land back of the point rises abruptly and is well wooded.

From Pandan Point the coast trends southwestward for 1½ miles and thence northwestward for 4 miles to Saingan Point forming Hinunangan Bay, the head of which is shoal. The town of **Hinunangan** lies on the north side of the mouth of the Malaga River. The Malaga River has very little water on its bar at low water. The water shoals gradually in Hinunangan Bay and anchorage may be taken up off the town, according to draft. In the northeast monsoon, when it is too rough to lie in front of the town, partial shelter may be found off Kanipaan, 1¼ miles north-northwestward of Hinunangan, the Cabugan Islands acting as a breakwater. Most of the little steamers trading to Hinunangan discharge their cargoes here when the north-

east winds are strong and when it would be impossible to discharge in front of the town. Good shelter may also be found under the lee of Cabugan Islands, but the depths here are greater.

Saingan Point, the northern entrance point to Hinunangan Bay, is composed of dark, smooth rock, low and steep-to; it is very prominent from southward.

Cabugan Islands are two small, well-populated islands lying in front of Hinunangan Bay. Cabugan Chico, the southern, smaller, and more conspicuous one, lies about 2 miles northward of Pandan Point. It is about 5/8 mile in extent, and the highest point, about 300 feet, is cone-shaped and prominent. Shoal water, with 5 fathoms at its edge, extends 1/3 mile northeastward from it. The remainder of the island is fringed by a narrow, steep-to coral reef. Cabugan Grande, lying about 3/4 mile northward of Cabugan Chico, has no prominent elevation, the hills being of a low, rolling, grassy nature. They are separated from the coast of Leyte by a deep, clear channel, about 2 miles wide. Between the islands there is a good channel, limited by the shoal water extending northeastward from Cabugan Chico and that which extends southward for 1/8 mile from the south end of Cabugan Grande.

From Saingan Point the coast trends in a general northerly direction for about 8 miles to Hinatungan Point. **Sogod Point**, 2 miles northward of Saingan Point, is low and wooded and fringed by a narrow reef. **Silago** lies at the mouth of the river of the same name about 3 1/2 miles northward of Sogod Point. About 3/8 mile from shore and 1 1/4 miles northeastward of Silago there is a cluster of dark rocks, mostly awash at high tide, but having one spot probably 6 feet above high water. This reef is surrounded by shoal water and should be given a good berth; the channel between it and the land is shallow and should not be used.

Pelada Rock, 1 1/4 miles southward of Hinatungan Point and 3/8 mile from shore, is about 100 yards long north and south, 70 yards wide, and 34 feet high. There is a small amount of scrub vegetation growing in its crevices. Pelada Rock is not prominent from east or south. It is clean and steep-to and surrounded by deep water. There is a channel about 1/4 mile wide between it and the shore reef. In a small bay westward of Pelada Rock fair shelter and good landing places for small craft may be had during heavy northeast weather.

The only inshore dangers in this vicinity requiring mention are those off the point immediately north from Pelada Rock. The outermost of these dangers is a large, dark rock which comes within about 2 feet of the surface, breaks at low water in moderate weather, and with a heavy swell breaks at all times. This rock is about 300 yards from the outer edge of the shore reef. About 200 yards southwestward of this rock is a rocky cluster which bares at low water and is separated from the outer edge of the shore reef by a narrow channel about 100 yards wide.

Hinatungan Point, the most easterly point in this vicinity, seen from northward or southward, has the appearance of a long, low, heavily wooded point. It is fringed by a narrow reef.

Extending about 300 yards from the south side of Hinatungan Point are a number of rocks, the outer one, awash at low water, about 30 yards southward of the outer visible rock, which is about 4 feet

high. All these rocks are of dark color and do not show well when the sea is smooth.

From Hinatungan Point the coast trends northwesterly for 8 miles; this coast is fringed by a narrow, steep-to, coral reef, and there are no offlying dangers.

Hinatungan is a small, unimportant village at the head of a break in the coral reef about 5/8 mile northward of Hinatungan Point, where small vessels up to 80 feet in length can find shelter in any weather. This anchorage is used by native craft trading on this coast.

About 3/4 mile southward of Taytay Point is a small, rocky islet 57 feet high, separated from the coast by a shallow channel about 1/8 mile wide. This islet is not prominent except when close-to.

Taytay Point, about 10 miles northwestward of Hinatungan Point, is a sharp, rocky headland with a very conspicuous 100-foot wooded hill near its outer end. Back from the point the land rises rapidly to a height of over 1,000 feet about 1 mile southwestward from it. A narrow, rocky ledge about 3 feet above high water extends about 200 yards east-northeast from the point, and 100 yards northward of this ledge is a rock 15 feet high, with deep water immediately outside of it.

From Taytay Point the coast trends westward for 6½ miles to the mouth of the Nalibunan River. The three intervening points are rocky, heavily wooded, and fringed with bowlders. The adjoining country is mountainous and heavily wooded. From the Nalibunan River the coast trends northward for 20 miles to Vigia Point and, with the exception of Liberanan Head, is generally low, flat, and thickly wooded. This coast is clean and steep-to and can be safely navigated at a distance of ½ mile. There are a number of rivers emptying along this coast, but they are small and of little value to navigation. Hemp and copra are the principal exports.

Anchorage, sheltered only during the southwest monsoon, may be found anywhere in this vicinity.

About 5 miles southward of Liberanan Head and 1 and 1½ miles from shore are two small coral patches with depths of 5¼ fathoms, respectively. Liberanan Head, bearing nothing northward of 350° (349° mag.), leads well eastward of these patches, which are the only detached shoals between Taytay Point and Liberanan Head.

Abuyog, on the Baturaue River, which empties into the Nalibunan River, is quite conspicuous, owing to the galvanized-iron roofs, the most prominent ones being on the large, stone church and on the military barracks. Small craft drawing not over 5½ feet cross the bar at high water and unload opposite the town.

Dulag, on the coast 13 miles northward of Abuyog, can be readily identified by its many iron roofs, the most prominent ones being on the large, stone church and on the chapel in the cemetery north of the town. Considerable hemp and copra are shipped from here, and frequently four or five small craft are anchored off the town.

Liberanan Head, a prominent hill about 400 feet high, stands close to the shore about 4½ miles southward of Vigia Point. Catmon Hill, which rises to a height of 1,000 feet above, is 2 miles northwestward of Liberanan Head; both form excellent landmarks. Although there is no appreciable change in the trend of the shore line at this point,

the hills rising so abruptly from the flat country to the southward give it the appearance of a decided headland when seen from the sea.

Tolosa lies on the south side of Vigia Point and is quite prominent.

Vigia Point, the western entrance to San Pedro Bay, is formed by a rocky headland 384 feet high, which shows as a pyramid from southward. There is an old fort on the top.

Southward of a line drawn between Vigia Point and Mariquitdaquit Islet and from ½ to 4 miles from shore there are a number of shoals with 1¼ to 5 fathoms whose position will be best understood by reference to the chart. The most dangerous of the above shoals is a small coral patch with a least depth of 1¼ fathoms lying ½ mile from shore, 2⅛ miles southward of Vigia Point.

San Pedro Bay is a large bay formed by the east coast of Leyte and the southwest coast of Samar. It is about 11 miles wide at the entrance between Vigia Point, Leyte, and Capines Point, Samar, and extends some 12 miles northward. The towns of Tanauan and Palo are in the western part, Tacloban, the capital of Leyte, in the northwestern part, and Basey in the northeastern part of the bay. The eastern shore of the bay is sparsely settled. The San Joaquin and Palo Rivers in the western part and the Basey in the northern part are the principal rivers emptying into the bay. The entire bay is shoal and encumbered by numerous islets, reefs, and shoals, the location of which can be best understood by reference to the chart.

The following is a brief description of those which principally concern the navigator:

Mariquitdaquit Islet, lying 5 miles westward of Capines Point, is a flat rock washed by the sea, not more than a foot or two above high water, on which are two rocky lumps about 18 feet high. A sunken rock, with 2 fathoms, is reported about ½ mile westward of this islet. A light visible 10 miles is shown from a white concrete pillar on the island.

Dio Islet, low and wooded, lies 1¾ miles southeastward of Cataisan Point and about 1¼ miles from shore.

Palo Reef is a small, rocky patch with a least depth of ¼ fathom lying 5¾ miles northward of Vigia Point and about 1½ miles eastward of the mouth of the Palo River.

Egbert Shoals are two small, rocky patches covered by 2½ and 2 fathoms of water, lying about 4 miles south-southeastward of Dio Islet. These patches lie ⅞ mile apart, northeast and southwest, and have depths of 9 and 10 fathoms around and between them.

Iris Shoal is a small shoal with a least known depth of 2½ fathoms, lying 2 miles southward of Punubulu Islet.

Raso and Badungbadung Islets lie about 4 miles northeastward of Mariquitdaquit Islet and 1 mile from shore. Raso Islet, the western and smaller, is very conspicuous, being 100 feet high and shaped like an hourglass. Badungbadung is 130 feet high.

Camoropudan Islets are a group of seven small islets from 55 to 150 feet high; their bases are underworn by the sea until in some places the overhang is 15 to 20 feet. They lie close to the eastern shore of the bay.

Punubulu Islet, lying 3½ miles eastward of Dio Islet, is a small, low, wooded islet about 300 yards long east and west and 150 yards

wide. There are several shoal spots eastward of Punubulu, but they are out of the ordinary track of navigation. Foul ground with rocks awash extends about 1 mile southward and eastward of Punubulu, and there is a small reef, which bares at low water, lying northwestward of the islet.

There is a long, narrow shoal, with ¼ fathom least water extending about 2½ miles in an east-and-west direction across the head of the bay. There is a narrow channel, with 1½ fathoms least water between this shoal and Cataisan and Panirugan Points, but the main channel in and out of Tacloban is east and north of this shoal.

From Panirugan Point, the northeast point of the peninsula on which Tacloban stands, the coast trends south and east, and then north to Cataisan Point, forming Cancabato Bay, a large, shallow bay about 2 miles long north and south, and 1 mile wide. San Ricardo stands at the head of this bay.

Jinamoc Island is a well-wooded island, about 60 feet high, lying off the town of Basey. A flashing white light, visible 10 miles, is shown from a white, concrete pillar on the west side of the island.

Basey, a municipality of the Province of Samar, contains a prominent church, which, in range with Tingib Point, the western extremity of Jinamoc Island, bearing 1° (0° mag.), leads up to the entrance to Tacloban Harbor.

Tacloban, the capital and largest town of the Province of Leyte, is mainly on the west side of a peninsula facing San Juanico Strait. There are a number of small wharves, two of which have 15 to 18 feet alongside of them. No supplies, fresh water, or coal are obtainable. Vessels drawing 18 to 20 feet of water can enter the harbor from the southward, but larger vessels are obliged to anchor in the vicinity of Dio Islet in 5 or 6 fathoms; mud bottom. The usual anchorage in the harbor is 300 or 400 yards north and northwest of the town, although the deeper water is found farther northward. Pilots for Tacloban and San Juanico Strait may be obtained at Jinamoc Island and Canauay Island in Janabatas Channel.

A fixed red light, visible 7 miles, is shown from a white frame structure on a hill close to an old fort ¼ mile westward of Panirugan Point.

Directions.—The channel leading into Tacloban Harbor from San Pedro Bay is marked by three black buoys and one red buoy. Vessels entering by this channel should have no difficulty if the buoys are in position, but in case they are gone or out of position the following directions should be observed: When in the vicinity of Dio Islet bring the church at Basey in range with the western point of Jinamoc Island, bearing 1° (0° mag.), and steer for it until ¾ mile from Jinamoc Island, and Mount Danglay (1,177 feet high) bears 302° (301° mag.). Steer for Mount Danglay on this bearing for ⅞ mile, until Anibong Point, the first point westward of Tacloban Peninsula, bears 273° (272° mag.); head for Anibong Point for 3 miles, until, when drawing up toward Panirugan Point, the vessel should be hauled southward and anchorage taken up off the wharves in 2½ to 3 fathoms; muddy bottom.

APPENDIX.

COAST PILOTS, SAILING DIRECTIONS (PHILIPPINE ISLANDS), AND FIELD STATIONS OF THE COAST AND GEODETIC SURVEY.

COAST PILOTS.

	Price.
U. S. Coast Pilot, Atlantic Coast, Section A, from St. Croix River to Cape Cod	$0.50
U. S. Coast Pilot, Atlantic Coast, Section B, from Cape Cod to New York, including Long Island Sound	.50
U. S. Coast Pilot, Atlantic Coast, Section C, Sandy Hook to Cape Henry, including Delaware and Chesapeake Bays	.50
U. S. Coast Pilot, Atlantic Coast, Section D, Cape Henry to Key West	.50
U. S. Coast Pilot, Atlantic Coast, Section E, Gulf of Mexico, from Key West to the Rio Grande	.50
Inside Route Pilot, coast of New Jersey	.20
Inside Route Pilot, New York to Key West	.20
Inside Route Pilot, Key West to New Orleans	.20
U. S. Coast Pilot, Pacific Coast, California, Oregon, and Washington	.50
U. S. Coast Pilot, Pacific Coast, Alaska, Part I, from Dixon Entrance to Yakutat Bay	.50
U. S. Coast Pilot, Pacific Coast, Alaska, Part II, Yakutat Bay to Arctic Ocean	.50
U. S. Coast Pilot, West Indies, Porto Rico	.50
Coast Pilot Notes on Hawaiian Islands	Free.
U. S. Coast Pilot, Philippine Islands, Part I, Luzon, Mindoro, and Visayas (this volume)	.50

SAILING DIRECTIONS, PHILIPPINE ISLANDS.

Section V. Coasts of Mindanao and adjacent islands	Free.
Sections VI and VII. Mindoro Strait, Palawan Island, and Sulu Sea and Archipelago	Free.

FIELD STATIONS.

Boston, Mass., room 1806, customhouse.
New York, N. Y., room 441, customhouse.
New Orleans, La., room 503, Godchaux Building.
San Francisco, Cal., room 310, customhouse.
Seattle, Wash., room 202, Burke Building.
Manila, P. I., Intendencia Building.

At these stations complete files of United States Coast and Geodetic Survey charts, Coast Pilots, Tide Tables, and other publications relating to navigation may be consulted and information affecting navigation obtained without charge.

Light Lists, Buoy Lists, and Notices to Mariners are kept for free distribution to mariners.

The field stations are also sales agencies for the Coast and Geodetic Survey publications.

A chart catalogue, giving lists of charts, coast pilots, tide tables, and agencies of the Coast and Geodetic Survey, can be obtained from any of the field stations, or will be sent, free of charge, on application to the Coast and Geodetic Survey, Washington, D. C. Frequent changes occur in the agencies, and the list of agencies is published in the first notice each month of the Notices to Mariners.

HARBOR REGULATIONS.

The following extract from Customs Marine Circular No. 53, publishing rules and regulations governing the operations of Philippine vessels within Philippine harbors, is republished for the information and guidance of all concerned:

PAR. 117. **Manila Harbor** is defined as that portion of Manila Bay within the following boundaries: An imaginary line extending from the mouth of the San Antonio Estero (near Fort San Antonio Abad on Malate Beach) due west to its intersection with an imaginary line running due north from the end of Sangley Point; thence along an imaginary line extending from from this point of intersection to the mouth of the Vitas River 32° (31° mag.); thence along the shore to the mouth of the San Antonio Estero, the place of commencement.

PAR. 118. **Iloilo Harbor** is defined as that portion of Iloilo Strait within the following boundaries: An imaginary line extending from the northern bank of the Dumangas River, Island of Panay, across the Iloilo Strait up to the Culasi Point on the northern coast of the island of Guimaras; thence along the northwest and west shore of Guimaras Island to Luzaran Point; thence along an imaginary line extending from Luzaran Point to the south bank of the mouth of Binaragan River in the municipality of San Joaquin, Province of Iloilo, island of Panay; thence along the southern shore line of the island of Panay to the north bank of the Dumangas River, the point of commencement.

PAR. 119. **Cebu Harbor** is defined as that portion of the strait between Mactan Island and the island of Cebu within the following boundaries: An imaginary line extending from Bantolinao Point, Mactan Island, due north to the island of Cebu; and an imaginary line extending from Lauis Ledge, Mactan Island, to Lipata Point, island of Cebu.

PAR. 123. **Aparri Harbor** is defined as all that portion of the Cagayan River between the barrio of Calarmanargan and the sea.

PAR. 124. **Cavite Harbor** is defined as that portion of Manila Bay to the southward of an imaginary line extending from Sangley Point to Parañaque and for one-half of a nautical mile due north of said line and limits.

PAR. 125. All confluent rivers and other inland waters having outlets within the harbor limits defined for Philippine ports of entry shall for purposes of these regulations be considered as portions of the respective harbors into which they empty.

PAR 126. All vessels on entering any port, entry or coastwise, in the Philippine Islands, shall show their colors and signal their official numbers or letters and the number of sacks of mail (if any) on board for that port, and such signals shall be kept flying till the vessel is boarded by the proper officials: *Provided*, That all vessels on entering Manila Bay shall also show their colors and signal their official numbers or letters and the number of sacks of mail (if any) on board when within signal distance of Corregidor, and shall keep such signals displayed for a period of not less than fifteen minutes and in all cases till the signal station on Corregidor Island is abeam of the vessel displaying them.

PAR. 127. Should vessels require such service, a licensed pilot will be furnished upon display of the proper signal or upon application to the pilot station. Signal by day: International code letter "S"; at night, Bengal light, which may be preceded by two whistles.

PAR. 128. When a vessel is approaching or leaving a wharf, other vessels in the immediate vicinity shall obey the orders of the pilot on board the vessel in motion.

PAR. 129. Only licensed pilots shall be permitted to pilot vessels at ports having pilots' associations, viz: Manila, Iloilo, Cebu, Nueva Caceres, Daet, Tacloban, Aparri, and Dagupan.

PAR. 130. The following signals or calls shall be used and recognized at Philippine ports of entry:

Customs.—International code K G W; at night, three or four short blasts of whistle and waving of a light.
Quarantine.—International code Q at fore.
Pilot.—International code S.
Explosives or inflammables.—International code B at fore.
Medical assistance.—International code Q, or customs call.
Infectious or contagious disease.—International code L.
Death.—Customs and quarantine calls.
Distress.—International code N S (or other code signals).
Mail.—International code R E W. Vessels for Manila should also fly this signal when passing Corregidor Island; if mail launch does not respond, fly customs call.
Water boat.—International code G U J.
Harbor police.—Customs call.

In Manila Harbor a customs boarding officer in charge of a harbor launch is on duty daily from sunrise to sunset, and a customs patrol boat is on duty from sunset to sunrise. Communication may be established by the international code signals with the customs semaphore station, which is equipped with telephones. At other Philippine ports of entry signals will be responded to from the pilot tower or customhouse.

PAR. 131. Vessels entering a harbor shall be considered in quarantine and shall keep the quarantine flag flying at the fore until boarded and given pratique by the quarantine officer. This regulation shall be subject to such exceptions as may be prescribed from time to time by the chief quarantine officer.

PAR. 132. No person shall be permitted to disembark from or go aboard a vessel, except the pilot and quarantine officer, until pratique has been given; unless the vessel be in distress, in which case those rendering assistance, if compelled to go on board, shall be subject to quarantine restrictions.

PAR. 133. All official orders and regulations of the quarantine officer shall be strictly and promptly obeyed by all persons on board or alongside while the vessel is under quarantine jurisdiction.

PAR. 134. All cases of sickness of a contagious or communicable character which may occur while the vessel is in port shall be at once reported in writing to the quarantine officer.

PAR. 135. Deaths, illness, or accidents, involving physical injury to any person on a vessel in a harbor, shall be at once reported to the collector of customs and the quarantine officer.

PAR. 136. Every vessel arriving in port with inflammable or explosive cargo shall hoist a red flag at the foretruck and keep said flag flying during the hours of daylight while any such cargo is on board, and shall display by night one red light, which light shall be at a height of not less than 20 feet above the deck. Such vessel shall anchor where indicated by the harbormaster and shall not change anchorage without his permission.

PAR. 137. Smoking and the use of any light or fire, with the exception of the regulation harbor lights at night, on board any boat, lighter, or similar vessel carrying inflammables or explosives either in a harbor or a river is prohibited.

PAR. 139. Every vessel, lighter, or boat carrying inflammable or explosive cargo shall hoist a red flag on its foremast; or, if there is only one mast, at the masthead; or, if there is no mast, on a pole at least 6 feet above the highest point of the vessel; and if permitted to move at night they shall carry a red light in the same position as the flag.

PAR. 140. Discharging, carrying, and other handling of inflammables and explosives in a port shall be permitted only between sunrise and sunset, except on written authorization of the collector of customs or surveyor of the port.

PAR. 141. Vessels of all classes carrying inflammables or explosives shall not lie alongside of nor be tied to another vessel, except when actually discharging or receiving such cargo. They shall be berthed or lie at such places as may be designated by the harbormaster, and shall be discharged or loaded with the least possible delay.

PAR. 142. Upon the arrival of a foreign vessel in port no persons except the pilot, customs and quarantine officers, and, subject to permission of the customs

boarding officer, consuls and agents of the vessel shall be permitted to go on board; nor shall any of the crew or passengers disembark until the vessel has been placed under customs jurisdiction.

PAR. 143. A coastwise vessel on arrival at a port shall not be required to wait for customs boarding officers before entering the harbor or river. Such vessels upon mooring shall be boarded by a customs officer, who, if there is foreign cargo in transit, shall place a customs inspector on board.

PAR. 144. Masters or officers in charge of vessels shall, upon demand, exhibit to the customs officers the ship's roll, register, crew list, passenger list, manifest, or any other public ship's paper.

PAR. 145. Any vessel having foreign cargo consigned to a port of entry shall discharge such cargo within the harbor limits of such port, unless permission is obtained from the insular collector of customs to discharge outside such limits.

PAR. 147. No launch, lighter, or other vessel shall be allowed to make fast to any channel or marking buoy.

PAR. 148. In case two or more vessels are making for the same landing, the one nearest to such landing shall have the right of way, and the other or others are prohibited from making any attempt to go alongside first.

PAR. 149. All orders of the harbormaster in connection with the berthing or movement of vessels shall be at once carried out by the master or other officer in charge of the vessel to which such orders relate.

PAR. 150. Every vessel entering a port whose harbor limits are prescribed shall be berthed or moored at the point designated by the harbormaster, and no vessel shall change its anchorage or berthing place without his permission.

PAR. 152. Masters of vessels desiring to load or discharge ballast shall first obtain permission from the collector or surveyor of customs and shall obey the instructions given them by the harbormaster as to where the ballast shall be taken from or discharged, as the case may be.

PAR. 153. At ports having no regularly appointed harbormaster the duties of such official shall be performed by the surveyor of customs or other designated customs officer.

PAR. 154. Where it is necessary for a vessel in a harbor to have repairs made that will temporarily disable or prevent the vessel from being controlled or moved, it shall be the duty of the master thereof to report that fact to the harbormaster, and to take adequate precautions against fire and storm. Before such repairs are made the vessel shall be berthed as directed by the harbormaster.

PAR. 155. There shall not be thrown, deposited, or discharged from any vessel or floating craft of any kind, or from the shore or wharf, into the waters of any of the harbors described above, or into the navigable waters of any river tributary thereto, any refuse or other matter or thing which might impede or obstruct navigation or cause an obstruction thereto.

PAR. 156. Whenever a vessel, raft, or other craft is wrecked and sunk in a navigable channel, accidentally or otherwise, it shall be the duty of the owner of said sunken craft to mark it immediately with a buoy or beacon with a red flag attached thereto during the day and with a red lantern at night, which flag or lantern shall show at least 4 feet above water, and to maintain such marks until the removal of the sunken craft; and it shall also be the duty of said owner to commence the immediate removal of the same and to prosecute said removal with due diligence.

PAR. 158. No vessel or other craft shall tie up or anchor in the navigable waters of any harbor in such manner as to prevent or obstruct the passage of other vessels or craft, nor so as to obstruct or endanger the Government dredges, towboats, scows, and other floating apparatus in their work of improving rivers and harbors, nor shall they navigate said waters at a rate of speed that may endanger other vessels or craft at anchor or under way, nor shall any person voluntarily or carelessly sink, or permit to be sunk, vessels or other craft in navigable channels, nor float loose timber and logs in streams or channels actually navigated by steam vessels in such manner as to obstruct, impede, or endanger navigation.

PAR. 159. No vessel shall be anchored within any fairway of a harbor set apart by the harbormaster for the passage of vessels, nor shall any vessel be so anchored as to obstruct the passage of other vessels in such fairway.

PAR. 163. Steam vessels towing shall have the right of way over steam vessels not towing: *Provided*, That vessels of over 10 feet draft shall have the right of way in deep and narrow channels. In carrying out the rules for right of way, due regard shall be had to the fact that a vessel going against the

tide or current is much more manageable than one going with it. In rivers and narrow channels connected with harbors or the sea which are traversed by steam vessels, such steam vessels shall have the right of way over launches, lighters, cascoes, and other river and harbor vessels: *Provided*, That the steam vessels are of 100 gross tons or more. Coastwise vessels of less than 100 gross tons shall conform to the rules of the road with river and harbor vessels. In rivers and narrow channels every steam vessel shall, when it is safe and practicable to do so, keep to that side of the fairway or mid-channel which lies to the starboard of such vessel.

PAR. 164. Steam and other vessels are prohibited from turning around in navigable rivers or narrow channels by means of warping lines stretched across the channel in such manner as to obstruct free navigation, but shall be so managed as to leave at all times one side of the river free for the passage of other vessels.

PAR. 168. All vessels entering, leaving, or lying in the rivers of the Philippine Islands shall swing all boats inboard, keeping the davits in that position. All gangways shall be folded against the side of the vessel. Each vessel shall have one or more of the small boats which are swung inboard ready at all times to be swung out and lowered in case of necessity. On sailing vessels the yards shall be braced fore and aft and the jib boom shall be run in.

PAR. 176. A vessel in a harbor in distress and requiring assistance from other vessels or from the shore shall use or display the following signals, either together or separately; viz:

Day signals: International signals N C or N S and a continuous sounding of any fog-signal apparatus.

Night signals: First, flames on the vessel as from a burning tar barrel, oil barrel, etc.; second, a continuous sounding of any fog-signal apparatus or firing a gun.

PAR. 177. Any vessel entering an entry or coastwise port shall, if mail is to be discharged, inform the port authorities thereof by the prescribed signal at the earliest practicable moment.

PAR. 178. Masters or other officers in charge of vessels shall give due notice to the collector of customs of their intention to clear, stating the day and hour of proposed sailing, and shall fly the "blue peter" (International Code P) at the fore for 24 hours before sailing.

PAR. 179. Nothing in these regulations, whether general or special, shall relieve any vessel, or the owner, master, or crew thereof, from the consequences of any neglect to carry lights or signals, or to keep proper lookout, or from the consequences of any neglect to take the precautions to do that which may be required by the ordinary practice of seamen or by the special circumstances of the case.

PAR. 180. Harbor police duties are performed by customs officers. Any master or officer in charge of a vessel within the limits of any harbor defined in these regulations desiring police assistance shall fly the international code customs call K G W, and such other signal as the urgency of the case may require. Customs officers have the power to make arrests within harbor limits of persons violating the customs, immigration, Chinese exclusion, and navigation laws and regulations, and of persons committing crimes or breaches of the peace, and shall report without delay to their superior officer. Any person who assaults, resists, opposes, or interferes in any manner with a customs officer in the discharge of his duty shall be liable to the penalties prescribed by law.

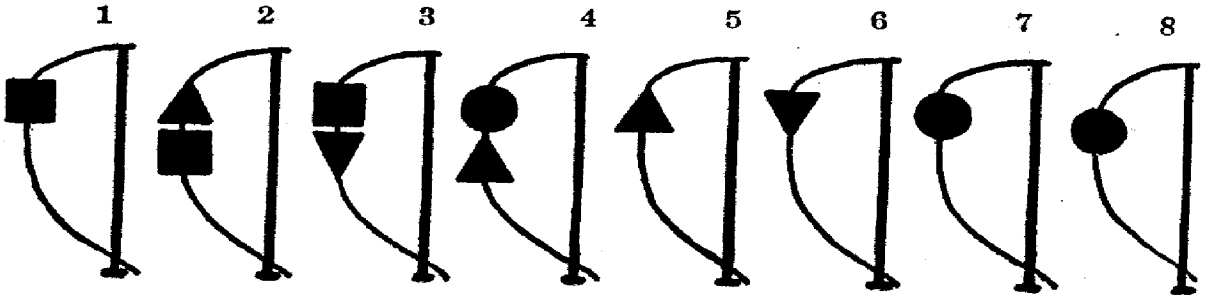
PAR. 181. Typhoon warning signals are displayed in accordance with advices from the Weather Bureau, and their meaning is the same wherever shown in the archipelago. Masters of vessels are required to notify the collector of customs or the harbormaster if, after typhoon signals have been hoisted, any vessels fail to take suitable precautions for their own safety and thus endanger other vessels.

PAR. 182. The following typhoon signals will be displayed when occasion requires:

DAY SIGNALS.

Black cylinder, 1½ feet in diameter, 2 feet high.
Black cone, base 1½ feet in diameter, 2 feet high.
Black sphere, 2 feet in diameter.
Flag 3 or 4 feet square, of any convenient color.

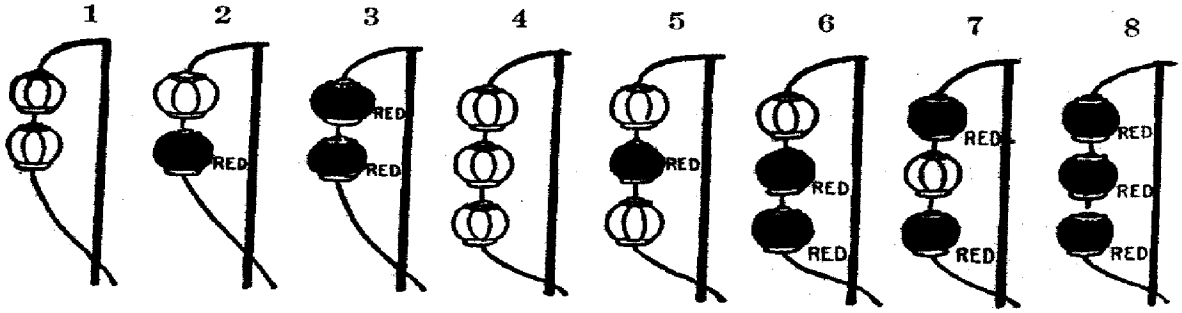
Arranged as follows:



NIGHT SIGNALS.

(See note, below.)

Red and white lights in either vertical or horizontal line, arranged as follows:



FIRST SIGNAL.

The meaning of the first signal is necessarily somewhat indeterminate; it may signify—

(*a*) Indications of a distant typhoon the direction of whose movement is still unknown. The signal will be changed in case the typhoon approaches;

(*b*) The direction of the distant typhoon is at present such that the storm may pass off without seriously affecting the archipelago; or

(*c*) A general warning, viz: When the weather indications are dangerous but such as are not covered by any one of the other signals in use, for instance when the typhoon recurves east of the archipelago. In such cases see the daily weather note posted at all the meteorological and telegraph stations and customhouses.

Precautions.—Vessels should prepare to strengthen their moorings and to get up steam. Small vessels, especially open launches, should not risk going far from port.

SECOND SIGNAL.

The center of the typhoon will pass (or is passing) to the northward at a considerable distance. Winds from third quadrant (west to south) are to be expected, which may acquire considerable force and continue for several days.

Precautions.—Vessels should strengthen their moorings. It is deemed advisable that vessels should send down light yards and masts. Steamers should be ready to use their engines on short notice. Dangerous for small vessels to be in Manila Bay; bancas must not leave the rivers.

THIRD SIGNAL.

The center of the typhoon will pass (or is passing) to the southward at a considerable distance. Winds from the second quadrant (east to south) are to be expected. These are generally less violent than those corresponding to the second signal.

Precautions.—The same as for signal No. 2.

(NOTE.—Signal No. 8, as printed here, is incomplete. A flag should appear above the sphere.)

FOURTH SIGNAL.

The location of the typhoon is dangerous for the place where the signal is hoisted, though the danger is not imminent. Look out for the next signal.

Precautions.—Vessels strengthen their moorings. Steamers must be ready to use their engines in case of sudden emergency. Small vessels must remain at their moorings; bancas are not to move about in the river nor cascoes to leave it.

FIFTH SIGNAL.

The center of the typhoon will pass (or is passing) to the northward at a short distance. Strong winds from the third and fourth quadrants (south over west to north) are to be expected, which may become very violent.

Precautions.—Vessels strengthen their moorings as much as possible. Lower and secure all gear. Use steam to help anchors. Vessels outside Manila Harbor may find it necessary to seek refuge in Cavite. No vessels under way while this signal is up.

SIXTH SIGNAL.

The center of the typhoon will pass (or is passing) to the southward at a short distance. Strong winds from first and second quadrants (north over east to south) are to be expected, which may become very violent, though usually they are less severe than those corresponding to the fifth signal.

Precautions.—The same as for signal No. 5.

SEVENTH SIGNAL.

The center of the typhoon will pass over the place where the signal is hoisted.

Precautions.—The same as for signal No. 5. It must be noted, however, that after the absolute or relative lull, due to the actual passing of the center, the winds will suddenly change to a direction opposite to the one from which they came before the calm; also that they may often be more violent than before.

EIGHTH SIGNAL.

Strong winds, very high tides, and floods.

Precautions.—The same as for signal No. 5. No vessels of any description must attempt to enter or leave a harbor or river, nor to move about in them.

PAR. 183. Masters of vessels are requested to furnish all shipping news of general interest and such sanitary and hydrographic information as they may have. Masters wishing to have barometers tested can do so by giving glass reading to the harbor master, who shall compare the same with observatory instruments and return correction to ship. The harbor master shall, when requested, supply masters with latest pilot charts, Notices to Mariners, and other hydrographic publications, and harbor regulations, and such meteorological data as may be of use in these waters, for which no charge shall be made.

PAR. 184. Any person violating any of the provisions of these harbor regulations is liable, under the terms of section 8 of act No. 1136, upon conviction thereof, to imprisonment for not more than six months, or to a fine of not more than two hundred pesos, or both such fine and imprisnment, at the discretion of the court.

SPECIAL REGULATIONS FOR MANILA HARBOR AND THE PASIG RIVER.

PAR. 185. All vessels entering the breakwater of Manila Harbor or the Pasig River (which is part of the harbor) shall take such anchorages or berths as may be assigned to them by the harbor master, and no vessel shall change to another anchorage or berth without his permission. A vessel shall be removed to a new anchorage or berth at the option of the harbor master.

PAR. 186. Pilotage into and out of the breakwater is optional. Pilotage into and out of the Pasig River is compulsory. Vessels changing berths in the Pasig River shall use a pilot.

PAR. 191. Vessels lying inside the breakwater of Manila Harbor shall moor with anchors placed as directed by the harbormaster.

PAR. 192. The assignment of berths to coastwise vessels lying in the Pasig River, and the enforcement of harbor regulations, shall be under the supervision of the harbormaster. Vessels shall be berthed at the river wharves in the order of arrival. The mooring of a vessel shall be done by the pilot in charge. Masters of vessels wishing to enter the river shall notify the chief pilot (or the pilot on duty, should the chief pilot be absent) of their intention to do so, and shall receive their turn accordingly. The harbormaster shall be notified by the chief pilot of the order of arrival of vessels.

PAR. 193. Steamers shall not be permitted to lie more than two abreast in the Pasig River except when specially authorized by the harbormaster. But one steam vessel shall lie at the upper berth of the San Gabriel wharf nearest to the Bridge of Spain.

PAR. 194. Steam vessels carrying more than 10 head of cattle shall discharge below the Bridge of Vitas, unless otherwise specially permitted by the harbormaster.

PAR. 195. Sailing vessels shall be moored abreast Fort Santiago above the Anda Monument, unless otherwise specially permitted by the harbormaster, and not nearer than 50 feet to deep channel.

PAR. 196. No launches, lighters, or other vessels shall lie at any space of the Pasig River wharves which has been specially reserved by order of the Insular Collector of Customs as a landing place for passengers or baggage or for other purposes. Any launch or vessel going to such reserved place to embark or disembark passengers or others shall move away without delay.

PAR. 198. No steam vessel shall be allowed to run at a speed of more than 4 knots an hour between the Hospicio de San Jose and the mouth of the river, nor more than 2 knots an hour when passing through the canal which connects the inner harbor basin with the Pasig River.

PAR. 199. Vessels which have finished discharging shall anchor behind the breakwater within twenty-four hours thereafter and there remain until they are ready to take on cargo, unless otherwise permitted by the surveyor of the port.

PAR. 201. No logs or lumber in rafts or otherwise shall be discharged in the waters of Manila Harbor, the Pasig River, or esteros leading thereto, which may in any way impede navigation on the said waters, either by steam vessels or other craft.

There shall not be thrown, deposited, or discharged from any vessel into the waters of Manila Harbor, including the Pasig River, any garbage or similar refuse. Garbage and similar refuse shall be either burned on board the vessel, or shall be placed on shore in suitable receptacles.

PAR. 202. Vessels loaded with petroleum or other inflammable liquids shall not be allowed to enter the Pasig River or the breakwater without first obtaining permission from the surveyor of the port. The harbormaster shall indicate where such vessels shall moor and discharge. Whenever such vessels are not being discharged their hatches shall be closed. All such vessels shall display a red flag by day and red lights at night, as elsewhere provided, and while loading and unloading they shall use such precautions as may be directed by the harbormaster.

PAR. 203. Gasoline, petroleum, and dynamite or other explosive compounds shall not be laden on or discharged from a vessel lying in the Pasig River unless the shipper, master, owner, or agent of the vessel obtains a permit from the chief of the Manila fire department, approved by the surveyor of the port or the harbormaster: *Provided*, That this regulation shall not apply to dynamite and other explosive compounds belonging to the government of the Philippine Islands or of the United States when under direct charge and in care of Government officers: *And provided further*, That all such dangerous cargo shall be laden at the place designated by the harbormaster.

PAR. 205. Any vessel or other water craft in the Pasig River shall, when a case of sickness occurs on board, immediately hoist the regulation quarantine flag (yellow) and keep the same flying until boarded and passed upon by an inspector of the bureau of health. The flag shall be of sufficient size and so placed as to be plainly visible.

PAR. 207. Vessels shall not remain in the Pasig River below the Bridge of Spain while undergoing repairs or awaiting inspection, nor shall disabled or condemned vessels be permitted to remain in that part of the river, nor behind the breakwater, nor shall condemned or unseaworthy vessels be broken up in Manila Harbor or Pasig River without the specific permission of the insular collector of customs.

PAR. 208. No coastwise vessel at the port of Manila shall prepare for inspection of boilers till a permit has first been obtained from the surveyor of the port or the harbormaster, and no vessel shall be so inspected by the supervising inspector of hulls and boilers unless the master, owner, or agent of the vessel to be inspected exhibits the permit issued by the surveyor of the port or the harbormaster authorizing the vessel to prepare for inspection: *Provided*, That in all such cases necessary precautions against storm shall be taken, and all fire-fighting apparatus available on board shall be kept in readiness for immediate use.

PAR. 209. While in harbor no repairs shall be made to any vessel which will temporarily disable or prevent such vessel from being controlled or moved by her own power, without first obtaining permission from the surveyor of the port or the harbormaster, and in all cases of repairs necessary precautions against fire and storm shall be taken, and the fire-fighting apparatus on board shall be in readiness for immediate use. If repair work is to be done at night, that fact shall be specified in the written application and also in the written permission to do the work.

PAR. 210. Vessels and lighters of all kinds when under way in the Pasig River shall, when it is safe and practicable, keep on that side of the river which lies on the starboard of said vessel or lighter.

PAR. 214. All vessels having jib booms shall rig them in before entering the river and shall keep them in that position, and their yards shall be braced up: *Provided, however*, That vessels with stationary jib booms shall be permitted to enter the river whenever in the judgment of the harbormaster it is deemed advisable.

PAR. 215. The following number of working days shall be allowed for unloading vessels in the Pasig River.

	Days.
For steamers with a carrying capacity of—	
Less than 100 tons	1
From 100 to 200 tons	2
From 200 to 400 tons	3
More than 400 tons	4
For sailing vessels:	
At the rate of four working days for every 100 tons of cargo unloaded.	

A corresponding number of days shall be allowed for the loading of said vessels. These allowances may be increased by the harbor master in his discretion.

PAR. 216. A vessel approaching the breakwater entrance shall reduce its speed to the absolute requirements of the "steerage way," which in no case shall exceed 3 miles per hour.

PAR. 218. Whenever it becomes necessary on account of storm or stress of weather for a vessel anchored in the Pasig River to change its berth to a position of greater safety, such vessel shall proceed to another berth in the Pasig River only on the express permission of the harbor master and under the direction of a pilot. In case an immediate change of berth is necessary for the safety of the vessel, the master thereof shall leave the Pasig River and proceed to a berth in the harbor behind the breakwater. The provisions of this paragraph shall not apply to launches, lighters, or cascoes engaged in bay and river work.

PAR. 219. If, upon the arrival of a coastwise vessel at the port of Manila, a typhoon is blowing to such a degree that renders it impossible for a pilot to board the same for the purpose of bringing her to a berth in the Pasig River, the master of the vessel, instead of entering the river, shall remain outside or shall enter the harbor behind the breakwater and there anchor his vessel at some safe point until the weather moderates and the vessel is assigned a berth in the Pasig River by the harbor master, and a pilot is available to take the vessel thereto. In anchoring his vessel behind the breakwater care must be taken by the master not to moor the same in the fairway or in such a way as to interfere with any other vessel at anchor.

PAR. 222. Unoccupied buoys must be lighted from sunset to sunrise.

PAR. 223. When a foreign or coastwise vessel berths at a Philippine Government pier, the master of the vessel shall immediately, after the lines have been secured to the pier, cause rat guards of sufficient size and proper construction to be placed on all the lines leading to the pier, so as to prevent any rats from going ashore.

PAR. 224. The master of a vessel alongside a pier shall also be required to have suitable rat guards placed on all lines leading from lighters or cascoes to the vessel.

PAR. 225. No cargo shall be discharged from or received on board a vessel at a pier before suitable rat guards have been placed on all the lines leading from the carriers to the vessel and from the vessel to the pier.

PAR. 226. When a vessel berthed at a pier has not a supply of suitable rat guards on board, a sufficient number shall be loaned to the vessel by the wharfinger in charge of the pier, receipt to be taken in each case for the rat guards and the vessel held responsible for the loss of any of the rat guards so loaned.

PAR. 227. All foreign and coastwise vessels docking at the Philippine Government piers shall be fended off from the piers a distance of at least 6 feet.

PAR. 228. All cargo chutes and gangways connecting the vessel with the pier shall be removed at night, as soon as the vessel has stopped work of discharging or receiving cargo and shall not be put in place again until the following morning. This does not apply to the gangways of passenger vessels, which need not be removed until the pier is actually closed and work has been stopped.

SPECIAL REGULATIONS FOR FOREIGN VESSELS ENTERING THE PORT OF MANILA.

Customs Marine Circular No. 65.

OCTOBER 23, 1913.

I. Vessels from abroad entering the port of Manila through the North Channel shall pass between La Monja Island and Guardia Shoals, and shall proceed directly through the center of the channel between Corregidor Island and the mainland to their anchorage ground at the port of Manila, where they will be assigned anchorage by the harbor master. The same route shall be followed by such vessels when leaving Manila Harbor by the North Channel. Vessels from abroad entering the port of Manila from the south, upon arriving off Limbones Islands, shall keep south of a line projected from Caballo Light and bearing S 56° W (true), and in passing through the channel shall keep south of said line and shall not approach closer than 1 mile to the shore or any island and shall proceed directly to their anchorage grounds in Manila, where they will be assigned anchorage by the harbor master. The same route shall be followed by such vessels when leaving Manila Harbor by the South Channel.

II. Such vessels are prohibited from lingering, loitering, or anchoring at any place between the entrance to Manila Bay and their place of anchorage, regardless of whether the vessels are entering or leaving the port of Manila.

SPECIAL REGULATIONS FOR ILOILO HARBOR AND RIVER (OR ESTERO).

PAR. 233. Vessels and lighters of all kinds when under way in the Iloilo River (or estero) shall, when it is safe and practicable to do so, keep on that side of the river which lies to the starboard of such vessels and lighters.

PAR. 234. No steam vessel while in the Iloilo River (or estero) shall proceed at more than half speed.

PAR. 235 Launches and other vessels shall not navigate side by side in the Iloilo River (or estero), but shall follow in the wake of one another.

PAR. 236. Not more than two vessels shall lie abreast along the south bank of the Iloilo River (or estero) below the customhouse wharf, except in special cases by permission of the collector of customs.

PAR. 237. Vessels shall not be permitted to lie abreast along the north bank of the Iloilo River (or estero) nor shall vessels be permitted to moor in the Iloilo River (or estero) in such a manner as to obstruct navigation.

PAR. 238. All orders of the surveyor of the port relative to the berthing of vessels and other water craft, and the movement thereof, when not inconsistent with the "Rules of the Road," shall be obeyed by the masters, officers, or other persons in charge of the vessels to which such orders relate.

PAR. 239. Only one casco or lorcha may lie on either side, opposite each hatch, of ocean-going vessels loading cargo between the mouth of the Iloilo River (or estero) and the customhouse wharf.

PAR. 240. No vessel of any description shall be permitted to undergo repairs on the south bank or beach of the Iloilo River (or estero) above the custom-house. Repairs to vessels may be made on the beach on the north side of the river.

PAR. 241. No merchandise shall be discharged onto the wharf or the banks of the Iloilo River (or estero) between the mouth of the river and the Forbes Bridge, except for the purpose of immediate transportation, unless otherwise specially permitted by the collector of customs.

PAR. 242. No lighters of any description shall lie in the river nearer than 50 feet to the deep channel.

SPECIAL REGULATIONS FOR CAVITE HARBOR.

PAR. 246. Commercial vessels entering the harbor of Cavite shall be subject to the same regulations that govern vessels in Manila Harbor, except as to berthing: *Provided, however*, That clearance of foreign commercial vessels entering or departing from Cavite Harbor shall be made at the Manila custom-house.

SPECIAL REGULATIONS FOR APARRI HARBOR.

PAR. 247. No launch, lighter, boat, barangayan, or other craft shall go alongside of, or make fast to, or attach to, by means of hooks, lines, or poles, or in any other manner, any incoming steamer or vessel for the purpose of embarking or disembarking passengers, baggage, or cargo, or for the purpose of soliciting the business of embarking or disembarking passengers, baggage, or cargo, or for any other purpose, until such incoming steamer or vessel is safely and properly anchored or moored and the permission or consent of the master or person in charge of such incoming steamer or vessel has been duly given or signalled, which signal, in the case of steamers, shall be three short blasts of the whistle.

PAR. 248. No patron, owner, agent, manager, or person in charge of any launch, lighter, boat, barangayan, or other craft, or any other person, except a duly authorized pilot, a quarantine officer, a customs inspector, or the duly authorized representative of any of them, or in the case of a vessel in distress, those rendering necessary assistance, shall, for any purpose whatsoever, go aboard, or attempt to go aboard, by means of any launch, lighter, boat, barangayan, or other craft or in any other manner, any such incoming steamer or vessel, until the same is safetly and properly anchored or moored, and the permission or consent of the master or person in charge of such incoming steamer or vessel, has been duly given or signalled, which signal shall, in the case of steam vessels, be that specified in paragraph 247 hereof.

PAR. 370. Any violation by any officer, owner, or agent of any vessel, or by any other person, of any of the provisions of the regulations hereinbefore prescribed, shall subject such officer, owner, agent, or other person to a fine or penalty of not more than five hundred pesos (₱500), Philippine currency, unless otherwise hereinbefore specifically provided for, in the discretion of the insular collector of customs, or to such other, further, or different penalties as may have been duly provided by law, upon conviction for any violation thereof. If the violation of any of the provisions these regulations has been committed by an owner, agent, or officer of any vessel, such vessel shall be subject to the payment of any fine or penalty which may be imposed upon such owner, agent, or officer. In addition to the penalties above provided, a violation of any of the provisions of said regulations by any vessel, or the officer, owner, or agent thereof, shall subject the license of said vessel to revocation, and a violation thereof by any officer of any vessel shall subject his marine license to revocation, the revocation in either case to be in the discretion of the insular collector of customs.

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