DEPARTMENT OF COMMERCE AND LABOR
COAST AND GEODETIC SURVEY
O. H. TITTMANN
SUPERINTENDENT

UNITED STATES COAST PILOT

PACIFIC COAST

CALIFORNIA, OREGON, AND WASHINGTON

VK
947
.N3
1st ed.
1903

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DEPARTMENT OF COMMERCE AND LABOR,
COAST AND GEODETIC SURVEY,
WASHINGTON, D. C., *November 25, 1903.*

This volume covers the coast waters, bays, sounds, harbors, and navigable rivers in the States of California, Oregon, and Washington.

This publication is based mainly upon the work of the Coast and Geodetic Survey, including the results of special examinations and investigations made in the field in 1901 and 1902 in connection with its preparation.

The system adopted in this publication includes—

I. A tabular description of all lighthouses, light-vessels, and fog signals; lists of life-saving stations, Weather Bureau storm warning display stations, and information regarding tides, variation of compass, etc.

II. General information concerning the several bodies of water and harbors, including notes relative to pilots and pilotage, towboats, depth of water, draft of vessels entering, harbor and quarantine regulations, supplies, facilities for making repairs, usual or best anchorages, and other matters of practical interest. In each case the information of this nature precedes the sailing directions and is printed in smaller type.

III. Sailing directions, with subordinate paragraphs treating of prominent objects, dangers, aids to navigation, etc. In the arrangement adopted the aim has been to conform, as far as practicable, to the order in which these matters would be considered in practice, and to render available such information as may be wanted promptly. For this purpose, and to afford a ready means of reference from one part to another, the sailing directions, where long, are divided into numbered or lettered sections, printed in large type, each followed by its own subordinate remarks in smaller type.

IV. Appendices.

The part of the coast of the United States treated in this volume has been covered by the following publications of the Coast and Geodetic Survey prepared by George Davidson, Assistant, Coast and Geodetic Survey: Directory of the Pacific Coast of the United States, 1862; Coast Pilot of California, Oregon, and Washington Territory, 1869; Coast Pilot of California, Oregon, and Washington, 1889. The latest of these publications has been consulted in the preparation of the present volume.

This volume has been prepared by Mr. Harry L. Ford under the direction of Herbert G. Ogden, Assistant, Coast and Geodetic Survey, Inspector of Hydrography and Topography.

Great courtesy has been shown by local authorities in furnishing information desired for incorporation in this work.

The aids to navigation are correct to November 25, 1903.

As absolute accuracy in a work of this class is scarcely possible, navigators will confer a favor by notifying the Superintendent of the Coast and Geodetic Survey of errors which they may discover, or of additional matter which they think, for the good of mariners, should be inserted.

O. H. TITTMANN,
Superintendent.

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NOTE.

All bearings and courses are *magnetic*, except where otherwise stated.

All distances are in *nautical miles*, except where otherwise stated.

The depths in this volume are referred to a plane of the *mean of the lower low waters*, except in Puget Sound, where they are referred to a plane *2 feet lower* than the *mean of the lower low waters*.

SYSTEM OF BUOYAGE ADOPTED IN UNITED STATES WATERS.

The following order is observed in coloring and numbering the buoys in United States waters, 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 of the channel, 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 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 MID-CHANNEL 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 is 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 what side they shall be passed.

Nun buoys, properly colored and numbered, are usually placed on the starboard side, and can buoys on the port side of channels.

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.

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

The positions of the buoys mentioned in this volume are shown on the charts of the Coast and Geodetic Survey, which are kept corrected from information furnished by the Inspectors of the Lighthouse Districts, for the changes in the aids to navigation rendered necessary from time to time to indicate the best channels.

The following symbols and abbreviations are used on the charts of the Coast and Geodetic Survey:

◊ Red buoys, with even numbers, to be left on starboard hand in entering; if green, yellow, or white, the color is printed close to the buoy.

♦ Black buoys, with odd numbers, to be left on the port hand in entering.

◊ Black and white perpendicular stripes, without numbers, mid-channel or fairway buoys.

◊ or H. S., red and black horizontal stripes, without numbers, marking dangers or obstructions, to be left on either hand.

◊ Lighted buoys, different colors as above.

◊ ***WHISTLE,*** whistling buoys, different colors as above.

◊ ***BELL,*** bell buoys, different colors as above.

C., N., or S., signifies can, nun, or spar buoy.

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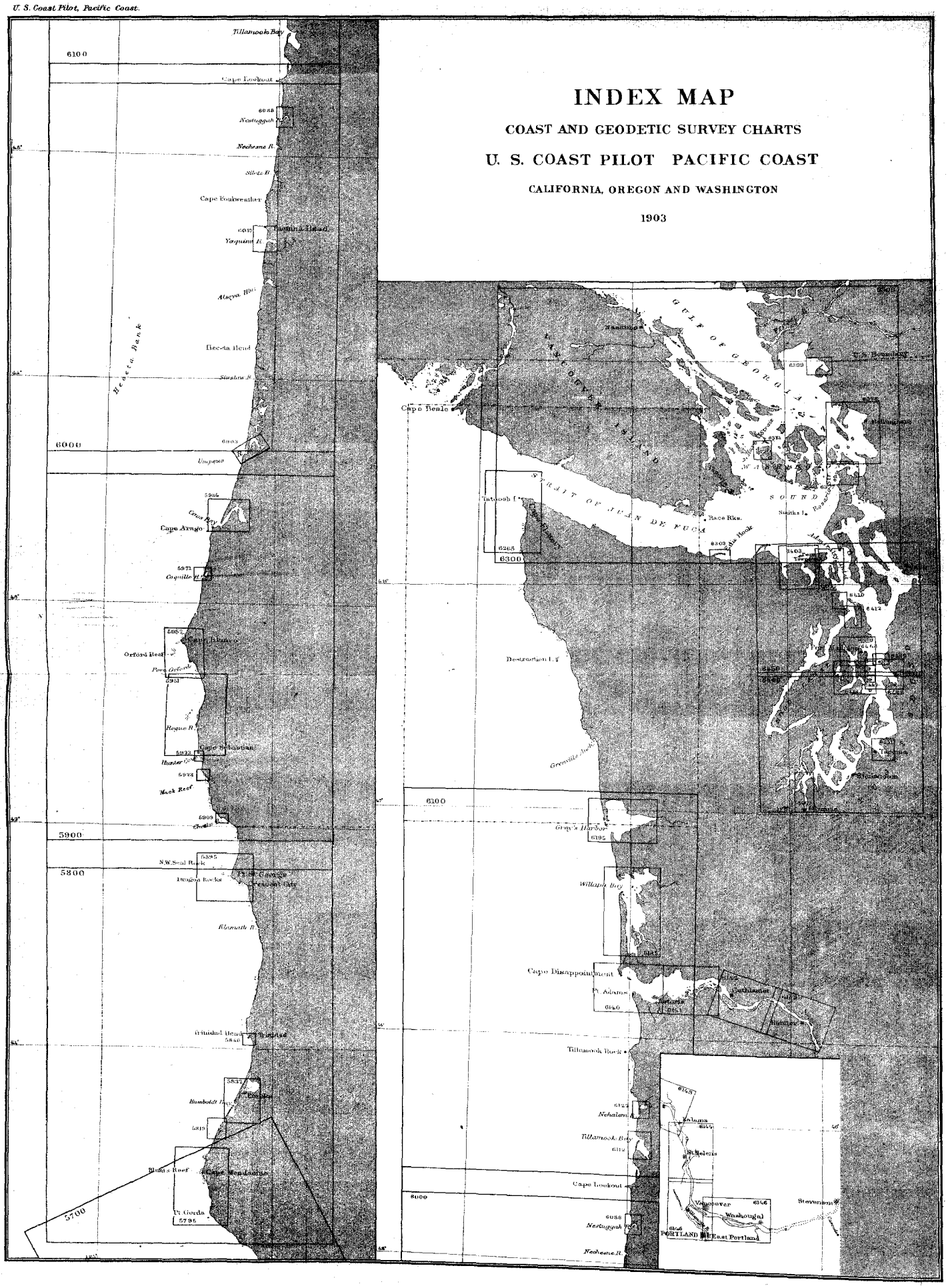
INDEX MAP

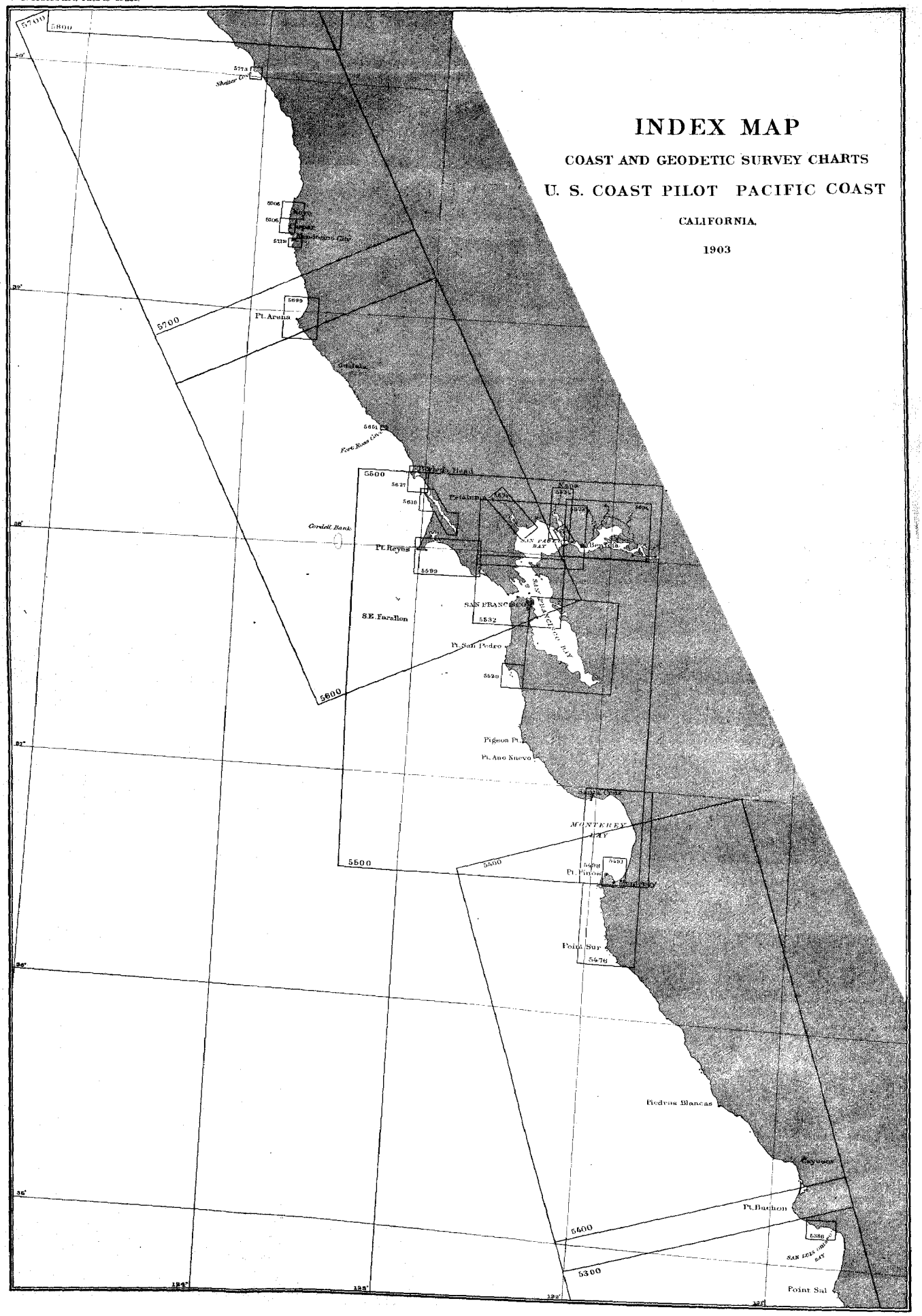
COAST AND GEODETIC SURVEY CHARTS

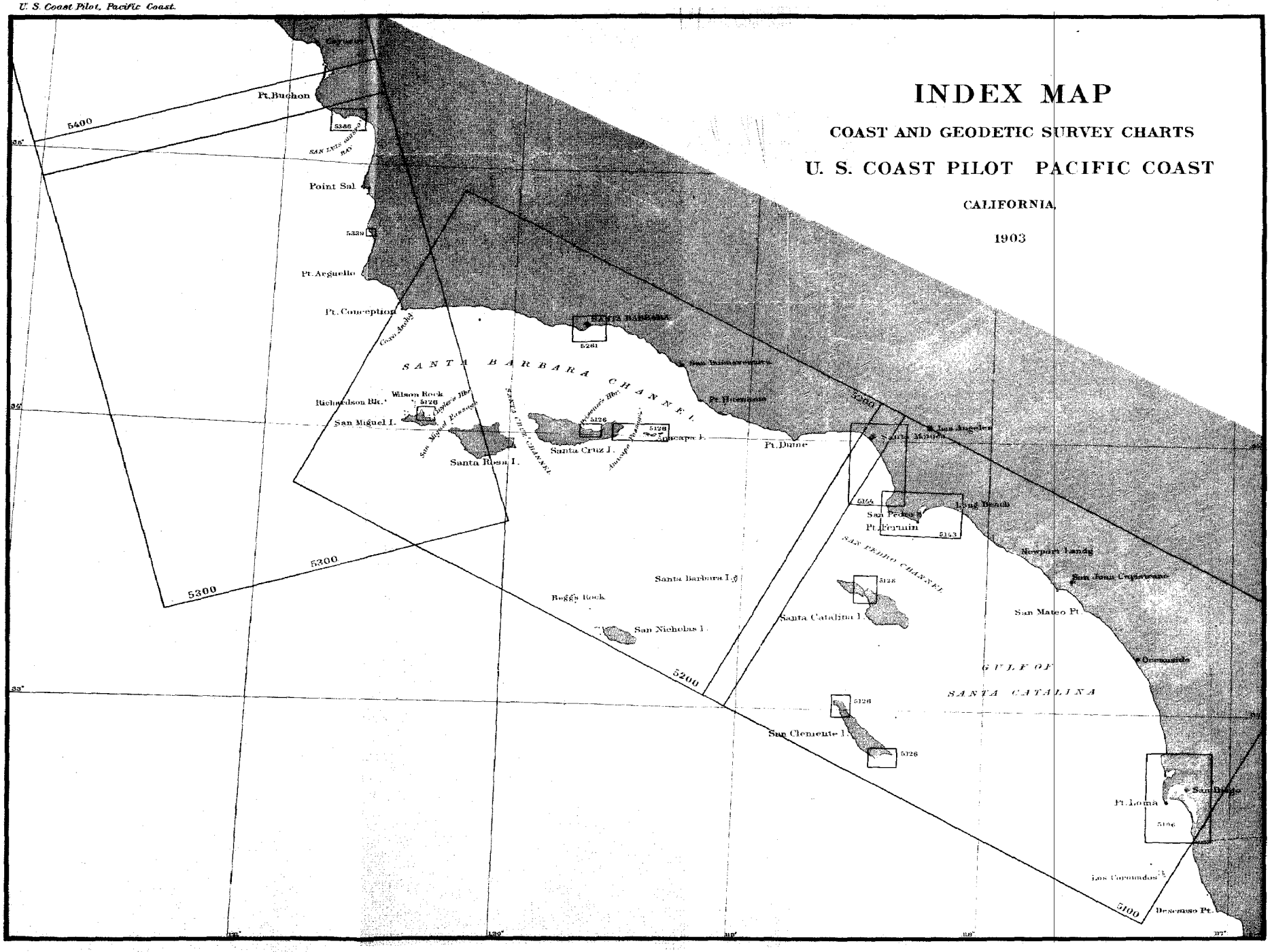
U. S. COAST PILOT PACIFIC COAST

CALIFORNIA, OREGON AND WASHINGTON

1903




INDEX MAP
COAST AND GEODETIC SURVEY CHARTS
U. S. COAST PILOT PACIFIC COAST
CALIFORNIA.
1903
5700
5800
40°
5773
Shelter Cove
5606
5606
5119
5699
Pt. Arena
5700
39°
Gualala
5651
Fort Ross Cove
5800
5627
5616
Tomales
5599
Cordell Bank
Pt. Reyes
5599
SAN FRANCISCO BAY
SAN PABLO BAY
SAN FRANCISCO
5532
S.E. Farallon
Pt. San Pedro
5520
5600
38°
Pigeon Pt.
Pt. Ano Nuevo
Santa Cruz
MONTEREY BAY
5500
5400
5498
5493
Pt. Pinos
Monterey
Point Sur
5476
36°
Piedras Blancas
Cayucos
Pt. Buchon
5400
5386
SAN LUIS OBISPO BAY
5300
Point Sal
124°
123°
122°
121°


INDEX MAP
COAST AND GEODETIC SURVEY CHARTS
U. S. COAST PILOT PACIFIC COAST
CALIFORNIA,
1903
Pt. Buchon
5386
SAN LUIS OBISPO BAY
Point Sal
5339
Pt. Arguello
Pt. Conception
Cow Anchor
SANTA BARBARA
5261
SANTA BARBARA CHANNEL
Wilson Rock
5126
Richardson Rk.
San Miguel I.
San Miguel Passage
Santa Rosa I.
Santa Cruz I.
Anacapa I.
Pt. Dume
Pt. Hueneme
Los Angeles
Santa Monica
5200
5154
San Pedro
Pt. Fermin
5153
Long Beach
SAN PEDRO CHANNEL
Newport Landing
San Juan Capistrano
Santa Barbara I.
Santa Catalina I.
San Mateo Pt.
Oceanside
GULF OF SANTA CATALINA
San Nicholas I.
San Clemente I.
5400
5300
5100
San Diego
Pt. Loma
5106
Los Coronados
Descanso Pt.
34°
33°
128°
127°

AGENCIES ON THE PACIFIC COAST FOR THE SALE OF THE CHARTS, COAST PILOTS, AND TIDE TABLES OF THE COAST AND GEODETIC SURVEY.

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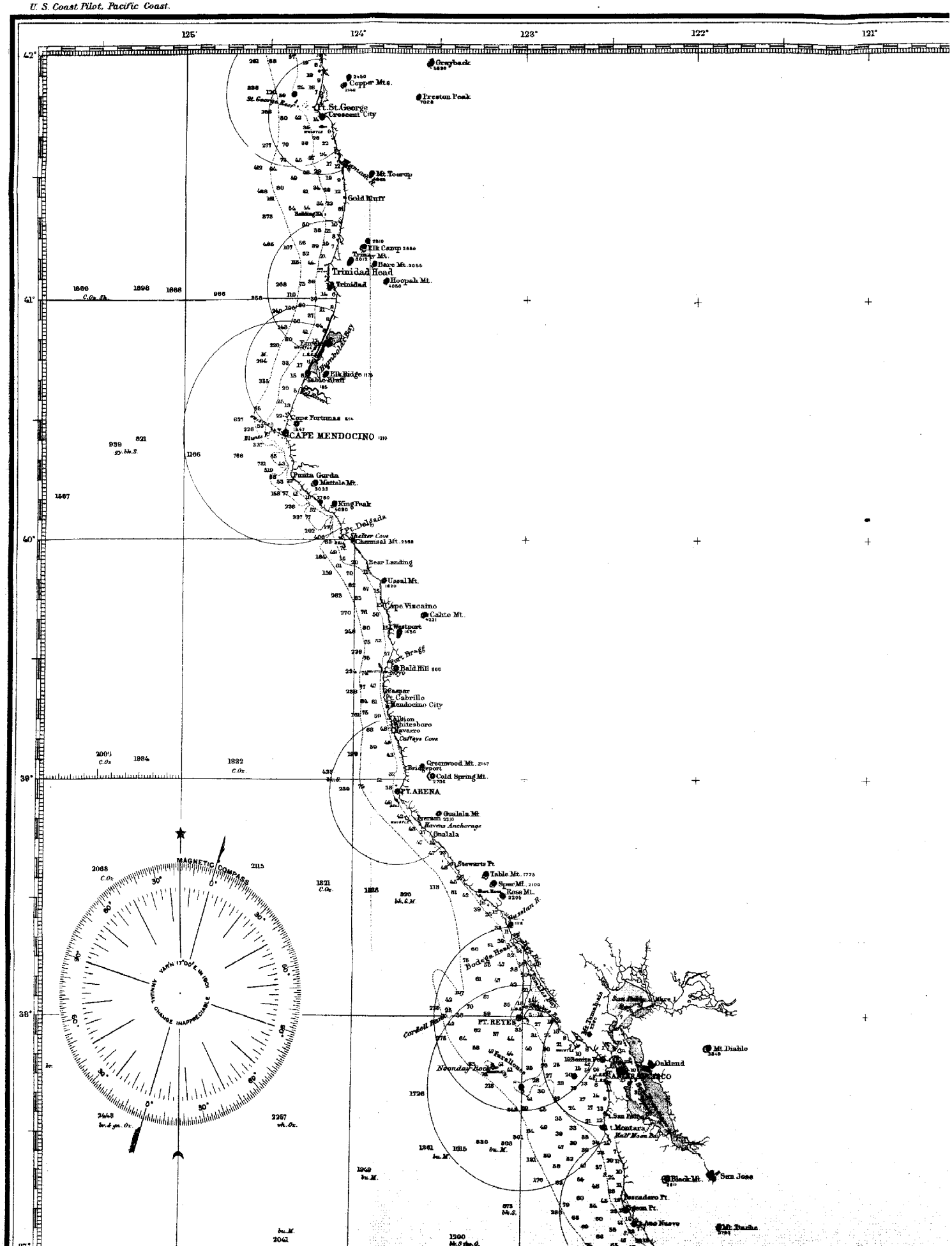

125°
124°
123°
122°
121°
42°
41°
40°
39°
38°
Greyback
Copper Mts.
Preston Peak
St. George Reef
Pt. St. George
Crescent City
Mt. Tourup
Gold Bluff
Elk Camp
Trinity Mt.
Bare Mt.
Trinidad Head
Trinidad
Hoopah Mt.
Humboldt Bay
Elk Ridge
Table Bluff
Cape Fortunas
CAPE MENDOCINO
Punta Gorda
Mattole Mt.
King Peak
Pt. Delgada
Shelter Cove
Chemisal Mt.
Bear Landing
Ussal Mt.
Cape Vizcaino
Cahto Mt.
Westport
Arena Bragg
Bald Hill
Caspar
Pt. Cabrillo
Mendocino City
Albion
Whitesboro
Navarro
Caffeys Cove
Greenwood Mt.
Bridgeport
Cold Spring Mt.
PT. ARENA
Gualala Mt.
Averill
Havens Anchorage
Gualala
Stewarts Pt.
Table Mt.
Spur Mt.
Rose Mt.
Bodega Head
PT. REYES
Tomales Bay
San Rafael
Mt. Diablo
Oakland
San Francisco
San Mateo
Montara
Half Moon Bay
Black Mt.
San Jose
Cascadero Pt.
Point Pt.
Ano Nuevo
Mt. Bache
MAGNETIC COMPASS
VARN 17°00' E IN 1901
ANNUAL CHANGE INAPPRECIABLE

121° 120° 119° 118° 117°

42° 41° 40° 39° 38° 37°

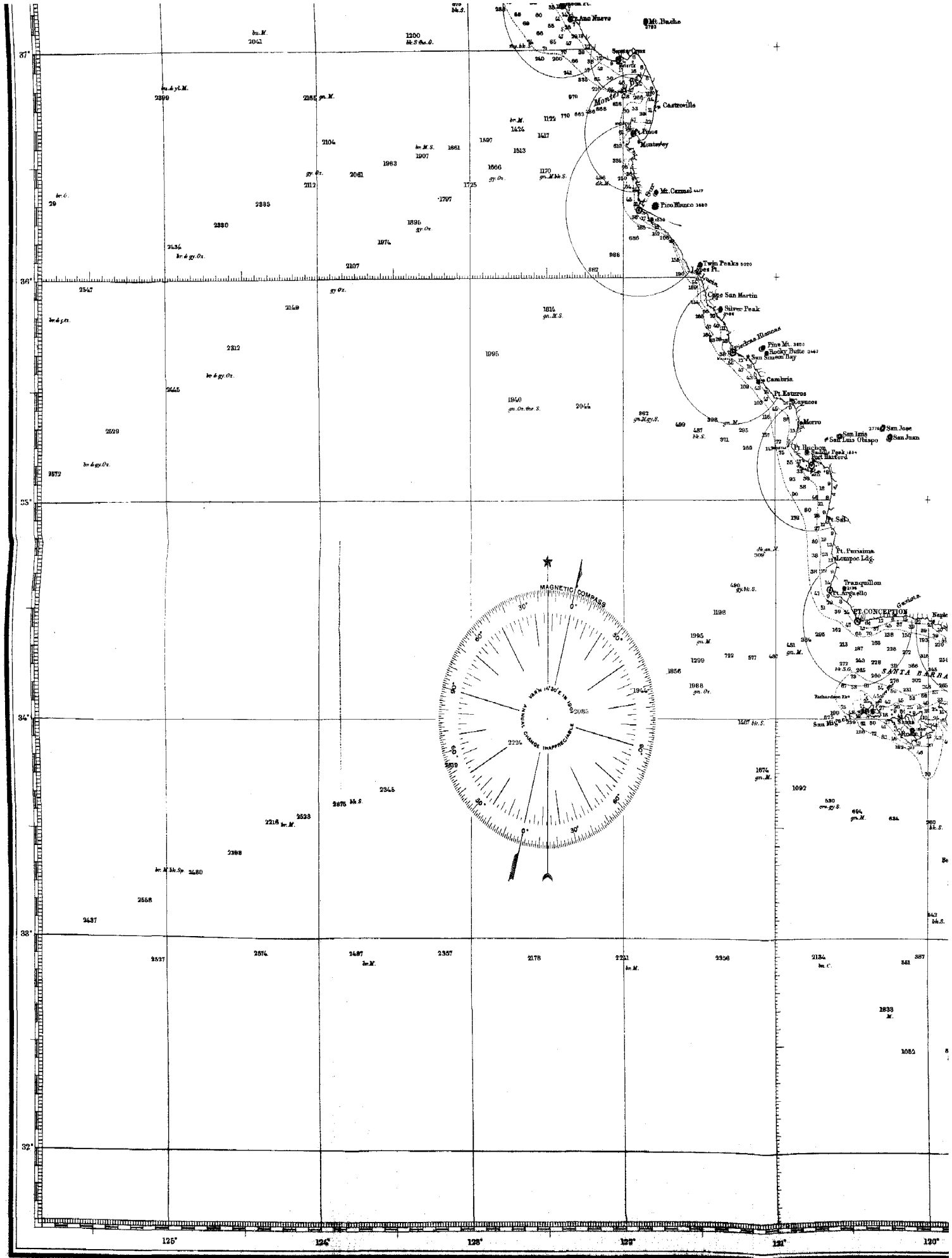
DEPARTMENT OF COMMERCE AND LABOR
COAST AND GEODETIC SURVEY

PACIFIC COAST

SAN DIEGO TO POINT ST. GEORGE

CALIFORNIA

(Mercator Projection)



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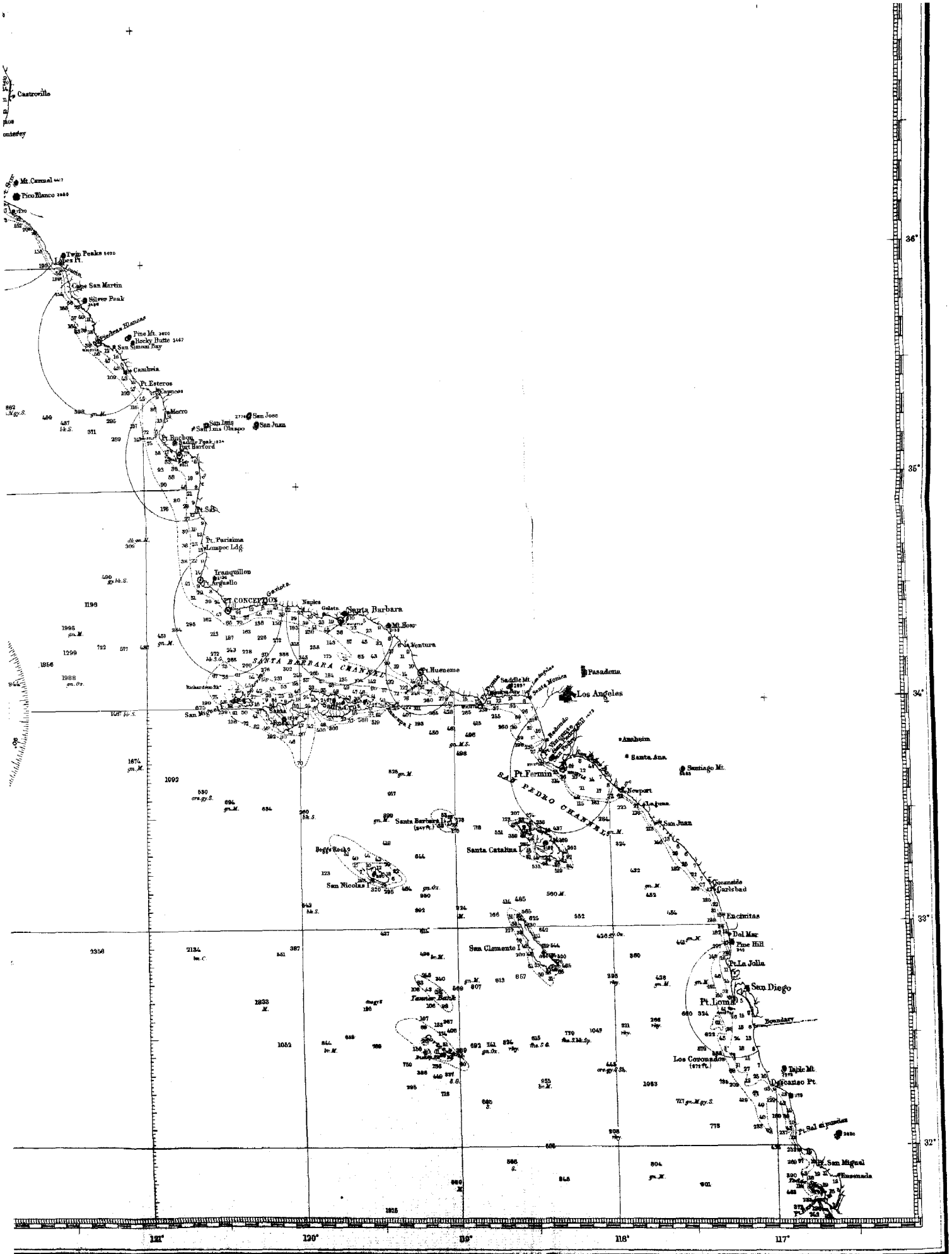

A.B. Graham Lith. Washington D.C.

The following addendum includes the only change which occurred to December 28, 1903, while this volume was in press:

PAGE 75, SECTION 4 A.

Mare Island Strait.—A slatted three-pile beacon, painted red, is established in 16 feet of water, about ¼ mile **SE. ¼ E.** from Commission Rock beacon, and will be left about 125 yards on the starboard hand on the **NW. ⅝ W.** course through the dredged channel.

UNITED STATES COAST PILOT.

PACIFIC COAST*—CALIFORNIA, OREGON, AND WASHINGTON.

GENERAL REMARKS.

This volume, "Pacific Coast—California, Oregon, and Washington," covers the western coast of the United States between the Mexican boundary on the south and the international boundary between British Columbia and the United States on the north, including Juan de Fuca Strait and tributary waters within those limits.

The coast, as a rule, is rugged and mountainous, the high land in many places rising abruptly from the sea. Southward of San Francisco Bay the mountains are usually bare or covered with chaparral and underbrush. Northward of San Francisco Bay they are generally well timbered, and in some places, especially northward of the Columbia River, the timber is particularly dense and heavy.

There are few outlying dangers, the principal ones being **Bishop Rock**, southward and westward of Point Loma; **Noonday Rock** and the **Farallones**, in the approaches to San Francisco Bay; **Blunts, St. George, Rogue River, Orford,** and **Umatilla** reefs, northward of San Francisco. These are described under separate headings in their appropriate place in the detailed description of the coast. The islands off the southern coast of California are the largest and most prominent and, except the Farallones, are the farthest offshore of any along the coast.

The depths in approaching the coast are too great for the ordinary vessel to obtain soundings until within a short distance of the shores; the slope from the 100-fathom curve to greater depths is very abrupt, as is the case in many places from the 30-fathom curve to 100 fathoms. The 100-fathom curve lies at an average distance of less than 10 miles offshore, but this distance is increased in several cases, as in approaching San Francisco Bay, in the vicinity of Hecate Bank, off the mouth of the Columbia River and at the entrance to Juan de Fuca Strait. In thick weather the greatest caution should be exercised and soundings taken frequently.

Aids to Navigation.—These are numerous, and there are few places along the coast where a vessel is not in sight of one or more lights. Light-vessels are placed off San Francisco Entrance, the mouth of the Columbia River, and Umatilla Reef. The dangers are buoyed as a rule and generally marked by kelp. At the entrance to some of the harbors and at the mouth of the Columbia River the buoys indicating the channel are not shown on the charts, owing to the shifting character of the channel.

Kelp grows on nearly every danger having a rocky bottom and is particularly heavy at various points in the Santa Barbara Channel and in the vicinity of San Diego Bay. It will be seen on the surface of the water during the summer and autumn months; during the winter and spring it is not always to be seen, especially where it is exposed to a heavy sea. Kelp should always be considered a sign of danger and no vessel should pass through it unless the spot has been carefully examined and sounded. There are, however, many rocks not marked by it; a heavy sea will occasionally tear the kelp away from rocks, and a moderate current will draw it under water so that it will not be seen. When passing on the side of a patch of kelp from which the stems stream away with the current care should be taken to give it a good berth, as the rocks are in the wake of the kelp. Dead, detached kelp floats on the water in masses, while live kelp, attached to rocks, streams away level with the surface.

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*The outside coast is shown in part on Coast and Geodetic Survey charts **5002** and **5052** (Mercator projection); **5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000,** and **6100**, scale $\frac{1}{200,000}$; **6400**, scale $\frac{1}{300,000}$; price of each, $0.50. Juan de Fuca Strait and tributaries are shown on Coast and Geodetic Survey chart **6400**, scale $\frac{1}{300,000}$, and in part on Coast and Geodetic Survey charts **6300**, scale $\frac{1}{200,000}$, **6450** and **6460**, scale $\frac{1}{80,000}$; price of each, $0.50. Portions of these waters are shown more in detail on harbor charts as noted under the several headings.

These charts can be obtained from the agents named in the list given on page 7. Between pages 6 and 7 are index maps showing the location and limits of charts covering the waters included in this volume. The catalogue of charts and other publications of the Coast and Geodetic Survey also contain similar index maps; copies of this catalogue can be obtained free of charge on personal application at any of the sale agencies, or by letter addressed to the Coast and Geodetic Survey, Washington, D. C.

Anchorage, affording shelter from the severe northwesterly winds of summer, may be had in a number of places situated along the coast. In southeast and southwest weather there are few places where shelter may be had; San Diego Bay, the harbor of refuge at San Pedro, the lee side of the islands off the southern coast, and Monterey Bay are the only places south of San Francisco Bay. North of San Francisco, Humboldt and Coos bays, Columbia River, Willapa Bay, and Grays Harbor afford good shelter, but must be made before the storm breaks, as afterwards the bars are impassable. Neah Bay, just inside the entrance to Juan de Fuca Strait, is used considerably by vessels in westerly or southerly weather.

Pilots will be found cruising off the principal ports, or may be obtained at many points by making signal. Extracts from the laws governing pilots and pilotage will be found in Appendix II.

Towboats may be had at all the principal ports, and sailing vessels usually take one before entering Juan de Fuca Strait or as soon after as possible. Sailing vessels occasionally are towed north during the summer months when time is an object. Many of the towboats are owned by the lumber companies at ports like Humboldt Bay, Coos Bay, etc.

Supplies.—Vessels usually obtain their supplies in either San Francisco, Portland, or Seattle. Coal can be obtained at a number of points. At San Francisco fuel oil can be obtained. Ship-chandler's stores can be had at San Francisco, Portland, and Puget Sound, and in limited quantities at several other places.

Repairs may be made at San Diego, San Francisco and vicinity, Humboldt Bay, Coos Bay, Astoria and Portland, Grays Harbor, and at a number of places on Puget Sound, of which Seattle and Tacoma have the best facilities. There are no docking facilities southward of San Francisco. A floating dock is building at Portland, and there are several docks and marine railways in Puget Sound, and at Victoria, Esquimalt, and Vancouver in British Columbia.

Communication is by regular lines of coasting steamers and rail and by telegraph and telephone. There are several trans-Pacific lines of steamers and a number of transcontinental railroads.

Storm warning displays of the United States Weather Bureau are made at a number of points along the coast and in Juan de Fuca Strait and tributaries (see table, page 12).

Quarantine is conducted in accordance with local laws and in accordance with the regulations of the United States Public Health and Marine-Hospital Service. (Extracts from these regulations are given in Appendix IV.)

United States Public Health and Marine-Hospital Service.—Stations of this service for the treatment of seamen are located in California at San Diego, Los Angeles, San Francisco, and Eureka; in Oregon, at Marshfield, Astoria, and Portland; in Washington, at Hoquiam, Port Townsend, Seattle, and Tacoma. Marine hospitals are located at San Francisco, Cal., and Port Townsend, Wash., to which seamen requiring long hospital treatment are sent. At Seattle, patients able to bear transportation are sent to Port Townsend. (See Regulations, United States Public Health and Marine-Hospital Service, Appendix IV.)

Weather.—There are two seasons—the summer or dry season, which begins about May and continues until October, and the winter or rainy season, covering the remainder of the year. These seasons vary in length in different parts of the coast as well as in different years.

In the southern part of the coast the rainy season is comparatively short and the rainfall much lighter than in the northern portion, being so light in some years as to cause considerable damage to the stock and farming industries. The winter gales from southward and southwestward are less frequent and less severe than at more northern points. The temperatures are milder and more even, and the snowfall is limited to the higher mountain peaks.

Northward of San Francisco the rainy season increases in length and the amount of rainfall, and as Juan de Fuca Strait is approached showers of short duration and generally local may be looked for at any time. Snow falls at rare occasions in San Francisco and vicinity, but is frequent and at times heavy in the vicinity of Juan de Fuca Strait. From San Francisco northward the winter gales increase in severity, frequency, and duration, while in summer the northerly and northwesterly winds at times reach almost hurricane strength.

Winds.—The prevailing winds in summer are from northwest, west, and southwest; on the southern part of the coast the westerly and southwesterly winds prevailing. The northwest winds in summer frequently reach a velocity of 70 miles an hour and extend as far south as Point Conception, eastward of which their severity is much less. As a rule, the northwest wind begins about sunrise and reaches its maximum velocity about 3 or 4 p. m., moderating toward sunset and dropping to light airs or calms by daylight. The severe northwesterly gales generally last two to three days and continue throughout the night with little or no diminution.

In winter the heaviest weather is from southeast and southwest, with an occasional northerly gale of short duration. The southeast gale occurs at any time, generally accompanied by rain and thick weather, and increasing in severity northward. These gales, with the heavy southwest swell prevailing during the winter

months, cause a confused, irregular sea that taxes the weatherly qualities of a vessel to their utmost. They spring up gradually from southward, and increase in strength, with a rapidly falling barometer. When the barometer becomes stationary the wind shifts to southwest and blows heavily, with clearing weather and frequent rain squalls. The barometer rises when the wind hauls to southwest, from which point it generally blows from twelve to twenty hours.

When the southwest gale of winter is not preceded by southerly weather the barometer seldom falls, but either remains stationary, when the gale may be expected to continue longer, or rises slowly, when it will gradually subside and fine weather follow.

Fog.—On the outside coast fogs are liable to occur at any time, but are more frequent in July, August, and September. On the southern part of the coast they are light and generally clear away by noon. In the northern parts of the coast they are more frequent and at times are very dense, and have been known to extend several hundred miles seaward. They continue at times for weeks, rendering navigation difficult, and frequently require considerable wind to dispel them. They are generally brought in toward sundown from seaward by light westerly winds, and ordinarily continue until noon of the following day and sometimes later.

Smoke from forest fires occurs in July, August, and September in Puget Sound and Georgia Strait, and at times extends a considerable distance seaward, southward and northward of Cape Flattery. At times it is a serious impediment to navigation and has been known to stop it entirely in Puget Sound. In recent years its prevalence has considerably diminished, some seasons being entirely free from it: it is cleared away by rains.

Currents.—A current with an estimated width of 200 to 300 miles flows nearly south-southeast, following the trend of the coast from about 50° N. to Point Conception, where it bends southward and westward. The estimated velocity is about ¾ knot, but this is largely influenced by prevailing winds.

Close inshore is a counter eddy current, generally known as the *Davidson Inshore Current*, flowing northwestward and following the trend of the coast, and causing at times tide rips close inshore. Its velocity is largely influenced by prevailing winds, and at times its direction is reversed, to be resumed upon moderation of the weather. A continuation of this current sets along the outer coast of British Columbia and Southeast Alaska.

Tidal currents.—These have little influence on the outside coast, but become of considerable importance in Juan de Fuca Strait and tributaries. They are described in connection with the localities affected by them under separate headings.

BEARINGS AND DISTANCES.

The following bearings and distances serve to indicate relative positions of certain aids to navigation. An inspection of the charts will enable the mariner to select from the bearings given the ones which may be used as courses.

Point Loma Lighthouse.—The following are bearings and distances from Point Loma Lighthouse:

	Miles.
Bishops Rock, **WSW. Southerly**	95
E. end of San Clemente Island, **W. ¼ S. Southerly**	56½
E. end of Santa Catalina Island, **WNW**	66¼
Point Fermin Lighthouse, **NW. ¾ W**	81¾

Point Conception Lighthouse.—The following are bearings and distances from Point Conception Lighthouse:

	Miles.
Point Hueneme Lighthouse, **E. ⅛ S**	65
Point Dume, **E. ¼ S**	86½
Point Fermin Lighthouse, **E. ¾ S. Easterly**	117
E. end of Anacapa Island, **E. ⅞ S**	60¾
Richardson Rock, **S. ¾ E**	21
Point Arguello Lighthouse, **NW. by W. ¾ W**	117⅞

Point Arguello Lighthouse.—The following are bearings and distances from Point Arguello Lighthouse:

	Miles.
Piedras Blancas Lighthouse, **NW. ¼ N**	73
Point Sur Lighthouse, **NW**	120¾
Farallon Lighthouse, **NW. ¼ W**	219½

Farallon Lighthouse.—The following are bearings and distances from Farallon Lighthouse:

	Miles.
Point Sur Lighthouse, **SE. ¼ E. Easterly**	99
Point Pinos Lighthouse, **SE. ⅞ E**	83
Pigeon Point Lighthouse, **SE. by E. ¼ E**	43¾
San Francisco Light-vessel, **NE. by E. ½ E**	15
Bonita Point Lighthouse, **NE. by E**	23½
Point Reyes Lighthouse, **N. by W. ¾ W**	18
Point Arena Lighthouse, **NW. ¼ N. Northerly**	83

Cape Mendocino Lighthouse.—The following are bearings and distances from Cape Mendocino Lighthouse:

	Miles.
Point Arena Lighthouse, **SE. ¾ S**	93¾
St. George Reef Lighthouse, **N. by W. ½ W**	84¾
Cape Blanco Lighthouse, **NNW. Northerly**	144¼

North Head Lighthouse (Cape Disappointment).—The following are bearings and distances from North Head Lighthouse:

	Miles.
Tillamook Rock Lighthouse, **SSE. ½ E. Easterly**	22
Cape Meares Lighthouse, **SSE. ½ E. Southerly**	49
Yaquina Head Lighthouse, **SSE. Southerly**	87¼
Heceta Head Lighthouse, **S. by E. ¾ E. Easterly**	129¾
Umpqua River Lighthouse, **S. by E. ¾ E**	158½
Cape Arago Lighthouse, **S. by E. ½ E**	177¾
Cape Blanco Lighthouse, **S. by E. ⅜ E**	208½
Umatilla Reef Light-vessel, **NW. ½ N. Westerly**	116½
Destruction Island Lighthouse, **NW. ¾ N. Northerly**	83½
Grays Harbor Lighthouse, **NNW. ⅜ W**	35½

Cape Flattery Lighthouse.—The following are bearings and distances from Cape Flattery Lighthouse:

	Miles.
Vancouver Island Lighthouse (Cape Beale), **NW. by W. ½ W. Westerly**	30½
Carmanah Lighthouse, **NNW. ¼ W**	13
Race Island Lighthouse, **ENE. ½ E. Easterly**	48¼
Umatilla Reef Light-vessel, **S. ½ E**	14¼

Point Wilson Lighthouse.—The following are bearings and distances from Point Wilson Lighthouse:

	Miles.
New Dungeness Lighthouse, **WSW. ⅝ W**	14½
Cape Flattery Lighthouse, **WSW. ⅞ W**	81
Race Island Lighthouse, **W. ⅝ S**	32½
Brotchy Ledge Lighthouse, **W. ⅝ N**	30
Discovery Island Lighthouse, **WNW. ½ W. Northerly**	25
Smith Island Lighthouse, **NW. ⅛ N**	11
Admiralty Head Lighthouse, **NE. ⅛ E**	nearly 3¼

STORM WARNING DISPLAY STATIONS.

The storm warning displays of the United States Weather Bureau are made for the benefit of mariners at the following stations. The displays are described and their meaning is explained in Appendix III.

San Diego, Cal.*
San Pedro, Cal.
Redondo, Cal.
Port Los Angeles (Santa Monica), Cal.
Ventura, Cal.
Santa Barbara, Cal.
Port Harford, Cal.
Point Lobos, Cal.
San Francisco, Cal.*
Point Reyes Light, Cal.*
Mendocino City, Cal.
Fort Bragg, Cal.
Humboldt Bay Life-saving Station, Cal.
Eureka, Cal.*
Arcata, Cal.
Point Adams Life-saving Station, Oreg.
Astoria, Oreg.
Portland, Oreg.
Cape Disappointment Life-saving Station, Wash.
North Head, Wash.*
Aberdeen, Wash.
Tatoosh Island, Wash.*
Neah Bay, Wash.*
East Clallam, Wash.
Port Crescent, Wash.*
Port Angeles, Wash.
Port Townsend, Wash.
Anacortes, Wash.
Port Ludlow, Wash.
Everett, Wash.
Tacoma, Wash.*
Seattle, Wash.*
Fairhaven, Wash.
New Whatcom, Wash.

The following are seacoast telegraph stations with which passing vessels can communicate by International Code Signals:

Farallon Light, Cal.
Point Reyes Light, Cal.
North Head (Fort Canby), Wash.
Tatoosh Island, Wash.

*At these stations barometers will be compared with standards.

Marine reports are telegraphed from the following points on the Pacific Coast, under an arrangement with the Merchants' Exchange, San Francisco, Cal., the reports being prepared by agents of the Exchange or by captains of coasting vessels:

Victoria, B. C.
Vancouver, B. C.
Astoria, Oreg.
Marshfield, Oreg.
Seaside, Oreg.
Anacortes, Wash.
Bremerton, Wash.
Hoquiam, Wash.
Port Angeles, Wash.
Port Crescent, Wash.
Port Townsend, Wash.
Seattle, Wash.
Whatcom, Wash.
Oceano, Cal.
Point Reyes, Cal.
Eureka, Cal.
Hueneme, Cal.
Mendocino, Cal.
Port Harford, Cal.
Port Los Angeles, Cal.
San Diego, Cal.
San Francisco, Cal.
San Pedro, Cal.
Santa Barbara, Cal.
Santa Cruz, Cal.
Santa Monica, Cal.
Ventura, Cal.
Westport, Cal.
Cayucos, Cal.
Conception, Cal.
Surf, Cal.

UNITED STATES LIFE-SAVING STATIONS.

The following is a list of life-saving stations on the coast covered in this volume. The geographic positions given are approximate and are taken from the Official Register of the Service. These stations are furnished with lifeboats, mortars, and all other appliances for affording assistance in cases of shipwreck.*

Name of Station.	State.	Locality.	Approximate Position. Latitude, North.			Longitude, West.		
			°	′	″	°	′	″
Grays Harbor	Wash	Just S. of Grays Harbor light	46	53	15	124	07	15
Willapa Bay	Wash	Near lighthouse boat landing	46	43	00	124	03	00
Ilwaco Beach	Wash	13 miles N. of Cape Disappointment	46	27	50	124	03	25
Cape Disappointment	Wash	Bakers Bay, ½ mile NE. of light	46	16	40	124	03	00
Point Adams	Oreg	¾ mile SE. of Fort Stevens	46	12	00	123	57	00
Yaquina Bay	Oreg	About 1 mile S. of harbor entrance	44	35	30	124	03	54
Umpqua River	Oreg	Near entrance of river, north side	43	42	00	124	10	30
Coos Bay	Oreg	Coos Bay, north side	43	22	50	124	18	00
Coquille River	Oreg	In town of Bandon	43	07	00	124	25	00
Humboldt Bay	Cal	Near old lighthouse tower, N. side entrance Humboldt Bay.	40	46	00	124	13	00
Point Reyes	Cal	3½ miles N. of light	38	02	20	122	59	30
Fort Point	Cal	¾ mile E. of light	37	48	10	122	27	50
Golden Gate	Cal	On beach in Golden Gate Park, San Francisco, ¾ mile S. of Point Lobos	37	46	10	122	30	30
Southside	Cal	3⅜ miles S. of Golden Gate Park Life-saving Station.	37	43	18	122	30	18

*Instructions to enable mariners to avail themselves fully of the assistance thus afforded will be sent free of charge upon application to the General Superintendent of the Life-Saving Service, Washington, D. C.

VARIATION OF THE COMPASS.

The magnetic variations for 1904 at points mentioned are as follows; the annual change is inappreciable:

Locality.	Compass variation.
	°
Point Loma, Cal	13½ E.
Point Fermin, Cal	14½ "
Point Arguello, Cal	15¼ "
Point Sur, Cal	16¼ "
Farallon Light, Cal	16¾ "
Point Arena, Cal	17½ "
Cape Mendocino, Cal	18 "
Point St. George, Cal	19 "
Cape Blanco, Oreg	19¾ "
Heceta Head, Oreg	20½ "
Cape Lookout, Oreg	21½ "
Cape Disappointment, Wash	22 "
Cape Elizabeth, Wash	23 "
Cape Flattery, Wash	23½ "
Point Wilson, Wash	23 "
West Point (Seattle Harbor), Wash	22½ "

TIDES.*

GENERAL TABLE.

On the coast of California, Oregon, and Washington there are usually two unequal high waters and two unequal low waters during the lunar day, the inequality varying principally with the declination of the moon. When the moon is near the equator the tides are generally nearly equal and have the least diurnal range. When the moon is near its greatest declination (farthest N. or S.) the tides are very unequal and usually have the greatest range of the month; these are called "great tropic tides." The effect of new or full moon is to increase the range of all tides.

The relative height of consecutive high waters or of consecutive low waters may be ascertained by noting the declination and the transit of the moon, there being two cases:

1. With north declination the higher high water occurs near the time of the moon's lower transit, and the lower low water follows the higher high water.

2. With south declination the higher high water occurs near the time of the moon's upper transit, and the lower low water follows the higher high water.

It will be noticed by an inspection of the table that there is a gradual but considerable increase of rise and fall from the coast toward the heads of the bays and estuaries, and that the times of high and low waters occur later in them than on the coast, though the differences in the more open waters are but small.

These rules do not apply to Juan de Fuca Strait and its tributaries (see following table).

Tropic tides are those which occur near the time of the moon's greatest declination either north or south. In the following table the tropic lunitidal intervals† are marked *a* or *b*.

a. Indicates that an upper transit goes with a north declination and a lower transit with a south declination.

b. Indicates that a lower transit goes with a north declination and an upper transit with a south declination.

To find the time of high or low water from the table.—Use the intervals under "Mean tides" during the period from 2 days before to 4 days after the moon's zero declination (on the equator), and use the lunitidal intervals under "Tropic tides" at other times.

Locality.	Lunitidal intervals.				Rise and fall (range).	
	Mean tides.		Tropic tides.		Mean tides.	Great tropic tides.
	High water.	Low water.	Higher high water.	Lower low water.		
	h. m.	h. m.	h. m.	h. m.	Feet.	Feet.
San Diego Bar	9 29	3 07	8 46*a*	3 43*b*	3.9	5.9
San Diego, La Playa	9 32	3 20	8 48*a*	3 55*b*	3.8	5.9
San Pedro	9 36	3 13	8 51*a*	3 42*b*	4.1	6.2
Santa Barbara Light	9 37	3 15	8 49*a*	3 46*b*	3.6	5.5
Santa Catalina Harbor	9 28	3 08	8 41*a*	3 38*b*	3.8	5.9
Cuyler Harbor, San Miguel Island	9 23	3 02	8 36*a*	3 32*b*	3.7	5.6
San Luis Obispo	10 17	4 05	9 30*a*	4 35*b*	3.7	5.6
Cayucos, Estero Bay	10 33	4 27	9 46*a*	4 57*b*	3.8	5.8
San Simeon	10 38	4 34	9 52*a*	5 04*b*	4.0	6.1
Monterey Harbor Light	10 43	4 24	9 43*a*	4 43*b*	4.0	6.8
Santa Cruz Harbor Light	10 54	4 27	9 57*a*	4 45*b*	4.3	7.1
Half Moon Bay	10 48	4 24	9 48*a*	4 43*b*	3.9	6.6
San Francisco Bar	11 37	4 55	10 35*a*	5 16*b*	3.5	6.1
San Francisco Entrance, Fort Point	11 39	5 03	10 36*a*	5 24*b*	3.7	6.2
San Francisco, Mission Street	12 07	5 34	11 08*a*	5 53*b*	4.2	7.1
Oakland	12 11	5 42	11 09*a*	6 02*b*	4.5	7.3
San Mateo Point	0 00	6 00	–0 53*b*	6 17*b*	5.1	8.2
Redwood City, Creek Entrance	0 11	6 15	–0 38*b*	6 31*b*	6.1	9.4
Ravenswood	0 13	6 27	–0 36*b*	6 44*b*	6.0	9.3
Sausalito	11 44	5 22	10 45*a*	5 45*b*	3.5	6.0
The Brothers Light	0 15	6 09	–0 38*b*	6 29*b*	4.2	6.9
Petaluma Point	0 20	6 35	–0 28*b*	6 59*b*	4.5	7.4
Sonoma Creek Entrance	0 36	6 51	–0 16*b*	7 11*b*	4.5	7.4
Mare Island Light	1 05	7 15	0 10*b*	7 29*b*	4.7	7.6
Benicia	1 35	7 48	0 43*b*	8 08*b*	4.7	7.6

* Tide Tables for the Pacific Coast of the United States and Alaska, published annually by the Coast and Geodetic Survey, predicting the times and heights of tides for every day of the year, at all the principal ports, can be obtained from the agents named in the list given on page 7, price, $0.10.

† The mean lunitidal interval for high water or for low water is the average time from the meridian transit of the moon to the next following high or low water, respectively; it is also called the corrected establishment.

Locality.	Latitudinal intervals.				Rise and Fall (Range).	
	Mean tides.		Tropic tides.			
	High water.	Low water.	Higher high water.	Lower low water.	Mean tides.	Great tropic tides.
Drakes Bay	11 33	5 17	10 36*a*	5 35*b*	4.3	7.1
Tomales Bay	12 00	5 50	10 58*a*	6 10*b*	3.7	6.3
Point Arena Light	10 36	4 21	9 32*a*	4 42*b*	3.4	5.9
Mendocino Bay	10 35	4 24	9 33*a*	4 44*b*	3.8	6.5
Fort Bragg Landing	11 00	4 50	10 00*a*	5 09*b*	3.9	6.6
Humboldt Bay Bar	11 33	5 19	10 51*a*	5 39*b*	4.3	6.4
Eureka, Humboldt Bay	11 57	5 45	11 16*a*	6 05*b*	4.6	6.7
Trinidad Harbor Light	11 27	5 11	10 46*a*	5 31*b*	4.6	6.7
Crescent City Light	11 33	5 15	10 53*a*	5 34*b*	4.7	6.9
Rogue River	11 42	5 39	11 01*a*	5 59*b*	4.5	6.5
Port Orford	11 32	5 15	10 52*a*	5 34*b*	4.8	7.0
Bandon, Coquille River	11 32	5 44	10 50*a*	6 04*b*	4.2	6.3
Coos Bay Bar	11 55	5 49	11 15*a*	6 08*b*	4.8	7.0
Empire	0 13	6 41	–0 31*b*	7 02*b*	3.9	5.9
North Bend	0 53	7 24	0 10*b*	7 45*b*	4.1	6.1
Marshfield	2 04	7 59	1 22*b*	8 19*b*	4.4	6.5
Umpqua River, Bar at Entrance	0 05	6 30	–0 33*b*	6 48*b*	5.0	7.3
Gardiner	0 36	7 08	–0 03*b*	7 27*b*	5.1	7.4
Yaquina Bay, Bar at Entrance	11 50	5 37	11 14*a*	5 54*b*	5.9	8.3
Hobsonville, Tillamook Bay	12 31	6 23	11 56*a*	6 40*b*	6.3	8.8
Columbia River Bar	12 10	6 10	11 35*a*	6 27*b*	6.1	8.6
Point Adams (Clatsop)	0 05	6 29	–0 30*b*	6 46*b*	6.2	8.7
Astoria	0 15	6 42	–0 22*b*	6 59*b*	6.4	8.6
Tongue Point	0 34	7 12	–0 01*b*	7 29*b*	6.2	8.7
Cathlamet	1 53	9 05	1 13*b*	9 24*b*	4.9	7.2
Oak Point	2 31	10 12	1 46*b*	10 34*b*	3.7	5.6
Kalama	3 39	11 25	2 45*b*	11 51*b*	2.6	4.2
Willamette River Entrance	6 11	1 30	4 46*b*	2 11*a*	1.1	2.1
Willapa Bay Entrance	0 00	6 00	0 35*b*	6 17*b*	6.2	8.7
South Bend, Willapa Bay	0 45	6 35	0 13*b*	6 50*b*	7.5	10.3
Grays Harbor Entrance	12 15	5 45	11 42*a*	6 01*b*	6.9	9.6
Hoquiam, Grays Harbor	0 26	6 28	–0 04*b*	6 42*b*	8.3	11.2
Laidlaw, Grays Harbor	0 04	6 28	–0 29*b*	6 44*b*	7.0	9.7
Cape Flattery Light, Tatoosh Island	0 08	6 16	–0 28*b*	6 34*b*	5.7	8.1
Port Angeles	2 10	8 23	3 41*a*	8 16*b*	4.4	8.3
New Dungeness Light	2 42	8 34	4 39*a*	8 27*b*	4.2	8.2
Port Townsend	3 47	9 32	5 39*a*	9 25*b*	5.2	9.5
Port Ludlow	4 00	9 56	5 35*a*	9 50*b*	6.3	11.3
Port Gamble	4 03	10 00	5 35*a*	9 55*b*	6.7	11.8
Union City	4 18	10 30	5 42*a*	10 25*b*	8.1	13.7
Port Madison	4 20	10 23	5 38*a*	10 18*b*	7.5	12.5
Seattle, Elliott Bay	4 22	10 33	5 34*a*	10 24*b*	7.7	12.7
Port Blakely	4 25	10 29	5 51*a*	10 24*b*	7.8	13.3
Bremerton, Puget Navy Yard	4 27	10 35	5 49*a*	10 30*b*	7.8	13.3
Tacoma	4 32	10 45	5 55*a*	10 40*b*	8.2	13.8
Olympia, Budd Inlet	4 55	11 20	6 08*a*	11 16*b*	10.8	17.3
Utsalady	4 20	10 36	5 46*a*	10 31*b*	7.9	13.5
Deception Pass	4 05	10 05	5 50*a*	9 59*b*	5.2	9.7
Burrows Bay, Allan Island	4 03	9 45	5 48*a*	9 39*b*	5.2	9.7
Anacortes, Fidalgo Island	4 02	10 19	6 00*a*	9 54*b*	6.3	11.3
Thatcher Pass, Decatur Island	4 25	10 00	6 09*a*	9 54*b*	5.4	10.0
Peavine Pass, Obstruction Island	4 28	10 00	6 11*a*	9 54*b*	5.5	10.1
Strawberry Bay, Cypress Island	4 20	10 00	6 04*a*	9 54*b*	5.3	9.9
Eagle Harbor, Cypress Island	4 30	10 30	6 13*a*	10 24*b*	5.5	10.1
William Point, Samish Island	4 35	10 30	6 19*a*	10 24*b*	5.3	9.9
Fairhaven	4 47	10 30	6 32*a*	10 24*b*	5.2	9.7
Point Migley, Lummi Bay	4 50	10 33	6 35*a*	10 27*b*	5.2	9.7
Drayton Harbor	4 59	11 10	6 37*b*	11 04*b*	5.9	10.7
Cattle Point, San Juan Island	3 28	9 22	5 16*b*	9 15*b*	5.0	9.4
Green Point, Spieden Island	3 43	9 48	5 26*b*	9 42*b*	5.5	10.1
Roche Harbor, San Juan Island	3 35	9 36	5 19*b*	9 30*b*	5.4	10.0
Turn Point, Stuart Island	3 51	9 56	5 32*b*	9 50*b*	5.7	10.4
Alden Point, Patos Island	4 17	10 23	5 58*b*	10 17*b*	5.7	10.4

TABLE OF LIGHTS.

Lighthouse District, Etc.—The waters covered by this volume lie within the **Twelfth and Thirteenth Lighthouse Districts** of the United States. These districts extend from the Mexican boundary northward, including the States of California, Oregon, and Washington. The Light list and Buoy list for the Pacific Coast of the United States give full descriptions of the aids to navigation.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
		° ′ ″				
1	POINT LOMA	32 39 48 117 14 37	Flashing alternately red and white; interval between flashes 20 seconds.	3	88	15
	SAN DIEGO BAY:					
2	Ballast Point	32 41 04 117 14 04	Fixed white	5	34	11
3	La Playa	32 42 (05) 117 14 (11)	Fixed white	Lens lantern.	28	
4	Beacon No. 2	32 42 (03) 117 13 (48)	Fixed red	Lens lantern.	18	
5	Beacon No. 3	32 42 (47) 117 13 (28)	Fixed white	Lens lantern.	24	
6	Beacon No. 6	32 42 (47) 117 12 (45)	Fixed red	Lens lantern.	18	
7	Beacon No. 5	32 43 (08) 117 12 (47)	Fixed white	Lens lantern.	18	
8	Beacon No. 10	32 42 (54) 117 11 (41)	Fixed red	Lens lantern.	13	
9	POINT FERMIN	33 42 14 118 17 41	Fixed white	4	154	17
	SAN PEDRO BAY:					
10	Deadmans Island Breakwater Beacon	33 43 (21) 118 16 (15)	Fixed red	Lens lantern.	16	
11	San Pedro Harbor Beacon, No. 4	33 43 (47) 118 16 (28)	Fixed red	Post lantern.	11	
12	San Pedro Harbor Beacon, No. 3		Two, fixed white	Post lantern.	{10} {16}	
13	POINT DUME					
14	POINT HUENEME	34 08 38 119 12 40	Flashing white every 5 seconds	4	52	11¼
15	SANTA BARBARA	34 23 45 119 43 22	Fixed white	4	178	17¾
16	POINT CONCEPTION	34 26 49 120 28 18	Flashing white every 30 seconds	1	133	17¾
17	POINT ARGUELLO	34 34 (28) 120 38 (53)	Fixed white	4	91	15¼
18	SAN LUIS OBISPO	35 09 (32) 120 45 (42)	Flashing alternately red and white; interval between flashes 30 seconds.	4	130	17½
19	PIEDRAS BLANCAS	35 39 51 121 17 05	Fixed white varied by a white flash every 15 seconds.	1	168	19¼
20	POINT SUR	36 18 17 121 54 07	Flashing alternately red and white; interval between flashes 15 seconds.	1	270	23¼
21	POINT PINOS	36 37 55 121 56 02	Fixed white	3	89	15¼
22	Santa Cruz	36 57 05 122 01 38	Fixed red	5	67	8½
23	Año Nuevo Island	37 06 (44) 122 19 (51)	Fixed white	Lens lantern.	22	
24	PIGEON POINT	37 10 49 122 23 39	Flashing white every 10 seconds	1	148	18½
25	Point Montara	37 32 (04) 122 31 (09)	Fixed red	Lens lantern.	55	

CALIFORNIA.

These pamphlets, which are corrected and reprinted from time to time, are sent free of charge to any shipmaster on application to the office of the Light-House Board, Washington, D. C., or to the Inspector of the Twelfth Lighthouse District, Safe Deposit Building, San Francisco, Cal., and Inspector of the Thirteenth Lighthouse District, Customhouse, Portland, Oreg. They can also be had on application at the United States Branch Hydrographic Offices at San Francisco and Port Townsend.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
1	Square, white, pyramidal, skeleton tower, inclosing stair-cylinder, surmounted by watch room and black lantern and gallery railing; stands about midway between and 85 feet southerly of two white one-and-one-half-story dwellings with lead-colored trimmings, green blinds, and red roofs.	60	
2	Square, white, frame tower attached to easterly corner of one-and-one-half-story white frame dwelling with green blinds, lead-colored trimmings, and red roof; lantern, black. A similar dwelling, without tower, stands a few yards to northward of lighthouse; fog-bell structure a few yards to southward.	30	Bell struck by machinery every 10 seconds.
3	Lantern on platform on top of storehouse		Bell struck by machinery every 3 seconds.
4	Cluster of four piles surmounted by a red lamphouse with "2" in black on each side.		
5	Cluster of four piles surmounted by black lamphouse with "3" in white on each side.		
6	Cluster of four piles surmounted by a red lamphouse with "6" in black on each side.		
7	Black, three-pile structure crossed with slats; "5" in white on each side		
8	Cluster of four piles surmounted by a red lamphouse with "10" inside a black diamond on each side.		
9	Square, white structure, rising from white dwelling with red roof; lantern, black	50	
10	Square, red, pyramidal, wooden structure of four piles, surmounted by a lamphouse and lantern.		
11	Lantern suspended from an arm on a single red pile		
12	Lanterns suspended from single pile crossed with boards, painted black		
13	*Light and fog signal to be established*		
14	Square, white structure, rising from white dwelling with red roof, standing on a slight elevation, and showing very prominently against distant hills; lantern, black.	46	
15	White tower, rising from white dwelling with green window shutters and red roof; lantern, black.	34	
16	Low, white tower, rising from behind a white building, on plateau below the pitch of Point Conception; lantern, black. White fog-signal buildings, cottage, etc., on the plateau westerly of the lighthouse. Dwelling and outbuildings, white, with red roofs, on the bluff, 127 feet above the lighthouse.	39	12-inch steam whistle; blasts 8 seconds, silent intervals 52 seconds.
17	Square tower, with black lantern, rising from fog-signal building. One double and a single two-story dwelling, with red roofs, about 600 feet to northward and eastward of tower. Buildings, wood, white, with lead-colored trimmings.	27¾	12-inch compressed-air whistle; blasts 2 seconds, silent intervals 28 seconds.
18	Square, white, frame tower attached to southwesterly corner of a one-and-one-half-story white frame dwelling, with lead-colored trimmings, green blinds, and red roof; lantern, black. A one-and-one-half-story double dwelling, painted like the above, stands 150 feet to the eastward. Fog-signal building between dwellings and 150 feet to southward.	30	10-inch steam whistle; blasts 5 seconds, silent intervals 35 seconds.
19	Conical, white tower, about 50 feet in front of dwelling; dome of lantern, balustrade, and gallery, black. Dwelling, outhouses, and fences, white; roofs, red.	90	
20	Square, gray-stone tower, rising from near the middle of a rectangular gray-stone oil and fog-signal house; lantern, black. Two-and-one-half-story gray-stone dwelling, with red shingled roof, stands about 1,000 feet easterly of tower.	38½	12-inch steam whistle; blasts 5 seconds, silent intervals 35 seconds.
21	Low, white tower, rising from white dwelling with red roof; lantern, black	35	
22	Small, square, white tower, rising from white dwelling with green blinds and red roof; dome of lantern, black.	35	
23	White buildings; roofs, red. Dwelling E. by N. from fog-signal house. Lens lantern in small structure in front of fog-signal house. Large cylindrical water tank on highest point of the island.	4	12-inch steam whistle; blasts 10 seconds, silent intervals 55 seconds.
24	Conical, white tower; lantern, black. Dwelling to northwestward of tower; fog-signal house 100 feet westward of tower. Buildings, white, with red roofs.	100	10-inch or 12-inch steam whistle; blasts 4 seconds, alternate silent intervals 7 and 45 seconds.
25	Fog-signal house and dwelling about 90 feet apart, white, with lead-colored trimmings and red roofs. Lens lantern on post 300 feet W. by S. of fog-signal house.	8½	12-inch steam whistle; blasts 5 seconds, silent intervals 25 seconds.

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
		° ′ ″				
26	FARALLON	37 41 51 123 00 07	Flashing white every minute	1	358	26
27	*San Francisco Light-Vessel, No. 70* (*See Description of Station.*)	37 44 (56) 122 41 (33)	Two fixed white 5 seconds, eclipses 10 seconds; three lanterns encircling each masthead.	Lens lantern.	57	13
28	BONITA POINT	37 48 51 122 31 47	Fixed white	2	124	17
29	MILE ROCKS					
	SAN FRANCISCO BAY:					
30	Fort Point	37 48 32 122 28 39	Flashing alternately red and white; interval between flashes 5 seconds.	4	18	14¾
31	Lime Point	37 49 26 122 28 43	Fixed white	Lens lantern.	19½	
32	Angel Island	37 51 (10) 122 26 (31)	Fixed red	Lens lantern.	34	
33	Alcatraz Fog-Signal Station					
34	Alcatraz	37 49 29 122 25 21	Flashing white every 15 seconds	4	164	19
35	Yerba Buena	37 48 21 122 21 45	Fixed white	5	95	12¾
36	Oakland					
37	Oakland Harbor	37 47 55 122 19 54	Fixed white	5	43	12
38	Oakland Harbor South Jetty	37 47 (44) 122 19 (52)	Fixed red	Lens lantern.	18	
39	South San Francisco Beacon		Fixed red	Lens lantern.	18	
40	East Brother Island	37 57 42 122 26 01	Fixed white	4	61	13½
	SAN PABLO BAY:					
41	Mare Island	38 04 19 122 15 19	Fixed white	4	74	14¼
42	Mare Island Strait Beacon	38 04 (09) 122 14 (38)	Fixed white	Lens lantern.	18½	
43	POINT REYES	37 59 39 123 01 24	Flashing white every 5 seconds	1	294	24
44	POINT ARENA	38 57 12 123 44 27	Fixed white	1	155	18¾
45	CAPE MENDOCINO	40 26 18 124 24 25	Flashing white every 30 seconds	1	422	28
46	HUMBOLDT	40 41 (37) 124 16 (26)	Fixed white	4	176	17

CALIFORNIA.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
26	Conical, white tower; lantern, black. Three dwellings, with outhouses, at foot of hill, about ¼ mile S. of tower. Fog-signal structures, consisting of signal house, coal house, blacksmith shops, etc., 600 feet SSE. ¾ E. from westerly dwelling. Buildings, white, with red roofs.	29	1st-class steam siren; blasts 5 seconds, silent intervals 45 seconds.
27	Flush-deck, steam light-vessel, two masts, schooner-rigged, no bowsprit. Circular black gallery at each masthead. Hull, red, with "SAN FRANCISCO" in white on each side, and "70" in white on each bow. A black smokestack and the fog signal between the masts. *This vessel will be withdrawn from her station from about April 1 to May 1 of each year. During her absence the station will be marked by a gas buoy showing a fixed white light and painted red, with "Light-Vessel Moorings" in black.*	----------	12-inch, steam, chime whistle; blasts 2 seconds, silent intervals 13 seconds. If whistle be disabled, a bell will be rung by hand.
28	Low, white tower; lantern, black. Old tower, white, about ¼ mile from lighthouse, a little W. of N., and is used as a daymark only. Fog-signal house, white, on extreme end of Bonita Point. Roofs, red. *The siren will sound 5 or 6 short, sharp blasts and a blast of 15 seconds to warn the life-saving crew when vessels are in distress.*	21	1st-class steam siren; blasts 5 seconds, silent intervals 35 seconds.
29	*Light and fog signal to be established*	----------	----------
30	White tower with black lantern, two white dwellings, with green shutters and red roofs, about 200 feet southerly of tower. Fog bell on bastion of fort.	27	Bell struck by machinery every 10 seconds. *2d-class Daboll trumpet to be established.*
31	Brick fog-signal building and dwellings, white; roofs, red. Lantern on southeasterly corner of fog-signal building. *The whistle will sound 5 or 6 short, sharp blasts and a blast of 15 seconds to warn the life-saving crew when vessels are in distress.*	----------	12-inch steam whistle; blasts 10 seconds, silent intervals 30 seconds.
32	Fog-signal house and square frame dwelling with pyramidal roof. House and dwelling, white, with red roofs. Lantern on southeasterly corner of fog-signal building.	----------	Bell struck by machinery a double blow every 15 seconds.
33	White, square, frame, fog-signal house with red roof	----------	Bell struck by machinery every 6 seconds.
34	Cylindrical, white tower, rising from white dwelling with red roof; lantern, black. Fog bell, in white building with lead-colored trimmings and red roof, on southeasterly part of the island, about 450 feet ESE. ⅜ E. from lighthouse.	36	Bell struck by machinery five blows, at intervals of 10 seconds, followed by a silent interval of 25 seconds.
35	Low, octagonal tower, white, with lead-colored trimmings; lantern, black; dwelling, white, on hill in rear of tower. Fog-signal structures, white, with red roofs, situated below and in front of tower.	22	10-inch steam whistle; blasts 4 seconds, silent intervals 16 seconds. If whistle be disabled a bell will be struck by machinery every 10 seconds.
36	*Light and fog signal to be established*	----------	----------
37	Black lantern on a one-story white frame dwelling with red roof and green window blinds, on a foundation of eleven piles.	----------	Bell struck by machinery every 5 seconds.
38	Square, red, pyramidal skeleton, upper third inclosed	----------	----------
39	Red four-pile structure, surmounted by a red lamphouse and the lantern	----------	----------
40	White, square tower, rising from white dwelling with red roof and green blinds; lantern, black. White fog-signal house and outbuildings, with red roofs, on easterly end of island, 150 feet from lighthouse.	37½	12-inch steam whistle; alternate blasts of 4 and 6 seconds, silent intervals 24 seconds. At the beginning of fog, or if whistle be disabled, a bell will be struck by hand at intervals of about 15 seconds.
41	Small, square tower with black lantern, rising from white dwelling with red roof. White fog-signal building with red roof, on end of wharf, southerly of lighthouse.	----------	Bell struck by machinery every 10 seconds.
42	Triangular, red and black horizontally striped, pyramidal, wooden structure of three piles surmounted by lamphouse and lantern.	----------	----------
43	White, sixteen-sided tower; lantern, black. Dwelling, white, 1,090 feet (⅕ mile) NE. ¼ E. of and 200 feet higher than the base of tower. Fog-signal buildings, white, on a cliff about 100 feet lower than tower. *There is a signal-display station on the extreme northwesterly end of the high ridge on the light-house reservation, connected with San Francisco by telephone.* *The Light-House Establishment is not responsible for the maintenance of the signal station or the display of the signals.* *The whistle will sound 5 or 6 short, sharp blasts and a blast of 15 seconds to warn the life-saving crew when vessels are in distress.*	23	12-inch steam whistle; blasts 5 seconds, silent intervals 70 seconds. *The whistle can seldom be heard to northward in northwest winds, and rarely ever in the bight above.*
44	White, conical tower, white dwelling 60 feet in rear. Dome of lantern, gallery, balustrade, and band, black. White fog-signal building, 60 feet westerly of tower. Roofs, red.	100	10-inch or 12-inch steam whistle; blasts 5 seconds, silent intervals 25 seconds.
45	White, sixteen-sided tower; lantern, black. White dwelling with lead-colored trimmings and brown roof, 314 feet E. ⅛ N. from tower. White barn with brown roof, 325 feet SE. ⅜ E. from tower.	20	----------
46	White, square, frame tower, attached to northwesterly corner of a one-and-one-half-story white frame dwelling, with lead-colored trimmings, green blinds, and red roof; lantern, black. A one-and-one-half-story, frame, double dwelling, painted similarly to the above, stands near, and the fog-signal house stands southerly of and midway between the two dwellings. *The whistle will sound 5 or 6 short, sharp blasts and a blast of 15 seconds to warn the life-saving crew when vessels are in distress.*	30	10-inch or 12-inch steam whistle; alternate blasts of 4 and 8 seconds, silent intervals 24 seconds.

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of lights.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
	HUMBOLDT BAY:	° ′ ″				
47	Range: Humboldt Bay Entrance Front Beacon	40 45 (23) 124 14 (07)	Fixed red	Lens lantern.	21	
48	Range: Humboldt Bay Entrance Rear Beacon	40 45 (06) 124 13 (52)	Fixed white	Lens lantern.	23	
49	Humboldt North Jetty Beacon	40 45 (52) 124 13 (13)	Fixed white	Post lantern.	23	
50	Humboldt Beacon, No. 1	40 46 (53) 124 11 (55)	Fixed white	Post lantern.	13	
51	Brosnons Wharf Beacon	40 47 (33) 124 11 (12)	Fixed red	Post lantern.	23	
52	Clark Slough Beacon, No. 6	40 47 (57) 124 10 (54)	Fixed red	Post lantern.	20	
53	TRINIDAD HEAD	41 03 01 124 09 03	Fixed white varied by a red flash every minute.	4	196	17¼
54	Crescent City	41 44 (36) 124 12 (10)	Fixed white varied by a white flash every 90 seconds.	4	77	14½
55	ST. GEORGE REEF	41 50 (10) 124 22 (30)	Flashing alternately red and white; interval between flashes 15 seconds.	1	146	18
56	CAPE BLANCO	42 50 (22) 124 33 (30)	Fixed white	1	252	22½
57	COQUILLE RIVER	43 07 (23) 124 25 (17)	Fixed white 28 seconds, eclipse 2 seconds	4	47	12¼
58	CAPE ARAGO	43 20 (36) 124 22 (31)	Fixed white varied by a white flash every 2 minutes.	4	84	14¾
	COOS BAY:					
59	Range: Coos Bay Entrance Front	43 20 (58) 124 20 (24)	Fixed white	Post lantern.	12	
60	Range: Coos Bay Entrance Rear	43 20 (33) 124 19 (31)	Fixed white	Post lantern.	45	
61	Range: Coos Bay Inside Front	43 20 (53) 124 20 (16)	Fixed red	Post lantern.	13	
62	Range: Coos Bay Inside Rear	43 20 (48) 124 20 (21)	Fixed white	Post lantern.	65	
63	Pony Bend	43 25 (13) 124 16 (57)	Fixed white	Post lantern.	12	
64	North Bend		Fixed white	Post lantern.	8	
65	Ranges: Stave Mill Lower Rear	43 22 (50) 124 13 (13)	Fixed red	Post lantern.	25	
66	Ranges: Stave Mill Lower and Upper Front	43 22 (58) 124 13 (10)	Fixed white	Post lantern.	8	
67	Ranges: Stave Mill Upper Rear	43 23 (03) 124 13 (16)	Fixed red	Post lantern.	25	
68	Range: Marshfield Front	43 22 (28) 124 12 (28)	Fixed white	Post lantern.	8	
69	Range: Marshfield Rear	43 22 (37) 124 12 (26)	Fixed white	Post lantern.	12	
70	UMPQUA RIVER	43 39 (33) 124 12 (09)	Flashing white and red, every third flash red; interval between flashes 5 seconds.	1	164	19
71	HECETA HEAD	44 08 (08) 124 07 (51)	Flashing white every minute	1	204	20½
	YAQUINA BAY:					
72	Range: Yaquina Bar Front Beacon		Fixed white	Lens lantern.	15	
73	Range: Yaquina Bar Rear Beacon		Fixed white	Post lantern.	30¼	
74	Government Wharf Beacon		Fixed red	Post lantern.	12¼	

CALIFORNIA AND OREGON.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
47	Lantern on a pyramidal structure; upper part, red; lower, white		
48	Lantern on a pyramidal structure; upper part, red; lower, white		
49	Lantern on a black, pyramidal structure	12	
50	Lantern on a black box, numbered "1," crowning a double pile		
51	Lantern suspended from an arm on a red post on the southwesterly corner of the wharf.		
52	Lantern on a red box, numbered "6," crowning a pile		
53	White, pyramidal tower; lantern, black. White dwellings, with red roofs, about 150 feet northeasterly of tower. White fog-signal house, with red roof, on white trestle, 126 feet above sea level.	18	4,000-pound bell struck by machinery every 10 seconds.
54	Low, white tower, rising from white dwelling with red roof and green shutters; lantern, black; outbuildings, white, with red roofs.	35	
55	Square, pyramidal, gray-stone tower, rising from the easterly end of an oval masonry pier, built on the rock to a height of 66 feet above the water; lantern, black. Fog-signal apparatus within the pier.		12-inch steam whistle; blasts 5 seconds, silent intervals 75 seconds.
56	White, conical tower, with black lantern. White dwelling about 100 feet to southward.	50	
57	White, conical tower, with black lantern, attached to the easterly side of a white fog-signal building with black roof. White, one-and-one-half-story, double dwelling, with brown roof, on the sand dunes, about 650 feet ($\frac{1}{7}$ mile) northeasterly from the tower, and a white barn 150 feet to the northward of the dwelling.	40	Daboll trumpet; blasts 5 seconds, silent intervals 25 seconds.
58	White, octagonal, pyramidal tower; dome and lantern, black; attached to the rear of a white, one-story fog-signal building with black roof. White, one-and-one-half-story, double dwelling, with lead-colored trimmings and brown roof, stands 1,050 feet ($\frac{1}{5}$ mile) SE. from the tower, and faces south.	25	Daboll trumpet; blasts 5 seconds, alternate silent intervals of 8 and 42 seconds.
59	Lantern suspended from an arm on a post		
60	Lantern suspended from an arm on a post		
61	Lantern suspended from an arm on a post		
62	Lantern suspended from an arm on a post		
63	Lantern suspended from an arm on a post		
64	Lantern suspended from an arm on a single pile		
65	Lantern suspended from a white arm on a white post		
66	Lantern suspended from an arm on a three-pile structure		
67	Lantern suspended from a white arm on a white post		
68	Lantern suspended from a white arm on the center pile of a five-pile dolphin		
69	Lantern suspended from a white arm on a three-pile dolphin		
70	White, conical tower; lantern, black; white workroom attached in rear. Two galvanized-iron oilhouses in rear of tower. Two dwellings, 240 feet apart, about 120 feet, respectively, to the northward and southeastward of the tower. A barn 280 feet northward of tower. Dwellings and barn, white, with brown roofs.	50	
71	Conical, white tower; lantern, black; white workroom attached. Two oilhouses, white, with brown roofs, 50 and 90 feet, respectively, to eastward of tower. Two dwellings and a barn, each white with brown roof, about 700 feet ($\frac{2}{5}$ mile) southeasterly of tower.	50	
72	Lantern suspended from an arm on a single pile		
73	Lantern on a white gallows frame		
74	Lantern on a white gallows frame		

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
	YAQUINA BAY—Continued.	° ′ ″				
75	Middle Ground Beacon		Fixed white	Post lantern.	32¼	
76	Coquille Point Beacon		Fixed white	Post lantern.	30	
77	YAQUINA HEAD	44 40 35 124 04 (40)	Fixed white	1	161	19
78	CAPE MEARES	45 29 (00) 123 58 (35)	Fixed white varied by a red flash every minute.	1	220	21½
79	TILLAMOOK ROCK	45 56 (12) 124 01 (10)	Flashing white every 5 seconds	1	132	17¾
80	*Columbia River Light-Vessel, No. 50*	46 11 (13) 124 11 (40)	Two fixed white	Refl'r.	{30} {30}	10½
	COLUMBIA RIVER:					
81	Range. Jetty Sands Front Post Light		Fixed white	Post lantern.	10	
82	Range. Jetty Sands Rear Post Light		Fixed white	Post lantern.	16	
83	Desdemona Sands	46 13 (27) 123 57 (24)	Fixed white	4	46¼	12
84	Fort Stevens Wharf Post Light		Fixed red	Lens lantern.	14	
	The lighted beacons in Columbia River and Willamette River are omitted on account of numerous changes.					
85	CAPE DISAPPOINTMENT	46 16 29 124 03 11	Flashing alternately red and white; interval between flashes 15 seconds.	4	233	21¾
86	NORTH HEAD	46 17 (52) 124 04 (48)	Fixed white	1	192½	20¼
87	WILLAPA BAY	46 43 00 124 04 25	Fixed white varied by a white flash every 2 minutes.	4	80½	14½
88	GRAYS HARBOR	46 53 (16) 124 07 (13)	Flashing alternately red and white; interval between flashes five seconds.	3	122	16
89	Lower Beacon	46 57 (48) 123 58 (15)	Fixed white	Post lantern.	16	
90	Rennies Island Beacon	46 57 (43) 123 56 (18)	Fixed white	Post lantern.	16	
91	Hoquiam River Beacon	46 58 (09) 123 53 (16)	Fixed red	Post lantern.	16	
92	South Channel Beacon	46 57 (24) 123 51 (24)	Fixed white	Post lantern.	12	
93	Cow Point Beacon	46 57 (41) 123 50 (58)	Fixed white	Post lantern.	16	
94	DESTRUCTION ISLAND	47 40 (07) 124 30 (00)	Flashing white every 10 seconds	1	147	18
95	*Umatilla Reef Light-Vessel, No. 67*	48 09 (43) 124 50 (43)	Two fixed white; four lanterns encircling each mast.	Lens lantern.	{39} {39}	11½
96	CAPE FLATTERY	48 23 30 124 44 06	Fixed white with a fixed red sector between SE. ½ S. and SSE. ⅞ E.	1	155	19

OREGON AND WASHINGTON.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
75	Lantern on a shelf on a single white pile		
76	Lantern on a white stake	19	
77	White conical tower; lantern, parapet, and dome, black. White dwelling 70 feet to eastward.	81	
78	White, octagonal, pyramidal tower with white workroom attached; lantern, black. Two brown oilhouses, 65 feet, and two keepers' dwellings, white, with lead-colored trimmings and brown roofs, 1,000 feet to eastward of tower.	23	
79	White, square tower rising from the center of a white dwelling, with a fog-signal house attached on the westerly side; lantern and dome, black.	48	First-class steam siren; blasts 5 seconds, silent intervals 90 seconds.
80	Two masts, schooner-rigged, no bowsprit; red, circular, iron, cagework daymark at each masthead; hull red, with "COLUMBIA RIVER" in black on each side and "No. 50" in black on each quarter.		12-inch steam whistle; blasts 5 seconds, silent intervals 55 seconds.
81	Lantern on an arm on a stake		
82	Lantern on an arm on a stake		
83	White, octagonal, one-and-one-half-story dwelling, with gray trimmings, rising from a rectangular platform, on piles, and having a bronze-colored pyramidal roof, surmounted by a gray cylindrical lantern with bronze-colored roof. A small one-story projection, for the fog signal, is on the westerly side, and a one-story annex on the easterly side of the dwelling.		Daboll trumpet; blasts 3 seconds, alternate silent intervals 3 and 23 seconds.
84	Lantern on a small, dark-brown, wooden house		
85	Conical, white tower; lantern, black. Dwelling, white, but not visible from the bar or sea. *There is a signal-display station here connected with Astoria by telephone, and a life-saving station just inside the point of Fort Canby.*	40	
86	Conical, white tower with watch room at base; lantern, black. Two cement-washed, stone-colored oilhouses, with black roofs; two cement-washed, stone-colored dwellings with black roofs, and a white barn, to the eastward of the tower. *There is here a signal-display station of the Weather Bureau, connected with Astoria and Portland, Oreg., by telephone. It is equipped with International Code Signals for reporting vessels, and for receiving or sending messages.* *The Light-House Establishment is not responsible for the maintenance of the signal station or the display of the signals.*	50	
87	White, conical tower, rising from dwelling; lantern, black	35	
88	White, octagonal, pyramidal, brick tower with stone base and workroom attached; white watch and service rooms; lantern, black. Fog-signal building, light-gray, just to seaward of tower. Two dwellings, barn, and other buildings not visible from seaward.	92½	First-class steam siren; blasts 5 seconds, alternate silent intervals of 5 and 75 seconds.
89	Lantern suspended from an arm on a pile		
90	Lantern suspended from an arm on a three-pile structure		
91	Lantern suspended from an arm on a three-pile structure		
92	Lantern suspended from an arm on a dolphin		
93	Lantern suspended from an arm on a two-pile structure		
94	Conical, white tower; lantern and parapet, black. Two oil houses, 75 feet; two dwellings, 550 feet, a barn 650 feet ENE., and a fog-signal building 130 feet northwesterly of the tower; buildings white, with brown roofs.	80	1st-class steam siren; blasts 5 seconds, silent intervals 55 seconds.
95	Flush-deck, steam light-vessel, two masts, schooner-rigged, no bowsprit. Circular white gallery at each masthead. Hull red, with "UMATILLA REEF" in black on each side, and "67" in black on each bow and each quarter. A black smoke-stack and the fog signal between the masts.		12-inch steam whistle; blasts 3 seconds, silent intervals 27 seconds. If whistle be disabled a bell will be rung by hand.
96	White, conical tower, rising above gray sandstone dwelling; lantern, black. Another dwelling 73 feet to northeastward. Fog-signal building about 80 feet northerly of tower. *There is here a signal-display station of the Weather Bureau. It has telephonic communication and is equipped with International Code Signals and vessels can be reported, or may send or receive messages.* *The Light-House Establishment is not responsible for the maintenance of the station or the display of the signals.*	64	12-inch steam whistle; blasts 8 seconds, silent intervals 52 seconds.

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
	JUAN DE FUCA STRAIT:	° ′ ″				
97	Neah Bay Post Light		Fixed white	Post lantern.	16½	
98	Slip Point					
99	Low Point Post Light		Fixed white	Post lantern.	25	
100	Port Crescent Post Light		Fixed red	Post lantern.	40	
101	Ediz Hook	48 08 24 123 24 07	Fixed white	5	41¾	11¾
102	NEW DUNGENESS	48 10 55 123 06 31	Fixed white	3	90¾	15¼
103	SMITH ISLAND	48 19 07 122 50 36	Flashing white every 30 seconds	4	87	15
	ADMIRALTY INLET:					
104	POINT WILSON	48 08 39 122 45 14	Fixed white varied by a red flash every 20 seconds.	4	50	12½
105	ADMIRALTY HEAD	48 09 (40) 122 40 (46)	Fixed white	4	127	17¼
106	Point Hudson Post Light	48 07 (00) 122 44 (53)	Fixed red	Post lantern.	12	
107	Marrowstone Point Post Light	48 06 (05) 122 41 (00)	Fixed red	Lens lantern.	22	
108	Bush Point Post Light	48 01 (52) 122 36 (21)	Fixed white	Post lantern.	25	
109	Port Gamble Post Light	47 51 (45) 122 34 (33)	Fixed white	Post lantern.	12	
	PUGET SOUND:					
110	Point No Point	47 54 44 122 31 31	Fixed white	5	23	9¾
111	Point Monroe Post Light	47 42 (25) 122 30 (34)	Fixed red	Post lantern.	25	
112	West Point	47 39 43 122 26 03	Flashing alternately red and white, intervals between flashes 10 seconds.	4	23¾	10
113	Battery Point Post Light	47 34 (34) 122 25 (08)	Fixed white	Lens lantern.	12	
114	Orchard Point Post Light		Fixed white	Post lantern.	25	
115	Robinson Point Post Light	47 23 (20) 122 22 (20)	Fixed red	Lens lantern.	40	
116	Point Brown	47 18 (22) 122 26 (34)	Fixed white	Lens lantern.	20	
117	Eagle Island Post Light	47 11 (13) 122 41 (44)	Fixed white	Post lantern.	25	
118	Johnson Point Post Light		Fixed white	Post lantern.	25	
119	Doffiemyer Point Post Light	47 08 (20) 122 54 (25)	Fixed white	Post lantern.	20	
120	Olympia Jetty Post Light		Fixed red	Post lantern.	21	
121	Olympia Post Light		Fixed red	Post lantern.	21	
122	Arcadia Post Light		Fixed white	Post lantern.	25	
	SARATOGA PASSAGE:					
123	Sandy Point Post Light.	48 02 (04) 122 22 (27)	Fixed white	Post lantern.	24	
124	Oak Harbor Post Light		Fixed white	Post lantern.	15	
125	Maylor Spit Post Light		Fixed red	Post lantern.	20	

WASHINGTON.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
97	Lantern on a white gallows frame		
98	*Light and fog signal to be established*		
99	Lantern on white gallows frame	12	
100	Lantern on white gallows frame	8	
101	White, square tower on dwelling; dome of lantern, black. White, pyramidal, frame bell-tower 325 feet NW. by N. from the lighthouse.	35	Bell struck by machinery every 15 seconds.
102	Conical tower rising from grayish-yellow dwelling; upper part of tower, black; lower part, white; lantern, red. Fog-signal building 450 feet northeasterly and white barn 100 feet southwesterly from dwelling.	89	12-inch steam whistle; blasts 6 seconds, silent intervals 12 seconds; blasts 3 seconds, silent interval 39 seconds.
103	Low, conical tower, rising from white dwelling; lantern, black	35	
104	White, square tower, rising from white dwelling; lantern and dome, black. White fog-signal building in front of dwelling.	46	12-inch steam whistle; blasts 8 seconds, silent intervals 52 seconds.
105	Cylindrical tower surmounted by a black, cylindrical lantern connected to NW. corner of two-story dwelling by a covered passageway. Roof of dwelling brown.	32	
106	Lantern in a white box		
107	Lantern on a shelf on a white flagstaff in front (NNE.) of and close to a white one-and-one-half-story dwelling, with lead-colored trimmings and red roof. Bell suspended in front of dwelling.		Bell struck by machinery every 15 seconds.
108	Lantern on a white stake		
109	Lantern suspended from an arm on a three-pile structure		
110	White, low, square tower, with watch-room and fog-signal building attached; lantern and dome, black. White dwelling 200 feet to westward.	20	Daboll trumpet; blasts 3 seconds, alternate silent intervals 3 and 21 seconds.
111	Lantern on a white stake	18	
112	White, low, square tower, with watch-room and fog-signal building attached; lantern, black. Old white fog-signal building 60 feet and two white dwellings 200 feet in rear of light-tower. *Old fog-signal building to be removed.*	20	Daboll trumpet; blasts 5 seconds, silent intervals 25 seconds.
113	White stake	10	*Fog signal to be established.*
114	Lantern suspended from an arm on a tree		
115	Lantern on a white frame. Frame fog-signal house, on end of spit, and a one-and-one-half-story dwelling, 700 feet to southward; both buildings white, with brown roofs.	25	12-inch steam whistle; blasts 6 seconds, silent intervals 54 seconds.
116	White, two story, frame tower; lantern projecting from west side	16	Bell struck by machinery every 20 seconds.
117	Lantern suspended from a white stake	9	
118	Lantern suspended from a white stake	18	
119	White stake	9	
120	Lantern suspended from a white arm on a cluster of three unpainted piles		
121	Lantern suspended from a white arm on a cluster of three unpainted piles		
122	Lantern on a white gallows frame	6	
123	Lantern suspended from a white stake	18	
124	Lantern suspended from a white stake	9	
125	Lantern suspended from a white stake	18	

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
	SKAGIT BAY:	° ′ ″				
126	Skagit River Channel Post Light		Fixed red	Post lantern.	15	
127	Skagit River Post Light		Fixed white	Post lantern.	15	
128	La Conner Jetty Post Light		Fixed white	Post lantern.	10	
129	La Conner Post Light		Fixed white	Post lantern.	60	
130	Hole-in-the-Wall Post Light		Fixed red	Post lantern.	15	
131	Galliher Point Post Light	48 22 (57) 122 30 (16)	Fixed red	Post lantern.	6	
132	Port Susan Post Light		Fixed white	Post lantern.	15	
	WASHINGTON SOUND:					
133	Deception Pass Post Light		Fixed white	Post lantern.	40	
134	Burrows Bay Post Light		Fixed white	Post lantern.	12	
135	March Point Post Light		Fixed white	Post lantern.	12	
136	William Point Post Light		Fixed white	Post lantern.	35	
137	Lummi Point Post Light		Fixed white	Post lantern.	27	
138	Obstruction Passes Post Light		Fixed white	Post lantern.	24	
139	Obstruction Point Post Light		Fixed red	Post lantern.	24	
140	Pole Pass Post Light	48 36 (03) 122 59 (15)	Fixed red	Post lantern.	15	
141	Cattle Point Post Light	48 27 (03) 122 57 (42)	Fixed white	Lens lantern.	100	
142	Turn Point	48 41 20 123 14 09	Fixed white	Lens lantern.	37¾	
143	Patos Islands	48 47 22 122 58 12	Fixed red	Lens lantern.	28½	
144	Semiahmoo Post Light		Fixed red	Post lantern.	20	

The names of the lights are printed as follows, viz:

1st. PRIMARY SEACOAST LIGHTS.

2d. SECONDARY SEACOAST LIGHTS AND LAKE-COAST LIGHTS.

3d. *Light-vessels.*

4th. Sound, bay, river, and harbor lights.

The geographic positions of lights which are uncertain by some seconds, not having yet been accurately determined, and those of light-vessels which vary somewhat in position, have the seconds inclosed thus: 30° 45′ (57″). The geographic positions which are given without having the seconds so inclosed are furnished by the Coast and Geodetic Survey and have been determined by triangulation.

WASHINGTON.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
126	Lantern suspended from a white upright rising from the center of a cluster of three unpainted piles.		
127	Lantern suspended from a white arm on a cluster of three unpainted piles		
128	White stake on a five-pile beacon		
129	Lantern suspended from a white stake	4	
130	Lantern suspended from a white stake	4	
131	Lantern suspended from a white stake	9	
132	Lantern suspended from a white stake		
133	Lantern suspended from a white stake	5	
134	White box on westerly corner of house		
135	White stake with arm for lantern		
136	Lantern suspended from a white stake	10	
137	Lantern suspended from a white stake	18	
138	Lantern suspended from a white stake		
139	Lantern suspended from a white stake	12	
140	Lantern suspended from a white stake	4	
141	Lantern in a white frame rising from a small white sentry box	12	
142	Lantern on a white stake. A one-story fog-signal house and a one-and-one-half-story double dwelling, each white with lead-colored trimmings and brown roofs, near the light to the southeastward.	10	Daboll trumpet; blasts 3 seconds, silent intervals 27 seconds.
143	Lantern on a white stake. A one-story fog-signal house and a one-and-one-half-story double dwelling, each white with lead-colored trimmings and brown roofs, near the light to the southward and eastward.	10	Daboll trumpet; blasts 2 seconds, silent intervals 18 seconds.
144	Lantern suspended from an arm on a cluster of three red piles		

In the column "Characteristic of light," the time interval of flashing lights is given from the beginning of one flash to the beginning of the next following flash, and bearings are magnetic and given from seaward.

In the column "Distance visible, in nautical miles," will be found the distances within which the lights can be seen, under ordinary conditions of the atmosphere, the height of the light being measured from mean high water and the eye of the observer taken at an elevation of 15 feet above sea level.

The fact should be noted that sound signals are not always reliable. The sound may be lost while really approaching it, after being heard; or even when approached until close-to, it may not be heard at all, though properly made. These conditions are the exception, not the rule. They are, however, always possible and render great care necessary.

TABLE OF LIGHTS.

Number.	Name.	Latitude, north. Longitude, west.	Characteristic of light.	Order of light.	Height of light above mean high water, in feet.	Distance visible, in nautical miles.
		° ′ ″				
1	CAPE BEALE	48 47 (30) 125 13 (16)	Revolving every 30 seconds; white, from WNW. ½ W. to E.; red, from E. to SSE.	Refl'r.	178	19
2	CARMANAH	48 36 43 124 44 59	Group revolving white; two intervals 15 seconds, one interval 30 seconds.	Refl'r.	173	19
3	WILLIAM HEAD QUARANTINE STATION FRONT	48 20 23 123 31 45	Fixed red		30	4
4	WILLIAM HEAD QUARANTINE STATION REAR		Fixed red		36	4
5	RACE ROCKS	48 17 53 123 31 47	Flashing white every 10 seconds	2	118	18
	Cape Flattery, U. S. Light					
6	FISGARD	48 25 50 123 26 45	Fixed white between N. ¼ W. and NW. by W. ⅓ W.; fixed red from NW. by W. ⅓ W. to S. ¾ E.; fixed white ray to westward of S. ¾ E.	4	67	12
7	BROTCHY LEDGE	48 24 20 123 23 40	Fixed white 40 seconds, eclipse 20 seconds	P. Electric (incandescent).	18	9
8	BEERENS ISLAND	48 25 22 123 24 00	Fixed white 15 seconds, eclipse 5 seconds; fixed red 15 seconds, eclipse 5 seconds, over Brotchy Ledge.	6	44	10
9	SHOAL POINT	48 25 24 123 23 40	Fixed red	P.	5	3
10	MIDDLE ROCK	48 25 22 123 23 20	Fixed white	P.	8	3
11	FIDDLE REEF	48 25 39 123 17 26	Fixed white, with a fixed red sector between N. ¾ W. and NE. ½ N., and another between SSE. ¾ E. and S. by W. ¼ W.	7	30	10
12	DISCOVERY ISLAND	48 25 27 123 13 27	Fixed white	6	91	15
13	SATURNA ISLAND	48 46 (59) 123 02 (38)	Revolving white every 30 seconds	Refl'r.	125	17

ABBREVIATIONS AND EXPLANATIONS.

LIGHTS.

Fixed. A continuous steady light. In catoptric lights the intensity may vary, depending on the position with reference to the axis of the reflectors.

Flashing. Showing single flashes.

Revolving. Light gradually increasing to full effect, then decreasing to eclipse. (*At short distances and in clear weather a faint continuous light may be observed. As lights of this class are all catoptric, they are liable to variations in intensity during the continuance of the flash as the position of the reflectors changes.*)

Alternating. Red and white light alternately at equal intervals.

The time given for a revolving or flash light is from the beginning of one flash to the beginning of the next.

ILLUMINATING APPARATUS.

Refl'r. Metallic reflectors.

Lenses are numbered from the first order downward. Those marked of the 7th order are anchor lenses or anchor lens lanterns of 5 inches focal distance; those marked "P" are inferior pressed-glass lenses, principally of 3½ inches focal distance.

The bearings are *magnetic*, and are given *from seaward.*

The given distances from which the lights are visible are calculated from a height of 15 feet above the sea, the elevation of the lights being in all cases taken as above high water.

The geographic positions of the lights are approximate.

BRITISH COLUMBIA.

Number.	Description of station.	Height, in feet, from base of structure to center of lantern.	Fog signal.
1	White, square, wood, with dwelling attached	42	
2	White, square, wood; white dwelling attached; iron lantern, red. Fog-signal building, white, wood, unpainted shingle roof, in front of light-tower, facing S. by E. ½ E.; horns 125 feet above high water. *A steam whistle is used for communicating with passing steamers in foggy weather. A private code has been arranged, but strangers may communicate with the station by whistle by using the "Morse" or "Continental" telegraphic codes.*	46	Steam horn; blasts 6 seconds, silent intervals 24 seconds.
3	Lantern on a mast		
4	Lantern on a mast		
5	Alternate black and white horizontal bands; circular, stone, dwelling attached. *In addition to the regular fog signal, a signal of four short blasts from the whistle at this station in answer to the fog signal of any steamer enveloped in fog in the Strait of Juan de Fuca will denote that the northern portion of the strait is free from fog.*	105	12-inch steam whistle; blasts 5 seconds, silent intervals 72 seconds.
6	White, circular, brick; red brick dwelling attached	56	
7	Black, square, steel, open framework on black, conical base		Electric horn; blasts 20 seconds, silent intervals 40 seconds. *Not sounded Sundays between sunrise and sunset. When the horn is in operation its blasts are sounded during the eclipse of the light and its silent intervals coincide with the display of the light.*
8	White, square, wood, dwelling attached. Bell tower on seaward side	30	Bell rung by hand answers vessels' signals.
9	Lantern on top of a dolphin of three red piles		
10	Lantern on top of a dolphin of three black piles		
11	White, square, pyramidal, wooden tower, with square, wooden lantern, on a pier	30	
12	White, square, wood, dwelling attached. Fog-signal building, wood, white, with brown roof, 300 feet southeasterly of light, 45 feet above high water.	47	Steam horn; blasts 8 seconds, silent intervals 60 seconds.
13	White, square, wood, with dwelling attached; iron lantern, red	58	

CAUTION.

WITH RESPECT TO LIGHTS.

The intrinsic power of a light should always 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.

Colored lights are also inferior in power to bright or white lights, and are more quickly lost under unfavorable circumstances.

CUTS OR SECTORS.

In some conditions of the atmosphere white lights may have a reddish hue. The mariner should not trust solely to color where there are sectors, but verify the position by taking a bearing of the light. On either side of the line of demarcation, between white and red, and also between white and green, there is always a small arc of uncertain color.

FOG SIGNALS.

Having in view the varying distances at which a fog signal can be heard at sea, and the frequent occurrence of fog near to, but not observable from, a fog signal station—

Mariners are cautioned that, while they are entitled to assume that every endeavor will be made to start fog signals as soon as possible after signs of fog have been observed, they should not, when approaching the land in a fog, rely implicitly upon these fog signals, but should always use the lead, which, in nearly all cases, will give sufficient warning.

Mariners are strongly cautioned that they must not judge their distance from a fog signal by the power of the sound. Under certain conditions of the atmosphere the sound may be lost at a very short distance from the station, and these conditions may vary at the same station within very short intervals of time.

The expression "foggy weather" means that the state of the atmosphere is such as to make objects indistinct.

GENERAL REMARKS ON APPROACHING AND SAILING ALONG THE COAST.

In clear weather little difficulty will be experienced in approaching or sailing along the coast. The landmarks for the principal ports are prominent, visible seaward in daytime for a considerable distance, and at night the numerous aids to navigation afford a ready means of locating a vessel's position. The principal ports for which foreign vessels are usually destined are San Diego, San Pedro, San Francisco, Humboldt Bay, the Columbia River, Willapa Bay, Grays Harbor, and Juan de Fuca Strait. For each of these the landmarks are distinctive and easily distingished, and on a nearer approach to the coast the aids to navigation assist in a more accurate location of a vessel's position.

In foggy weather, often lasting several weeks, a vessel approaching the coast should do so with the greatest caution, as owing to the irregularity of the currents in both direction and velocity, the length of time elapsed since last obtaining sights, and the fact that under conditions of thick or foggy weather the winds are usually light, a vessel's position is very uncertain. Vessels from seaward crossing the outer southerly current and coming under the influence of the inshore northerly current, as a rule find themselves when the weather clears northward of their calculated position. This is particularly true in the vicinity of the Columbia River, Willapa Bay, and Grays Harbor.

Vessels coasting will find, under favorable weather conditions, the "Outside Sailing Directions along the Coast" the most direct. These are available for steamers of any draft and for sailing vessels with favorable winds. During the summer months when the northerly winds prevail, northbound steamers may follow, in clear weather, the "Inside Sailing Directions along the Coast." These routes are followed by the majority of the coasting steamers bound northward in summer and lead in smoother water with less wind, the force of which is somewhat moderated by the projecting points of the land. In thick weather, vessels should keep farther offshore, sounding frequently to avoid an inshore set. In southeasterly or southwesterly weather there is little choice of routes, and if the weather is exceptionally heavy it is best to heave-to at a safe distance from shore until the weather moderates.

Sailing vessels bound northward along the coast in summer generally stand well offshore, taking advantage of every favorable slant to make their northing until the prevailing northerly winds lead fair for their port of destination, and in some cases make a higher latitude than their port in order not to fall to leeward of it. This holds good even for vessels from the Hawaiian Islands, which frequently sail nearly due north from the islands before hauling eastward for the coast. When bound southward in summer as direct a course as possible is made, and after leaving Cape Flattery, Cape Blanco is the first point usually sighted.

In winter no rules can be given except to take advantage of every favorable slant of wind, and in case of unsettled weather take the precaution of having plenty of sea room to ride out heavy weather should it come.

The Lead.—Too much importance can not be given to the use of the lead when approaching or sailing along the coast in thick or foggy weather. A high percentage of the wrecks and stranded vessels on the coast is due almost entirely to a failure to obtain frequent and sufficient soundings or of not getting any. The abrupt rise from 100 fathoms to 30 fathoms or less over the greater portion of the coast necessitates frequent casts, and if less than 100 fathoms be obtained, continuous sounding until in as shoal a depth as is considered prudent. The failure to use the lead combined with the uncertainty of position, due to chronometer errors or an overconfidence in the position of the vessel from the last sights obtained, constitute the main cause of shipwreck to vessels approaching the coast from seaward. Vessels from seaward, uncertain of their position, on getting less than 100 fathoms should heave-to and await clear weather, sounding frequently to avoid an inshore set.

OUTSIDE SAILING DIRECTIONS ALONG THE COAST FROM SAN DIEGO ENTRANCE TO SAN FRANCISCO ENTRANCE.

These directions are available for steamers of any draft and comprise the direct routes from San Diego Entrance to San Francisco Entrance and intermediate points.

They are divided in sections, as follows:

Section 1 and 1 A. San Diego Entrance to Point Arguello.

Section 2. Point Arguello to Point Sur.

Section 3. Point Sur to San Francisco Entrance.

Coasting directions, which, under certain conditions of weather, may be found more advantageous on account of their leading closer inshore in smoother water and less wind, are on pages 33 to 36.

1. ***From San Diego Entrance to Point Arguello.—Through the outer Santa Barbara Passage.***—From the whistling buoy off Point Loma steer **W.** by **N.** (N. 64° 50′ W. true) for 179 miles. This course made good should bring the west end of San Miguel Island to bear *N.* ⅝ *W.*, distant 8¼ miles, and the west end of Santa Rosa Island to bear *NE.*, distant 12½ miles. From this position make good a **NW.** (N. 28° 55′ W. true) course for 40 miles, when Point Arguello Lighthouse should bear *NE.*, distant about 12 miles.

Remarks and dangers.—These courses lead through the **Gulf of Santa Catalina** and the **Outer Santa Barbara Channel,** and clear all dangers. Vessels are off soundings except in the vicinity of **Santa Barbara Island,** where there is a least depth of 26 fathoms on **Osborn Bank** about 6 miles southward from the island. The lead should be used frequently in this vicinity in thick weather as a check on the vessel's position.

The **W.** by **N.** course passes about 5½ miles northward of **San Clemente Island** and 12½ miles southward of **Santa Catalina Island;** it passes about 6½ miles southward of **Santa Barbara Island,** 13½ miles northward of **San Nicolas Island,** and about 7 miles southward of **Santa Rosa** and **San Miguel Islands.** In clear weather these islands are prominent and unmistakable landmarks; **Santa Catalina Island** is particularly noticeable on account of the deep gulch in the western part, nearly dividing it and making it appear as a double island from even a short distance. For a detailed description of these islands see pages 47 to 52.

The approaches to the western ends of Santa Barbara and San Nicolas islands are foul, the 50-fathom curve extending 2½ miles westward from the former and nearly 8 miles westward from the latter. The kelp fields are extensive on their western sides.

Beggs Rock, 40 feet high, lies 7¾ miles **WNW.** from the western end of San Nicolas Island; it rises abruptly from 50 fathoms and is visible for about 10 miles. It is surrounded by kelp, with a reef extending about 100 yards northward and southward from it.

From northward **Point Loma** will generally be raised as an island, and the **Coronados,** a group of small, rocky islands about 14 miles southward from the point, are unmistakable landmarks (see page 37).

The **NW.** course passes about 5 miles westward of the western end of San Miguel Island and 4 miles westward of Richardson Rock.

Richardson Rock, 50 feet high, lies about 4¼ miles northwestward from the western end of San Miguel Island. It rises abruptly from 30 fathoms of water.

The **currents** in the vicinity of San Miguel and Santa Rosa islands are variable in direction and velocity, and in thick weather the islands should not be approached too closely.

1 A. ***From San Diego entrance to Point Arguello. Through the Santa Barbara Channel.***—From the whistling buoy off Point Loma steer **NW.** by **W.** ⅛ **W.** (N. 44° 04′ W. true) for 83 miles; this course made good should bring Point Fermin Lighthouse to bear *NNE.* ⅞ *E.*, distant 7 miles. From this position make good a **WNW.** ⅜ **W.** (N. 57° 25′ W. true) course for 51 miles, when Point Hueneme Lighthouse should bear *N.* by *E.* ⅝ *E.*, distant 4½ miles. Then steer **W.** ⅛ **N.** (N. 73° 26′ W. true); this course made good for 83 miles should bring Point Arguello Lighthouse to bear *NE.*, distant 12 miles.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently and the depth should not be shoaled to less than 50 fathoms. The currents are variable in direction and velocity, particularly in the vicinity of Point Conception and Anacapa Island, and largely influenced by prevailing winds.

Remarks and dangers.—These courses lead through the **Gulf of Santa Catalina** and **San Pedro** and **Santa Barbara Channels.** They lead well offshore and clear all dangers. In clear weather the mountains inland are prominent features and the islands offshore southward of the courses are prominent and unmistakable.

The **NW.** by **W.** ⅙ **W.** course passes about 8 miles northward of **Santa Catalina Island,** noticeable on account of the deep cut in the western part, which makes it appear as a double island.

The **WNW.** ⅜ **W.** course heads for the eastern entrance to the Santa Barbara Channel, favoring the northern side to avoid **Anacapa Island,** the eastern end of which is comparatively low and flat, and in thick weather may be considered a danger. To avoid it in thick weather vessels generally haul northward and make the whistling buoy off Point Hueneme. About 13 miles eastward from Point Hueneme a submarine plateau, with depths of 90 to 47 fathoms, extends about 5 miles seaward, rising abruptly from depths of 150 to 200 fathoms on the eastern, seaward, and western sides. This, and a similar plateau in the vicinity of Point Hueneme, serve to locate a vessel's position in making the whistling buoy, which is near the head of a narrow, deep submarine valley that has a depth of 50 fathoms within ½ mile of the lighthouse (see table, page 16).

Point Hueneme is low and flat. Several warehouses and a short wharf are situated a short distance eastward of the lighthouse.

The **W.** ⅙ **N.** course leads through the Santa Barbara Channel, passing about 11¼ miles southward of the **Santa Barbara Lighthouse** (see table, page 16) and about 4 miles southward from **Point Conception** (see table, page 16). When abreast Santa Barbara the glare from the electric lights can generally be seen.

Point Conception from a distance will appear as an island with an abrupt seaward slope.

Point Arguello (see table, page 16), 11½ miles **WNW.** from Point Conception, is a narrow, rocky point with an outlying rock about 200 yards southeastward.

The **Espada,** a steep, rocky cliff 360 feet high, about 5 miles northward from Point Conception, is prominent when well offshore.

Tranquillon Mountain, 2,136 feet high, is the landfall for making Point Arguello. It is bold and jagged, the summit being about 4 miles eastward of the point.

Between Point Conception and Santa Barbara the odor of the petroleum discharged from submarine oil wells is at times quite marked.

2. ***From Point Arguello to Point Sur.***—From a position 12 miles *SW.* from Point Arguello steer **NW.** (N. 29° 07′ W. true) for 121 miles. This course made good should bring Point Sur Lighthouse to bear *NE.*, distant 8½ miles.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently, and if in 50 fathoms or less the vessel should be hauled offshore at once.

Remarks and dangers.—The course leads well offshore, passing **Point Buchon** at a distance of 21 miles and **Piedras Blancas Lighthouse** (see table, page 16) at a distance of 16 miles. Northward of Point Buchon it draws gradually inshore until abreast of **Point Sur** (see table, page 16). The mountains along the coast are the most prominent features in clear weather. The 30-fathom curve follows the trend of the coast very closely and is seldom over 1½ miles from the beach.

Mount Buchon is a rocky, mountainous mass about 40 miles northward from Point Arguello, and is the landfall for Point Buchon. **Saddle Peak,** 1,800 feet high, the highest point, is visible from seaward for over 40 miles.

From Mount Buchon to San Carpoforo Valley, about 5 miles northward of Piedras Blancas, the coast is comparatively low. Northward of the valley the coast is rugged and bold as far as Point Sur, the mountains reaching elevations of 3,000 to 5,000 feet within a few miles of the coast.

Cone Peak, 5,000 feet high, about 25 miles northward of Piedras Blancas, lies about 3 miles inland and is prominent in clear weather.

Santa Lucia Mountain, nearly 6,000 feet high, lies about 7 miles northward and eastward from Cone Peak, and about 10 miles from the coast. There are pine trees on and near the top.

Point Sur is a black, rocky butte, 400 feet high, with low sand dunes behind it for about ¾ mile. From northward or southward it is raised as an island, and in clear weather is visible for about 25 miles. The lighthouse (see table, page 16) is on the northwest extremity of the rock. **False Sur,** a smaller butte, 210 feet high, lies about 1 mile southeastward.

Several **sunken rocks** and **ledges** extend about 2 miles southward of Point Sur at a distance of over 1 mile offshore. In approaching from southward or northward soundings should be taken frequently and the vessel put offshore at once if less than 30 fathoms be obtained.

3. *From Point Sur to San Francisco Entrance.*—From a position 8½ miles *SW.* from Point Sur Lighthouse steer **NW. ¼ N.** (N. 26° 47′ W. true) for 53 miles. This course made good should bring Pigeon Point Lighthouse to bear *NNE.*, distant 12 miles. From this position a **NNW. ¼ W.** (N. 9° 07′ W. true) course made good for 44 miles leads to San Francisco Light-vessel. Then follow the directions under section 1, Sailing Directions, San Francisco Bay and Approaches, page 71.

Destring to enter by the South Channel.—When Pigeon Point Lighthouse bears *NNE.*, distant 12 miles, steer **N.** by **W. ¾ W.** (N. 3° 17′ W. true) about 30½ miles. This course made good should bring Point Montara Post Light to bear *ENE. ½ E.*, distant 3 miles. Then steer about **N.** so as to pass 2 miles westward of Point San Pedro, and follow the directions in section 1 A, Sailing Directions, San Francisco Bay, page 71.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently, and the depths southward of Point Año Nuevo should not be shoaled to less than 50 fathoms, and northward of that to less than 25 fathoms.

Remarks and dangers.—The **NW. ¼ N.** course leads across the broad open bight, **Monterey Bay,** passing **Cypress Point** at a distance of about 12 miles and just outside the arc of visibility of **Point Pinos Lighthouse** (see table, page 16). The mountains northward of Point Sur gradually decrease in height, terminating in Point Pinos, which is low and rocky. The lighthouse is situated on the northern extremity of the point. The low valley of the **Salinas River,** which extends eastward from Monterey Bay between the high mountains terminating at Point Pinos and the high land extending southward from the San Francisco peninsula, is a marked feature when in this vicinity.

The **NNW. ¼ W.** course leads nearly parallel to the coast, passing nearly 9 miles westward of **Pigeon Point Lighthouse** and 6 miles westward of **Point Montara** (marked by a post light). The high land southward of San Francisco entrance, and **Mount Tamalpais,** northward of the entrance, are prominent in clear weather. **Point Reyes** will show as an island upon nearing the end of the course, and the **Farallon Islands** are prominent features.

When a little northward of Monterey Bay the lead is an excellent guide in thick weather in making the light-vessel, the soundings on the course decreasing very regularly northward from the 100-fathom curve.

The **N. by W. ¾ W.** course leads about 8 miles westward of Pigeon Point Lighthouse, and then follows the coast at a distance of about 7 miles. **Montara Mountain** will be on the starboard bow, and **Point Montara** should be passed at a distance of 3 miles.

Montara Mountain, nearly 2,000 feet high, is steep, rugged, and bare of timber. It terminates seaward in **Point San Pedro,** which is prominent (see description, page 61).

Point Montara (see table, page 16) is a rounding point about 3½ miles southward from Point San Pedro. Sunken rocks and ledges lie ¾ mile westward from the point and extend in a northwest and southeast direction for 1½ miles. In this vicinity the depths should not be shoaled to less than 25 fathoms.

INSHORE SAILING DIRECTIONS ALONG THE COAST FROM POINT LOMA TO SAN FRANCISCO ENTRANCE.

These directions are available for steamers of any draft in clear weather, and comprise the general routes followed in clear weather by the regular coasting steamers during the prevailing northwesterly winds of summer. They lead within a short distance of the landings and the entrances to the bays and coves along the coast. In thick weather vessels should keep farther offshore and sound frequently to guard against an inshore set.

For convenience in reference the directions are divided into sections as follows:

1. From Point Loma to Point Vincente.
2. From Point Vincente to Point Hueneme.
3. From Point Hueneme to Point Arguello.
4. From Point Arguello to Point Buchon.
5. From Point Buchon to Point Sur.
6. From Point Sur to San Francisco Entrance.

A detailed description of the coast, including the landings, bays, and anchorages, in sections as above, follows the sailing directions.

1. *From Point Loma to Point Vincente.*—From the whistling buoy off Point Loma steer **NW.** $\frac{7}{8}$ **W.** This course made good for 89 miles leads to the whistling buoy off Point Vincente. Then follow the directions in section 2.

Remarks.—The course leads clear of all dangers, and with the exception of the first 7 miles, will be off soundings until up with the whistling buoy off **Point Vincente.** The high land in the vicinity of **San Juan Point, San Pedro Hill,** and **Santa Catalina Island** are prominent features in clear weather, the divide in the western part of the island being prominent from either northward or southward.

Point Fermin is marked by a lighthouse (see table, page 16) and should be passed at a distance of 3½ miles. At night when first made the light should bear about **NW.** ¼ **N.**

In thick weather in approaching Point Vincente soundings should be taken frequently and the greatest caution exercised when in 50 fathoms or less. A good lookout should also be kept for kelp.

For a detailed description of the coast see pages 40 and 41.

2. *From Point Vincente to Point Hueneme.*—From the whistling buoy off Point Vincente steer **WNW.** ¾ **W.** for 45½ miles. This course made good leads to the whistling buoy off Point Hueneme. Then follow the directions in section 3.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently and the greatest caution exercised when in less than 50 fathoms; a good lookout should also be kept for kelp.

Remarks.—This course leads across the broad, open bight of **Santa Monica Bay,** and clears all dangers. **Point Dume** should be passed at a distance of 4¼ miles. Vessels will be off soundings until about 7 miles westward of Point Dume, where a submarine plateau extends offshore for about 5 miles, with depths of about 50 fathoms. This plateau is cut by two submarine valleys with depths of over 200 fathoms, that head close inshore near Point Mugu and Point Hueneme.

Point Dume lies about 25 miles westnorthwestward from Point Vincente. It is the seaward end of a rather low plateau that terminates in a dome-shaped head 200 feet high, rising from a bold, rocky bluff. The bluff is reddish, with white cliffs eastward and westward.

Point Hueneme is low and sandy. A lighthouse (see table, page 16) is situated a short distance westward from the wharf and some warehouses close to the beach.

For a detailed description of the coast see pages 44 and 45.

3. *From Point Hueneme to Point Arguello.*—From the whistling buoy off Point Hueneme steer **WNW.** ⅜ **W.** with Santa Barbara Lighthouse ahead. This course made good for 28½ miles leads to a position 2 miles from the lighthouse and ½ mile southward of the whistling buoy off Santa Barbara. From this position make good a **W.** by **S.** course for 39 miles, when Point Conception Lighthouse should bear *N.* by *W.*, distant 1¼ miles. Then steer **WNW.** for 13 miles. This course made good should bring Point Arguello Lighthouse to bear *NE.*, distant 1¾ miles. Then follow the directions in section 4.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently, and the depths should not be shoaled to less than 35 fathoms; a good lookout for kelp should also be kept.

Remarks and dangers.—These courses lead at a safe distance from shore and clear all dangers; the kelp is a good indication of a near approach to the shore, and between **Ventura** and **Point Conception** grows quite thickly, extending in some places over a mile from the beach.

The **WNW.** ⅜ **W.** course draws offshore until approaching Santa Barbara, and leads across a submarine plateau in depths of 11 to 40 fathoms; the decrease in depths is more abrupt in approaching Santa Barbara than approaching Point Hueneme. **Lookout Hill** and **Santa Barbara Lighthouse** should be made ahead. The town of Santa Barbara, and at night the glare of the electric lights in the town, should be made on the starboard bow.

Lookout Hill, 593 feet high, about 2 miles westward from Santa Barbara, is prominent in approaching from eastward or westward, and will be seen before the lighthouse or buildings in the town can be distinguished. **Santa Barbara Point,** its southeastern termination, is a high cliff and is the eastern limit of a narrow table-land upon which the lighthouse (see table, page 16) is situated.

The **W.** by **S.** course passes **Santa Barbara Lighthouse** and **Goleta Point,** 6 miles westward from it, at a distance of 1 mile, and then draws gradually offshore until approaching **Point Conception,** which will be raised as an island

from eastward or northward. The lighthouse (see table, page 16) is situated on the plateau at the foot of the abrupt seaward face. A **black rock,** nearly awash at high water, lies about 400 yards southward from Point Conception.

A **rock,** with 15 feet over it, lies in the edge of the kelp, about 5¼ miles westward from Goleta Point, and about 1 mile offshore.

The mouths of the gulches and canyons in the coast are now closed by the embankments of the railroad which runs alongshore close to the beach; these embankments are noticeable from quite a distance offshore.

Between Santa Barbara and Point Conception the odor of petroleum from submarine oil springs is at times quite marked.

The **WNW.** course draws gradually offshore until approaching **Point Arguello,** passing over 1¼ miles southward of the eastern extremity of the point.

The **Espada,** a steep, rocky cliff 360 feet high about 5 miles northward from Point Conception, is prominent.

Tranquillon Mountain, 2,136 feet high, is the landfall for making Point Arguello: it is bold and jagged, the summit being about 4 miles eastward from the point.

Point Arguello is narrow, jagged, and rocky, and extends 800 yards westward from the general trend of the coast, with an outlying rock 200 yards seaward on line with the southern cliffs. The extremity of the point overhangs the water's edge, and 200 yards back from the outer end the point is nearly divided by cuts from the north and south sides, forming a saddle, which from northward or southward give it the appearance of two small heads. The lighthouse (see table, page 16) is situated on the extremity of the point.

4. ***From Point Arguello to Point Buchon.***—From a position 1¾ miles *SW.* from Point Arguello Lighthouse, steer **NNW. ¾ W.** for 43 miles. This course made good leads to a position ½ mile westward of the whistling buoy off Point Buchon. Then follow directions in section 5.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently and the depths should not be shoaled to less than 20 fathoms when between Point Arguello and Point San Luis; northward of Point San Luis to Point Buchon the depths should not be shoaled to less than 30 fathoms; a good lookout should also be kept for kelp.

Remarks.—This course draws gradually offshore until approaching **Point Buchon,** and passes **Purissima Point** at a distance of 5 miles and **Point Sal** at a distance of 6 miles. The wharf and houses at **Lompoc,** 9½ miles northward from Point Arguello, are prominent in clear weather.

Point Purissima, 10½ miles northward from Point Arguello, is low and rocky, with reefs extending southwestward about ¼ mile; the north side of the point is bare sand.

Point Sal, 20 miles northward from Point Arguello, is a bold headland, marked by streaks of yellow sandstone. From northwestward it appears as a low conical hill with two higher conical hills behind; from southward the hills are not as well defined. **Seal Rock,** a large, rocky islet, lies off the south face with a small rock close to the point.

Mount Buchon is a good landmark from either southward or northward. It is a rugged mountainous mass with a seaward face about 8 miles in length; the highest point is Saddle Peak, 1,800 feet high, near the southern part.

Point San Luis is the southeastern extremity of a spur from Mount Buchon, and is marked by a lighthouse (see table, page 16). **Whaler Island,** 75 feet high, lies about 125 yards **E.** by **S.** from the point; it is connected with the point by a jetty, and another jetty extends about 125 yards southwestward from the island.

5. ***From Point Buchon to Point Sur.***—From a position ½ mile westward of the whistling buoy off Point Buchon steer **NW. ¾ W.** This course made good for 80 miles should bring Point Sur Lighthouse to bear *NE.*, distant a little over 2 miles. Then follow the directions in section 6.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently and the depths should not be shoaled to less than 30 fathoms; a good lookout should also be kept for kelp. From Cape San Martin to Pfeiffer Point the 30 and 100 fathom curves are close inshore, and in thick weather great caution must be exercised, as the lead will hardly give sufficient warning of the proximity of the beach.

Remarks and dangers.—From Point Buchon the course leads across the broad, open bight. **Esteros Bay**, and then follows the coast at a distance of 4½ miles. **Piedras Blancas Lighthouse** should be made on the starboard bow, and having stood 30 miles on the course the lighthouse should bear abeam, distant 1¾ miles. The course should lead over 1 mile westward of the whistling buoy off the lighthouse.

Morro Rock, 573 feet high, lies close to the beach about the middle of Esteros Bay; it is conical in shape and prominent for a considerable distance seaward on account of the low land immediately behind it.

Von Helm Rock, with 15 feet over it, lies 7¼ miles northward from Point Esteros, the northern head of Esteros Bay, and nearly 1 mile offshore; a buoy (nun, red, "VH") is moored about 150 yards **SW.** by **W.** ½ **W.** from the rock. Vessels should not pass eastward of the buoy.

Point Piedras Blancas, marked by a lighthouse (see table, page 16), is low and rocky, with sand dunes extending northeastward. Two **prominent white rocks** lie off the point, the higher close inshore and the other, a double one, about ⅝ mile **E.** by **S.** from the lighthouse and 600 yards offshore.

Northward of Point Piedras Blancas the course follows the coast at a distance of 3 to 5 miles until approaching **Point Sur**. About 5 miles northward of Piedras Blancas the mountains become very rugged and approach the coast closely, there being elevations of 4,000 feet and over within 2 miles of the beach.

Cape San Martin, 16 miles northward from Piedras Blancas, presents a very rugged, precipitous face for a distance of 3 miles with numerous outlying rocks. **San Martin Rocks** lie off the northern extremity of the cape. The outer one, 44 feet high, lies about ½ mile offshore; the inner one, 168 feet high, lies 100 yards offshore, with a smaller rock, 34 feet high, halfway between it and the outer rock.

Lopez Point is a narrow table-land, about 90 feet high, projecting slightly from the general trend of the coast. **Lopez Rock**, 20 feet high, lies ¼ mile offshore and about ¾ mile northwestward from Lopez Point; there are several caves in it.

Twin Peak, 4,700 feet high, and **Cone Peak**, 5,000 feet high, about 4½ miles eastward from Lopez Point, are prominent features in clear weather.

Pfeiffers Point, 400 or 500 feet high, is the seaward termination of a very prominent ridge about 6 miles southward from Point Sur; a deep **gully** lies immediately northward of the point.

Point Sur is a black, rocky butte about 400 feet high with low sand dunes behind it for about ¾ mile. From northward or southward it is raised as an island, and in clear weather it is visible about 25 miles. The lighthouse (see table, page 16) is on the northwest extremity of the rock. **False Sur**, a smaller butte 210 feet high, lies about 1 mile southeastward.

Several **sunken rocks** and **ledges** extend about 2 miles southward of Point Sur at a distance of over 1 mile offshore. In approaching from northward or southward soundings should be taken frequently and the vessel put offshore at once if less than 30 fathoms be obtained.

6. ***Point Sur to San Francisco Entrance.***—From a position 2 miles *SW.* from Point Sur Lighthouse steer **NW.** ¼ **N.** for 58 miles. This course made good should bring Pigeon Point Lighthouse to bear *NE.* ¼ *E.*, distant 3¾ miles. Then steer **NW.** by **N.** for 37 miles. This course made good leads to San Francisco Light-vessel. Then follow the directions in section 1, Sailing Directions, San Francisco Bay.

Desiring to enter by the South Channel.—When Pigeon Point Lighthouse bears *NE.* ¼ *E.*, distant 3¾ miles, steer **NNW.** ¾ **W.** for 23½ miles. This course made good should bring Point Montara Post Light to bear *ENE.* ½ *E.*, distant 3 miles. Then steer about **N.** so as to pass 2 miles westward of Point San Pedro, and follow the directions in section 1 A, Sailing Directions, San Francisco Bay.

Caution.—In thick weather or at night, to guard against an inshore set, soundings should be taken frequently and the depths should not be shoaled to less than 30 fathoms until northward of Point Montara. Northward of Point Montara the depths should not be shoaled to less than 20 fathoms.

Remarks and dangers.—These courses lead at varying distances offshore and clear all dangers, which in no case extend more than 1 mile from the beach.

The **NW.** ¼ **N.** course passes **Point Pinos Lighthouse** at a distance of about 9 miles, and leads well offshore until approaching **Pigeon Point Lighthouse.** It passes **Año Nuevo Island Light** at a distance of 4 miles. For a description of the lighthouses, see table, page 16.

Point Pinos is low and wooded. The lighthouse is near its northern point.

Point Año Nuevo consists of sand dunes 20 to 100 feet high. A small, black islet, upon which the light and fog signal are situated, lies about ¼ mile from the point. The immediate vicinity is foul but fairly well marked by kelp. A **rock**, with 17 feet over it, lies 1 mile **WNW.** from the light and about ½ mile offshore. A **rock**,

with 9 feet over it, lies ½ mile **SE.** from the light. Between these dangers are numerous ledges which as a rule break in ordinary weather.

Pigeon Point is a comparatively low, rocky point about 5 miles northwestward from Point Año Nuevo. Its seaward face is about 50 feet in height, with several detached rocks extending 350 yards **WSW.** from the point. The lighthouse is situated on the southern extremity of the point.

The **NW. by N.** course draws gradually offshore, passing **Point Montara** at a distance of 4 miles. In clear weather the **Farallones** will be visible, and **Montara Mountain** and the high land of the San Francisco Peninsula will be seen.

Point Montara, a spur from Montara Mountain, terminates in cliffs 60 feet high; a fog signal and lens lantern is located on the extremity of the point. A group of **sunken rocks** and **ledges,** about 1½ miles long in a northwest and southeast direction, lies 1 mile offshore from the point; these show a break in ordinary weather. The depths should not be shoaled to less than 20 fathoms in this vicinity.

Point San Pedro is a bold, black, rocky promontory, 640 feet high, with a high jagged rock at its northern extremity; it is the seaward termination of a spur from Montara Mountain, and an excellent mark, especially from southward. A large triple-headed **rock,** 100 feet high and white on its southern face, lies ¼ mile westward from the point.

The **NNW. ¾ W.** course leads parallel with the coast, and passes **Point Montara** at a distance of 3 miles; in approaching Point Montara the depths should not be shoaled to less than 25 fathoms. Northward of Point Montara the beach may be approached to within less than 1 mile, as there are no outlying dangers.

SAN DIEGO BAY AND APPROACHES.*

The entrance to San Diego Bay lies about 10 miles northwestward from the boundary between the United States and Mexico. The bay is the best natural harbor south of San Francisco and affords perfect protection in any weather. From the entrance, which is about ¼ mile in width, it expands to a width of 1½ miles, curving sharply eastward for 5 miles, where it contracts to ½ mile between San Diego and Coronado. From this point it extends southeasterly for 7½ miles, expanding to a shallow basin about 2 miles wide. The head of the bay is separated from the ocean by a low, narrow, sand spit, which at its northern end expands to a width of 1 mile and is nearly divided by Spanish Bight, dry at low water.

San Diego, on the eastern shore about 5 miles from the entrance, is the principal town on the bay. The depths at the wharves vary from 18 to 28 feet at mean low water according to locality. There is a large amount of foreign and domestic commerce by water and rail. Lumber, iron, cement, guano, and general merchandise are imported; fruit, and farm and dairy produce are exported. The customhouse landing is at the Santa Fe wharf.

National City, on the eastern shore, 3½ miles southward of San Diego, is of no maritime importance; it is connected with San Diego by rail.

Coronado, a winter resort opposite San Diego, is of no commercial importance; it is connected with San Diego by ferry and rail.

North San Diego and **Roseville** are small villages situated on the bay between San Diego and the entrance.

Channels.—The harbor is being improved by the Government with a view of obtaining a depth of 24 feet in the channel across the bar. A jetty has been built southward from the eastern point at the entrance for about 4,600 feet in the direction of Gammon Shoal. At present, 1902, there is a least depth of 21½ feet in the channel crossing the bar; this channel is marked by buoys. The average draft of the larger vessels is about 22 feet, but 26 feet has been taken over the bar. The bar rarely breaks, due to the protection of the thick kelp bed extending southward and westward from Point Loma.

The channel for deep-draft vessels leading through the bay varies from 250 yards to ⅓ mile wide, with an average depth of 7 to 8 fathoms as far as San Diego, beyond which point it shoals to 3 and 4 fathoms. It is well marked by beacons (a number of which are lighted) and buoys as far as San Diego. Vessels do not, as a rule, pass beyond San Diego.

Prominent features.—*Table Mountain,* 2,200 feet high, lies in Mexican territory, about 26 miles southeastward from Point Loma and about 16 miles inland; it is flat-topped and a prominent landmark.

The *Coronado Islands,* in Mexican territory, are a group of 3 bare, rocky islands extending about 4½ miles in a northwest and southeast direction, about 7 miles offshore. The northwestern island, 467 feet high, lies nearly 14 miles **S. ¼ E.** from Point Loma; the southeastern and largest is 672 feet high. These are prominent in clear weather. The channel between them and the mainland is frequently used by steamers.

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*Shown on charts **5100,** scale $\frac{1}{200,000}$, price $0.50; **5106,** scale $\frac{1}{40,000}$, price $0.25. See also footnote on page 9.

Point Loma, the western point at the entrance, is the southern point of a hill about 400 feet high and 5½ miles long in a north and south direction. It is bare of trees, except in the gullies, and is sparsely covered with grass, sage brush, and cactus. At a distance it is usually raised as an island. The lighthouse (see table page 16) is situated on the southern extremity of the point. On a nearer approach the old tower, on the highest part of the hill immediately back of the point, and the buildings of a theosophical seminary farther northward on the crest of the hill will be distinguished. A thick bed of kelp extends 1½ miles southward from Point Loma and northward of the point for nearly 5 miles, parallel to the beach and about 1 mile offshore.

The *Coronado Hotel* is situated about 3½ miles eastward from Point Loma on the beach; this is prominent in approaching from southward or seaward.

The tall, red-brick chimney of an electric power house in San Diego is quite prominent.

Ballast Point, low and sandy, projects about ⅜ mile northeastward from the eastern side of Point Loma, 1 mile northward from the lighthouse. *Ballast Point Lighthouse* and buildings are situated on the extremity of the point (see table, page 16). There is deep water close to the outer end of the point.

Anchorage may be had anywhere in the channel and off San Diego between beacons 7 and 12, keeping clear of the water pipe and cable which cross from San Diego to Coronado. Vessels outside waiting for a pilot or towboat will find good anchorage in from 6 to 9 fathoms anywhere eastward of the line joining the bell and whistling buoys.

Pilots are usually employed by strangers and pilotage is compulsory for all vessels from foreign ports (see Appendix II).

Towboats.—Vessels in the offing making signal will be met by towboats and towed in on the succeeding high tide. A lookout is kept at Point Loma and La Jolla (11 miles northward), which are in communication with the barge office. Square-rigged vessels take towboats, and all sailing vessels tow out.

Harbor regulations.—See Appendix II.

Quarantine.—National regulations only are enforced. Vessels must not pass above the station at La Playa until boarded by the health officer, which is usually done between the bar and the station (see Appendix IV).

Marine hospital.—There is a relief station (Class II) of the United States Public Health and Marine-Hospital Service at San Diego (see Appendix IV).

Supplies.—Coal can be obtained in any quantity at the wharves or by lighters; water at the wharves or by water boat; provisions and ship-chandler's stores in San Diego.

Repairs to vessels and moderate repairs to machinery can be made at San Diego; extensive repairs or docking can not be done nearer than San Francisco.

Storm warning displays of the United States Weather Bureau are shown from a staff on the Keating Building and are plainly visible from the harbor.

Communication with points north and south may be had by rail and regular coasting steamers; with the interior by rail. There are also telegraph and telephone facilities.

Fogs are unusual; occasionally, in the early mornings or late fall, they occur for about an hour or more at Point Loma, clearing shortly after sunrise.

Winds.—The prevailing winds are from the northwest and west; the heaviest, from the southwest, occur generally in the spring or fall. They rarely exceed 25 miles an hour and shipping in the harbor is safe at all times.

Currents.—The currents run generally in the direction of the channels and vary from 1 to 2.5 miles, depending upon the stage of the tide. Westward of the Middle Ground north of Ballast Point is an inshore eddy of 0.1 to 0.3 mile on both flood and ebb. On the flood the current sets northwestward over the Middle Ground and on the ebb in the opposite direction. South of the end of the jetty there is a slight set toward Zuninga Shoal on the ebb.

Tides.—See table, page 14, also the tide tables published annually in advance by the Coast and Geodetic Survey, in which the tides are predicted for every day of the current year.

For **variation of the compass** see table, page 13.

GENERAL REMARKS ON APPROACHING SAN DIEGO BAY.

From Northward.—Reverse the directions in section 1 or 1 A, San Diego entrance to Point Arguello, page 31, or in section 1, Point Loma to Point Vincente, of the inshore coasting directions, page 34, which will lead to the whistling buoy 2½ miles *S.* ¾ *E.* from Point Loma Lighthouse. Then follow the Sailing Directions, San Diego Bay.

From Seaward.—In clear weather vessels approaching from seaward will raise San Clemente Island (see page 47), the southernmost of the Santa Barbara Islands, before the distinguishing features of the coast can be seen. This will check the vessel's position and indicate the subsequent shaping of the course for Point Loma. Upon a nearer approach, Mount Cuyamaca and the high land of the interior, the Coronado Islands, and Point Loma will be distinguished. When up with the whistling buoy 2½ miles *S.* ¾ *E.* from Point Loma Lighthouse, follow the Sailing Directions, San Diego Bay, section 1.

In thick weather or at night when in the vicinity of Tanner and Cortes banks (between latitude 32° 20′ and 32° 50′ north and longitude 119° 00′ and 119° 20′ west) soundings should be taken frequently as a check on the position.

Tanner Bank covers an area about 12 miles long in a west-northwest by east-southeast direction and about 4 miles wide. The least depth as far as known is 28 fathoms. The northwestern end of the bank lies about 30 miles *SE.* by *S.* from the eastern end of San Nicolas Island, and about 37 miles *SW.* ½ *W.* from the northern end of San Clemente Island.

Cortes Bank, lying southward of Tanner Bank, covers an irregular area about 20 miles long and 8 miles wide. The depths are irregular, from 100 fathoms to 15 feet, this latter depth being found over Bishop Rock, near the southern end of the bank. The southern end of the bank lies 38 miles *SW.* by *S.* from the southern end of San Clemente Island.

Bishop Rock, with but 15 feet over it, is the shoalest point on Cortes Bank and is approximately in latitude 32° 26′ north and longitude 119° 06′ west. Westward of the rock for several miles the depths range from 9 to 11 fathoms. This rock is the farthest outlying danger on the coast. The currents in its vicinity are variable in direction and have a velocity of 1 to 2 miles. These create considerable swell and even in moderate weather the rock shows a breaker. Navigators should exercise great caution when in this vicinity.

From Southward.—Vessels from southward in clear weather will make Table Mountain, and the high land in its vicinity, and the Coronado Islands before raising Point Loma. The passage eastward of the Coronado Islands can be used with safety, and coasting steamers bound to or from Mexican ports frequently do so. The depths in the vicinity of the Coronado Islands are irregular, and in thick weather or at night great caution must be exercised when in their vicinity. The passages between them should not be attempted. When up with the whistling buoy 2½ miles *S.* ¾ *E.* from Point Loma Lighthouse follow the Sailing Directions, San Diego Bay, section 1.

SAILING DIRECTIONS, SAN DIEGO BAY.

The following directions are good at high water for a draft of 21 feet with a smooth sea when crossing the bar. Vessels of deeper draft should take a pilot.

1. ***From the whistling buoy off Point Loma to the anchorage.***—From Outside Bar whistling buoy steer **N. ¾ E.**, passing Outside Bar bell buoy close-to on the port hand and heading so as to pass between San Diego Bar (outside) buoy (can, black, No. 1) and Gammon Shoal buoy (nun, red, No. 2) marking the channel over the bar, continue the course until up with the San Diego Bar (inside) buoy (nun, red, No. 4). Leave this buoy close-to on the starboard hand and steer **NNW. ⅜ W.**, heading so as to leave Ballast Point about 150 yards on the port hand.

Round Ballast Point at a distance of about 100 yards and pass about 100 yards southward of the buoy (spar, red and black horizontal stripes) marking the southern end of the Middle Ground Shoal. When this buoy is abeam, round-to gradually with a port helm until the buildings at the quarantine station bear *N.* by *W.* Then keep about 200 yards from the western shore, steering so as to pass about 150 yards westward of San Diego Bay buoy (nun, red and black horizontal stripes) marking the upper end of the Middle Ground Shoal.

When the buoy is abeam steer **N. ⅞ E.** until La Playa Light on the end of the wharf is abeam, distant 200 yards on the port hand. From this position steer **NNE. ¾ E.** heading

for lighted beacon No. 5 until midway between lighted beacon No. 3 and red beacon No. 4. Then steer **NE.** until beacon No. 5 is abeam, distant 300 yards on the port hand. From this position steer **E. ¾ N.** until lighted beacon No. 10 is abeam, distant 300 yards on the starboard hand. Then steer **ESE.** and anchor as desired.

Vessels of 18 feet draft or less at high water.—Follow the directions in the first paragraph to a position 150 yards eastward of Ballast Point, and then steer **NNW. ⅛ W.** heading for La Playa Light until lighted beacon No. 5 bears **NNE. ¾ E.** Then steer for beacon No. 5 on this bearing, pass 200 yards eastward of La Playa Light, and proceed as directed above to the anchorage.

Remarks and dangers.—Vessels entering the harbor should do so as nearly as possible at high water, when the current in making the sharp turn westward around Ballast Point will have its least effect.

The **N. ¾ E.** course from the whistling buoy leads for the inside bar buoy (nun, red, No. 4), the other buoys being practically on that line. Ballast Point Lighthouse from the whistling buoy should be just open from the eastern side of Point Loma. La Playa Light, on the warehouse at the end of the Quarantine Station wharf, should open eastward of Ballast Point just before crossing the bar between the buoys. The jetty on Zuninga Shoal will be seen ahead and the Coronado Hotel will be well on the starboard bow. Point Loma Lighthouse should be nearly abeam when up with Gammon Shoal buoy.

Gammon Shoal, with a least depth of 15 feet, lies about 1 mile southward of the end of the jetty, in the line of its prolongation.

The **NNW. ⅜ W.** course heads for the buildings at the quarantine station, and at night a little westward of La Playa Light. Vessels should round Ballast Point closely at a distance of about 100 yards, as the flood sets northeastward and the ebb has a tendency to set a vessel off the beach, and in either case toward Middle Ground Shoal. Vessels whose draft permits crossing the bar above the Middle Ground Shoal will find the **NNW. ⅛ W.** course from Ballast Point to La Playa more advantageous, as the sharp turn around Ballast Point is thereby avoided.

A **shoal** of small extent with 18 feet over it lies ⅝ mile **SSE. ⅜ E.** from Ballast Point Lighthouse; a similar shoal lies ¼ mile from the lighthouse on the same bearing.

Middle Ground Shoal, with depths of 12 to 18 feet, lies northward of Ballast Point, the southern end being ⅛ mile **NNW.** from the lighthouse. This end is marked by a red and black horizontally striped spar buoy. Form this point the shoal extends ⅓ mile **NNW.**, and then nearly **NNE.** to lighted beacon No. 2. A red and black horizontally striped nun buoy marks a 12-foot spot where the shoal changes its direction.

The courses above La Playa lead approximately in mid-channel. At night, owing to the electric lights in San Diego and Coronado, the red light on Beacon No. 10 is difficult to pick up. The beacons are located on the edge of the flats marking the channel, the slope from deep water being abrupt.

COAST FROM POINT LOMA TO POINT VINCENTE.*

From Point Loma the coast trends northward for 5⅛ miles to the entrance of False Bay, a small lagoon full of shoals and of no importance.

Point La Jolla (False Point), 11 miles northward from Point Loma, is a rounding rocky point, the seaward termination of a spur from Soledad Mountain, the first high land northward from Point Loma. The cottages and buildings at La Jolla and at Pacific Beach, on the north shore of False Bay, are prominent from seaward.

From Point La Jolla the coast extends northward for 37 miles to San Mateo Point as a low, flat table-land, with abrupt cliffs seaward 60 to 130 feet high and broad, low-water beaches. The table-land is intersected by numerous steep valleys containing streams that are usually dry in summer. In the northern portion the high mountain ridges of the interior approach much nearer to the coast.

Pine Hill, 346 feet high, 4 miles northward from Point La Jolla, is the only pine-covered hill along this section of the coast.

Oceanside, 21 miles northward from Point La Jolla, is a small town on the railroad skirting the coast. The buildings of the town are prominent from seaward, one with a cupola, on the hill, being particularly noticeable.

The bridge and trestlework of the railroad crossing Santa Margarita River, 3 miles northward from Oceanside, are also prominent.

San Mateo Point, terminating in cliffs about 60 feet high, is the north head at the mouth of San Mateo Creek Both San Mateo and San Onofre creeks are crossed by trestlework.

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*Shown on chart **5100**, scale $\frac{1}{200,000}$, price, $0.50.

From San Mateo Point to San Juan Point, about 8 miles, the land is higher and more rugged, and is broken by the San Juan Capistrano valley and river, about 1½ miles eastward of San Juan Point.

San Juan Point, 53 miles northward from Point Loma, is the seaward end of a high ridge. The point is 281 feet high, with a broken, precipitous face; outlying rocks and ledges extend offshore for about 350 yards. San Juan Rock, 10 feet high, is about 50 feet in extent, and lies 340 yards southward of the highest point of the cliff.

From San Juan Point to Newport Bay, about 12 miles, the coast is bold, with rocky cliffs 40 to 100 feet high, which are the seaward ends of ridges transverse to the coast, separated by narrow, deep valleys.

Newport Bay is an extensive shallow lagoon of no commercial importance. The bar shifts frequently with storms, and is not crossed by vessels.

Newport Landing, 14 miles westward from San Juan Point and 19 miles **E. ¼ S.** from Point Fermin Lighthouse, is at the head of a narrow submarine valley, with a depth of 40 fathoms ½ mile from the beach. There is considerable domestic trade, lumber and general merchandise being imported and farm and dairy produce exported. **Newport Beach** is the post office. It is connected by rail with Santa Ana, about 20 miles in the interior, and by regular coasting steamers with points north and south. Water and provisions may be obtained and a limited amount of coal. The wharf and warehouses in its vicinity are the most prominent features. The depths alongside the wharf are 37 to 45 feet at the end, 45 to 13 feet on the western and 37 to 9 feet on the eastern side of the wide part. Mooring buoys are placed for vessels to haul out to in bad weather. Severe storms are rare, and vessels as a rule load and discharge throughout the year. The prevailing winds are westerly, and heaviest from west and southwest. The anchorage is open, but good holding ground can be had westward of the wharf in 7 fathoms, sticky blue mud.

From Newport Landing to Point Fermin, about 20 miles, the coast is low, with several lagoons in the vicinity of the beach, the largest of which, Wilmington Lagoon, is connected by a narrow navigable channel with San Pedro Bay. The country is treeless, except in the valleys and gulches, and is covered with grass and sagebrush, green during the rainy season, but brown in summer.

Point Lasuen, about 6 miles westward from Newport Landing, is a low bluff, the seaward end of a long, low ridge, Las Bolsas, with low land on each side.

Long Beach and **Alamitos Beach,** about 5 miles eastward of San Pedro, are seaside resorts.

San Pedro Bay and **Harbor** and **Wilmington Lagoon** are described under a separate heading.

San Pedro Hill, 1,475 feet high, is a prominent landmark and the distinguishing feature for making San Pedro Bay from eastward or westward. It terminates seaward in steep, rocky cliffs about 60 feet high, with several horizontal terraces between them and the summit.

Point Fermin, the southeast extremity of San Pedro Hill, is a bold bluff about 100 feet high. The lighthouse (see table, page 16) is situated near the end of the point. A rock, with 3 feet over it, lies ¼ mile **SE.** from the point and is marked by a whistling buoy, which lies ⅝ mile **SE.** from the lighthouse.

Deadmans Island, 40 feet high, lies 1¾ miles northward and eastward from Point Fermin. It is small and connected by a jetty with Rattlesnake (Terminal) Island, which separates San Pedro Harbor from San Pedro Bay.

From Point Fermin the coast trends in a general westerly direction about 6½ miles to Point Vincente, the southwest termination of San Pedro Hill, and forms the northern shore of San Pedro Channel, about 18 miles wide, that lies between the mainland and Santa Catalina Island.

Portuguese Bend, a small, unimportant bight, lies 2¼ miles eastward from Point Vincente. It is used chiefly by fishermen, and a boat landing can be made at times.

Between Point Fermin and Point Vincente the coast is free from outlying dangers and is well marked by kelp.

Point Vincente is a steep, rocky cliff, 120 feet high, white and red, with the red predominating. A low, black rock, awash, lies 250 yards southwestward from the point, with kelp extending 100 yards farther. A small, black, pyramidal rock, 25 feet high, lies about ¼ mile eastward from Point Vincente, close inshore. A whistling buoy is moored a little over ¼ mile **SSW.** from the point, in range with the rock awash and the point. Vessels should pass southward of the buoy.

SAN PEDRO BAY AND HARBOR.*

San Pedro Bay is a broad, open roadstead lying eastward of Point Fermin, which affords good shelter from northerly and westerly winds. A **breakwater** is under construction eastward from a point 600 yards eastward

*Shown on charts **5100**, scale $\frac{1}{200,000}$, price $0.50; **5143**, scale $\frac{1}{40,000}$, price $0.25.

from Point Fermin with the view of making the bay a harbor of refuge. At present (1903) the outer end of the breakwater is a little over 1½ miles **ENE.** ⅞ **E.** from Point Fermin Lighthouse and is generally marked by a fixed red light. The inshore end of the breakwater, connected with the beach by a trestle, is marked by a fixed white light. These lights are maintained during the construction of the breakwater by the Corps of Engineers, U. S. Army.

San Pedro Harbor is a narrow channel which connects San Pedro Bay with Wilmington Lagoon. The harbor is under improvement by the Government. The entrance to the harbor from San Pedro Bay is between Deadmans Island and the jetty connecting it with Rattlesnake Island on the east, and the jetty extending southeastward from Timms Point on the west. The **channel** has a width of 75 to 125 yards, and is marked by beacons and buoys. There is a depth of 15 feet in the channel to San Pedro, but a draft of 18 feet has been taken in at high water.

Wilmington Lagoon, about 2 miles northward of Point Fermin, is about 2 miles long and 1 mile wide. It is shallow with several narrow channels, one of which, San Pedro Harbor, connects with San Pedro Bay. Mormon Island is considered the head of navigation, to which point there is a depth of 9 feet in the channel.

Wilmington, on the north shore of Wilmington Lagoon, 2 miles above San Pedro, is of little commercial importance. There is a depth of 5 feet in the channel to the wharves.

San Pedro, on the western shore of San Pedro Harbor, is the principal town, and is the seaport for Los Angeles, about 21 miles inland. The depths alongside the wharves range from 10 to 18 feet, according to locality. There is a large amount of domestic commerce, lumber and general merchandise being imported, and grain, fish, and dairy products exported.

Prominent features.—Vessels approaching from seaward can locate their position by the **Santa Barbara Islands** (see page 49) and shape their course accordingly. **San Clemente** and **Santa Catalina islands** are prominent and unmistakable, especially the latter on account of the deep cut in the western part of the island. **San Pedro Hill, Point Firmin,** and **Deadmans Island** are described on page 41. **Deadmans Island Breakwater beacon light** (see table, page 16) is on the southerly end of a short breakwater extending southward from the island, on the eastern side at the entrance to San Pedro Harbor.

Anchorage may be had anywhere in San Pedro Bay in 5 to 6 fathoms with good holding ground. In winter vessels anchor farther offshore so as to be able to slip in case of heavy weather from southeastward, from which there is no protection. The anchorage in the lee of the breakwater under Point Fermin affords good protection from winds from northward, westward, and southwestward. Only small, light-draft vessels anchor in the inner harbor, larger vessels going direct to the wharves.

Pilots are usually employed by strangers in entering the inner harbor, and pilotage is compulsory for all vessels from foreign ports (see Appendix II). Vessels are met outside, and if waiting for a pilot anchor anywhere in the roads.

Towboats are taken by all sailing vessels entering or leaving the harbor, and meet vessels outside.

Quarantine.—National quarantine regulations are in force. Vessels are boarded by the health officers if from a foreign port, outside if infected, otherwise inside; there are no quarantine limits (see Appendix IV).

Marine hospital.—There is a relief station (Class II) of the United States Public Health and Marine-Hospital Service at Los Angeles (see Appendix IV).

Supplies.—Coal is not generally kept on hand, but can be obtained in any desired quantity at short notice. Water can be had at the railroad wharves by pipe or hose, and in San Pedro Bay by water boat. Provisions and ship-chandler's stores can be had in San Pedro.

Repairs to wooden vessels may be made at Mormon Island, but for other repairs vessels are obliged to go to San Francisco or San Diego. There is a marine railway at Mormon Island with a capacity of 150 tons that can take on a draft of 8 feet forward and 11 feet aft. The length of the cradle is 110 feet, width 30 feet.

The **customhouse landing** is at the end of the Southern Pacific Railroad wharf.

Storm warning displays of the United States Weather Bureau are shown from the Southern Pacific Railroad wharf, and weather reports may be obtained by telephone from Los Angeles.

Communication may be had by rail with the interior, and by regular coasting steamers with points north and south; there are also telephone and telegraph facilities.

Fogs are not common. They occur generally in spring, coming in with light westerly winds at night or early morning, but clearing shortly after sunrise.

The prevailing **winds** during summer are from northwest, and in winter from southward and westward; the heaviest winds for each season come from the prevailing direction. Southeast gales occur five or six times during the winter, and are dangerous to vessels in the outer harbor. The summer winds are sometimes quite strong but not dangerous. The "Santa Ana" is a local and exceptional wind of considerable strength from eastward.

The tidal currents follow the channel and have an average velocity of 2 miles. From the harbor entrance the ebb of a large tide sets westward in San Pedro Bay and then sweeps southeastward, finally setting northeastward between the end of the breakwater and the bell buoy. On a small tide this is not noticeable. The flood is very regular, setting toward the entrance from eastward and following up the channel.

For **tides** see table, page 14.

For **variation of the compass** see page 13.

SAILING DIRECTIONS, SAN PEDRO BAY AND HARBOR.

These directions are good for a draft of 18 feet at high water, and lead to the wharves in San Pedro Harbor, above which local knowledge is necessary. Strangers are advised to take a pilot.

1. ***From Southeastward.***—From the whistling buoy off Point Loma steer **NW. ⅝ W.** for 8¾ miles. This course made good leads to the bell buoy off the entrance to San Pedro Harbor. Pass southward of the bell buoy and then follow the directions in section 2.

Remarks and dangers.—The course leads well offshore and there are no dangers until approaching Point Fermin. In clear weather San Clemente and Santa Catalina islands will be seen off the port bow, and San Pedro Hill (see description, page 41) should be made a very little on the port bow. On approaching, Point Fermin Lighthouse (see table, page 16), the breakwater (see description, page 41) eastward of the point, and Deadmans Island should be made a very little on the port bow. In approaching the bell buoy an easterly set may be experienced on the ebb, particularly with spring tides.

In thick weather the lead will be a good guide, the 20-fathom curve extending about 8 miles southeastward of the bell buoy. The depths should not be shoaled to less than 10 fathoms.

If desiring to anchor behind the breakwater care should be taken to avoid two **shoal spots** with 3½ fathoms over them. The eastern one is on the range of Point Fermin Lighthouse and the white light at the inner end of the breakwater, distant nearly ⅝ mile from the latter. The western one lies 400 yards **NW.** by **W.** from the eastern shoal.

A **rock** marked by kelp, with 17 feet over it, lies nearly ¾ mile **ESE.** ¾ **E.** from the end of the jetty projecting from Deadmans Island. It is marked by a bell buoy moored about 150 feet **S.** of the rock. Vessels should pass southward of the buoy.

1 A. ***From Westward.***—Pass southward of the whistling buoy off Point Vincente, and make good an **E.** ½ **S.** course for a little over 6¾ miles, which will lead to the whistling buoy off Point Fermin, with Point Fermin Lighthouse bearing *NW.*, distant ⅝ mile. Then steer **NE.** by **E.** ¼ **E.** and pass 200 yards or more eastward of the breakwater under construction eastward of Point Fermin. When Deadmans Island Breakwater beacon light bears *NW.* by *W.* ½ *W.*, steer **NW.** by **W.** for a little over ¾ mile, heading for the bell buoy ¾ mile *SE.* by *E.* ¾ *E.* from Deadmans Island. Pass southward of the bell buoy and follow the directions in section 2.

Remarks and dangers.—The **E.** ½ **S.** course follows the coast at a distance of ¼ to ½ mile, and leads a little over ⅜ mile southward of Point Fermin Lighthouse. The kelp is comparatively heavy and fringes the beach for nearly the entire distance about ¼ mile offshore.

A **rock** with 8 feet over it lies ¼ mile **SE.** from Point Fermin and is marked by a whistling buoy which lies ⅚ mile **SE.** from the lighthouse.

See also remarks and dangers under section 1.

2. ***From the Bell Buoy to San Pedro Harbor.***—Leave the bell buoy close-to on the starboard hand, and steer **WNW.** ⅜ **W.** so as to leave black can buoy No. 1 close-to on the port hand. From the black buoy pass midway between the ends of the jetties, and then steer **NNW.** ½ **W.**, leaving red nun buoy No. 2 about 30 yards on the starboard hand, and pass about the same distance westward of red lighted beacon No. 4. When up with beacon No. 4 steer **NW.** ¾ **W.**, heading for the upper end of the warehouse on the dock, and so as to leave black beacon No. 3 about 30 yards on the port hand. Pass close eastward of the wharves, and dock where directed or as draft permits.

Remarks.—Vessels should enter as near high water as possible in order to avoid the currents at the entrance between the jetties. Local knowledge is necessary for the best place to dock necessary for draft and for the channel above the railroad wharf. At night strangers should take a pilot, and are also cautioned not to pass northward of the bell buoy.

COAST FROM POINT VINCENTE TO POINT HUENEME.*

From Point Vincente to Point Dume, about 25 miles, the coast forms a broad, open bight about 10 miles wide, known as **Santa Monica Bay.**† Its eastern shore is comparatively low, consisting of sand dunes about 100 feet high, but the western shore is bold, rocky, and rugged, with steep, white cliffs rising abruptly from the water's edge. This character of country continues to Point Mugu, 15 miles westward of Point Dume, where it changes to a series of sand dunes and beaches, with lagoons and marshes behind them, which extend 8 miles westward to Point Hueneme. The shores of Santa Monica Bay are free from outlying dangers, and the soundings are comparatively shoal, the 10-fathom curve lying as a rule at a distance of about 1 mile from shore.

Rocky Point, 2 miles northward of Point Vincente, is a bold, bluff point, 120 feet high, rising rapidly to the western extremity of San Pedro Hill. There are no dangers off the point but heavy kelp extends out about ⅝ mile.

Malaga Cove, 2½ miles northward from Rocky Point, sometimes used by small vessels with local knowledge, affords shelter from all but westerly and southwesterly winds, with which a heavy swell sets in. There is a break in the kelp, and those who use it anchor inside the kelp in 6 to 7 fathoms, with the south point of the bight bearing **S.** by **W.**

Redondo Beach is situated about 4 miles northward from Rocky Point and about 23 miles **E.** ¾ **S.** from Point Dume. It has some domestic commerce by schooners and steamers, importing lumber and general merchandise, and exporting grain, farm, and dairy produce. There are two wharves, known as Docks Nos. 1 and 2; these are situated near the head of a submarine valley that heads within ¼ mile of the beach with a depth of about 40 fathoms. Dock No. 1 has 61 feet at the outer end and 18 feet at the inner end; Dock No. 2 has 72 feet at the outer end and 20 feet at 220 feet from the end. Vessels usually anchor about ½ mile off the end of Dock No. 1. The holding ground is good, with some protection from southeast gales, but is open in southerly or westerly weather.

At Redondo Beach there are no pilots, but the master of the tugboat will furnish necessary assistance and information. Coal is not kept on hand, but any desired quantity can be had at short notice; water and provisions can be obtained. Communication may be had by rail and by regular coasting steamers, and there are telegraph and telephone facilities. The hotel on the bluffs and the large Chautauqua Assembly building are prominent features in addition to the wharves when approaching. About 1½ miles **WSW.** from the wharves petroleum from a submarine oil spring covers an area 1½ miles long by ½ mile wide.

From Redondo Beach the coast trends northwestward for 12 miles to **Santa Monica,** a small seaside resort on the beach. The sand dunes are continuous as far as Ballona Lagoon, 3 miles southeastward from Santa Monica. The buildings and hotel in Santa Monica are prominent from seaward.

Port Los Angeles, on Santa Monica Bay, about 2 miles westward from Santa Monica, is 18 miles **NW.** by **N.** from Point Vincente, and 13½ miles **ENE.** from Point Dume. It is a terminus of the Southern Pacific Railroad and one of the ports for Los Angeles. It has considerable domestic and a small amount of foreign trade. General merchandise and coal are imported, and grain, fruit, and farm products are exported. A wharf has been built out nearly ¾ mile from the beach; there is a depth of 34 feet at the outer end and 29 feet where it narrows. No pilots are necessary, and the tug meets sailing vessels desiring to go alongside. Mooring buoys have been placed for vessels to haul out to when the weather does not permit of lying at the wharf. Vessels anchor anywhere about ½ mile off the wharf; the holding ground is fair. The prevailing winds are northwest in summer and from southward and eastward in winter; in the winter southeast and southwest storms are apt to occur at any time, and are dangerous to vessels at anchor on account of the heavy swell. During these storms vessels can not lie at the wharf and are hauled out by the tug that is kept there at all times. Coal is usually kept on hand, and water and provisions can be obtained. Communication may be had by rail and by coasting steamers, and there are telegraph and telephone facilities. The wharf and the hotel near its inner end are prominent when approaching.

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* Shown in parts on charts **5100, 5200,** scale $\frac{1}{200,000}$, price of each $0.50.

† Shown on chart **5144,** scale $\frac{1}{40,000}$, price $0.25.

Kellers Shelter, 7 miles northeastward from Point Dume, is an open bight which affords protection from northerly and westerly winds in 5 to 7 fathoms, sandy bottom. A reef, marked by kelp, extends a short distance offshore about ½ mile westward of the anchorage.

Dume Cove, about 2 miles northeastward from Point Dume, affords protection similar to Kellers Shelter. The anchorage is abreast the fourth break or arroyo in the cliffs from Point Dume, with the point bearing **SW.** Kelp should be avoided on account of possible dangers.

Point Dume is the seaward end of a rather low plateau that terminates in a dome-shaped head, 200 feet high, rising from a bold, rocky bluff. The bluff is reddish with white cliffs eastward and westward. A whistling buoy is placed ½ mile off the point.

Between Point Dume and Point Mugu, about 13 miles, the coast is very rugged with no outlying dangers.

About 2 miles eastward of Point Mugu is a **sand dune,** 60 feet high, on the beach at the foot of a very high bluff. This is quite prominent and can be made out on clear, moonlight nights.

Point Mugu is the seaward termination of the Santa Monica Mountains, and is prominent on account of the low land of the Santa Clara Valley westward. Mugu Lagoon, immediately westward of Point Mugu and parallel with the beach, is about 5 miles long, shoal, and of no importance.

Laguna Point and **Middle Point** are merely wider portions of the sand beach separating Mugu Lagoon from the sea; they are not prominent from seaward.

Point Hueneme, low, rounding, and sandy, is the outermost point of the low land at the mouth of the Santa Clara Valley. In clear weather it may be recognized by the lighthouse and buildings (see table, page 16) and by the wharf and warehouses a short distance eastward.

The submarine valleys in the vicinity of Point Hueneme and Point Mugu are described on page 34.

Hueneme Landing has a small amount of domestic trade, importing general merchandise and exporting grain and farm produce. The wharf is about 1,600 feet long. There is a depth of 23 feet at the outer end, decreasing gradually to 21 feet at the inner end of the wide part. Mooring buoys are placed off the wharf. The best anchorage is southward of the wharf in 6 to 7 fathoms, mud and sand, good holding ground. Artesian water is piped on the wharf and fresh provisions may be obtained. The prevailing winds are westerly, but southeast or southwest gales occur five or six times during the year. During these gales vessels generally make Prisoners Harbor, Santa Cruz Island, for shelter. Communication may be had by irregular coasting steamers with points north and south, and a good wagon road connects with the railroad 5 miles inland. The coasting directions, section 2, Point Vincente to Point Hueneme, from eastward, and section 3, reversed, Point Hueneme to Point Arguello, from westward, lead to the whistling buoy. The lighthouse and buildings and the wharf with warehouses near the inner end are the most prominent features in approaching.

COAST FROM POINT HUENEME TO POINT ARGUELLO.*

From Point Hueneme to Point Conception this section of the coast forms the northern shore of the Santa Barbara Channel, which is about 60 miles in length in an east and west direction with an average width of 20 miles. The islands forming its southern boundary are described under a separate heading.

From Point Hueneme the coast, consisting of low sand beaches and sand dunes, trends northwestward for 8½ miles to the mouth of the San Buenaventura River.

Ventura Landing, lying about 8 miles **NW.** from Point Hueneme Lighthouse and 22½ miles **E. ½ S.** from Santa Barbara Lighthouse, has a small amount of domestic commerce, importing general merchandise and exporting petroleum and farm produce. A wharf has been built with 14 feet on the east side and 16 feet on the west side. The prevailing winds are westerly and light, and southerly gales are rare. The northwest winds when heavy are the most dangerous. Vessels anchor anywhere in the bight with good holding ground, but there is no protection. The buildings in the town, the oil tanks at the inner end of the wharf, and the railroad trestle crossing the San Buenaventura River immediately westward of the town are prominent features in approaching. Several houses may be seen near the beach southward of the town.

From the San Buenaventura River the Santa Inez Mountains extend to Point Conception and Point Arguello. For about 10 miles westward from the river to Rincon Point the coast is very rugged, elevations of over 2,000 feet being found within 1 mile of the beach. The dangers do not extend over ½ mile from the beach, which is well fringed with kelp.

Point Las Pitas is the first bold point westward of the river. A very steep arroyo or gulch is on its western side.

*Shown in parts on charts **5200, 5300,** scale $\frac{1}{200,000}$, price of each $0.50.

Point Gorda, 3½ miles westward of Point Las Pitas, is low at the extremity, but rises rapidly to **Mount Hoar,** a prominent mountain about 2,100 feet high.

Rincon Point, low and sandy, is about 10 miles westward from Ventura and about the same distance eastward from Santa Barbara.

Sand Point, 3½ miles westward from Rincon Point, is low and rounding, with the narrow opening to Carpenteria Lagoon (shoal and of no importance) lying close under and eastward of it.

Carpenteria Landing, sometimes known as Smiths wharf, is 7 miles eastward of Santa Barbara. The post office on the railroad is **Serena.** Considerable asphalt is shipped from here. Coasting steamers touch irregularly and several steam schooners call for asphalt. There is about 12 feet at the end of the wharf. The best anchorage is eastward of the wharf in 5 to 6 fathoms.

Summerland is a small settlement about 4½ miles eastward from Santa Barbara. A wharf has been built out to 20 feet of water. Several other wharves are in its vicinity for oil derricks, but these are probably not permanent and are for the oil derricks only.

Lookout Hill (La Vigia), 593 feet high, is the distinguishing feature in approaching Santa Barbara from eastward or westward, and can be seen before either the lighthouse or mission. Point Castello, its northeastern extremity, terminates in an almost perpendicular cliff about 50 feet high. **Santa Barbara Point,** its southeastern extremity, is a high cliff and the eastern limit of a narrow table-land upon which the lighthouse (see table, page 16) is situated.

Santa Barbara is situated immediately eastward from Lookout Hill. It is about 40 miles eastward from Point Conception and about 30 miles westnorthwestward from Point Hueneme. Lumber and general merchandise are imported, and fruit, farm produce, and abalone meat exported. An extensive wharf has been built, which has 25 feet at its outer end. There is an extensive kelp bed in front of the wharf, but there is a break in it that is usually kept clear by steamers. The prevailing winds are westerly. During the winter southwesterly storms occur five to seven times during the season. Good anchorage may be had anywhere inside the kelp, but large vessels usually anchor outside on account of better holding ground. In bad weather they generally run over to the islands for a lee. Coal can be obtained in limited quantities, but the charges are excessive and the handling inconvenient. Water and provisions may be had. Communication can be had by rail and by regular coasting steamers, and there are telegraph and telephone facilities. For directions in approaching from eastward see section 3, page 34, or from westward, reverse the directions of the same section. From the whistling buoy vessels can stand straight in for the wharf. The **Mission,** a large building with two towers, situated above the town on the north side of the valley, is prominent in the approaches. The electric lights are also prominent at night.

Goleta Point, 6½ miles westward from Santa Barbara Point, is low and terminates in a cliff about 30 feet high.

Coal Oil Point, 2 miles westward of Goleta Point, is low, and may be distinguished by the strong odor of petroleum discharged by a spring; this odor is noticeable over 2 miles offshore.

Goleta (Mores) **Landing** is about 1¾ miles eastward from Goleta Point, and has a small amount of domestic trade. Lumber and general merchandise are imported, and farm products and asphalt exported. There is a depth of 15 feet at the end of the wharf, but there may be a little less in winter. A heavy bed of kelp affords protection from the sea. Anchorage may be had anywhere inside the kelp with fair holding ground. Communication may be had with points north and south by irregular steamers and schooners.

From Goleta Point to Point Conception, about 32 miles, the coast is more rugged than that eastward. **Gaviota Pass,** about 26 miles westward from Santa Barbara, is prominent as it is the only decided break in the range of mountains extending to Point Conception. A railroad skirts the beach, and the trestles and embankments across the mouths of the numerous gulches and arroyos are quite prominent. The kelp grows quite heavily, and in some places extends over 1 mile offshore.

A **rock,** with 15 feet over it, lies about 5 miles westward from Goleta Point and ¾ mile offshore. It is surrounded by kelp.

Gaviota Landing, at the mouth of the Gaviota Pass, has some domestic trade, importing lumber and general merchandise and exporting grain and farm products. There is 19 feet at the end of the wharf and vessels can go alongside except in unusually severe storms. A heavy bed of kelp protects the wharf, and anchorage can be had anywhere inside the kelp. The prevailing winds are west and northwest, the afternoon breeze drawing through the pass being quite heavy at times. Southeast gales occur five or six times during the winter; vessels usually run over to the islands for shelter. Water may be had but must be handled in barrels; groceries may be obtained in limited quantities. Communication with points north and south may be had by coasting steamers and by rail.

Alcatraz Landing, 1 mile eastward from Gaviota Landing, is similar in regard to commerce and local conditions. The buildings and tanks are prominent.

Coxo Anchorage, 1¾ miles eastward of Point Conception, affords protection from moderate westerly and northwesterly winds in 5 to 10 fathoms, hard sandy bottom, off the mouth of the Coxo Valley. The cove 1¾ miles eastward of this anchorage, known as **Little** or **Old Coxo**, affords somewhat similar advantages.

Point Conception is a bold headland, 220 feet high, at the western end of Santa Barbara Channel, and marks an abrupt change in the trend of the coast. There is comparatively low land immediately behind it. At a distance, when coming from northward or eastward, it is usually made as an island. A lighthouse and fog signal (see table, page 16) are situated near the western part of the point and several dwelling houses are situated on the highest part. A low, **black rock**, nearly awash at high tide, lies about 220 yards offshore southward and westward of the lighthouse.

From Point Conception the coast trends in a gentle curve northwestward for 12 miles to Point Arguello, and consists of bold, rocky cliffs 100 to 400 feet high.

The **Espada** is a prominent cliff, 360 feet high, about 5½ miles northward from Point Conception; the cliffs on each side drop sharply to less than 100 feet in height. It is quite prominent from seaward.

Point Arguello is a narrow, jagged, rocky projection, extending about 800 yards westward from the general trend of the land, with an outlying rock 200 yards seaward. The extremity of the point overhangs the water's edge and 200 yards back is nearly divided by gullies from the north and south sides. These form a saddle, which, from northward and southward, makes it appear like two small heads. The western extremity of the point is marked by a lighthouse and fog signal (see table, page 16).

Mount Tranquillon, the seaward end of the Santa Inez Mountains, is prominent in clear weather. It terminates in Rocky Point, Point Arguello, and Point Pedernales, which are separated by a little over a mile.

Rocky Point and **Point Pedernales** have numerous detached rocks, extending in some cases 300 yards offshore. Point Pedernales and the largest rock off it are very dark and conspicuous as **sand dunes** commence immediately northward of the point.

ISLANDS OFF THE COAST OF SOUTHERN CALIFORNIA.*

SAN CLEMENTE ISLAND

is 1,964 feet high and lies 60 miles **W. ½ S.** from Point Loma, from which it is visible in clear weather. It is about 18 miles long in a northwest and southeast direction, with an average width of about 2½ miles, the broader and higher part of the island being near the southeast end. The northeast side of the island is straight and bold, with rocky, precipitous cliffs. The southwest side is lower and more broken. There is no kelp along the north shore, but the south shore is well fringed. The island is of little commercial importance, a few sheep and goats being about the only resources. There are one or two small ranch houses. The depths in approaching the island from northward are great, the 100-fathom curve lying in many places but little over ¼ mile from the beach. On the south side the depths are less, the 100-fathom curve near the southeast extremity lying over 3 miles offshore.

Pyramid Head, the eastern point of the island, is about 900 feet high, sharp and jagged; it is a prominent feature in making the island.

Northwest (Clemente) **Harbor**,† on the north side of the western end of the island, affords shelter in southerly weather, but is uncomfortable, as the swell makes around the point. It is open northward, and is unsafe in heavy northwesterly weather. The kelp extends to 10 fathoms.

Wilson (Driggs) **Cove**, on the north shore 2½ miles eastward of the western end of the island, affords fair shelter in southerly weather. The anchorage is about 200 yards off the mouth of a small valley in 7 to 8 fathoms. Kelp grows close inshore and is apt to foul the anchor in getting under way. There are two or three houses on the beach. Water can not be obtained.

Pyramid (Smugglers) **Cove**† is under the eastern point (Pyramid Head) of the island, about 2½ miles westward of the point on its southern shore. A windmill and corral are near the western end of the sand beach. Protection is afforded from northwesterly weather in 10 to 15 fathoms, sandy bottom, about ⅓ mile offshore, at the western limit of the kelp, with the windmill bearing **NW.** by **N.** A **rock**, bare at lowest tides and not marked by kelp, lies in the western part of the cove, ¼ mile **S.** by **E.** from the small, projecting, rocky point at the western end of the sand beach. Good water may be obtained in barrels.

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*Shown in parts on charts **5100, 5200,** and **5300,** scale $\frac{1}{200,000}$, price of each $0.50.

†Shown on chart **5126,** price $0.25.

SANTA CATALINA ISLAND

lies about 18 miles southward from Point Fermin. It is about 18 miles long in an east and west direction with a greatest width of about 7 miles. About 6 miles from the western end is a **deep cut** in a north and south direction that almost divides it. The coves on each side of the island formed by this cut are less than ½ mile apart at their heads, the land separating them being so low that at a distance of a few miles the island appears as two. The island is rugged and mountainous with steep, precipitous shores, intersected occasionally by deep gulches and valleys, and is covered with a thick growth of brush and some scrub oak. The highest peak, 2,100 feet, lies about in the middle of the eastern part of the island. Sheep and cattle are raised to some extent. The shores are free from kelp, except in a few places on the southern shore. The island rises abruptly from deep water, the 30-fathom curve lying close inshore.

Dakin Cove, generally known as **Avalon,** is on the north shore of the island about 2½ miles from its eastern end. It is about ½ mile wide by ¼ mile in depth, and affords anchorage in 8 fathoms, sandy bottom. The shelter is good in southeasterly and southwesterly weather, and fair in northwesterly weather if the wind is not too strong. **Avalon,** a summer resort and post office, is situated here. The depth at the outer end of the wharf is 18 feet. A steamer makes daily trips from San Pedro. Water and a limited amount of provisions may be obtained.

White Cove, about 3½ miles westward from Avalon, affords an anchorage in about 8 fathoms; the protection is similar to that at Avalon.

Isthmus Cove,* on the north shore about 6 miles eastward from the western end of the island, affords shelter for small vessels in southerly weather but is dangerous in northwesterly weather. A wharf has been built to about 12 feet of water, and other improvements are in progress and contemplation with a view of making a summer resort. **Fisherman Harbor** is a small cove in the eastern part of the bight; it is only available for small craft and is little used. The deep cut in the island is the prominent feature in making the cove. **Bird Rock,** 66 feet high and of small extent, lies about ¾ mile off the entrance to the cove. It shows as a black haystack from the channel, and the top is generally white with bird lime. **White Rock,** 30 feet high and about 170 yards in extent, lies about ¼ mile off the eastern part of the cove; it is covered with sand and grass. Two **rocks,** with 7 and 18 feet over them, lie about 100 yards northwestward from the rock, and a **shoal** extends about 100 yards from the southern face. A **rock,** with 6 feet over it, lies about 100 yards southeastward from the eastern end of the rock. **Harbor Reefs,** ¼ mile southwestward from White Rock, are about 350 yards long in an east and west direction and less than 100 yards wide; they are generally well marked by kelp. At low water a portion is exposed at the eastern end. The anchorage is about 300 yards off the end of the wharf with the eastern end of White Rock bearing **NE. ½ N.** *In entering,* bring Bird Rock to bear **N. ¼ W.** astern and steer **S. ¼ E.** until the eastern end of White Rock bears **NE. ½ N.** The western point of the cove should be favored to avoid Harbor Reefs.

Catalina Harbor,* on the southern side of the isthmus separating it from Isthmus Cove, affords shelter, except in southerly weather, for small vessels. It is funnel-shaped, about ¾ mile long, and at the entrance ⅜ mile wide. It is free from hidden dangers and easy of access. **Pin Rock** is a small rock above water lying close inside the eastern head; it is about 100 yards offshore with deep water around it. The anchorage is in 4 to 5 fathoms, soft bottom, abreast the long, low point on the eastern shore known as **Ballast Point;** the head of the bay is shoal. The 3-fathom curve is marked by kelp, and vessels entering should give the shores a berth of 150 yards. If the wind is northwesterly vessels are likely to lose it at the heads and be obliged to tow in by boats. No directions are necessary.

SANTA BARBARA ISLAND

lies about 21½ miles **WSW. ¾ W.** from the western end of Santa Catalina Island; it is about 1½ miles long in a north and south direction, with a greatest width of 1 mile. The profile of the island is saddle-shaped and at a considerable distance it appears as two. The greatest elevation is 547 feet, and the island is visible for over 25 miles in clear weather. The shores are bold and precipitous and well marked by kelp, which extends to 10 fathoms at irregular distances from the beach. Westward, the kelp makes out over 1 mile, covering irregular bottom with a **rock awash** in the outer and southern edge. The water around the island is deep except where kelp indicates foul or rocky bottom. A rocky islet, 257 feet high and surrounded by kelp, lies ⅓ mile **SW.** from the southwestern point of the island; its northern face is steep. A smaller rock, 125 feet high, lies 200 yards offshore about ¼ mile westward from the northern point of the island.

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* Shown on chart **5128,** scale $\frac{1}{10,000}$, price $0.20.

An indifferent **anchorage** may be had on the eastern shore about midway between the north and south points, in 8 fathoms, hard bottom. A poor landing place between the reefs and outlying rocks is abreast the anchorage, and another landing equally poor is on the northern side of the northwestern point.

SAN NICOLAS ISLAND

lies about 55 miles offshore and is the outermost island of the group. It is about 45 miles westward from San Clemente and 25 miles southwestward from Santa Barbara Island. It is about 7¾ miles long in an east and west direction with an average width of 2½ miles; the highest point is 890 feet, and the island is visible for about 38 miles. Two-thirds of the island is covered with sand, the remainder being covered with coarse grass and a few patches of scrub oak. It is surrounded by kelp except for about 2 miles at the northeastern extremity. At the western end of the island the kelp extends westward for about 3 miles, covering very irregular bottom. Two **reefs** lie in the kelp, 1½ miles **WSW.** ½ **W.** from the western point of the island. In thick weather great caution must be exercised in approaching from westward, and vessels should in no case pass inside the kelp. No dangers are known to exist outside the kelp.

Anchorage may be had under the lee of the sand spit making out from the northeast point of the island in 9 to 10 fathoms, hard, sandy bottom. This is a good lee from the prevailing westerly wind, and the boat landing, though poor, is improving owing to the extension of the sand spit. **Corral Harbor,** on the north side of the island 3½ miles from the western point, affords a good boat landing. The entrance is 20 feet wide with a basin 60 feet in diameter inside, having a smooth sand beach protected from all swell.

Begg Rock, 40 feet high, lies 7¾ miles nearly **WNW.** from the western point of San Nicolas Island, and is visible about 10 miles in clear weather. It is surrounded by kelp, with a **reef** extending northward and southward of it a little over 100 yards in each direction. The rock rises abruptly from 50 fathoms close-to.

THE SANTA BARBARA ISLANDS,

Anacapa, Santa Cruz, Santa Rosa, and **San Miguel,** form a chain about 55 miles long extending in a general **W.** by **S.** direction from the eastern point of Anacapa Island. These form the southern boundary of the Santa Barbara Channel. The passages between them, while navigable, are not much used.

Anacapa Passage, between Anacapa and Santa Cruz islands, is 4 miles wide and free from dangers, with deep water close to either shore. This passage should not be attempted in thick weather as the lead gives no warning of a close approach to the islands.

Santa Cruz Channel, between Santa Cruz and Santa Rosa islands, is about 8 miles long and 5 miles wide, with good water close in to both islands; the **rocks** off the western and southwestern points of Santa Cruz Island and the eastern and northeastern points of Santa Rosa Island are so close inshore that they can not be considered as dangerous in the channel.

San Miguel Passage, between Santa Rosa and San Miguel islands, is about 2½ miles wide between the ledges which project from the opposite points of the two islands. There is much broken water and many current rips in the vicinity of these ledges. To avoid **Talcott Shoal** (described on page 51) vessels using this passage should not allow the outer rock off the western point of Santa Rosa Island to bear southward of **S.** by **E.** Sailing vessels should avoid this passage as the light airs and calms under the lee of San Miguel Island and the currents frequently combine to set a vessel toward Talcott Shoal.

The **currents** in the vicinity of the islands generally follow the directions of the wind, with counter eddies under the lee of the islands and the projecting points. In northwest weather a current of considerable velocity sets eastward from Cardwell Point toward Talcott Shoal, and is frequently felt near and eastward of it.

ANACAPA ISLAND*

is the eastern one of the Santa Barbara Islands and consists of three islands separated by two very narrow passages, the eastern one being filled with rocks and the western one affording only a passage for small boats. The eastern point of the island lies 11 miles **SSW.** ½ **W.** from Point Hueneme Lighthouse. From the point the island extends about 4½ miles in a general **W.** by **S.** direction. The eastern and lowest one is about 1 mile long, ¼ mile wide, and about 260 feet high, and rather level on top. The middle one is nearly 1¾ miles long, ¼ mile wide, and 320 feet high. The western and largest is 2 miles long, ¾ mile wide, and rises to a peak 980 feet high. This is visible at a distance of 35 miles in clear weather, and the other two at 15 to 20 miles. The shores are perpendicular and filled with numerous caves. The eastern extremity terminates in an arch rock, with a pyramidal rock just southward of its eastern end. The island is surrounded by kelp except in a few small places.

* See first footnote on page 47.

The best **anchorage** is on the northern side about ¼ mile northward of the middle of the middle island, in 11 to 12 fathoms, with the eastern passage open. Anchorage may also be had on the southern side about ¼ mile **SSW.** from the western passage in 11 fathoms, and also about ¼ mile **SE.** by **S.** from the eastern passage in 12 fathoms. Boat landings may be made on the northern side of the eastern and western extremities. The island rises abruptly from deep water and in thick weather in its vicinity vessels should not shoal the depths to less than 50 fathoms.

Anacapa Passage, separating Anacapa Island from Santa Cruz Island, is described on page 49.

SANTA CRUZ ISLAND

is the largest of the Santa Barbara islands, and lies 21 miles southward from the town of Santa Barbara, its eastern end, San Pedro Point, being about 4½ miles **W.** from the western end of Anacapa Island. It is about 21 miles long in an east and west direction, with an average width of 4 miles. The highest peak, in the western part, is about 2,400 feet high; the eastern part is about 1,500 feet high. The eastern part is very irregular, barren, and destitute of water; the western part has a few trees, is well covered with grass, and has several springs. Sheep are raised to a considerable extent. The shores are high, steep, and rugged, with deep water close inshore, and there is much less kelp than around the other islands. There are no outlying dangers, except **Gull Island,** 150 feet high, which is the largest and outermost of a group of small, rocky islets, ¼ mile in extent, lying nearly ¾ mile southward of the southern point of the island. A field of kelp stretches offshore from the southwest point of the island and surrounds Gull Island, terminating 1 mile eastward of it. The bottom is foul in the vicinity of these islets and between them. The shores of the island are indented by numerous coves and small bays, affording boat landings and shelter for small craft.

Chinese Harbor, in the western part of the bight on the northern shore about 4½ miles from the eastern point of the island, affords anchorage in the kelp in 5 to 6 fathoms. Fresh water may be obtained ¾ mile eastward of the anchorage.

Prisoners Harbor,* on the northern shore of the island about 8 miles from the eastern point, affords shelter from all winds except those from northeast to west; some protection in northwest weather is afforded by the kelp, but a heavy swell rolls in. In northeast weather the anchorage is unprotected and dangerous. A wharf extends to 16 feet. The best **anchorage** is in 12 to 15 fathoms, abreast a white rock on the western shore of the bight, with the outer end of the wharf and the buildings at the inner end in range. Fresh water can be obtained.

There are several other small coves on the north shore, but these are only available for small craft owing to their small extent.

Smugglers Cove, immediately southward of the eastern point of the island, affords shelter in northwesterly weather in 5 fathoms, sandy bottom. Water may be obtained from wells on shore.

Alamos Anchorage, on the southern shore about 3¾ miles eastward from Gull Island, is good for small craft in northwesterly weather and affords a good boat landing.

Forney Cove, about 1 mile eastward of Fraser Point at the western end of the island, affords shelter in northerly weather in 7 to 8 fathoms. The surf is heavy on the beach, but the rocky islet westward and the reef connecting it with the shore lessen the swell at the anchorage.

SANTA ROSA ISLAND

lies 5 miles westward from Santa Cruz Island, the two islands being separated by Santa Cruz Channel (see page 49). The island is about 15 miles long in an east and west direction, with a greatest width of nearly 10 miles. The highest point, near the middle of the island, is 1,562 feet high, being visible for over 40 miles. Water is plentiful, and the island is well covered with vegetation, but there are no large trees. The shores are bold, high, and rocky, and kelp surrounds the greater part of the island. The depths in approaching shoal more abruptly from southward than from northward, where the 100-fathom curve is over 5 miles and the 20-fathom curve about 2 miles from the beach.

East Point, the eastern extremity of the island, is moderately high, sharp, and bold. A **rock,** with 16 feet over it, lies in the kelp ⅔ mile **N.** ¾ **W.** from East Point, and a **shoal,** with 4¼ fathoms over it, lies **N.** ¼ **W.,** distant 2 miles from the point.

Skunk (Channel) **Point,** 2½ miles northward from East Point, is low and formed by drifting sand, with sand beaches westward and southward; the sand dunes behind it are 250 feet high.

Carrington Point, the northern point of the island, has a seaward face about ¾ mile in length; it is bold and rocky, and rises rapidly to an elevation of 440 feet.

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*See second footnote on page 47.

Foul Ground extends about ⅓ mile northward, terminating in **Beacon Reef;** there is from 3 to 4 fathoms over it, with spots of 10 to 15 feet. The reef rarely breaks and there is no safe passage inside of it.

Brockway Point is high, bold, and rounding, and about midway between Carrington Point and the western end of the island.

Rodes Reef, marked by kelp, is a patch of three sunken rocks lying 1½ miles **NE.** by **E.** from Brockway Point, and about ¾ mile offshore; it breaks in nearly all weather.

Sandy Point, the western extremity of the island, is moderately bold and rocky, with a detached rock lying close inshore and sand dunes 400 feet high extending inland. These **white sand dunes** are prominent when approaching from southward or westward.

Talcott Shoal, with 11 feet over it, lies on the edge of the kelp, about 1½ miles **N.** ½ **E.** from Sandy Point; a detached kelp patch lies about 1 mile northward of the shoal. The soundings in the vicinity of the shoal range from 4½ to 12 fathoms; the shoal breaks only in heavy weather.

South Point, the south point of the island, terminates in a rocky bluff 100 feet high, and rises rapidly to a height of 460 feet; the southwestern face of the point is formed by ½ mile of bluffs several hundred feet high.

Bee Rock lies ¾ mile off the southern shore of the island, 3½ miles eastward of Sandy Point; it is low and not easily seen but is surrounded by kelp which stretches from South Point to Sandy Point. Several rocks and shoals exist inside the kelp, which should not be entered.

There are no harbors around the island, but anchorage may be made in Becher Bay and Johnsons Lee; there are several good boat landings.

Becher Bay is a broad, semicircular bight on the north shore of the island, about 4⅓ miles wide by 1⅓ miles deep, lying between Skunk and Carrington points. **Northwest Anchorage** is in the western part of the bight about 1¾ miles from Carrington Point; it affords fair shelter in northwesterly weather. A wharf has been built with 16 feet at its outer end. The best anchorage is in 6 to 7 fathoms off the end of the wharf. **Southeast Anchorage** is about 1½ miles westward from Skunk Point, and affords protection in southeasterly weather in about 6 fathoms, sandy bottom.

Johnsons Lee is an open roadstead immediately eastward of South Point; it affords fair shelter from westerly and northwesterly winds but is dangerous in southerly weather. The anchorage is in the kelp in 5 to 9 fathoms, sandy bottom, with **Slay Rock** (low, black, with a central peak) bearing between **WNW.** and **NNW.**; no dangers have been discovered in the kelp. The bottom west of Slay Rock is rocky and dangerous to ground tackle. Fresh water may be obtained on the beach.

Sandy Point Anchorage, on the south side of the point, affords shelter to small vessels of 20 to 30 tons from northerly and northwesterly winds, but local knowledge is necessary to avoid outlying rocks.

San Miguel Passage, separating Santa Rosa and San Miguel islands, is described on page 49.

SAN MIGUEL ISLAND

is the westernmost of the Santa Barbara Islands, and is the most dangerous to approach. Its western point lies about 25 miles **S.** by **E.** ½ **E.** from Point Conception, and its eastern point is about 3 miles westward from Santa Rosa Island, the passage separating them being known as San Miguel Passage. The island is irregular in shape and about 7 miles long in an east and west direction, with an average width of 2 miles; the highest point, 860 feet, is about the middle of the island near the southern shore, and is visible for about 35 miles. The island is covered with long grass but there are no trees. The shores are bold, broken, and rocky, with a few short stretches of beach, the southern shore being more precipitous than the northern. Several anchorages and boat landings may be made at different points on the northern and southern shores.

Cardwell Point, the eastern point of the island, terminates in a broad cliff 40 feet high. A dangerous **reef** extends ½ mile eastward from the point, and foul ground extends ¾ mile north-northwestward.

Prince Island, 303 feet high, lies about 2½ miles northwestward from Cardwell Point, and about ½ mile off the eastern head of Cuylers Harbor; it is dark in color, and rocky, with a precipitous seaward face.

Harris Point, the northern point of the island, is bold and precipitous, rising to a hill, 550 feet high, 1 mile southward; there are no outlying dangers and the water is bold close-to.

Wilson Rock, 15 feet high, lies 2½ miles **NW.** ¾ **W.** from Harris Point; a **reef,** showing two points at low water, extends 1 mile **W.** by **N.** from the rock, with foul ground a short distance northward of the reef. There is foul ground southward and southwestward of the rock. These dangers are unmarked by kelp, and this locality should not be approached in thick weather, as the dangers rise abruptly from deep water and the lead gives no warning of their proximity.

Point Bennett, the western point of the island, is a long, narrow, jagged bluff, 40 feet high, rising rapidly to 380 feet; high sand dunes extend inland from the point for 2 miles. There are three rocky islets south of and close under the point, and **foul ground** extends ¾ mile westward and northward of the point, but inside the limit of the kelp.

Castle Rock, 145 feet high, is a three-headed islet lying 1½ miles **N.** by **E.** from Point Bennett in the middle of the kelp field and about ½ mile offshore. A **shoal spot** lies ½ mile **W.** by **S.** from the rock near the edge of the kelp.

Wescott Shoal, with 8 feet over it, lies ¾ mile **NNW.** from Castle Island, and ⅔ mile **NNE.** ½ **E.** from the shoal is a 4-fathom spot near which is an oil well.

From the southwest head of Simonton Cove, 2¼ miles northeastward from Point Bennett, foul ground extends northwestward for nearly 1 mile.

Crook Point, the southern point of the island, is low and irregular. A **shoal,** with 3½ fathoms over it, lies ¾ mile eastward of the point and about ⅓ mile offshore.

Wyckoff Ledge, with 15 feet over it, lies 1½ miles **W.** ¾ **S.** from Crook Point and about ½ mile offshore.

Cuylers Harbor * lies on the northern shore, about 1¼ miles southeastward from Harris Point. The bight is about 1 mile wide by ⅔ mile deep, the anchorage being in the western part; the eastern part is foul. It affords good shelter in southerly weather, but the holding ground is poor, and in heavy northwesterly weather, or with northerly or easterly winds, the protection is poor; these latter winds, however, are rare. Water may be obtained at a house on the hillside abreast the anchorage. **Princes Island** and **Harris Point** are prominent in the approaches. **Middle Rock,** small and low, lies ½ mile **SW.** from the western point of Prince Island; foul ground surrounds it for about 100 yards. **Can Rock,** low, lies about ⅜ mile **SSW.** from the western point of Prince Island; there is foul ground between it and the beach. Kelp grows profusely all over the harbor.

To enter, bring Harris Point to bear **WSW.,** distant 1¾ miles, and the western point of Prince Island to bear **S.** ¾ **E.,** distant 1¼ miles; then steer **S.** by **W.** ½ **W.,** heading midway between Middle Rock and the western point at the entrance and when the southern point of Prince Island bears midway between Middle and Can rocks, anchor in 7 to 8 fathoms. The course heads for **Judge Rock,** small and black, near the western end of the sand beach; the western point at the entrance should be given a berth of not less than ¼ mile to avoid the shoal extending eastward for over 300 yards. If desired, anchorage may be made about ⅛ mile farther westward, where better protection is afforded in northwesterly weather. The passage between Prince Island and the eastern head should not be attempted.

A **boat landing** may be made on the southern shore of the island in a small cove immediately westward of Crook Point, but there is no anchorage.

Tyler Bight, on the southern shore, 1¾ miles eastward from Point Bennett, affords shelter in northwesterly weather in the northwestern part of the bight under the high bluff, in 6 to 8½ fathoms, with the western point bearing **SW.** by **W.** ¾ **W.,** distant ½ mile. A large field of kelp lies southward and eastward.

Anchorage for small craft may be had at Adams Cove, immediately eastward of Point Bennett, and at several places along the southern shore, but local knowledge is necessary.

Richardson Rock, 50 feet high and of small extent, lies 5½ miles **NW.** ¾ **W.** from Point Bennett; two smaller and lower rocks lie close-to on the eastern side. The rock rises abruptly from deep water, 30 to 40 fathoms being found within ⅓ mile. This rock is prominent in clear weather, but in thick weather the locality should be avoided, as the lead gives no warning of a near approach.

COAST FROM POINT ARGUELLO TO POINT BUCHON.†

From Point Arguello to Point Sal the coast trends northward for 19 miles in two shallow bights, separated by Purisima Point, 11 miles northward from Point Arguello. From Point Sal the coast continues northward for about 15 miles and then bends sharply westward for a little over 6 miles to Point San Luis, forming San Luis Obispo Bay. From Point San Luis to Point Buchon, about 9 miles, the direction is northwest. The lead is a good guide on this stretch of the coast; between Point Arguello and Point San Luis the 20-fathom curve can be followed with safety in thick weather, but between Point San Luis and Point Buchon the depths should not be shoaled to less than 30 fathoms. In clear weather the headlands and other natural features can be easily recognized.

The **Cañada Honda,** 2 miles northward of Point Arguello, is a deep gulch crossed by a railroad trestle easily distinguished when abreast the mouth.

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*See second footnote on page 47.

†Shown on chart **5300,** scale $\frac{1}{200,000}$, price $0.50.

From Cañada Honda the coast to Purisima Point consists of a low tableland and sand dunes that contrast strongly with the dark cliffs southward.

Purisima Point is low and rocky, with reefs extending southwestward for about ¼ mile; the northern side of the point is bare sand.

Lompoc Landing,* about 1¾ miles southeastward from Purisima Point, has some domestic trade, importing general merchandise and exporting farm produce. Communication may be had by regular coasting steamers and steam schooners, and by wagon road. A wharf has been built out for a little over 1,000 feet; there is 13 feet at the end and 11 feet about 80 feet inside. A **rock**, with 11 feet over it, lies about 75 feet **SE.**, and another with 12 feet over it lies about 60 yards **W.** by **S.** from the end of the wharf. The best **anchorage** is in 8 to 9 fathoms about ½ mile from the end of the wharf, with good holding ground. Southerly storms occur six or seven times during the winter seasons; vessels are obliged to leave. Purisima Point and the wharf and warehouses at Lompoc Landing are prominent in approaching.

From southward, having followed the directions in section 3 of the coasting directions, when Point Arguello bears **NW.**, distant 1¾ miles, steer **N.** for 10½ miles; this course made good leads to the wharf. *From northward*, from Point Buchon whistling buoy, steer **SE.** ½ **S.** for 34½ miles; this course made good leads to a position 1 mile westward of the wharf, which can then be steered for. In thick weather the depths should not be shoaled to less than 15 fathoms.

From Purisima Point to Point Sal the coast is sandy and lower than that southward.

Point Sal is a bold, dark headland marked by stretches of yellow sandstone. From northwestward it appears as a low, conical hill, with two higher, conical hills behind; from southward the hills are not so well defined. **Seal Rock,** 45 feet high, a large, rocky islet, lies 200 yards off the south face with a small rock close to the point. Breakers and reefs extend nearly 600 yards southward and westward from Point Sal and 200 yards southwestward from Seal Rock.

Anchorage may be had under Point Sal with some protection from northwesterly winds in 7 to 9 fathoms, sandy bottom, but subject to swell. Shoal water extends nearly ½ mile westward from the southeast point of the anchorage. The best anchorage is in 7 fathoms, with the northern end of Seal Rock just open of the extremity of Point Sal, bearing **WNW.** ½ **W.**, distant 250 yards from Seal Rock.

From Point Sal northward the coast consists of low sand dunes and cliffs for 14 miles, and then changes to bold, rocky cliffs that curve sharply westward to Point San Luis and form the northern shore of San Luis Obispo Bay.

San Luis Obispo Bay and **Port Harford** are described under a separate heading on page 54.

Point San Luis, the western point at the entrance to San Luis Obispo Bay, is bold and rocky and is marked by a lighthouse and fog signal on its seaward face (see table, page 16). A small rock lies close inshore and nearly abreast the lighthouse. **Whaler Island,** 75 feet high, lies about 125 yards **E.** by **S.** from the point and is connected with it by a jetty. A breakwater extends about 1,200 feet southeastward from the island. **North Whaler Island,** 52 feet high, lies about 400 yards northward from Whaler Island and about 100 yards offshore. There are several small fishermen's houses on it.

Souza Rock, with 16 feet over it, lies 2 miles **SE.** ¼ **E.** from San Luis Obispo Lighthouse. It rises abruptly from depths of 19 fathoms. A bell buoy (red and black horizontal stripes) is placed 350 yards **S.** from the rock.

From Point San Luis to Point Buchon the coast trends northwestward for about 9 miles and consists of cliffs 40 to 60 feet high with numerous outlying rocks. The land rises rapidly from the cliffs to Mount Buchon. There are numerous outlying rocks and sunken ledges, in some cases over 1 mile from the beach.

Westdahl Rock, with 18 feet over it, is a dangerous pinnacle rock lying a little over 1¼ miles **SW.** ⅝ **S.** from San Luis Obispo Lighthouse; it rises abruptly from depths of 9 and 10 fathoms. A buoy (can, black, No. 1) is placed about 600 feet southwestward from the rock. Vessels should not pass northward of the buoy.

Santa Rosa Reef, with a least depth of 18 feet, lies 1⅜ miles **SW.** by **W.** ¾ **W.** from San Luis Obispo Lighthouse; this shoal rises abruptly from depths of 9 and 10 fathoms.

Lone Black Rock, 6 feet high and of small extent, lies about ½ mile westward from the lighthouse and about ¼ mile offshore.

Pecho Rock, 31 feet high, lies 3 miles **W.** ⅝ **N.** from the lighthouse and about ½ mile offshore; a smaller rock lies nearly on the same bearing ⅜ mile eastward from it. Foul ground marked by kelp lies between them and the beach.

* Shown on chart **5339**, scale $\frac{1}{5,000}$, price $0.25.

Lion Rock lies about 2¾ miles southeastward from Point Buchon and about 600 yards offshore; it is about ¼ mile long in a northwest and southeast direction and 112 feet high. A high rock lies between it and the beach, and a small, low rock lies 200 yards westward.

Point Buchon terminates in an overhanging cliff about 40 feet high with a low table-land behind it. There are a few detached rocks close under the cliffs.

Mount Buchon is bold and rugged and is a prominent landmark from either northward or southward. **Saddle Peak,** 1,800 feet high, is the highest point and is visible for over 40 miles.

SAN LUIS OBISPO BAY AND PORT HARFORD LANDING.*

San Luis Obispo Bay lies immediately eastward of Point San Luis; it is a rather open bight about 3½ miles long by 1 mile wide. From the point eastward to San Luis Obispo Creek the shores are high, rocky bluffs, but from the mouth of the creek eastward to the town of **Avila,** about ¼ mile, the shore is low and sandy; beyond Avila are rocky bluffs 40 to 60 feet high. **Port Harford,** the landing, is the seaport for **San Luis Obispo,** about 12 miles inland, and the adjacent country. Grain, farm and dairy produce are exported, and lumber and general merchandise are imported.

The bay has been improved by the Government; a **breakwater** has been built from Point San Luis to Whaler Island, and from the island about 1200 feet southeastward toward the ledge which partly bares at low water. This has improved the shelter for vessels at anchor, or at the wharf, from the heavy westerly or southwesterly swells.

Mount Buchon and **San Luis Hill,** the latter 700 feet high, are prominent at a considerable distance in approaching from southward; and from northward **Lion** and **Pecho** rocks and **Point Buchon** are distinguishing features.

The wharf has been built out about 1,600 feet obliquely to the beach from a point about ¾ mile inside Point San Luis. The outer end is about 350 yards offshore, with 20 feet at the outer end and about 13 feet halfway in. Vessels of 18 feet draft have loaded and discharged at the wharf. There is a large freight shed on the end of the wharf, and the tracks of the railroad communicating with the interior run into the shed.

Anchorage.—The best anchorage is in 3½ to 4 fathoms, muddy bottom, southward from the end of the wharf, with the eastern edge of Whaler Island bearing **S. ¾ W.,** and the middle of North Whaler Island bearing **SW.,** distant 300 yards. Vessels, however, can anchor anywhere ¼ mile eastward of the wharf, leaving a fairway for vessels going to or departing from it. The anchorage affords good shelter in northerly or westerly weather, but is exposed in southerly or southeasterly weather. Southeast gales occur two or three times during the winter season.

Supplies.—Water and provisions may be obtained. Coal is not kept on hand, but can be procured if necessary.

Communication is by regular coasting steamers and by rail; there are also telegraph facilities.

For **tides** see table, page 14.

For **variation of the compass** see table, page 13.

SAILING DIRECTIONS, SAN LUIS OBISPO BAY.

These directions are available for vessels of any draft, and lead to the anchorage.

1. ***From Southward.***—From a position 1¾ miles *SW.* from Point Arguello Lighthouse steer **N.** by **W. ¾ W.** for 34 miles. This course made good should lead to the bell buoy southward of Souza Rock. Pass 100 yards or more westward of the bell buoy and steer **N.** by **W. ½ W.,** taking care to give the ledge extending southeastward from Whaler Island a berth of ¼ mile. When abreast North Whaler Island, head westward and anchor where desired.

Remarks.—The **N.** by **W. ¾ W.** course passes a little over 2 miles westward of Point Sal, and at night San Luis Obispo Light should be made a very little on the port bow when abreast the point; the light should not be brought to bear westward of **NW. ¼ N.** until the bell buoy is made so as to clear Souza Rock. Vessels should not pass eastward of the bell buoy.

In thick weather vessels should not shoal the depths to less than 20 fathoms until the bell buoy is made.

*Shown on chart **5386,** scale $\frac{1}{20,000}$, price $0.20.

Dangers.—**Souza Rock**, with 16 feet over it, lies 2 miles **SE.** ¼ **E.** from San Luis Obispo Lighthouse. It rises abruptly from depths of 19 fathoms. A bell buoy, red and black horizontal stripes, is placed 350 yards **S.** from the rock; vessels in entering should pass westward of the buoy.

Howell Rock, in the eastern part of the bay, lies 1⅝ miles **ENE.** ⅞ **E.** from the lighthouse, and has 14 feet over it; a buoy (nun, red, No. 2) is placed about 450 yards southward of the rock.

A **ledge**, bare at low water, lies about 600 yards **SE.** by **E.** from Whaler Island. A **rock**, with 16 feet over it, lies 125 yards **SSE.** from the southern point of the ledge.

A **rock**, with 17 feet over it, and usually marked by kelp, lies ⅝ mile **NE.** by **E.** from the outer end of the wharf.

1 A. *From Northward.*—Pass westward of the whistling buoy off Point Buchon and steer **SE.** for 3½ miles, when Lion Rock should bear *NE.*, distant 1 mile. Then make good a **SE.** by **E.** ¾ **E.** course for 6¾ miles, passing over 1 mile westward of Pecho Rock and ½ mile westward of Westdahl Rock buoy (can, black, No. 1). When San Luis Obispo Lighthouse bears *NNE.* ¼ *E.*, distant 2 miles, steer **NE.** ½ **E.** for 2½ miles, heading for Howell Rock buoy (nun, red, No. 2), and passing ⅞ mile southward of the lighthouse and about ⅜ mile southward of the ledge off Whaler Island. When San Luis Obispo Lighthouse bears *W.* by *N.* steer **NW.** ¼ **W.**, heading for the warehouse on the end of the wharf, and when abreast North Whaler Island head westward and anchor where desired.

Remarks.—These courses lead at a safe distance from the beach, but in thick weather the depths should not be shoaled to less than 20 fathoms. **Pecho** and **Lion** rocks are described on pages 53 and 54. **Pecho House** is prominent, and is situated about 2 miles westward from the lighthouse on a small table-land about ⅛ mile back from the edge of the cliffs.

Dangers.—**Santa Rosa Reef** and **Westdahl Rock** are described on page 53.

Ten Foot Rock, about 100 yards northward from Whaler Island, is a bargeload of rock dumped there accidentally. It is marked by a buoy (spar, red and black horizontal stripes). It is out of the ordinary track of vessels.

See also dangers, under section 1, preceding.

COAST FROM POINT BUCHON TO POINT SUR.*

From Point Buchon to Point Sur the coast trends northwestward for 80 miles with but one marked indentation, **Esteros Bay**, immediately north of Point Buchon. Above Esteros Bay the coast is bold and rugged, elevations of 2,000 to 5,000 feet being found within less than 3 miles from the beach. The dangers do not extend over 1 mile from the beach, which is generally fringed with kelp, and except at a point 10 miles from Point Sur the 30-fathom curve is a good guide in thick weather. Several of the higher mountain peaks are distinguishing landmarks, and the features alongshore are easily recognized.

From Point Buchon the coast trends in a general northerly direction for about 11 miles and then turns sharply westward for 5 miles to Point Esteros, forming **Esteros Bay**. The southeastern shore of the bay is low.

Morro Bay, a shoal lagoon of several miles in extent, is separated from Esteros Bay by a narrow strip of sand beach. The entrance is near Morro Rock, but is only available for light-draft vessels in smooth weather. Once inside, good protection may be had. The post village of **Morro** is situated on the eastern shore of the bay near the entrance; it is of little commercial importance. Water and a limited amount of provisions can be obtained. A draft of 8 feet can be taken over the bar in smooth weather, but only 5 feet can be taken to the wharf. On account of the shifting channel pilots are necessary. These are signaled for by three blasts of the whistle, and will be answered by a flag, hoisted halfway up if impossible to come out, and mastheaded if the bar can be crossed.

Morro Rock, 570 feet high, is a prominent, conical rock 7 miles northward from Point Buchon and about 300 yards offshore. It is near the entrance to Morro Bay, and is visible from a considerable distance in clear weather. **Pillar Rock**, 100 feet high, lies about 50 feet from its northern end.

Northward of Morro Rock the shore becomes bolder, the seaward faces of **Cayucos Point** and **Point Esteros** consisting of cliffs 50 to 90 feet high.

*Shown on chart **5400**, scale $\frac{1}{200,000}$, price $0.50.

Cayucos Landing is about 11 miles northward from Point Buchon in the northwest corner of Esteros Bay. Grain and produce are exported and general merchandise and lumber imported. A wharf has been built out to 16 feet; during the winter the depth may be reduced to 14 feet. Vessels of 15 feet draft can lie at the wharf in smooth weather. The channel leading to the wharf is marked by buoys, and has a depth of 24 feet, but is narrow, leading between sunken ledges, and should not be attempted by strangers. Pilots may be obtained by making signal. **Mouse Rock,** the outer danger, is marked by a bell buoy. The best anchorage is southward of the bell buoy. Southerly storms occur six or seven times during the winter season; northwesterly gales occur during the summer, causing a heavy swell that breaks on the reefs and outside the end of the dock. During these storms vessels can not enter, and if at anchor or at the dock are compelled to leave. Water and provisions can be obtained, but no coal. Communication is by regular coasting steamers and schooners and by stage.

From southward, from Point Buchon whistling buoy steer **N.** by **W.** ⅛ **W.** for 10½ miles; this course made good leads to the bell buoy southward of Mouse Rock. Then signal for a pilot. *From northward,* from a position 1¾ miles **SW.** ¾ **S.** from Piedras Blancas Lighthouse, steer **SE.** by **E.** ¾ **E.** for 20½ miles, passing over 1 mile westward of Von Helm Rock buoy (nun, red, "V. H.") and Point Esteros. When Point Esteros bears **NNW.** ½ **W.**, distant 2 miles, steer **ENE.** for 4 miles, passing ¼ mile southward of Constantine Rock buoy (can, black, "C. Rk."); this course made good leads to the bell buoy southward of Mouse Rock. Then signal for a pilot.

Constantine Rock, with 8 feet over it and marked by kelp, lies ½ mile off Cayucos Point, 3 miles eastward from Point Esteros; it is marked by a buoy (can, black, "C. Rk.") placed 600 feet southward of the rock.

From Point Esteros northward to Santa Rosa Creek, 8 miles, the coast consists of bluffs 20 to 60 feet high, backed by a steep range of hills 500 to 700 feet high. The beach is well fringed with kelp, with a number of small rocks lying close inshore, of which **White Rock,** 6 miles northward from the point, is the most prominent.

Von Helm Rock, with 15 feet over it, lies 7½ miles west-northwestward from Point Esteros and 11½ miles east-southeastward from Piedras Blancas Lighthouse; it is nearly 1 mile offshore. A buoy (nun, red, "V. H.") is placed 150 yards **SW.** by **W.** ½ **W.** from the rock, and lies nearly 1½ miles **W.** ¾ **S.** from White Rock; vessels should not pass eastward of the buoy.

From Santa Rosa Creek to San Simeon Point the cliffs are 20 to 30 feet high and backed by low, rolling hills.

Cambria Rock, about 10 feet high, lies about ½ mile offshore, a little northward of the mouth of Santa Rosa Creek. It is small and sharp, with a breaker 125 yards southward and eastward.

Pico Rock, 12 feet high, lies 2 miles northward from Cambria Rock and about ½ mile offshore. There is foul ground northward and southward of the rock, but not extending more than ½ mile from the beach.

San Simeon Point is low, with a group of houses and trees on the inner side about 300 yards from the point. The trees show well from northward, but from southward the warehouses and buildings in the village are more prominent. From northward the point itself is not easily recognized unless familiar with it.

San Simeon Bay and landing lies immediately eastward of San Simeon Point. It affords good shelter in northerly weather, but a slight swell makes around the point. It is exposed in southerly weather. Farm produce is exported and general merchandise imported. A wharf has been built out to 20 feet. Provisions can be obtained, and water has been piped to the head of the dock and can be taken aboard with a long hose. The best anchorage is in the middle of the bight in 5 to 8 fathoms, hard sand. Southeasterly and southwesterly storms are liable to occur any time during the winter, compelling vessels to leave. Communication may be had by regular coasting steamers and occasional schooners and there is a daily mail by stage to San Luis Obispo.

From southward, from Point Buchon whistling buoy steer **NW.** ¼ **W.** for 19 miles to a position ¾ mile southwestward of Von Helm Rock buoy (nun, red, "V. H."). Then steer **NW.** ½ **N.** for 7 miles, with the wharf at San Simeon ahead, which leads to the anchorage. *From northward,* from a position 1¾ miles **SW.** ¾ **S.** from Piedras Blancas Lighthouse steer **E.** ¾ **N.** for 6 miles to a position ¾ mile southward of San Simeon Point. Round San Simeon Point at a distance of over ½ mile, steer **NW.** ½ **N.** for the wharf, and anchor in the middle of the bay. San Simeon Point should be given a berth of over ¼ mile and the eastern shore of the bay a berth of ½ mile.

From San Simeon Point to Piedras Blancas, 5 miles, the coast is low, with numerous detached rocks, lying in some cases ½ mile offshore. These are usually well marked by kelp.

Piedras Blancas Point is a low, rocky point projecting about ½ mile from the general trend of the coast and is marked at its end by a lighthouse (see table, page 16). Sand dunes extend northeastward from the point. Two prominent **white rocks** lie off the point, the higher close under the point and the other, a double rock, about ⅜ mile **E.** by **S.** from the lighthouse and about 600 yards offshore. A red whistling buoy is placed ¾ mile **SW.** by **W.** ¼ **W.** from the lighthouse. Vessels should not pass eastward of the buoy.

Anchorage for a small vessel, with protection from northwesterly winds, may be had under Piedras Blancas Point in 4 to 5 fathoms, sandy bottom, with the lighthouse bearing **W. ½ S.**, distant about ¼ mile.

From Piedras Blancas Point to the mouth of the San Carpoforo Valley, about 6 miles, the coast continues low, with numerous outlying rocks, and is well fringed with kelp. **Harlech Castle Rock**, with 1 foot over it, lies 1½ miles **NW. ½ W.** from Piedras Blancas Lighthouse and nearly ¾ mile offshore; this rock is usually marked by kelp.

Point Sierra Nevada, 3¼ miles northward from Piedras Blancas, is a low, bluff point covered with sand dunes. **La Cruz Rock**, 40 feet high, lies ½ mile southward of the point, and about 400 yards off the mouth of Santa Cruz Creek.

Ragged Point, ½ mile southward of the mouth of the San Carpoforo Valley, is a low projecting point, with visible rocks and ledges extending ¼ mile westward.

From the San Carpoforo Valley northward to the Big Sur River, 41 miles, the coast is very bold and rugged. The cliffs are 200 to 500 feet high, and the land rises rapidly to elevations of 2,500 to 5,000 feet in 2 to 3 miles. There are few beaches, and few outlying rocks.

Salmon Cone, about 500 feet high, is about 10 miles northward from Piedras Blancas. It is a prominent rocky butte close to the beach. A prominent **white rock**, 39 feet high, lies just southward of the butte about ½ mile offshore.

From Salmon Cone to Cape San Martin, 6 miles, the coast is intersected by several narrow, deep gulches or canyons, **Villa Canyon** and **Alder Creek** being the most prominent. A prominent **white rock**, 64 feet high, lies ¼ mile offshore 1 mile southward of the mouth of Villa Canyon.

Cape San Martin, 16 miles northward from Piedras Blancas, presents a rugged, precipitous seaward face for a distance of 3 miles, with numerous detached rocks. **San Martin Rocks**, three in number, lie off the northern extremity of the cape, the outer one, 44 feet high, being about ½ mile offshore. The inner one, 168 feet high, lies about 100 yards offshore, and the middle one, 34 feet high, about halfway between the inner and outer rocks.

From Cape San Martin to Lopez Point, 10 miles, the coast forms a shallow bight with rugged shores intersected occasionally by deep, narrow valleys. There are a few detached rocks, but with one exception they do not extend far from the beach. **Tide Rock**, awash and usually showing a break, is a small, black rock 4 miles northward of Cape San Martin and ⅔ mile offshore.

Lopez Point is a narrow table-land, about 90 feet high, projecting a short distance from the high land. **Lopez Rock**, 20 feet high, lies ¼ mile offshore and about ¾ mile northwestward from Lopez Point. There are several caves in it.

An open **anchorage**, affording some protection from northwesterly winds, may be had southeastward of Lopez Point in about 5 fathoms, sandy bottom. The swell is broken considerably by the large bed of kelp extending about 1 mile southward from the point.

In clear weather, Santa Lucia Mountain and Twin and Cone peaks are prominent in this vicinity. **Santa Lucia Mountain**, 5,967 feet high, lies about 10 miles northeastward from Lopez Point. There are pines on and near the summit. It is more prominent when well offshore than close in, owing to the high land between it and the coast.

Twin Peak, 4,700 feet high, and **Cone Peak**, 5,020 feet high, are about 3 miles back from the coast and about 4½ miles east-northeastward from Lopez Point. These are also wooded.

Pfeiffer Point, 17½ miles northward from Lopez Point and about 6 miles southward of Point Sur, is 400 to 500 feet high, and the seaward termination of a prominent ridge; a deep gully lies immediately northward of the point. From southward the point is less prominent than from northward.

Anchorage, affording some protection in northwesterly weather, may be had about 1 mile eastward of Pfeiffer Point in 7 to 10 fathoms, clay bottom, at the outer edge of the kelp.

From the mouth of the Big Sur River, 2½ miles northward of Pfeiffer Point, to Point Sur the land is low, with sand beaches and sand dunes extending eastward. Numerous sunken rocks and ledges, extending in some cases 1 mile offshore, lie between Cooper Point, about 1½ miles northward from Pfeiffer Point, and Point Sur.

Point Sur is a black, rocky butte, about 400 feet high, with low sand dunes extending eastward from it for over ½ mile. From northward or southward it is raised as an island and in clear weather is visible about 25 miles. The northwestern extremity is marked by a lighthouse and fog signal about 250 feet above sea level (see table, page 16). **False Sur**, 210 feet high, is a hillock close to the beach, about 1 mile southeastward from Point Sur; the north side is sandy.

Sur Rock, 1¾ miles **SE.** from Point Sur Lighthouse, is a rock awash nearly ¾ mile offshore. About ½ mile **SW. ½ S.** from Sur Rock is a **shoal** with 4½ fathoms over it that breaks in heavy weather. Extending

⅞ mile from Sur Rock toward Point Sur are a number of **sunken rocks** and **dangers** that show breakers in even ordinary weather; foul ground lies between them and the beach. These dangers are as a rule well marked by kelp, but it is a dangerous locality in thick or foggy weather, and when in this vicinity vessels should not shoal the depths to less than 30 fathoms.

COAST FROM POINT SUR TO POINT SAN PEDRO.*

From Point Sur the coast trends northward for about 20 miles to Point Pinos, the southern point at the entrance to Monterey Bay, with Carmel Bay, a small, open bight immediately southward of Point Pinos. **Monterey Bay** (described on page 59) is a broad, open bight about 20 miles long, between Point Pinos and Point Santa Cruz, and about 9 miles wide. The shores decrease in height and boldness as Point Pinos is approached, while those of Monterey Bay are as a rule low and sandy. The valleys of the Salinas and Pajaro rivers, which empty in the eastern part of Monterey Bay, cause a marked depression in the coast range of mountains that is prominent from a considerable distance seaward. From Point Santa Cruz the coast trends in a gentle curve westward and northward for about 23 miles to Pigeon Point, and then extends for 37½ miles in a general north-northwesterly direction to Point Lobos, the southern headland at the entrance to San Francisco Bay.

Southeastward of Monterey Bay the coast is bold, the 30-fathom curve lying in many cases less than 1 mile from the beach. A deep submarine valley extends into Carmel Bay; and another enters about the middle of Monterey Bay, extending to the eastern shore with a depth of over 50 fathoms within ½ mile of the beach. Northward of Monterey Bay the soundings are more regular, and in thick weather the lead is a good guide. There are few dangers and these extend less than 1 mile offshore.

Little Sur River empties about 1½ miles northward from Point Sur, its valley being quite noticeable from seaward.

Ventura Rocks, 2½ miles northward from Point Sur, are two high, prominent rocks, close together, about ½ mile offshore. A sunken **rock** lies 200 yards northeastward from them.

From Little Sur River to Soberanes Point, a little over 7 miles, the coast although moderately straight is bold, rugged, and broken, with numerous detached rocks and sunken ledges lying close inshore.

Soberanes Point projects but slightly from the general trend of the coast. An isolated, grassy hillock, 200 feet high, lies immediately behind, with a grassy ridge extending back and rising to 1,600 feet elevation.

Lobos Rocks, a group of small, rocky islets of small extent, lies ½ mile westward from the point. From seaward they rise abruptly from 20 fathoms, but there is foul ground between them.

Pico Blanco (Sur Peak), 3,680 feet high, lies a little over 4 miles eastward from Point Sur. It is pointed and white-topped, and is prominent in clear weather.

Mount Carmel (Boulder Peak), 4,400 feet high, lies about 8 miles northeastward from Point Sur, and is round and bare on the summit. Mount Carmel and Pico Blanco can sometimes be made when the lower land is shut in by fog or haze.

From Soberanes Point to Point Carmel, about 4½ miles, the coast in the vicinity of the beach is rugged and broken, with innumerable rocks and ledges extending in some cases over ¼ mile offshore. The rise from the beach to the high land back becomes less abrupt as Point Carmel is approached.

Yankee Point, 2½ miles northward of Soberanes Point, projects about ¼ mile from the general trend of the coast. The seaward face is irregular and broken, with numerous detached rocks, one of which lies about 125 yards westward from the point. A **sunken rock,** generally showing a breaker, lies ⅜ mile southward from the point and about the same distance offshore.

Point Carmel, the southern point at the entrance to Carmel Bay, is an irregular, jagged, rocky point, about 100 feet high. **Whalers Knoll,** 200 feet high and rocky, lies on the northern side about ½ mile from the western extremity of the point. Numerous detached rocks lie off the point, **Whaler Rock,** ½ mile southwestward, being the farthest offshore.

Carmel Bay is a small, open bight immediately southward of Monterey Bay. It is about 2¼ miles long and about 1¼ miles wide. It affords shelter to small craft with local knowledge in northerly and southerly weather. In northerly weather, anchorage may be had in a small, contracted cove on the northern shore, but local knowledge is necessary to avoid the dangers. In southerly weather, anchorage may be had in **Carmel Cove,** a small cove on the southern shore, but there is a **rock** with 9 feet over it about the middle of the cove that contracts the anchorage. A deep submarine valley heads in the southeastern part of the bay, with 50 fathoms within less than ¼ mile of the beach. This bay is not recommended for strangers, and no directions can be given that would be of value.

*Shown in parts on charts **5400, 5500,** scale $\frac{1}{200,000}$, **5476,** scale $\frac{1}{40,000}$, price of each $0.50; **5498,** scale $\frac{1}{60,000}$, price $0.20.

Point Cypress, the northern point at the entrance to Carmel Bay, is a comparatively low point extending about 2 miles beyond the general trend of the coast. The cliffs are steep, with numerous detached rocks close under them; the point is heavily wooded. **Cypress Rock** lies about 300 yards northwestward from Point Cypress, and is prominent from either northward or southward.

From Point Cypress to Point Pinos the coast trends northward for 4 miles, formed by low, rocky cliffs closely bordered by numerous small rocks. The height of the cliffs decreases toward Point Pinos, and the northern part is covered with **sand dunes** that are conspicuous, even in moonlight, when contrasted with the dark trees behind them.

Point Pinos, the southern point at the entrance to Monterey Bay, is low, rocky, and rounding, with visible rocks extending offshore for less than ¼ mile. It is bare for about ¼ mile back from the beach, and beyond that is covered with pines. A whistling buoy is placed about ½ mile northwestward from the point. A lighthouse (see table, page 16) is situated near the northern end of the point.

Point Santa Cruz, lying 20 miles **NNW. ½ W.** from Point Pinos, is flat, terminating in cliffs about 40 feet high, with two flat rocks close under the point, the outer one being the higher. The lighthouse is situated near the southern extremity of the point and is a good leading mark (see table, page 16).

About 2 miles westward from the point a **water tank** supported by a skeleton structure is prominent by day from either northward or southward.

Needle (Sail) **Rock Point** is about 4 miles westward of Santa Cruz Lighthouse; a slender pillar of rock stands a short distance seaward from the face of the cliffs; another lower pinnacle stands about 200 yards eastward. Neither are distinguishable when abreast them.

Sand Hill Bluff lies about 6½ miles westward from Santa Cruz Lighthouse and 12 miles southeastward from Año Nuevo Island Lighthouse. It is composed of sandstone cliffs about 50 feet high, with a rounding irregular **hillock** of white sand near the edge of the cliffs; this is white on the northwestern side and covered with brush and grass on the southeastern side, and is an excellent landmark.

Point Año Nuevo is formed by sand dunes 20 to 100 feet high; a low, black, rocky **islet** lies about ¼ mile off the point. The lighthouse and fog whistle (see table, page 16) are located on the islet. Foul ground extends northwestward and southeastward from the islet. **Anchorage** with protection from northerly and northwesterly winds may be made in the bight southward of the point in 8 fathoms with the lighthouse bearing **W. by S.,** distant ⅞ mile. The kelp bed and reef extending a little over ½ mile southeastward from the islet break the force of the swell.

Big Gulch, eastward of Point Año Nuevo, is a narrow, steep-sided valley; the cliffs immediately northward are quite prominent.

Pigeon Point is about 5 miles northwestward from Point Año Nuevo, the coast between them being low and rocky. This point is about 50 feet high with lower land immediately behind it; several moderately large, detached rocks extend 350 yards southwestward. A lighthouse and fog signal (see table, page 16) are located on the extremity of the point, and several other buildings and a chute are located near them.

From Pigeon Point to Pescadero Point, 4 miles, the coast is nearly straight and composed of reddish cliffs, with numerous outlying sunken and visible rocks. About 1 mile southward of the point is a prominent **hotel.** A **rock** with 14 feet over it lies ⅓ mile offshore, about ½ mile southward of the hotel, and well outside the 3-fathom curve. Another **rock,** with 17 feet over it, lies 650 yards **S. by W. ½ W.** from the point.

From Pescadero Creek, 1½ miles northward of Pescadero Point, the coast for 8 miles northward becomes more broken and rugged, with yellow or white vertical cliffs. A prominent whitish **cliff** over 100 feet high lies about 7½ miles northward of Pescadero Point. The coast is broken by several small streams with deep, steep-sided valleys. A short distance northward of the high cliff, a low, flat table-land begins that extends northward for 9 miles and then bends sharply westward to Pillar Point, forming Half Moon Bay.

Pillar Point lies about 19½ miles northwestward from Pigeon Point; it is about 180 feet high, with several black rocks extending over 300 yards southward. From northward these show as three or four rocks, but from southward appear as one. **Sail** or **Pillar Rock** is the largest and southernmost rock, the pillar being situated at its southwestern point. **Foul ground,** well marked by kelp, extends southeastward for over 1 mile; a buoy (can, black, No. 1) is placed in 9 fathoms about 200 yards southeastward from the end of the reef.

Southeast Reef is a sunken reef about 650 yards in length in a general northwest and southeast direction, with an average width of about 100 yards. The northern extremity lies 1⅝ miles **SE. ½ E.** from Sail Rock; depths of 5 fathoms and less extend northwestward from the reef for over ⅜ mile. A buoy (nun, red, No. 2) is placed about ¼ mile northwestward from the northern end of the reef, and a buoy (can, black, No. 3) is placed about ¼ mile southeastward from the southern end.

Half Moon Bay lies eastward of Pillar Point, and affords good shelter in northerly and northwesterly weather, but is exposed and dangerous in southerly weather. There is a small amount of domestic trade, general merchandise being imported and grain and farm products exported. A wharf has been built out from the eastern shore of the bight; there is 12 feet at the end in summer but only 9 to 10 feet in winter. **Amesport** (P. O. Half Moon Bay) lies about 2 miles southward from the wharf and nearly a mile inland. The buildings in the town are prominent, especially a church with a large tower. A limited amount of provisions can be obtained, but no coal or water. The best anchorage is under Pillar Point but vessels must be prepared to leave on the approach of southerly weather.

From southward, from a position 3¾ miles **SW. ¼ W.** from Pigeon Point Lighthouse steer **N.** by **W. ¾ W.** for about 19½ miles; Pillar Point should be made ahead. When Amesport wharf bears **NE. ½ N.**, steer for it on that bearing and pass between red nun buoy No. 2 and black can buoy No. 1, leaving the black buoy about 100 yards on the port hand. After passing the black buoy, continue the course if bound to the wharf, or haul northward and anchor in the northern part of Half Moon Bay, as desired. Vessels from southward may enter Half Moon Bay between Southeast Reef and the shore, passing about ¼ mile eastward of black can buoy No. 3. *From northward*, round Point Montara at a distance of 2 miles and steer **SE.** by **E.** for 4 miles, passing 1¼ miles southwestward of Pillar Point. When Amesport wharf bears **NE. ½ N.**, steer for it on that bearing and pass between red nun buoy No. 2 and black can buoy No. 1, leaving the black buoy about 100 yards on the port hand. After passing the black buoy, continue the course if bound to the wharf, or haul northward and anchor in the northern part of Half Moon Bay, as desired.

Montara Mountain, about 1,900 feet high, lies 4½ miles northward of Pillar Point and about 2½ miles inland. It is dark, pyramidal in shape, and bare of trees. It is a prominent feature from southward or northward or in approaching the entrance to San Francisco Bay.

Point Montara, 2¾ miles northward from Pillar Point, is the seaward end of a spur from Montara Mountain, and terminates in cliffs about 60 feet high with numerous outlying rocks. Sunken rocks and ledges lie ¾ mile westward from the point, and extend in a northwest and southeast direction for 1½ miles. This is a dangerous locality in thick weather, and the depths should not be shoaled to less than 30 fathoms in its vicinity. The post light and fog signal are near the northern end of the point (see table, page 16).

From Point Montara to Point San Pedro the coast is bold and rugged, rising sharply from the sea to the spurs from Montara Mountain; there are no outlying rocks or dangers other than those off Point Montara.

Point San Pedro is a black, bold, rocky promontory, 640 feet high, with a high, jagged rock at its northern extremity; it is the seaward termination of a spur from Montara Mountain and an excellent mark in clear weather from either northward or southward. A large, triple-headed **rock**, about 100 feet high and white on its southern face, lies ¼ mile westward of the point.

MONTEREY BAY*

is a broad, open roadstead about 20 miles long between Point Pinos and Point Santa Cruz, and about 9 miles wide. The shores are low with sand beaches backed by sand dunes or low, sandy bluffs. The low land extending eastward from about the middle of the bay is a prominent feature from seaward, as it forms the break between the Santa Lucia mountain range southward and the high land of the San Francisco peninsula northward. The bay is free from dangers, the 10-fathom curve lying at an average distance of ¾ mile offshore; the lead is a good guide in thick weather. A submarine valley heads near the middle of the bay with a depth of over 50 fathoms about ⅜ mile from the beach near Salinas Landing. Shelter from northwesterly winds is afforded at Santa Cruz Harbor and Sauquel Cove, on the northern shore of the bay, and from southeasterly winds at Monterey Harbor, on the southern shore.

Monterey Harbor lies about 3 miles southeastward from Point Pinos, and affords good shelter in southerly weather. There is a small amount of domestic trade, general merchandise and lumber being imported, and fish, fruit, and farm products being exported. The depths alongside the wharves vary from 10 to 18 feet. The best anchorage is ⅛ to ½ mile eastward of the main and largest wharf, in 4 to 7 fathoms, sandy bottom. Water is piped to the main wharf; provisions can be had, but no coal. Communication may be had by regular coasting steamers and by rail; there are telegraph and telephone facilities. A bell buoy is placed ½ mile off Point Almeja, and about 1¾ miles eastward from Point Pinos.

From southward, from a position 2 miles **SW.** from Point Sur Lighthouse steer **NNW. ½ W.** for 17½ miles, when Point Cypress should be abeam, distant nearly 2 miles, and Point Pinos Lighthouse should bear

* Shown on charts **5500**, scale $\frac{1}{200,000}$, price $0.50; **5498**, scale $\frac{1}{60,000}$, price $0.20; and in part on chart **5400**, scale $\frac{1}{200,000}$, price $0.50.

NNE. ¾ **E.**, distant 5¼ miles. Then steer **N.** by **E.** ¾ **E.** for 5¾ miles, passing ¼ mile outside the whistling buoy. Round Point Pinos Lighthouse at a distance of 1 mile and steer **SE.** by **E.** so as to leave the bell buoy on the starboard hand. When about ½ mile past the bell buoy steer **SSE.** ½ **E.** and anchor as desired. *From northward*, from a position 3¾ miles **SW.** ¼ **W.** from Pigeon Point Lighthouse, steer **SE.** by **E.** for 40 miles, which should lead to a position 1 mile northeastward of Point Pinos Lighthouse. Continue the course so as to leave the bell buoy on the starboard hand, and when about ½ mile past it steer **SSE.** ½ **E.** and anchor as desired.

Moss Landing, on the eastern shore of the bay, lies 12 miles **N.** by **E.** ½ **E.** from Point Pinos and 14½ miles **ESE.** from Santa Cruz Lighthouse. It has a small amount of domestic trade, lumber and general merchandise being imported and grain and farm products exported. A wharf has been built out to deep water, the depth at the end varying from 30 to 50 feet, according to the season of the year, being less in winter. The anchorage is unprotected, but the holding ground is good; vessels anchor southward of the wharf to avoid the deep water off the end. The prevailing winds are northwesterly, with a few southeasterly gales during the winter; the latter are dangerous to vessels at anchor. No supplies can be obtained except by previous arrangement. Communication is had by regular coasting steamers and schooners and by rail.

Sauquel Cove and **Landing** is in the northeastern part of Monterey Bay, eastward of Santa Cruz Harbor. There is a small amount of domestic trade, general merchandise being imported and paper and farm produce exported. A wharf has been built out to a depth of 9 feet. Fair shelter is afforded in northwesterly weather but vessels are obliged to leave in southerly weather. The best anchorage is southeastward of the wharf in 5 to 6 fathoms, sandy bottom. **Capitola** is a summer resort and post office. The large hotel is prominent in approaching. Provisions may be had in limited quantities, but no coal or water. Communication is had by regular coasting steamers and other vessels and by stage. There are telegraph and telephone facilities.

Santa Cruz Harbor is on the northern shore of Monterey Bay, and has a small amount of domestic trade, general merchandise being imported, and lime, fruit, and farm produce exported. There are two wharves, the railroad wharf with a depth of 14 feet at the end, and the lime wharf with 9 to 12 feet. Good shelter is afforded in northerly weather, but with northwesterly winds a heavy swell sweeps around the point into the bay. In southerly weather there is no protection and vessels are obliged to leave. There is good anchorage anywhere off the wharves in 5 to 6 fathoms, sandy bottom. The post village of **Santa Cruz** is situated on the northwest shore; **Vista del Mar** and **Seabright** are suburbs of Santa Cruz on the beach eastward. Provisions may be obtained, but no coal or water. Communication is by regular coasting steamers, and by rail and stage; there are also telegraph and telephone facilities. A lighthouse (see table, page 16) is situated near the southern extremity of Point Santa Cruz, the western point at the entrance to the cove. A whistling buoy (nun, black and white horizontal stripes "S C") is placed in 10 fathoms, 1⅜ miles **ESE.** ¼ **E.** from the lighthouse.

From southward, from a position 2 miles **SW.** from Point Sur Lighthouse steer **NNW.** ½ **W.** for 17½ miles, when Point Cypress should be abeam, distant nearly 2 miles, and Point Pinos Lighthouse should bear **NNE.** ¾ **E.**, distant 5¼ miles. Then steer **N.** by **W.** ½ **W.** for 23 miles and pass ½ mile eastward of Santa Cruz Lighthouse; this course made good leads to the anchorage off the wharves. *From northward*, from a position 3¾ miles **SW.** ¼ **W.** from Pigeon Point Lighthouse, steer **ESE.** and give the coast a berth of over 1 mile. Continue this course about 21½ miles, and when Santa Cruz Lighthouse bears **NE.** by **E.**, steer **ENE.** for the whistling buoy and pass nearly 1 mile southward of the lighthouse. When the lighthouse bears **NW.** ¼ **W.**, steer **N.** by **E.** ¾ **E.**, which leads to the anchorage off the wharves.

SAN FRANCISCO BAY AND APPROACHES.*

The approaches to San Francisco Bay are included in the area bounded on the north by Point Reyes, on the west by the Farallones, and on the south by Point San Pedro. This body of water, known as the **Gulf of the Farallones**, is about 35 miles long in a northwest and southeast direction, with a greatest width of 23 miles, and communicates eastward by a narrow entrance, the Golden Gate, with San Francisco Bay. The prominent and easily distinguished landfalls, and the numerous natural and artificial aids to navigation, make the navigation of the approaches comparatively simple in clear weather. In thick weather the currents, variable in direction and velocity, render the approaches difficult and dangerous, and strangers should either lie off and wait for clear weather or take a pilot. Point Reyes, Mount Tamalpais, the Farallones, Point San Pedro, and Montara Mountain are all prominent in clear weather, and can frequently be used to locate a vessel's position when the lower land near the beach is shut in by fog or haze. Drakes Bay, eastward of Point Reyes, and

*Shown on charts **5500, 5600,** scale $\frac{1}{200,000}$, price of each $0.50. San Francisco Entrance is shown on chart **5532,** scale $\frac{1}{40,000}$, price $0.50.

Bolinas Bay, eastward of Duxbury Point, are open bights affording shelter in northwesterly weather, but exposed in southerly weather.

Point Reyes is a bold, dark, rocky headland, nearly 600 feet high, with low land northward, so that from northward and southward it is usually made as an island, and also from seaward in hazy weather. It is visible for over 25 miles westward from Point Bonita, the northern headland at the entrance to the Golden Gate. A lighthouse and fog signal are situated on the western extremity of the point (see table, page 18). A storm warning display and seacoast telegraph and reporting station is situated on the northwesterly end of the high ridge back of the lighthouse.

Mount Tamalpais, about 6 miles northward from Point Bonita, is a prominent peak about 2,600 feet high. In clear weather it is visible for over 60 miles. From southward and westward it shows three summits, of which the western is the highest and the eastern the sharpest. It is covered with bushes and scrub trees, giving it a dark appearance which contrasts strongly with the surrounding hills, especially in summer, when the latter assume a light reddish color.

The **Farallones** are a group of rocky islets extending about 7 miles in a northwest and southeast direction. The **Southeast Farallon,** the largest of the group, lies 18 miles **S.** by **E.** ¾ **E.** from Point Reyes Lighthouse, and 23½ miles **SW.** by **W.** from Point Bonita. It is a double island, the eastern one being gray and pyramidal in shape, 350 feet high, and surmounted by a lighthouse and fog signal (see table, page 18). The western and smaller one, Maintop, is about 220 feet high. There are several rocky islets close-to, the largest of which, Sugarloaf, 200 feet high, lies northwestward from the lighthouse. It is round-topped with vertical sides, the summit being usually white with bird lime. **Hurst Shoal** lies ⅝ mile **SE.** ½ **S.** from the lighthouse; it is of small extent, with a least depth of 6 fathoms, and breaks only in heavy weather. The **Middle Farallon** lies 2¼ miles **NW.** by **W.** from the lighthouse. It is a single black rock about 50 yards in diameter and 20 feet high. A **rock,** with 5¼ fathoms over it, lies ½ mile **SW.** by **S.** from it. *The **North Farallones** lie about 6½ miles **WNW.** from the lighthouse and about 14 miles **S.** from Point Reyes. They consist of two clusters of bare, precipitous islets and rocks extending in a west-northwest and east-southeast direction for ⅞ mile, with an average width of ¼ mile. The highest rock, 155 feet, is in the southeastern group. **Noonday Rock,** with 14 feet over it, lies 3 miles **W.** ¾ **N.** from the northernmost rock of the North Farallones and 14 miles **S.** by **W.** ⅛ **W.** from Point Reyes. It rises abruptly from depths of 20 fathoms and over, and is the principal danger in approaching from northward. It is marked by a whistling buoy placed in about 28 fathoms, 400 yards **SW.** ¾ **S.** from the rock. The rock is the shoalest point of **Fanny Shoal,** about 2 miles in extent, having depths of 20 to 30 fathoms.

Montara Mountain, 1,940 feet high, about 15 miles southward of the Golden Gate, is dark, pyramidal in shape, and bare of trees. It is a prominent feature in approaching the entrance.

Point San Pedro, 11 miles southward of the entrance, is a black, bold, rocky promontory, 640 feet high, with a high, jagged rock at its end. It is the seaward termination of a spur from Montara Mountain, and is an excellent mark in clear weather from either northward or southward.

From Point San Pedro to Point Lobos, the southern headland at the entrance, the coast extends 11½ miles in a north-northwesterly direction, the first 8 miles consisting of whitish cliffs which at a point 5 miles northward of Point San Pedro reach a height of 720 feet. Between Point Lobos and these cliffs are broad, low, sand beaches extending back to high sand dunes. These whitish sand dunes are prominent from a considerable distance seaward.

Point Lobos is a high, rocky, rounding cape, with black, rugged cliffs at its base. **Seal Rocks,** a group of high, rocky islets, lie close under its western face. The **Cliff House** and a number of other prominent buildings are situated on and near the southern point of its western face.

From Point Reyes to Point Bonita the coast extends in a general easterly direction for about 26 miles. From the point the coast trends eastward for about 3 miles and then bends sharply northward and eastward forming Drakes Bay.

Drakes Bay* affords shelter in northwesterly weather in 5 to 6 fathoms, sandy bottom. From the western headland high, white cliffs extend northward and eastward in a gentle curve for 6 miles, terminating in high, white sand dunes. Several lagoons on the northern shore empty through a common channel which is navigable by light-draft vessels with local knowledge. The western point is 230 feet high, with a detached rock lying close under the eastern extremity. A **reef,** with 4¼ fathoms which breaks in moderate weather, extends ½ mile **E.** ¾ **S.** from the point. The harbor is used extensively by vessels in heavy northwesterly weather. Shelter has been obtained in southeasterly weather, close under the western point, in 4 fathoms, sticky bottom, the force of the swell being broken by the reef off the point; this anchorage is not recommended. No directions

*Shown on chart **5590**, scale $\frac{1}{40,000}$, price $0.20.

for entering are necessary, further than to give the point a berth of not less than ¾ mile to avoid the reef previously mentioned.

From the sand dunes near the eastern part of the bight, rocky cliffs 100 to 200 feet high extend eastward and southward for 6 miles to Double Point.

Double Point is formed by two bold, rocky cliffs, about ½ mile apart. They are about the same height, the southern being 460 feet high. Two rocks lie off the northern cliff, one, 125 yards long, about 250 yards southwestward from the bluff, and the other and smaller one about 200 yards westward from the point. The southern cliff has a rock close under the point and nearly connected with it at low water.

From Double Point to Bolinas Point, 3½ miles, the coast is bold with high, rocky cliffs bordered by narrow sand beaches and no outlying dangers.

Bolinas Point, about 100 feet high, is the western point of the comparatively level table-land extending eastward to Bolinas Lagoon. Owing to its proximity to Duxbury Point it is not particularly prominent.

Duxbury Point, 160 feet high and yellowish in color, is about 5 miles southeastward from Double Point and about 9½ miles northwestward from Point Bonita. It is the southern extremity of the table-land westward of Bolinas Lagoon. **Duxbury Reef** is a long, narrow reef, partly bare at low water, extending 1¼ miles **SE.** from Duxbury Point. A ledge, with 5 to 6 fathoms over it, extends southward from the reef, its outer end lying 1⅜ miles **S.** by **E.** ¼ **E.** from the point. A whistling buoy is placed in 12 fathoms, 1⅞ miles **SSE.** ¼ **E.** from Duxbury Point. Vessels should not pass northward of the buoy.

Bolinas Bay lies immediately eastward of Duxbury Point. It is an open bight about 4 miles long between Duxbury and Rocky Points and about 1 mile wide. It affords shelter in northwesterly weather in 4 to 6 fathoms, sandy bottom, with Duxbury Point bearing about **W.** by **S.**, distant 1½ miles, but is little used. A **rock awash** at low water, with another rock awash about 250 yards northward of it, lies ¾ mile **E.** by **N.** from Duxbury Point. A rock, with 2 feet over it, lies 150 yards westward of the first rock. A **rock awash,** with a **rock** having 13 feet over it, 250 yards **NE.** by **E.**, lies nearly 1⅛ miles **SE.** by **E.** ½ **E.** from Duxbury Point. No directions are necessary other than to keep clear of Duxbury Reef and the dangers previously described.

Bolinas Lagoon is separated from the bay by a narrow strip of sandy beach that is cut by a narrow shifting channel near the bluffs about the middle of the bight. The lagoon is shoal and of little commercial importance. It is entered by small, light-draft vessels with local knowledge. The small settlement of **Bolinas** is located a short distance inside the entrance on the western shore.

Rocky Point, about 4 miles eastward from Duxbury Point, is about 100 feet high and shelving. Numerous detached rocks lie within 200 yards of the cliffs, which on the southern side of the point are high and precipitous.

From Rocky Point to Point Bonita the coast is very rugged and broken. The cliffs, which are the seaward termination of spurs from Mount Tamalpais, rise to heights of over 500 feet and are intersected by deep, narrow valleys stretching inland.

Point Bonita, the northern point at the entrance, is a black, sharp, narrow, precipitous cliff 100 feet high, increasing in height to 300 feet on its seaward face at the old light-tower ¼ mile northward. From northwestward it shows as three heads, the southern one being cut down to form a place for the lighthouse (see table, page 18). In the summer the cliffs are white with bird lime, but the first heavy rain restores them to their natural black color. There are a few detached rocks surrounding the point, but these do not extend over 200 yards offshore.

THE BAR.

The bar outside the entrance is circular in form, the area, with 6 fathoms or less, extending from a point ½ mile westward from Point Bonita to a point about ¾ mile offshore 2½ miles southward from Point Lobos. The extreme outer point is about 5½ miles **SW.** from Point Bonita. This is also the narrowest part, the distance between the inner and outer 6-fathom curves being little over ¼ mile. The northern part is the shoalest and is known as **Four Fathom Bank,** within the limits of which is a small area of less than 4 fathoms, locally known as the "**Potato Patch.**" The outer end of the Four Fathom Bank lies 5 miles **SW.** by **W.** from Point Bonita, and at its widest part, near the inshore end, the bank is about 1 mile wide. The Potato Patch is about 1 mile long and ¼ mile wide. Over the remainder of the bar the depths range from 31 to 36 feet, the deepest water being found near the southern end, which is about ¾ mile wide. The depths as a rule vary but little from year to year, with a slight tendency to increase. The depths in approaching are regular and decrease gradually to about 8 fathoms and then abruptly to the crest of the bar. Inside the bar the depths increase slowly and regularly to the entrance.

Channels.—In smooth weather the bar can be crossed anywhere southward of the western end of the Four Fathom Bank, but in thick or heavy weather use is made of one of the following channels.

The **Main Ship Channel** is the one in general use, and is included between the range of Fort Point and Alcatraz lighthouses, bearing **NE.** ¾ **E.**, and Fort Point Lighthouse, bearing **NE.** by **E.** ¼ **E.** This channel has a width of ¾ mile, and is only a little over ¼ mile between the outer and inner 6-fathom curves. The least depth is 33 feet at low water. The light-vessel (see table, page 18) is situated about 3 miles outside the bar, immediately northward of the Fort Point and Alcatraz range, and in thick weather this channel is easily entered owing to the short run from the light-vessel to the bar.

The **South Channel** is parallel to the beach southward of Point Lobos at a distance of ¾ mile, and at its southern end is about ⅜ mile wide. Vessels entering this channel and heading for Point Bonita Lighthouse, bearing **N.** by **W.** ¾ **W.**, will find nothing less than 6 fathoms and as a rule deeper water. Deep-draft vessels are taken through this channel with a heavy southwesterly swell, and although they may roll considerably they pitch but little and lessen the possibility of touching from that cause.

The **Bonita Channel** lies between the eastern end of Four Fathom Bank and the coast northward of Point Bonita. It is about 2 miles in length, and varies in width from ⅜ mile at its southern end abreast Point Bonita to ⅝ mile at the northern end. The navigable width is reduced to ¼ mile by several rocky patches. **Centissima Rock,** 1¼ miles **WNW.** ¼ **W.** from Point Bonita Lighthouse and ½ mile offshore, is the outer one of these rocks and has a depth of 4½ fathoms over it. A buoy (can, black, No. 3) is placed 114 feet **S.** ¾ **W.** from the rock in 27½ feet. **Sears Rock,** with 18 feet over it, lies a little over 150 yards inside Centissima Rock; several rocky patches, with less than 6 fathoms, lie inside and close to Sears Rock. Vessels should not attempt to pass eastward of the buoy. The eastern end of the Four Fathom Bank is marked by a buoy (nun, red and black horizontal stripes) which also marks the southern entrance to the channel. The northern entrance is marked by a buoy (nun, red, No. 2) placed near the northern end of the Four Fathom Bank. This channel is used by a large number of vessels, especially coasting steamers northward bound, and by deeply laden vessels when the Main Ship Channel or South Channel are impassable. A depth of over 8 fathoms can be carried through, and it has never been known to break; in heavy weather, owing to the foam from the breakers on the Four Fathom Bank and its apparent proximity to the beach, it looks forbidding but is perfectly safe. It is not recommended at night or in thick weather.

THE GOLDEN GATE

is the connecting passage between the ocean and San Francisco Bay. The western end is 2 miles in width, from which it contracts to a width of about ⅞ mile between Lime Point on the northern shore and Fort Point on the southern. The depths increase from 23 fathoms at the western end to depths of over 60 fathoms near the eastern end; these depths, combined with the currents, render the lead of little value in thick weather. The northern shore is bold and rugged, the cliffs, reddish in color, rising abruptly from the water's edge to heights of over 600 feet.

Bonita Cove, immediately eastward of Point Bonita, is occasionally used as an anchorage by small vessels. The anchorage is close under Point Bonita and is used considerably by the pilot boats.

Point Diablo, about midway between Point Bonita and Lime Point, projects sharply into the strait for about ⅛ mile. It rises abruptly to a height of over 200 feet, with deep water on all three sides.

From Point Diablo to Lime Point the shore forms a shallow bight with steep, precipitous cliffs; near the middle of the bight the cliffs are cut by a narrow valley which terminates in a low beach at the shore.

Lime Point is high and precipitous, and rises abruptly to a height of nearly 500 feet in less than ¼ mile. The southern face shows the effect of blasting. The lighthouse and fog-signal buildings are situated on the extremity of the point. A wharf has been built a short distance westward of the lighthouse.

The south shore of the Golden Gate extends in a gentle curve eastward and northward to Fort Point, forming a shallow bight known as **South Bay.** The cliffs rise abruptly from narrow beaches except near the middle of the bight, where a narrow valley terminates in a sand beach about ¼ mile long. Sailing vessels are sometimes obliged to anchor here from lack of wind, or, on an ebb current, to avoid drifting on Mile Rocks, but the anchorage is uncomfortable and it is difficult to get under way from it.

Mile Rocks are two small, black rocks lying ⅜ mile **NW.** ½ **W.** from the sharp, projecting point on the north face of Point Lobos. They are 20 feet high and about 100 feet apart, with reported deep water between them. In 1903 a lighthouse and fog signal are being constructed on the outer and larger rock. A **rock** with 6 feet over it lies 130 yards **E.** ⅜ **S.** from the outer rock. The passage between the rocks and the beach should not be attempted, as a **rock** with 15 feet over it lies about 300 yards **SSE.** ¼ **E.** from the outer rock and nearly in the middle of the passage, and sunken and visible rocks extend over 300 yards from the shore.

Fort Point projects slightly from the high cliffs, and is marked by a red brick fort with a stone sea wall in front. The fort is the distinguishing feature, and is surmounted by a lighthouse and fog signal (see table,

page 18). **Fort Point Ledge** is a dangerous sunken ledge extending 200 yards northward from the point. The outer end is marked by a buoy (nun, red, No. 2) placed in 7½ fathoms about 200 yards westward of the ledge and about 400 yards **NW. ⅞ W.** from Fort Point Lighthouse.

SAN FRANCISCO BAY.*

This is the most important as well as the largest harbor on the Pacific coast of the United States. It is landlocked and affords good shelter and anchorage in all weather. It is the terminus of several trans-Pacific lines of steamers and of several transcontinental railroads, and its commerce, both foreign and domestic, is extensive. Much of the local navigation is carried on by means of light-draft river steamers and barges, and by flat-bottomed scow schooners that ascend the Sacramento and San Joaquin rivers. A large amount of grain is exported, together with other native products.

From its junction with San Pablo Bay between Point San Pedro and Point San Pablo, about 10 miles above the entrance, it extends southeastward about 40 miles. The eastern shore as a rule is low, and in the southern part is composed of extensive marshes intersected by numerous winding sloughs. For about 4 miles southeastward from Point San Pablo the shore is formed by a ridge of rolling, grassy hills. The western shore, north of the entrance, is much bolder, with only a few stretches of low marsh. From Fort Point the shore trends eastward for 3 miles, and then rounds sharply southward for about 7 miles, from which point marshes and flats, intersected by numerous sloughs, extend to the head of the bay. There are several islands in the bay.

Alcatraz Island, about 2½ miles eastward from Lime Point and about 1 mile off the northern side of San Francisco, is prominent in the approaches, and is one of the leading marks in entering from outside. It is small and about 128 feet high, with numerous buildings of the military post located here. The lighthouse (see table, page 18) is situated on the highest part of the island. Fog bells are located on the extreme northwestern and southeastern ends of the island.

Angel Island, partially wooded, is about 1¾ miles northward from Alcatraz Island, and is separated from Point Tiburon by Raccoon Strait on its northern side. The island is irregular in shape, its greatest length being about 1¼ miles in an east and west direction with a width of 1 mile. The highest point, 762 feet, is about the center of the island. **Point Knox,** the southwestern point of the island, is marked by a lighthouse and fog signal (see table, page 18). A **shoal,** with 16 feet at its outer end, makes out ¼ mile southwestward from a point about ⅛ mile eastward from Point Knox. The wharf for the military post is situated about ¼ mile northwestward from Point Knox. **Point Blunt,** the southeastern point of the island, terminates in a knob, 60 feet high, connected by a low neck of land with the island; a **shoal** extends southeastward about ⅛ mile, the outer point being marked by a buoy (can, red and black horizontal stripes). **Quarry Point,** the eastern point of the island, is a bold bluff with deep water close-to. **Hospital Cove** is a small bight on the northern shore; the wharf for the National Quarantine Station is on the eastern shore of the cove.

Goat Island, about 320 feet high, lies 2½ miles eastward from Alcatraz Island; it is of rather small extent and irregular in shape. The eastern point is marked by a lighthouse and fog signal (see table, page 18). The northern point terminates in a small knob about 160 feet high; the northern and eastern faces of the knob are steep. The knob slopes back to a low neck of land on which are the buildings of the Naval Training Station. The wharves of the Light-House Establishment, Naval Training Station, and Army Engineers are in the small cove on the eastern face of the island southward of the knob. A **shoal** extends 1½ miles northwestward from the island: the northern end is marked by a buoy (nun, red).

Point Richmond, on the eastern shore of the bay, about 4 miles southeastward from Point San Pablo, is the ferry terminal of the Santa Fe Railroad. The wharf has been built out from the western extremity of the point.

Red Rock, 169 feet high, in the northern part of the bay, is visible in clear weather from the anchorage near Goat Island. It is reddish in color and of small extent. It lies 1 mile from the eastern shore and 2¼ miles southward of Point San Pablo.

Castro Rocks are small and low, and lie about ⅜ mile off Castro Point on the eastern shore abreast Red Rock.

Point San Quentin, on the western shore 3 miles southward from Point San Pedro, is prominent on account of the low land on either side. The buildings of the State Prison, and the wharf built out from the eastern extremity of the point, are prominent.

The **Marin Islands,** 1¼ miles northward from Point San Quentin, are two small islands lying close together about 1 mile offshore.

*Shown on chart **5500,** scale $\frac{1}{200,000}$; and in parts on charts **5532,** scale $\frac{1}{40,000}$, and **5531,** scale $\frac{1}{50,000}$; price of each $0.50.

The Brothers are two small, low, flat-topped islands ¼ mile westward from Point San Pablo. The eastern one is surmounted by a lighthouse and fog signal (see table, page 18). **Invincible** and **Whiting rocks lie** southwestward of The Brothers, and are marked by buoys.

Point San Pablo is the northwest extremity of a low ridge of hills on the eastern shore of the bay at the junction with San Pablo Bay. The point rises abruptly to a height of 140 feet.

Point San Pedro, the western point at the junction with San Pablo Bay, is prominent from either northward or southward. It rises rather abruptly to a knoll about 300 feet high with a small saddle behind it. **The Sisters,** two small, bare, rocky islets, about 100 yards apart, lie a little over ¼ mile northeastward from the point.

Southward of San Francisco, **Point Avisadero** (the eastern point of Hunters Point), **Sierra Point, Point San Bruno,** and **Point San Mateo,** all on the western shore, are the prominent natural features. Quite an extensive area is under oyster cultivation, and the stake fences inclosing the oyster beds and the quarters for the men—houses built on piling—are prominent. Near the southern part is a long flume crossing the marshes, inclosing water pipes that cross the bay at **Dumbarton** (Potrero) **Point.** A few small houses and a wharf are near the end of the point.

San Francisco, the largest city on the bay, is situated on the northern end of the peninsula separating the southern arm of the bay from the ocean. The depths at the wharves are ample for deep-draft vessels, and are maintained by dredging.

Oakland, the second largest city on the bay, is situated on the eastern shore opposite San Francisco. About 20 feet can be taken to the wharves at low water. Access to the water front is obtained by means of **San Antonio** (Oakland) **Creek,** which has been dredged and is confined between jetties. Further improvements are in progress. A lighthouse and lighted beacon are placed close-to off the ends of the north and south jetties, respectively. The creek is crossed by two drawbridges near the eastern end. A long railroad wharf and mole extends from the western part of the city to within ⅝ mile of Goat Island.

Alameda, immediately southward of Oakland, is of little commercial importance. A railroad mole and wharf, parallel to and southward of San Antonio Creek, projects about 2 miles westward from the western part of the town.

Berkeley and **Emeryville,** northward of and adjoining Oakland, are of little commercial importance. A small amount of manufacturing is done at Emeryville, from which a long wharf projects, terminating about ⅝ mile from Goat Island.

Sausalito, on the western shore about 2 miles northward of Lime Point, is the terminus of a railroad connecting with interior northern points; it is of little commercial importance. **Richardson Bay,** northward of Sausalito, is shoal.

Belvedere, on the eastern shore of Richardson Bay opposite Sausalito, is a summer resort and of little commercial importance.

Tiburon, near Point Tiburon, is the terminus of a railroad connecting with interior northern points.

Several small towns and villages, of little commercial importance, on both shores of the bay south of San Francisco, are reached at high water by narrow sloughs winding through the marshes.

The **United States Military Reservations** embracing Fort Point and Black Point are on the northern shore of the peninsula.

Channels.—From the Golden Gate to the anchorage off San Francisco and southward to Point Avisadero, and northward to the entrance of San Pablo Bay, the channels are wide, and have ample depth at low water for deep-draft vessels. Arch and Shag rocks, which were formerly above water, have been removed to a depth of 30 feet, and operations are (1903) in progress to remove Blossom Rock to the same depth.

From Point Avisadero the southern end of the bay is reached by a rather narrow channel, marked by beacons, following the western shore, and gradually decreasing in width from 2½ miles at its northern end to less than ¼ mile at its junction with Alviso Slough near the southern end. This channel is used principally by light-draft steamers and sailing vessels, engaged in carrying oysters from the different beds or in transporting farm produce from some of the landings reached by the sloughs connecting with the channel. An occasional steam lumber schooner enters Redwood City Slough at high water. The slopes of the channel are very abrupt, and rise rapidly from depths of 6 and 7 fathoms to depths of a few feet, and in some cases bare at low water. The northern portion of the channel is comparatively shoal, with depths of 3½ to 4½ fathoms.

Anchorage.—The usual anchorage for vessels is westward of Goat Island, and in the vicinity of Mission Rock off the southern part of San Francisco. Government vessels usually anchor in the triangular area included between the railroad-car-ferry route and the passenger-ferry route. In southeast weather and spring tides considerable sea is raised, and vessels at times anchor under the lee of Black Point and vicinity, where the force of the wind and sea are broken. For the limits of the forbidden anchorage see Appendix II.

Pilots will be found cruising off the Farallones and off the bar. Pilots for San Francisco, San Pablo, and Suisun Bays will be found at San Francisco. Pilotage is compulsory except for enrolled vessels sailing under a coasting license. Extracts from the laws of California relating to pilots and pilotage will be found in Appendix II.

Towboats may be had at San Francisco, and several will generally be found cruising off the bar. Under favorable conditions of wind and tide vessels do not require them when entering, but strangers are advised to take them.

Quarantine regulations for San Francisco Bay are prescribed when necessary by the State Board of Health (see Appendix II). **National Quarantine** regulations also apply (see Appendix IV). The **National Quarantine Station** is at Angel Island. The quarantine anchorage is off Sausalito. Vessels are boarded near Angel Island, and vessels subject to inspection must not pass beyond the line drawn from Alcatraz Island to the northern end of the sea wall.

The **Marine Hospital** is situated in the western part of San Francisco. The service has an officer and dispensary in the Appraiser's Building where out-patients are treated by an officer of the service, who is also the proper person to whom to apply for admission to the hospital. Extracts from the regulations for the government of the United States Public Health and Marine-Hospital Service are given in Appendix IV.

Harbor regulations.—Extracts from the code and harbor regulations will be found in Appendix II.

Supplies.—Coal, provisions, and ship-chandler's stores may be had in any desired quantity. Coal may be had at the wharves or in lighters. Water may be obtained on the wharves or by water boat. Oil for fuel for steamers so equipped is also obtainable.

Repairs to vessels and machinery of all kinds can be made. Docking facilities are ample. The largest dock is at Hunters Point; length 750 feet; width at top 122 feet, at bottom 74 feet; depth over sill at high water 32 feet. There is also a smaller dock here. Several other docks, floating and hydraulic, are located in San Francisco, and several marine railways are situated on San Antonio Creek.

A **time ball** is dropped daily except Sunday from the staff on the tower of the ferry building at San Francisco exactly at noon of the 120th meridian, that is at 8h. 0m. 0s. Greenwich mean time. The instant of noon is marked by the beginning of the fall of the ball. A notice is furnished for publication in the San Francisco daily papers stating whether the ball has fallen at the correct time, or giving the amount of error if any.

A **Coast and Geodetic Survey Suboffice** is located in the Appraiser's Building, San Francisco, where information relating to the coasts of the United States, Alaska, Hawaii, and Philippine Islands is furnished on application without charge.

A **United States Branch Hydrographic Office** is established in the Merchants' Exchange Building, San Francisco. Bulletins are posted here giving information of value to seamen, who are also enabled to avail themselves of publications pertaining to navigation, to compare barometers and chronometers, and to correct their charts from standards. No charge is made for this service.

Storm warning displays of the United States Weather Bureau are shown from a staff on the Mills Building, San Francisco, and can be seen by vessels at anchor in the harbor.

Buoy depot.—One of the depots of the Twelfth Lighthouse District (see page —) is situated on Goat Island.

Currents.—The tidal currents as a rule follow the general directions of the channels. At the entrance they attain their greatest velocity and are irregular in direction, and are sometimes influenced by the freshets in the Sacramento and San Joaquin rivers. In the Golden Gate on the ebb during spring tide a velocity of 6 to 7 miles per hour has been observed, and off the water front of San Francisco, 4 to 4½ miles.

Tides.—The mean rise and fall at Fort Point is 3.7 feet; at Oakland 4.5 feet; at the Brothers Lighthouse 4.2 feet; at Ravenswood wharf 6.0 feet. At Fort Point the mean time of high water after the moon's meridian passage is 11h. 39m., and of low water 5h. 03m. See also the table on page 14, and the tide tables published annually in advance by the Coast and Geodetic Survey, in which the tides are predicted for every day of the current year.

A **tide indicator,** maintained by the Coast and Geodetic Survey, is erected at the southeastern point of Alcatraz Island so as to be seen by passing vessels. On this indicator is shown the stage of the tide, and whether the tide is rising or falling. The arrowhead in the middle of the semicircle when pointing upward indicates a rising tide, and when pointing downward a falling tide. The pointer near the arrowhead points to the height of the tide (in feet), which is indicated by figures on the semicircle, the zero agreeing with mean lower low water.

For **variation of the compass** see page 13.

Magnetic ranges for determining the compass error of vessels have been established and are described, with the method of using them, in Appendix I.

SAN PABLO BAY*

is a circular basin of water about 10 miles long in a northeast and southwest direction, with a greatest width of about 8 miles. The northern part consists of low marshes intersected by numerous sloughs with a large area of shoal water and mud flats that bare at extreme low tides. The southern shore is bolder, except between Point San Pablo and Pinole Point, where the shore is low and marshy for about 3 miles. At its eastern end it communicates with Suisun Bay by Karquines Strait, and by Mare Island Strait northward with Napa Creek. There is considerable traffic through the bay; deep-water vessels passing through to load grain at points on Karquines Strait, and to South Vallejo to load flour and discharge lumber; light-draft vessels, sail and steam, for points on Suisun Bay and the Sacramento and San Joaquin rivers, and for points on Petaluma and Napa creeks.

Petaluma Creek† enters from northward in the western part of the bay through a narrow, winding channel, marked by beacons, extending through the flats to the main channel. A depth of 3 feet at low water can be taken to Petaluma, the head of navigation, about 16 miles above the mouth. The deepest draft taken into the creek is about 6 feet. The channel has been improved by the Government. A considerable amount of farm and dairy produce are carried on light-draft vessels, sail and steam, and a small amount of general merchandise imported. The creek is crossed by a railroad drawbridge near the mouth.

Napa Creek† and **Mare Island Strait,**‡ the southern portion of the creek, enter from northward at the eastern end of the bay. The creek has been improved by the Government and a depth of 4 feet at low water can be carried to Napa City, the head of navigation, about 17 miles above the entrance. A considerable amount of farm and dairy produce is carried on light-draft vessels, steam and sail, to and from various points on the creek. The southern portion, Mare Island Strait, leads to South Vallejo and Vallejo, on the eastern shore, and the navy yard on the northern and eastern shore of Mare Island. This portion has been improved and a depth of 4¾ fathoms at low water can be taken through a dredged channel to the navy yard.

South Vallejo, on the eastern shore of Mare Island Strait inside the entrance, is the terminal of a railroad connecting with interior northern points. A large flour mill is located southward of the railroad wharf, and lumber wharves northward. From 10 to 21 feet at low water can be taken alongside, dependent on the locality. Communication may be had by rail and steamers with other points on the bay; there are also telegraph and telephone facilities.

Vallejo, about 1 mile above South Vallejo, is a small town of little commercial importance. It supplies a large amount of fresh provisions to the naval station and affords residences for the employees and others attached to it; it also serves as a distributing point for a considerable agricultural area in its vicinity. Communication with San Francisco and other points may be had by rail and steamer; a ferry makes regular trips to the navy yard.

The **United States Naval Station,** on the western side of Mare Island Strait, maintains a depth of 30 feet alongside the sea wall. There is a large stone dry dock and extensive facilities for repairs in wood or iron. A **time ball** is dropped from a building near the ferry gate at noon, 120th meridian, or, 8h. 0m. 0s., Greenwich mean time. The magazine and wharf are near the southern end of the island immediately inside the entrance to the strait.

There are several small landings on the southern shore of San Pablo Bay used by light-draft vessels; on the northern shore, **McNears Landing,** near Point San Pedro, is the most important.

Prominent features.—Point San Pedro and **Point San Pablo** are described on page 66.

Pinole Point is a moderately high, rocky bluff projecting about 1 mile from the southern shore; shoals and flats, bare at low water, extend from Point San Pablo to Pinole Point, and from Pinole Point northeastward to Lone Tree Point.

Mare Island, at the eastern end of the bay, is about 2 miles in length, and near its southern end rises to a height of 280 feet. A lighthouse and fog signal (see table, page 18) are located on the southern point; the wharf for the station is at the light. The chimneys and some of the buildings of the naval station will be seen in clear weather near the north end.

The buildings of the **Selby Smelting Works,** on the southern shore abreast Mare Island, can be seen in clear weather, and the smoke is quite prominent.

The high, white, pyramidal **skeleton towers** on each side and near the entrance of Karquines Strait that carry electric-power cables across the strait are prominent in clear weather. The cables are too high to interfere with passing vessels.

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* Shown on chart **5523**, scale $\frac{1}{50,000}$, price $0.50.

† Shown on chart **5524**, scale $\frac{1}{30,000}$, price $0.20.

‡ Shown on charts **5524**, scale $\frac{1}{30,000}$; **5525**, scale $\frac{1}{10,000}$, price of each $0.20.

Channels.—The main channel through the bay extends in a gentle curve northward and eastward from the entrance to the eastern end of the bay. The average width between the 18-foot curves is a little over 1¼ miles, being a little wider at the southern end and about ¾ mile wide at the eastern end. About 1½ miles eastward from abreast Pinole Point the depths shoal to less than 4 fathoms, the least being about 3¼ fathoms. This shoal, known as Pinole Shoal, is (1903) being improved by the Government with a view of obtaining a depth of 30 feet, and the deepest water in the channel is marked by buoys.

The channel leading into Petaluma Creek has a least depth of 7½ feet and is marked by beacons. It joins the main ship channel about 2½ miles northward from Point San Pedro.

The channel leading into Mare Island Strait has a depth of 28 feet at the entrance, and a channel with this depth has been dredged to the Navy Yard. A buoy (can, black, No. 1) marks the edge of the shoal extending southward from Mare Island, and a lighted beacon is placed about 200 yards eastward of the point of the shoal extending from the eastern shore of the strait. About ⅜ mile above the entrance the channel is contracted by **Commission Rock,** which is marked by a beacon placed on the shoalest part of the rock. The eastern end of the dredged channel is marked by a red nun buoy westward of the beacon; vessels should not pass between the buoy and the beacon.

Tides.—See table, page 14.

KARQUINES STRAIT*

connects San Pablo and Suisun bays and is about 6 miles in length in a general easterly direction. For the first 3½ miles it is a little less than ½ mile in width, and then expands to a width of about 1 mile. It is deep throughout with the exception of a small stretch of flats on the northern shore, and a smaller area in the bight on the southern shore near the eastern end. There are several small settlements on both shores.

Benicia, on the northern point at the eastern entrance, is the largest town. The **U. S. Army Reservation** and **Arsenal** are located at the eastern end of the town. The car ferry of the Southern Pacific Railroad between Port Costa and Benicia lands at the western part of the town.

Port Costa, on the southern shore, ships a large amount of wheat. Extensive sheds for storing the grain occupy a considerable portion of the southern shore of the strait.

Martinez, on the southern shore, in the bight near the eastern entrance, is a small town of little commercial importance. This bight is used considerably by vessels for laying up. It affords excellent shelter with good holding ground, and the water is practically fresh.

SUISUN BAY†

is a broad, shallow body of water with marshy shores, and filled with numerous marshy islands, a large number of which have been reclaimed and are now under cultivation. It is practically the delta of the Sacramento and San Joaquin rivers, that enter in the eastern part of the bay. A narrow, winding **channel,** following the southern shore, leads to the mouths of the rivers. This is well marked by buoys and beacons and several lights. A draft of 7 feet can be taken to **Sacramento,** on the Sacramento River, and 9 feet to **Stockton,** on the San Joaquin River. The rivers and the channels near their mouths have been improved by the Government with a view of increasing the depth, removing obstructions, and providing relief during seasons of freshet. The bay is used almost entirely by light-draft vessels, steam and sail, most of which possess the local knowledge for its navigation. Strangers should take a pilot if bound above Benicia.

GENERAL REMARKS ON APPROACHING SAN FRANCISCO BAY.

Vessels approaching San Francisco Bay in clear weather, by day or night, will experience no difficulty in making a landfall, as the aids to navigation, both natural and artificial, are prominent and easily distinguished. *From northward*, vessels will make Point Reyes, and when up with the point can lay a course for the light vessel, observing proper care to avoid Noonday Rock northward of the North Farallones, or use the Bonita Channel, as prudence and inclination direct. *From seaward*, vessels should make the Southeast Farallon and shape a course for the light-vessel. *From southward*, vessels should make the light-vessel, or if desiring to cross the bar southward of the Main Ship Channel make Point Bonita Lighthouse and use the South Channel, or cross westward of the channel, as prudence and the condition of the bar warrant.

* Shown on chart **5523**, scale $\frac{1}{50,000}$; **5534**, scale $\frac{1}{40,000}$; price of each $0.50.

† Shown on chart **5534**, scale $\frac{1}{40,000}$, price $0.50.

In thick weather, vessels from northward endeavor to make Point Reyes fog signal. This is seldom heard in the bight northward of the point, but the lead will indicate the position. If inside the 30-fathom curve and the signal is not heard the vessel should be put broad offshore. Under certain conditions of foggy weather it has sometimes been found difficult to locate the signal owing to deflection in the direction of the sound, but by following the 30-fathom curve closely a vessel can round the point safely.

Cordell Bank lies about 20 miles **W.** by **S.** from Point Reyes. Within the 30-fathom curve it is about 2 miles long in a northwest and southeast direction, with a width of about 2 miles. The least water given on the bank is 25 fathoms, rocky bottom, but 19 fathoms has been reported. Between the bank and Point Reyes the depths increase to 66 fathoms; outside the bank the depths increase rapidly to 100 fathoms in 2 miles, and over 200 fathoms in 3 miles. Vessels from northward are sometimes guided by soundings on Cordell Bank, provided they can verify their soundings by the depths and characteristics of the bottom.

A vessel in 50 fathoms shoaling the depths on a south or southeast course will be northward of Noonday Rock Shoal or northward of Cordell Bank. In either case Noonday Rock whistling buoy is the only aid, and the vessel should either head offshore and wait for a pilot, or follow the 50-fathom curve until it takes a southeasterly direction with deeper water southward. If, however, the Point Reyes fog signal has been made, a course may be shaped for the light-vessel.

From westward, vessels should exercise the greatest caution when inside of 100 fathoms, and if inside of 50 fathoms should head offshore and wait for clear weather or a pilot, unless the fog signal on the Southeast Farallon can be made. This signal can not be heard well from northward, especially during northerly or northwesterly winds. If northward of the Farallones, the 50-fathom curve, followed southward, should lead within sound of the fog signal, after making which a course can be shaped for the light-vessel.

From southward, vessels make the fog signal at Pigeon Point or Point Año Nuevo and lay a course to pass about 3 miles off Montara Point, when the fog signal at that point should be made; the depths should not be shoaled to less than 25 fathoms. When abreast Montara Point a course can be shaped for the light-vessel, and the lead will be a good guide in approaching it and the bar.

Strangers are advised not to use the Bonita Channel in thick weather. The approaches lead past Duxbury Reef, and unless the buoys are plainly seen and distinguished, the channel, on account of its comparatively narrow width, is dangerous to those not thoroughly familiar with it.

Strangers without a pilot, after crossing the bar, are advised to anchor in about 10 fathoms and wait for a pilot or clear weather. Unless one is thoroughly familiar with the characteristics of the fog signals in the entrance and the peculiarities of the currents, entering in thick weather is hazardous, as the lead is of little value in the Golden Gate.

SAILING DIRECTIONS, SAN FRANCISCO BAY AND APPROACHES.

These directions are available for the deepest-draft vessels in clear weather to the anchorage off San Francisco. In thick weather strangers should wait for clear weather or take a pilot. In following the sailing directions care should be taken not to be set off the courses by the tidal currents, which have considerable velocity, especially in the Golden Gate. It is advisable to pick up a range ahead when practicable.

The directions for entering and passing through San Francisco Bay are arranged in sections, as follows:

1. Approaching and Entering, by the Main Ship Channel to Lime Point.
1 A. Approaching and Entering, by the South Channel to Lime Point.
1 B. Approaching and Entering, by the Bonita Channel to Lime Point.
2. From Lime Point to the Anchorage off San Francisco.
3. From San Francisco southward to Dumbarton Point.
2 A. From Lime Point northward to East Brother Island Lighthouse.

3 A. From East Brother Island Lighthouse through San Pablo Bay to Mare Island Lighthouse.

4. From Mare Island Lighthouse to an Anchorage off Martinez.

4 A. From Mare Island Lighthouse to the Navy Yard.

1. ***Approaching and Entering, by the Main Ship Channel to Lime Point.***—*I. From Southward.*—Follow the directions in section 3 of the Outside Sailing Directions, page 33, or section 6 of the Inshore Sailing Directions, page 36, until up with San Francisco Light-vessel. Bring Fort Point Lighthouse to bear **NE.** by **E.** ¼ **E.** and steer for it on that bearing. Then follow the directions in paragraph IV.

II. From Seaward.—Having made the lighthouse on Southeast Farallon, steer so as to pass not less than 1 mile southward of the island; then steer **NE.** by **E.**, heading for the light-vessel. When up with the light-vessel bring Fort Point Lighthouse to bear **NE.** by **E.** ¼ **E.** and follow the directions in paragraph IV.

Remarks.—The passages between the Farallones are not recommended, and, owing to Hurst Shoal, the Southeast Farallon should not be approached nearer than 1 mile. In thick weather, the fog signal on the Southeast Farallon can not be heard plainly northward of the island, especially with northerly or northwesterly winds. Soundings should be taken frequently when inside the 100-fathom curve, as the slope westward of the Farallones is abrupt.

Hurst Shoal, with 6 fathoms over it, lies about ½ mile southeastward from the Southeast Farallon, and breaks in heavy weather.

III. From Northward.—Round Point Reyes at a distance of 1 mile and steer **ESE.** until Fort Point Lighthouse bears **NE.** by **E.** ¼ **E.**; then steer for the lighthouse on that bearing, and follow the directions in paragraph IV.

Remarks.—San Francisco Light-vessel should be made a little on the starboard bow, and when Fort Point Lighthouse bears **NE.** by **E.** ¼ **E.** the light-vessel should bear about **S.**, distant 1 mile.

IV. When Fort Point Lighthouse bears **NE.** by **E.** ¼ **E.** steer for it on this bearing until Point Bonita Lighthouse bears abeam (*NNW.* ¾ *W.*), distant ⅞ mile. Then make good a **NE.** course until Lime Point Lighthouse bears *N.* by *W.*, distant a little over ¼ mile. Then follow the directions in section 2. Or if bound northward in San Francisco Bay to San Pablo Bay direct, follow the directions in section 2 A.

Remarks.—The **NE.** by **E.** ¼ **E.** course, when about 3 miles northeastward of the light-vessel, leads about ⅝ mile southward of West End of Four Fathom Bank buoy (can, black, No. 1), and then leads over the bar, which at this point is about ¼ mile wide with a depth of 5½ fathoms (see description of the bar on page 63). The course leads nearly midway between Point Bonita and Point Lobos (see description, pages 62 and 63) and passes about ½ mile northward of Inside Bar buoy (can, black and white perpendicular stripes). **Alcatraz Island** (see page 65) will be seen open northward of Fort Point Lighthouse, and at the end of the course **Point Blunt,** the southeast extremity of Angel Island (see page 65), should be seen open southward of Lime Point.

The **NE.** course favors the northern side of the Golden Gate, which has deep water close in to the beach, and leads about ¾ mile northward of **Mile Rocks** and ⅜ mile southward of **Point Diablo** (see page 64). On the ebb care should be taken not to be set southward toward **Fort Point Ledge,** which extends nearly 250 yards northward from Fort Point, and is marked by a buoy (nun, red, No. 2).

1 A. ***Approaching and Entering, by the South Channel to Lime Point.***—Follow the directions in section 3 of the Outside Sailing Directions, page 33, or section 6 of the Inshore Sailing Directions, page 36, to a position 2 miles westward of Point San Pedro. Then steer **N.** ½ **W.** for 9 miles with the Cliff House on Point Lobos ahead. South Side life-saving station, about 3½ miles southward of Point Lobos, should be passed at a distance of 1 mile. Then bring Point Bonita Lighthouse to bear **N.** by **W.** ¾ **W.**, and steer for it on the bearing. When Fort Point Lighthouse bears *NE.* by *E.*, and Alcatraz Island is open a little northward of it, steer **NE.** until Lime Point Lighthouse bears *N.* by *W.*, distant a little over ¼ mile. Then follow the directions in section 2. Or if bound northward in San Francisco Bay to San Pablo Bay direct, follow the directions in section 2 A.

Remarks.—The **N.** ½ **W.** course draws gradually inshore. There are no dangers if the beach be given a berth of over ½ mile. As South Side life-saving station is approached, Oceanside buoy (nun, red, No. 2) should be made on the starboard bow. When about ½ mile past the life-saving station, and the buoy is about the same distance on the starboard bow, Point Bonita should come on the bearing **N.** by **W.** ¾ **W.**

The **Cliff House,** on the western face of Point Lobos, is prominent and unmistakable; there are several other prominent buildings near it.

The **N.** by **W.** ¾ **W.** course follows the beach at a distance of ¾ mile, and passes westward of red nun buoys Nos. 2 and 4, about ½ mile westward of **Seal Rocks** off the Cliff House, and about ¾ mile westward of the bell buoy off **Mile Rocks.** The least depth liable to be found on the course is 5¾ to 6 fathoms between buoys Nos. 2 and 4. When Point Bonita Lighthouse is about 1 mile distant ahead the course is changed to **NE.**

See also the remarks under section 1, paragraph IV, page 71.

1 B. ***Approaching and Entering, by the Bonita Channel to Lime Point.***—This channel should not be attempted at night. It is not recommended for sailing vessels, owing to the changes in the direction of the wind that are liable to occur, and for lack of room to work ship. A short beam swell will frequently be felt, the result of the break on Four Fathom Bank, but not heavy enough to cause any inconvenience.

Round Point Reyes at a distance of 1 mile and steer **E.** ⅛ **S.**; this course made good for 18 miles leads to a position about ⅜ mile southward of Duxbury Reef whistling buoy. Then steer **E.** ⅝ **N.** heading for Tennessee Point, 1½ miles northward from Point Bonita. When Point Bonita Lighthouse bears *ESE.* ½ *E.* steer **ESE.**, passing 250 yards northward of red nun buoy No. 2, marking the northern end of the channel; continue the course passing 200 yards southward of Centissima Rock buoy (can, black, No. 3), 250 yards northward of East End of Four Fathom Bank buoy (nun, red and black horizontal stripes), and about ¼ mile southward of Point Bonita Lighthouse. Round Point Bonita Lighthouse at a distance of over ¼ mile and steer **NE.** by **E.** ¼ **E.**, passing about 400 yards southward of Point Diablo. When Lime Point Lighthouse bears *N.* by *W.*, distant a little over ¼ mile, follow the directions in section 2. Or if bound northward in San Francisco Bay to San Pablo Bay direct, follow the directions in section 2 A.

Remarks and dangers.—On the **E.** ⅞ **S.** course **Blue Mountain** (920 feet) will be ahead, and the higher **San Bruno Mountain** and **Montara Mountain** will be seen southward; **Point Bonita** and **Duxbury Point** will be on the port bow, and the latter point should be passed at a distance of a little over 2 miles. Duxbury Reef whistling buoy should be made on the port bow, and the course leads ⅜ mile southward of it.

Duxbury Reef is a long, narrow reef, partly bare at low water, extending 1¼ miles **SE.** from Duxbury Point. A ledge, with 5 to 6 fathoms over it, extends southward from the reef, its outer end lying 1⅜ miles **S.** by **E.** ¼ **E.** from the point. A whistling buoy is placed in 12 fathoms, 1⅞ miles **SSE.** ¼ **E.** from Duxbury Point. Vessels should not pass northward of the buoy.

On the **E.** ⅝ **N.** course, **Tennessee Point** will be ahead; it is the first prominent point north of the first marked cut in the hills northward of Point Bonita. The course leads nearly ⅜ mile northward of the 6-fathom curve on the northern side of Four Fathom Bank. Tennessee Point will be about 1 mile ahead when Point Bonita Lighthouse bears **ESE.** ½ **E.**, and the red nun buoy No. 2 at the northern end of Bonita Channel should be about ½ mile on the starboard bow; the course is then changed to **ESE.**

On the **ESE.** course through Bonita Channel the buoys will be readily seen in clear weather. Care should be taken to give Point Bonita a berth of about ¼ mile. The **ranges** for the channel are a **windmill** on the eastern slope of Point Lobos in range with the **highest point of Blue Mountain,** or the **outer rock** off Rocky Point in range with a **small knob** near the head of Bolinas Lagoon. These ranges are not well defined, and unless familiar with the locality are not readily picked up. See also, the description of Bonita Channel on page 64.

Centissima Rock and **Sears Rock** are the serious dangers in Bonita Channel. Centissima Rock, with 27 feet over it, lies a little over ⅜ mile **S.** ½ **E.** from Tennessee Point and 1¼ miles **WNW.** ⅜ **W.** from Point Bonita Lighthouse, and is marked close to its southern side by a buoy (can, black, No. 3). Sears Rock, with 18 feet over it, lies a little over 150 yards northeastward of Centissima Rock; several **rocky patches,** with 4¾ to 6 fathoms, lie close to northward and eastward of Sears Rock.

2. ***From Lime Point to the Anchorage off San Francisco.***—From a position about ¼ mile *S.* by *E.* from Lime Point Lighthouse steer **ENE.** ⅞ **E.** heading for the northeastern point of Goat Island, passing about ¼ mile northward of Presidio Shoal gas-lighted buoy and ½ mile southward of Alcatraz Island Lighthouse. Then haul southward and follow the water front of San Francisco at a distance of about ½ mile. Anchor as desired outside the forbidden anchorage limits given in Appendix II.

Remarks and dangers.—On the **ENE.** ⅞ **E.** course vessels should avoid being set southward on Presidio Shoal or northward on Blossom Rock on the ebb tide.

Presidio Shoal, with 3½ to 4¾ fathoms and rising abruptly from deep water, is about ⅝ mile long in a **NE.** by **E.** ¼ **E.** direction with an average width of about 100 yards, and is marked near its middle by a gas-lighted buoy. The western end is a little over ⅝ mile **NE.** by **E.** ¼ **E.** from Fort Point, the shoal extending about parallel with the Presidio at a distance of about ⅝ mile offshore.

Anita Rock, bare at low water, lies about 300 yards northward from the Presidio wharf, and is marked by a spindle surmounted by a cage.

Blossom Rock, with 3¾ fathoms over it, lies nearly 1 mile **E.** ½ **S.** from the southeastern end of Alcatraz Island. In 1903 operations are in progress to remove the rock to a depth of 30 feet. Heavy tide rips occur in the vicinity of the rock.

3. ***From San Francisco Southward to Dumbarton Point.***—There is a depth of about 21 feet in the channel to Dumbarton Point, the shoalest water being abreast Point San Bruno.

From the anchorage steer southward so as to pass 100 yards or more eastward of the buoy (gas-lighted, red and black horizontal stripes), marking the eastern rock off the Pacific Mail Dock. Then steer **SE.** by **S.** so as to pass about ¼ mile eastward of Point Avisadero; continue the course about 5½ miles past Point Avisadero, and when Point San Bruno bears *W.*, distant 3 miles, steer **SE.** by **E.** ¼ **E.** for nearly 4 miles to a position nearly ⅜ mile northward of red beacon No. 2. Then steer **ESE.** ½ **E.** for about 3¼ miles so as to pass about 300 yards northward of red beacon No. 4. Then steer **ESE.**, heading for red beacon No. 8 off Ravenswood Point until black beacon No. 3 is abeam, distant about ⅜ mile, and then haul a little eastward so as to pass 300 to 500 yards northward of beacon No. 8. Then steer **ESE.**, heading for the wharf at Dumbarton Point. Give Dumbarton Point a berth of about ½ mile and pass 100 to 300 yards westward of the wharf. Anchor abreast or a little eastward of the wharf. Strangers bound beyond Dumbarton Point should take a pilot.

Remarks and dangers.—Two **rocks**, with 4¾ and 4½ fathoms over them, lie 500 and 900 yards, respectively, eastward from the Pacific Mail Dock. They are marked by buoys, the inner one a nun, and the outer a gas-lighted buoy, placed close to and eastward of them. There is deep water between them, but vessels bound southward are recommended to pass eastward of the gas-lighted buoy.

On the **SE.** by **S.** course, **Point Avisadero**, with the buildings of the dry docks located there, will show prominently on the starboard bow. There is deep water close eastward of the point. Southward of Point Avisadero, **Point San Bruno**, and the oyster beds and beacons southward of it, will be seen in clear weather (see description, page 66). **Point San Mateo**, terminating in a small, wooded knoll with low land behind it, will be seen on the starboard bow, and **Guano Island**, a small knoll on the edge of the marsh eastward from Point San Mateo, will be seen on the port bow. The course leads nearly 2 miles eastward of South San Francisco lighted beacon off Point San Bruno.

From abreast Point San Bruno the channel leads between extensive flats which bare in places at extreme low water. The channel gradually narrows to ¾ mile abreast Point San Mateo, which width it maintains to beacon No. 6. From beacon No. 6 to Dumbarton Point the channel between the flats is about ⅜ mile wide.

On the **SE.** by **E.** ¼ **E.** course beacon No. 2 and Guano Island will be on the starboard bow.

On the **ESE.** ½ **E.** course **Dumbarton Point** will be a little on the starboard bow, the buildings on the point showing prominently.

On the **ESE.** course from beacon No. 4, beacon No. 6, at the entrance to Redwood City Creek, will be left nearly 400 yards on the starboard hand. Local knowledge is necessary to cross the bar at the entrance to Redwood City Creek, and for the channel leading to the landing. Beacon No. 3 is about ⅜ mile northward of the edge of the channel.

On the **ESE.** course from beacon No. 8, Ravenswood Point should be given a berth of about ⅜ mile; **flats** extend over ¼ mile off the point. A short, rolling, grass-covered ridge lies about 2½ miles northward of Dumbarton wharf. Water pipes, covered by a wooden structure, extend across the marshes to Dumbarton Point and cross the channel westward of the wharf. About 18 feet can be taken alongside the wharf.

2 A. ***From Lime Point Northward to East Brother Island Lighthouse.***—The least water liable to be found in following the courses is 5¾ fathoms, about 1½ miles southward of Red Rock; the directions lead near the former position of Shag Rock, which has been removed to a depth of 30 feet.

From a position about ¼ mile *S.* by *E.* from Lime Point Lighthouse steer **NE.** for about 3½ miles, giving Point Blunt a berth of about ⅜ mile. Round Point Blunt at a distance of ⅜ mile and steer **NW.** ½ **N.**, heading for the opening between the Marin Islands, and passing Quarry Point and Point Simpton (both on Angel Island) at a distance of about 300 yards. Continue this course about 4¼ miles, and when Red Rock bears *NE.* by *N.*, distant nearly 1 mile, steer **N.** by **W.** ¼ **W.**, heading for the eastern one of The Sisters, off Point San Pedro, and passing westward of Invincible Rock and Whiting Rock buoys (cans, red and black horizontal stripes) and East Brother Shoal buoy (nun, red). When East Brother Island Lighthouse bears *E.*, distant ½ mile, follow the directions in section 3 A.

From the anchorage off San Francisco.—Steer so as to pass 300 yards eastward of Quarry Point; when up with the point steer **NW.** ½ **N.** and proceed as directed above.

Remarks and dangers.—The **NE.** course leads a little over ¾ mile northward of Alcatraz Island and a little northward of the former position of Shag Rock. A good berth should be given to Point Blunt to avoid the **foul ground** which extends about 250 yards southward from the point, and is marked by a buoy (can, red and black horizontal stripes) moored 100 yards eastward from its southern end. The **tide rips** and **swirls** are heavy around Point Blunt, especially on the ebb of a large tide.

Raccoon Strait, on the northwest side of Angel Island, is nearly ½ mile wide, and is sometimes used by vessels bound northward in San Francisco Bay from Lime Point. The strait is free from dangers, but the tidal currents have considerable velocity and the **rips** and **swirls** are heavy at times. A mid-channel course can be followed with safety.

The **NW.** ½ **N.** course leads 300 yards eastward of Angel Island: **Quarry Point,** steep and rocky, is frequently made use of in foggy weather by the echo from the whistle. When abreast of Quarry Point, **Point San Quentin,** with the buildings of the State Penitentiary, should be seen on the port bow and **Red Rock** on the starboard bow, and **Marin Islands** (see description, page 65) will be seen ahead in the bight northward of Point San Quentin. The course passes well westward of Southampton Shoal.

Southampton Shoal extends in a northwest and southeast direction for 2 miles, with an average width between the 18-foot contours of ¼ mile. On the western side the slope is abrupt from 6 fathoms to 9 to 12 feet, while on the eastern side the shoaling is gradual. The least water is 9 feet on the western edge of the shoal, about midway between the northern and southern points. The northern extremity, lying 1¼ miles **SE.** from Red Rock, and the southern point, about 1⅜ miles **NNE.** ½ **E.** from Quarry Point, are each marked by a buoy (nun, red and black horizontal stripes). The channel eastward of the shoal has a depth of 3 to 4 fathoms, and is little used, except that portion included in the route of the ferryboats between Point Richmond and San Francisco.

A **shoal,** with depths of 3¾ to 5 fathoms, extends about 1¼ miles **S.** by **E.** from Red Rock. The water shoals gradually toward the shoal, and the course leads over ¼ mile westward of the 5-fathom curve surrounding it.

On the **N.** by **W.** ¼ **W.** course, **Point San Pablo** (high and prominent), with **The Brothers** (two small islands, the easternmost marked by a lighthouse) off the point, will be on the starboard bow; **Point San Pedro** (high and prominent) will be on the port bow, and **The Sisters** (two bare, rocky islets) will be seen off the point, the easternmost ahead.

Invincible Rock, with 8 feet over it, lies ½ mile **SSW.** ¼ **W.** from East Brother Island Lighthouse, and is marked on its western side by a buoy (can, red and black horizontal stripes).

Whiting Rock, with 12 feet over it, lies northward of Invincible Rock and nearly ⅜ mile **SW.** by **S.** from East Brother Island Lighthouse. It is marked on its western side by a buoy (can, red and black horizontal stripes).

A red nun buoy is placed in 17 fathoms a little over ¼ mile **W.** ¼ **S.** from East Brother Island Lighthouse. This marks a reported **spot** with 15 feet over it; a recent examination (1900) failed to find any indications of this danger, and it is not believed to exist. Vessels should, however, pass westward of the buoy.

The **channel** eastward of Red Rock and The Brothers is frequently used by the river steamers on the ebb, as the current has less velocity although the rips and swirls are at times heavy.

3 A. ***From East Brother Island Lighthouse through San Pablo Bay to Mare Island Lighthouse.***—The least water found in following the courses is 3¼ fathoms in crossing Pinole Shoal between Point Wilson (Mid-channel) buoy and Upper Mid-channel buoy.

From a position ½ mile *W.* from East Brother Island Lighthouse, steer **NNE.** for about 4¾ miles to a position about 250 yards southeastward from Lower Mid-channel whistling buoy, marking the channel over Pinole Shoal. Then steer **NE.** ½ **N.** about 1¾ miles so as to pass close northward of Point Wilson Mid-channel buoy (can, black and white perpendicular stripes). When up with the buoy steer **NE.** ⅛ **E.** heading for Upper Mid-channel

buoy (can, black and white perpendicular stripes). Pass close to the buoy and steer **NE.** by **E.** ¾ **E.**, heading for the northern point at the entrance to Karquines Strait. When Mare Island Lighthouse bears *NNW.*, distant ⅝ mile, follow the directions in section 4; or, if bound up Mare Island Strait, follow directions in section 4 A.

Remarks.—The **NNE.** course passes about 1 mile westward of Pinole Point just before reaching the whistling buoy. From the whistling buoy to Upper Mid-channel buoy the channel leads over Pinole Shoal, with a least depth of 3¼ fathoms, and the buoys are the principal guides for strangers. The channel has a width of 1¼ miles to Point Wilson (Mid-channel) buoy, and then decreases gradually to ¾ mile at Mare Island.

On the **NE.** ⅛ **E.** course, Mare Island Lighthouse (see table, page 18), on the south end of Mare Island, will be a little on the starboard bow.

4. ***From Mare Island Lighthouse to an anchorage off Martinez.***—From a position ⅝ mile *SSE.* from Mare Island Lighthouse, steer about **E.** by **N.** and follow a mid-channel course, keeping out of the bights until up with the ferry terminal at Benicia. Then favor the southern shore to clear a 19-foot shoal, making southward from Benicia to mid-channel about ½ mile eastward of the ferry terminal, and anchor as desired between Martinez and Benicia, in 5½ to 7 fathoms, sticky bottom. Strangers desiring to pass above Benicia should take a pilot.

Remarks and dangers.—The bight 1½ miles wide in the northern shore westward of the ferry terminal is shoal, and the channel is over ⅜ mile wide between it and the southern shore.

The only outlying danger is a **shoal**, with 10 feet over it, which extends southward from Benicia to mid-channel, ½ mile eastward from the end of the ferry terminal. The southern end of the shoal lies nearly ⅝ mile **SE.** from the end of the ferry terminal, and is easily avoided by keeping the southern shore aboard, distant ¼ to ⅜ mile, in passing it.

Above Benicia the channels are winding, and the changes in depth and direction are such that no directions can be given that would be of value to a stranger.

4 A. ***From Mare Island Lighthouse to the Navy Yard.***—From a position ⅝ mile *SSE.* from Mare Island Lighthouse, steer **N.** by **E.** ¼ **E.**, passing about 100 yards eastward of San Pablo Bay buoy (can, black, No. 1). When about 300 yards past the buoy, and the magazine wharf is well open from the eastern point of Mare Island, round slowly northward and westward so as to pass the magazine wharf at a distance of 125 yards. When abreast the wharf steer **NW.** ⅝ **W.**, standing through the dredged channel westward of Commission Rock. Continue the course until above the northernmost wharf at Vallejo, and then anchor as desired. If bound above the navy yard into Napa Creek, take a pilot.

Remarks.—In entering favor the buoyed side of the channel, as the lighted beacon on the eastern shoal is nearly 200 yards from its outer point. The currents have considerable velocity on the ebb and vessels should avoid an easterly set. The flour mills, and railroad wharf and depot above them, on the eastern shore opposite the magazine wharf, are prominent in entering.

The **NW.** ⅝ **W.** course, when abreast the upper end of the railroad wharf, leads into the **dredged channel,** which is ⅝ mile long and 80 to 125 yards wide, with a depth of 4¾ fathoms. **Commission Rock beacon** will be left about 160 yards, and buoy about 75 yards, on the starboard hand. The course leads about 100 yards northeastward of the receiving ship "Independence." The **depths** in the channel off the navy yard are 3½ to 4¾ fathoms, but close along the sea wall of the navy yard has been dredged to 5 fathoms.

The **anchorage** above the navy yard is 300 to 500 yards wide, with depths of 12 to 21 feet, and is on the western side of the strait. The wharves on the eastern shore extend to the edge of the channel. Private vessels, anchoring abreast the navy yard, anchor on the eastern side of the channel.

Commission Rock, about ¾ mile above the magazine wharf, lies nearly in mid-channel. It is bare at low water, and is marked by a beacon (cylindrical iron, with spindle, red and white horizontal stripes). A red nun buoy is moored westward of the beacon near the eastern edge of the channel, and vessels should not pass between them. The channel eastward of Commission Rock has depths of 13 to 14 feet, and is frequently used by vessels whose draft permits, giving the beacon a berth of over 75 yards. A long wharf projects from the eastern shore to the edge of the channel a little northward of Commission Rock.

OUTSIDE SAILING DIRECTIONS ALONG THE COAST, FROM POINT REYES TO CAPE FLATTERY.

These directions are available for steamers of any draft, and comprise the direct and generally used routes from San Francisco entrance to northern points.

They are divided into sections, as follows:

Section 1. From Point Reyes to Point Arena.
Section 2. From Point Arena to Cape Mendocino.
Section 3. From Cape Mendocino to Cape Blanco.
Section 4. From Cape Blanco to Columbia River entrance.
Section 5. From Cape Blanco to Juan de Fuca Strait.

Inshore sailing directions along the coast follow the above, and in clear weather during the prevailing northwesterly winds of summer may be found more advantageous on account of their leading closer inshore in smoother water and less wind. These also lead within a short distance of the landings and the entrances to the bays and coves along the coast.

1. ***From Point Reyes to Point Arena.***—From a position 1 mile southwestward of Point Reyes, steer **NW. ⅝ W.** (N. 32° 14′ W. true) for 67 miles. This course made good should bring Point Arena Lighthouse abeam, distant 3 miles. Then proceed as directed in section 2, following.

Caution.—In thick weather on this course the depths should not be shoaled to less than 30 fathoms, and in approaching Point Reyes or Point Arena from either northward or southward this caution should be particularly observed.

The fog signal at Point Reyes can seldom be heard from northward in northerly weather, and rarely, if ever, in the bight to the northward.

Remarks.– This course leads from 3 to 10 miles offshore. The dangers on this section of the coast do not extend more than 1 mile offshore.

Bodega Head, about 20 miles **N.** of Point Reyes, shows as a bright, yellow cliff from seaward in clear weather.

The south point of Arena Cove, 3 miles **S.** of Point Arena, is a bright, rocky cliff about 200 feet high. It is visible about 16 miles from seaward and serves to locate Point Arena when the latter is below the horizon.

Point Arena is a long, level plateau, diminishing in height to about 60 feet at the point. It is bare of trees for a mile back of the point, which is marked by the lighthouse and buildings (see table, page 18).

Dangers.—**Russian River Reef** lies about 9 miles northward of Bodega Head and extends about 1 mile offshore. Several of the rocks are visible at high tide.

A **sunken reef,** extending about 1 mile offshore, lies about 13½ miles northward of Bodega Head and about 2 miles southward of Fort Ross Cove.

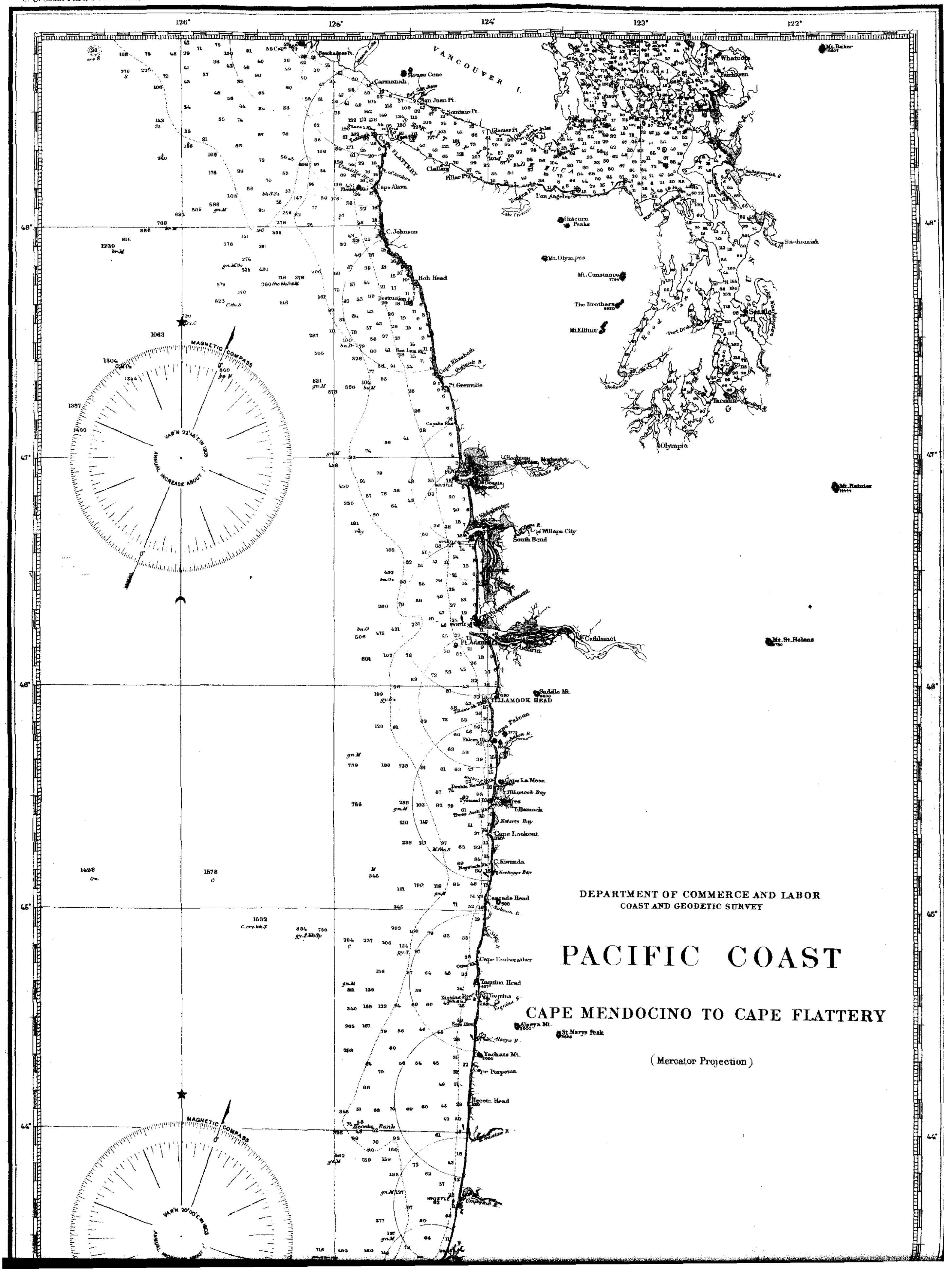
Saunders Reef lies about 7½ miles southward of Point Arena and about ¾ mile offshore. A whistling buoy, red, is placed about ⅜ mile **SW.** by **W.** from the outer rock of the reef. Vessels should not pass inside of the buoy.

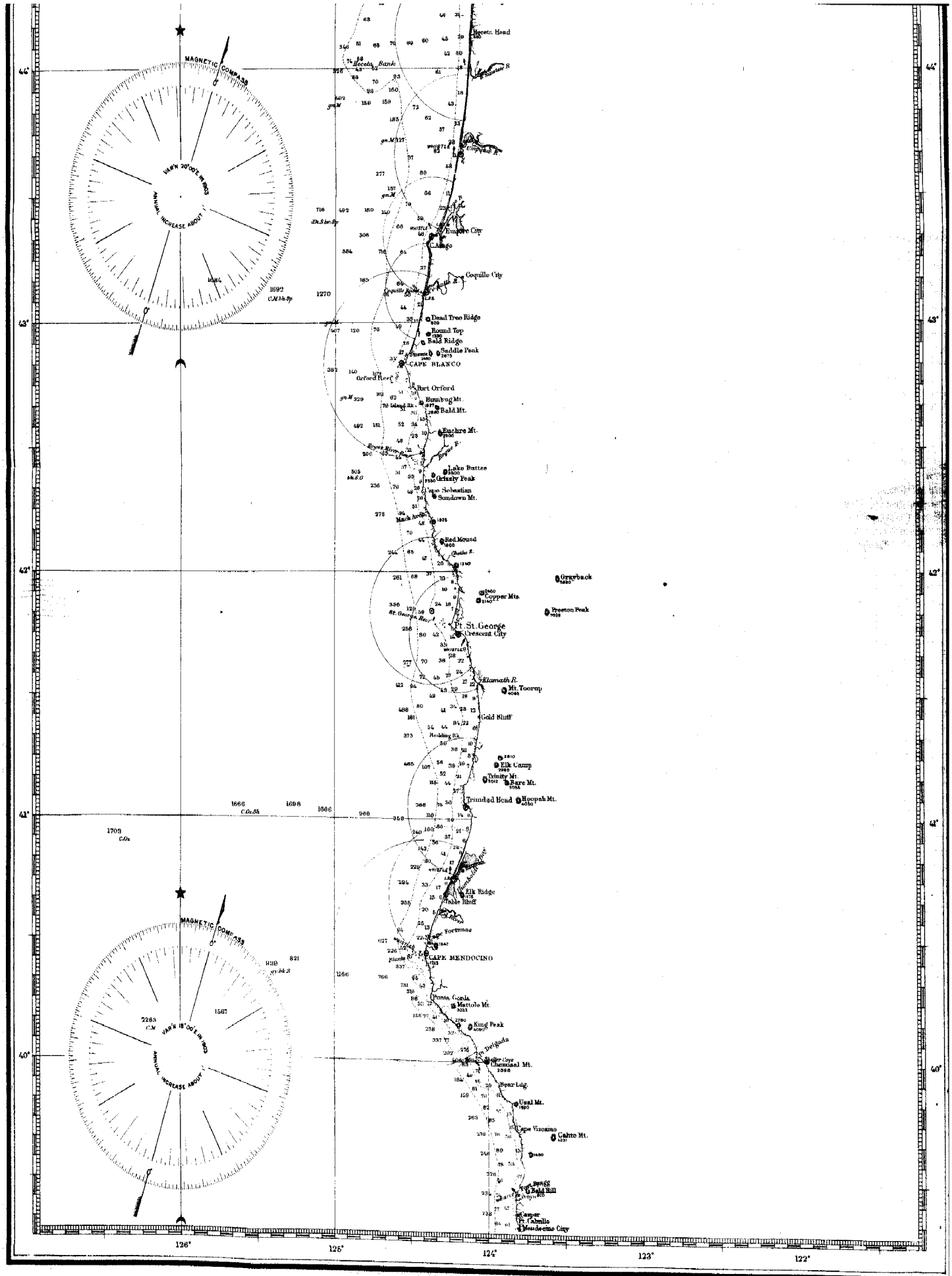
A **reef** extends about ¾ mile **NW.** from Point Arena.

Arena Rock, with 13 feet over it, lies nearly 1⅛ miles **NW.** ¾ **N.** from Point Arena.

2. ***From Point Arena to Cape Mendocino.***—Having followed the directions in section 1, preceding, steer **NW. ⅝ N.** (N. 20° 17′ W. true) for 97 miles. This course made good should bring Blunts Reef whistling buoy abeam, distant about 1½ miles, with Cape Mendocino Lighthouse bearing *ENE. ⅝ E.*, distant 5¼ miles. Then proceed as directed in section 3, following.

Caution.—In thick weather, in approaching Point Arena from northward the depths should not be shoaled to less than 30 fathoms. The same caution should be observed in approaching Point Gorda and Cape Mendocino. Between Point Gorda and Cape Mendocino the depths are very irregular, with two submarine valleys having depths of over 100 fathoms, terminating within 2 miles or less of the shore. The greatest caution should be observed


DEPARTMENT OF COMMERCE AND LABOR
COAST AND GEODETIC SURVEY
PACIFIC COAST
CAPE MENDOCINO TO CAPE FLATTERY
(Mercator Projection)
MAGNETIC COMPASS
Cape Alava
C. Johnson
Hoh Head
Pt Grenville
Tillamook Head
Saddle Mt.
Cape Falcon
Cape Lookout
C. Kiwanda
Cascade Head
Cape Foulweather
Yaquina Head
Yachats Mt.
Cape Perpetua
Heceta Head
Heceta Bank
Willapa City
South Bend
Cathlamet
Olympia
Tacoma
Seattle
Snohomish
Whatcom
Fairhaven
Mt. Baker
Mt. Rainier
Mt. St. Helens
Mt. Olympus
Mt. Constance
The Brothers
Mt. Ellinor
Port Angeles
Pillar Pt.
Clallam
Carmanah
San Juan Pt.
Sombrio Pt.
Unicorn Peaks
Cape Meares
Tillamook
Tillamook Bay
Alsea Mt.
St. Marys Peak
126°
125°
124°
123°
122°
48°
47°
46°
45°
44°



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in thick weather when between these two points, as the lead can not be relied upon to give sufficient warning.

Remarks.—This course leads from 3 to 15 miles offshore until nearing Point Gorda, which is passed at a distance of about 3 miles. The dangers do not extend more than 1 mile offshore until near Cape Mendocino.

From the low stretch of sand beach north of Ten Mile River, 33 miles **N.** of Point Arena, the coast north to Point Gorda is very bold and rugged, covered with chemise or timber, with elevations of 1,200 to 4,000 feet, but a mile or two from the shore. This high land is frequently visible over the lower fog or haze inshore.

King Peak, 4,000 feet high, lies about 12½ miles **ESE.** from Point Gorda, and in clear weather is visible from seaward for about 75 miles.

From Point Gorda to Cape Mendocino the land is lower than that southward, and is bare of timber.

Point Gorda, 11 miles **SSE.** from Cape Mendocino, is a high, bold, rounding cape, terminating seaward in cliffs 800 to 900 feet high, and, except in the gulches, is bare of trees. For over 1½ miles northward and 2 miles southward of the point the shore is bordered by numerous rocks, extending in some cases 400 yards offshore.

Gorda Rock, 20 feet high, lies 300 yards **WNW.** from the point, with a small, low rock lying 350 yards **WNW. ½ W.** from it. There is foul ground between them.

Cape Mendocino (see table, page 18) is a bold, mountainous headland, the seaward face being steep and rocky, backed by rolling, grass-covered hills, and rising to a height of 2,000 feet 1 mile from shore.

Sugar Loaf Rock, 330 feet high, lies 250 yards off the cape and is connected with it at low water by a narrow neck of rocks and shingle beach. In thick weather Cape Fortunas and False Cape Rock should not be confused with Cape Mendocino and Sugar Loaf Rock, between which there is some resemblance. The former rock is but two-thirds the height of the Sugar Loaf Rock.

Dangers.—On this stretch of the coast the dangers do not extend more than ¾ mile offshore until in the vicinity of Cape Mendocino.

Blunts Reef, two low rocks, bare at all tides, about 200 yards apart, lies 2¾ miles **W. ⅝ S.** from Cape Mendocino Lighthouse. A whistling buoy is placed about ¾ mile **W. ¾ S.** from the outer rock. Vessels should not pass inside the buoy.

The **Great Break**, a rock with 4¼ fathoms over it, lies about ¾ mile **S. ½ E.** from the outer rock of Blunts Reef. It has no kelp.

A rock with 10 feet over it lies nearly ½ mile **ENE.** from the Great Break and about ½ mile **SE. ⅞ S.** from the outer rock of Blunts Reef. It has no kelp.

A number of rocks and sunken ledges lie within a radius of 2 miles from Cape Mendocino Lighthouse. **Fauntleroy Rock,** 1¾ miles **SW. ½ W.** from the lighthouse, with 6 feet over it, is the farthest offshore. Southward of the cape for about 4 miles numerous rocks and sunken ledges extend from ½ to 1 mile offshore. **Devils Gate,** 20 feet high, and **Steamboat Rock,** 46 feet high, being the most prominent of those visible. No detailed description of these dangers is considered necessary.

3. ***From Cape Mendocino to Cape Blanco.***—Having followed the directions in section 2, preceding, steer **NNW.** (N. 3° 45′ W. true) for 143½ miles. This course, made good, should bring Cape Blanco Lighthouse abeam, distant 7 miles. Then proceed as directed in section 4 or 5, following.

Caution.—In thick weather, in approaching Cape Blanco from any direction, to guard against an inshore set, the depths should not be shoaled to less than 80 fathoms, and soundings should be taken frequently when in its vicinity. The same caution should be observed in the vicinity of Point St. George and St. George Reef.

In thick weather, in approaching Cape Mendocino from northward, to guard against an inshore set, the depths should not be shoaled to less than 30 fathoms and soundings should be taken frequently.

Remarks.—This course leads well offshore, clearing all dangers, and passes about 12½ miles westward of St. George Reef Lighthouse and nearly 5 miles westward of Orford Reef. It leads inside the circles of visibility of Humboldt Bay and St. George Reef Lighthouses (see table of lights, page 20).

Cape Fortunas (False Cape) lies about 4 miles **N. ½ W.** from Cape Mendocino and is the abrupt seaward termination of a mountain ridge. It is grass-covered, with trees in the gulches, and at the upper edge of the steep pitch is about 800 feet high.

False Cape Rock, 216 feet high, lies ⅝ mile **W.** from Cape Fortunas. Numerous rocks and sunken ledges lie between it and the cape and extend about 2 miles north and south alongshore.

From Cape Fortunas to Trinidad Head the land is low for a considerable distance back from the shore.

Trinidad Head (see table, page 20) lies 38 miles **N.** from Cape Mendocino. It is 380 feet high and at a distance, from a vessel close inshore north or south of it, appears as a dark, round-topped island with steep, rocky sides, covered with chaparral.

Rocky Point lies about 5½ miles **NNW.** from Trinidad Head. It terminates in bold cliffs about 200 feet high with numerous rocks lying 200 to 300 yards offshore.

The mountains inland northward and eastward of Trinidad Head are good landmarks in clear weather. **Trinity Mountain**, 3,000 feet high, lies 8 miles **N.** by **E.** ½ **E.** from Trinidad Head and is visible over 50 miles offshore. **Mount Hoopah** and **Mount Kismet**, about 40 miles inland, are visible nearly 70 miles offshore.

Mount Tocrup, 4,000 feet high, lies about 8 miles **E.** of the mouth of Klamath River and about 27 miles northward of Trinidad Head, and is visible seaward for about 60 miles.

Point St. George, 81 miles **N.** by **W.** from Cape Mendocino, is comparatively low, with low land and sand dunes immediately behind it. Several irregular and rocky hillocks are on the immediate shore line, with several high, rocky islets close-to, and one lying ⅔ mile offshore southward.

Promontory Rock is the most prominent of the hillocks on the shore line. Its seaward face is nearly vertical and about 150 feet high.

From a vessel in the latitude of Point St. George the land behind, as well as for a considerable distance north and south of the point, appears moderately low. Farther inland are elevations of 2,400 and 2,700 feet, and beyond these is the rocky Siskyou Range, the highest point of which is **Preston Peak**, 7,000 feet high, about 28 miles **ENE.** from Point St. George. It is visible from about 60 miles seaward. **Grayback**, 5,800 feet high, a sharp, rocky peak, lies 8 miles **N.** of Preston Peak. These two mountains are known as the Crescent City Peaks.

Dangers.—The dangers in approaching Cape Mendocino are described under section 2, preceding.

St. George Reef, a group of rocks and sunken ledges, some of which are over 60 feet high, extends about 6¼ miles **W.** by **N.** from Point St. George. The outermost rock, **Northwest Seal Rock**, is marked by a lighthouse (see table, page 20). St. George and Dragon channels lead between the reefs.

Rogue River Reef extends about 3½ miles westward from the entrance to Rogue River. Several of the rocks are of considerable elevation. The shore for some distance north and south of the river is quite foul, and 5 miles north of the river is a sunken ledge about 2 miles offshore.

Orford Reef, about 4½ miles **S.** from Cape Blanco, covers an area about 2 miles long by 1 mile wide and consists of a group of rocks and sunken ledges with a passage between them and the shore. Many of the rocks are visible at high water.

4. ***Cape Blanco to Columbia River Entrance.***—From a position 7 miles *WSW.* from Cape Blanco Lighthouse steer **N.** by **W.** ¼ **W.** (N. 6° 44′ E. true) for 203 miles. This course made good should lead to a position ½ mile eastward of the light-vessel off the entrance to the Columbia River.

Caution.—In thick weather, when on this course, to guard against an inshore set, the depths should not be shoaled to less than 50 fathoms until northward of Tillamook Rock. In approaching Cape Blanco from northward the depths should not be shoaled to less than 80 fathoms, and soundings should be taken frequently when in its vicinity.

Remarks.—This course leads nearly parallel with the coast at an average distance of about 15 miles, drawing slightly offshore until up with Tillamook Rock, beyond which it draws inshore on approaching the entrance to the river. It passes within the limit of visibility of all the lights and about ½ mile eastward of the Columbia River Light-vessel. It clears all dangers, which in no case extend over 1 mile from the beach. Only the more prominent features of the coast are visible on this course, for a detailed description of which see "Coast from Cape Blanco to Columbia River Entrance," pages 106 to 111.

5. ***Cape Blanco to Juan de Fuca Strait.***—From a position 7 miles *WSW.* from Cape Blanco Lighthouse steer **NNW.** (N. 1° 15′ W. true) for 320 miles. This course made good should bring Umatilla Reef Light-vessel to bear *ENE.*, distant 2 miles, and the outer Bodelteh Island to bear *NE.* by *E.* ¼ *E.*, distant about 5 miles; then steer **N.** ½ **W.** for 17½ miles, taking care to pass over 1¾ miles westward of Cape Flattery Lighthouse. When Cape Flattery Lighthouse bears *SE.* ⅝ *S.*, distant about 3 miles, in range with Duntze and Duncan rocks, follow the directions under the heading Juan de Fuca Strait.

Caution.—In thick weather, in approaching Flattery Rocks and Umatilla Reef from any direction, the depths should not be shoaled to less than 30 fathoms. During heavy southwesterly weather Umatilla Reef Light-vessel is frequently obliged to leave her station.

The irregularity of the currents in direction and velocity, in the vicinity of Cape Flattery, require great caution in approaching the entrance to Juan de Fuca Strait. In thick weather, the depths should not be shoaled to less than 50 fathoms and soundings should be taken frequently.

In thick weather in approaching Cape Blanco from northward depths should not be shoaled to less than 80 fathoms.

Remarks and dangers.—The **NNW.** course draws gradually offshore, passing about 32 miles off the mouth of the Columbia River, from which point it draws gradually inshore, passing Cape Johnson at a distance of about 8 miles and Umatilla Reef at a distance of a little over 4 miles. Only the higher land in the interior is prominent. **Saddle Mountain**, immediately southward of the Columbia River, should be distinguished in clear weather, and northward of the river, the high mountains of the Olympus Range. After passing Cape Blanco, the course leads outside the circles of visibility of all lights until approaching Destruction Island. This light (see table, page 22) in clear weather, when first made, should bear about **NE.** ½ **N.** and should be passed at a distance of about 15½ miles. **Umatilla Reef Light-vessel** (see table, page 22) should be made when a little northward of Cape Johnson and when first made should bear about **N.** by **W.** ¼ **W.**

Heceta Bank lies 63 miles northward from Cape Blanco, about 30 miles offshore, and covers an irregular area about 30 miles long and 10 miles wide. The least water found so far is 43 fathoms, but the soundings are irregular. Northward and southward of the bank the depths are considerably greater.

From Point Grenville to Cape Flattery the coast is fringed by numerous rocky islets and sunken ledges; by keeping outside the 30-fathom curve these can be avoided.

Umatilla Reef, 2½ miles **W.** from Cape Alava, is the principal danger on the northern coast. It consists of several low rocks and sunken ledges in the prolongation of Cape Alava and the Bodelteh Islets, and is surrounded by deep water. A light-vessel (see table, page 22) is moored in 25 fathoms, about 2½ miles **SW.** ⅝ **S.** from the reef; in heavy gales the light-vessel is sometimes obliged to leave her station. In thick weather in this vicinity the depths should not be shoaled to less than 30 fathoms.

The **N.** ½ **W.** course clears all dangers until up with Cape Flattery Lighthouse (see table, page 22). In clear weather no difficulty will be found in clearing **Duntze** or **Duncan rocks,** but in thick weather the irregularity of the currents in direction and velocity is a source of danger. The depths should not be shoaled to less than 50 fathoms and the greatest caution should be exercised.

From southward the low valley extending from the head of Waatch Slough to Neah Bay is quite noticeable. At night, Cape Flattery Lighthouse, on the southwestern face of Tatoosh Island, should be made when about 3 miles southward from Umatilla Reef Light-vessel, and should be passed at a distance of about 2 miles.

Duntze and **Duncan** rocks are almost in range with the lighthouse and bear about **NW.** ⅝ **N.** from it; both are in the red ray of the light. They rise abruptly from very deep water.

Duntze Rock has 3½ fathoms over it, and in an ordinary swell usually shows a breaker. It lies 1¼ miles from the lighthouse and about ¼ mile from Duncan Rock.

Duncan Rock, small, low, and black, lies about 1 mile from the lighthouse and is usually swept by the swells. A **sunken ledge,** with 4 fathoms over it, lies ⅜ mile **ESE.** ½ **E.** from the rock.

The passage between Duncan Rock and Tatoosh Island is not recommended for strangers, while the passage between Tatoosh Island and the mainland should not be attempted under any circumstances.

INSHORE SAILING DIRECTIONS ALONG THE COAST FROM POINT REYES TO CAPE FLATTERY.

These directions are available *in clear weather* for steamers of any draft and comprise the general route followed in clear weather by the regular coasting steamers during the prevailing northwesterly winds in summer. They lead within a short distance of the landings and the entrances to the bays and coves along the coast. In thick weather vessels should keep farther offshore and sound frequently to guard against an inshore set by the currents. For convenience in reference the directions are divided into sections, as follows:

1. From Point Reyes to Point Arena.
2. From Point Arena to Cape Mendocino.
3. From Cape Mendocino to Point St. George.
4. From Point St. George to Cape Blanco.
5. From Cape Blanco to Columbia River Entrance.
6. From Columbia River Entrance to Juan de Fuca Strait.

A detailed description of the coast, including the landings, bays, and anchorages, in sections as above, follow the sailing directions.

1. ***From Point Reyes to Point Arena.***—From a position 1 mile westward of Point Reyes Lighthouse, make good a **NNW.** ⅜ **W.** course for 18 miles to a position about 2½ miles *SW.* from Bodega Head. Then make good a **NW.** ¼ **W.** course for 14¾ miles to a position with the western point at the entrance of Fort Ross Cove bearing *N.*, distant about 1¾ miles. From this position steer **NW.** by **W.** ¼ **W.**, passing Salt Point at a distance of about ¾ mile. Make good this course for 31½ miles, and when Point Arena Lighthouse is made, bearing northward of *NW.* by *N.*, steer **NW.** ¼ **W.**, passing over ¾ mile westward of the north point of Arena Cove, and nearly 1½ miles westward of Point Arena Lighthouse. When the lighthouse bears *E.*, distant 2 miles, follow the directions in section 2.

Caution.—The currents are irregular both in direction and velocity, and in thick weather or at night soundings should be taken frequently to guard against an inshore set.

Remarks and dangers.—These courses lead alongshore at distances varying from ¾ to 4 miles and follow, as a rule, the 30-fathom curve. At night or in thick weather soundings should be taken frequently and the vessel hauled offshore at once if less than 30 fathoms be obtained. The dangers extend less than 1 mile offshore, and in clear weather, with strong northwesterly winds, the regular coasting steamers frequently hug the beach at a distance of about 1 mile, taking advantage of the lee afforded by the projecting points and of smooth water.

The **NNW.** ⅜ **W.** course leads offshore until nearing Bodega Head, and having stood on the course for 15 miles Tomales Point should be abeam, distant 4½ miles.

A **reef** extends about 1 mile southeastward from Bodega Head.

The **NW.** ¼ **W.** course after passing Bodega Head leads about 3½ to 4 miles offshore until nearing **Fort Ross Cove.** Numerous rocks, 20 to 130 feet high, lie about ¼ mile offshore. Fort Ross Cove may be recognized by the houses in the town and by the buildings on the eastern side of the point.

Rocks and **sunken ledges** extend about 1 mile off the mouth of the Russian River, nearly 10 miles northward of Bodega Head.

A **reef,** marked by kelp, extends nearly 1 mile offshore, 2½ miles southeastward from Fort Ross Cove. A **pinnacle rock,** unmarked by kelp, is reported as lying ⅞ mile outside the end of this reef; there is about 10 feet over it.

Pinnacle Rocks, 1 mile **SE.** from Fort Ross Cove and 600 yards offshore, are 35 feet high and are connected with the beach by a reef locally known as Fort Ross Reef.

The **NW.** by **W.** ¼ **W.** course passes **Salt Point,** 5 miles northward of Fort Ross Cove, at a distance of ¾ mile, and then increases the distance offshore to 1½ and 2 miles. **Horseshoe Point** should be passed at a distance of a little over 1 mile. **Stewarts Point Landing** about 11 miles northward from Fort Ross Cove, will be recognized by the buildings and houses. **Walalla Point Island,** 8½ miles northward from Stewarts Point, should be passed at a distance of 1½ miles. The sand dunes behind it are quite prominent. **Fish Rocks** should be passed at a distance of 1¼ miles, and Saunders Reef whistling buoy at a distance of ½ mile. When about 2½ miles past the whistling buoy and 1½ miles offshore, Point Arena Lighthouse should be made, bearing **NW.** by **N.**

Robinson (Walalla) **Reef** lies northward of the mouth of the Walalla River, and 1⅙ miles **NW.** ½ **W.** from Walalla Point Island. It is a cluster of twenty-five or thirty rocks above water about 600 yards offshore, with a sunken rock 70 yards **WNW.** from the outer visible rock.

Saunders Reef, about 4½ miles northward from Fish Rocks, is a little over ½ mile offshore. It shows several rocks awash at low water, with foul ground between them and the beach. It is well marked by kelp. A whistling buoy is placed in 17 fathoms, ⅜ mile **SW.** by **S.** from the outer rock and 7½ miles southward from Point Arena. Vessels should not pass inside the buoy.

The **NW.** ¼ **W.** course leads about ¾ mile westward of Arena Cove bell buoy and over ¾ mile westward of the northern point of **Arena Cove.** Point Arena Lighthouse (see table, page 18) when abeam should be distant about 1½ miles.

For a detailed description of the coast see heading, "Coast from Point Reyes to Point Arena."

2. ***From Point Arena to Cape Mendocino.***—Having followed the directions in section 1, preceding, when Point Arena Lighthouse bears *E.*, distant 2 miles, make good a **N.** course for 6 miles to a position 2 miles from the beach. Then steer **NW.** by **N.** for 18¼ miles, taking care to give the projecting points of the coast a berth of not less than 1 mile. These courses made good should bring the southern point at the entrance to Caspar Cove abeam, distant 1½ miles. Then steer **N.** by **W.**, passing ¼ mile westward of Fort Bragg whistling buoy; this course made good for 17 miles should bring the town of Westport abeam, distant 1½ miles.

Then steer **NW.** ⅞ **N.** about 11 miles, passing Cape Viscaino at a distance of 1 mile, and when the mouth of Usal Creek bears *NE.*, distant about 2 miles, change course to **NW.** by **W.**, passing Anderson Cliff at a distance of 1¼ miles. Make good this course for 14½ miles, and when 1⅝ miles off the southern end of Point Delgada change course to **NW.** by **W.** ½ **W.** for 20 miles, which should bring Point Gorda abeam, distant 1½ miles. Then make good a **NW.** ¼ **N.** course for 13½ miles, which should bring Blunts Reef whistling buoy abeam, distant ¾ mile, and Cape Mendocino Lighthouse to bear *ENE.* ¾ *E.*, distant about 4½ miles. Then follow the directions in section 3.

Caution.—In thick weather, on account of the irregularity of the currents both in direction and velocity, soundings should be taken frequently and the depths should not be shoaled to less than 30 fathoms. In the vicinity of Point Delgada and between Point Gorda and Cape Mendocino particular caution should be observed on account of the irregularity of the depths.

Remarks and dangers.—These courses lead alongshore following generally the 30-fathom curve until in the vicinity of Point Delgada, where the depths shoal to 12 and 15 fathoms, and if outside the course to less, owing to the shoal water on **Tolo Bank.** Above Point Delgada the soundings are irregular but are not less than 30 fathoms. A submarine valley with steep sides and of varying width makes into the coast 5 miles northward of Point Delgada with a depth of over 100 fathoms within less than ½ mile of the beach. Between Point Gorda and Cape Mendocino the soundings are also very irregular, two submarine valleys with depths of over 100 fathoms making into the coast 2½ and 6½ miles northward of Point Gorda.

In clear weather the regular coasting steamers frequently follow the coast at a distance of 1 mile until approaching Cape Mendocino, no dangers extending beyond that distance offshore; this is done in heavy northwest weather, and takes advantage both of the lee formed by the projecting points of land and of smoother water. Upon the approach of thick weather the vessel should be hauled offshore.

The **N.** course leads alongshore at a distance of about 3 miles from the beach. The buildings and landing at **Greenwood** should be nearly ahead or a little on the port bow; the smoke from the sawmills can generally be seen, and at night the lights in the town.

Arena Rock, with 13 feet over it, lies a little over 1¼ miles **NW.** by **N.** from Point Arena Lighthouse, and shows a breaker except with a smooth sea.

The **NW.** by **N.** course draws gradually inshore and passes **Navarro Head,** 5 miles above Greenwood Landing, at a distance of 1 mile. From Navarro Head to abreast Caspar Landing the course is about 1 mile from the projecting points of the beach. **Mendocino City** will be recognized by the buildings in the town, and as the mouth of **Big River** is opened, the sawmill may be seen well inside on the north bank. A large schoolhouse, immediately northward of the town, is quite prominent. **Point Cabrillo** is passed at a distance of over 1 mile, and the houses in **Caspar** can be seen.

A **sunken rock** lies ½ mile **W.** ½ **S.** from the south point at the entrance to Whitesboro Landing, and about 1½ miles **NW.** ½ **W.** from Navarro Head.

Colby Reef, 1¼ miles northward from Albion River, lies ⅝ mile offshore, abreast Stillwell Point. It consists of two sunken rocks, with 6 feet over them, about on the line of the 20-fathom curve, with from 7 to 15 fathoms close-to. There is foul ground between the reef and the shore.

The **N.** by **W.** course follows the coast at a distance of about 1¼ miles until up with Fort Bragg whistling buoy, when it draws gradually offshore until approaching **Westport.** **Laguna Point,** 3¼ miles northward from Fort Bragg, and **Bruhels Point,** 2 miles southward of Westport, are passed at a distance of 1½ miles. The buildings in Westport can be easily seen, a large yellow hotel and a white church being most prominent.

A low **reef** extends about 300 yards northwestward from Laguna Point and two **sunken rocks** lie about 100 yards outside the point of the reef.

The **NW.** ⅞ **N.** course passes 1 mile off Cape Vizcaino, and in clear weather **Big White Rock** will be seen a little on the starboard bow and **Anderson Cliff** will be ahead.

The **NW.** by **W.** ½ **W.** course passes 1¼ miles off Anderson Cliff, 1½ miles westward of Point Delgada bell buoy, and 1⅜ miles westward of Point Delgada; **Point Gorda** will be ahead on this course. **Shelter Cove,** under Point Delgada, affords anchorage only in northwesterly weather. This course leads inside **Tolo Bank,** which has a least known depth of 7¾ fathoms and is sometimes marked by heavy kelp.

Several **rocks,** with depths of 9 to 15 feet, and marked by kelp, surround the southern end of Point Delgada between the bearings **ESE.** and **SW.** by **S.**, the farthest from the point being ⅝ mile. Broken ground, with depths of 5¾ fathoms and less, with several kelp fields, lies outside these rocks to a distance of 1⅛ miles southward of the southern end of the point. A bell buoy is placed eastward of this broken ground off the entrance to Shelter Cove.

The **NW.** by **W.** ½ **W.** course leads a little over 2 miles offshore at **Big Flat,** and passes nearly 1 mile westward of Rodgers Break (4½ miles southeastward of Point Gorda) and Gorda Rock. A few scattered ranch houses are situated on Big Flat.

Rodgers Break, with 3 feet over it, lies 4½ miles southeastward from Point Gorda and nearly ¾ mile offshore.

Gorda Rock, 16 feet high, is a small, conical rock about ¾ mile southward of Point Gorda and about ⅝ mile offshore.

Conical Rock, 20 feet high, lies 300 yards **WNW.** from Point Gorda, with a small, low rock 350 yards **WNW.** ½ **W.** from it; there is foul ground between them.

On the **NW.** ¼ **N.** course **Sugar Loaf Rock,** high and prominent, will be seen just off Cape Mendocino. Cape Mendocino Lighthouse (see table, page 18) when abeam should be distant 4 miles. Blunts Reef whistling buoy should be made well on the starboard bow, and the course made good should lead over 1 mile southwestward of the Great Break, and at the end of the course the buoy should be abeam, distant ¾ mile. Vessels should not pass between Blunts Reef and the cape, and when in this vicinity in thick weather great caution should be observed owing to the irregular depths and currents.

Blunts Reef is the outermost danger off Cape Mendocino and consists of two black rocks about 230 yards apart, showing generally a heavy break lying about 2⅞ miles **W.** ¾ **S.** from the lighthouse. The reef is marked by a whistling buoy, placed in 26 fathoms about ¾ mile **W.** ¾ **S.** from the outer rock. A rock, with 9 feet over it, lies ½ mile **SSW.** ½ **W.** from the outer rock of Blunts Reef. Between Blunts Reef and Cape Mendocino are a number of sunken rocks and ledges. Vessels should not attempt to pass eastward of the whistling buoy, and the cape should be given a berth of not less than 4½ to 5 miles.

The **Great Break** is a rock, with 4¼ fathoms over it, ¾ mile nearly **S.** ¼ **E.** from the outer rock of Blunts Reef.

For a detailed description of the coast see heading, "Point Arena to Cape Mendocino."

3. ***From Cape Mendocino to Point St. George.***—Having followed the directions in section 2, preceding, from a position 4½ miles *WSW.* ¾ *W.* from Cape Mendocino Lighthouse steer **N.** by **E.**, passing ½ mile westward of Blunts Reef whistling buoy and about 1⅞ miles westward of Humboldt Lighthouse, and the course made good for nearly 23 miles should lead to the Outside Bar whistling buoy off the entrance to Humboldt Bay. Then steer **N.** by **W.**, passing 3 miles westward of Trinidad Head Lighthouse and 1 mile westward of Cone Rock. This course made good for 21½ miles should bring Turtle Rocks abeam, distant ⅞ mile.

From Turtle Rocks continue the **N.** by **W.** course for 25 miles, passing over ½ mile eastward of Redding Rock. This should lead to a position 2¼ miles westward of the mouth of the Klamath River, with Crescent City Lighthouse bearing *NW.* by *N.* Then steer **NW.** ¾ **N.** for 11 miles. This should lead to Crescent City whistling buoy, with Crescent City Lighthouse bearing *N.* by *W.* ¼ *W.*, distant nearly 1⅝ miles. From the whistling buoy make good a **W.** ½ **N.** course for 8 miles, and when St. George Reef Lighthouse bears *NNW.* steer **NNW.** ¾ **W.** for 4 miles to a position ½ mile westward of the lighthouse. Then follow the directions in section 4.

In clear weather, to pass through St. George Channel.—From Crescent City whistling buoy steer **NW.** by **W.** ½ **W.** for 5 miles. This course made good should pass ¼ mile southwestward of Castle Rock and should bring Star Rock to bear *SW.* by *S.*, distant nearly ½ mile. Then make good a **N.** ⅞ **W.** course for 10½ miles to a position 1 mile westward of Prince Island, and follow the directions in section 4.

Caution.—The currents are irregular both in direction and velocity, and in thick weather, in approaching Cape Mendocino or Point St. George, from either northward or southward, the greatest caution should be exercised to avoid an inshore set.

Remarks and dangers.—These courses lead alongshore at a distance of 1 to 4 miles, and in from 15 to 30 fathoms. Except in the vicinity of Cape Mendocino and Point St. George, the dangers do not extend more than 1 mile offshore, and in clear weather the coast may be approached with safety to within 1½ miles. The currents are irregular, and in thick weather soundings should be taken frequently and the vessel headed offshore if in less than 20 fathoms. In approaching Cape Mendocino from northward in thick weather the depths should not be shoaled to less than 30 fathoms. The vicinity of St. George Reef is also dangerous on account of the irregular bottom, and in thick weather it should be given a good berth, and the depths should not be shoaled to less than 50 fathoms in approaching it from either northward or southward. In clear weather **St. George Channel** may be used safely by following the directions, but **Dragon Channel** offers no advantages if bound either northward or southward.

The **N.** by **E.** course follows the trend of the coast at a distance of about 2½ miles, gradually decreasing to about 1½ miles as Humboldt Lighthouse is approached. After passing Cape Fortunas the coast is low and

sandy until reaching **Trinidad Head** (see table, page —), which will be made on the port bow. **Cape Fortunas** and **False Cape Rock** are somewhat similar to Cape Mendocino and Sugar Loaf Rock and should not be confused in thick or hazy weather. A **rock** with 12 feet over it lies ½ mile westward of False Cape Rock. **Table Bluff**, 12½ miles northward of False Cape Rock, is marked by Humboldt Lighthouse (see table, page 18). **Red Bluff**, inside and abreast the entrance to Humboldt Bay, the old light tower on the north spit, the buildings in Eureka, and the smoke from the sawmills are prominent.

The **N.** by **W.** course from the whistling buoy off Humboldt Bay leads offshore until approaching Trinidad Head. In clear weather, at night, Trinidad Head Lighthouse should be made on the starboard bow when a little northward of Humboldt Bay entrance.

From Trinidad Head to **Rocky Point**, 5½ miles northward, the beach is fringed by numerous rocks and sunken ledges extending about 1 mile offshore, and should not be approached closer than 1½ miles, and in thick weather the depths should not be shoaled to less than 20 fathoms.

The **N.** by **W.** course from **Turtle Rocks** follows the general trend of the coast at a distance of about 3 miles, decreasing to 2¼ miles abreast the mouth of the Klamath River. **Redding Rock**, about 17 miles northward of Trinidad Head, will be visible in clear weather when abreast Turtle Rocks, and will be made almost ahead, a little on the port bow; it is 94 feet high and rises abruptly from depths of over 20 fathoms. Abreast of Redding Rock the coast becomes quite steep, and the heads at the mouth of the **Klamath River** are quite prominent and will be made on the starboard bow. At night, in clear weather, Crescent City Lighthouse (see table, page 20) will be made when abreast the Klamath River, or possibly a little southward of it.

About 6 miles northward of Rocky Point a number of outlying **rocks** and **sunken ledges** extend alongshore for about 6½ miles to 1¼ miles northward of Mussel Point. The outermost of these dangers lies nearly ¾ mile **WSW.** from Sharp Point, and about 7½ miles northward from Rocky Point.

The **NW. ¾ N.** course heads a little inside of Point St. George, with Crescent City Lighthouse a little on the starboard bow. It leads about 2 miles offshore, and nearly 1½ miles outside the nearest dangers. **Crescent City Cove** affords a fair summer anchorage in northwesterly weather, but there is no shelter from southward. St. George Reef Lighthouse (see table, page 20) should be made when about 4 miles northward of the Klamath River.

Northward of Klamath River, for 8 miles, rocks and sunken ledges extend offshore in some cases over 1 mile. **False Klamath** and **Sisters rocks**, 3 and 7 miles, respectively, northward of the mouth of the Klamath River, are about ½ mile offshore and the most prominent. In thick weather, when in this vicinity, the depths should not be shoaled to less than 20 fathoms.

On the **W. ½ N.** course Crescent City Lighthouse should bear **E. ½ N.** when St. George Reef Lighthouse bears **NNW.** This course leads a little over 1¼ miles southward of **Jonathan Rock**, and caution should be observed to guard against any northerly set.

The **NNW. ¾ W.** course leads about ½ mile westward of St. George Reef Lighthouse, which should not be brought to bear westward of **NNW.** so as to give a berth of at least ½ mile to **Mansfield Break.** The soundings in the vicinity of the reef are very irregular, and, in thick weather the lead cannot be depended on in less than 50 fathoms.

In passing through St. George Channel, on the **NW.** by **W. ½ W.** course from the whistling buoy, the four visible rocks at the southern end of **St. George Reef** will be seen a little on the port bow nearly in range with St. George Lighthouse, **Star Rock** being the nearest.

On the **N. ⅞ W.** course **Brown Rock**, the outermost rock off the northwestern extremity of Point St. George, will be passed at a distance of ¾ mile, and the course will lead about the same distance eastward of **Long** and **East** rocks.

From Crescent City Lighthouse to the northwestern extremity of Point St. George the shore is fringed with numerous outlying rocks and sunken ledges, extending in several instances ¾ mile offshore. **White Rock** and **Castle Rock** are the most prominent, and lie farthest from the beach. The soundings are very irregular, and with the uncertainty of the currents in direction and velocity render the vicinity particularly dangerous in thick weather.

St. George Reef, a group of rocks and sunken ledges, some of which are over 60 feet high, extends about 6¼ miles **W.** by **N.** from Point St. George. The outermost rock, **Northwest Seal Rock**, is marked by a lighthouse (see table, page 20). St. George and Dragon channels lead between the reefs. (For a detailed description of the reef see page 100.)

For a detailed description of the coast, see heading, "Coast from Cape Mendocino to Point St. George."

4. ***From Point St. George to Cape Blanco.***—Having followed the directions in section 3, preceding, from a position ½ mile westward of St. George Reef Lighthouse make good a **NNE.** course for 9 miles to a position 1⅜ miles *W.* ½ *S.* from Prince Island. Then make good a **NW.** by **W.** course for about 10 miles to a position 1½ miles southwestward from Cape Ferrelo. From this position steer **NW. ¾ N.**, passing 1¼ miles off Mack Arch and not less than 2 miles off Cape Sebastian; this course made good for 23 miles

should bring the northwest bare rock of Rogue River Reef to bear 1⅜ miles on the starboard beam, and Needle Rock, the highest in the reef, to bear *E.* ¾ *N.*, distant 2¼ miles.

From this position make good a **N.** ½ **E.** course for 11½ miles to a position about 1 mile from the beach with the largest of the Sisters Rocks bearing *SE.* ½ *S.*, distant 2 miles. Then steer **NW.** ¾ **W.**, passing nearly ½ mile eastward of Island Rock and the same distance westward of Redfish Rocks; continue this course for 8½ miles to a position ¼ mile southwestward of Klooqueh Rock.

From a position ¼ mile southwestward of Klooqueh Rock steer **W.** ½ **S.**, passing ¾ mile southward of Southeast Black Rock and ½ mile southward of Fox Rock. When about 1 mile past Fox Rock, with Cape Blanco Lighthouse bearing *NNE.* ¼ *E.*, distant 6 miles, and in range with Northwest Rock, steer **N.** ⅜ **W.**, so as to pass 3 miles westward of the lighthouse, and follow the directions in section 5.

In daytime and clear weather, to pass between Orford Reef and Cape Blanco.—From a position ¼ mile southwestward of Klooqueh Rock steer northward and bring the eastern end of Island Rock in range with the western point of the shore eastward of Klooqueh Rock, bearing *SE.* ⅛ *S.*, and steer **NW.** ⅛ **N.**, keeping the range astern. When Arch and West Conical Rocks (the two largest rocks in the southern part of Orford Reef) are in range, bearing *SW.* ½ *W.*, change course to **W.** by **N.** with the northern end of a bluff on the shore astern, and pass about midway between the southernmost bare rock of Blanco Reef and Northeast Rock of Orford Reef.

Caution.—In thick weather the greatest caution must be observed in the vicinity of St. George Reef, Orford Reef, and Cape Blanco, and the depths should not be shoaled to less than 50 fathoms. In the vicinity of the Rogue River Reef the depths should not be shoaled to less than 30 fathoms.

Remarks and dangers.—These courses lead alongshore following the general trend of the coast, and in northwesterly weather take advantage of the lee afforded by the projecting points and of smoother water. In thick weather the depths should not be shoaled to less than 30 fathoms, and when in the vicinity of Orford or St. George reefs they should not be shoaled to less than 50 fathoms.

The **NNE.** course leads inshore, heading for **Cone Rock** (70 feet), with **Prince Island** (185 feet), a little on the starboard bow, and when the latter bears **E.** ½ **N.** Cone Rock will be 1⅝ miles distant.

A cluster of three bare rocks, covering an area of about 100 yards, lies a little over 1 mile south of Prince Island, and about 1 mile offshore.

Northward of Prince Island the coast is fringed by numerous rocks and sunken ledges, extending in some cases nearly 1½ miles offshore.

The **NW.** by **W.** course draws gradually inshore, passing **Goat Island** (200 feet) at a distance of about 1¼ miles, and clears all dangers. **Chetko Cove,** about 5 miles southeastward from Cape Ferrelo, affords shelter in northwesterly weather, but is wide open southward.

Numerous rocks and sunken ledges fringe the coast from Chetko Cove to **Crooks Point,** 9½ miles northward of **Cape Ferrelo;** they do not extend farther than ½ mile offshore, and in thick weather are easily cleared by keeping outside the 30-fathom curve.

On the **NW.** ¾ **N.** course **Mack Arch** and **Cape Sebastian** should be passed at the distances given in the directions to insure clearing Rogue River Reef and the sunken rocks southeastward. In thick weather the depths should not be shoaled to less than 30 fathoms. A fair summer **anchorage** may be had in the small cove formed by Mack Arch and Mack Reef. The **NW.** ¾ **N.** course if made good for about 19 miles past Rogue River Reef will lead to a position 1¼ miles southwestward of **Fox Rock; Cape Blanco Light** will be made shortly after passing Rogue River Reef.

A **sunken rock** lies 1 mile **NNW.** ½ **W.** from Cape Sebastian, and a little over ½ mile offshore.

Rogue River Reef extends about 3½ miles westward from the entrance to the Rogue River. Several of the rocks have considerable elevation. The shore for some distance north and south of the river is quite foul, and 5 miles north of the river is a sunken ledge about 2 miles offshore. See detailed description under separate heading, page 104.

The **N.** ½ **E.** course draws gradually inshore, passing about 1½ miles westward of Sisters Rocks (close to shore, northern one 400 feet high). On the last 2 miles of the course **Cape Blanco Lighthouse** will be obscured by the western head of Port Orford. In thick weather when on this course the depths should not be shoaled to less than 20 fathoms.

A patch of **sunken** and **visible rocks,** about 1 mile long and ½ mile wide, lies 5 miles north of the Rogue River and about 2 miles offshore. These rise abruptly from 12 fathoms. **North Rock,** about 10 feet high, is the largest and nearest to the beach, off which are numerous rocks and sunken ledges as far south as the river.

On the **NW. ¾ W.** course **Island Rock** (219 feet) and **Redfish Rocks** (60 to 140 feet) are easily distinguished. **Klooqueh Rock** will be seen ahead and about midway between them; vessels should pass westward of this rock, which is comparatively bold-to. The steep face of **Humbug Mountain,** northeastward of Island Rock, is quite prominent, and the wharf and buildings in **Port Orford** will be seen on the starboard bow. Fair shelter in northwesterly weather may be had in Port Orford, but it is open southward. In thick weather, in making Port Orford from southward, the echo of the whistle from Island or Redfish rocks is frequently used in locating the vessel's position.

On the **W. ½ S.** course the rocks of **Orford Reef** are readily identified, but no attempt should be made to pass between them. In thick weather a northerly set of the current should be guarded against, and the depths when in its vicinity not shoaled to less than 50 fathoms, soundings being taken frequently.

Orford Reef, about 4½ miles **S.** from Cape Blanco, covers an area about 2 miles long by 1 mile wide, and consists of a group of rocks and sunken ledges with a passage between them and the shore. Many of the rocks are visible at high water. See detailed description under separate heading, page 105.

Blanco Reef extends about 1½ miles **SW.** by **S.** from Cape Blanco, and consists of numerous rocks and sunken ledges, some of which are marked by kelp. **Pyramid Rock,** about 80 feet high, lies nearly 1 mile **SW.** by **W. ½ W.** from the lighthouse. There are no visible rocks outside of it, but several between it and the cape. A narrow, black rock, about 125 yards long, lies ⅝ mile **SSE.** from Pyramid Rock. A **rock** with 13 feet over it lies a little over ¼ mile **SW.** by **W.** from the long, black rock, and 1½ miles **SW.** by **S.** from the lighthouse. This is the outermost known rock of the reef. A **rock** with 18 feet over it lies ⅞ mile **S. ¼ E.** from the lighthouse; it is well marked by kelp. In thick weather, when bound either northward or southward, the depths in this vicinity should not be shoaled to less than 50 fathoms.

5. ***From Cape Blanco to the Columbia River Entrance.***—Having followed the directions in section 4, preceding, from a position 3 miles westward from Cape Blanco Lighthouse steer **N. ⅜ W.** for 31½ miles, passing Cape Arago at a distance of 2¼ miles; this course made good should bring Cape Arago Lighthouse to bear *E.*, distant 2¾ miles. From this position make good a **N. ⅜ E.** course for 20 miles, which should lead to a position ½ mile westward of Umpqua River whistling buoy, with Umpqua River Lighthouse bearing *E.* by *N.*, distant about 2¼ miles.

Then steer **N.** by **W. ⅜ W.** passing Heceta Head Lighthouse at a distance of 3 miles, Yaquina Head Lighthouse at a distance of a little over 2 miles, and Cape Lookout at a distance of 1¼ miles. This course made good for 110 miles should bring Cape Meares Lighthouse to bear *ENE.* ½ *E.*, distant 1½ miles. From this position steer **NNW. ¾ W.,** passing Tillamook Rock Lighthouse at a distance of 4 miles, and about ½ mile eastward of Columbia River Light-vessel; this course made good for 43 miles will lead to a position ½ mile eastward of Columbia River Light-vessel. Then follow the directions in section 6.

Caution.—In thick weather, when between Cape Blanco and Cape Arago Lighthouse, the depths should not be shoaled to less than 50 fathoms, and soundings should be taken frequently. When northward of Cape Arago Lighthouse in thick weather the depths should not be shoaled to less than 30 fathoms.

Remarks and dangers.—The **N. ⅜ W.** course leads between 3½ and 4½ miles offshore until approaching Cape Arago, and passes 4½ miles westward of **Coquille River Lighthouse.** A nearer approach to the beach is not advisable, and in thick weather the depths should not be shoaled to less than 50 fathoms when in this vicinity. When abreast Coquille River, **Cape Arago Light** (see table, page 20) should be made at night bearing about **N. ⅝ E.**

Coquille Rock, 1¾ miles **W. ¼ S.** from Coquille River lighthouse, breaks only in heavy weather. It is the outer rock of a reef extending from **Coquille Point,** which should not be approached closer than 2 miles. A buoy (nun, red) is placed in 16 fathoms about ⅜ mile **NW. ¾ N.** from Coquille Rock. Vessels should not pass inshore of the buoy.

About 4 miles southward from **Cape Arago** are two rocks, about 1 mile offshore. The outer one is awash at high tide, but the inner one breaks only at low water. About 1 mile southward of these rocks, a reef extends nearly ¼ mile offshore; the visible rocks range from 10 to 40 feet in height.

Reefs extend northward and westward for nearly 1 mile from the southern extremity of Cape Arago.

Baltimore Rock, with 11 feet over it, is the outermost rock of a reef extending from the extremity of Cape Arago. It lies a little over ½ mile **NNW. ½ W.** from the lighthouse. In thick weather, when in the vicinity of Cape Arago, the depths should not be shoaled to less than 50 fathoms and soundings should be taken frequently.

On the **N. ⅜ E.** course **Umpqua River Lighthouse** (see table, page 20) should be made when a short distance north of Coos Bay. There are no known dangers along this stretch, but in the absence of hydrographic surveys the depths should not be shoaled to less than 30 fathoms.

The **N.** by **W. ⅜ W.** course follows the coast at a distance of 2½ to 3½ miles, this being lessened to about 1¾ miles abreast **Cape Foulweather** and to a little over 1 mile **off Cape Lookout.** In thick weather the depths should

not be shoaled to less than 30 fathoms. **Heceta Head Lighthouse** (see table, page —) should be made when about 8½ miles north of the **Umpqua River**, and will be passed at a distance of 3 miles. There are no dangers on this course until 3 miles northward of the **Alseya River**, from which point to **Cascade Head** the coast is fringed with numerous rocks and sunken ledges.

Seal Rock, about 3½ miles northward of Alseya River, is a group of visible and sunken rocks about ½ mile offshore and extending about 2 miles north and south. The largest of the rocks is about 20 feet high.

Two reported rocks, about 1½ miles offshore, lie 7½ and 9 miles, respectively, **S.** by **E.** from Yaquina Head Lighthouse.

Yaquina Reef, about 2½ miles long in a north and south direction, lies in front of the entrance to **Yaquina Bay** and about 1 mile offshore. The course passes about 1¼ miles westward of the whistling buoy, which is about 1 mile westward from the reef.

Yaquina Head Lighthouse should be made when abreast the Alseya River and should not be brought to bear westward of **N.** by **W.** Cape Foulweather should be passed at a distance of about 1¾ miles, and Cascade Head about 2½ miles.

Between Yaquina Head and Cascade Head there are no dangers extending over ¾ mile from the beach.

Cape Meares Lighthouse should be made when abreast of **Nestugga River.** Cape Lookout is passed at a distance of about 1 mile. Good **shelter** from northwesterly winds may be had under the cape, but none in westerly or southerly weather. **Three Arch Rocks**, about 1½ miles southward from Cape Meares, are prominent and are passed at a distance of about 1 mile. At the end of the course Cape Meares Lighthouse should bear **ENE. ½ E.**, distant 1½ miles.

The **NNW. ¾ W.** course draws slightly offshore, passing about 2 miles from Tillamook Bay whistling buoy and about 2¾ miles from the Nehalem River buoy (can, black and white perpendicular stripes). **Cape Falcon** and **Neah-kah-nie Mountain** are prominent in clear weather. **Tillamook Rock Lighthouse** (see table, page 22) should be made when a little northward of Nehalem River, and is passed at a distance of 4 miles. Vessels should not attempt to pass eastward of Tillamook Rock. **Cape Disappointment Lighthouse** (see table, page 22) should be made when abreast Tillamook Rock, and **North Head Lighthouse** (see table, page 22) when a little farther northward. Cape Disappointment is raised as a small island. **Columbia River Light-vessel** (see table, page 22) should be made when about 7 miles northward of Tillamook Rock. In thick weather the depths should not be shoaled to less than 30 fathoms, and in clear weather vessels as a rule should make nothing eastward of the course.

For a detailed description of the coast see heading, "Coast from Cape Blanco to the Columbia River."

6. ***From the Columbia River Entrance to Juan de Fuca Strait.***—Having followed the directions in section 5, preceding, from a position ½ mile eastward of the Columbia River Light-vessel, steer **N.** by **W.** ½ **W.** for about 26 miles; this course made good leads ½ mile westward of Willapa Bay whistling buoy. Then steer **NNW.** ⅞ **W.** for about 16½ miles; this course made good leads ½ mile westward of Grays Harbor whistling buoy. Then steer **NW.** ¼ **N.**, passing Destruction Island Lighthouse at a distance of 6 miles, and Jagged Islet at a distance of 2¾ miles; this course made good for 80 miles leads to a position about 2 miles *WSW.* from Umatilla Reef Light-vessel, with the outer Bodelteh Islet bearing *NE.* by *E.* ¼ *E.*, distant about 5¼ miles. From this position steer **N.** ½ **W.**, taking care to pass Cape Flattery Lighthouse at a distance of over 1¾ miles; this course made good for 17½ miles should bring Cape Flattery Lighthouse to bear *SE.* ⅝ *S.*, distant about 3 miles, and in range with Duntze and Duncan rocks. Then follow the directions for Juan de Fuca Strait.

Caution.—In thick weather, when between the Columbia River and Grays Harbor, the depths should not be shoaled to less than 20 fathoms. When between Grays Harbor and Umatilla Reef Light-vessel the depths should not be shoaled to less than 30 fathoms; between Umatilla Reef Light-vessel and Cape Flattery the depths should not be shoaled to less than 50 fathoms, and in the vicinity of Cape Flattery the greatest caution must be observed on account of the velocity and irregularity of the currents.

Remarks and dangers.—These courses lead about parallel with the coast at an average distance of about 4½ miles. Northward of Grays Harbor they draw gradually offshore until nearing Cape Johnson, when the distance is decreased, the course passing about 3 miles westward of **Carroll** and **Jagged islets.** Between the Columbia River and Point Grenville the coast is low and flat, with no distinguishing features in its vicinity. Back from the coast the high mountain masses of the Olympus Range are visible in clear weather.

On the **N.** by **W.** ½ **W.** course the buildings and summer cottages along the beach for a distance of 10 miles above North Head will be seen in clear weather. **North Head Lighthouse** (see table, page 22) should be passed at a distance of 4¼ miles; at night the light should be visible from the whistling buoy off Willapa Bay. At night **Willapa Bay Lighthouse** (see table, page 22) should be made when about 11 or 12 miles northward of North

Head; by day it is not distinguishable until much closer. **Grays Harbor Lighthouse** (see table, page 22) should be made when a little southward of Willapa Bay. There are no dangers along this stretch of coast, but it is not advisable to shoal the depths to less than 15 fathoms.

The **NNW. ⅞ W.** course leads about 4½ miles offshore, along which are no dangers, and about 5¼ miles westward of Willapa Bay and Grays Harbor lighthouses. It is advisable not to shoal the depths to less than 15 fathoms. The lighthouse on the southern point at the entrance to Grays Harbor, and the **jetty** and buildings at its inshore end are easily distinguished by day.

On the **NW. ¼ N.** course, **Destruction Island Lighthouse** (see table, page 22) should be made when about 5 miles northward of Cape Elizabeth.

Sonora Reef extends about 2 miles southward from **Cape Elizabeth,** its southern extremity lying about 1½ miles offshore.

From this point to Cape Flattery the coast is fringed with numerous rocky islets and sunken ledges, extending in some cases over 3 miles offshore. In thick weather the depths southward of Cape Flattery should not be shoaled to less than 30 fathoms, as the currents are extremely irregular both in direction and velocity.

Umatilla Reef, 2½ miles **W.** from **Cape Alava,** is the worst danger on the northern coast. It consists of several low rocks and sunken ledges in the prolongation of Cape Alava and the **Bodelteh Islets,** and is surrounded by deep water. A **light-vessel** (see table, page 22) is moored in 25 fathoms about 2½ miles **SW. ⅝ S.** from the reef; in heavy gales the light-vessel is sometimes obliged to leave her station. In thick weather, in this vicinity, the depths should not be shoaled to less than 30 fathoms.

The **N. ½ W.** course clears all dangers until up with **Cape Flattery Lighthouse** (see table, page 22). In clear weather no difficulty will be found in clearing **Duntze** or **Duncan** rocks, but in thick weather the irregularity of the currents in direction and velocity is a source of danger. The depths should not be shoaled to less than 50 fathoms and the greatest caution exercised.

From southward the low valley, extending from the head of **Waatch Slough** to **Neah Bay,** is quite noticeable. At night Cape Flattery Lighthouse, on the southwestern face of **Tatoosh Island,** should be made when about 3 miles southward from Umatilla Reef Light-vessel, and should be passed at a distance of about 2 miles.

Duntze and **Duncan rocks** are almost in range with the lighthouse and bear about **NW. ⅝ N.** from it; both are in the red ray of the light.

Duntze Rock has 3½ fathoms over it, and in an ordinary swell usually shows a breaker. It lies 1¼ miles from the lighthouse and about ¼ mile from Duncan Rock.

Duncan Rock, small, low, and black, lies about 1 mile from the lighthouse, and is usually swept by the swell. A ledge, with 4 fathoms over it, lies ⅜ mile **ESE. ½ E.** from the rock.

The **passage** between Duncan Rock and Tatoosh Island is not recommended for strangers, while the **passage** between Tatoosh Island and the mainland should not be attempted under any circumstances.

COAST FROM POINT REYES TO POINT ARENA.*

This section of the coast trends in a general northwesterly and southeasterly direction for about 67 miles, with the exception of the first 10 miles, which trends nearly north and south. There are but few dangers, and these do not extend over 1 mile from the beach, and in thick weather the 30-fathom curve may be followed with safety. During the summer months the rocks are generally well marked by kelp, which extends in some cases to the 10-fathom curve. During the winter gales much of this is torn away. It is a safe rule to avoid all kelp (see page 9.)

In clear weather the mountains inland may be readily seen, and at times are visible when the lower land is shut in by haze or fog. In thick weather soundings should be taken frequently as the currents are extremely irregular in both direction and velocity.

Lumber, farm, and dairy produce are shipped from several small landings, at most of which the loading and unloading of vessels is accomplished by the use of a wire cable or chutes.

Protection from the prevailing northwesterly winds of summer may be had at several places, but there is no shelter from the winter winds, which are usually accompanied by a heavy westerly swell.

Point Reyes is described on page 62.

From Point Reyes the coast trends in a general northerly direction for about 10 miles as a broad, white, sand beach backed by high sand dunes. The entrance to a small lagoon lies 7½ miles north of Point Reyes, the northern point at the entrance being about 140 feet high.

From the northern end of the sand beach the coast curves northwestward for 6 miles in high, yellow, rocky cliffs, terminating in **Tomales Point,** the south point at the entrance to Bodega Bay. A small, rocky islet, 60 feet high, lies ¾ mile southward from the point, about ¼ mile offshore.

*Shown on chart **5600,** scale $\frac{1}{200,000}$, price $0.50.

Bodega Head, 240 feet high, lies 4½ miles **NW.** from Tomales Point. The summit is rounding and grassy, with steep, rocky cliffs on the southern and western ends. **Bodega Rock,** low, lies ⅓ mile **SE.** from the southeastern face of the head. Foul ground extends ⅜ mile southward and southeastward from the rock.

Bodega Bay,* included between Tomales Point and Bodega Head, is about 6 miles in length in a northwest and southeast direction, with a width of about 1½ miles. It affords shelter from northwesterly weather at its northern end, but is dangerous in southerly or westerly weather. Northward of the bay, and separated from it by a narrow strip of sand beach, is a shallow lagoon connected with the bay by a narrow channel. The depths over the bar at the entrance to this channel are from 7 to 8 feet at low water, but are variable and subjected to change during heavy southeasterly or southwesterly gales. Some farm produce and fish are shipped in light-draft vessels to San Francisco. Local knowledge is necessary for the bar and inside channels.

To anchor in Bodega Bay, round Bodega Rock, giving it a berth of ¾ mile, until Bodega Head bears **W.** ¾ **S.,** just open northward of Bodega Rock; then steer **NW.** for about ¾ mile and anchor in 5 to 6 fathoms, about ½ mile from the beach, with Bodega Rock bearing about **S.** by **W.** ½ **W.** Anchorage may be had closer to the beach if the vessel's draft permits. On the approach of southerly or westerly weather vessels should leave at once.

Tomales Bay † enters in the southern part of Bodega Bay immediately eastward of Tomales Point, and extends southeastward for about 12 miles with an average width of about ½ mile. It is much obstructed by shoals, through which are several channels used by light-draft vessels with local knowledge. The depths on the bar at the entrance to the bay are from 8 to 9 feet at low water, but are variable and subject to change in heavy weather. Some farm produce, fish, and clams are shipped from here to San Francisco. Communication may be had by rail and telegraph from several points near the head of the bay. No directions can be given that would be of value to a stranger.

Northward of Bodega Head, the cliffs are about 200 feet in height for about 2 miles, and are then succeeded by a broad sand beach 2 miles long, backed by sand dunes 120 feet high. From this point the coast northward consists of abrupt, rocky cliffs, broken by gulches, to the mouth of the **Russian River,** 10 miles northward of Bodega Head.

Numerous rocks, from 20 to 130 feet high, lie offshore in some cases over ¼ mile. **Gull Rock,** 100 feet high, lies 1¼ miles southeastward from the mouth of Russian River and about ¼ mile offshore. About ½ mile northwestward from Gull Rock and 400 yards offshore is a large **arched rock,** 85 feet high and flat on top. This is the largest arched rock on this part of the coast.

From the Russian River the coast extends northwestward and is nearly straight. It is bold and heavily wooded with pine and redwood to the crests of the hills, which approach it closely. It is cut by numerous gulches and bordered by many rocks, which, as a rule, are close inshore. Several landings, some abandoned, are on this stretch of the coast. About 4½ miles northward from the mouth of Russian River is a **sunken reef** extending about ¾ mile offshore. **Fort Ross Reef** (Pinnacle Rocks) lies about 5¾ miles northward from the Russian River and nearly 1 mile eastward from Fort Ross Cove. The rocks are 35 feet high, about 600 yards offshore, and connected with the beach by a reef, which is partially marked by kelp.

Fort Ross Cove,‡ 15 miles northward of Bodega Head and nearly 33 miles northward from Point Reyes, affords fair shelter in northwesterly weather. The holding ground is poor and the anchorage contracted by a rock awash about in the middle of the cove and a sunken rock about 50 yards northward of it with but 14 feet over it. The cove is divided into two bights, the western one being slightly the larger. A landing chute extends eastward from the western point, with about 16 feet at its outer end. Some lumber and dairy produce are exported and general merchandise imported. Communication by wagon road and telephone may be had with the interior. This anchorage is suitable for small vessels only, and if used by strangers should be entered with caution as no directions can be given that would be of value.

Timber Cove, 2 miles northward of Fort Ross Cove, affords similar shelter with local knowledge, but is not good for vessels of over 10 feet draft.

Salt Point, 5 miles northward from Fort Ross Cove, is about 85 feet high, very rocky, and bare of trees. It is bordered by outlying rocks for about 200 yards.

Gerstle Cove, or Salt Point Landing, is a contracted cove and landing under Salt Point.

Fisk Mill Cove, with a post village (Fisk), about 2½ miles northward from Salt Point, affords fair northwest shelter for small vessels. The bottom is rocky, but there are no hidden dangers.

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* Shown on chart **5627**, scale $\frac{1}{30,000}$, price $0.20.

† Shown on chart **5618**, scale $\frac{1}{30,000}$, price $0.25.

‡ Shown on chart **5651**, scale $\frac{1}{6,000}$, price $0.20.

Horseshoe Point, 3 miles northward from Salt Point, is a cliff 180 feet high, with a depression of 60 feet immediately behind it. It is bare of trees, but the summit is marked by several projecting rocks.

From Horseshoe Point the coast trends **NW.** by **W.** for 12½ miles to the Walalla River, consisting of cliffs about 60 feet high and bordered by numerous outlying rocks. The tree line is from ⅛ to ½ mile back from the edge of the cliffs.

Stewarts Point Landing (Fisherman Bay) is a post village 3 miles northward from Horseshoe Point. Some lumber and a small amount of farm and dairy produce are exported. Communication may be had by stage and telephone. Vessels are loaded by wire cable, mooring buoys being placed in the cove in from 5 to 6 fathoms. About 350 yards off the southern point of the cove are two sunken rocks, each of which is well marked by kelp. The buildings are readily made from seaward. There is fair shelter for a small vessel in northwesterly weather in from 5 to 6 fathoms, hard bottom and sand. No directions are considered necessary.

Bihler Point Landing is about 5½ miles northward from Horseshoe Point.

About 4 miles northward from Bihler Point and about 3 miles southward from the Walalla River is a sand beach about ½ mile long, backed by high **sand dunes** parallel with the beach; these dunes are quite prominent.

Walalla Point Island lies about 15 miles southward from Point Arena, and about 1 mile south of the Walalla River. It is 42 feet high, about 300 yards offshore, and connected with the bluff by a rocky reef; sand dunes extend behind the bluff for about 600 yards.

The **Walalla River** enters about 1 mile northward from Walalla Point Island. A long sand beach extends about 1 mile southward from the mouth. The smoke from the saw-mills can sometimes be seen. The old landing is abandoned and the lumber is now shipped from Bowens Landing.

Robinson (Walalla) **Reef** lies northward of the mouth of the Walalla River, and about 1⅛ miles northward of Walalla Point Island. It is a cluster of twenty-five or thirty rocks above water about 600 yards offshore, with a sunken rock, 70 yards **WNW.** from the outer visible rock.

Bowens Landing is 1½ miles northward of the Walalla River. It is the outlet for the lumber mills on the Walalla River, and exports considerable lumber, ties, shingles, and some tan bark. Communication may be had by stage and telegraph. Vessels are loaded by wire cable. The anchorage is exposed and can be used only in summer. A reef projecting a short distance westward from the point breaks the force of the swell for vessels loading at the moorings, which are heavy. There are 5 to 6 fathoms at the outer moorings, and about 17 feet at the inner buoys. Local knowledge is necessary on account of several sunken rocks in the approaches.

Fish Rock Landing (Havens Anchorage) is 12 miles southward from Point Arena, and about 4 miles northward from Walalla Point Island. Some lumber, ties, and tan bark are shipped from this point. Communication may be had by stage and telegraph. Shelter from northwest winds may be had in the cove southward of Fish Rock. Vessels of 200 tons may use the cove, which is contracted by rocks and sunken ledges extending about 250 yards southeastward from the western head. Strangers should approach the anchorage with caution.

Fish Rocks are two rocky islets, connected at low water and surrounded by numerous smaller ones, about 4½ miles northward of Walalla Point Island. The outer one is about 150 feet high, and the inner 100 feet high and 100 yards offshore; a rock, 40 feet high, lies about 175 yards southeastward from the outer rock.

Havens Neck is a prominent head 145 feet high, about ⅝ mile northward from Fish Rock; it is bare of trees and connected to the bluffs by a low neck.

Walalla Mountain, 2,200 feet high, is a prominent feature in clear weather. It is about 5 miles inland and bears nearly **NE.** from Havens Neck.

Sail Rock, 44 feet high, is a sharp, pyramidal rock about 800 yards offshore about 2¾ miles northward from Fish Rock.

Saunders Reef, about 4½ miles northward of Fish Rock, lies about ½ mile offshore. It shows several rocks awash at low water and is well marked by kelp. Foul ground exists between it and the beach. A whistling buoy is placed in 17 fathoms ⅜ mile **SW.** by **S.** from the outer rock and 7½ miles southward from Point Arena. Vessels should not pass inside the buoy.

Arena Cove * lies about 2½ miles southward from Point Arena, and is a small indentation affording shelter to small vessels in northwesterly weather. The southern head is a bright, rocky, yellow cliff that under favorable circumstances is visible for a considerable distance seaward. A small wharf is at the head of the cove, with from 6 to 8 feet at its outer end. There is a wire cable and mooring buoys in addition to the wharf. Considerable dairy produce and some ties and bark are exported; general merchandise is imported.

* Shown on chart **5699,** scale $\frac{1}{20,000}$, price $0.40.

A few provisions may be had and water obtained by hose. The post village of **Point Arena** is situated about 1 mile back from the landing. Communication may be had by stage and telegraph; a coasting steamer makes regular weekly trips.

A buoy (bell, black and white perpendicular stripes, "Point Arena") is placed about ⅝ mile **SW.** ¼ **W.** from the end of the wharf.

To enter, make the bell buoy; then bring the end of the wharf to bear **NE.** by **E.** and stand in on this course. This leads about 150 feet southward of a rock, with 16 feet over it, that lies 300 yards **SW.** by **W.** ⅞ **W.** from the end of the wharf. In thick weather during the summer, in approaching the cove from northward or southward the edge of the kelp may be followed, which will lead to within about 300 yards of the bell buoy.

Point Arena is the first prominent point north of Point Reyes. It consists of a long, level plateau, diminishing in height to the end of the point, which is about 60 feet high. It is bare of trees for about 1 mile back of the point and is marked at its extremity by a lighthouse and buildings (see table, page 18). A sunken reef usually showing breakers extends ⅝ mile **NW.** from the extremity of the point.

Arena Rock, with 13 feet over it, lies a little over 1¼ miles **NW.** by **N.** from Point Arena Lighthouse, and shows a breaker except in very smooth weather.

COAST FROM POINT ARENA TO CAPE MENDOCINO.*

From Point Arena the coast extends in a general north-northwesterly direction for about 50 miles and then trends about west-northwest for nearly 35 miles to Point Gorda, from which point it trends about north-northwest for 10 miles to Cape Mendocino. The southern portion is less bold and rugged, and the mountains are neither so high nor so close to the coast. The dangers are all included within the 30-fathom curve, and with the exception of Blunts Reef and the other reefs in the vicinity of Cape Mendocino do not extend more than 1 mile offshore. Between Point Delgada and Cape Mendocino are several deep submarine valleys, heading in some cases within ½ mile of the beach, that require great caution in thick weather when in the vicinity, owing to the irregularity of the soundings.

In clear weather the mountains are good landmarks and can frequently be seen when the lower land is obscured by fog or haze. In thick weather soundings should be taken frequently, as the currents are irregular in both direction and velocity.

Lumber and farm and dairy produce are shipped from several points, the loading and unloading of vessels being accomplished in the majority of cases by wire cable.

Protection from the prevailing northwesterly winds of summer may be had in a few places, but there is none from southward or westward.

Point Arena is described above.

From Point Arena the cliffs of the point extend ½ mile northeastward to the mouth of the Garcia River, from which sand dunes and beaches extend northward for about 4 miles. Beyond this for about 40 miles to the mouth of Ten Mile River the coast is rugged, with high, bold cliffs bordered by numerous outlying rocks.

Mal Pass is a steep gulch 5¼ miles northward from Point Arena; the bluffs on each side are nearly 280 feet high.

Newhaven Landing, under the north point of the little cove formed by the gulch (Mal Pass), is exposed and little used.

Bridgeport Landing, little used, is an open, exposed landing about 6½ miles northward of Point Arena.

Red Bluff, a prominent, reddish cliff about 200 feet high, is about 8 miles northward of Point Arena.

A **rocky islet**, 93 feet high and about ½ mile offshore, lies 1¼ miles north of Red Bluff.

Greenwood Landing (Elk P. O.) is about 10½ miles northward from Point Arena. An incline runs from the cliff down to a cluster of three rocks, from which a wire cable leads for loading and discharging. Vessels ride to mooring buoys on the north side of the rocks in 6 to 7 fathoms; the shelter is only fair. Considerable lumber is exported, together with tan bark, farm and dairy produce; general merchandise is imported. Communication may be had by stage and telegraph; small coasting steamers call here several times a month. Provisions may be had in limited quantities. The church immediately north of Cuffeys Cove and the buildings in the town are prominent by day from seaward; at night the glare from the electric lights is prominent. No directions that would be of value to a stranger can be given.

Cuffeys Cove, about ¾ mile northward from Greenwood Landing, is a small, contracted anchorage affording fair shelter in northwesterly winds. The outer point at the entrance to the cove is 140 feet high, with a rocky

*Shown on chart **5700**, scale $\frac{1}{200,000}$, price $0.50.

islet 46 feet high about 450 yards westward. The approaches are obstructed by several sunken rocks and should not be attempted without local knowledge. The landing and village are practically abandoned.

From Cuffeys Cove to the Navarro River, about 3 miles, the coast consists of cliffs about 200 feet high, bordered by outlying rocks.

Navarro Landing (Navarro P. O.), at the mouth of Navarro River, is now practically abandoned, but may resume. Lumber and ties are exported and occasionally tan bark. Communication may be had by stage and by telegraph or telephone. While loading, vessels ride at mooring buoys placed in about 21 feet. Shelter is only fair from northwesterly winds.

In entering, care should be taken to avoid a sunken rock nearly ½ mile **S.** from the inner end of the chute. This rock usually shows a breaker and may be cleared by bringing the mill to bear **N.** by **E.** ½ **E.** and keeping it on that bearing when heading for the buoys.

Navarro Head, on the north bank of the Navarro River, is about 400 feet high.

Salmon Point, the south point at the entrance to Whitesboro Cove, about 1¼ miles northward from the Navarro River, is a treeless cliff about 100 feet high. Detached rocks extend westward from the point for about ¼ mile, with a sunken ledge usually showing a breaker about ½ mile **W.** ½ **S.** from the extremity of the point.

Whitesboro Landing is now abandoned and the mooring buoys have been removed.

Albion River and Landing is about 2 miles northward from Navarro Head and about 16½ miles northward from Point Arena. The south point at the entrance is about 180 feet high, and about ⅔ mile from Salmon Point. Rocks extend about ¼ mile westward from the point. The north point at the entrance is a rocky islet 80 feet high lying close to a point of about the same elevation, both bare. A small, bare rock lies about 200 yards westward from the island, and a sunken ledge, usually showing a breaker, lies nearly 270 yards southward from the western point of the island. The entrance lies close under the north point, northward of the sunken ledge. The cove is divided by rocks extending from the north shore into an outer and inner anchorage, vessels riding to mooring buoys placed in from 8 to 13 fathoms at the outer, and in from 3 to 4 fathoms at the inner anchorage. Considerable lumber has been exported from this point, and a tug is necessary for towing sailing vessels in and out. The mill was destroyed by fire, but in 1901 was being rebuilt with a view of resuming operations. Communication may be had by stage and by telegraph and telephone. Water may be had, but no coal or provisions. The post village of **Albion** is situated on the north bank of the river. No directions at present can be given that will be of value to a stranger.

Stillwell Point is a bold, sharp cliff, 190 feet high, about 1½ miles northward from the Albion River. A rocky islet, 150 feet high, lies close inshore on its northwestern side.

Little River lies about 4 miles northward from Navarro Head and about 19 miles northward from Point Arena. The northwest shore of the cove is bluff and rocky, and bare of trees for over ½ mile. Good shelter from northwestward and fair protection from southward is afforded by the reef and rock on the southern side of the cove, which are well marked by kelp. It is open westward, and bad, especially for sailing vessels, owing to the narrow entrance and heavy undertow when in the vicinity of the rocks. The anchorage is about 300 yards in diameter, with depths of 4 to 5 fathoms. A short wharf makes out from the eastern shore, with about 6 feet at its outer end. Ties, tan bark, and farm and dairy produce are exported, and general merchandise imported. No supplies are obtainable. Communication may be had by stage and telephone. A small coasting steamer calls several times a month. The channel in entering is 125 yards wide, and is obstructed by two sunken rocks which reduce it to about 60 yards in width abreast the inner visible rock. In entering bring the end of the wharf to bear **N.** by **E.** ¾ **E.** and stand in on that bearing, passing 30 yards northward of the inner visible rock. After passing this rock anchor in from 4 to 5 fathoms. Strangers should enter with caution.

From Little River Landing to Mendocino Bay the coast is a broad table-land with a seaward face of cliffs, 40 to 60 feet high, bordered by numerous low rocks; the tree line is over ½ mile from the cliffs.

Mendocino Bay* lies 21 miles northward from Point Arena, and affords fair shelter in northwesterly weather, but vessels are obliged to leave in southerly or westerly weather. In heavy southwesterly gales the sea breaks clear across the entrance. It is about ⅞ mile long in a north and south direction with a width of a little over ¼ mile. The northern point at the entrance is a broken cliff, 60 feet high, bordered by numerous rocks close inshore. The southern point is a rocky, irregular cliff about 100 feet high, bordered by numerous rocks, with a reef extending about 150 yards northwestward toward the northern point. A knoll, 156 feet high, lies about 300 yards back from the point. The post village of **Mendocino** is situated on the northern shore of the cove. **Big River** enters in the northeastern part of the cove; a sawmill is situated about ½ mile above

*Shown on chart **5719**, scale $\frac{1}{10,000}$, price $0.20.

the mouth on the north bank. Vessels load and discharge at the chute on the northeast face of the north point, where at low water there is a depth of 11 to 18 feet. Considerable lumber is exported, together with farm and dairy produce; general merchandise is imported. Provisions, fresh meat, and water can be had, but no coal. Sailing vessels call occasionally in summer, but the bulk of the carrying trade is handled by steam schooners of available draft. Mooring buoys are placed for warping into position under the chutes, and for riding-to in case the chutes are occupied by other vessels. Communication may be had by stage and telegraph or telephone; a coasting steamer from San Francisco makes weekly trips, touching also at Areha Cove and Little River. The buildings in the town are the prominent features when in the vicinity of the bay.

To enter, bring the south point of the river to bear **NE. ½ E.** and stand in on that bearing, giving the north point at the entrance a berth of 250 yards. When the chutes are well open, anchor in from 5 to 6 fathoms, or make fast to the outer mooring buoy. This course clears a dangerous sunken ledge, lying ¼ mile **NW.** from the outer visible rock off the southern point. The ledge extends about 250 yards in a northwest and southeast direction, and has a least depth of 3¼ fathoms over it.

Point Cabrillo is about 2½ miles northward of Mendocino City and about 24 miles northward of Point Arena. It is a flat-topped point, 50 to 60 feet high, terminating seaward in nearly vertical cliffs; numerous low rocks extend offshore for over 200 yards. The point is bare with the tree line about ½ mile back.

From Point Cabrillo the coast trends northward for 9 miles to Laguna Point as a nearly straight line of bluffs with numerous rocks close under the cliffs. It is moderately high, wooded to the face of the cliffs, and is broken by several indentations and small streams.

Caspar Anchorage,* ¾ mile northward from Point Cabrillo, is a small cove, about ⅜ mile wide, at the head of which is the mouth of Caspar Creek. Fair shelter, except from westward, is afforded. The anchorage is contracted, and is used only by coasting steamers when the sawmill is in operation. At present it is of little importance. There is a chute with 14 feet at the end, projecting from the north shore of the cove, and a wire cable is also used. Mooring buoys are placed for warping into position. The post village of **Caspar** is situated on the north bank of the creek near its mouth. Communication may be had by stage and by telegraph and telephone. Provisions may be had in limited quantities, and water can be obtained at the chute. No directions that would be of value to a stranger can be given, and the entrance should not be attempted without local knowledge.

From Caspar Creek to Noyo Anchorage the coast consists of broken, irregular cliffs, 40 to 60 feet high, with numerous rocks extending in some cases 400 yards offshore. These are fairly well fringed by kelp, especially in summer.

Noyo Anchorage,† about 5 miles northward from Point Cabrillo, is at present of little commercial importance. The cove is less than ½ mile long and about ¼ mile wide, and while affording fair shelter from northward or southward, is open westward. The anchorage is limited to an area about ¼ mile long and less than ⅛ mile wide, with depths of 3½ to 7 fathoms. Heavy mooring buoys are placed for vessels to ride-to while loading. This anchorage is used chiefly by vessels whose draft does not permit of loading at Fort Bragg; they are generally towed in and out by steam schooners, and loaded either from them or by lighters. **Noyo River** enters at the head of the cove, and the post village of **Noyo** is situated on the north bank of the river near its mouth, the sawmill and other buildings being easily distinguishable when abreast the entrance to the cove. No supplies are obtainable. Communication may be had by stage and by telegraph and telephone.

In entering, bring the south point at the entrance to the river, abreast the sawmill, to bear **E.** and head in on that bearing until the north point at the entrance to the cove is a little abaft the beam, then head for the outer mooring buoys, or head a little southward and anchor in the middle of the cove in about 4½ fathoms. The **E.** course in entering passes about 100 yards northward of a rock, with 18 feet over it, lying 400 yards **NW.** from the south point at the entrance, and about 75 yards southward of a rock awash lying a little over 100 yards southward from the north point at the entrance to the cove. Strangers should enter with caution.

From Noyo River to Fort Bragg Landing (Soldiers Harbor), about ⅜ mile, the coast consists of rocky cliffs, 40 to 60 feet high, bordered by rocks and sunken ledges extending 100 to 400 yards offshore.

Fort Bragg Landing ‡ is 30 miles northward from Point Arena in the small cove formerly known as Soldiers Harbor. The cove is about ⅜ mile long and about ¼ mile wide, but is contracted to much less by the rocks and ledges extending from both points, and there is no room to anchor. The clear channel leading to the wharf is about 125 yards wide at the entrance between the breakers, but once inside is smooth and affords fair shelter in northwesterly and southeasterly weather; in westerly weather it is wide open. A rocky reef, partly

*Shown on chart **5705**, scale $\frac{1}{10,000}$, price $0.50.

†Shown on chart **5706**, scale $\frac{1}{10,000}$, price $0.50.

‡Shown on chart **5706**, scale $\frac{1}{10,000}$, price $0.50.

bare at high water, extends southwestward from the northern head and breaks the force of the swell from northwestward. The post village of **Fort Bragg** is near the head of the cove. Vessels load and discharge at the wharf, which extends about 600 feet from the head of the cove; the bottom on the north side of the wharf is rocky, but on the south side is sandy, the depth being about 21 feet. Considerable lumber is exported, with some farm and dairy produce; general merchandise is imported. Provisions, fresh meat, and water can be had, but no coal. The bulk of the trade is carried by steam schooners of available draft. There is an average of two steamers weekly between here and San Francisco. Communication may be had by stage and by telegraph and telephone. The buildings in the town are prominent by day and the electric lights at night. A whistling buoy is placed about ⅝ mile westward from the entrance to the cove.

To enter, make the whistling buoy and then steer **E. ¾ N.** until the end of the wharf bears **NE.** by **E. ¾ E.**, when head for it on that bearing. The south side of the wharf should be kept a little open to avoid the point of the northern reef.

From Fort Bragg Landing to Laguna Point, about 3 miles, the coast is moderately low and rocky, and cut by two small streams. The tree line is within ¼ mile of the beach.

Laguna Point is about 8½ miles northward from Point Cabrillo, near the southern end of Ten Mile River beach. It is a small, projecting cliff about 30 feet high, flat-topped, and bare of trees for about 600 yards; it is noticeable only when close inshore. A bare reef extends 300 yards northwestward from the point.

Cleone (Laguna Landing), immediately northward of Laguna Point, is a post village of little commercial importance except as regards lumber and ties. It is exposed and only available for small steamers. It affords fair protection at the wharf in southeasterly weather, and is occasionally used in winter. Mooring buoys are placed off the wharf. No provisions or other supplies are available. Communication may be had by stage and by telegraph and telephone.

For ½ mile northward from Laguna Point the bluffs are low, and northward of these a straight sand beach extends for 3 miles to the mouth of Ten Mile River. The beach is backed by sand dunes for about ½ mile inland, with the tree line about 1½ miles from the beach.

From Ten Mile River the coast extends in a general northwesterly direction for about 50 miles to Point Gorda. This stretch of the coast is particularly bold and rugged, bordered by numerous rocks, and as far as Point Delgada is heavily timbered. Northward of Point Delgada the tops of the ridges are generally bare or only partly covered with trees and brush. The cliffs along the beach range from 40 to 100 feet in height. The high, rugged mountains in the vicinity of the coast, which reach elevations of 4,000 to 5,000 feet, are prominent.

Bruhels and **Bells** points are two small points, 3 and 4½ miles, respectively, northward of Ten Mile River. They are not noticeable unless close inshore.

Bells Mountain, about ½ mile eastward from Bells Point, is about 1,000 feet high, bare on top, and with a few trees on the ocean side. It is the principal landmark for Westport Landing.

Westport Landing, about 12 miles northward from Fort Bragg Landing, is at present practically abandoned. It is exposed, and suitable only in summer and in smooth weather when an occasional small steamer calls for a cargo of ties. There are a few houses on the small flat at the foot of the hills, but little or no business is transacted. Mooring buoys are placed for warping into position and a wire cable is used for loading. There is from 24 to 26 feet at the moorings, but this is subject to change, depending on the prevailing winds and swell; at times there are 3 to 4 feet less. Communication may be had northward by wagon and telephone as far as Usal Landing, and southward by stage and telegraph and telephone. The buildings in the village, especially a yellow hotel and a white church, are the most prominent features from seaward. No supplies of any kind are available and provisions in limited quantities only.

Gordons Hill lies about 6½ miles northward from Ten Mile River; it is bare to the summit and terminates seaward in **Abalone Point,** 60 feet high, with low, outlying rocks.

From Abalone Point the coast trends northwestward for about 4 miles to **Cape Vizcaino,** which is a broad, irregular line of precipitous cliffs, about 100 feet high, very broken and bordered by low rocks, 200 or 300 yards offshore. A rocky islet, **Island Knob,** about 200 yards long and 100 feet high, lies close-to and almost connected with the point. A breaker lies about 275 yards westward and southward from the northwest point of the islet.

Cottaneva Rock, about 20 feet high, is a small rock about 500 yards southeastward from Island Knob, and about 275 yards offshore. Several smaller rocks lie inside of it, and two others about 160 yards northwestward.

Cahto Mountain, about 4,200 feet high, is about 12 miles eastward from Cape Vizcaino, and in clear weather is prominent as a landmark.

Between Cape Vizcaino and Point Delgada are several small, exposed landings available for use only in the summer and in smooth weather. These landings ship ties, tan bark, and shingles, and then only when they can be handled at a profit; and the landings are abandoned or revived according to commercial demands.

Wire cables are used in loading and discharging, mooring buoys being placed where necessary. Supplies are not obtainable and communication is irregular. The principal landings are **Rockport, Usal, Hardy Creek, Bear Harbor,** and **Needle Rock**.

Double Cone Rocks, 15 and 20 feet high, are about 3½ miles northward from Cape Vizcaino, and lie about 300 yards offshore.

Usal Rock, about 5½ miles northward from Cape Vizcaino, is about 50 feet high and always black in color. It lies about 200 yards off a small point of rocks.

The **Usal Valley** lies about 1 mile northward of Usal Rock, and is a narrow, steep gulch in front of which is a small area of flat land with a low beach; a small, grassy hillock is just inside the gulch. The view up the valley is open for a very short time while passing.

Big White Rock, 100 feet high, is about 2 miles northward from the Usal Valley, and about 125 yards offshore from the steep cliffs, which are bordered by numerous rocks. This rock is a prominent feature when the higher points of the land are in fog.

Anderson Cliff, 2 miles north of Big White Rock, is a projecting rocky spur, about 680 feet high, with one large rock and numerous smaller ones close inshore.

Cluster Cone, about 80 feet high, is the whitest and most conical of a small cluster of high rocks about 200 yards offshore, 4¾ miles northward of Big White Rock. The largest rock is over 100 feet high.

A small, **white rock** lies about 5 miles northward from Cluster Cone Rock and about 4 miles southward from Point Delgada. It is close inshore and just outside the low-water beach.

From a little below the small, white rock to Point Delgada the country is not timbered but is covered with dense, low brush, which presents a uniform dark green appearance.

Point Delgada lies about 65 miles northward from Point Arena, and nearly 20 miles southward from Point Gorda. It is a cliff-faced plateau making out about 1 mile from the general trend of the coast. The seaward face of the plateau is about 1 mile long and bordered by numerous rocks.

Shelter Cove* lies under the southern face of Point Delgada, and affords fair shelter in northwesterly weather, but is exposed and dangerous with southerly or westerly winds. There is nearly always a swell running. A wharf has been built in the western part of the cove and has about 15 feet at the end. Some farm produce is exported and general merchandise imported. A wagon road leads to the interior. Coasting vessels stop here irregularly. No supplies are obtainable, but water may be had. A bell buoy is placed 1 mile **S.** by **E.** ⅝ **E.** from the end of the wharf. The best anchorage is in 5 fathoms, on line between the buoy and end of the wharf, with the southernmost extremity of Point Delgada bearing **W.** Two pinnacle rocks close together, with 15 feet over them, lie a little over ½ mile **SE.** from the point. These are well marked by kelp. A rock, with 14 feet over it, lies a little over ¼ mile **SE.** by **E.** from the point. This is usually well marked by kelp.

In entering make the bell buoy, and then steer for the end of the wharf, course about **NW.** ⅝ **W.** If coming from northward, Point Delgada should be given a berth of not less than 1 mile when heading eastward for the bell buoy.

A submarine ridge, known as the **Tolo Bank,** extends southward from Point Delgada for about 5 miles, and is marked by numerous kelp patches. The depths are quite irregular, the least found being 7¾ fathoms about 3 miles **S.** by **E.** ½ **E.** from the point. At the tail of the ridge is 17 fathoms, from which the depths increase rapidly to 30 fathoms.

From Point Delgada the coast extends about 19 miles northward to Point Gorda, backed by steep mountains covered with chemise and trees. About ¾ mile northward from Point Delgada the rocky character of the coast changes to a clean shore, with a sand beach extending northward for about 4 miles. **Kaluna Cliff,** nearly 1,500 feet high, overhangs the southern end of the sand beach.

King Peak, nearly 4,100 feet high, is the highest of three, the well-known landfall generally called Three Peaks. It lies about 8 miles northward from Point Delgada, about 2½ miles from the coast, and in clear weather is visible seaward for about 75 miles.

About 6 miles northward from Point Delgada is the head of a submarine valley, the 100-fathom curve lying within ½ mile of the beach. This valley extends in about a north and south direction, with an average width of 1 mile between the 100-fathom curves for about 3½ miles, and then expands funnel-shaped for about 3 miles more. Over 400 fathoms are found at its mouth, and 300 fathoms within 4 miles of the beach. The side slopes are abrupt.

Big Flat is a narrow strip of low, flat beach about 7 miles northward from Point Delgada. It is about 2 miles long and bordered by sand beaches. Several ranch houses and barns are located along the flats. **Shubrick Rock,** low and small, lies about 300 yards off the southern end.

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* Shown on chart **5778**, scale $\frac{1}{15,000}$, price $0.20.

Reynolds Rock, 20 feet high, lies 6½ miles northward from Big Flat. It is 480 yards offshore, abreast the precipitous slope of Reynolds Spur, which is about 800 feet high.

Rodgers Break is a sunken rock, with 3 feet over it, nearly ¾ mile offshore. It lies 4¾ miles **SE. ¾ E.** from the conical rock off Point Gorda and 6¾ miles **WNW. ¼ W.** from Big Flat. It is a pinnacle rock that seldom breaks; the top is occasionally seen in a heavy swell. This is the outermost danger on this stretch of the coast.

From Reynolds Rock northward to Point Gorda the shore line is bordered by numerous rocks extending about ¼ mile offshore.

The sharp depression in the hills near the coast, caused by the gulch of **Couskie Creek,** 3½ miles southward of Point Gorda, is sometimes useful in dark nights in making the point from southward by vessels close inshore.

Point Gorda is a high, bold, rounding cape, 83½ miles northward from Point Arena and 11 miles southward from Cape Mendocino. The seaward face rises to 800 or 900 feet, 400 yards back from the beach, and the point of it is a smaller spur, 140 feet high, almost overhanging the sea. It is bare of trees except in the gulches. For over 1½ miles northward and about 2 miles southward of the point the beach is bordered by numerous rocks extending in some cases 400 yards offshore.

Gorda Rock, about 15 feet high, is a conical rock ⅘ mile southward from Point Gorda and about 1,200 yards offshore.

Conical Rock, about 20 feet high, lies about 300 yards **WNW.** from the point. A small, low rock lies 350 yards **W. by N.** from it, with foul ground between.

From Point Gorda to Cape Mendocino the hills back of the coast are lower than those southward; they are bare of trees and bordered by stretches of low, narrow, sandy flats with a narrow, low-water beach. The outlying rocks are not over ⅔ mile offshore until within 1½ miles of Cape Mendocino, where they extend farther and terminate in **Blunts Reef,** 2½ miles broad off the cape. At 3 miles northward of Point Gorda a narrow submarine valley makes in, with 100 fathoms a little over 1 mile from the beach; and another makes in 4½ miles southward of Cape Mendocino, with 100 fathoms 2 miles from the beach.

The **Mattole River** enters about 2 miles northward of Point Gorda. The north head is bare and about 360 feet high, and the south head is about the same height, partially covered with oak trees. A prominent **sand dune** is on the south side at the entrance to the valley.

Sea Lion Rock, about 12 feet high, is the largest of a cluster of small rocks about ½ mile offshore and nearly 4 miles northward from Point Gorda.

Double Rock, about 12 feet high, consists of two small rocks, close together, 800 yards offshore, and about ½ mile northward of Sea Lion Rock.

Devils Gate Rock, 20 feet high, lies nearly 2¾ miles southward of Cape Mendocino and about ½ mile offshore. It is low and pyramidal, with a smaller rock close under the northwest side. A reef extends about 200 yards westward from the rock. Numerous rocks lie inshore.

Steamboat Rock, 46 feet high, lies 1½ miles southward from Cape Mendocino and 600 yards offshore. The upper part is white and the lower black, somewhat resembling a steamer with a low, black hull and white upper works.

Cape Mendocino* (see table, page 18) is one of the most prominent points on the western coast, lying about 94 miles northward from Point Arena and 11 miles northward from Point Gorda. It is a bold, mountainous headland, the seaward face being steep and rocky and backed by rolling grass-covered hills. For over 3 miles southward of the cape the beach is bordered by numerous rocks and sunken ledges, extending in some cases over ½ mile offshore. The lighthouse and buildings are situated on one of the western spurs about 400 feet above the sea.

Sugar Loaf Rock, about 330 feet high, lies about 250 yards westward from the cape, and is connected with it at low water by a narrow neck of rocks and shingle beach. This rock is a prominent feature in making the cape from either northward or southward, but in thick or hazy weather care should be taken to avoid mistaking it for **False Cape Rock,** which it somewhat resembles, that lies in a similar position off Cape Fortunas, 4½ miles northward of Cape Mendocino. False Cape Rock is about 216 feet high and is not so regular in outline as the Sugar Loaf and from the west or northwest shows two large rocks, 90 and 46 feet high, immediately inside of it, whereas the Sugar Loaf stands solitary and compact.

Blunts Reef is the outermost danger off Cape Mendocino. It consists of two small, black rocks, bare at all tides, about 230 yards apart, with 15 fathoms between. The southern and outer rock lies 2½ miles **W. ⅜ S.** from the Sugar Loaf Rock. This is the larger of the two rocks. A whistling buoy, marked "Blunt," is moored in 26 fathoms, about ¾ mile **W. ¾ S.** from the outer rock. Vessels should not pass inside of the buoy.

*Shown on chart 5795, scale $\frac{1}{40,000}$, price $0.40.

The Great Break, with 9 feet over it, lies ½ mile **SSE. ½ E.** from the outer rock of Blunts Reef. A small patch, with 4¼ fathoms over it, lies ¾ mile **S. ¼ E.** from the outer rock of Blunts Reef.

Eastward of Blunts Reef and the Great Break are a number of dangerous rocks and sunken ledges, a detailed description of which is unnecessary. Vessels should not attempt the passage between Blunts Reef and the cape under any circumstances. A heavy westerly swell breaks even in 9 and 10 fathoms in this locality.

Cape Mendocino is the turning point for nearly all vessels bound north or south, and, in view of the dangers in its vicinity, is approached with considerable caution in thick weather, especially from southward, owing to the irregularity of the bottom and currents. The meteorological conditions northward of the cape are quite different from those southward. Fog is more prevalent southward, and the rainfall is heavier northward. The strong northwesterly winds of summer are less violent southward of the cape, which forms a partial lee for vessels working their way northward. The currents in the vicinity of the cape are quite irregular.

COAST FROM CAPE MENDOCINO TO POINT ST. GEORGE.*

From Cape Mendocino to Trinidad Head the coast trends nearly north for about 40 miles, and with the exception of the rocks off Cape Fortunas is free from dangers if the beach be given a berth of over ½ mile. The land is generally low with sandy beaches, broken by the mouths of the Eel and Mad rivers and the entrance to Humboldt Bay, the only marked elevations being Red Bluff and Table Bluff. From Trinidad Head to Rocky Point, about 5 miles, the coast is rocky with numerous outlying, rocky islets and sunken ledges; these, however, do not extend over 1 mile offshore. Above Rocky Point the beach is low and sandy, with several lagoons behind it for nearly 11 miles to the southern end of the Gold Bluffs. From this point to Point St. George the coast is rocky, the cliffs being from 100 to 500 feet in height and bordered by numerous rocks. The Klamath River breaks through the cliffs about 16 miles southward from Point St. George.

Cape Mendocino is described on page 95.

From Cape Mendocino to Cape Fortunas (False Cape), a distance of about 4 miles, the coast is straight and bold, and bordered by a broad, low-water beach. A small stream enters about midway between the two capes.

Cape Fortunas is a steep, bold headland, rising to a height of over 600 feet in less than ¼ mile from the beach. It projects but little from the general trend of the coast. It is covered with grass, but the gulches on its sides are wooded. The base of the cape is bordered by a narrow, low-water beach of shingle and sand. For about 1 mile on each side of the cape are numerous rocks and ledges which do not extend over ½ mile from the beach.

False Cape Rock, 216 feet high, lies nearly ½ mile westward from the cape, with two rocky islets, 90 and 46 feet high, between. It is not as regularly shaped or as high as the Sugar Loaf off Cape Mendocino, and the top is much flatter. A **rock**, with 12 feet over it, lies a little over ½ mile westward from the rock.

Northward from Cape Fortunas the hills decrease in height, and about 4 miles beyond the cape is the beginning of a stretch of sand beach and dunes that extend to Trinidad Head, broken only by Table and Red bluffs.

The **Eel River**† enters about 9 miles northward from Cape Fortunas. This is a stream of considerable size, and is occasionally entered by light-draft vessels, but the channel over the bar is continually shifting. The depth on the bar varies largely with the amount of water in the river, depending upon the character of the winter, and has been at times as much as 14 feet, but generally it is about 8 or 9 feet.

Table Bluff, about 12 miles northward from Cape Fortunas, and 4½ miles southward of Humboldt Bay Entrance, is a prominent feature from seaward. The seaward face is about ½ mile in extent, about 165 feet high, very steep, and waterworn. The top of the bluff is wooded and is marked by Humboldt Lighthouse (see table, page 18), which is situated near the extreme western edge of the bluff.

From Table Bluff to Humboldt Bay Entrance the coast consists of a narrow sand spit for about 4 miles, behind which lies the southern part of Humboldt Bay.

Humboldt Bay and entrance are described under a separate heading on page 100.

Red Bluff lies abreast the entrance on the eastern shore of Humboldt Bay, and is a prominent feature from seaward on account of its color and elevation. While only 96 feet high, it is prominent on account of the surrounding low land, and in a low-lying haze frequently resembles an island.

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*Shown on chart **5800**, scale $\frac{1}{200,000}$, price $0.50.

†Shown on chart **5819**, scale $\frac{1}{20,000}$, price $0.25.

Northward of the entrance to Humboldt Bay the coast consists of sand dunes for 11 miles to the mouth of **Mad River**, and for the first 7 miles forms the western shore of Humboldt Bay. Above the bay the land behind the dunes is low and marshy as far as the river.

From the mouth of Mad River the sand dunes, varying in height from 20 to 60 feet, continue for 5½ miles to **Little Trinidad River**, a small shallow stream. The north point at the mouth of the stream is rocky, and from this point the coast consists of rocky cliffs extending to Trinidad Head and farther north.

Little River Rock, 120 feet high, lies about ¾ mile northwestward from the mouth of Little Trinidad River, and about ¼ mile offshore. Several rocks and foul ground lie between it and the beach, and a rock, 10 feet high, lies about 100 yards northwestward.

From Little River Rock to Trinidad Head the shore is bordered by numerous rocks and sunken ledges, extending about ¼ mile offshore.

Trinidad Head (see table, page 20) lies nearly 39 miles northward from Cape Mendocino, and about 17½ miles northward from the entrance to Humboldt Bay. It covers an area about 700 yards long and 500 yards wide, and rises to a height of 380 feet. The sides are steep and covered with chaparral. The lighthouse and buildings are situated near the southern point of the head about 180 feet above the sea. From northward or southward it is generally raised as a dark, round-topped island. Near the northern end it is joined to the mainland by a narrow neck from the southern side of which, **Little Head**, a rocky knoll, 125 feet high, projects into the bay.

Blank Rock, 100 feet high, lies a little over ¼ mile westward from the head; there is foul ground between it and the head. A smaller rock lies about 150 yards northward from Blank Rock. A rock awash and a ledge with 15 feet over it lie about 275 yards **SE.** from Blank Rock.

Off Trinidad Rock, 80 feet high, lies about ⅓ mile northwestward from Blank Rock. It is considerably larger than Blank Rock, with two rocky heads of about the same height. A sunken rock lies about 300 yards off its southwestern face, and numerous ledges extend southeastward toward the head.

Pilot Rock, 103 feet high, lies ½ mile southward from Trinidad Head. It is of small extent, conical, and whitish in color, rising abruptly from depths of 8 and 9 fathoms on all sides.

Trinidad Harbor* is the small cove lying eastward of Trinidad Head. It affords shelter in northwesterly weather, but is dangerous in westerly or southerly weather. The cove is small and further contracted by several rocks, and as a rule there is always a swell even in northerly weather. The post village of **Trinidad** is on the north shore of the cove, but at present is of little commercial importance. Communication may be had by stage or wagon and by an occasional steamer. A wharf has been built along the eastern face of the head, and vessels moor in such a position that loading and discharging may be done by derrick. The swell usually prevents vessels from lying at the dock.

The best anchorage is in 7 fathoms, muddy bottom, about halfway between Prisoners Rock and Trinidad Head, with Flat Rock bearing **NE.** ¾ **E.**, just open southward of Prisoners Rock.

Prisoners Rock, 60 feet high, is the most prominent of the rocks in the cove, and consists of two rocks so close together that they are usually taken for one. From southward they resemble an animal lying down with its head toward the west. It lies about 220 yards eastward from the eastern shore of the head. A rock, with 7½ feet over it, lies 150 yards **NNW.** from it.

Flat Rock, low and small, lies about 350 yards northeastward from Prisoners Rock; a rock, with 5 feet over it, lies 150 yards southeastward from it.

A rock, with 3¾ fathoms over it, lies nearly ¼ mile **SE.** ½ **E.** from Prisoners Rock.

In entering from southward, vessels should not pass eastward of the line with the west tangent of Prisoners Rock on with Little Head to avoid the 3¾-fathom spot southward of Prisoners Rock. Pilot Rock may be passed close-to on either hand. From northward, after passing Cone Rock, about 3½ miles northward of the lighthouse, the coast should be given a berth of not less than 1¼ miles, until the lighthouse bears **ENE.** ½ **E.**, when the course can be changed to **E.** by **N.** This passes about 250 yards southward of the 15-foot spot and rock awash southward of Blank Rock. The southern face of the head may be kept close aboard.

From Trinidad Head to Rocky Point, a distance of 5½ miles, the coast is rugged and rocky, the cliffs reaching elevations of over 100 feet. Rocks and sunken ledges extend, in some cases, over 1 mile offshore. The mountains back of Trinidad Head are good landmarks for vessels approaching from seaward.

Trinity Mountain, about 3,000 feet high, lies about 7 miles northeastward from Rocky Point, and is easily made out. **Mount Hoopah** and **Mount Kimet** are farther inland.

*Shown on chart **5846**, scale $\frac{1}{15,000}$, price $0.20.

Green Rock, 108 feet high and of small extent, lies 1½ miles northward from Trinidad Head and nearly 600 yards offshore. The top is covered with grass. Numerous rocks lie inshore, and a rock awash at high water lies 700 yards **WSW.** ¾ **W.** from it. A **rock,** with 3¾ fathoms over it, lies about ½ mile **WSW.** from Green Rock; it seldom breaks, and rises abruptly from 15 fathoms. It lies just within the arc of visibility of the light. Two **sunken rocks** lie ⅜ and ⅛ mile **NW.** ½ **W.** from Green Rock. They are inshore of the arc of visibility of the light.

White Rock, 130 feet high, lies 1⅞ miles northward from Trinidad Head. It is of small area and lies 250 yards off a small, wooded, projecting head of about the same height. Another small, rocky islet, 150 feet high, lies about 1 mile northward from White Rock.

Cone Rock, 40 feet high, lies 3¾ miles northward from Trinidad Head and a little over 1 mile offshore. It is conical in shape and of small extent. A small rock, 40 feet high, lies ½ mile eastward.

Turtle Rocks, two small rocks 20 and 50 feet high, lie about 1½ miles northward from Cone Rock. They are of small extent and lie about 1 mile off Rocky Point. Eastward of Turtle Rocks the ground is foul, with two breakers lying 600 and 800 yards from the outer rock, and numerous visible rocks thence to the beach.

Rocky Point, 5½ miles northward from Trinidad Head, is a bold, rocky point with cliffs about 200 feet high, bordered by numerous rocks and ledges extending 200 to 300 yards offshore. It is covered with oak and scrub pine for ½ mile back to the redwood forest; through this oak growth project two rocky pinnacles about 250 feet high.

Northward from Rocky Point the cliffs are succeeded by a low, sandy beach for about 4 miles to the entrance of **Big Lagoon,** which lies immediately behind the sand beach. Above the entrance to Big Lagoon the cliffs recommence and extend about 2 miles to **Stone Lagoon.**

Sharp Point, at the northern end of the sand beach in front of Stone Lagoon, lies 7¾ miles northward from Rocky Point. It is a high, projecting point, with a precipitous face southward, and sharp slope northward, where a low sand spit extends for ½ mile to a second rocky head and thence for another ½ mile to the Gold Bluffs. A fresh-water lagoon lies behind each sand beach. Numerous rocks border the beach extending about ¾ mile offshore.

The southern point of **Gold Bluffs** lies about 9 miles northward from Rocky Point. They extend northward for about 9 miles, ranging from 100 to 500 feet high, the first 3 miles being moderately low and bordered by several outlying rocks. About 4 miles from the southern end the cliffs are broken by two moderately broad valleys. These bluffs are composed of gravel and sand and are not rocky.

Mussel Point is a small, projecting head 11¼ miles northward from Rocky Point.

Redding Rock, 94 feet high and of small extent, lies nearly abreast of Mussel Point about 4½ miles offshore. It is dark for about one-third the height and white above with a cleft on the southern face. It rises abruptly from depths of 20 fathoms, and can be approached close-to with safety.

Northward of Gold Bluffs the coast becomes rocky, irregular, and broken, the bold cliffs being bordered by many rocks.

Split Rock is a slightly projecting head 3½ miles northward from the north end of Gold Bluffs; it is so named on account of the cut in the north face.

High Bluff is a slightly projecting head about ¾ mile northward from Split Rock. It is prominent on account of an enormous split or chasm on its northern face; at the southern edge of the cut the bluff is 340 feet high.

White Rock, 107 feet high, lies 600 yards northward from High Bluff and about 300 yards offshore; numerous rocks sunken and visible lie between it and the beach. Its southern face is very precipitous and its west face is steep, sloping northward.

Flint Rock Head, 135 feet high, is a detached, rocky head connected with the cliffs by a low sand spit. It lies abreast the southern end of the Klamath River sand beach, about 1¾ miles northward from Split Rock. Its southwest face is precipitous. A rock awash lies ¾ mile **NW.** by **W.** ⅝ **W.** from Flint Rock Head and about ½ mile offshore.

The **Klamath River** enters about 16 miles southward of Point St. George and about 30 miles northward of Trinidad Head. It is a large river with an extensive mountainous watershed. The entrance is narrow with a short bar outside on which there is usually a heavy surf. The channel across the bar changes frequently, as do the depths. Occasionally a small light-draft vessel enters for a cargo of salmon, but not regularly.

Mount Toorup, over 4,000 feet high, about 8 miles eastward of the mouth of Klamath River, is a prominent landfall in this vicinity, and in clear weather is visible about 60 miles seaward.

From the mouth of the Klamath River the coast curves northwestward for 3 miles to the mouth of the False Klamath River (Wilson Creek). The cliffs are high, irregular, and jagged, and the hills above are covered with grass and chaparral; numerous rocks extend about 300 yards offshore.

A **sunken rock,** ⅝ mile offshore, lies 1⅜ miles **W.** ¾ **N.** from the mouth of the Klamath River.

A **rock,** 17 feet high, lies a little over 2½ miles **NW.** by **W.** ½ **W.** from the mouth of the Klamath River and about 1½ miles southward of the False Klamath River.

False Klamath Rock, 195 feet high and round-topped, is the most prominent rock on this part of the coast. It lies about 650 yards westward of the south point of the small cove into which the False Klamath or Wilson Creek empties.

Wilson Rock, with but 2½ feet over it, lies ½ mile **WSW.** ¼ **W.** from False Klamath Rock.

A **rock awash** lies ⅝ mile about **SW.** by **W.** from False Klamath Rock. Numerous sunken rocks lie eastward and northeastward of the line from this rock to the rock 17 feet high southward of False Klamath Rock.

From False Klamath Rock the coast for 7 miles northward consists of bold, rocky cliffs, much broken and bordered by numerous sunken and visible rocks. Beyond these, extending about 4 miles to Crescent City, is a broad sand beach backed by flat land under cultivation.

Midway Point lies 4 miles northward from False Klamath Rock. It is bold, rising to an elevation of 820 feet 800 yards from the beach.

Sister Rocks, a cluster of prominent rocks ½ mile westward from Midway Point, consist of three large and several smaller rocks covering a limited area; the outer one is 92 feet and the inner one 89 feet high.

Crescent City* is on a small, rocky, contracted anchorage about 3 miles southeastward from Point St. George. It affords fair shelter in northwesterly weather, but is dangerous in westerly or southerly weather. The approaches are bad, and the greatest caution must be observed in making the anchorage. A wharf, with about 13 feet at its end, is built out from the western shore, and heavy mooring buoys have been placed for riding to and for warping into position. The old wharf, which was built out to Flat Rock, is partially carried away and no longer in use. Communication may be had by coasting steamers at irregular intervals, and by wagon road with the interior. Lumber and some farm produce are exported; general merchandise is imported.

A small, rocky islet, about 45 feet high, lies about 200 yards southward of the western point of the bay. Crescent City Lighthouse (see table, page 20) is situated on the seaward extremity of this island.

The dangers in the cove and approaches are too numerous for detailed description. From Crescent City Lighthouse numerous rocks, above and under water, extend southward ½ mile, and also **ESE.** ½ **E.** for nearly ¾ mile to a bell buoy which marks the western side of the entrance. **Round Rock,** lying ⅞ mile **SE.** ¾ **E.** from Crescent City Lighthouse, is 45 feet high and has deep water close-to. Eastward of Round Rock are numerous sunken rocks which extend northward to **Whaler Island** (77 feet high, largest in cove); the channel between the westernmost of these rocks and the bell buoy is about 100 yards wide.

In approaching from southward, keep Crescent City Lighthouse bearing northward of **NW.** by **N.** until up with the whistling buoy, lying 1⅝ miles **S.** by **E.** ½ **E.** from the lighthouse, to clear a 3¼-fathom ledge lying ⅞ mile **SSE.** ⅛ **E.** from Round Rock. In thick weather the depth should not be shoaled to less than 18 fathoms until the whistling buoy is made. From the whistling buoy steer **N.** by **E.** ¼ **E.** so as to pass about 100 yards westward of Round Rock, and from the rock steer **N.** ½ **E.** and pass close eastward of the bell buoy. After passing the bell buoy haul gradually westward for the wharf and anchor in about 3½ fathoms.

In approaching from westward, when Round Rock is made it may be steered for on any bearing northward of **ENE.,** passing ¾ mile or more southward of Crescent City Lighthouse. When up with Round Rock proceed as directed in the preceding paragraph.

From Crescent City Lighthouse to Point St. George, 3⅜ miles, the coast is moderately low, but rocky, with numerous rocks above and under water, extending about ¾ mile offshore. **Castle Rock,** the largest, is 208 feet high, and lies 2¼ miles **W.** by **N.** from Crescent City Lighthouse and ⅝ mile southward of the southern point of Point St. George. By passing ¾ mile or more southward of Crescent City Lighthouse and over ¼ mile southward of the outer visible rocks, all dangers will be avoided between the lighthouse and Castle Rock.

Point St. George is low, with several irregular and rocky hillocks near the beach; the seaward face is about 1 mile long, northwest and southeast, with sand dunes and low land immediately behind it. The tree line is about ⅝ mile inland, with a few trees near the southern end of the point. Numerous small but high rocks fringe the point between Castle Rock and Brown Rock, one of which (White Rock) shows an arch from westward. **Brown Rock** is 51 feet high and lies at the end of the reef of visible rocks which extends ½ mile **WNW.** ½ **W.** from the northwest end of Point St. George; the reef extends about 250 yards southwestward from Brown Rock.

St. George Channel, with a width of over 1 mile, is a clear channel between the visible rocks fringing Point St. George and the easternmost rocks of St. George Reef. It is frequently used by coasting steamers in clear weather. For sailing directions through the channel from southward see section 3, page 82.

*Shown on chart **5895,** scale $\frac{1}{40,000}$, price $0.20.

St. George Reef is a group of rocks and sunken ledges, extending 6½ miles northwestward and westward from Point St. George. There are nine visible rocks, the outer one, **Northwest Seal,** being marked by St. George Reef Lighthouse (see table, page 20). **Star** (Four Mile) **Rock,** the southeastern one, is 64 feet high and lies 2 miles **W.** by **S.** from the southern end of Point St. George. Between Star and Northwest Seal rocks are three rocks, **Hump, Whale,** and **Southwest Seal,** almost in range, varying in height from 15 to 45 feet. Southward of this line of visible rocks are two sunken ledges, **Mansfield Break** and **Jonathan Rock.** The latter lies 2½ miles **W.** from Star Rock and 3⅛ miles **SE.** ¼ **S.** from Northwest Seal Rock. It breaks only in a heavy swell, and then not continuously, and has deep water surrounding it. Mansfield Break lies 2¼ miles **SE.** ¾ **S.** from Northwest Seal Rock and nearly 3½ miles **W.** ¾ **N.** from Star Rock. It is about 100 yards in extent, with 20 fathoms close-to and around it. **The Great Break** lies ½ mile **SE.** ½ **E.** from Southwest Seal Rock and is about 150 yards in extent. A sunken ledge showing a heavy breaker at low tide lies about 125 yards southwest of Southwest Seal Rock. **Dragon Channel,** which leads northward of Jonathan Rock and between Mansfield Break and The Great Break, is not recommended. **East** and **Long rocks** lie 2⅛ and 1⅝ miles, respectively, **NNW.** ¾ **W.** from Star Rock. On this line and 1 mile northward from Star Rock is a rock visible at lowest tides; southeastward from this rock nearly ⅜ mile is a rocky patch with but 4¾ fathoms in which a rock, with but 5 feet over it, has been reported. **Flat Rock** lies nearly midway between Long and Whale rocks and about ½ mile from the former. **Mussel Rock** lies nearly ½ mile **W.** ½ **S.** from Long Rock; a **sunken ledge** showing a breaker lies 200 yards **N.** by **W.** from the rock. All the rocks of St. George Reef rise abruptly, and when in its vicinity the lead gives no warning of their presence. In thick weather the greatest caution should be observed and the reef given a good berth.

HUMBOLDT BAY.*

Humboldt Bay is the first important harbor north of San Francisco, the entrance being about 21½ miles northward from Cape Mendocino Lighthouse. A large amount of redwood lumber is exported to foreign and domestic ports, and there is also a considerable amount of farm and dairy produce, most of which is shipped to San Francisco. General merchandise, railroad iron, and cement are imported.

Since the improvements by the Government this harbor can be used as a harbor of refuge in impending bad weather provided it can be made before the bar becomes impassable.

The bay consists of two shallow basins connected by a narrow channel about 5 miles long, the entrance to the bay being at the junction of this channel with the southern basin.

The northern basin is about 3 miles in diameter, with low, marshy shores cut by numerous sloughs. There are two channels, the Mad River Channel, leading into Mad River Slough, and the Arcata Channel, leading to the railroad wharf at Arcata. The former has a least depth of 8 feet and is marked by several beacons; the latter has a depth of over 15 feet until within ½ mile of the railroad wharf, where it shoals to a least depth of 8 feet. This channel is also marked by beacons. **Indian Island** and **Daby Island,** both low and marshy, lie in the entrance to the northern basin.

The southern basin is about 3 miles long and about 2 miles wide. There are two channels, one leading to Southport and the other past Fields Landing to Hookton, at the head of Hookton Slough. The Southport Channel has a least depth of 9 feet, but is little used. The Hookton Channel has a depth of 12½ feet near the mouth, increasing inside; this channel is marked by several beacons and buoys.

Eureka, the principal town on the bay, is situated on the eastern shore, about 4 miles northward of the entrance to the bay. The depth at the wharves is about 13 feet.

Arcata is situated on the north shore of the northern basin. A railroad wharf extends about 1 mile to the head of Arcata Channel.

Samoa, on the western shore opposite Eureka, is the terminus of a railroad running from the lumber mills to Arcata.

Bucksport is a small village on the eastern shore, about 1 mile above the entrance; it is of little importance.

Fields Landing is on the eastern shore of the southern basin, about 2 miles south of the entrance; it is reached by Hookton Channel. The depths at the wharves vary from 12 to 15 feet.

Southport and **Hookton** are small settlements on the south shore of the southern basin; they are of little commercial importance. Southport is reached by Southport Channel; the wharf is practically gone, and is used only by small scows and lighters. Hookton is reached by Hookton Slough, the continuation of Hookton Channel; it is available for light-draft vessels and lighters.

The harbor has been improved by the construction of two jetties, about 1 mile in length, at the entrance, and by dredging along the water front of Eureka, where there is at present (1903) a basin about 9,000 feet

*Shown on chart 5832, scale $\frac{1}{30,000}$, price $0.50.

long and 200 feet wide, with a depth of about 14 feet. The outer ends of the jetties, which are submerged, are marked by buoys.

The **bar** has a depth of 31 feet (1903), but this varies slightly with the season of the year, being somewhat shoaler in winter. The deepest draft taken over the bar is about 25 feet. The channel leading over the bar is marked by lighted range beacons, but owing to changes in the bar the range can not be relied on to lead in the best water.

The **channel** after crossing the bar is contracted between the jetties to a width of about 200 yards by a shoal making out from the north jetty abreast the outer range beacon; this shoal is marked by a buoy. From abreast the outer range light the channel curves northward and passes close under the eastern point of the north spit and then continues northward for about 3¼ miles to the entrance to the north basin. Here it divides into three branches, the eastern one passing along the water front of Eureka, the middle one between Indian and Daby islands, and the western and largest one between the north spit and Indian Island. The western channel divides into Mad River and Arcata channels immediately northward of Indian Island; the eastern channel runs into Eureka Slough.

Prominent features.—Humboldt Lighthouse (see table, page 18) is on Table Bluff, about 4 miles southward of the entrance. The old light-tower on the southern end of the north spit is a good daymark. **Red Bluff**, on the eastern shore of the bay abreast the entrance, is a small hill about 100 feet high and noticeable on account of the lower land surrounding it. The smoke from the sawmills can generally be seen.

Anchorage.—The best anchorage is from a point about ¼ mile northward of red nun buoy No. 8, abreast the Bucksport wharf, to the post light marking the entrance to the channel leading to the water front at Eureka. Vessels in anchoring must keep clear of the cable crossing the channel from a little below the red post light on Flanagans wharf to the western shore. If obliged to anchor outside the bar, the best anchorage will be found a little southward and westward of the whistling buoy in about 15 fathoms, sand and clay bottom; anchors as a rule are hard to break out.

Pilots.—Pilots may be obtained by making signal. Vessels are reported from the signal tower of the life-saving station or from the old light-tower; vessels from northward sighting Trinidad Head will also be reported.

Pilotage is compulsory for foreign vessels; the rates, including towage, are $0.50 per 1,000 feet of lumber in and out; vessels otherwise laden, $0.25 per ton outward and half rate inward; steamers in and out, about $50. Extracts from the laws of California relating to pilots and pilotage will be found in Appendix II.

Towboats owned by the lumber mills are available at all times. The rates for towage are included, as a rule, in the pilot fees.

Quarantine regulations are prescribed when necessary by the local board of health. The quarantine anchorage is in the main channel westward of the southern point of Indian Island.

Marine Hospital.—There is a relief station, Class III, United States Public Health and Marine-Hospital Service, at Eureka (see Appendix IV).

Harbor regulations are issued by the Board of Pilot Commissioners for the Port of Eureka. These are enforced by the harbor master. The rates of dockage and wharfage are also established by them (see Appendix II).

Supplies.—A limited amount of coal is always on hand, but any amount can be had at short notice from San Francisco. Water can be obtained at the wharves. Provisions and ship-chandler's stores as desired.

Repairs to wooden vessels and ordinary repairs to machinery and boilers of steamers can be made. There are no facilities for docking, the small marine railway being out of repair.

Communication may be had by several lines of coasting steamers, by stage, and rail. There are also telegraph and telephone facilities.

Currents.—The tidal currents follow the general direction of the channels. In the main channel the maximum velocity does not exceed 3 miles; between the jetties the maximum velocity is between 4 and 5 miles.

Tides.—The mean rise and fall at Eureka is 4.6 feet; at the bar, 4.3 feet. At Eureka high water occurs 41m. and low water 55m. before high and low water, respectively, at Astoria, Oreg. On the bar high water occurs 1h. 5m. and low water 1h. 21m. before high and low water, respectively, at Astoria. (See also page 14.)

For **variation of the compass** see table, page 13.

Consult also pages 18 to 20.

GENERAL DIRECTIONS, APPROACHING HUMBOLDT BAY ENTRANCE.

From southward, follow the directions in section 3, page 82, until up with the whistling buoy off the entrance to Humboldt Bay, and then signal for a pilot. At night Humboldt

Lighthouse should be made shortly after passing Blunts Reef whistling buoy, and when nearing the entrance the range lights for the bar channel and the lights in Eureka will be seen. In thick weather, after passing False Cape Rock, all dangers will be cleared by keeping in a depth of over 15 fathoms until up with the whistling buoy where anchorage should be made until a pilot is obtained.

From northward, the directions reversed of section 3, page 82, will lead near the whistling buoy off the entrance to Humboldt Bay. Or, from a position 1 mile westward of Turtle Rocks (see page 82) make good a **S.** by **E.** course for 21½ miles, which should lead to the whistling buoy. This course leads 3 miles westward of Trinidad Head Lighthouse, and Humboldt Lighthouse (see table, page 18), 5 miles southward of the whistling buoy, should be made a very little on the port bow. In thick weather the depths should not be shoaled to less than 20 fathoms between Turtle Rocks and Trinidad Head, and when southward of the head the depths should not be shoaled to less than 15 fathoms until up with the whistling buoy, where anchorage should be made until a pilot is obtained.

From seaward, vessels can stand in boldly until sure of their position when the course should be shaped for the entrance. In clear weather, the high land of Cape Mendocino and Point Gorda southward and Trinidad Head northward of the entrance are good landmarks. At night the lights are a good guide. In thick weather soundings should be taken frequently, and upon getting depths of 30 fathoms or less great caution must be exercised until sure of the vessel's position.

Sailing vessels during the prevailing northwesterly winds of summer should endeavor to make the land in the vicinity of Trinidad Head, which gives them a fair slant for the entrance, and is an additional precaution against the irregular southerly set of the current. In thick weather soundings should be taken constantly when inside of 50 fathoms. Making the land northward of the entrance avoids the irregular bottom and dangerous currents in the vicinity of Cape Mendocino. The description of the features of the coast are given under the heading "Coast from Cape Mendocino to Point St. George," pages 96 to 100.

COAST FROM POINT ST. GEORGE TO CAPE BLANCO.*

From Point St. George to Cape Blanco, a distance of about 60 miles, the coast trends in a general northwesterly direction, with a shallow bight, Pelican Bay, immediately northward of Point St. George. The beach is fringed by numerous rocks and sunken ledges, but, with the exception of Rogue River and Orford reefs, these in general do not extend over 1 mile from shore. The 30-fathom curve follows the general trend of the coast, and in thick weather may be considered as the limit within which it is unsafe to approach the coast, but in the vicinity of Rogue River and Orford reefs the depths should not be shoaled to less than 50 fathoms.

For about 10 miles northward of Point St. George sand dunes, with a broad sand beach, extend to the mouth of Smith River. Lake Talawa and Lake Earl, surrounded by low, marshy land, lie behind this stretch of dunes.

A small rock, about 20 feet high, lies about 2 miles south of the mouth of Smith River and about ⅓ mile offshore.

A cluster of three low rocks lies nearly 1 mile offshore and about 1⅙ miles **S. ¼ W.** from Prince Island.

Pyramid Point, a rocky knoll about 250 feet high, marks the north point of Smith River.

Prince Island, of small extent and about 185 feet high, lies about ⅙ mile offshore abreast Pyramid Point. **Hunter Rock**, double-headed and somewhat smaller, but of about the same elevation, lies ¼ mile north of Prince Island; several other smaller rocks are in the vicinity.

Between Smith River and Chetko River, a distance of about 6 miles, the coast is composed of low, rocky cliffs, bordered by numerous rocks and ledges, sunken and awash, and is backed by a low, narrow table-land. Several prominent, rocky knolls rise from 100 to 200 feet above this table-land. The **Winchuk River**, a small stream with about ½ mile of low sand dunes on the south side of its mouth, enters about 3 miles northward from Prince Island.

Cone Rock is the most prominent of the dangers in this vicinity. It is 70 feet high and of small extent. The remaining dangers are too numerous for description, and this stretch of the coast should not be approached closer than 1½ miles.

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*Shown on chart **5900**, scale $\frac{1}{200,000}$, price $0.50.

Chetko Cove,* at the mouth of the Chetko River, is about 16 miles northward of Point St. George. It affords an indifferent anchorage with some protection from northwest winds, but is exposed in southerly weather. There are numerous visible and sunken rocks fringing the shore of the cove and its approaches, necessitating caution in its use. At the middle of the cove is a sand and gravel beach about ⅔ mile in length at the mouth of the river. **Millers House,** prominent and white, is situated on the western point at the entrance to the river. From southward the valley of the river is well marked even in hazy weather.

In approaching from southward give the coast a berth of over 1½ miles until Millers House bears **N. ¾ W.,** and then stand in on this course with the house in range with **Bar Rock,** which is the easternmost visible rock in the cove and lies ¼ mile southward of Millers House. Anchor on the range about ¼ mile southward of Bar Rock, with the southernmost bare rock off Chetko Point (about ¾ mile westward) bearing **W. by S.,** in about 7 fathoms. There are several sunken rocks southward and southeastward of Bar Rock, and vessels should not stand eastward of the range nor approach Bar Rock closer than ¼ mile. In approaching from northwestward give the coast a berth of over 1 mile until Millers House is made, and then stand eastward into the cove, giving the outer bare rocks a berth of over ½ mile until on the range of Millers House and Bar Rock, bearing **N. ¾ W** Anchor as directed above.

From Chetko Point to Cape Ferrelo, 4½ miles, the coast is composed of high, broken cliffs bordered by numerous rocky islets and ledges extending in some cases over ½ mile offshore.

Goat Island, 200 feet high, lies 2 miles northward from Chetko Point and about 500 yards offshore. There is deep water off its western and southwestern face, but rocks and foul ground extend about 200 yards southward from the southeastern point.

Cape Ferrelo is the first prominent headland north of St. George Reef, and, while not projecting seaward to any considerable extent, is noticeable on account of its bold, rugged face. Several rocks and islets lie directly off the cape to a distance of about ½ mile.

From Cape Ferrelo to Crooks Point the coast is very rugged and rocky, with several large and prominent, rocky islets and reefs extending well offshore, forming, in some cases, anchorage for small vessels in northerly weather.

Whales Head is the outer of two rocky islets about 120 feet high, 2¼ miles northward from Cape Ferrelo. A rock awash lies 800 yards **S.** from the highest point of Whales Head.

A rugged cliff from 200 to 300 feet high lies 3¼ miles northward from Cape Ferrelo. The face is about 1 mile in length and behind it rises a treeless, triple-headed hill to heights of 700 to 800 feet.

Leaning Rock, 80 feet high, lies close inshore, 3½ miles northward from Whales Head; it has a perpendicular face on its northwest side and slopes gradually southeastward. Several other rocks are in its vicinity.

Between Whales Head and Crooks Point are two prominent, apparently grassy, areas in the forest near the crest of the hills, about 2 miles apart and situated at an elevation of nearly 2,000 feet; the southern one is known as **Rocky Prairie.** These are noticeable when off this section of the coast.

Yellow Rock, 84 feet high, lies about 4½ miles northward from Whales Head, and about ½ mile offshore.

Mack Arch is a double-headed, rocky islet ¾ mile offshore, about 1½ miles southward from Crooks Point and about 8 miles northward from Cape Ferrelo. The western head is 228 feet high and the eastern a little lower; both are black to the summits. The arch, about 40 feet high, is under the eastern summit and shows prominently from southward. A **rock awash** lies 125 yards south from the eastern point.

Mack Arch Reef extends from Mack Arch to Crooks Point, and is a collection of some thirty rocks, visible and sunken, varying in height from awash to 110 feet. From southward these rocks stand out conspicuously when seen against the white sand dunes northward of Crooks Point, Mack Arch, on account of its size and height, being the most prominent.

Mack Arch Cove † lies immediately eastward of the reef, and affords fair shelter in northwesterly weather in 6 to 7 fathoms, sandy bottom. *In entering* from southward, pass eastward of Mack Arch, giving it a berth of about 150 yards, but taking care to avoid the rock about 125 yards south of its eastern point. Then bring the 111-foot rock, the highest of the northern part of the reef, to bear **NNW. ½ W.** and steer for it on that bearing until up to the anchorage abreast the group of rocks about ½ mile northward of Mack Arch. Vessels in entering may also pass westward of Mack Arch, between it and the next rock northward, which may be found more desirable for sailing craft. Steamers may find smoother water by continuing the **NNW. ½ W.** course through the kelp and anchoring in 4 fathoms with the 111-foot rock bearing **NW. ¼ W.,** distant about 300 yards. This latter anchorage is contracted and should not be attempted by sailing vessels owing to lack of room in getting under way.

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*Shown on chart **5909,** scale $\frac{1}{10,000}$, price $0.20.

†Shown on chart **5923,** scale $\frac{1}{10,000}$, price $0.25.

Crooks Point is moderately low, but terminates seaward in a rocky knoll about 120 feet high, with a slight depression immediately behind it.

Northward of Crooks Point for 2½ miles to the mouth of the Pistol River is a low, sandy beach backed by high sand dunes; these are visible for a considerable distance, and with northwesterly winds the flying sand resembles smoke. From the mouth of the river to Cape Sebastian are numerous rocks and rocky islets extending ⅓ mile offshore, reaching in some cases a height of 170 feet.

Cape Sebastian is prominent from either northward or southward. It is the seaward termination of a ridge transverse to the coast, and rises abruptly from seaward to a height of about 600 feet, with a depression behind it, and then more gradually to a height of about 2,000 feet. The seaward face is precipitous and broken and has few trees; southward the lower part is grass-covered. A sunken rock, showing a breaker, lies ½ mile offshore, about 1 mile **NW.** ½ **N.** from the western extremity of the cape.

Hunter Cove * is a small, contracted anchorage under the southeastern face of Cape Sebastian. It is formed partly by the cape and partly by Hunter Island in the entrance. The island is about ¼ mile in extent, rocky, flat-topped, and about 120 feet high; shoal water extends from it eastward to the beach. The anchorage is only suitable for small vessels in northerly weather and is not recommended.

From Cape Sebastian to the mouth of the Rogue River, a distance of 6 miles, the coast is considerably broken and quite rugged, but rather low in the vicinity of the beach, which has but few outlying rocks.

Hunter Creek enters about 4 miles northward from Cape Sebastian; it is small and unimportant. Off the mouth are three visible rocks, the outer (middle) one lying nearly ½ mile offshore.

Rogue River † is the first important stream north of San Francisco. Some lumber and the output from several canneries are exported and some general merchandise imported. **Ellensburg** (Goldbeach P. O.) is on the south bank of the river near the mouth. The depth on the bar at the entrance is 4 to 5 feet, and is crossed only at high tide during the summer months by light-draft vessels with local knowledge. Owing to the shifting character of the bar no directions that would be of value to a stranger can be given.

The north head of Rogue River reaches an elevation of 700 feet about 2 miles northward of its mouth, and the marked depression in the coast range made by the valley of the stream is visible from a considerable distance seaward.

Rogue River Reef extends in a general **WNW.** direction from the mouth of the Rogue River for about 4 miles, with a channel about ½ mile wide separating it from the beach. This channel has been used occasionally, but it is not safe for a stranger. **Northwest Rocks**, about 4 miles **WNW.** ½ **W.** from the entrance to Rogue River, are the outermost rocks of the reef and are about 10 feet in height. **Needle Rock**, 120 feet high, is the most prominent and lies in about the middle of the group, about 3 miles **W.** by **N.** from the north point of the river. The needle is on the southern side of the rock. **Pyramid** and **Double rocks** are the most prominent of the remaining visible rocks, and are 50 and 65 feet high, respectively. A **rock** with 16 feet over it, lies 2 miles **S.** by **E.** ¼ **E.** from Needle Rock and 2¾ miles **SW.** by **W.** ½ **W.** from the mouth of the river, and shows a breaker with an ordinary swell. A **rocky patch** with 4¾ fathoms over it lies ¾ mile **E.** from the buoy; this generally shows a breaker.

Northward of the Rogue River the coast trends nearly north for about 10 miles and then sweeps northwestward until reaching Cape Blanco. The mountains are high, irregular, dark, and covered with chaparral. For about 5 miles northward from the mouth of the river the beach is bordered by numerous rocks, but beyond that is comparatively clear with the exception of Orford and Blanco reefs.

A group of sunken and visible rocks, about 1 mile long and ½ mile wide, lies 5 miles north of the Rogue River and about 2 miles offshore; these rise abruptly from 12 fathoms. **North Rock**, about 10 feet high, is the largest and is nearest the beach.

Sisters Rocks are a group of three rocky islets 10½ miles northward from the mouth of the Rogue River. The northern and largest one is about 350 yards in extent and about 400 feet high, lying close to a projecting rocky point about 265 feet high. The second one lies about 250 yards south of the first and is about 150 yards in diameter and 200 feet high. The southern and outermost is about 150 yards long and only about 5 feet above water, and lies a little over ⅜ mile **S.** from the middle rock and nearly ¾ mile offshore. There is fairly smooth water in northwest weather under the lee of the largest island, and a landing has been built that is used by small schooners. This is known as **Frankfort** and ships a small amount of tan bark to San Francisco. The warehouses and buildings on the cliff behind the largest island can be seen for some distance in clear weather.

Lookout Rock, about 2¼ miles northward of the Sisters, is a prominent, projecting cliff, about 550 feet high, with a marked depression behind it. The seaward face is precipitous.

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*Shown on chart **5923**, scale $\frac{1}{10,000}$, price $0.25.

†Shown on chart **5951**, scale $\frac{1}{40,000}$, price $0.25.

Humbug Mountain, 1,740 feet high, lies about 5 miles northward from the Sisters and about 4 miles southward from Port Orford. It is conical in shape and its seaward face is steep and rugged. It is a prominent feature from seaward.

Bald Mountain (Pilot Knob), nearly 2,900 feet high, lies in the interior about 4 miles eastward from Humbug Mountain. From northward this appears as a double peak, but from southward shows three peaks of nearly equal height, the eastern one being bare and the other two wooded.

Island Rock, 219 feet high, lies 1¼ miles off the seaward face of Humbug Mountain. It is about 350 yards in extent. About 200 yards off its northwest end is a needle rock 115 feet high. These islands are prominent when approaching Port Orford from southward. There is deep water around them and between them and the beach.

Redfish Rocks are a group of islets covering an area of about ½ mile square lying 2 miles northward of Island Rock and about ½ mile offshore. They are five in number and range from 60 to 140 feet in height. A sunken rock lies in the center of the cluster.

Port Orford * lies about 7 miles southward of Cape Blanco and about 20 miles northward of Rogue River. It affords good shelter in northwesterly weather, but is exposed and dangerous in southerly weather. It is easy of access, and is probably the best northwest lee north of Point Reyes. **Port Orford Head**, 350 feet high, the western point of the cove, is rugged and precipitous. It is easily made out from either northward or southward. **Tichenor Rock**, 90 feet high, lies about 175 yards off the head. **Battle Rock**, high, narrow, and black, lies in the northern part of the cove close to shore. Rocks and foul ground extend about ⅝ mile southeastward. Port Orford is at present of little commercial importance. Some lumber is exported, and a small amount of general merchandise is imported. The wharf, which is situated about the middle of the cove, has 18 feet at its end. Water is piped on the wharf. A small amount of provisions may also be obtained. The best anchorage is in 6 fathoms, hard, sandy bottom, with Battle Rock bearing **N.**, distant about ⅓ mile, and the south point of Tichenor Rock bearing **SW.**, distant ¾ mile. There is usually some swell making around the point.

Klooqueh Rock, about 50 feet high, black and conical, lies about ⅓ mile off the northwest face of Port Orford Head. It is prominent, especially when coming from northward inside the Orford Reef.

From Port Orford Head to Cape Blanco, about 6 miles, the coast extends in a general northwest direction. For about ½ mile north of the head it is a narrow sand ridge, rising at one point to 160 feet, covered with grass, fern, and brush. Northward of this are sand dunes to the mouth of the Elk River, a small, unimportant stream. Beyond the mouth of Elk River to Cape Blanco the coast consists of vertical cliffs, wooded to the edges and in some places over 150 feet high.

Orford Reef is composed of a group of irregular rocks and sunken ledges, about 2½ miles long by 1½ miles wide, extending in a north and south direction. The northernmost limit of the reef is about 2½ miles **S.** from Cape Blanco Lighthouse, and the southernmost limit lies about 5 miles **W.** from the western head of Port Orford. A channel about 2 miles wide leads eastward of the reef following the general trend of the coast, but at its northern end where it turns westward is contracted to about 1 mile by the reef extending southward and westward from Cape Blanco. This channel is much used in clear weather, but should not be attempted when thick. There is considerable kelp eastward of and inside the reef.

Fox and **Southeast Black rocks**, a little over 1¼ miles apart, are the two southernmost rocks of Orford Reef. The former is about 10 feet high, low and black, and lies nearly 6 miles **W.** from Port Orford Head; the latter is 12 feet high and lies **ENE.** ½ **E.** from Fox Rock, with a heavy break about ¼ mile **WNW.** from it.

Steamboat, West Conical, and Arch (Fin) rocks are the prominent ones in the southern part of Orford Reef, and extend in a general northeast direction about ¼ mile apart.

Steamboat Rock is so named on account of its appearance from about northward or southward.

West Conical Rock, 112 feet high, is so named on account of its shape, the highest point being on the northwest side.

Arch or **Fin Rock** is 149 feet high with steep sides and a large, square arch visible from southward or southwestward. It is the inshore rock of the three.

Conical White Rock, 81 feet high, is nearly in the middle of Orford Reef, and a little over ¼ mile northward from Arch Rock.

Table Rock, 147 feet high, is the largest of the northern group of rocks. **Foul ground** extends from it southward and eastward for nearly ⅜ mile, and for ¾ mile northward in the direction of Cape Blanco. The northernmost part of this danger lies 1 mile **ENE.** ⅜ **E.** from Northwest Rock with the eastern edge of Seal Rock in range with Arch Rock; Klooqueh Rock is also in range with Tichenor Rock off Port Orford Head.

* Shown on chart **5952**, scale $\frac{1}{40,000}$, price $0.20.

Seal Rock, 53 feet high, is large and lies ¼ mile about **SE.** by **S.** from Table Rock. **Long Brown Rock,** 70 feet high, lies nearly ½ mile westward of Table Rock. **Large Brown Rock** lies midway between and a little northward of them. **Square White Rock,** 72 feet high, lies about ½ mile westward from Seal Rock, with Round Rock midway between and a little northward of them. Between these rocks are numerous smaller ones, some sunken and some visible.

Blanco Reef extends about 1½ miles **SW.** by **S.** from Cape Blanco, and consists of numerous rocks and sunken ledges, some of which are marked by kelp. **Pyramid Rock,** about 80 feet high, lies nearly 1 mile **SW.** by **W.** ½ **W.** from the lighthouse. There are no visible rocks outside of it, but several between it and the cape. A narrow, black rock, about 125 yards long, lies ⅝ mile **SSE.** from Pyramid Rock. A **rock** with 13 feet over it lies a little over ¼ mile **SW.** by **W.** from the long, black rock, and 1½ miles **SW.** by **S.** from the lighthouse. This is, as far as known, the outermost rock of the reef. A **rock,** with 18 feet over it, lies ⅞ mile **S.** ¼ **E.** from the lighthouse; it is well marked by kelp.

Cape Blanco projects about 1½ miles from the general trend of the coast. It is a small, bare table-land, terminating seaward in a cliff 200 feet high, with low land behind it. A large, high rock lies close under the south side of the cape. From seaward the cape is not prominent, but from northward or southward appears like a moderately low, bluff islet. The lighthouse and buildings (see table, page 20) are situated about in the center of the flat part of the cape.

COAST FROM CAPE BLANCO TO COLUMBIA RIVER ENTRANCE.*

From Cape Blanco to the Columbia River, 208 miles, the coast is remarkably straight, trending in a general **N.** by **W.** direction. It differs considerably from that southward. The coast mountains are much lower, the difference being more marked by the high mountains inland. The shore consists of high, yellow sand dunes and cliffs, broken by bold, rocky headlands of moderate height and backed by low, pine-covered hills. There are few outlying dangers or islands, the farthest offshore being at Coquille River, Cape Arago, and Tillamook Rock.

Cape Blanco and **Blanco Reef** are described above.

Gull Rock, 118 feet high, lies 1 mile **N.** from Cape Blanco Lighthouse, with sunken rocks surrounding it and between it and the beach. Its seaward face is black and rugged, and the summit of the rock is marked by two knobs, the higher at its southern part.

Castle Rock, 188 feet high, lies 1½ miles **N.** by **E.** from Cape Blanco Lighthouse, about 300 yards offshore and abreast the mouth of Sikhs River. It rises abruptly from the sea and is readily made out from seaward at a distance of 10 miles. Several low rocks and sunken ledges surround it, the farthest outlying rock being about 350 yards southwestward.

Blacklock Point is a precipitous, rocky point about 3 miles northward from Cape Blanco. The cliff is about 190 feet high, with a sharp, high point, bordered by rocks, stretching out nearly 300 yards. A narrow, curved line of rocks, some of which are from 80 to 100 feet high, extend southwestward from the point for about ¾ mile. **Tower Rock,** 126 feet high, is the principal one and lies nearly 700 yards **SW.** by **W.** ½ **W.** from the point. The **Three Sisters** mark the outer end of the reef; two of them are about 40 feet high and pyramidal in shape.

From Blacklock Point to the Coquille River the coast is broken and irregular, with numerous rocks extending in some cases ½ mile offshore. Cliffs 40 to 100 feet high extend 3 miles south of the entrance to the river. The land behind them is comparatively flat and wooded.

Coquille River is described under a separate heading on page 111. Rocks and foul ground extend nearly 1¾ miles offshore from Coquille Point, just south of the entrance to the river.

From the entrance to Coquille River the sand dunes extend northward for 4 miles and are then succeeded by cliffs.

Five Mile Point, 6 miles northward from the river, is a small point of a rocky cliff about 60 feet high, with a cluster of rocks 10 to 40 feet high extending about ⅓ mile offshore.

Northward of Five Mile Point the coast consists of cliffs, 40 to 80 feet high, which 2 miles southward of Cape Arago increase to heights of 100 to 250 feet and are heavily wooded. Numerous rocks of varying shapes and sizes border the beach.

South Cove, immediately under the southern point of Cape Arago, is a small, contracted anchorage available in summer for small vessels with local knowledge.

Cape Arago, about 30 miles northward from Cape Blanco, is an irregular, jagged point projecting about 1 mile from the general trend of the coast. There are no high mountains immediately behind it, and it is

* Shown in parts on charts **5900, 6000, 6100,** scale $\frac{1}{200,000}$, price of each $0.50.

conspicuous, especially when the mountains in the interior are obscured. The seaward face of the cape consists of sharp, broken cliffs sparsely wooded at their edges. Immediately off the cape are reefs extending northwestward for about 1 mile. A small cove on the northern side inside the reefs is sometimes used by very small vessels with local knowledge. The lighthouse (see table, page 20) is situated about 2½ miles northward of the cape on a rocky, partially wooded island close inshore.

Coos Head, 220 feet high, is the southern point at the entrance to Coos Bay, and lies 1¾ miles **NE.** by **E.** from Cape Arago Lighthouse. The cliffs are about 100 feet high, and terminate in several small, rocky points with sand beaches between them.

Coos Bay is described under a separate heading on page 111.

From Coos Bay to Heceta Head, about 48 miles, the coast consists of sand dunes backed by moderately low, wooded hills. In the northern portion the dunes are quite high. This stretch of coast is broken by several streams, the principal ones being the **Umpqua** and **Siuslaw Rivers,** which are described under separate headings.

Heceta Head lies 28¾ miles **N.** by **W.** from Umpqua River Lighthouse. The seaward face is about 2½ miles long, with nearly vertical cliffs from 100 to 200 feet high. The summit of the head reaches an elevation of 1,000 feet ½ mile from the beach and is covered with grass and a few pines. A **sharp, black, conical rock,** 100 feet high, marks the extreme western and northern part of the head and is easily made out from either northward or southward.

The lighthouse (see table, page 20) is on a bench cut in the high bluff near the western extremity. Vessels from northward will not make out the tower or buildings until abreast the station, as they are shut out by the high bluff northward.

Cox Rock, 100 feet high, conical in shape and usually white on top with bird lime, lies close under the southern part of the head.

From Heceta Head to Cape Perpetua, 9 miles, the coast consists of high, broken, rocky cliffs, with the exception of the first 2 miles, where it is much lower and formed by sloping, sandy cliffs backed by a strip of clear land. The hills behind reach an elevation of over 800 feet in less than ½ mile from the beach and are heavily wooded, showing in many places large areas of burnt timber still standing.

Ten Mile Creek, 5 miles northward of Heceta Head, is marked by a sand beach about ¼ mile long at its mouth.

Cape Perpetua lies 9 miles northward from Heceta Head and consists of two projecting points; the northern one is the bolder and reaches a height of 800 feet a short distance from the beach and 1,000 feet in about ¾ mile. The rocky cliff forming the face of the northern point is reddish in color with a few rocks, awash at low water, close under its face.

Yachats Creek, navigable only for canoes, breaks through the coast hills immediately northward from Cape Perpetua.

The coast northward of Cape Perpetua to Alseya Bay, 8 miles, consists of cliffs, 15 to 30 feet high, with a narrow strip of grassy land ¼ to 1 mile wide behind them.

Alseya Peak, 2,000 feet high, lies about 11 miles northeastward from the mouth of Alseya Bay. It is flat-topped, covered with dead trees, and presents a whitish appearance.

Alseya Bay lies 8 miles northward of Cape Perpetua. The principal export is lumber, but a salmon cannery is in operation and some farm and dairy produce is exported and general merchandise is imported. **Collins** and **Waldport** are the two principal settlements. Communication northward and southward may be had by stage. The north point is low, broad, and sandy; the south point is an abrupt, rounding, sandstone cliff about 100 feet high, covered with trees. The entrance has the usual shifting bar and channel; the depth on the bar is about 6 feet at low water. A buoy (can, black and white perpendicular stripes) is moored about 1 mile westward from the entrance. The bay is formed by the widening of the river immediately inside the entrance to a width of little over 1 mile. It is full of shoals and sand flats with a narrow, winding channel. No directions that would be of value to a stranger can be given.

From Alseya Bay to Yaquina Bay the coast is nearly straight for 11½ miles. For 1½ miles northward of Alseya Bay is a low sand beach backed by sand dunes and then changes to bluffs, which 2½ miles farther north rise to heights of 70 and 100 feet.

Seal Rocks, abreast the highest part of the bluffs, are low and extend parallel to the coast for about 2½ miles at a distance of about ½ mile from the beach. The highest rock rises 20 feet above water.

Beyond Seal Rocks the bluffs are low with a broad sand beach until within 1½ miles of Yaquina Bay, where sand dunes begin and continue to its entrance. The land behind is comparatively low and wooded, with areas of burnt timber.

Marys Peak, a prominent mountain 3,800 feet high, lies about 24 miles eastward from the entrance to Yaquina Bay. Its sides are wooded, but its summit is covered with grass.

Yaquina Bay is described under a separate heading on page 114.

From Yaquina Bay to Yaquina Head, 3½ miles, the coast consists of broken, yellow cliffs bordered on the southern part by broad, low-water, sand beaches.

Yaquina Head, about 32½ miles northward of Heceta Head, is distinguished by two conical hills covered with grass. The outer one is 360 feet high, and the inner 407 feet high, with a low saddle, 200 feet high, between them. The extremity of the point, which projects about 1 mile from the general trend of the coast, is broken and rocky, but comparatively low. The lighthouse (see table, page 22) and buildings are situated on the flat bench projecting at the western extremity of the head. One mile inland from the point the grass-covered land changes to a dense forest and the hills rise rapidly. Two sunken ledges lie northward from the point, not over ½ mile from the beach.

From Yaquina Head to Cape Foulweather, 4½ miles, the coast consists of yellow and white sandstone cliffs, low and broken.

A low, flat, black rock, 2⅞ miles northward from Yaquina Head, lies about ½ mile offshore.

Otter Rock, 36 feet high, lies about 3¼ miles northward from Yaquina Head and about ½ mile offshore.

Cape Foulweather is a prominent headland with a seaward face about 6½ miles in length, consisting of rocky cliffs over 60 feet high. It is formed by several grass-covered headlands with densely wooded gulches between them. Near the middle of the cape is a strip of flat land about ½ mile long and ¼ mile wide, bare of trees. The highest point of the cape is near the southern part; a grassy patch on the southwest slope is a good landmark. About ⅞ mile southeastward from the extreme western point of the cape is a rocky point, 430 feet high; ⅝ mile eastward of this point the hills rise to a height of 1,100 feet. A rocky islet, 400 feet long and 30 feet high, lies ⅝ mile southward of the point, about ⅜ mile offshore; it is 1 mile northward from Otter Rock. Dangers lie between the island and the point and extend about 250 yards northeastward from the island. Dangers extend for nearly 2 miles northward from the northern point of Cape Foulweather and nearly 600 yards offshore.

From Cape Foulweather to the southern part of Siletz Bay, about 2¾ miles, the coast continues as yellow, broken cliffs, 40 to 100 feet high, bordered by sandy beaches. From the northern point of the cliffs to the entrance to the bay are sand dunes covered with low brush.

Siletz River enters about 15 miles northward from Yaquina Head, the entrance being marked by a buoy (nun, black and white perpendicular stripes, "Siletz River") moored about ¾ mile westward of the bar. The channel changes frequently, but is used by light-draft vessels bound to the cannery. The bay inside the entrance is shoal and formed by a widening of the river. The north point at the entrance is a low bluff with a narrow sand beach; the south point is low and sandy with sand dunes extending about ⅝ mile northward from the yellow, sandy cliffs. Under the cliffs southward of the entrance to the river are numerous rocks; a large rock, 75 feet high, stands ⅛ mile **WSW**. from the south point of the cliffs. No directions that would be of value to a stranger can be given.

From the north point of Siletz Bay the coast extends 6 miles northward to the Salmon River, the yellow cliffs being about 50 feet high. Immediately northward of the river is a rocky cliff with a seaward face about ⅝ mile in length, the summit being 470 feet high; extending southward and eastward from this to the river is a rolling, grassy plateau with but few trees.

Cascade Head lies 16¾ miles northward from Cape Foulweather; it is very jagged, heavily wooded, and prominent to vessels close inshore. The face of the cliff is about 3 miles long, in places over 700 feet high, and is cut by several deep gorges through which the waters of three creeks are discharged from cascades 60 to 80 feet high. Several rocks lie about ⅛ mile offshore.

Double Arch Rock, 30 feet high, lies ⅞ mile northward from the southern point of Cascade Head, the surface sloping westward. The arches are visible from northward, the inner one being the larger.

From Cascade Head to Cape Kiwanda, about 9½ miles, the coast is a low sand beach with a narrow line of marshes behind the southern part. Rolling hillocks, occasionally wooded, rise to an elevation of 500 feet behind the beach; behind them the forests have been burned to the Coast Range.

Nestugga River* enters about 5½ miles northward from Cascade Head. The channel over the bar changes frequently in position and depth, and only vessels of light draft with local knowledge are able to cross. A small amount of canned salmon is exported. A buoy (can, black and white perpendicular stripes, "NES") is moored about ½ mile westward from the bar.

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*Shown on chart **6088**, scale $\frac{1}{10,000}$, price $0.25.

The south point at the entrance to the river consists of several low, rolling, grassy hillocks, about 400 to 500 feet high, that at this point approach very closely to the beach. The north point is the southern extremity of the sand spit and dunes that extends to Cape Kiwanda.

Haystack Rock, 332 feet high, lies about ½ mile southwestward from Cape Kiwanda and about ½ mile offshore; it is a prominent landmark when in this vicinity. It is conical and dark for about half its height, the top in summer being white with bird lime.

Cape Kiwanda is a low, yellow, rocky point, much broken and eroded, projecting about ½ mile from the general trend of the coast. Behind the cape are bright sand dunes, about 500 feet high, which are prominent from seaward.

From Cape Kiwanda the coast extends for 7½ miles in a general northerly direction to Cape Lookout; it is broken about halfway by the entrance to Sand Lake, which is shallow and not navigable. The coast consists of sand beaches and dunes until 1 mile northward of Sand Lake, when it changes to vertical, sandstone cliffs, 50 to 100 feet high, which continue to Cape Lookout. The hills and country back of the beach as far as the ridge of Cape Lookout have been burned over except in the gulches, and numerous trunks of whitened trees are still standing.

Cape Lookout lies 17½ miles northward from Cascade Head and nearly 40 miles northward from Yaquina Head Lighthouse. It projects about 1½ miles at right angles to the coast, a narrow, rocky promontory, ranging in height from 425 feet at its seaward extremity to 1,000 feet at its inner limit. The southern face is nearly straight, with precipitous cliffs, in which are numerous caves. The northern face is sloping and covered with a thick growth of timber. In general appearance the cape is flat-topped, although crosscut by several sharp depressions. The ridge in continuation of the cape is at right angles to the coast and reaches an elevation of 2,500 feet about 3¾ miles northeastward from the extremity of the cape. The north side of the cape is clean and bold for the first mile, and then is much broken and marked by caves and several cascades. Good shelter from northwesterly winds may be had under the south side of the cape.

North of Cape Lookout for 2 or 3 miles the land falls to a low, narrow, sandy peninsula, separating Netarts Bay from the ocean. The sand dunes on the peninsula are visible 10 or 12 miles from seaward.

Netarts Bay is a shallow lagoon about 4 miles long, with an average width of 1 mile. The greater portion is bare at low tide except the channel, close under the north shore, which has from 6 to 7 feet. The post village of **Netarts** is on the north shore about 1 mile inside the entrance; it is of no commercial importance. Only light-draft vessels with local knowledge can enter, and no directions can be given that would be of value to a stranger.

North of the entrance to Netarts Bay for 1½ miles to the rocks forming the southern part of Cape Meares the coast is a sandy beach backed by cliffs 50 to 120 feet high. These cliffs are covered by sand dunes varying in height from 150 to 200 feet, which are good landmarks.

Cape Meares is high and rocky, with a seaward face about 2 miles in length. The northern portion is the higher, with nearly vertical cliffs 460 feet high. The western point is narrow, covered with fern and brush, and terminates seaward in a cliff about 200 feet high, on the summit of which is the lighthouse (see table, page 22).

A **pillar rock,** 75 feet high, lies about ⅜ mile northwestward from the point, and a little over ½ mile farther in the same direction is a haystack rock, 109 feet high, which leans outward.

Bald Mountain, 550 feet high, is an irregular hill close to and eastward of the southern part of the cape.

Three Arch Rocks are the largest of a cluster extending about 350 yards off the southern point of the cape, and range in height from 275 to 300 feet. The largest arch is in the middle and lowest rock, and is about half the height of the rock above water. These rocks are the favorite resort of sea lions, whose barking can be heard a considerable distance with a favorable wind.

From Cape Meares to Kincheloe Point the coast is a low, narrow sand spit, with dunes 40 to 50 feet high; it forms the western shore of Tillamook Bay.

Tillamook Bay is described under a separate heading on page 115.

From Tillamook Bay to the Nehalem River the coast is nearly straight for about 4½ miles. It is the seaward face of the ridge, 1,600 feet high, between the bay and river. At the southwest face of the ridge are sand dunes 60 to 120 feet high, partly covered with grass and fern.

Double Headed Rock lies about 700 yards offshore and about 2 miles northward from the entrance to Tillamook Bay. This prominent feature is in reality two rocks, whose bases are so close together that they generally appear as one. The southern and larger one is 88 feet high and has an arch in it; the other is 75 feet high.

Nehalem River* is a small stream with a shifting bar at its mouth, having generally about 6 feet on it. A cannery and sawmill are situated on the river a short distance from the mouth. There is a small tug

*Shown on chart **6122**, scale $\frac{1}{20,000}$, price $0.20.

here and an occasional light-draft steamer enters when the state of the bar will permit. A buoy (can, black and white perpendicular stripes, "N") is moored about 1 mile westward from the bar. The north point at the entrance is a long, low, sand spit. Abreast the southern end of the point a reef makes out from the south shore or head, contracting the channel to a width of about 100 yards. No directions that would be of value to a stranger can be given; a pilot is necessary.

Northward from the entrance to Nehalem River the coast for 3 miles is low and sandy; it then increases in height, and is covered with a dense forest, except in the vicinity of the beach, where there is a narrow line of grassy hillocks, 40 to 100 feet high.

Cape Falcon, about 17 miles northward from Cape Meares and about 10 miles southward from Tillamook Rock, is the western termination of a mountain ridge over 2,700 feet high; it projects about 2 miles from the general trend of the coast. The seaward face is less than ½ mile in extent, very jagged, with numerous rocks under the cliffs. The southwest point of the cape is composed of nearly vertical cliffs 200 feet high and is partially bare of timber.

Falcon Rock, 50 feet high and small in extent, lies ⅔ mile westward from the southwest point of the cape.

Neah-kah-nie Mountain, 2 miles eastward from Cape Falcon, is a prominent landmark. It is double-headed, the western summit being rounded and 1,700 feet high; the eastern summit is lower, serrated, and divided into three peaks of nearly equal height. The entire southeastern slope is bare of timber and covered with grass and fern. The seaward face terminates in rocky, broken cliffs over 500 feet high, with a few rocks lying about 100 feet from the beach.

The coast northward from Cape Falcon consists of high cliffs until 1½ miles southward of Arch Cape, where they change to low bluffs.

Arch Cape is rocky and precipitous, and projects but little from the general trend of the coast. A rock, 120 feet high, lies close under the cape, and is connected with it at low water; a smaller rock, 25 feet high, lies about 100 yards outside of this rock. There are several other high rocks in the vicinity of the cape.

Arch Cape Rock, 113 feet high, lies ⅝ mile westward from the highest part of the cape and is the outermost bare rock. A **rock awash** lies about ⅞ mile off the cape and ⅜ mile **SSW. ½ W.** from Arch Cape Rock; and a **rock**, bare at lowest tides, lies ½ mile offshore and 1 mile **SSE. ½ E.** from Arch Cape Rock.

Hug Cape is a small cliff close to the beach 1¾ miles northward from Arch Cape; the cliffs in its vicinity are about 180 feet high.

Midway Cliff, halfway between Cape Falcon and Tillamook Head, is the seaward termination of a ridge extending eastward which reaches a height of 1,000 feet in less than ⅔ mile from the shore. It is heavily wooded and pitches abruptly to the sea, ending in a rocky, broken cliff 100 feet high and ¼ mile long. A rock, 100 feet high, lies close to and abreast of the southern end of the cliff, and another, 76 feet high, lies close to and abreast the northern end. A **ledge**, showing two rocks bare at half tide, lies 1 mile **WSW. ¼ W.** from the highest part of the cliff.

From Midway Cliff the coast extends **NNW.** for 2⅔ miles to the mouth of Elk Creek, and then turns sharply northwestward for the same distance to the western point of Tillamook Head. The coast is high and wooded, with broken cliffs bordered by numerous rocks except at the mouth of Elk Creek.

Tillamook Head ends in a double point, the points being about ½ mile apart. At the southern point the cliffs are 560 feet high, and at the northern point are 1,000 feet high. A pinnacle rock lies at the foot of the cliffs at the northern point, and extending offshore from it for 300 yards is a cluster of rocks, 45 to 150 feet high, the outer one being the lowest. The summit of the head is 1,200 feet high, flat, and densely wooded, with slightly lower land behind it.

Tillamook Rock lies nearly 1¼ miles **W.** by **S.** from the southern point of Tillamook Head. It is nearly 100 feet high, and is marked by a lighthouse and buildings (see table, page 22). The western face leans a little seaward; there is some resemblance in this respect to Falcon Rock. A **rock awash** lies ⅓ the distance from the rock to the nearest part of Tillamook Head.

North of Tillamook Head the coast is a broad sand beach extending for 14 miles to **Point Adams**, the south point at the entrance to the Columbia River. Low, sandy ridges, covered with grass, fern, and brush, extend parallel with and back of the beach. Several hotels and summer resorts are situated along this stretch, and a sawmill, the smoke from which can generally be seen, is near the southern end.

Saddle Mountain, double-headed and 3,300 feet high, is the landfall for this section of the coast and in approaching the Columbia River. It lies 12½ miles **NE.** by **E. ½ E.** from Tillamook Head, and is visible 50 miles offshore.

Cape Disappointment, the north point at the entrance to the Columbia River, is the only headland on the low, sand beach that extends from Tillamook Head to Point Grenville, a distance of over 80 miles. It is a group

of rounding hills covering an area about 2½ miles long and 1 mile wide, divided by a narrow valley extending **NNW.** and **SSE.** The seaward faces of these hills are precipitous cliffs with jagged, rocky points and small strips of sand beach. The extreme southeastern point is marked by a lighthouse (see table, page 22). **McKenzies Head,** ¾ mile northwestward from the lighthouse, is 190 feet high and nearly round; it is covered with grass and fern, but bare of trees. **North Head,** the extreme western point of the cape, is 270 feet high, with a very jagged, precipitous cliff backed by a narrow, grassy strip, the higher ground behind it being covered with trees. It is marked by a lighthouse and fog signal (see table, page 22).

From southward or northward Cape Disappointment is generally made as two small, round-topped islands, with high, wooded hills in the interior. From westward it is not prominent, but any haze or smoke inside the cape brings it out clearly.

The **Columbia River and Approaches** are described under a separate heading, on pages 116–118.

COQUILLE RIVER *

enters about 18 miles northward from Cape Blanco. The principal exports are lumber and coal; several canneries are also in operation. General merchandise is imported. The river is in the collection district of southern Oregon; the port of entry is at Empire, on Coos Bay. The south point of the river is 60 feet high, with several outlying rocks 65 feet high. **Tuppers Rock,** near the south bank inside the entrance, is a steep, rocky butte, 155 feet high, prominent as a landmark. The north point of the river is a long, low, narrow spit of shifting sand dunes; the lighthouse (see table, page 20) is situated on its southern end on the western side of Ratcliff Rock.

The entrance to the river is under improvement by the Government. A jetty 2,700 feet long has been constructed on the south side, and the jetty on the north side is under construction; the channel, which formerly shifted considerably, is now confined between the jetties.

The channel over the bar varies in depth from 4 to 10 feet at low water, and, once inside, vessels of 11 feet draft find no difficulty in navigating the river for 25 miles to Coquille. Several of the dangers in the channel are buoyed. From Coquille to Myrtlepoint, 13 miles, navigation is carried on by light-draft vessels irregularly, dependent upon the stage of water. Improvements in this section are contemplated by dredging and the removal of snags.

Bandon is on the south bank of the river near the mouth. It has communication by regular river steamers with points above.

There are several small settlements between Bandon and Coquille.

Coquille is 25 miles above the mouth of the river. It has communication with the interior by stage, and with Marshfield, on Coos Bay, by rail; there are telegraph facilities. The railroad extends to Myrtlepoint, a small village 13 miles above Coquille.

Pilots.—Strangers entering the river should take a pilot. There are no licensed pilots, but one of the life-saving crew will act as such if necessary.

Towboats will be found at Bandon and other points on the river; the rates are $0.50 per thousand feet, pilotage included.

Supplies.—Coal, water, and provisions may be had as desired; a limited amount of ship-chandler's stores may also be obtained.

Repairs in wood and minor repairs to machinery can be made. Ship carpenters can be had from Coos Bay, and small machine work can be handled at the mills.

In approaching Coquille River entrance from southward, follow the directions in section 5 of the Inshore Sailing Directions (page 85) until up with the Coquille River buoy, and signal for a pilot; or from northward, the directions reversed of the same section will lead to the buoy off the entrance. No directions for crossing the bar or for the channel inside that would be of value to a stranger can be given.

COOS BAY.†

The entrance to Coos Bay lies about 34 miles northward from Cape Blanco and about 1½ miles northward from Cape Arago Lighthouse. The main exports are lumber and coal, but some farm and dairy produce and fish are exported; general merchandise is imported. Since its improvement by the Government this harbor can be used as a harbor of refuge in impending bad weather, provided it can be made before the bar becomes impassable.

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*Shown on chart **5971**, scale $\frac{1}{10,000}$, price $0.25.

†Shown on chart **5984**, scale $\frac{1}{20,000}$, price $0.25.

The entrance is near the southern part of the bay. From the entrance the bay extends northward for about 6½ miles, with an average width of about ¾ mile, and then bends sharply southeastward for 3¾ miles, terminating in a shallow basin about 1½ miles in width, surrounded by marsh land intersected by several sloughs.

The western shore of the bay as far as the bend is formed by a sand spit, covered with sand dunes, reaching in some places a height of 100 feet. On the eastern shore and above the bend are low, rolling hills, covered with timber.

South Slough, shoal and navigable by small boats only, extends about 4 miles southward from its junction with the bay near the entrance.

Haynes Slough and **North Slough** join the bay through a common entrance on the north side of the bay at the bend. These are navigated by small boats and launches engaged in marketing the produce of several farms situated on the sloughs.

The **Coos River** empties through two channels into the bay at its head. The north channel follows the eastern side of the bay and empties near North Bend Point. The Marshfield channel crosses the flats and empties abreast the town of Marshfield. The river is navigated for about 14 miles by light-draft steamers engaged in towing logs and freighting farm and dairy produce. The river has been improved by the Government, and a draft of 5 feet can be taken to the head of navigation at high water.

Empire is situated on the eastern shore of the bay about 4 miles above the entrance. It is the port of entry for the collection district of southern Oregon, a deputy collector being stationed here. At present the place is of little commercial importance. There is a large sawmill here, but in 1901 it was not in operation. A cannery is in operation during the fishing season. The depth at the wharves is from 9 to 14 feet.

North Bend, about 4 miles above Empire, is located on the eastern side of North Bend Point. It is dependent upon the sawmills here; a few vessels have also been built. The depth at the wharves is from 10 to 12 feet.

Porter, about 1 mile southward of North Bend, is now practically abandoned.

Marshfield, on the western shore at the mouth of Isthmus Slough, at the head of the bay, is the principal town. It is the distributing point for a considerable section of country that is devoted to lumbering, coal mining, dairying, and agriculture. There is also some shipbuilding, confined generally to schooners and small coasting steamers, the machinery for which is generally installed in San Francisco.

The entrance to the bay has been improved by the construction of two jetties. The north jetty, about 9,600 feet long, projects seaward from North Spit about ¾ mile. A jetty about 1,700 feet long has been built extending southwestward from Fossil Point, on the eastern shore inside the entrance. These have maintained a depth of 18 to 20 feet in the channel over the bar, sufficient for the class of vessels trading to this port. Above the entrance the improvements consist of dredging and the removal of snags. The channel is liable to change in depth owing to freshets. A draft of 13 feet at low water can be taken to Marshfield. The channels are marked by range lights and beacons, and by buoys to indicate the best water.

Prominent features.—Coos Head, Umpqua River Lighthouse, and **Cape Arago Lighthouse** (see table, page 20) are prominent in making the entrance to the bay; the sand dunes northward of Cape Arago are also a noticeable feature. **Guano Rock,** low and small, lies on the south side of the channel about 250 yards northwestward from Coos Head. See also pages 106–107.

Anchorage may be had at almost any point inside the bay, dependent upon the draft. Outside the entrance vessels with local knowledge have ridden out southeast gales by anchoring close under Cape Arago in 5 to 6 fathoms, but this is dangerous if the wind shifts to southwest.

Pilots and towboats.—Pilots may be obtained by making signal when off the entrance. In case none are available, the life-saving station may be relied upon. A towboat is usually stationed at Empire. At times, however, she is called upon to tow for the Coquille or Umpqua rivers, but is not generally absent from her station.

Extracts from the laws of Oregon relating to pilots and pilotage will be found in Appendix II.

Quarantine is prescribed when considered necessary, the anchorage limits being defined at the time.

Hospitals.—There is a relief station, Class III, of the United States Public Health and Marine-Hospital Service at Marshfield (see Appendix IV).

Harbor regulations.—See the State laws in Appendix II.

Supplies.—Provisions, water, and coal can be had at any town on the bay, and a limited amount of ship-chandler's stores.

Repairs to wooden vessels and moderate repairs to machinery can be made. There is a small foundry and machine shop at Marshfield. At Empire shafting of 16 feet length can be handled. There are no facilities for docking.

Communication may be had by coasting steamers and by stage and rail. There are also telegraph and telephone facilities.

Tides.—The mean rise and fall at the bar is 4.8 feet; at Empire, 3.9 feet; at North Bend, 4.1 feet; at Marshfield, 4.4 feet. High water at Marshfield occurs about 2 hours later, and at North Bend about 1 hour later, than at the bar (see table, page 15).

For **variation of the compass** see table, page 18.

GENERAL REMARKS ON APPROACHING COOS BAY.

No directions for crossing the bar, or for the channel inside, can be given that would be of value to a stranger. *From southward* follow the directions given in section 5 of the Inshore Sailing Directions, Cape Blanco to Columbia River Entrance, page 85; or *from northward*, the directions reversed of the same section may be followed until up with the whistling buoy. *From seaward*, Cape Blanco and Cape Arago are the prominent features, and, at night, the lights furnish excellent means for determining a vessel's position, after which a course can be laid for the whistling buoy off the entrance.

In thick weather soundings should be taken frequently and the greatest caution exercised when in less than 50 fathoms.

UMPQUA RIVER.*

The entrance to the Umpqua River lies 20 miles northward from Cape Arago Lighthouse. Considerable lumber is exported and several canneries are in operation; general merchandise is imported. The river is in the collection district of southern Oregon; the port of entry is at Empire, on Coos Bay.

The south point at the entrance to the river is marked by sand dunes covered partially with trees and reaching an elevation of about 300 feet. About 1 mile below the entrance is a bright, bare spot in the dunes that shows prominently among the trees. The lighthouse and buildings (see table, page 20) on the southern point are surrounded by trees and only the roofs and upper stories of the buildings are visible.

The north point at the entrance consists of high, shifting sand dunes extending northward for about 3 miles. These are bare as a rule and on the river side reach elevations of 90 and 124 feet. The life-saving station is on the north spit about 1 mile from its southern extremity.

Winchester Bay is a small, open cove just inside the entrance on the eastern bank.

Ork Reef, a patch of rocks and sand, awash at half tide, lies nearly in mid-channel abreast the northern point of Winchester Bay. It is marked by a buoy (spar, red, No. 2) placed about 200 feet westward from the northern point of the reef.

The **bar** shifts frequently and the buoys are moved to correspond with the changes. The whistling buoy marking the entrance is moored about ⅞ mile westward of the entrance.

The **channel** over the bar varies in depth, but generally maintains about 13 feet. The channel up the river is buoyed, and at high water is deep enough for the draft of vessels trading to Gardiner, about 8 miles above the mouth. The shoalest part is about 3 miles inside the entrance, where a flat shoal extends across the river with depths of 8 to 9 feet for about 1 mile. Above Gardiner navigation is carried on by light-draft vessels; a draft of 5 feet at high water can be carried to Scottsburg, the head of navigation, about 18 miles above Gardiner. These depths are affected considerably by snags and the material brought down by freshets. Smith River, a tributary entering about 2 miles above Gardiner, is also navigable by light-draft vessels for a short distance.

Gardiner is on the north bank of the river about 8 miles above the entrance. Communication by stage may be had northward with the Siuslaw River and southward with Coos Bay. The depth at the wharves varies from 12 to 14 feet, muddy bottom.

Pilots and towboats.—Strangers entering the river should take a pilot; there are no licensed pilots, but a pilot can be had at Coos Bay in case the towboat here, whose master acts as pilot, is disabled. The towage rates are $0.40 per thousand feet, pilotage included (see also Appendix II).

Supplies.—Water and provisions may be had as desired, but no coal; a limited amount of ship-chandler's stores may also be obtained.

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*Shown on chart **6003**, scale $\frac{1}{20,000}$, price $0.20.

Repairs.—Light repairs in wood and minor repairs to machinery can be made. Ship carpenters can be had from Coos Bay, and small machine work can be handled at the mills.

In approaching Umpqua River entrance from southward follow the directions in section 5 of the Inshore Sailing Directions until up with the whistling buoy off the bar, when signal for a pilot; or from northward, the directions reversed of the same section may be followed to the whistling buoy. No directions that would be of value to a stranger can be given for crossing the bar or for the channel inside.

SIUSLAW RIVER.*

The entrance to the river lies about 40 miles northward of Cape Arago Lighthouse and nearly 7½ miles southward from Heceta Head Lighthouse. Lumber is the principal export, but canneries are in operation; general merchandise is imported. The river is in the collection district of southern Oregon; the port of entry is at Empire, on Coos Bay.

A jetty has been completed on the north side at the entrance for a distance of 4,000 feet, which includes a tramway approach of about 3,000 feet. As a result of this, a partial checking of the tendency of the channel to shift northward has been accomplished. The latest information (1903) gives a depth of a little over 7 feet on the bar. Vessels which cross the bar can ascend the river to Florence, and light-draft steamboats can navigate the river to the head of tide, about 13 miles above Florence. Freshets cause frequent changes in the channels. Information regarding the condition of the bar channel can generally be obtained in San Francisco, Cal., from masters of vessels trading here, or from their representatives.

Florence is a small town about 4 miles inside the entrance, on the eastern bank of the river. The depths along the wharf vary from 8 to 18 feet. Communication may be had by stage with points north and south and with the interior.

Pilots may be had from Coos Bay, and when the canneries are in operation the local fishermen may be relied on.

Supplies.—Water and a small amount of provisions are obtainable, but no coal.

Repairs.—There are no facilities for repairs. Light repairs in wood could be made by obtaining ship carpenters from Coos Bay. The repairs to machinery are dependent upon the size of work handled by the sawmills.

In approaching Siuslaw River entrance from southward follow the directions in section 5 of the Inshore Sailing Directions (page 85) until up with the buoy (can, black and white perpendicular stripes, "S"), and signal for a pilot; or from northward, the directions reversed of the same section may be followed to the entrance. No directions that would be of value to a stranger can be given for crossing the bar or for the channel inside.

YAQUINA BAY.†

The entrance to this bay lies about 3½ miles southward from Yaquina Head (see page 108). It is a tidal estuary, the bay proper being only the widening of the Yaquina River just inside the entrance.

The north point at the entrance is a rounding, sandy bluff, about 120 feet high; the old tower, situated at the extremity, is prominent as a daymark. The south point is a low sand beach backed by sand dunes, the highest, about 150 feet high, being at its southern extremity.

There are several small settlements on the bay and river. At one time there was considerable commerce at this port, but now (1903) it has decreased to a few hundred tons a year.

The bay has been improved by the Government; jetties have been built from the north and south points at the entrance, and several rocks in the channel crossing the bar have been removed to depths of 11 to 12 feet at low water. A whistling buoy is moored about 1 mile southwestward from the outer entrance to the channel leading over the bar.

The channel over the bar has a depth of about 11 feet, but is narrow and winding and should not be attempted by strangers without a pilot. A reef extends for nearly 1½ miles northward of the entrance about ½ mile offshore, and southward of the entrance, at a distance of about 1 mile, is a patch of sunken rocks, usually showing a breaker. In the approach to the entrance, which is between these rocks and the reef, the bottom is irregular, with several depths of 4 fathoms and less. Inside the entrance the channel is subject to frequent change. Several buoys and beacons, some of which are lighted, are placed to mark the channel and ranges.

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* Shown on chart 6000, scale $\frac{1}{200,000}$, price $0.50.

† Shown on chart 6057, scale $\frac{1}{20,000}$, price $0.20.

Newport is a small settlement inside the entrance on the eastern side of the north head. There are several wharves, but these are as a rule out of repair and but little used.

Yaquina, about 3½ miles above the entrance, is a small settlement, the terminus of a railroad extending into the interior to the eastern part of Oregon. There is little business transacted here at present. There are several other small settlements on the river.

No directions can be given that would be of value to a stranger and those desirous of entering should employ a competent pilot. The entrance in winter is exceptionally bad on account of the heavy swell, and the place is not recommended.

TILLAMOOK BAY.*

The entrance to this bay lies about 42 miles southward from the Columbia River, 22½ miles southward from Tillamook Lighthouse, and about 5 miles northward from Cape Meares Lighthouse. Lumber, fish, and dairy produce are exported to San Francisco and the Columbia River; general merchandise is imported.

Kincheloe Point, the south point at the entrance, is low and sandy. The north point at the entrance is the southern termination of a high, wooded ridge lying between the Nehalem River and the bay. **Green Hill,** at the entrance opposite Kincheloe Point, is a spur from this ridge terminating in a bluff, rounding point; it is bare of trees, but is covered with fern and grass and is a prominent feature in recognizing the entrance and crossing the bar. Two low rocks lie close inshore and westward of the point; the outer one is whitewashed and used as a range for crossing the bar.

The **Sow and Pigs,** a ledge of rather small extent and bare at half tide, lies in the entrance about ⅜ mile eastward from Green Hill Point and about 400 yards offshore. It is marked by a buoy (nun, red and black horizontal stripes) moored close-to on the seaward side. This is a dangerous ledge when entering with the flood tide as the current sets toward it.

Channels.—The depth in the channel over the bar is fairly permanent, varying from 9 to 11 feet; at times this increases to as much as 15 feet. The position of the channel can not be depended on and is liable to change in heavy weather. Inside the entrance the bay is obstructed by shoals and sand flats, with a narrow channel partially marked by beacons winding through them and connecting with Hoquarten Slough; a depth of 9 feet at high water can be carried through the channel and slough to Tillamook.

The lumber vessels usually load to 14 or 15 feet at Hobsonville, but 16 feet has been taken over the bar at high tide with a smooth sea.

The channel inside the bay is under improvement by the Government; dikes and training walls have been built, and dredging operations are contemplated with a view of straightening Hoquarten Slough, as some of the bends are difficult to make without the use of lines.

Garibaldi, on the north shore, ½ mile inside of Green Hill Point, is a small settlement and post office, dependent principally on the cannery in operation at this point. There is about 7 feet at the end of the wharf.

Hobsonville is a small settlement and post office on Memaluct Head about ¾ mile eastward from Garibaldi; it is dependent principally on the sawmill at the point.

Tillamook, on Hoquarten Slough, about 9 miles from the entrance, is the distributing point and business center for the Tillamook valley, which extends southward and eastward from the head of the bay. The dairying and agricultural interests are extensive, a large amount of dairy produce being exported to San Francisco and Columbia River points.

Pilots and towboats.—There are no regular pilots. Towboats can be had from Astoria or arrangements can be made with steamers trading here for towing in and out. Sailing vessels should not attempt the entrance owing to the currents.

Supplies.—Water and provisions can be obtained, but no coal or ship-chandler's stores. Water is piped on the wharves.

Repairs.—There are no facilities for repairs beyond what are afforded by the sawmills. Some blacksmith work can be done in Tillamook.

Communication is had by stage, and with San Francisco and the Columbia River by irregular coasting steamers.

Currents.—The tidal currents run with considerable velocity at the entrance.

No directions that would be of value to a stranger can be given.

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*Shown on chart **6112**, scale $\frac{1}{20,000}$, price $0.20.

COLUMBIA RIVER.*

This great river of the Pacific Coast enters the ocean in latitude 46° 15′ north, and with its tributaries drains a large and productive territory. The lower portion of it forms the boundary between the States of Oregon and Washington. Below the Cascades the river flows through a canyon averaging 5 miles in width between the high cliffs on each side; of this width the river occupies about 1 mile, the rest being marsh, low islands, and lowland. Near the mouth the river becomes wider and in some places is about 5 miles wide. It is navigable for deep-draft vessels up to the Cascades, a distance of 123 miles, but as a rule they seldom go above the mouth of the Willamette, 85 miles from the mouth. Above the Cascades navigation is carried on in light-draft steamers, which handle a large amount of the imports and exports. Both the foreign and domestic trade are extensive. The exports are principally wheat, flour, lumber, and fish; the imports are general, but owing to the railroads constitute a much smaller amount by sea than the exports. There are numerous small settlements and landings, but the business is centered principally in Astoria, on the south bank about 10 miles from the entrance, and in Portland, on the Willamette River, about 9 miles from its junction with the Columbia.

Baker Bay is a shoal, open bight eastward of Cape Disappointment formed by the cape and the recession of the land northward. **Sand Island,** low, lies in front of the bay; a narrow channel immediately eastward of the island leads to **Ilwaco,** a small town, the terminus of the railroad extending northward to Willapa Bay. The bay is full of shoals and fish traps.

Youngs Bay, about 7 miles inside the entrance on the south bank of the river, is the widening of the mouth of Youngs River, which enters at this point. It is of no commercial importance, being traversed only by light-draft steamers navigating Youngs River. The Astoria and Columbia River Railroad crosses the bay on trestlework, a suitable drawbridge being situated in the channel.

Astoria is situated about 9 miles from the entrance on the south bank of the river. It is the principal town on the lower part of the river, and the fishing interests during the season are extensive; considerable grain and lumber are also exported. The wharves, which are under private control, are ample, with depths varying from 8 to 40 feet alongside, depending upon the locality. This is the port of entry for the river, and the point where the bar and river pilots exchange.

Between Astoria and Portland there are numerous small landings and settlements, dependent either on the fisheries or acting in some cases as shipping points for the country immediately behind them; these are ports of call for the regular river steamers. Deep-draft vessels do not as a rule stop between Astoria and Portland.

Cowlitz River enters the Columbia River about 54 miles from the entrance. It has been under improvement by the Government, and is navigated by light-draft steamers that ascend to Toledo, about 40 miles above its junction with the Columbia. A considerable amount of farm and dairy produce is handled by them; lumbering is also extensive.

Lewis River has also been improved and is navigated by light-draft steamers; lumbering is the main industry.

Willamette River, which empties into the Columbia about 84 miles above its mouth, is the largest tributary of the Columbia below the Cascades. Under favorable conditions during the high-water stage of the river navigation can be carried to Eugene by light-draft vessels, but deep-draft vessels do not go above Portland.

Portland, on the west bank of Willamette River about 9 miles from its mouth, is a large and prosperous city of considerable commercial importance. There are extensive warehouses and wharves; the wharves are owned by private parties and are under their control. **East Portland** and **Albina** are on the east bank opposite Portland and connected with it by four bridges; there are extensive docks and warehouses. There is ample depth alongside the wharves on either side of the river for vessels of any draft. A large amount of grain and salmon is handled here by foreign and domestic vessels, both steam and sail.

Vancouver is a small town situated about 4 miles above the mouth of the Willamette on the north bank of the Columbia River. It is of little commercial importance. There are several wharves, the depths ranging from 12 to 18 feet. An army post is located near the town.

Channels.—Improvements are in progress for maintaining a deep-water channel from the ocean to Portland. A jetty about 4½ miles long has been built out from the southern point at the entrance. Above the mouth, training walls have been built and dredging done that has maintained a depth of 19 to 20 feet at the low-water stage of the river. At the Cascades locks have been built which permit the river steamers to pass the falls and ascend the river as far as The Dalles.

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* The entrance is shown on charts **6100,** scale $\frac{1}{200,000}$, price $0.50; **6140,** scale $\frac{1}{40,000}$, price $0.25. The river is shown in parts on charts **6140** to **6146,** scale of each $\frac{1}{40,000}$, price of each $0.25.

The **bar** is semicircular and extends about 3 miles westward of the line joining the end of the jetty and Cape Disappointment; in heavy weather it is impassable, and it should not be attempted at any time without a pilot or local knowledge. The channel over the bar is subject to frequent changes, but as a rule the best water is found toward Cape Disappointment. The buoys marking it are shifted when necessary. In 1903 the greatest depth was about 22 feet at low water. By taking advantage of high tide, vessels drawing 23 and 24 feet have been towed to sea.

The **channels** inside the entrance permit a draft of 20 feet at low water to be taken to Portland. These are subject to change, especially during the high-water stage of the river.

Aids to navigation.—The beacons and buoys are changed to indicate the best water in the channels crossing the bar and in the river, and conform to the system adopted in United States waters (see page 5).

A light-vessel (see table, page 22) is situated about 8 miles southwestward from Cape Disappointment Lighthouse and about 5 miles westward from the bar.

Prominent features.—**Cape Disappointment** is described on page 110.

The old **light-tower** on Point Adams, on the south point at the entrance, shows fairly well from seaward. The jetty and trestlework extending seaward from Point Adams is prominent from southward; it shows well when entering by the main channel.

Scarboro Hill is on the north bank of the river inside the entrance, about 5¾ miles eastward from Cape Disappointment. It is a long, gradually rising ridge, reaching a height of about 1,000 feet, covered with grass and fern. It shows bright and green, the hills behind and on each side of it being covered with dark timber; it is the only grass-covered hill visible from seaward on the north bank of the river.

Point Ellice, on the north bank of the river, is the termination of a spur from Scarboro Hill; it is about 4 miles northeastward from Point Adams. The point is rounding and rocky, but not high. Two hillocks lie behind the point; one is about 240 feet high and the one behind it is much higher.

Smith Point, on the south bank, at the junction of Youngs Bay and the river, is the western termination of a high, wooded ridge; it is the first prominent point on the south bank eastward of Point Adams. The ridge culminates in **Coxcomb Hill,** 647 feet high, behind Astoria.

Tongue Point, on the south bank, about four miles westward from Smith Point, is a bold, rocky peninsula about 300 feet high covered with trees and connected with the south bank by a low, narrow neck. It projects into the river for about ¾ mile; a buoy depot of the Light-House Establishment is situated on the western face of the peninsula, near its inner end.

Mount St. Helens, nearly 10,000 feet high, cone-shaped and snow-capped, lies about 75 miles eastward of the entrance to the river. On a clear day it is visible when looking up the valley from seaward.

Saddle Mountain is described on page 110.

Anchorage.—At Astoria vessels generally anchor abreast the town on the north side of the channel between buoys 9 and 11. There are no prescribed anchorage limits.

At Portland vessels generally anchor between the southern part of the Oregon Railway and Navigation Company's docks and the lower bridge, leaving a fairway for passing vessels (see Appendix II).

Pilots.—Pilotage is compulsory except for vessels engaged in the whaling or fishing trade, and vessels licensed and engaged exclusively in the coasting trade; pilotage is not compulsory for the river above Astoria, but owing to the changes in the channels vessels are advised to take one.

Pilots will be found cruising off the bar; their jurisdiction extends only to Astoria, where river pilots may be obtained as well as at Portland.

Extracts from the laws of Oregon relating to pilots and pilotage will be found in Appendix II.

Towboats will generally be found cruising off the bar; they can also be obtained at Astoria and Portland. Nearly all of the river towing is done by stern-wheel steamers.

Quarantine.—Vessels entering subject to quarantine are boarded below Smith Point, and do not proceed above Smith Point until so boarded. Extracts from the State quarantine laws are given in Appendix II.

Hospital.—Relief stations of the United States Public Health and Marine-Hospital Service are established at Astoria (Class III) and Portland (Class II). For the regulations of the service see Appendix IV.

Harbor regulations.—Extracts from the laws of Oregon and Washington relating to harbor control, and harbor regulations for the port of Portland, are given in Appendix II.

Supplies of all kinds can be obtained at both Portland and Astoria.

Repairs of all kinds, except those that necessitate docking, can be made at either Astoria or Portland. In 1903 a floating dry dock of 10,000 tons capacity is under construction by the port of Portland; length 460 feet over all, beam 112 feet, draft of vessel 25 feet.

Communication between Astoria and Portland and intermediate points may be had by rail and river steamers, and with points north and south by rail and ocean-going steamers. Several transcontinental railroads pass through Portland, and trans-Pacific steamers call at both Astoria and Portland. There are also telegraph and telephone facilities.

Storm warning displays of the United States Weather Bureau are shown at Portland. The forecast is also telegraphed to Astoria.

The **condition of the bar** is reported to Astoria daily by the observer at Cape Disappointment; vessels are also reported from the same point.

Freshets occur in the river, the high-water stage being reached about June; they generally range from about 20 feet at Portland to 0 at Astoria.

Currents.—At the entrance the currents are variable and at times reach a velocity of over 5 miles with an ebb tide; with a flood tide they seldom exceed a velocity of 2 miles. Above Astoria the current averages from 1 to 2 miles an hour except during the freshet period, when it is considerably increased, but not enough to seriously affect navigation.

Ice forms occasionally in the river, but is not heavy enough to affect navigation.

Tides.—Daily predictions in full for Astoria are given in the Tide Tables published annually in advance by the Coast and Geodetic Survey. Astoria is also the port of reference for several other points on the river. The influence of the tide is felt above the mouth of the Willamette, but does not affect the direction of the flow (see table, page 15).

GENERAL DIRECTIONS FOR APPROACHING COLUMBIA RIVER ENTRANCE.

Owing to the changes in the channel over the bar no directions that would be of value to a stranger can be given for crossing it.

From southward, follow the directions in section 5 of the Inshore Sailing Directions, Cape Blanco to Columbia River Entrance, page 85, or in section 4 of the Outside Sailing Directions, Cape Blanco to Columbia River Entrance, page 78, until up with the light-vessel, and wait for a pilot.

From northward, reverse the directions in section 6 of the Inshore Sailing Directions, Columbia River Entrance to Juan de Fuca Strait, page 86, until up with the light-vessel, and wait for a pilot.

From seaward, the landmarks are prominent, and the lights at the entrance, at Willapa Bay, 20 miles northward, and Tillamook Rock, 20 miles southward, are distinguishing marks for determining a vessel's position north or south of the entrance and the subsequent shaping of the course.

In thick weather vessels should sound frequently and should not shoal the depths to less than 20 fathoms without being sure of their position. Care should be taken not to mistake the low sand beach north of Cape Disappointment for that southward of Point Adams; the northward set of the inshore current must also be carefully considered.

Sailing vessels should endeavor to make the land to windward of the entrance; in the summer months in the latitude of Cape Disappointment, and southward of it in the winter months when the prevailing winds are southerly accompanied by a heavy southwest swell.

The inshore current sets northward, its velocity being greatly affected by the prevailing winds. Under the conditions of thick weather or fog which at times extends several hundred miles seaward and lasts for several weeks, the set of this current must be guarded against. Nearly all of the vessels which have gone ashore while endeavoring to make the entrance under such conditions have been wrecked north of the mouth of the river.

The bar is impassable in the heavy weather which prevails during the winter months, and vessels should heave-to at a safe distance offshore and await favorable conditions for entering.

Sailing vessels as a rule tow in and out.

COAST FROM COLUMBIA RIVER ENTRANCE TO JUAN DE FUCA STRAIT.*

From Cape Disappointment the coast extends northward for 19½ miles to Willapa Bay as a low, sandy beach, with sandy ridges about 20 feet high parallel with the shore. Back of the beach the country is heavily wooded. Numerous summer resorts and cottages are situated along the beach.

A life-saving station is situated about 11 miles northward from Cape Disappointment.

Leadbetter Point, the southern point at the entrance to Willapa Bay, is low and sandy with no distinctive feature to mark its extremity nearer than the limit of the trees 2¾ miles southward.

Cape Shoalwater, the northern point at the entrance, is low and sandy, the northern portion covered with trees. A lighthouse (see table, page 22) is situated about 2 miles from the extremity of the point, clear of the trees, on the southern point of a sand ridge about 50 feet high.

Willapa Bay is described under a separate heading on pages 123–124.

From Cape Disappointment to Point Hansen, the southern point at the entrance to Grays Harbor, the coast extends for 12 miles as a low sand beach backed by a heavy growth of timber.

Point Hansen is low and sandy, and for 2 miles southward from the extremity is bare of trees. A jetty projects about 13,000 feet seaward from the end of the point. A lighthouse (see table, page 22) and life-saving station are situated 1 mile southward of the northern extremity of the point.

Point Brown, the northern point at the entrance to Grays Harbor, is about 2½ miles northward from Point Hansen; it is low, rounding, and sandy, with shoals extending southward and westward, forming with those extending westward from Point Hansen the bar at the entrance. It is wooded to within ½ mile of the extremity, near which is a lone tree, easily made from seaward and serving as a leading mark for crossing the bar.

Grays Harbor is described under a separate heading on pages 125–126.

From Point Brown the coast extends northward for 26 miles to Point Grenville as a low, sandy beach, broken occasionally by small streams and in some places by low bluffs. A few small settlements connected by stage roads or trails are scattered along this stretch.

Copalis Head, nearly 13 miles northward from Point Brown, is a bright-yellow cliff, about 2 miles long and 140 to 200 feet high; it is 1¾ miles northward from Copalis River. Two small rocks, the larger 35 feet high, lie 500 yards off the head and a **rock awash** lies nearly 700 yards westward from them.

Two small bluffs mark the mouth of Jo Creek, 3½ miles northward from Copalis Head.

Nemotolipse River enters about 6 miles northward of Copalis Head. The south point at the mouth is bare and sandy; on the north bank is a bright yellowish bluff 50 feet high.

Point Grenville is a broken, rocky promontory with nearly vertical, whitish cliffs over 100 feet high. Numerous rocks extend for some distance off the point. **Arch Rock,** 82 feet high, is the outer and more prominent of two rocks lying westward from the point. It is ⅝ mile **SW.** by **S.** from the inner extremity of the point; the arch lies east and west. A **rock,** awash at high water, lies 400 yards **WNW.** from Arch Rock. The western rock off the western end of the point is about 200 yards off the cliff and 92 feet high; there are a number of rocks inside of it, but none outside. Two rocks over 90 feet high lie 400 yards southward from the southern extremity of the point.

A poor **anchorage** in northwesterly weather may be had under Point Grenville by vessels of moderate drafts, but the depths compel anchoring at such a distance from the beach that little shelter is afforded. The anchorage is in 4 fathoms, sandy bottom, with the inner extremity of the cape bearing **NW.** and Arch Rock bearing **W.**

From Point Grenville to Cape Elizabeth, 3½ miles, the coast consists of dark cliffs, 80 to 100 feet high, covered with trees.

Quenault River breaks through the cliffs about 1 mile southward from Cape Elizabeth.

Sonora Reef extends **SSE.** from Cape Elizabeth for over 2 miles, its southern end lying about 1⅛ miles offshore. The reef lies out of the usual course of vessels.

Cape Elizabeth projects about 1 mile from the general trend of the coast and when seen from seaward appears as a bright-yellow, rocky cliff reaching in places a height of 200 feet. There are no high or large rocks off the cape. The houses of the **Quenault Indian Reservation** are situated at the eastern end of the cliffs.

From Cape Elizabeth to the Hoh River, a distance of 24 miles, the coast is nearly straight with low shores and rocky cliffs heavily wooded to the edges. Numerous rocks lie offshore but out of the usual track of vessels.

*Shown on chart **5052,** Mercator projection, deg. lat. = 3.3 inches; and in parts on chart **6100,** scale $\frac{1}{200,000}$; **6400,** scale $\frac{1}{300,000}$, price of each $0.50.

Flat Rock, low and black, lies 1⅝ miles northward from Cape Elizabeth, about 1 mile offshore. A sunken rock which breaks in ordinary weather lies 400 yards southward from it.

A small low rock lies halfway between Flat Rock and Cape Elizabeth, with a smaller one inside halfway to the beach.

Pratts Cliff, 3 miles northward from Cape Elizabeth, is a sharp point with cliffs 100 feet high.

Split Rock, 85 feet high, lies 3½ miles northward from Cape Elizabeth and 1 mile offshore at the north end of Pratts Cliff; it is split in two, the division showing when seen from west to northwest. A small, low, black rock lies about ½ mile southward from it, and another, somewhat larger, lies ½ mile **SE.** by **S.** from Split Rock.

Willoughby Rock, 123 feet high, lies about ½ mile **NE.** by **N.** from Split Rock; it is nearly round with an abrupt seaward face. A cluster of rocks lies between Willoughby and Split rocks and a little southward of them; one is black and conical, with a rock awash 200 yards **SW.** by **W.** from it.

Sea Lion Rock, 15 feet high, small and black, lies 3 miles **NW.** by **W.** ¼ **W.** from Split Rock and about 2¾ miles offshore.

From Pratts Cliff to Raft River, 3½ miles, the coast consists of broken cliffs over 100 feet high, bordered by rocks extending over ½ mile offshore.

Raft Rock lies in the entrance to Raft River and at low water is connected with the south point of the river; it is over 100 feet high and about 300 yards long. A vertical pillar, 150 feet high, lies 150 yards **NNW.** from the rock and a cluster of rocks lies close-to under its southeastern point.

From Raft River to Queets River, 4⅓ miles, the coast consists of cliffs broken occasionally by small streams.

Queets River is the largest stream between Grays Harbor and Cape Flattery. The south point is a low, sandy spit about ⅛ mile long. The north point is about 1⅓ miles long and is covered with sand and trees at the mouth of the river.

From Queets River to Abbey Islet, abreast Destruction Island, 11½ miles, the coast is rather low and is broken by cliffs about 50 feet high with broad, low-water beaches; a group of low, flat rocks lies 6 miles northward from the river close inshore.

Destruction Island, 90 feet high, lies 20 miles northward from Cape Elizabeth and about 3 miles offshore. It is flat-topped and covered with brush, with a few clumps of trees. It is about ½ mile long and at its southern part about 300 yards wide. From the northern end rocks and ledges extend about 1 mile from the bluff. These are bordered by a line of kelp on the inshore side. A lighthouse and fog signal (see table, page 22) are established on the southwestern point. An indifferent **anchorage,** affording shelter from northwest winds, may be had off the southeast face of the island in 12 fathoms, sandy bottom, with the lighthouse bearing between **W.** and **WNW.** Vessels must leave if the wind hauls westward or southward.

From abreast Destruction Island to Hoh Head, 5 miles, the coast trends in a general northwesterly direction, forming a shallow bight; the cliffs are 80 to 100 feet high with numerous rocks and ledges extending in some cases nearly 1 mile offshore.

Hoh River enters about 2 miles eastward from Hoh Head. There is a broad sand beach at its mouth, and the cliffs are broken down nearly ⅜ mile, which is noticeable for a considerable distance offshore. In smooth weather it can be entered by canoes, but the channel shifts. An Indian village is located on the south bank at its mouth.

Hoh Head, 200 feet high, is a bright-yellow cliff, covered with a dense forest. It projects a little over ½ mile from the general trend of the coast. Sunken rocks extend 1 mile **S.** by **W.** from the head and between it and North Rock, while a large cluster lies off the south cliff of the head.

North Rock, 100 feet high, black with nearly vertical sides, lies 1⅛ miles southward from Hoh Head.

Middle Rock, 40 feet high, black with vertical sides, lies about ½ mile off the mouth of the Hoh River. A rock awash lies ⅔ mile from Middle Rock on a line between it and Destruction Island. Numerous low, flat rocks lie between it and the shore.

Perkins Reef, a long, bold, and jagged islet, lies 1⅙ miles **W.** ½ **S.** from the head. Between it and the shore is a small, visible rock with two sunken rocks near it.

From Hoh Head to Toleak Point, 5 miles, the coast forms two shallow bights, the southern being the larger. The cliffs are from 100 to 120 feet high and are broken by two small streams, one about two miles northward from Hoh Head and the other about 1 mile southward from Toleak Point. Several rocky, wooded islets, 25 to 115 feet high, lie in some cases 1½ miles offshore, and numerous rocks and sunken ledges extending over 2 miles offshore border this stretch of the coast. A detailed description is impracticable and only the prominent ones will be described.

Alexander Island, 121 feet high, lies 2 miles northward from Hoh Head and about 1 mile offshore. It is about ¼ mile long and ⅙ mile wide, bare, flat-topped with steep sides, and in general appearance is similar to Destruction Island. It is prominent in hazy or smoky weather. A cluster of three **sunken rocks** lies nearly ½ mile southward from the island. A **rock** awash at low water lies 1⅛ miles **WSW.** ½ **W.** from the island, and a small, bare rock, 25 feet high, lies halfway between them. Between the rock awash and the beach are two small rocks 44 and 75 feet high.

Toleak Point is a narrow point terminating in a small knob with an abrupt seaward face. A high, wooded islet lies 400 yards westward from the point, and is connected with it by an extensive, bare reef.

Rounded Islet, a round, grassy rock, 129 feet high, with steep sides, lies ½ mile seaward from the point; a low, black rock lies ⅔ mile **S.** by **E.** from it.

From Toleak Point to Teahwit Head, 4½ miles, the coast is irregular and much broken with numerous outlying rocks and sunken ledges extending in some cases 1 mile offshore.

The **Giants Graveyard** is an irregular group of rocks, some of which are wooded, varying in height from 88 to 212 feet. They are about 1½ miles northward from Toleak Point, and extend about ½ mile offshore, the farthest outlying danger being ¾ mile from the beach.

Teahwit Head is an irregular, jagged, double point, about 100 feet high, and heavily wooded behind the dead trees at the edge of the cliff.

From Teahwit Head to the Quillayute River the coast extends for 1½ miles in high, rocky cliffs, changing to a low sand beach 1 mile southward of the mouth of the river.

Huntington Rock, 135 feet high, is the outermost of a group of islands and rocks ⅔ mile off the northern end of the cliffs; it is flat-topped and bare with vertical sides. One of the inner islets is 192 feet high and another 223 feet high, the latter being wooded. One sunken and five low, black rocks extend northward for ¼ mile from Huntington Rock.

Quillayute Needle, 83 feet high, ⅓ mile southeastward from Huntington Rock, is about 35 feet in diameter and nearly vertical; it is the southeasternmost of a line of rocks, one of which is 47 feet high and another 73 feet high.

James Island, 125 feet high, lies 15 miles northwestward from Destruction Island and marks the mouth of the Quillayute River; it is bold, wooded, and connected with the beach at low water. Three smaller, wooded islands lie immediately northward of it. These islands are prominent, as the beach north and south of them is low, bare, and sandy, and the valley of the Quillayute River, heavily wooded and low, is behind them. An indifferent **anchorage** affording some shelter from northwest winds may be had close under and southward of James Island, in 5 to 6 fathoms, sandy bottom, about 600 yards from the beach. Any swell makes it unsafe.

The Indian village of **Lapush** is situated abreast James Island at the southern end of the sand beach extending from the Quillayute River.

Quillayute River enters at the northern end of the sand beach, expanding into a large lagoon inside the entrance. This is the largest river on the seacoast of Washington, but the bar at its entrance is navigable only by canoes.

From the Quillayute River to Cape Johnson the coast extends northward for 3 miles with steep, wooded bluffs and a narrow beach.

Cake Island, 116 feet high, lies 2⅛ miles **NW.** by **W.** ½ **W.** from James Island and 1½ miles offshore. It is about 200 yards long by 100 yards wide, with steep sides and a flat, grassy top in the middle of which is a small round mound about 20 feet high. Halfway between Cake Island and the beach is a jagged rock 131 feet high. A large, low, black rock lies 1⅛ miles **NNW.** ½ **W.** from Cake Island about 1 mile offshore.

Cape Johnson is small and not particularly prominent. It projects less than ½ mile from the general trend of the coast, terminating in a rocky, vertical cliff with a mass of rocks at its base. Several high rocks extend about ⅙ mile **WNW.** from the cape, the highest being 103 and 127 feet.

Three high, rocky pillars lie from ½ to 1 mile **SSE.** from the cape and reach elevations of 117, 209, and, 127 feet.

Between the cape and Cake Island is a cluster of low, black rocks, and northwestward are two clusters about 1 mile offshore.

From Cape Johnson to Cape Alava the coast extends in a general **NNW.** direction for 12½ miles. The cliffs are not continuous and show bright in but few places, the slopes being densely timbered. Back from the coast the country rises gradually for 10 or 15 miles to the flanking, wooded, snow-capped mountains of the Olympus Range.

Jagged Islet, 68 feet high, lies nearly 2¾ miles **W.** by **N.** from Cape Johnson. It is large, bare, black, and irregular in outline; a low, black rock lies 200 yards northward.

Carrol Islet, 200 feet high, lies 3 miles **NW.** by **W.** ½ **W.** from Cape Johnson and ⅞ mile **N.** ½ **W.** from Jagged Islet. It is about ⅛ mile in diameter, with vertical, whitish sides and wooded on top. A **pillar rock,** 176 feet high, lies 100 yards westward. A small, low, black rock lies 200 yards off the southeastern side. Carrol Islet and the pillar rock are quite prominent, especially when in sunlight.

Bald Islets are two high, bare rocks inside of Jagged and Carrol Islets about ¾ mile offshore. The outer and larger one is 247 feet high, with steep sides; the smaller one is 175 feet high. They are about 200 yards apart and between them are two pinnacle rocks close together. A cluster of small, low, black rocks lies ⅗ mile **SSE.** from the larger islets. Five small, black rocks lie between the larger islet and the beach, and several low, black rocks lie about 1 mile northwestward.

Hand Rock, 27 feet high, lies 1½ miles **N.** by **W.** from Carrol Islet and 1½ miles offshore; it is so named from its shape. A large rock, 40 feet high, lies halfway between it and the beach.

White Rock, 162 feet high, lies 7¾ miles from Carrol Islet, 2 miles **SSE.** from Cape Alava, and about ¾ mile offshore. It is about 100 yards in extent, with nearly vertical sides and a rounded top.

A group of large, low, black rocks lies ¾ mile **SSE.** from White Rock and about ¾ mile offshore; a small black rock is on the same bearing, distant 1½ miles.

Cape Alava lies 13½ miles southward from Cape Flattery, and nearly the same distance northward from Cape Johnson. The seaward face is about 1 mile in extent, with a steep, rocky islet off its northwestern end; the shore is bordered by numerous rocks and sunken ledges. The **Ozette Indian village** is situated here.

Flattery Rocks and **Umatilla Reef** are a group of rocks and islets extending westward from Cape Alava for a little over 2 miles. **Ozette Island,** 240 feet high, lies about 1 mile southward from the cape; it is about ½ mile long, with a width of ⅜ mile. It is flat-topped and wooded, with steep sides; off the south and southeast sides are low, black rocks at a distance of ⅓ mile. **Bodelteh Islets** are two wooded islets with high, bold, seaward faces. The outer one, 250 feet high, lies about 1⅕ miles westward from Cape Alava; the inner one, 230 feet high, is about 100 yards inshore from the outer islet. A high, bare rock lies close under the southwest face of the outer islet; a rock 175 feet high and about 50 yards in extent, with two smaller rocks outside of it, lies 200 yards westward of the outer islet.

Umatilla Reef extends about 200 yards east and west, with a width of 75 yards. It lies 1 mile westward of the outer Bodelteh Islet, and consists of several small, low, black rocks, with several breakers. It is difficult to make out, especially in thick weather, and is the worst danger on the northern coast. A light-vessel (see table, page 22) is moored about 2½ miles southwestward from the reef, but in very heavy weather is sometimes obliged to leave her station.

From Cape Alava the coast extends northward for 8 miles in two shallow bights, and then bends eastward, forming Mukkaw Bay, 3 miles wide, from the northern point of which it trends northwestward for 3 miles to Cape Flattery. The coast is irregular, with alternate stretches of wooded bluffs and rough, rocky cliffs, 100 to 200 feet high. The country immediately back of the beach is not high, but densely wooded.

Point of Arches lies 5 miles northward from Cape Alava, and is the northern point of cliffs extending 1½ miles southward. Numerous rocks and ledges border the cliffs, and extend in some cases ¾ mile offshore.

Father and Son, two rocks connected by a low, black reef, lie ⅝ mile offshore abreast the southern end of the cliffs; the outer rock is 163 feet high and the inner one 66 feet. A rock 40 feet high lies 1 mile **NNW.** from Father and Son and about ½ mile offshore, with several rocks between it and the beach.

Spike (Sail) **Rock,** 42 feet high, sharp and bare, lies ⅞ mile westward from Point of Arches. It is the outermost of a chain of rocks extending from the point, the three largest ranging in height from 152 to 170 feet; there are three arches in these rocks. A rock awash lies ⅓ mile **SW.** ⅝ **S.** from Spike Rock; it is inside the usual course of vessels.

Portage Head, 7⅗ miles northward from the outer Flattery Rock, has a seaward face about 1 mile in length of bold, rocky, irregular cliffs over 100 feet high. A reef extends from the point toward Cape Flattery for 1½ miles, showing several low, black rocks awash at low water and one small rock 44 feet high.

Mukkaw Bay is a shallow bight included between Portage Head and Waatch Point, a distance of about 3 miles. It affords indifferent shelter in northerly and easterly weather with a smooth sea, but is little used. The shores are low and sandy. The southern half of the bay is shoal, with reefs and rocks extending 1½ miles from Portage Head. The **Tzues Indian village** is situated at the southern end of the sand beach. The Tzues River enters about the middle of the bight. **Waatch Slough** enters in the northern part of the bight immediately eastward of Waatch Point. It is a tidal slough, and the valley through which it runs

extends to Neah Bay on Juan de Fuca Strait. This low depression is one of the features for recognizing Cape Flattery. The **Waatch Indian village** is situated at the mouth of the slough.

Waatch Point, 3 miles southeastward from Cape Flattery, is the eastern extremity of the cliffs, extending to the cape. This stretch is bordered by numerous rocks and ledges. Four rocky masses, extending ⅜ mile offshore, range in height from 44 to 88 feet.

Fuca Pillar lies ¼ mile **SSE.** from the western point of Cape Flattery. It is a rocky column, 140 feet high and 60 feet in diameter, leaning slightly northwestward; it is 120 yards off the face of the cliffs and is more prominent from northward than from southward.

Cape Flattery is a bold, rocky head, with cliffs 120 feet high, rising to an elevation of 1,500 feet 1 mile back from the beach. Numerous rocks and reefs border the cliffs eastward and southward of the cape. From southward it is usually raised as an island, on account of the low land in the vicinity of Waatch Slough.

Tatoosh Island lies ⅜ mile **NNW.** from Cape Flattery. The main island is about ¼ mile in diameter, with three smaller ones and several reefs awash close-to on its northwestern face. It is 108 feet high, flat-topped, and bare; a **reef,** the outer rock of which is usually awash, extends ¼ mile westward. Cape Flattery Lighthouse and fog signal (see table, page 22) and several buildings are situated on the western end of the island. The passage between the island and the cape is dangerous.

Duncan Rock, small, low, and black, lies 1 mile **NW.** ⅞ **N.** from the lighthouse. A **rock,** with 4 fathoms over it, lies ⅜ mile **ESE.** ½ **E.** from Duncan Rock.

Duntze Rock, with 3¼ fathoms over it, lies ¼ mile **NW.** ⅝ **N.** from Duncan Rock and almost in line with it and the lighthouse; it shows a breaker in heavy weather.

WILLAPA BAY.*

The entrance to this bay lies about 22 miles northward from Cape Disappointment. The principal exports are lumber, fish, and oysters; imports, general merchandise. Vessels clearing for foreign ports are cleared by a deputy collector from Grays Harbor or from Puget Sound.

The entrance is in the northern part of the bay, which consists of two arms, the southern about 16 miles long and the eastern about 10 miles long. Both arms are filled with extensive shoals, large areas of which bare at low water. The southern arm is separated from the ocean by a strip of low sand and sand dunes, averaging about 1½ miles in width and covered with trees until within 2 miles of Leadbetter Point, the northern extremity, and the southern point at the entrance to the bay. Numerous cottages and summer resorts are situated along the seaward face of the narrow peninsula. The shores of the bay elsewhere are composed of low, rolling hills 100 to 200 feet high covered with a dense growth of timber.

Nasal River and several small streams enter from the eastern shore, and are navigated by small logging steamers.

Willapa River enters at the head of the eastern arm, and is navigable for over 10 miles by light-draft vessels; deep-draft vessels do not go above South Bend. This river has been improved by the Government, with a view of obtaining a depth of 8 feet at low water, by the removal of snags and dredging below Willapa.

North River enters the eastern arm about 3 miles westward from the mouth of Willapa River; it is navigated by small logging steamers. It has also been improved by the removal of snags and log jams.

South Bend, the principal town, is situated on the south bank of Willapa River about 3 miles above the mouth. The town is mainly dependent on the lumber and oyster industries.

Tokeland, on Toke Point about 2 miles eastward from Cape Shoalwater, is the terminus of a stage line connecting with points northward along the coast as far as Westport, on Grays Harbor.

Bay Center is a small village on Goose Point on the eastern shore of the south arm near its entrance; oyster raising is the main industry.

Nahcotta, about 10 miles southward from Leadbetter Point on the western shore of the south arm, is a small town, the terminus of the railroad communicating with Ilwaco on the Columbia River.

The **bar** at the entrance to the bay lies about 3 miles outside the line joining the lighthouse and Leadbetter Point. It is short and as a rule has but one breaker; in 1901 there was 18 to 20 feet. The changes in the bar and the channels inside are frequent, and since the last survey have been extensive. The buoys are moved to indicate the best water.

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*Shown on chart **6185,** scale $\frac{1}{40,000}$, price $0.50.

Channels.—The channel leading into North Cove, formerly used as an anchorage by the towboats, has a depth of 3 feet and is practically closed. The channel leading to Nahcotta has sufficient depth for any vessel that can cross the bar. In the eastern channel a depth of 14 feet at low water can be taken to South Bend, the shoalest water being in Willapa River about 1 mile above the mouth at the junction of Mail Boat Slough. These channels are buoyed, and in addition the lumber companies have established pile beacons in some of the channels leading to the river for the use of the logging steamers.

Prominent features.—The lighthouse (see table, page 22) on Cape Shoalwater, the northern point at the entrance, is the most prominent feature in the approaches.

Anchorage may be had at almost any point inside the bay; the holding ground is good.

Pilots and towboats.—There are no regular pilots. The towboats are owned by the lumber companies, and are generally in readiness when a vessel is expected. Towage rates are $0.40 per thousand feet of lumber.

Quarantine is established when considered necessary, the anchorage limits being defined at the time (see the State laws in Appendix II).

Harbor regulations.—See the Washington laws relating to harbor control in Appendix II.

Supplies.—Provisions and water may be obtained. A limited amount of coal is usually on hand, but any amount can be had at short notice. A small amount of ship-chandler's stores can be had.

Repairs.—Repairs to wooden vessels may be made, and minor repairs to machinery and boilers. Vessels are sometimes beached for cleaning.

Communication may be had by coasting steamers, and by stage and rail. A small passenger steamer makes a daily trip with mail from South Bend to Nahcotta and return, stopping at Bay Center and Tokeland en route. There are also telegraph and telephone facilities.

Currents.—At the entrance the velocity of the currents is 4 to 6 miles; the velocity is greatest on the ebb, especially with a southerly wind.

Tides.—The mean rise and fall at the entrance is 6.2 feet; at South Bend 7.5 feet; and at Nahcotta 7.2 feet. The time of high water at South Bend and Nahcotta is about 45m. later than at the entrance. (See table, page 15.)

For **variation of the compass** see table, page 13.

GENERAL DIRECTIONS FOR APPROACHING WILLAPA BAY.

Owing to the frequent changes in the bar and the channels inside, no directions that would be of value to a stranger can be given. *From southward* follow the directions in section 6 of the Inshore Sailing Directions, Columbia River to Juan de Fuca Strait, page 86, until up with the whistling buoy off the bar, and wait for a pilot or towboat; or *from northward*, the directions reversed of the same section may be followed to the whistling buoy. *From seaward* in clear weather, the lights at the entrance, at Grays Harbor, 10 miles northward, and at Cape Disappointment, 22 miles southward, are distinguishing marks for fixing a vessel's position and the subsequent shaping of the course.

In thick weather a vessel should sound frequently, and should not shoal the depths to less than 20 fathoms unless sure of the position. The northward set of the inshore current must also be carefully considered.

The inshore current sets northward, its velocity being greatly affected by prevailing winds. Under the conditions of thick weather or fog, which at times extends several hundred miles seaward and lasts for several weeks, the set of the current must be guarded against. A sailing vessel under these circumstances should not shoal the depths to less than 30 fathoms until sure of the position.

The bar is impassable during the heavy weather which prevails during the winter months and vessels should heave-to at a safe distance offshore and await favorable conditions for entering.

Sailing vessels generally tow in and out; with a favorable wind and local knowledge a few vessels cross the bar without the service of a towboat, but as a rule are obliged to take one before reaching South Bend on account of the narrow channel.

GRAYS HARBOR.*

The entrance to this bay lies nearly 40 miles northward from Cape Disappointment and about 100 miles southward of Cape Flattery. A large amount of lumber is shipped to domestic and foreign ports; general merchandise and machinery are imported. A few vessels are built here each year. It is in the collection district of Puget Sound, the deputy collector being stationed at Aberdeen.

The bay at the entrance is about 2 miles in width, but the navigable channel is contracted by the shoals extending from Point Brown to a width of ⅜ mile. From the entrance the bay extends eastward for about 16 miles to the mouth of Chehalis River, and is filled with shoals and flats, bare at low water.

North Bay, on the north shore immediately eastward of Point Brown, is a shallow bight about 4 miles long at the entrance and 4 miles wide; it is filled with shoals and flats, bare at low water. The Humtulips River enters in the north part of the bight, several narrow channels winding through the flats to the main channel of the bay.

South Bay, on the south shore immediately eastward of Point Chehalis, is about 2 miles long and 2 miles wide; it is full of shoals, bare at low water, with a narrow channel leading to Laidlaw and Bay City.

Chehalis River enters at the eastern end of the bay; it is navigable by light-draft vessels as far as Elma, a small lumber town about 30 miles above Aberdeen; regular vessels do not go above Montesano, 12 miles above the mouth. It is used extensively in transporting logs. The Hoquiam and Wishkah rivers are small streams entering on the north shore.

Westport is a small village on the eastern end of Point Chehalis on South Bay; it is the terminus of the stage line between Willapa Bay and Grays Harbor, but otherwise is of no commercial importance. A wharf about ⅓ mile long extends to deep water in the channel. Laidlaw and Bay City are lumber mills at the head of South Bay.

Ocosta, on the eastern shore of South Bay, is the terminus of a spur of the Northern Pacific Railroad. It is of no commercial importance, and the long wharf connecting it with deep water is out of repair.

Grays Harbor and wharf, on the northern shore, are now abandoned.

Hoquiam, on the north shore of the bay at the mouth of Hoquiam River, about 10 miles from the entrance to the harbor, is the terminus of a spur of the Northern Pacific Railroad. There are large lumber and shingle mills. There is from 12 to 18 feet alongside the wharves, according to locality. Hoquiam River is crossed by two drawbridges, which, when open, leave a clear passage of about 100 feet.

Aberdeen, on the north shore at the mouth of Chehalis River, is the largest town on the bay. There are several lumber and shingle mills on both sides of the river, and several shipyards. The depth alongside the wharves varies from 12 to 18 feet, according to locality. A deputy collector of customs is stationed here.

Cosmopolis, about 2 miles above Aberdeen on the south bank of Chehalis River, has several lumber and shingle mills.

The harbor is being improved by the Government. A jetty is under construction, extending seaward from Point Chehalis with a view of improving the channel over the bar, and dikes and training walls have been constructed near Hoquiam and Aberdeen for improving the channel in that vicinity. Some dredging has also been done. The trestlework of the jetty extends at present (1902) nearly 2 miles seaward.

The **bar** is short, and the channel covering it has a depth varying from 19 to 22 feet. In heavy southwesterly weather it is impassable. The buoys are moved when necessary to indicate the best water.

The **channel** in the harbor is available for a draft of about 18 feet to Hoquiam and Aberdeen at high water.

Hoquiam Bar, with a least depth of 7 feet, lies about 1 mile below Hoquiam, at the western end of Rennies Island, near the end of the dike closing the Middle Channel. **Cow Point Bar,** just below Aberdeen and abreast the upper end of Rennies Island, has a least depth of 10 feet. Vessels loading to a deeper draft than 18 feet either finish loading by lighters below the bars or wait for spring tides.

Prominent features.—The lighthouse (see table, page 22), situated about 1½ miles from the northern extremity of Point Chehalis, is the most prominent feature in approaching the entrance. The **jetty** and the **buildings** at its inner end are also prominent in daytime upon a near approach. A **lone tree** on the southern extremity of Point Brown is used as a leading mark for crossing the bar. In clear weather **Breckenridge Bluff,** on the north shore of the bay about 6 miles from the entrance, is quite prominent; it is a reddish cliff about 1 mile long, rising in two places to a height of 80 feet.

Anchorage may be had anywhere inside the bay; outward-bound vessels waiting for opportunity to cross the bar usually anchor in the channel abreast Westport. The holding ground is good.

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*Shown on chart **6195**, scale $\frac{1}{40,000}$, price $0.25.

Pilots and towboats.—There are no regular pilots; the masters of the towboats act as such when necessary. Towboats generally lie at Hoquiam and take a run outside once or twice a day to sight vessels. Occasionally they lie at Westport and keep a lookout from the lighthouse.

Quarantine.—Vessels subject to quarantine are boarded at Hoquiam and do not proceed above until so boarded. The anchorage limits are defined when necessary. See also the Washington laws relating to quarantine in Appendix II.

Hospitals.—There is a relief station, Class III, of the United States Public Health and Marine-Hospital Service at Hoquiam (see Appendix IV).

Supplies.—Provisions and water can be had; a limited amount of coal is usually on hand, but any amount can be had at short notice. Some ship-chandler's stores can be obtained.

Repairs to wooden vessels and moderate repairs to boilers and machinery can be made. There are several shipyards and shipsmiths. Vessels beach for cleaning.

Communication may be had by stage and rail, and irregularly by coasting steamers. Steamers run daily between Aberdeen, Hoquiam, and Westport, and up the Chehalis River to Cosmopolis and Montesano. There are also telegraph and telephone facilities.

Storm warning displays of the United States Weather Bureau are made from a flagstaff on one of the wharves at Aberdeen, and are easily seen from the harbor. For an explanation of the signals, see Appendix III.

Currents.—The currents at the entrance reach at times a velocity of 5 miles, and are affected by freshets in the river; inside the bay the currents have less velocity.

Tides.—The mean rise and fall at the bar is 7.9 feet; at Hoquiam 8.3 feet. High water occurs at Hoquiam about 1h. 10m. later than at the bar. See table, page 15.

For **variation of the compass** see table, page 13.

GENERAL DIRECTIONS FOR APPROACHING GRAYS HARBOR.

Owing to the changes in the bar and the channels inside no directions can be given that would be of value to a stranger.

From southward follow the directions in section 6 of the Inshore Sailing Directions, Columbia River to Juan de Fuca Strait, page 86, and when up with the whistling buoy signal for a pilot; or *from northward*, the directions reversed of the same section may be followed to the whistling buoy. *From seaward* the lighthouses (see table, page 22) at Grays Harbor and Willapa Bay are distinguishing marks for determining a vessel's position and the subsequent shaping of the course.

In thick weather a vessel should sound frequently and should not shoal the depths to less than 30 fathoms unless sure of the position. The northward set of the inshore current must also be carefully considered.

The inshore current sets northward, its velocity being greatly affected by prevailing winds. Under the condition of thick weather or fog, which at times extends several hundred miles seaward and lasts for several weeks, the set of the current must be guarded against.

The bar is impassable during the heavy weather which prevails during the winter months, and vessels should heave-to at a safe distance offshore and await favorable conditions for entering.

Sailing vessels generally tow in and out; with a favorable wind and local knowledge a few vessels cross the bar without the service of a towboat, but as a rule are obliged to take one before reaching Hoquiam on account of the narrow channel.

JUAN DE FUCA STRAIT AND TRIBUTARIES.

The entrance to this important body of water lies between the parallels of 48° 23′ N. and 48° 36′ N., on the meridian of 124° 45′ W. Juan de Fuca Strait is the connecting channel between the ocean and the inland passages extending southward to Puget Sound and northward to the inland waters of British Columbia and southeast Alaska.

The commerce of this region is extensive, both foreign and domestic. Vast quantities of lumber and fish, together with grain and coal, are exported, while the manufacturing and shipbuilding industries are becoming important. Several transcontinental railroads have their western terminals on Puget Sound and

Georgia Strait, and there are several trans-Pacific lines of steamers, foreign and domestic, in addition to the coasting and local steamers and sailing vessels.

The navigation of these waters is simple in clear weather, the aids to navigation are numerous, and the chart is a good guide; but in thick weather, owing to the irregularity of the currents, strangers need a pilot. The sailing directions and descriptions of the various bodies of water are arranged in the order in which they are most commonly used.

Pilots.—The masters of towboats are licensed pilots, and are the only ones cruising at the entrance to Juan de Fuca Strait. Pilots can be obtained at Port Townsend, Seattle, and Tacoma. For the State laws relating to pilotage see Appendix II. Pilots for the waters of British Columbia can be obtained in Royal Roads, and can also be found at the entrances to the principal ports.

Towboats will generally be found cruising at the entrance to Juan de Fuca Strait or in Neah Bay, and one can always be obtained by telegraphing from Neah Bay or Clallam Bay.

JUAN DE FUCA STRAIT.

Juan de Fuca Strait, separating Washington from Vancouver Island, extends eastward for about 50 miles to Race Rocks, with an average width of over 10 miles. Eastward of Race Rocks it extends east-northeastward for 30 miles, with an average width of over 18 miles, connecting northward with Georgia Strait through the channels of Washington Sound, and connecting southward through Admiralty Inlet, which enters in its southeastern part, with Puget Sound. The depths, as a rule, are bold to within a short distance of the beach, with but few outlying dangers, most of which are in the eastern part. The shores on both sides are heavily wooded, rising rapidly to elevations of considerable height, and except in a few places are bold and rugged.

The north shore should be avoided, as it is the lee shore for most gales, and with the exception of Esquimalt Harbor there are no anchorages for strangers that afford shelter from all winds.

Royal Roads, the approach to **Esquimalt** and **Victoria** harbors, is included between Albert Head and Clover Point, about 2 miles eastward of the entrance to Victoria Harbor. Vessels frequently anchor here when awaiting pilots for British Columbian waters and for shelter from westerly gales.

Race Rocks, a small group of rocky islets lying about 1 mile southeastward from the southeast point of Vancouver Island, mark the turning point for vessels bound to Royal Roads, Haro Strait, or eastward in Juan de Fuca Strait. The largest of the Race Rocks is marked by a lighthouse (see table, page 28). They should be given a good berth, as the tidal currents in their vicinity have great velocity. Race Passage, northward of the islands, is not recommended for the same reason, and should not be attempted by strangers.

On the south shore are several anchorages, some of which afford shelter in any weather and some that are of value only in southerly weather. Those most frequently used are **Neah Bay, Port Angeles,** and **Port Townsend,** the latter just inside the entrance to Admiralty Inlet. These are described under separate headings. There are several small settlements and logging camps on the southern shore, the principal ones being **Neah, East** and **West Clallam, Pysht, Gettysburg, Port Crescent, Port Angeles, New Dungeness, Port Williams,** and the **National Quarantine Station** near **Port Discovery.**

GENERAL REMARKS ON APPROACHING AND ENTERING JUAN DE FUCA STRAIT.

In clear weather no difficulty will be experienced in approaching the entrance of the strait from any direction as the land on both sides is high, and Cape Flattery, the southern point at the entrance, is prominent, particularly from southward, on account of the low land between Mukkaw and Neah bays, see page 123. Cape Beale, the eastern point at the entrance to Barkley Sound, on the Vancouver Island shore about 20 miles westward of the entrance to the strait, is marked by a lighthouse, but has no fog signal. Carmanah Point Lighthouse, Cape Flattery Lighthouse, Umatilla Reef Light-vessel, and Destruction Island Lighthouse mark the approaches, and have fog signals. In thick weather the soundings will assist in estimating approximately the distance from shore.

Soundings.—The outer limit of the 100-fathom curve is about 35 miles south-southwestward from Cape Flattery and Cape Beale. Westward of Barkley Sound it is at an average distance of 25 miles offshore until westward of Clayoquot Sound. Southward of Umatilla Reef Light-vessel it is at an average distance of 20 miles from the light-vessel and Destruction Island, except, in a narrow submarine valley with greater depths, which begins at a point 10 miles southwestward from the light-vessel, and extending northward,

expands to a width of over 5 miles between Carmanah Point and Cape Flattery, and then extends eastward in the strait for about 30 miles. The outer limit of the submarine valley is about 10 miles westward from Cape Flattery. Inside the outer 100-fathom curve, the soundings are irregular but less than that depth, with the exception of the submarine valley noted above and a small area or pocket 17 miles *SW.* by *W.* from Cape Beale which is surrounded by depths of less than 50 fathoms.

On the Vancouver Island shore the 50-fathom curve is not less than 10 miles offshore at the entrance to Clayoquot Sound, and eastward increases this distance rapidly to 25 miles off the western side of Barkley Sound. Off the entrance to Barkley Sound the depths indicate a bank, averaging 6 miles in width and having depths of 36 to 50 fathoms, surrounding a deep pocket which begins 7 miles from Cape Beale and extends in a *SW.* by *W.* direction for 22 miles, with depths varying from 50 to 102 fathoms, and an average width of 5 miles. Southward of Cape Beale the 50-fathom curve is about 4 miles offshore and extends toward Cape Flattery, inclosing Flattery Bank on which a depth of 13 fathoms has been reported about 14¾ miles *NW.* by *W.* ¾ *W.* from Cape Flattery Lighthouse. A sounding of 20 fathoms has been obtained in this vicinity, but the position is doubtful.

From Duntze Rock the 50-fathom curve passes ¾ mile westward of Cape Flattery Lighthouse, and then rapidly increases its distance from the coast to 8 miles, and is 3 miles westward of Umatilla Reef Light-vessel. The depths inside 100 fathoms decrease rapidly to 30 fathoms, where the bottom becomes more uniform. Southward of Cape Flattery the 30-fathom curve is about ¾ mile inside the 50-fathom curve until abreast of Flattery Rocks, where it is less than 1 mile westward of Umatilla Reef Light-vessel. The soundings at a distance of over 10 miles southward of Umatilla Reef Light-vessel decrease with greater uniformity from 100 to 30 fathoms.

Fog.—The fogs are generally heavier near the entrance, decreasing in density and frequency up the strait. Near the entrance the fog sometimes stands like a wall, and vessels entering the strait run out of it into clear, bright weather even before passing Tatoosh Island. These fogs frequently extend a long distance seaward, and when combined with the smoke from forest fires become exceptionally dense. The wind gradually works the fog into the strait, and it will follow the northern shore past Port San Juan to the Sombrio River; occasionally it will reach as far as Sooke Inlet and at times to Race Rocks. As a rule, however, the fog follows farther into the strait along the southern shore, at times reaching Port Townsend; frequently the northern shore is clear when the southern is enveloped in fog (see Race Rocks Lighthouse, page 28).

Wind and rain.—In summer the prevailing northwesterly winds draw into the strait, increasing toward evening, and at times blowing a 10-knot breeze before midnight; this occurs, however, only when the winds are strong outside and sailing vessels may be a week from Cape Flattery to Admiralty Inlet, or vice versa.

In winter southeasterly winds draw out of the strait, causing a heavy cross sea off the entrance, the heavy southwesterly swell meeting that coming out. Under these conditions vessels, especially sail, make Neah or Clallam bays and await more favorable weather. The weather off the entrance in winter is as a rule exceptionally severe and wrecks are of frequent occurrence; the heavy, broken seas are probably due to the shoaling off the entrance, the irregularity and velocity of the currents, and the conflict between the wind drawing out of the strait and that along the outer coast.

The rainfall in the vicinity of the entrance is considerable, even during the summer months; the heaviest rains occur during December, January, February, and March.

Currents.*—Along the western coast of Washington and Vancouver Island a current, estimated to be 40 to 50 miles in breadth, sets northwestward. The velocity of the current varies considerably, being increased in southerly and southeasterly weather and diminished during the northwesterly winds that prevail during the summer months; during severe northwesterly gales it is probable that the direction of this current is reversed, but resumed upon moderation of the weather. Off the entrance of Juan de Fuca Strait the current is

* This information is derived largely from the report made to the committee on harbors and navigation of the British Columbia Board of Trade by Capt. Chas. E. Clarke, harbor master and port warden of Victoria, B. C.

augmented by the ebb current from the strait, which from latest information sets in a general west-northwest direction. On the flood tide there is a set into all the sounds on the Vancouver Island shore, and this combined with the prevailing northwest current and light southerly winds, with possibly some swell from the same direction, make the coast in the vicinity and westward of Carmanah Lighthouse dangerous, especially for sailing vessels. Sailing vessels making the strait during the winter months (especially during November and December), and experiencing easterly and southeasterly winds prevalent at this season, should endeavor to hold a position southward or southwestward from Cape Flattery, and should on no account open the entrance to Juan de Fuca Strait until an opportunity offers of getting well inside.

Tidal currents.—The *flood current* sets northward along the outer coasts of Washington and Vancouver Island at a rate ranging from 1 to 1½ miles per hour, the velocity being increased in southerly weather and diminished in northerly weather. Entering Juan de Fuca Strait it sets with considerable velocity over Duncan and Duntze rocks, but instead of running in the direction of the channel there is a continual set toward the Vancouver Island shore, which is experienced as far as Race Rocks. The flood current has also more velocity on the northern shore of the strait than on the southern.

The *ebb current* sets west-northwestward after leaving the strait. It is felt most along the southern shore of the strait, and between New Dungeness Lighthouse and Port Crescent there is a decided set southward and westward, especially during spring tides. With the wind and swell against the tide a short, choppy sea is raised near the entrance to the strait.

From Cape Flattery to Race Rocks the tidal currents have a velocity of 2 to 4 miles, varying with the range of tide and influenced by strong winds; eastward of Race Rocks in the wider portion of the strait the velocity is considerably less. At Race Rocks and Discovery Island the velocity is 3 to 6 miles, and the currents continue to run 1 to 2½ hours after high and low water. Along the Vancouver Island shore the currents turn 1½ to 2½ hours earlier than on the Washington shore of the strait, and advantage is frequently taken of this by vessels having an adverse current in the strait.

Tide rips occur off the prominent points and in the vicinity of the banks. They are particularly heavy off Cape Flattery, Race Rocks, Point Dungeness, and Point Wilson, at times becoming dangerous to vessels of considerable size.

SAILING DIRECTIONS, JUAN DE FUCA STRAIT.

These directions are available for vessels of any draft and lead well clear of all dangers, which, with the exception of Duncan and Duntze rocks northward of Tatoosh Island, in no case extend more than ½ mile from the beach. From westward or southwestward vessels may enter in mid-channel and hold such a course until up with Race Rocks, and then follow the directions given to the point of destination. From southward, having followed the directions for the outside route or the coasting directions, vessels may proceed as directed in section 1, following.

1. ***From Cape Flattery to Admiralty Inlet.***—From a position 3 miles *NW.* ⅝ *N.* from Cape Flattery Lighthouse steer **E.** ¾ **N.** for 50 miles, or until Race Rocks Lighthouse bears *N.* ¾ *W.*, distant 4¼ miles. Then,

If bound into Admiralty Inlet steer **ENE.** for 18 miles; this course made good should bring New Dungeness Lighthouse to bear *SSE.*, distant nearly 2½ miles. From this position steer **E.** by **N.** for 15 miles, when Point Wilson Lighthouse should bear *S.* by *E.*, distant about 1½ miles, and Admiralty Head Lighthouse should be ahead. Then follow the directions for Admiralty Inlet and Puget Sound on page 134.

If bound through Haro or Rosario straits follow the directions under those headings, on page 151 or 158.

Remarks and dangers.—In clear weather vessels will experience no difficulty in navigating Juan de Fuca Strait, as the landmarks are unmistakable, and at night the lights furnish opportunity for checking the position. The passage between Duncan Rock and Tatoosh Island is used at times by vessels with local knowledge but is not recommended for strangers on account of the currents and tide rips, especially in southwesterly weather, and the difficulty of picking up the range leading through.

The **E. ¾ N.** course draws gradually away from the Washington shore and when abreast of Race Rocks is in mid-channel. It passes 1 mile northward of the whistling buoy marking the entrance to Neah Bay. **Waaddah Island** will be easily distinguished by day, and the light on Baaddah Point will be made at night. From the vicinity of Cape Flattery, Port San Juan, on the Vancouver Island shore, will show as a gap between the hills. A broken cliff, about 10 miles eastward of Port San Juan, is a prominent feature on the northern shore. As Race Rocks are approached Race Passage will open up and the wide expanse of the strait northward to Haro and Rosario straits will be seen.

Rosedale Rock, with a least depth of 5 feet, lies ⅜ mile **SE.** by **E.** from Race Rocks Lighthouse; rocky, uneven bottom, with depths of 5 to 8 fathoms, extends ½ mile eastward of the rock. A buoy (can, black) is moored in 10 fathoms, 250 yards **E. ¾ S.** from the rock, which should be given a berth of not less than 1 mile to avoid the tide rips and currents in its vicinity which set toward it and the reefs near it with great velocity.

On the **ENE.** course **Ediz Hook Lighthouse** should be passed at a distance of 5 miles, and **New Dungeness Lighthouse** (see table, page 24) should be made in clear weather when westward of Ediz Hook. **Discovery Island Lighthouse** (see table, page 28) will be seen northward when nearly up to Ediz Hook. **Smith Island Lighthouse** (see table, page 24) should be made on the port bow when westward of New Dungeness Lighthouse. On the ebb, especially during spring tides, a set southward and westward will be experienced and allowance must be made for it.

A **shoal** with 7 to 13 feet over it extends about ¾ mile **N.** by **E. ¾ E.** from New Dungeness Lighthouse, and is marked at its northern end by a buoy (nun, red, No. 2). Heavy tide rips occur in the vicinity and northward of the shoal.

The **E.** by **N.** course heads for **Admiralty Head Lighthouse** (see table, page 24) and crosses the open bight from which Washington Harbor and Port Discovery extend southward. Protection Island, lying off the entrance to Port Discovery, is described on page 133.

Dallas Bank is an extensive shoal making northward from Protection Island, the 10-fathom curve being at a distance of about 2½ miles. The 3-fathom curve is ½ mile, and depths of 4½ fathoms are 1 mile from the island. From the 10-fathom curve the depths increase abruptly to 20 fathoms and over.

High, bare, clay bluffs, sparsely wooded on top, extend from Port Discovery toward Port Townsend, reaching a height of 400 feet near **Middle Point,** halfway between them, and breaking down abruptly a little westward of Point Wilson.

A **shoal** with 10 feet over it lies ⅝ mile northwestward from Middle Point; it is marked by a buoy (nun, red, No. 4). A **sunken rock** has been found southward and eastward of the shoal, and vessels are cautioned not to pass between the buoy and the point.

Point Wilson is low, but rises rapidly to the high cliffs extending eastward from Port Discovery. Its eastern end is marked by **Point Wilson Lighthouse** (see table, page 24). Shoals extend ½ mile northward of Point Wilson to the 5-fathom curve, over irregular bottom; these are generally indicated by kelp. A reported dangerous **sunken rock** lies ½ mile offshore about ¾ mile westward from Point Wilson. The eastern edge of the shoals rises rather abruptly from deep water. A buoy (nun, red, No. 6) is placed off the foul ground in 7 fathoms about ¾ mile **WNW.** ¼ **W.** from Point Wilson Lighthouse. Heavy tide rips extend northward of these shoals, being especially heavy with a westerly wind and ebb current. In thick or foggy weather in approaching Point Wilson the lead should be kept going, especially if the fog signal is not heard.

Admiralty Head, with the lighthouse on its summit, is the southeastern end of a succession of light, bare bluffs, which extend well northward of Point Partridge. At Point Partridge, about 5½ miles northwestward from Admiralty Head, the bluffs are highest—about 300 feet.

The nearest dangers northward of the course are the **bowlder reef** extending about ¼ mile westward from Point Partridge and marked by a bell buoy, 1 mile westward from the point, outside the kelp; and **Partridge Bank,** about 3½ miles **W.** by **N.** from Point Partridge. This bank, usually marked by kelp, extends about 1 mile in a general **W.** by **N.** direction, with depths of 4 to 5 fathoms. The shoalest water, 14 feet, is at its eastern end, and is marked by a buoy (can, black, No. 1) placed immediately eastward of it. Vessels are not apt to approach these dangers except in thick weather, as they are from 3 to 4½ miles northward of the course: caution should be observed in this vicinity if inside of 20 fathoms.

NEAH BAY,*

about 5 miles eastward of Cape Flattery, is used extensively by vessels in southerly and westerly weather when too severe to venture outside. Its proximity to the entrance to the strait and ease of access at all times make this anchorage very valuable; there is usually some swell, especially in northerly or westerly weather, when it

* Shown on chart **6265**, scale $\frac{1}{40,000}$, price $0.40.

is rather uncomfortable. The anchorage space is about 1 mile by ½ mile with depths varying from 4 to 10 fathoms, sandy bottom. **Waaddah Island,** about ½ mile long by 250 yards in width, forms the northeastern side of the bay; it lies about ¼ mile northward from Baaddah Point and is high and wooded, with a **reef** and foul ground extending about ¼ mile from its southwestern side. A whistling buoy is placed in 21 fathoms, ½ mile **NW.** by **W.** ¾ **W.** from the northwest end of the island, as a guide to the main entrance. The entrance south of the island, between it and Baaddah Point, has a channel only 250 yards wide with a least depth of 3¾ fathoms: this channel is used only by small vessels with local knowledge and is marked by a post light on Baaddah Point.

Neah, a post office, is a small settlement at the head of the bay. Communication may be had with Puget Sound ports by steamers and telegraph. Freight and passengers are landed in small boats or canoes. Lighterage charges are about $4 per ton. Provisions can be obtained in limited quantities.

Storm warning displays of the United States Weather Bureau are made from a staff at Baaddah Point and are readily seen by vessels in the strait. At night the lights are much brighter than the post light on the point.

Tides.—The tides are practically the same as at Cape Flattery (see table, page 15).

To enter, pass westward of the whistling buoy and steer about **S.** by **E.** into the bay, giving Waaddah Island and the entire southwestern shore of the bay a berth of not less than 600 yards, and select anchorage as desired.

CLALLAM BAY,

about 15 miles eastward from Neah Bay, is a broad, open bight about 2 miles long and less than 1 mile wide. It affords anchorage in 9 to 10 fathoms, sandy bottom, and is used to some extent in southerly or thick weather.

Slip Point, the eastern point of the bight, has been selected as a site for a lighthouse; a reef extends westward from the point for about ¼ mile.

East and **West Clallam** are two small settlements situated on the eastern and western ends of the bight. At East Clallam a short wharf has been built out to a depth of 15 feet; logs and some farm produce are exported and general merchandise imported. A limited amount of provisions may be obtained. Communication with Puget Sound ports may be had by steamer and telegraph.

Storm warning displays of the United States Weather Bureau are made from a staff at West Clallam and can be seen by vessels in the strait.

Tides.—High water occurs 1h. 6m. later and low water 0h. 57m. later than at Cape Flattery.

No directions are necessary for entering other than to give Slip Point a berth of over ¼ mile to avoid the reef projecting westward from it.

PYSHT RIVER

exports a large number of logs and some fish. The principal landmark is **Pillar Point,** 1 mile northward of the mouth of the river and about 6 miles eastward of Slip Point. This is a bold point and wooded from the beach to the summit. A black, haystack rock over 100 feet high lies close under its eastern face, and is prominent when coming from westward. All freight and passengers are landed by boat.

GETTYSBURG LANDING,

at the mouth of the Lyre River, is about 11½ miles eastward from Pillar Point. Logging is the main industry and freight and passengers are landed by boat. Low Point, the eastern point of Lyre River, is marked by a post light (see table, page 24).

PORT CRESCENT,

about 15 miles eastward from Pillar Point, is a small semicircular bight about 1 mile in diameter. The eastern part is shoal, but a wharf has been built from the western shore with 12 feet at its end. This is not a good landing in northerly weather. The anchorage is of small extent and suitable only for small vessels. Logs, shingles, and a small amount of farm produce are exported. **Port Crescent** is a post office and small settlement at the head of the bight. A limited amount of provisions may be obtained. Communication with Puget Sound ports may be had by steamer and telegraph. The western head of the bay is marked by a post light (see table, page 24).

Crescent Reef, with 3 feet over it, lies about ⅜ mile northward of the western point at the entrance; it extends about ⅜ mile in an east and west direction, with a narrow channel between it and the point. The reef is marked by a buoy (nun, red, No. 2) placed about 50 yards **N.** by **W.** from the shoalest part of the reef. A **reef** extends about 400 yards northwestward from **Tongue Point,** the eastern point at the entrance.

Storm warning displays of the United States Weather Bureau are made from a staff at Port Crescent.

To enter, bring the hotel, near the inner end of the wharf, just open westward of the outer end and stand in on that range; this clears Crescent Reef and the reef extending westward from Tongue Point.

FRESH WATER BAY,

about 5 miles eastward from Port Crescent, is a broad, open bight affording anchorage in 6 to 10 fathoms. It is little used, on account of the lack of shelter and its proximity to Port Angeles.

PORT ANGELES*

is about 56 miles eastward of Cape Flattery and about 27 miles westward from Point Wilson; the entrance is about 11½ miles southeastward from Race Rocks Lighthouse. It is included between **Ediz Hook,** a low, narrow sand spit about 3 miles long, and the southern shore, and is about 2½ miles long with a width of 1¼ miles at the entrance, decreasing to half that width at the head. The harbor is easy of access by the largest vessels, and is frequently used by them when weather-bound, and awaiting orders or a tug. The prominent feature in approaching is the lighthouse and buildings on the eastern point of Ediz Hook. The harbor is protected from all but easterly winds, which are rare and have no serious effect. The depths are greatest on the north shore and decrease from 30 fathoms to about 15 fathoms in the middle of the harbor, sticky bottom; from the middle the depths decrease regularly to the southern shore, where the 3-fathom curve in some places in the eastern part is nearly ¼ mile from the beach. The best anchorage is in 7 to 12 fathoms, sticky bottom, off the wharves.

Port Angeles, a town of some importance, is situated on the southern shore, and is a port of entry, a deputy collector being stationed there. Shingles, farm produce, and some salmon are exported, and general merchandise imported. Morses Wharf, at the foot of Laurel street, has a depth of 3½ fathoms at its outer end; Dolans Wharf, at the foot of Valley street, has about the same, and Petersons Wharf, at the western end of the town, has about 16 feet. The remaining wharves are not much used.

National quarantine regulations govern the port, and there is a National quarantine and a local health officer.

Supplies.—A limited supply of provisions and ship-chandler's stores may be obtained. Water can be had at Morses wharf. Coal is not kept on hand, as a rule, but can be obtained at short notice from other ports.

Communication may be had with Puget Sound and British Columbia ports by steamer and telegraph. There is also cable communication with Victoria, B. C., and northern ports.

Storm warning displays of the United States Weather Bureau are shown from a high staff on Laurel street, between Front and First streets, and are plainly visible to vessels in the harbor and strait.

Tides.—High water occurs 1h. 33m. and low water 1h. 6m. before high and low water, respectively, at Port Townsend. See also table, page 15.

No directions are considered necessary. The eastern end of Ediz Hook can be rounded at a distance of about 200 yards, as the water is deep close-to.

NEW DUNGENESS BAY

lies about 12 miles eastward of Port Angeles. It affords shelter in westerly winds, but is open eastward, and in northerly weather the protection afforded is only fair. It is formed by a sand spit extending northeastward about 3½ miles, and forming, in addition to New Dungeness Bay, a small lagoon at the head of the harbor which can be entered by light-draft vessels with local knowledge. A lighthouse (see table, page 24) is situated on the end of the spit and is the prominent feature in the approaches. From the end of the spit a shoal extends northward for about ¾ mile from the lighthouse; this is marked by a buoy (nun, red, No. 2), and vessels should not pass between the buoy and the lighthouse. The best anchorage is in from 5 to 9 fathoms, sticky bottom, on line between the end of the long wharf and the lighthouse.

New Dungeness (post office Dungeness) is a small settlement on the south shore of the bay. Shingles and farm produce are the principal exports, and general merchandise is imported. A wharf about 4,000 feet long and 75 feet wide on its outer end has been built out to a depth of 12 feet. A limited amount of provisions may be obtained. Communication may be had with Puget Sound ports by steamer and telegraph.

Tides.—High water occurs 1h. 4m. and low water 1h. 6m. before high and low water, respectively, at Port Townsend. See also table, page 15.

No directions are considered necessary further than to caution vessels not to pass between the lighthouse and the buoy marking the extremity of the shoal making off from the spit. A shoal makes out nearly 1 mile from the southern shore, and the spit forming the western side of the bay should be given a berth of over ⅜ mile.

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*Shown on chart **6303**, scale $\frac{1}{10,000}$, price $0.25.

PORT WILLIAMS

is an open landing about 4½ miles southeastward from New Dungeness Lighthouse and near the entrance to Washington Harbor. Some shingles and salmon are exported and general merchandise imported. A wharf has been built out northeastward from the shore for about 500 feet, with a width of 25 feet; the outer end is about 100 feet on the face and about 80 feet wide. There is 15 feet alongside the outer face. Communication with Victoria, B. C., and with Puget Sound ports may be had by steamer and telegraph.

WASHINGTON HARBOR*

is a small, landlocked bay, about 3¾ miles long in a northwest and southeast direction, with an average width of 1 mile. A sand spit extends from the eastern shore at the northern point nearly across to the western shore, leaving a narrow, winding channel, through which 11 feet can be taken at low water with local knowledge. Once inside, there is good anchorage anywhere in from 6 to 20 fathoms, muddy bottom. This harbor is but little used. A clam cannery is situated on the western shore near the entrance.

PORT DISCOVERY*

lies about 5 miles eastward from Washington Harbor; it is about 8 miles long, with an average width of about 1¼ miles. From the entrance it extends southward for about 1½ miles, and then bends southeastward for 2½ miles, from which point it sweeps in a gentle curve southward and then southwestward to the head, terminating in flats that bare at low water for about ¾ mile. There are no outlying dangers, and the depths in mid-channel range from 30 fathoms at the entrance to 10 and 12 fathoms 1½ miles from the head, where good anchorage may be had in from 8 to 10 fathoms, muddy bottom. The flats rise abruptly from depths of 3 and 4 fathoms, and at high water care should be taken to avoid anchoring too close to them. This harbor is but little used, as it is out of the usual lines of travel.

Protection Island, about 1¾ miles northward from Clallam Point, the western point at the entrance, is the prominent feature in approaching. It is about 1½ miles long in a northeast and southwest direction, with an average width of 1 mile, and about 200 feet high and wooded; its north shore consists of bare, light bluffs. Its eastern end and southern shore are clear. From **Kanem Point,** its southwestern extremity, a shoal extends southwestward for over ¼ mile, with depths of less than 5 fathoms ½ mile westward of the point. This is marked by a buoy (can, black, No. 1) placed in 5½ fathoms about ½ mile **WSW.** from the end of the point. **Dallas Bank** extends northward from Protection Island, the 10-fathom curve lying at a distance of about 2½ miles from the northern point. From the 10-fathom curve the bank drops off abruptly to depths of over 20 fathoms.

The **National Quarantine Station** is situated at Clallam Point, the western point at the entrance.

Tides.—High water occurs 0h. 28m. and low water 0h. 20m. before high and low water at Port Townsend. See also table, page 15.

No directions are considered necessary for entering and a mid-channel course is clear to the anchorage. Entrance may be made either eastward or westward of Protection Island.

RICHARDSON LANDING

is on the southern shore of Lopez Island, on the north shore of the cove northward of Iceberg Point; a wharf has been built out to about 9 feet. There is a fishing station located here. **Richardson,** the post-office, has daily communication by mail steamer with other points on the islands and with Port Townsend and Bellingham Bay. Water can be had at the wharf. **Anchorage** with good shelter can be had in the cove about 1 mile eastward of the wharf in 5 to 6 fathoms, soft bottom. No directions are necessary; passing ¼ mile eastward of the islands westward and southward of Richardson clears all dangers.

ADMIRALTY INLET AND PUGET SOUND.†

Admiralty Inlet, connecting Juan de Fuca Strait and Puget Sound, extends in a general southeast and northwest direction from Point Wilson and Admiralty Head for about 17 miles to Point No Point and the southern point of Whidbey Island, with an average width of 3 miles. Its eastern shore is formed by Whidbey Island

* Shown on chart **6403**, scale $\frac{1}{40,000}$, price $0.25.

† Shown in parts on charts **6450, 6460**, scale $\frac{1}{80,000}$, price of each $0.50.

and is indented by several shallow, open bights affording neither shelter nor anchorage. The western shore is more broken and irregular, the principal inlets being **Port Townsend** at its northern part, and **Port Ludlow** and **Hood Canal** near the southern part. The inlet is free from outlying dangers and the shores may be approached as close as ½ mile with safety. **Port Townsend, Port Hadlock,** and **Port Ludlow** are the principal towns, the former being a port of entry.

Puget Sound extends about 35 miles in a general southerly direction from the southern end of Whidbey Island and then turns southwestward for about 30 miles, expanding into numerous inlets and passages, the majority of which are navigable by deep-draft vessels, although seldom used by them. At its northern end it connects with **Possession Sound** and the inland waters eastward of Whidbey Island. The eastern shore of the sound is comparatively straight, the principal indentations being **Elliot Bay,** the port of **Seattle,** and **Commencement Bay,** the port of **Tacoma.** On the western shore the principal inlets are **Port Orchard,** the site of the naval station, **Port Blakely** and **Eagle Harbor,** on Bainbridge Island abreast Elliot Bay, and **Quartermaster Harbor,** between Vashon and Maury islands, immediately northward from the entrance to Commencement Bay. **Case** and **Carrol** inlets, near the head of the sound, each extend in a general northerly and westerly direction for about 10 miles, but at present are of little commercial importance. **Budd Inlet,** the southernmost inlet, is the approach to **Olympia,** the State capital. It is used mainly by light-draft vessels which run to the small settlements on the small inlets in the vicinity.

The navigation of Puget Sound is easy in clear weather and the chart is an excellent guide. The outlying dangers are few and marked by aids, and generally a mid-channel course can be followed with safety. Few deep-draft vessels pass beyond Tacoma, the communication with points beyond being maintained by local steamers from either Tacoma or Seattle. The currents follow the general direction of the channels, and among the narrower passages in the southern portion of the sound attain considerable velocity. In thick weather vessels with local knowledge depend upon the echo from the whistle in navigating these waters, but owing to the uncertainty of the currents and the great depths which render the lead useless in many places, strangers are advised to take a pilot.

The principal cities and towns are **Seattle, Tacoma,** and **Olympia**; there are numerous small settlements which are at present of little commercial importance.

The large tides of Puget Sound are very complex and variable, and the use of the tide tables for the Pacific Coast, which give the daily time and height of every high and low water for the principal ports, is advised.

SAILING DIRECTIONS, ADMIRALTY INLET AND PUGET SOUND.

These directions are available for vessels of any draft, and lead from Point Wilson Lighthouse to Tacoma Harbor. The navigation of these waters is perfectly simple in clear weather with the use of the chart, as the channels are broad, open, and free from outlying dangers. In thick weather the use of whistle echoes is common by those with local knowledge, and in certain localities the lead is of use. Local navigators, familiar with the peculiarities of the currents, depend largely on the speed of their vessels, the usual times on certain courses, and the conditions of the tides, and as a rule have but few mishaps even in the thick, smoky atmosphere that at times, when exceptionally dense, has been known to suspend navigation completely. This intimate knowledge of the localities, only obtained by long experience under varying conditions, it is impossible to impart. Each steamer has its own track, dependent on size, speed, and current conditions. With a favorable current a mid-channel course is usually steered to obtain the full advantage; with an adverse current the courses are usually closer inshore, where the currents have less velocity and advantage may be taken of favorable eddies.

The courses given are the usual ones followed by vessels, but a mid-channel track should be followed when it is desired to make the most of a favorable current.

1. ***From Point Wilson Lighthouse to West Point.***—From a position 1½ miles *N.* by *W.* from Point Wilson Lighthouse steer **SE.** by **E.** ¼ **E.** for about 4¾ miles, giving Marrowstone Point Post Light a berth of about ½ mile. From Marrowstone Point steer **SE.** for 5 miles, and when Bush Point Post Light bears on the port beam distant 1 mile steer **SE.** by **E.** ¼ **E.** for 8 miles, passing Double Bluff at a distance of ¾ mile and Point No Point Lighthouse at a distance of ⅝ mile. When up with Point No Point Lighthouse steer **SE.** ¼ **S.** for about 8 miles, giving Apple Cove Point a berth of about 1 mile.

When abreast the middle of Apple Tree Cove steer **S.** by **E.** ¾ **E.** for 7½ miles until West Point Lighthouse bears *ENE.* ¾ *E.*, distant ¾ mile. Then proceed as in section 2, following.

Remarks and dangers.—These courses are the usual ones steered by vessels and clear all dangers, which, with few exceptions, do not extend over ¼ mile from shore. The landmarks are easily distinguished in clear weather and are not liable to be confused.

The **SE.** by **E.** ¼ **E.** course leads across the entrance of Port Townsend Harbor, and **Bush Point** will be a little on the starboard bow. As Marrowstone Point is approached the entrance to Hood Canal will open out and **Hood Head,** in the canal, will be made as an island.

The **SE.** course heads a little westward of Point No Point and eastward of **Foulweather Bluff,** the eastern point at the entrance to Hood Canal. At night **Point No Point Light** (see table, page 24) should be made when northward of Bush Point.

The **SE.** by **E.** ¼ **E.** course, after passing Bush Point, passes ¾ mile westward of Double Bluff.

Double Bluff consists of bare, white cliffs, 300 to 400 feet high on its eastern face but much lower on its southwest face. **Shoals** extend nearly 600 yards westward from Double Bluff and are usually marked by kelp.

Foulweather Bluff is bold and wooded and over 200 feet high; its northern face is a bare bluff and the bottom deepens gradually northward of the head. The 20-fathom curve lies about ¾ mile, and depths of less than 6 fathoms are nearly ½ mile northward of the head.

Scatchet Head and **Possession Point,** at the southern end of Whidbey Island, are both prominent, especially from southward, the white bluffs being visible for a considerable distance. **Shoals** extend ½ mile offshore immediately westward of Scatchet Head and over ¼ mile offshore from the head to Possession Point.

A **bank,** with depths of less than 20 fathoms, extends over 3 miles southward from Scatchet Head and Possession Point in the direction of Apple Cove Point.

The **SE.** ¼ **S.** course leads about ⅞ mile eastward of Apple Cove Point. Southward of Point No Point the 3-fathom curve is over ¼ mile from the beach in places, and in this vicinity the land should be given a berth of not less than ½ mile.

Apple Cove Point is low and treeless at the end and rises quickly to higher, wooded land. A **spit** makes out nearly ¼ mile from the shore about ¼ mile southward of Apple Cove Point.

At night, **West Point Light** should be made when northward of Apple Cove Point.

The **S.** by **E.** ¾ **E.** course passes about 1 mile eastward of **President Point** and **Point Jefferson** and across the entrance to **Port Madison.** The houses of the Indian reservation at the head of Port Madison show plainly in clear weather.

West Point is low but rises abruptly to an elevation of over 300 feet about ⅜ mile from its extremity, which is marked by a lighthouse and fog signal (see table, page 24).

2. ***From West Point to Tacoma.***—From a position ¾ mile *WSW.* ¾ *W.* from West Point Lighthouse steer **SSE.** ½ **E.** so as to pass ¾ mile westward from Battery Point Post Light (Alki Point). When the light is abeam steer **SE.** ¾ **S.** for 7½ miles to a position ½ mile westward of Point Pully, and then change course to **SE.** ⅜ **S.** so as to give Robinson Point Post Light a berth of ¼ mile. After rounding Robinson Point, a **S.** by **W.** ¼ **W.** course made good for about 6 miles should bring Point Brown Lighthouse abeam, distant ⅜ mile, when a **SSE.** course leads to the mooring buoys off the Tacoma water front.

Remarks and dangers.—The **SSE.** ½ **E.** course leads across the entrance to Elliott Bay; **Duwamish Head** and the buildings in Seattle will show prominently. At night the electric lights will be seen for a considerable distance. The smoke from the mills in Port Blakely is generally visible.

Duwamish Head, on the south shore of Seattle Harbor, bluff and steep on its northern face, will be seen after passing West Point. A **shoal** extends about 600 yards northward from the head, the outer extremity being marked by a bell buoy placed in 6 fathoms.

Alki Point is low at its outer extremity but rises to a small knoll about 100 feet high 200 yards back of the point. The outer end is marked by **Battery Point Post Light** (see table, page 24).

The **SE.** ¾ **S.** course from Alki Point favors the eastern shore slightly and heads for **Robinson Point Post Light.** In clear weather this should be made before coming up to Point Pully. This course is free from dangers and should clear Point Pully by ½ mile.

Point Pully is low at its extremity but rises to an elevation of 430 feet in less than ¾ mile. There are no outlying dangers, and the point may be approached within 300 yards with safety.

The **SE.** ⅜ **S.** course should clear Point Robinson by about ¼ mile; it leads in deep water throughout, and there are no outlying dangers.

Point Robinson, the eastern point of Maury Island, is bluff and wooded: the extremity is marked by a post light and fog signal (see table, page 24).

The **S. by W. ¼ W.** course, after rounding Point Robinson, crosses diagonally to the eastern shore, passing about ⅜ mile westward of **Dash Point**, 1 mile northward of Point Brown, and about ⅜ mile westward of **Point Brown Lighthouse**. The currents and eddies are variable on this course, and in thick weather care should be exercised in closing with Point Brown.

The **SSE.** course leads from Point Brown to the mooring buoys off the Tacoma water front. For information regarding Tacoma, see separate heading.

PORT TOWNSEND.*

This important and valuable harbor lies immediately eastward of Point Wilson, and has its entrance between Point Wilson and Marrowstone Point. It extends in a general south-southwest direction for 2½ miles, with an average width of 1½ miles, and then turns southeastward for 3 miles, with a reduced width, to its head. Inside Point Hudson the depths range from 15 to 8 fathoms to Port Hadlock, at the head of the bay. It is an excellent harbor with good anchorage throughout and easily entered.

Point Hudson, on the western shore, about 1¾ miles southeastward from Point Wilson, is low and sandy. Its extremity is marked by a post light (see table, page 24). Northward of the point shoals make out for nearly ¼ mile, the outer limits being marked by a buoy (spar, red, No. 2).

Marrowstone Point, the eastern point at the entrance, is low at its extremity but rises abruptly to a bluff about 120 feet high. The eastern extremity of the point is marked by a post light and fog signal (see table, page 24).

Mid-channel Bank extends northwestward from Marrowstone Point about 2 miles toward Point Wilson, with depths varying from 5¾ to 10 fathoms.

Kilisut Harbor is a narrow inlet extending about 3 miles in a southeasterly direction with an average width of ½ mile; the entrance is about 1½ miles westward of Marrowstone Point. The channel entering is winding, with a depth of about 11 feet; inside good anchorage is afforded in 4 to 5 fathoms. At the southern end it connects at high water with Oak Bay, a small cove opening into Admiralty Inlet. This inlet is little used and local knowledge is necessary to enter.

Port Townsend, the principal town, is situated on the western shore immediately southward and westward of Point Hudson. This is a port of entry and the one in most frequent use. The depths at the wharves are ample.

Fort Townsend, on the western shore about 3 miles southward of Port Townsend, is an abandoned military post; the buildings are visible from the anchorage.

Irondale, on the western shore about 1 mile from the head of the bay, exports some pig iron; the furnaces are prominent and there is a wharf extending to deep water. Extensive improvements are contemplated.

Port Hadlock, at the head of the harbor, exports considerable lumber. There is a sawmill and several wharves. The smoke from the sawmills can generally be seen except in thick weather.

Anchorage.—The usual anchorage is 1 to 1½ miles southward of Point Hudson in 8 to 10 fathoms, muddy bottom. In southerly gales, better anchorage is afforded in the bight northward of the military post, in 8 to 10 fathoms, muddy bottom, as the cliffs afford some protection.

Quarantine.—There are both National and State quarantine officials, and vessels bound to ports in Washington are boarded here. The **National Quarantine Station** is at Port Discovery, 7 miles southwestward from Point Wilson. See extracts from State and National quarantine laws, in Appendices II and IV.

Harbor regulations are in force. See Appendix II.

Supplies.—Provisions and ship-chandler's stores can be obtained. Water may be had at the wharves. A limited amount of coal is on hand but any amount can be supplied at short notice.

Repairs.—Minor repairs to vessels and machinery can be made.

A **United States Branch Hydrographic Office** is established at the customhouse. Bulletins are posted here giving information of value to mariners, who are also enabled to correct their instruments and charts from standards. No charge is made for this service.

Hospitals.—A marine hospital of the United States Public Health and Marine-Hospital Service is situated at Port Townsend.

Communication with ports on the sound, British Columbia, and Alaska, and with points on the outside coast, may be had by regular lines of steamers. There are also telegraph and telephone facilities.

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*Shown on charts **6450**, scale $\frac{1}{80,000}$, price $0.50; **6405**, scale $\frac{1}{20,000}$, price $0.25.

Storm warning displays of the United States Weather Bureau are shown from a staff on the customhouse and are plainly visible to vessels in the harbor.

Tides.—See page 15.

The **tidal currents** in the harbor have little velocity.

GENERAL DIRECTIONS, PORT TOWNSEND.

These directions are available for vessels of any draft and lead to the usual anchorage. Vessels bound to the head of the bay should not approach either shore closer than ⅜ mile, which will clear the shoals off the entrance to Kilisut Harbor and those northward of the wharf at Irondale.

From Juan de Fuca Strait.—Pass well northward of Point Wilson buoy (nun, red, No. 6) and give Point Wilson Lighthouse a berth of ½ mile until it bears *SW.* by *W.*; then steer **SE.** by **S.** for about 1½ miles until Point Hudson Post Light bears abeam. From this position a **S.** by **W.** ¾ **W.** course along the city front for 1 to 1½ miles leads to the usual anchorage.

From Admiralty Inlet.—Round Marrowstone Point at a distance of ½ mile and steer **SW.** by **W.** ¼ **W.** for about 2¾ miles; anchor as above, with Point Hudson Post Light bearing about *N.*

Remarks and dangers.—The tidal currents in the vicinity of Point Wilson and Marrowstone Point have considerable velocity, and in thick weather soundings should be taken frequently if the fog signal is not heard. Approaching Point Wilson from northward the depths should not be shoaled to less than 15 fathoms. The depths increase rapidly after passing **Point Wilson Shoal**, which is described on page 130. The approaches to Marrowstone Point from southward are deep, the 20-fathom curve lying about ½ mile from the beach.

Mid-Channel Bank, extending northwestward from Marrowstone Point, is described on page 136.

A **spit** makes out from the north side of Point Hudson about ¼ mile; it is marked at its northeast end by a buoy (spar, red, No. 2).

The shore for 1½ miles westward from Marrowstone Point should not be approached closer than ¼ mile, and off the entrance to Kilisut Harbor this distance should be increased to ½ mile.

A **bank**, partly bare at low water, extends offshore about ¼ mile off the mouth of Chimikin Creek, about ½ mile northward of Irondale; the 3-fathom curve extends about north from the outer end of the wharf until abreast the creek, when it draws inshore.

PORT LUDLOW.*

The entrance to this harbor, on the western shore of Admiralty Inlet, lies about 9 miles southward of Marrowstone Point and on the west side at the entrance to Hood Canal. From the entrance, which is broad, the bay extends in a general southerly direction about 2½ miles, terminating in a basin about ½ mile in diameter. The basin affords good anchorage in 7 to 8 fathoms, soft bottom; the shores are fairly steep.

Tala Point, the eastern point at the entrance and the dividing point between the harbor and Hood Canal, is bluff and wooded and about 250 feet high. **Colvos Rocks**, three in number, lie 1¼ miles **NW.** ½ **N.** from Tala Point and about ¼ mile offshore; the western one is 25 feet high, of small extent, with deep water around it. From the other two a bank with 8 to 27 feet extends to Tala Point. The passage between the rocks and Tala Point is marked by a buoy (nun, red, No. 2) placed in 18 feet about ½ mile southeastward from Colvos Rocks, and a buoy (spar, black, No. 1) placed in 17 feet about ¼ mile northward from Tala Point. There is a least depth of 3½ fathoms midway between the buoys with deeper water near the northern buoy.

Snake Rock lies ⅜ mile **SSW.** ½ **W.** from the western Colvos Rock and 300 yards offshore; it is 150 yards in extent and shows slightly above high water.

Klas Rock lies ⅝ mile **NNW.** ½ **W.** from the western Colvos Rock and ¼ mile from the western shore abreast the narrow entrance to a small lagoon; it is of small extent and portions of it show a few feet at high water. It is marked by kelp and surrounded by deep water, with 16 fathoms between it and the shore.

Channels.—The deepest channel in entering lies eastward of Klas Rock and between Snake Rock and the western Colvos Rock; the width between the 5-fathom curves is 600 yards, with depths of 11 to 16 fathoms in

* Shown on charts **6450**, scale $\frac{1}{80,000}$, price $0.50; **6410**, scale $\frac{1}{20,000}$, price $0.15.

mid-channel. The channel between Colvos Rocks and Tala Point is marked by buoys, and its depth ranges from 21 to 27 feet.

Port Ludlow, on the north side of the basin, is an important mill port and exports considerable lumber. Shipbuilding is also an industry and repairs to wooden vessels can be made. The wharves are available for deep-draft vessels. Provisions can be had and water may be obtained at the wharves. Towboats can always be had.

Tides.—See table, page 15.

GENERAL DIRECTIONS, PORT LUDLOW.

From Northward.—Follow the directions in section 1, page 134, to a position 1 mile southwest of Bush Point Post Light, and then steer for the western Colvos Rock, course **S.** ¼ **E.** for 4 miles, to a position ¼ mile eastward from Klas Rock. Then steer about **S.** by **W.** so as to pass about 250 yards westward of the western Colvos Rock. Pass in mid-channel between it and Snake Rock, and then steer **SSE.,** giving the western shore a berth of about ¼ mile. Then haul southward and westward into the port, favoring the point on which the mill is located in rounding into the basin, and anchor as desired.

From Eastward.—Pass ½ mile northward of Foulweather Bluff, the eastern point at the entrance to Hood Canal, and steer **SW.** ¾ **W.** for 2 miles, passing 200 yards southward of Colvos Rocks buoy (nun, red, No. 2). Then haul southward into the port, leaving Tala Point buoy ¼ mile on the port hand. Favor the point on which the mill is located in rounding into the basin, and anchor as desired.

Remarks and dangers.—Coming from northward on the **S.** ¼ **E.** course **Tala Point** will be on the port bow, and **Hood Head,** high and steep, will appear as an island showing between Tala Point and Foulweather Bluff.

Klas, Colvos, and **Snake** rocks and the bar extending from Tala Point to the Colvos Rocks are described above.

HOOD CANAL.*

The entrance to this inlet is on the western shore between Foulweather Bluff and Tala Point, about 10 miles southward from Marrowstone Point. It extends in a general southerly direction for 44 miles and then bends sharply northeastward for 11 miles, terminating in flats bare at low water. The shores are high, bold, and wooded, rising to a much greater height, particularly on the western shore, than in other parts of the sound. The water is deep as a rule, except at the heads of the bays and at the mouths of the streams. The chart is a sufficient guide for the purpose of navigation.

Port Gamble † is a small inlet on the eastern shore of the canal, about 5 miles from the entrance. It is about 2 miles in length, with an average width of about ½ mile and a narrow entrance. The channel in entering is narrow, and leads for about ½ mile over a bar just outside the entrance. The best depth in entering is 3½ fathoms, and the outer end of the channel is marked by a lighted beacon. Good anchorage is afforded in 4 to 9 fathoms, muddy bottom. **Port Gamble,** on the western shore at the entrance, is a mill port that ships considerable lumber. Provisions can be obtained and water is piped on the wharf. A tugboat is also available when not laid up for repairs.

Seabeck is a small settlement and lumber port at the head of Seabeck Bay, a small cove on the eastern shore, about 21 miles from the entrance to the canal. There is 7 feet at the wharf. About 1 mile northward from Seabeck is a wharf, with 16 feet, where wood and water can be obtained.

Dabop Bay, the entrance to which is on the western shore, abreast Seabeck, is the largest inlet in the canal. It extends about 9 miles in a northerly direction, with a small inlet, Quilcene Bay, on the western shore. The western shore is particularly steep and bold, reaching an elevation of over 2,600 feet in less than 2 miles.

Union, on the southern shore, near the point at which the canal turns northeastward, is a lumber port and the largest settlement on the canal.

Annas Bay lies immediately westward of Union and is a broad, open bight, the eastern half being a flat, bare at low water; this flat extends about ¼ mile into the canal immediately westward of Union.

There are several other small settlements on the canal, none of which are at present of much commercial importance.

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* Shown in parts on charts **6450, 6460,** scale $\frac{1}{80,000}$, price of each $0.50.

† Shown on chart **6412,** scale $\frac{1}{20,000}$, price $0.15.

Foulweather Bluff, the eastern point at the entrance to the canal, is one of the most prominent cliffs in Puget Sound. The northern face is about ½ mile broad and consists of vertical, sandy, clay bluffs about 225 feet high, covered with fir and dense undergrowth. Eastward it slopes to a bluff 40 feet high, but on the canal side the point is steep.

Hood Head, about 160 feet high, steep and wooded, generally appears as an island; it is a detached knoll connected by a low, narrow strip of sandy beach with the western shore. It is a prominent feature in entering the canal.

Sisters are two rocks about ⅜ mile from the northern entrance point to **Squamish Harbor,** a small, open bight on the western shore abreast the entrance to Port Gamble. They are a little over 200 yards apart, of small extent, and cover at about half tide. A rock, with about 7 feet over it, is reported to lie about ⅜ mile **WSW.** from the southern Sister and about ⅜ mile offshore.

Cases Shoal, partly bare at low water, lies about ⅝ mile from and parallel to the western shore of Squamish Harbor; it is about 1 mile long and its northern end is ½ mile from the northern shore of the harbor.

Communication.—The different settlements are reached by a steamer making regular trips from Seattle.

Tides.—See table, page 15.

The **tidal currents** have a maximum velocity of about 3 miles: off **Point Hannon,** the eastern point of Hood Head, **swirls** are formed, heaviest during spring tides, but not dangerous to navigation.

Sailing directions are not considered necessary; the dangers are few and close inshore and a mid-channel course is clear until reaching the point where the canal turns, when the north shore should be favored to clear the flats extending from the eastern part of Annas Bay. The chart is a good guide.

PORT MADISON.*

This port is on the western shore of Puget Sound about 25 miles southward of Marrowstone Point. It is included between the northern end of Bainbridge Island and Point Jefferson, and is about 3 miles in depth with an average width of 2 miles. The depths range from over 80 fathoms at the entrance to 20 fathoms less than ½ mile from the beach, but the port affords anchorage closer inshore in 15 to 16 fathoms, sticky bottom. In the southwestern part it connects with Port Orchard through Agate Passage.

The north shore is formed by broken, white cliffs with low beaches between and bordered by sand and shingle beaches, bare at low water in some cases for a distance of nearly ¼ mile. The cliffs on the western shore are moderately low; the buildings of the Indian reservation near the entrance to Agate Passage are prominent. The southern shore is composed of broken cliffs except where it is indented by the narrow arm extending southward about 1 mile, on which is situated the mill port of Port Madison. **Point Monroe,** the southern point at the entrance, is a low, narrow, sand spit, curving westward and marked by a post light.

The entrance to the inlet leading to the mill port of Port Madison is about ¾ mile westward of the post light. The channel in entering is narrow with a least depth of 13 feet, and local knowledge is necessary to keep in the best water. The anchorage inside is limited, but anchorage may be made off the entrance if necessary. Considerable lumber is exported. The wharf facilities are ample and mooring dolphins have been established. Provisions and water can be obtained and tugs are available. Repairs can be made to wooden vessels.

Tides.—See table, page 15.

EAGLE HARBOR.†

This inlet is situated on the eastern shore of Bainbridge Island about 5 miles southward of Point Monroe and opposite Elliott Bay. It is about 1 mile long with a width of about ½ mile and affords excellent anchorage in 5 to 6 fathoms, muddy bottom. A shipbuilding plant is in contemplation, but at present (1903) there are no settlements of commercial importance.

The entrance is deep, but is only about 200 yards wide, between Wing Point Reef and the spit on the south side at the entrance, and caution is necessary in entering.

Wing Point Reef extends southeastward for about ½ mile from Wing Point, the northern point at the entrance. The extremity of the reef is marked by a buoy (nun, red, No. 2), but there is a 16-foot spot and depths of less than 4 fathoms over ¼ mile southward of the buoy.

A **spit,** bare at low water, extends about 300 yards northward from the southern point at the entrance, and is marked by a buoy (can, black, No. 1) placed in 18 feet off its northeast edge. The spit extends nearly 500 yards northwestward from the point, with depths of 2 feet and less.

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*Shown on charts **6450,** scale $\frac{1}{80,000}$; **6443,** scale $\frac{1}{20,000}$, price of each $0.50.

†Shown on charts **6450,** scale $\frac{1}{80,000}$; **6444, 6445,** scale $\frac{1}{20,000}$, price of each $0.50.

Blakely Rock is prominent in approaching; it lies ¾ mile northward of Restoration Point and at high water shows about 15 feet at its highest point. It is about 400 yards in extent, with shoal water, well marked by kelp, extending over 250 yards northward.

Tides.—See page 15.

To enter, give Wing Point and buoy a berth of over ½ mile and pass midway between Blakely Rock and the buoy. Bring Restoration Point astern, bearing **SE.** ⅜ **S.**, and steer **NW.** ⅜ **N.** with black can buoy No. 1 a little on the port bow. Pass about 75 yards eastward of the black buoy and steer **W.** ½ **N.** for ¼ mile to clear the northwest end of the spit on the south side. Then haul southwestward into the harbor, following the northern side at a distance of 350 yards, and anchor as desired.

BLAKELY HARBOR.*

This small inlet is situated on the eastern shore of Bainbridge Island, near its southern end. It is about 1 mile in length and at the entrance nearly ½ mile wide, narrowing to the head. The depths range from 18 fathoms at the entrance to 3½ fathoms near the head. The usual anchorage is near the entrance in 9 to 16 fathoms, sticky bottom, slightly favoring the southern shore.

Blakely, at the head of the harbor, is a large mill port and exports a considerable amount of lumber. Wooden vessels are built here and repairs to wooden vessels can be made. Provisions, water, and tugs can be obtained. Communication with Seattle is had by means of a steamer making regular trips.

Blakely Rock is described above.

Restoration Point is flat and about 10 feet above high water for 300 yards, beyond which it rises abruptly to about 100 feet.

Decatur Reef, partly bare at low water, extends about 300 yards eastward from Restoration Point. The end of the reef is marked by a buoy (spar, red, No. 2) placed in 8 fathoms, 400 yards eastward of the point.

Tides.—See page 15.

Sailing directions are not needed for entering. Blakely Rock may be passed on either side, but if passing northward of it, should be given a berth of not less than ¼ mile.

PORT ORCHARD.†

This is an extensive body of water lying westward of Bainbridge Island; its general length is about 15 miles with an average width of over ¾ mile. At its northern end it connects with Port Madison through Agate Passage. A narrow, unimportant inlet, Dogfish Bay, makes into the western shore about 4 miles at the southern end of Agate Passage. At the southern end of Bainbridge Island Port Orchard connects with Puget Sound through **Richs Passage.** About 2 miles southward of Richs Passage, on the western shore of the port, is the entrance to Port Washington Narrows, a narrow passage about 3 miles long, connecting with Dyes Inlet, a body of water of little commercial importance.

The depths in the main body of Port Orchard range from 6 to 25 fathoms with but few dangers, and these as a rule close inshore. The shores are moderately low and wooded.

Charleston, Bremerton, and **Sydney**, on the southern part, are the most important of several small settlements along the shores.

Puget Navy Yard, from which Port Orchard derives its main importance, is situated southward of and adjoining Bremerton on the south side of the entrance to Port Washington Narrows.

Doc'k.—The Government dry dock at the naval station is 640 feet long over all, 573 feet on the blocks, and a width at the entrance of 93 feet 8 inches; there is 30 feet over the sill and 28½ feet on the blocks. Mooring buoys have been placed off the entrance to the dock.

Communication by means of regular steamers and by telegraph and telephone may be had with Seattle.

Channels.—Agate Passage, the northern entrance, connects with Port Madison; it is narrow, the tidal currents have considerable velocity, and it is obstructed by a shoal in the middle at the north end with depths of 6 to 7 feet. The least depth in the channel proper is 3¾ fathoms. Its use is confined to local vessels.

Richs Passage, at the southern end of Bainbridge Island, is the principal entrance and the one in general use. The approaches to the passage are between Restoration Point, described, under Blakely Harbor, and **Blake Island,** 160 feet high and wooded, 2½ miles southward of the point. The passage is about 3 miles long, with a rather sharp bend near the western end, and varies from a width of ¾ mile at its eastern end to a little more than ¼

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* Shown on charts **6450,** scale $\frac{1}{80,000}$; **6444, 6445,** scale $\frac{1}{20,000}$, price of each $0.50; **6442,** scale $\frac{1}{10,000}$, price $0.15.

† Shown in parts on charts **6450, 6460,** scale $\frac{1}{80,000}$; and in parts on charts **6443, 6444,** scale $\frac{1}{20,000}$, price $0.50.

mile at its western. The principal dangers are marked by buoys and a spindle, and the southern point at the entrance by Orchard Point Post Light. The depths in the passage range from 5 to 18 fathoms.

Tides.—See page 15.

The **tidal currents** are irregular and have considerable velocity. In Richs Passage swirls and tide rips are formed but are not dangerous to navigation.

GENERAL DIRECTIONS, PORT ORCHARD.

Enter between Restoration Point and Blake Island, giving either shore a berth of not less than ½ mile, and steer so as to pass 300 yards southward of Bainbridge Reef buoy (nun, red, No. 2). From a mid-channel position between Orchard Point and Bainbridge Reef buoy, steer **WNW. ½ W.**, heading for Middle Point and passing 200 yards southward of Orchard Rocks buoy (nun, red, No. 4). Continue the course until Orchard Rocks spindle is abeam, and then follow a mid-channel course to the western end of the passage. From the western end of Richs Passage steer **S.** by **W. ¾ W.** until abreast the entrance to Port Washington Narrows, when a **SW.** by **W. ¼ W.** course for about 1 mile leads to the anchorage off the naval station. Anchor as desired in 6 to 8 fathoms, soft bottom.

Remarks.—The least depth liable to be found in following the directions is 5 fathoms at a point in Richs Passage ¾ mile northwestward of Orchard Rocks. **Middle Point,** on the western side of the passage abreast Orchard Rocks, is prominent. The **S.** by **W.** ¾ **W.** course follows the eastern shore of Port Orchard, at a distance of about 600 yards, and leads in mid-channel in approaching Point Herron. Care should be taken to have Port Washington Narrows well open before changing course to **SW.** by **W.** ¼ **W.** so as to clear the shoal which extends southward from Point Herron.

Dangers.—**Decatur Reef,** partly bare at low water, extends about 300 yards eastward from Restoration Point. The end of the reef is marked by a buoy (spar, red, No. 2) placed in 8 fathoms 400 yards eastward of the point.

Shoals extend from the north side of Blake Island for a distance of 300 yards at its eastern end, and about 800 yards near its western end.

Bainbridge Reef, a shoal spot with 4 fathoms over it, lies 1,200 yards **NE.** ½ **E.** from Orchard Point Post Light, and 700 yards offshore from Bainbridge Island, on the line of its western shore. It is marked by a buoy (nun, red, No. 2) placed in 45 feet about 100 yards westward of the rock.

Orchard Rocks lie on the eastern side of the channel inside the entrance to Richs Passage. The highest point covers about half tide and is marked by a spindle, placed ¾ mile **NNW.** from Orchard Point Post Light. The southern limit of the reef is marked by a buoy (nun, red, No. 4) placed in 6 fathoms on line between the spindle and the post light, and about 900 yards from the latter.

A **shoal,** with 3¼ fathoms at its outer end, extends about 700 yards southward from Point Herron, the northern point at the entrance to Port Washington Narrows.

SHILSHOLE BAY.*

This is a wide, open bight situated immediately northward of West Point, on the eastern shore of the sound. It is used occasionally as a temporary anchorage, but affords no shelter. The bight itself is important only in forming the approach to the small inlet known as **Salmon Bay,** on which the town of Ballard is situated, and through which is the course of the proposed canal extending from deep water in Puget Sound to Lake Union. This has been partially constructed, and at low water a depth of 16 feet can be taken to the wharves at Ballard through a dredged cut 50 feet in width.

Ballard has considerable commerce, and is closely connected with Seattle by rail and electric cars. Shipbuilding is among the industries, and repairs to vessels and machinery can be made. There is a marine railway with a capacity of 600 tons. Provisions and water can be obtained, as well as ship-chandler's stores. Coal is generally obtained at Seattle. Tugs can be had at short notice.

The **tidal currents** have considerable velocity and run in the direction of the channel.

ELLIOTT BAY (SEATTLE HARBOR).†

This inlet is on the eastern shore of the sound about 35 miles southward from Marrowstone Point; the entrance is between **West Point** and **Alki** (Battery) **Point,** about 5 miles southward. The bay proper, included

* Shown on charts **6450,** scale $\frac{1}{80,000}$; **6445,** scale $\frac{1}{20,000}$, price of each $0.50; **6439,** scale $\frac{1}{20,000}$, price $0.15.

† Shown on charts **6450,** scale $\frac{1}{80,000}$; **6445,** scale $\frac{1}{20,000}$, price of each $0.50.

between Smith Cove and Duwamish Head, has a width of nearly 2 miles and extends east-southeastward for nearly the same distance to the flats at the head. The Duwamish River enters at the head through several channels extending through the flats, which rise abruptly from deep water. These flats are in process of reclamation. The depths in the bay are excessive and preclude anchorage, except at a few places close inshore. At the head of the bay the flats are crossed by the Northern Pacific Railroad trestle, the shallow water extending but a short distance northwestward of the trestle. A drawbridge, with a clear width of 55 feet, is near the eastern end of the trestle. Small vessels occasionally go above the trestle into the Duwamish River for the purpose of laying up in fresh water.

Seattle, the largest and most important city on the sound, covers practically the entire northern shore of the bay. Its commerce, both foreign and domestic, is extensive, and it is the terminus of or connects with several transcontinental railroads. It is the terminus of several trans-Pacific lines of steamers, and connects with points north and south by rail and water. Its railroad and shipping facilities give it a large proportion of the Alaska commerce. Coal, lumber, grain, fish, and general merchandise are largely exported. The wharves are extensive, with sufficient depth for any draft. Vessels usually go direct to the wharves, but mooring buoys have been placed for those waiting dock room or opportunity to coal at the bunkers.

West Seattle, on the south shore of the bay, is a small settlement with a few wharves and grain elevators. Deep-draft vessels can lie at one of the wharves. It connects with Seattle by rail and ferry.

Smith Cove, on the north shore about 2½ miles eastward from West Point, is a small indentation bare at low water; it is practically a continuation of the Seattle water front. There are wharves, coal bunkers, and grain elevators with modern facilities for loading and discharging. Deep-draft vessels can lie at the wharves.

Prominent features.—West Point, the northern point at the entrance, is low and sandy, but rises abruptly in ⅜ mile to steep bluffs, 200 to 300 feet high, that extend nearly to Smith Cove. The extremity of the point is marked by a lighthouse and fog signal (see table, page 24).

Duwamish Head, over 300 feet high, about 2 miles inside of Alki Point, is a prominent feature in approaching; it terminates in steep bluffs. A **shoal** extends northwestward from the point, the 3-fathom curve lying at a distance of about 600 yards. A bell buoy is placed in 6 fathoms off the end of the shoal.

Alki (Battery) **Point** is low, with a small knoll about 100 feet high immediately behind it; behind the knoll low land extends for nearly ⅜ mile before rising to the high land extending southward from Duwamish Head. A post light is situated near the end of the point (see table, page 24).

Anchorage.—Vessels are not allowed to anchor northward of a line from the coal bunkers to Duwamish Head. Few vessels anchor on account of the depth. Mooring buoys are placed for vessels, for the use of which fees are collected by the harbor master, who has charge of them; Government vessels are allowed free use of the buoys. In heavy, northerly weather, which is rare and occurs generally during the winter months, the anchorage is uncomfortable, and vessels at the wharves are liable to damage and are frequently obliged to haul out. During the freshet season in the Duwamish River a large amount of driftwood is brought into the harbor.

Harbor regulations are enforced by a harbor master (see Appendix II).

Wharves.—There is an extensive system of wharves; the public boat landing at Seattle is at the foot of Madison street.

Pilotage is not compulsory. Reliable licensed pilots can be obtained for the sound and for the inside passage to Alaska.

Towboats can be had and are in general use by sailing vessels.

Supplies of all kinds can be obtained. Water may be had at the wharves or from water boats.

Repairs of all kinds may be made; there is a large floating dock and several marine railways.

Hospitals.—There is a relief station (Class II) of the United States Public Health and Marine-Hospital Service at Seattle; the nearest marine hospital is at Port Townsend.

Storm warning displays of the United States Weather Bureau are made from a staff on the New York Building, corner of Second avenue and Cherry street.

For **variation of the compass** see page 13.

Tides.—See page 15.

The **tidal currents** in the harbor have little velocity.

SAILING DIRECTIONS, ELLIOTT BAY (SEATTLE HARBOR).

From Northward.—Follow the directions in section 1, page 134, and pass ¾ mile southwestward of West Point Lighthouse. Then steer **SE.** by **E.** ¼ **E.** for about 2 miles, heading

for Duwamish Head, until the harbor is well opened, when an **E. ¾ S.** course for about 4 miles leads to the anchorage.

From Southward.—Round Alki Point at a distance of ¼ mile, and steer **NNE.** for 2 miles, passing northward of Duwamish Head bell buoy; from the buoy an **E.** by **N.** course for about 2 miles leads to the anchorage.

Remarks and dangers.—The approaches to the bay are free from outlying dangers, and the entrance is easily made by day or night.

The wide, open bight immediately eastward of West Point is shoal, the 3-fathom curve in the middle of the bight extending nearly ½ mile offshore from Magnolia Bluff. There is a broad sand beach at low water.

Vessels should not pass southward of the bell buoy marking the end of the shoal extending northward from Duwamish Head.

Approaching the water front near the eastern end the glare from the electric lights at night is confusing.

The flats at the head of the bay extend 250 to 400 yards below the railroad trestle and are steep-to.

COMMENCEMENT BAY (TACOMA HARBOR).*

The entrance to this bay lies about 18 miles southward from Alki Point and about 52 miles from Marrowstone Point. It is about 2½ miles in length with an average width of nearly 2 miles, the entrance lying between Point Brown on the north shore and Point Defiance on the south shore. **Point Brown** is marked by a lighthouse (see table, page 24). At the head are mud flats which bare for nearly 1 mile at low water. The **Puyallup River** enters at the head. The waters of the bay are deep throughout, ranging from 90 fathoms at the entrance to 25 and 30 fathoms at the head, where the rise to the flats is very abrupt. The bay is easy of access and free from dangers.

Improvements are in progress with a view of extending the warehouses and wharf facilities by dredging a channel through the flats in the southern part of the bay along the water front of Tacoma. This channel is crossed by two drawbridges, the draws being about 100 feet in the clear.

Tacoma, the second city in size and importance on the sound, is situated on the southern shore at the head of the bay. It has considerable commerce, both foreign and domestic, and exports a large amount of coal, grain, lumber, and flour, and has part of the Alaska trade. It is one of the terminals of the Northern Pacific Railroad, which has extensive wharves and repair shops.

Old Tacoma, on the southern shore about 3 miles westward of Tacoma, has a number of mills and wharves. Moderate-sized vessels are built and repaired. Considerable lumber is exported.

Anchorage.—The depths as a rule are too great for convenient anchorage, but vessels occasionally anchor under the northern shore about one mile eastward of Point Brown. Vessels are not allowed to anchor between a line extending from the St. Paul and Tacoma Mill Company's wharf to the Tacoma Warehouse and Elevator Company's elevator and the west shore of the bay without written permission from the harbor master. Mooring buoys have been placed off the water front and are in charge of the harbor master; a fee is charged for their use.

Harbor regulations are enforced (see Appendix II).

Pilots and towboats can be obtained.

Wharves.—There is an extensive system of wharves and warehouses, the depths being ample for any draft, with good facilities for loading and discharging.

Supplies of all kinds may be obtained. Water can be had at the wharves or from water boats.

Repairs of all kinds can be made. In connection with the machine shops at Tacoma there is a floating dock at Quartermaster Harbor, on the western shore of the sound about 5 miles from Tacoma. The dock is 325 feet long, 100 feet wide, and 80 feet between side walls; there is 23 feet over the sill and the lifting capacity is about 8,000 tons.

Storm warning displays of the United States Weather Bureau are shown at Tacoma and are plainly visible from the harbor.

Hospitals.—There is a relief station (Class III) of the United States Public Health and Marine-Hospital Service (see Appendix IV).

Tides.—See page 15.

The **tidal currents** in the harbor have little velocity.

Sailing directions through Admiralty Inlet and Puget Sound to Tacoma are given in sections 1 and 2, pages 134–136. The flats extend nearly 1 mile from the head of the bay and are steep-to. Two mill wharves extend

* Shown on charts **6460**, scale $\frac{1}{80,000}$, price $0.50; **6451**, scale $\frac{1}{20,000}$, price $0.25.

from the head of the bay to deep water, and from the end of the northern wharf the edge of the flats extends about **N.** to the northern shore.

QUARTERMASTER HARBOR.

This harbor is situated between Maury and Vashon islands, opposite Commencement Bay, the entrance being about 4 miles northwestward from Tacoma. The shores are low and wooded, and at the head of the harbor is a narrow strip of marshy land covered at extreme high tide. It is irregular in shape, with a total length of about 5 miles and an average width of ½ mile. There is a large floating dock located here in connection with the machine shops at Tacoma (see Repairs, Tacoma Harbor). There is a wharf in connection with the dock, with ample depth for any vessel to lie alongside. The harbor affords an excellent anchorage about 2 miles inside the entrance in 5 to 10 fathoms, muddy bottom.

A **shoal** just inside the entrance extends about 300 yards from the eastern shore, and is marked at its outer end by a buoy (nun, red, No. 2) placed in 8 fathoms. For a distance of 1 mile above the buoy shoal spots extend 400 yards from the western shore, with depths of 9 to 17 feet.

The harbor is easy of access and a mid-channel course may be followed with safety.

COLVOS PASSAGE.

on the western side of Vashon Island, is about 11 miles in length in a general north and south direction, with an average width of 1 mile. It is nearly straight and free from outlying dangers. The northern entrance is about 4½ miles **S.** by **W.** from Alki Point and the southern entrance is about 4 miles westward from Point Brown and abreast Point Defiance. The currents, especially the ebb, have greater velocity than in the eastern passage, and advantage is at times taken of this by vessels bound from Tacoma to Seattle, although the distance is a little greater. The passage is used principally by tugs from up-sound points with logs for the sawmills. A mid-channel course can be followed with safety.

PUGET SOUND SOUTHWARD OF TACOMA.*

Southward of Point Defiance the sound is composed of a number of inlets, passages, and islands, at present of little commercial importance outside of the lumbering interests. These waters are navigated by small steamers with local knowledge with headquarters at either Seattle, Tacoma, or Olympia, occasional small sailing vessels, and by tugs engaged in towing logs to the sawmills. The depths are generally great and there are but few dangers. The shores are generally well wooded and moderately low. Olympia, at the head of Budd Inlet, is the principal and largest town, but there are a number of smaller settlements. The chart is an excellent guide and may be followed with safety in daytime, except in a few places, where a pilot is necessary. Strangers bound through these waters at night are advised to take a pilot.

From Point Defiance the sound extends in a general southerly direction for about 15 miles to the flats at the mouth of the Nisqually River, the first 5 miles being known as the **Narrows**. These average about 1 mile in width, and at spring tides the tidal currents reach a velocity of 5 to 6 miles.

Day Island Anchorage, on the eastern shore, about 4 miles southward of Point Defiance, is a shallow cove, the southern part being filled with flats. It affords anchorage for small craft in 7 to 8 fathoms, soft bottom, about ¼ mile northward of the point of Day Island.

Hales Passage, between Fox Island and the mainland, enters on the western shore about 5 miles southward from Point Defiance. It is about 4 miles in length and varies in width from 1 mile at its eastern end to less than ⅜ mile at its western end, where it connects with Carrs Inlet. The tidal currents have considerable velocity.

Whollochet Bay is a small inlet about 2 miles long and ¼ mile wide extending northward from Hales Passage about 1 mile inside the eastern entrance. The upper part of the bay is narrow and shoal. It affords an anchorage about ½ mile inside in mid-channel in 11 to 12 fathoms, sticky bottom.

Toliva Shoal lies a little over ⅜ mile **SSE.** from Gibson Point, the southeastern end of Fox Island. It consists of two rocks, with 14 feet over them and marked by a buoy (nun, red and black horizontal stripes) placed in 4½ fathoms between them. The shoal lies nearly in mid-channel and may be passed on either side, giving the buoy a berth of over 300 yards.

Carrs Inlet enters the western shore about 8 miles southward of Point Defiance. From the entrance between Fox and McNeil islands it extends about 6 miles westward and then trends northward for 8 miles.

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* Shown on chart **6460**, scale $\frac{1}{80,000}$, price $0.50.

terminating in flats at the head. Good anchorage is afforded at and near the head in 6 to 15 fathoms, soft bottom, and in several small coves on its southern and eastern shores. From the entrance a mid-channel course may be followed with safety.

Pitt Passage, westward of McNeil Island, connects Drayton Passage and Carrs Inlet. It is badly obstructed by rocks and shoals and used only by small craft with local knowledge.

Steilacoom is a small town on the eastern shore 9 miles southward from Point Defiance. There are several small wharves but it is of little commercial importance; it has rail and telegraph facilities. The State Asylum for the Insane is situated here. Indifferent anchorage may be had along the water front close inshore, but it is not recommended, as the holding ground is poor and the currents have considerable velocity. Off Steilacoom are tide rips that, with an adverse wind, are dangerous to small boats.

Balch Passage, between McNeil and Anderson islands, is the channel most in use by vessels bound to Olympia; it connects at its western end with Drayton Passage. It is about 2 miles long with an average width of ⅝ mile. The **State Penitentiary,** on the southeastern shore of McNeil Island, is prominent when approaching. **Eagle Island,** small, low, and wooded, lies near the middle of the passage, about ⅛ mile from Anderson Island. A post light marks its southern point (see table, page 24). **Eagle Island Shoal,** with 5 feet over it, lies about 300 yards westward of the island. The island may be passed on either side.

Drayton Passage, westward of Anderson Island, is about 3 miles long in a north and south direction and about 1 mile wide, connecting with Pitt and Balch passages at its north end and at its southern end with the western part of Nisqually Reach. With the exception of a spit extending about ¼ mile from the western shore about 1 mile northward of the southern entrance, the waters are deep and free from hidden dangers. **Titusi Bay,** on the western shore at the junction of Pitt Passage, is about 1½ miles long and irregular in shape. Its widest part, ¾ mile, is at the entrance. Good anchorage in 7 to 8 fathoms, muddy bottom, is afforded about ¼ mile inside the entrance.

Nisqually Reach curves around and southward of Anderson Island. The southern shore is formed by the Nisqually River flats which at low water are bare for nearly 1 mile. The edge of the flats is very bold. The reach may be said to extend from Ketron Island to the southern end of Drayton Passage, about 6 miles, the narrowest part, ¾ mile, being at the southern point of Anderson Island. **Cormorant Passage,** at the eastern end, eastward of Ketron Island, is clear but little used. **Oro Bay,** in the southeastern part of Anderson Island, is an irregular bight, the greater portion of which is shoal; it affords an indifferent anchorage in about 10 fathoms but is affected by the currents and affords no protection in northerly weather.

From **Devils Head,** the western point at the entrance to Drayton Passage, the channel extends westward for 1¾ miles to Johnson Point, low and marked by a post light (see table, page 24), which is the turning point for vessels bound southward into Dana Passage or Henderson Inlet. The main body of water continues northwestward into Case Inlet.

Case Inlet extends northwestward for 4 miles and then trends northward for 10 miles more, terminating in flats at the head, which is but 2 miles from the head of Hood Canal. For about 7 miles the western shore is formed by Hartstene Island. Its average width is about 1½ miles, narrowing at the head. The depths are irregular, varying from 10 to 30 fathoms, but there are no outlying dangers and a mid-channel course is clear to the head. **Herron Island,** steep and bluff on its western face, lies near the eastern shore about 4 miles from the entrance; the channel eastward of the island is not recommended as at the northern end it has a sharp turn and is obstructed by shoals making off from the island and from the eastern shore. At the northern end of Hartstene Island is the entrance to Pickering Passage. Good anchorage may be had anywhere northward of Hartstene Island, in 6 to 15 fathoms, muddy bottom, and a mid-channel course through the inlet is clear of all dangers to within 2 miles of the head where the flats begin.

Henderson Inlet, immediately westward of Johnson Point, extends about 4½ miles southward, its southern half being occupied by shoals and flats. The average width is about ½ mile, and good anchorage is afforded inside the entrance in 5 to 6 fathoms, muddy bottom. A **spit** makes out about ¼ mile northward from the western point at the entrance.

Itsami Shoal, with 5 feet over it, lies 1 mile **SW. ¼ W.** from Johnson Point Post Light and about ½ mile northward from the western point at the entrance to Henderson Inlet. It is surrounded by kelp and marked by a buoy (nun, red and black horizontal stripes) placed in 4 fathoms, northward of the kelp and about 200 yards from the rock. This is a danger in entering Henderson Inlet or Dana Passage, and vessels should not pass southward of the buoy.

Dana Passage, between the southern end of Hartstene Island and the mainland, is about 2 miles long and nearly ¼ mile wide in its narrowest part. It connects at its western end with Budd and Eld inlets, and

northward with Peale and Squaxin passages leading to Totten and Hammersley inlets. With the exception of Itsami Shoal, near its eastern end, the passage is clear and a mid-channel course may be followed with safety.

Budd Inlet* (Olympia Harbor) is about 26 miles from Tacoma. It is about 6 miles in length with an average width of 1 mile, extending southward from Dana Passage and terminating in flats bare at low water. The entrance is about 4½ miles southwestward from **Johnson Point Post Light,** between **Point Cooper** and **Dofflemeyer Point,** the latter being marked by a post light (see table, page 24). The depths range from 4½ to 6 fathoms, and good anchorage may be had anywhere inside the entrance in muddy bottom. The shores are comparatively low and wooded, and the depths shoal less abruptly on the eastern than on the western side of the harbor. The upper portion of the bay is obstructed by flats and shoals that bare for ¾ mile at low water, and a shoal with 5 to 12 feet over it extends 700 yards from the eastern shore between Olympia Shoal and the entrance to the dredged channel.

Olympia Shoal lies about ⅜ mile off the western shore and ¾ mile northward of Butler Cove, a small bight on the western shore, about 4 miles southward of Point Cooper. It bares at extreme low water and is marked by a buoy (nun, red and black horizontal stripes) placed in 4 fathoms about 200 yards **NE.** by **E.** from the shoal.

Improvements are in progress under the direction of the Government to secure a channel 250 feet wide and 12 feet deep leading to the wharves of Olympia, with a turning basin 500 feet wide at its inner end. At present there is a depth of 10 feet in the channel. The eastern edge of the channel is marked by two post lights.

Olympia, the capital of the State of Washington, is situated at the head of the harbor. It has some commerce, mainly lumber and oysters. There is one wharf in general use and the remains of another. Communication may be had with points on the sound and in the interior by rail and steamers; there are also telegraphic facilities.

Tides.—See page 15.

The **tidal currents** have little velocity in the harbor.

Sailing directions are not considered necessary. A mid-channel course through Budd Inlet in daytime clears all dangers until up with the post light at the entrance to the dredged channel. At night the range of the post lights marking the dredged channel clears Olympia Shoal, but if held southward of it leads across the edge of the shoal which extends 700 yards from the eastern shore.

Eld Inlet, immediately westward of Budd Inlet, resembles the latter in character and is of little commercial importance. It is somewhat narrower than Budd Inlet, and extends about 6 miles in a general southwesterly direction with two slight bends. It affords good anchorage anywhere inside the entrance in 4 to 7 fathoms, soft bottom. A mid-channel course is clear to the flats at its head. In entering, Point Cooper, the eastern point at the entrance, should be given a berth of not less than ¼ mile.

Peale Passage, between Hartstene and Squaxin islands, extends in a general northwesterly direction about 4 miles from Dana Passage, connecting at its northern end with Pickering Passage. The depths are comparatively shoal, but with local knowledge a draft of 10 feet can be taken through at low water. Strangers should take a pilot.

Squaxin Passage, southward of Squaxin and Hope islands, is about 1 mile in length and extends in a general westerly direction. It leads to the entrance of Totten and Hammersley inlets. The northern shore is foul, and at its western end a **rock** with 15 feet over it lies nearly in mid-channel. The passage is narrow and although the chart is good strangers should proceed with caution. The south shore should be favored throughout, and at the western end the northern point of Steamboat Island should be favored to avoid the mid-channel rock. The tidal currents have considerable velocity. The passage between Hope and Squaxin islands is foul and should not be attempted.

Totten Inlet extends southwestward from the western end of Squaxin Passage. It is about 8 miles long and varies in width from ¼ to over 1¾ miles. The depths range from 4 to 14 fathoms, with extensive shoals and flats, some bare at low water. Skookum Inlet is a small, shoal inlet on the western shore with a narrow entrance. The oyster industry is quite extensive and the main commercial interest. There is good anchorage anywhere inside from the entrance to the mouth of Skookum Inlet, above which the inlet is shoal; in entering favor the western shore to avoid the spit extending from Steamboat Island.

Hammersley Inlet enters the western shore about 1 mile north of the western end of Squaxin Passage. It is about 5 miles in length, expanding at its head into Oakland Bay, which is about 3½ miles long in a northeast and southwest direction and from ¼ to ½ mile wide. The inlet averages ¼ mile in width and is much obstructed by shoals, particularly at its mouth, where there is an extensive bar. It is navigated by light-draft vessels only, and local knowledge is required. The tidal currents have considerable velocity.

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*Shown on chart **6460**, scale $\frac{1}{80,000}$, price $0.50; **6462**, scale $\frac{1}{20,000}$, price $0.25.

Pickering Passage extends northward and eastward from the entrance to Hammersley Inlet, along the western side of Squaxin Island and the western and northern sides of Hartstene Island, connecting at its northern end with Case Inlet. It is about 8 miles long and from ¼ to ½ mile in width. The shores are low and wooded and the depths vary from 6 to 15 fathoms. Except for the shoals extending eastward from the mouth of Hammersley Inlet the passage is free from outlying dangers and a mid-channel course can be followed with safety.

GENERAL DIRECTIONS, POINT DEFIANCE TO OLYMPIA.

From Tacoma to Point Defiance vessels usually give the shore a berth of ¼ to ½ mile, and if meeting the ebb current from the narrows round the point close aboard, or if going with the flood stand out and take a mid-channel course. From Robinson Point, vessels steer about **SSW. ½ W.**, giving Point Piner and Neill Point a berth of about ¼ mile, and then head for Point Defiance. Vessels from northward through Colvos Passage can hold a mid-channel course.

From Point Defiance vessels can hold a mid-channel course for 7¾ miles until up with Toliva Shoal, which may be passed on either side, giving the buoy a berth of over 300 yards. If bound through Balch Passage steer about **SW.** from Toliva Shoal buoy and follow the south shore of McNeil Island at a distance of ¼ mile. Eagle Island may be passed on either side. The passage northward of the island is the broader, and a mid-channel course through it should be held until Drayton Passage is well open so as to avoid the shoal westward of Eagle Island. A mid-channel course through Drayton Passage clears all dangers. Round Devils Head at a distance of ¼ mile and steer about **W.** by **N.** so as to pass ¼ mile north of Johnson Point Post Light.

Or if bound through Nisqually Reach, a general mid-channel course should be steered from Toliva Shoal buoy, keeping the southern point of Anderson Island aboard at a distance of ¼ to ½ mile to clear Nisqually Flats, and then steering a general mid-channel course until up with Johnson Point.

Round Johnson Point at a distance of ¼ mile, and passing northward and westward of Itsami Shoal buoy keep in mid-channel through Dana Passage, giving the southern shore a berth of not less than ¼ mile until up with Dofflemeyer Point, when follow the directions for Budd Inlet, page 146.

POSSESSION SOUND AND TRIBUTARIES.*

These comprise the waters eastward of Whidbey Island, the principal ones being **Possession Sound, Port Susan, Saratoga Passage,** and **Skagit Bay**. These bodies of water connect at the southern end with Puget Sound through Possession Sound, and at the northern end with the northeastern part of Juan de Fuca Strait through Deception Pass. **Swinomish Slough** leads northward from Skagit Bay and connects with Padilla Bay in the southern part of Washington Sound.

Camano Island lies between Port Susan and Saratoga Passage; it is irregular in shape and about 13½ miles in length, the southern portion consisting of a long, narrow tongue terminating in **Camano Head**, about 300 feet high. At its northern end it is separated from the mainland by sloughs, dry at low water.

There is considerable traffic in these waters, confined, as a rule, to small local steamers that take advantage of the shelter afforded in making their trips between Washington Sound ports and points on Puget Sound. There are several small towns and settlements, but the majority are of little commercial importance. The principal exports consist of lumber, fish, and some farm produce; general merchandise is imported. The principal points have rail and telegraph communication in addition to steamers.

Possession Sound enters at the southern point of Whidbey Island and extends in a general northerly direction for about 10 miles to its junction with Saratoga Passage and Port Susan. From the entrance it extends for 3½ miles with an average width of about 2 miles, and then expands to an irregular basin about 6 miles in diameter. The eastern portion of this basin is filled with extensive flats, a large portion of which are bare at low water, and rise abruptly from deep water. These flats are intersected by several shifting channels, forming the mouth of the Snohomish River. These channels are under improvement by the General Government and are navigable by light-draft river steamers that navigate the deeper waters of the river. The water is generally deep and the only anchorage afforded is off the town of Everett, close inshore, in about 10 to 15 fathoms.

* Shown in parts on charts **6300**, scale $\frac{1}{200,000}$; **6450**, scale $\frac{1}{80,000}$, price of each $0.50.

Tulalip Bay is a small cove at the junction of Possession Sound and Port Susan, on which are situated the buildings of the Indian reservation. The bay is shoal and the channel leading to the wharf is marked by buoys. It is of little commercial importance.

Gedney Island, in the western part of the basin, is about 1½ miles long in an east and west direction by an average width of ½ mile. The island is high, wooded, and prominent. From its eastern point a shoal extends eastward, the 5-fathom curve being at a distance of ¾ mile; on the south shore, about the middle, the 3-fathom curve is at a distance of nearly ¼ mile offshore to the eastern point.

Everett, on the eastern shore of the sound, about 4 miles northeastward from Point Elliot, is the most important town. Extensive improvements are in progress for increasing its wharf facilities and for improving the harbor by dredging and jetties. It is on the line of the Northern Pacific Railroad and has in addition communication by steamers with Seattle. There are also telegraphic facilities. Provisions, water, and coal can be obtained and minor repairs to vessels can be made. There is a marine railway with a capacity of 1,500 tons.

Muckilteo is a small settlement eastward of Point Elliot; it is of no commercial importance.

Port Susan, on the eastern side of Camano Island, has a total length of about 11 miles in a northwest and southeast direction and a width of 1 mile at its entrance; it expands to a width of 5 miles at its head, terminating in flats, bare at low water, that extend over 3 miles. There are no important settlements. There is deep water throughout until nearing the head, where anchorage may be had off the extreme western edge of the flats in about 10 fathoms. Care should be used in approaching and anchoring as the flats rise abruptly from deep water. A channel, dry at low tide, has been dredged over the flats to the southern mouth of the Stillaguamish River; this is used by light-draft vessels at high water. The entrance to the south pass is marked by a post light.

Saratoga Passage, on the western side of Camano Island, is about 18 miles long in a northwest and southeast direction. At its entrance between Sandy Point and Camano Head it is about 1¼ miles in width, widening to its upper end, where it expands into a basin about 4¼ miles in diameter, connecting eastward with Skagit Bay. The depths decrease uniformly from 100 fathoms at the entrance to depths of 17 and 18 fathoms at the head. There are few outlying dangers and a mid-channel course is clear to the head.

Sandy Point, the southern point at the entrance, is low, rising rapidly to an elevation of 100 feet, with bluffs on each side; the end of the point is marked by a post light (see table, page 24).

Holmes Harbor, the entrance to which is on the southern shore about 8 miles above Sandy Point, extends in a southerly direction for about 5 miles, with an average width of 1¼ miles. The depths range from 30 and 40 fathoms at the entrance to 17 and 18 fathoms at the head, where anchorage may be had in muddy bottom. **Rocky Point,** the eastern point at the entrance, is low, but rises rapidly to a hill about 500 feet high. **Hackney Island,** low and of small extent, lies ¼ mile northwestward from the point, to which it is connected at low water. From the island a shoal, bare at extreme low water, extends ¼ mile northwestward.

In entering, round Rocky Point at a distance of ¾ mile and follow a mid-channel course to the head. The harbor is but little used.

Penn Cove enters the western shore of the basin at the head of Saratoga Passage and extends southwestward for 3½ miles, with an average width of 1 mile. The head of the cove is about 1½ miles eastward from Point Partridge, the western extremity of Whidbey Island. There are several small settlements—**Coveland** at the head, **San de Fuca** on the north shore, and **Coupeville** on the south shore; these are of little commercial importance. The cove affords good anchorage in 8 to 14 fathoms inside the entrance. **Snakeland** (Watsak) **Point,** the southern point at the entrance, is shoal, a narrow spit extending northward for ½ mile, with depths of about 6 feet. The spit is marked by a buoy (can, black, No. 1) placed in 24 feet about 100 yards northward of the end.

No directions for entering are considered necessary; after rounding the buoy a mid-channel course can be followed with safety.

Oak Harbor, on the northern shore, is a small, irregular cove about 1½ miles long and ¾ mile wide. The cove is shallow, with a narrow, winding channel leading to the wharf at Oak Harbor, a small settlement at the head. About 10 feet can be taken to the wharf. **Maylors Spit** extends northwestward from the eastern shore and is marked by two post lights (see table, page 24), one at the southern and one at the northern end. **Forbes Point,** the eastern point at the entrance, is foul, with a rock, bare at low water, ½ mile southwestward from the point. This is marked by a buoy (nun, red, No. 2) placed in 4 fathoms, 150 feet SSE. from the rock. The channel leading to the wharf is marked by buoys, but should not be attempted by strangers.

Crescent Harbor, immediately eastward of Oak Harbor, is a semicircular bight about 2 miles in diameter. The entrance is between Forbes Point and **Point Polnell,** the latter low, with a shoal extending westward for about ¾ mile. Shoals extend about ½ mile eastward from Forbes Point. With these exceptions the harbor is clear and affords good anchorage in 10 to 11 fathoms, muddy bottom, but is exposed southward.

No directions are necessary; in entering pass midway between Forbes Point and Point Polnell, which clears the shoals extending from these points.

Skagit Bay, the entrance to which is between Point Polnell and Point Demock, the northwestern point of Camano Island, is about 12 miles long in a west-northwest and east-southeast direction. The greater portion of it is filled with flats, bare at low water, and intersected by numerous channels through which the Skagit River discharges. Along the shore of Whidbey Island, between it and the edge of the flats, is a narrow channel varying in width from ¼ to ½ mile; the shore of the island is also shoal for a distance of 100 to 200 yards offshore. This channel is about 6½ miles long from its southern end to **Hope Island,** beyond which it expands into a small basin connecting westward through Deception Pass with Juan de Fuca Strait, and northeastward with Similk Bay. The tidal currents have considerable velocity. The depths vary from 7 to 23 fathoms. The southern channel leading into Skagit River is buoyed and marked by two post lights, but at low water the channel is dry; at high water there is a depth of 12 to 16 feet. Near the upper end of the flats, and about 2 miles southward of Hope Island, is the entrance to the dredged channel leading into Swinomish Slough. This is under improvement, jetties being in course of construction and dredging operations being carried on. At its northern end the slough connects with Padilla Bay in the southern part of Washington Sound. It is used principally by light-draft vessels with local knowledge. About 2 feet can be carried through at low water, but a greater depth is contemplated; the channel is marked by several post lights. **La Conner** is the only town on the slough.

Ala Spit, abreast the western end of Hope Island, is low, with a sand spit extending 350 yards offshore in the direction of the point.

Good **anchorage** may be had northward of Hope Island, and vessels at times make use of the anchorage while waiting for slack water in Deception Pass.

Deception Pass is about 2 miles in length; near its western end the channel is obstructed by an island, nearly in the middle of the passage, contracting the navigable channel, which is south of the island, to about ⅛ mile. This passage is used only by vessels with local knowledge at about the time of slack water, the velocity of the currents at other times making it impassable. Slack water occurs about 1½ hours after high and low water at Port Townsend. The northern point at the western entrance is marked by a post light (see table, page 26). **Deception Island** lies about ⅜ mile northwestward from the southern point at the western entrance; foul ground exists between the point and the island and vessels should not pass between them.

GENERAL DIRECTIONS, POSSESSION SOUND AND TRIBUTARIES.

The chart is a sufficient guide for the navigation of these waters and may be followed with safety. A mid-channel course may be followed, and with the exceptions previously noted the shore can be approached with safety to within ¼ mile. In entering Possession Sound from northward, the southern end of Whidbey Island from Indian Head to Possession Point should not be approached closer than 1 mile to avoid the shoals extending from the island. Vessels bound through Skagit Bay, to La Conner, or intending to use Deception Pass are advised to take a pilot.

WASHINGTON SOUND.*

This body of water embraces the passages and bays northward of the eastern end of Juan de Fuca Strait. These passages are used extensively by vessels bound to British Columbian and Alaskan ports and by local steamers. The commerce is extensive, the exports consisting of fish, lumber, fruit, and lime, while general merchandise is imported. The tidal currents have considerable velocity. There are several important towns connected by rail and steamer with points on Puget Sound and the interior. The principal passage is **Haro Strait,** the one most commonly used by vessels, the majority of which make Victoria a port of call for passengers and freight; it is also the widest and best equipped with aids to navigation. **Rosario Strait,** the eastern passage, is used most by vessels running between Blaine, in Drayton Harbor, the settlements in the islands, Bellingham Bay, and Puget Sound ports. The traffic in the islands is confined almost exclusively to local vessels.

The directions following are intended for use only in clear weather; in thick weather or at night strangers should take a pilot. Sailing vessels should not attempt the passages against the current unless the wind is fair

* Shown on chart **6300**, scale $\frac{1}{200,000}$, price $0.50.

and fresh; with the current a vessel will go through with little difficulty by keeping off the shore and giving the dangers a good berth.

The **tidal currents** have great velocity in places, causing heavy tide rips that are dangerous for boats. Owing to the variable direction and velocity of the currents, compass courses are of little value and where followed allowance must be made for the set of the currents.

Vessels bound from sea or from Victoria, B. C., to ports in British Columbia or Alaska should use Haro Strait, as it is the widest of the passages and well marked by aids. Vessels from Puget Sound ports bound northward may use Haro Strait, San Juan Channel, or Rosario Strait, as is found convenient. Vessels bound to East and West sounds should use either Rosario Strait and Thatcher or Obstruction passes, or San Juan and Upright channels. Wasp, North, and Pole passages should not be attempted by strangers. Vessels bound northward through Georgia Strait should follow the directions in United States Coast Pilot, Pacific Coast, Alaska, Part I.

HARO STRAIT,*

the western passage, has its southern entrance between Discovery Island (Canadian) and the southern point of San Juan Island. From the entrance it extends northwestward for about 16 miles to Turn Point, the western end of Stuart Island, marked by a post light (see table, page 26), and then bends sharply northeastward for 11½ miles to its junction with Georgia Strait between East Point, the eastern end of Saturna Island (Canadian), and Patos Island, both of which are marked by lights (see table, page 28). The width varies from 2 to 6 miles, and the depths are generally great with but few dangers.

No difficulty will be experienced in navigating the strait in clear weather; in thick weather strangers should have a pilot.

Tidal currents.—In Haro Strait the flood current sets northward through the strait and the ebb in the opposite direction. At its northern entrance the flood sets eastward on both sides of Sucia Islands, and eastward across Alden Bank. Close along the southeast side of East Point the current always sets northeast and only decreases in velocity at the turn of the current in the strait. The velocity of the current in the strait is 2 to 5 miles, increasing to between 3 and 6 miles at Discovery Island, between Stuart Island and Gooch Island, at East Point, and between Patos Island and Sucia Islands. The current has moderate velocity between Sucia Islands and Orcas Island. At its southern entrance the currents continue to run about 1½ to 2½ hours (latter for large tides) after high and low water by the shore. To find the approximate time of slack water at East Point take the Port Townsend time of high tide for higher high-water slack and add 1½ hours to the time of low tide for lower low-water slack; the time of slack water for small tides is more uncertain than for the large tides. Heavy tide rips occur on Middle Bank and northward of it and around Discovery Island. Tide rips also occur between Henry Island and Turn Point on the ebb, and around Turn Point. Heavy dangerous tide rips occur between East Point and Patos Island and for 2 miles northward in Georgia Strait.

San Juan Island, the largest of the group, is about 13 miles long, with a greatest width of 6 miles. It is rugged and partly wooded, with numerous elevations ranging from 400 to 1,000 feet in height. The shores as a rule are free from outlying dangers. The western side forms a part of the eastern limit of Haro Strait. The northern end of the island is indented by several small bays which, with the exception of **Roche Harbor,** are shoal and of no commercial importance.

Henry Island lies immediately westward of the northern point of San Juan Island and is separated from it by a narrow passage that at its northern end expands into a small basin forming Roche Harbor. The passage is obstructed by rocks and shoals and is only used by small, light-draft vessels with local knowledge.

Roche Harbor † has its main entrance on the eastern side of the north end of Henry Island, between it and Pearl Island; it is landlocked and about ½ mile in extent, with depths of 5 to 8 fathoms. A large amount of lime is made, and in addition to the kilns there is a barrel factory. This is a port of entry, and a deputy collector of customs is stationed at this port. Regular communication is had by mail steamers, and a small amount of provisions can be obtained. Water can be had at the wharves. The depth at the outer end of the main wharf is about 13 feet. **Morse Island,** small, 30 feet high, with two trees, lies ¼ mile **WNW.** from the north end of Henry Island and is the western point in the approaches to the harbor. The entrance is about 400 feet wide in its narrowest part, and is obstructed by a 17-foot spot in the middle about **WNW.** from Pearl Island, and by a spit with 16 to 17 feet over it extending 150 yards **SW.** by **W.** from the southwest point of Pearl Island. **Danger Shoal,** the principal danger in approaching from westward, lies ⅝ mile **N.** by **W.** ¼ **W.** from Morse Island; it has 5 feet over it and is marked by kelp at slack water. A **rock,** marked by kelp, with 10 feet over it, lies ⅛ mile northwestward from Barren Island; a buoy (can, black) is placed in 6 fathoms

* Shown on chart **6300**, scale $\frac{1}{200,000}$, price $0.50.

† Shown on chart **6381**, scale $\frac{1}{10,000}$, price $0.50.

about 150 feet northwestward from the rock. Another rock, marked by kelp, with 4 feet over it, lies 350 yards eastward of the one marked by the buoy.

To enter from westward, pass ¼ to ½ mile northward of Morse Island on an **E.** by **S.** course until the middle of the entrance bears **S.** ½ **E.** Stand in on this course, keeping the entrance points of Nelson Bay, at the head of the harbor, just open so as to see across the low neck of land at its head. Leave the 17-foot spot close-to on the starboard hand and steer nothing eastward of mid-channel in rounding the southwest point of Pearl Island. Anchor in 5 to 7 fathoms, soft bottom.

From eastward, steer so as to pass ⅛ mile northward of Roche Harbor buoy, marking the sunken rock off Barren Island, and when up with the buoy head for Morse Island until the middle of the entrance bears **S.** ½ **E.** Then proceed as directed above.

Spieden Island lies about ½ mile northward of San Juan Island and is separated from it by Spieden Channel. The island is about 2½ miles long in an east and west direction with an extreme width of about ½ mile. The eastern end is low and grassy; a few trees are on the south side of the island, but the northern face is well wooded. **Sentinel Island**, steep, wooded, and of small extent, lies ½ mile off the southern shore near the eastern end. **Sentinel Rock**, low and bare, lies about 400 yards westward from Sentinel Island; a sunken rock, marked by kelp, with 3 feet over it, lies about midway between them. **Center Reef**, marked by kelp and bare at low water, lies nearly ⅜ mile **S.** ½ **W.** from Sentinel Rock.

Stuart Island, westward of Spieden Island, is wooded, with two rather prominent hills 650 feet high near the middle. Turn Point, the western end, is marked by a post light (see table, page 26). **Reid Harbor**, at the southeast end, affords good anchorage in 4 to 4½ fathoms, soft bottom. It is about 1½ miles long and ¼ mile wide, landlocked and free from dangers. *Enter* in mid-channel and anchor anywhere in the middle of the wider portion of the harbor. **Prevost Harbor**, on the north shore, about 1½ miles eastward of Turn Point, affords good shelter and anchorage. **James Island** lies between the two points of the bight, with reefs and shoals extending eastward to the shore of the bight. *Enter* in mid-channel westward of James Island and anchor in 6 to 7 fathoms, muddy bottom, in the middle of the wider portion just inside the entrance, keeping clear of a rock about 200 yards off its south shore that bares about 8 feet at low water. Vessels should not pass eastward of James Island.

Johns Island lies immediately eastward of Stuart Island, separated from it by a narrow channel known as Johns Pass, which should not be attempted by strangers. A number of small islands and rocks lie southward and eastward of the eastern point and between it and Spieden Island.

SAILING DIRECTIONS, HARO STRAIT.

1. ***From Race Rocks Lighthouse to Turn Point Post Light.***—Having come through Juan de Fuca Strait, from a position 4¼ miles *S.* ¾ *E.* from Race Rocks Lighthouse, make good a **NNE.** ¾ **E.** course for 17½ miles, passing a little over 1½ miles southward of Discovery Island Lighthouse. When Discovery Island Lighthouse is abeam, bearing *NW.* by *W.* ¼ *W.*, steer **NNW.** for 9 miles, passing about 1⅜ miles eastward of Kelp Reefs beacon. When Kelp Reefs beacon bears abeam steer **NW.** ¾ **N.**, passing about ½ mile westward of the south end of Henry Island. This course made good for 8½ miles should bring Turn Point Post Light to bear *ENE.*, distant ½ mile. Then follow the directions in section 2, following:

Caution.—The tidal currents have velocities of 2 to 5 miles, and a range should be steered when possible so as to insure making the compass courses good. See tidal currents, page 150.

Remarks and dangers.—The **NNE.** ¾ **E.** course passes Race Rocks Lighthouse at a distance of about 2¾ miles, and crosses the broad, open bight forming the approaches to Victoria and Esquimalt harbors; it passes well southward of all dangers. In clear weather the houses in Victoria will be visible, and at night the electric lights can be seen plainly. At night the red sector of **Fisgard Island Lighthouse**, Esquimalt Harbor, should bear abeam when entered after passing through the red sector of **Berens Island Lighthouse**, Victoria Harbor; and the red sector of **Fiddle Reef Lighthouse**, in Baynes Sound westward of Discovery Island, should be made shortly after. **Discovery Island Lighthouse**, on the eastern end of Discovery Island, should be about ½ point on the port bow when abreast of Race Rocks Lighthouse; the course leads 2 miles southeastward of Trial Islands.

Trial Islands, bare and rocky, two in number but appearing as one, lie 3 miles westward from Discovery Island. The southern and larger one is 80 feet high and steep-to at its southern end; heavy tide rips occur off the southern point, especially during the flood, which runs at a velocity of 6 miles during spring tides.

The **NNW.** course passes about 1 mile eastward of Discovery Island Lighthouse and heads for the western side of Henry Island, northwestward of San Juan Island. It draws gradually toward the shore of San Juan Island, which may be approached to within ½ mile with safety. At night and in thick weather, and to avoid the currents, vessels frequently cross to the eastern side of the strait and follow that shore until up with the southern point of Henry Island. Heavy tide rips occur in the vicinity and eastward of Discovery Island.

Kelp Reefs extend about 1¾ miles **E.** by **S.** from Darcy Island, on the western side of the channel, and consist of a number of rocks and ledges, some of which bare at low water. The eastern edge of the reefs is marked by a stone beacon 20 feet above high water. This is the only danger to be avoided on this course.

The **NW. ¾ N.** course favors the eastern and clear side of the channel and passes ½ mile westward of Henry and Stuart islands. The currents have considerable velocity, the flood setting northeastward between the islands northward of San Juan Island. Heavy **tide rips** will be found off Turn Point, especially on the ebb tide.

Kellet Bluff, at the southern end of Henry Island, is steep and rocky, and prominent from either southward or northward.

Halibut (Low) **Island** lies on the western side of the strait about ½ mile northward of the eastern end of Sydney Island. Foul ground extends about ½ mile eastward from the eastern point of the island.

Ridge (Bare) **Island** lies about ½ mile northwestward from Halibut Island; there is foul ground between them.

Gooch Island is the comparatively low wooded island 2¼ miles **SSW. ½ W.** from Turn Point. **Moresby Island** is the large high island 2½ miles above Gooch Island, and the same distance **W. ½ N.** from Turn Point.

Cooper Reef, marked by kelp, lies about ½ mile northward from the eastern part of Gooch Island; it covers at ½ tide.

Arachne Reef, midway between Gooch and Moresby islands, covers at ¼ flood and is marked by kelp.

1 A. ***From Point Wilson Lighthouse to Turn Point Post Light.***—Having come from Admiralty Inlet pass midway between Point Wilson and Admiralty Head and steer **WNW. ½ W.** for about 8 miles, passing 1¾ miles southward of Partridge Bank buoy (can, black, No. 1). Then bring the eastern end of the high land of Point Wilson astern, bearing *SE.* by *E.* ¼ *E.*, and steer **NW.** by **W. ¼ W.** This course made good for 21 miles should lead to a position ½ mile southwestward of San Juan Island at the Limekiln. Continue the course about 2 miles beyond the Limekiln, and then, hauling northward, pass in mid-channel between Kelp Reefs beacon and San Juan Island and steer **NW. ¾ N.** for 8½ miles, passing ½ mile westward of Henry Island and Turn Point. Then follow the directions in section 2.

Caution.—In crossing from Smith Island to San Juan Island the tidal currents setting to or from Rosario Strait and San Juan Channel with an estimated velocity of 2 to 3 miles at strength should be kept in mind. See also tidal currents, page 129.

Remarks and dangers.—The **WNW. ½ W.** course follows the Whidbey Island shore to Point Partridge. **Point Partridge buoy** (bell, red) should be made on the starboard bow and left 1¾ miles on the starboard hand, and when changing course to **NW.** by **W. ¼ W.**, Partridge Bank buoy should be on the starboard beam, distant 1¾ miles, and **Smith Island Lighthouse** should be in range with the high bluff on **Watmough Head,** on the eastern point of Lopez Island, bearing **N.** by **W.**

Point Wilson and the reef on its north side are described on page 130.

From Point Partridge a bowlder **reef** extends ½ mile; a buoy (bell, red) is placed about 1 mile westward of the point, outside the kelp, in 15 fathoms.

Partridge Bank, within the 10-fathom curve, is 3 miles long, west by north and east by south, 1½ miles in width, and the eastern extremity reaches within 1½ miles of Point Partridge. The northern and eastern sides fall off abruptly to 20 and 30 fathoms. The shoalest **spot** lies on the northern side of the bank midway between the eastern and western ends. It has a depth of only 14 feet at the lowest water, and is 3¼ miles from the nearest shore of Whidbey Island and 3¾ miles **SSE. ¼ E.** from Smith Island Lighthouse. It is marked by a buoy (can, black, No. 1) placed on the southeast side of thick kelp, in 24 feet. Depths of 4 and 5 fathoms extend 1 mile **WNW.** of the 14-foot patch. A considerable part of the bank is covered with kelp, which is usually drawn under by currents. The kelp generally extends to the 7-fathom curve, except toward the eastern end, where the shoal narrows and no kelp exists beyond a depth of 4 fathoms. The currents over the bank are irregular, except at the eastern extremity, where they set from north and northwest with considerable velocity at flood and ebb tides.

Smith Island lies 5 miles westward from Whidbey Island and 6½ miles from Point Partridge. It is irregular in shape and about ½ mile in extent. At its eastern end it is low, but rises abruptly to an elevation of 55 feet at its western end, terminating in a white perpendicular cliff of sand and gravel. The lighthouse and fog

signal are situated near the western end (see table, page 26). **Minor Islet**, small, low, and rocky, lies 1 mile northeastward from the island, and at lowest tides is connected with it by a gravel and bowlder spit. A field of kelp extends 1½ miles westward of Smith Island, with a width of 1 mile and depths of 4¼ to 5 fathoms. A sunken **rock**, bare at lowest tides, is reported ⅜ mile **SW.** by **W.** from the lighthouse.

On the **NW.** by **W.** ¼ **W.** course **Mount Dallas**, the highest point of San Juan Island, should be a little on the starboard bow, and the eastern end of the high land of Point Wilson should be astern. **Smith Island** should be left 3½ miles on the starboard hand, and the course, if made good, will lead 1½ miles northeastward of **Hein Bank** and 3 miles southwestward of **Salmon Bank**. The shore of San Juan Island should be passed at a distance of ½ mile. When nearly up with Mount Dallas the lime-rock cliffs and buildings of **Limekiln** will be seen immediately westward under it. When abreast of Limekiln, **Kelp Reefs beacon** should be on the port bow bearing about **WNW.** ¾ **W.** The southwest shores of San Juan and Henry islands are fairly bold-to and free from outlying dangers.

Hein Bank, the shoalest point of which lies 8 miles **W.** by **S.** from Smith Island Lighthouse and 10½ miles **N.** ¾ **W.** from New Dungeness Lighthouse, is about 1½ miles long north and south within the 10-fathom curve and 1 mile wide. Depths of 4½ fathoms were found on it during the survey, but a least depth of 3½ fathoms has been reported. The shoalest part of the bank is covered with thick kelp in summer. On the north, east, and west sides of the bank the water deepens quickly; at its south end the bank is continued for over 2 miles within the 20-fathom curve with a width of 1 mile.

Salmon Bank, is an extensive shoal lying southward of **Cattle Point**, the southeastern end of San Juan Island, with depths ranging from 9 to 18 feet; it is marked by kelp. It is about 1¼ miles long by ½ mile wide, the southern end lying 1½ miles **S.** from Cattle Point; a buoy (spar-shaped, black, No. 1) is placed off its southern end in 5 fathoms.

Kelp Reefs are described in section 1, preceding.

The remarks and dangers relating to the **NW.** ¾ **N.** course are given in section 1, preceding.

2. ***From Turn Point Post Light to Patos Island Post Light.***—Having followed the directions in section 1, or section 1 A, round Turn Point at a distance of about ½ mile and make good a **NE.** ½ **N.** course for 10½ miles to a position with Patos Island Post Light ahead, distant 1½ miles. Then haul northward and steer for the white cliffs of Point Roberts on a **NNW.** ½ **W.** course with Orcas Knob astern, passing between East Point and Patos Island, and favoring the side of the latter, which is clear of dangers. Then,

If bound northward for British Columbian or Alaskan ports, follow the directions in United States Coast Pilot, Pacific Coast, Alaska, Part I.

If bound for Semiahmoo Bay or Drayton Harbor, when Patos Island Post Light bears *NE.* ½ *N.*, distant 1½ miles, make good a **N.** ½ **E.** course for 15 miles, passing ⅞ mile westward of Patos Island, and about the same distance westward of Birch Point. Anchor in Semiahmoo Bay with the post light at the entrance to Drayton Harbor bearing *E.*, distant about ½ mile, in 5 to 6 fathoms, and signal for a pilot.

Caution.—The tidal currents cause heavy rips on the ebb between Henry Island and Turn Point and around Turn Point. These are particularly heavy and dangerous between East Point and Patos Island and for 2 miles northward in Georgia Strait.

Remarks and dangers.—On the **NE.** ½ **N.** course **Pender Island** and **Saturna Island**, large and high, forming the northwest side of Haro Strait, are left in succession about 1 mile on the port hand. **East Point** (of Saturna) **Lighthouse** (see page 28) should be on the port bow and left 1 mile on the port hand; at night this light should be made immediately upon rounding Turn Point. **Waldron Island**, large, and highest near its southern point, is on the southeast side of the channel. **Skipjack Island** (1 mile southwestward from Waldron Island, 120 feet high and wooded on top) should be left 1¾ miles on the starboard hand. **Bare Islet** (40 feet high and grass-covered) will be seen ¾ mile eastward from Skipjack Island and ½ mile northward from Waldron Island. **Patos Island Post Light** (see page 26), marking the western end of **Patos Island** (about 70 feet high and bare at its western end), should be made directly ahead. **Sucia Islands**, larger and higher than Patos Island and well wooded, will be seen 1½ miles eastward of Patos Island and on the starboard bow. When East Point Lighthouse is a little abaft the beam, **Orcas Knob** (a remarkable, conical hill, with bare summit, 1,060 feet high, close to the western shore of Orcas Island and just westward of Turtle Back Range, 1,500 feet high) will be seen in range with the eastern side of Waldron Island. The course should be held about 1 mile past this point and East Point Lighthouse should bear **W.** by **S.**, distant nearly 1¾ miles, before hauling northward between East Point and Patos Island.

On the **NNW.** ½ **W.** course Orcas Knob should be astern and well open eastward of Waldron Island, and **Point Roberts**, 220 feet high, about 12 miles distant, appearing as an island with white cliffs, should be ahead. **Tumbo Reef buoy** should be on the port bow and left 1 mile on the port hand. Just before Patos Island Post

Light comes on the bearing **ESE. ⅛ E. Easterly** the north side of Sucia Islands will open north of Patos Island, with the **Matia Islands** farther eastward on the same range. This range passes about ⅞ mile northward of Tumbo Reef and is a good leading mark for clearing it.

Boiling Reef extends northward from East Point toward the buoy marking Tumbo Reef. The inner part of it, showing above high water, is about ¼ mile from the light, and it runs off but a short distance under low water. A depth of 6½ fathoms is found near its outer end about ¾ mile **N.** by **E.** from the light.

Tumbo Reef extends 1 mile **NE.** by **N.** from the east end of Tumbo Island; it has numerous rocky patches with 6 to 25 feet over them. The northeastern end of the reef is marked by a large, black, conical buoy, in 12 fathoms, about 1⅛ miles **N.** ¼ **E.** from East Point Lighthouse. About 100 feet southwestward from the buoy is a small patch of 2 fathoms. The strong tidal currents cause the buoy to lay close to the water, and with heavy tide rips and swirls it is sometimes difficult to see the buoy until it is close aboard. On these reefs slack water is sometimes less than 5 minutes in duration, and the current when strong boils over them like a cataract and can be heard for some distance.

On the **N.** ½ **E.** course leading to the approaches to Semiahmoo Bay and Drayton Harbor allowance must be made for the set of the current; from the southeastern part of Georgia Strait to Fraser River entrance the velocity is from 2 to 3 miles.

SAN JUAN AND PRESIDENT CHANNELS.*

San Juan Channel separates San Juan Island from the islands eastward. It is about 13 miles in length from its southern end to its junction with President Channel at the northern end. The depths as a rule are great and there are few outlying dangers, except at the southern entrance; the width varies from ½ to 3 miles. **Cattle Point**, the southeastern point of San Juan Island and the western point at the entrance, is marked by a post light (see table, page 26). **Salmon Bank** is an extensive shoal lying southward of Cattle Point, with depths ranging from 9 to 18 feet; it is marked by kelp. It is about 1¼ miles long by ½ mile wide, the southern end lying 1½ miles **S.** from Cattle Point Post Light; a buoy (spar-shaped, black, No. 1) is placed off the southern end in 5 fathoms. **Goose Island**, small and low, lies about ½ mile northward of Cattle Point and close to the western shore of the channel; with the knob on Orcas Island and the tangent to Turn Island it forms a range for clearing Salmon Bank in entering from southward. Several islands and rocks extend from the southwestern part of Lopez Island, the largest being **Long Island**. **White Rocks**, low, are about ½ mile westward from the western end of Long Island; a sunken **rock** marked by kelp lies about 400 yards southward of them.

Immediately northward from the southern entrance the shore of San Juan Island forms a broad, open bight known as **Griffin Bay**, about 3 miles long and 1¾ miles wide. There are numerous rocks and shoals in this bight and the shore should not be approached closer than ½ mile.

North Bay is a small bight in the northern part of the bay on which is located the village of **Argyle**. There is a small wharf making out to about 9 feet of water. The cove affords fair anchorage in 7 to 10 fathoms, with **Dinner Island**, near the southern shore, bearing about **SSE.**, distant 800 yards. In the approaches to the cove are two dangers. **Argyle Shoal**, with 10 feet over it and marked by kelp, lies about ¾ mile **ENE.** from the eastern point of Dinner Island; a buoy (spar, red and black horizontal stripes) is placed in 18 feet close to and westward of the shoal. The buoy should be given a berth of not less than 100 yards. A **shoal** with 6 feet over it and marked by kelp lies ½ mile **SE.** by **E.** ½ **E.** from the eastern point of Dinner Island. Rocks and shoals, some of which bare at low water, extend southeastward and southward from Dinner Island for about 400 yards; the passage between Dinner Island and the shore should not be attempted.

Fisherman Bay is a small, shoal cove on the western shore of Lopez Island and is entered by a narrow winding channel. Good anchorage, with shelter from all winds, for small, light-draft vessels with local knowledge may be had in 10 to 12 feet, soft bottom. The tidal currents have considerable velocity. **Lopez** is a small settlement situated at the entrance; a wharf is built out about 1,500 feet with 11 feet at its outer end.

About 2 miles northward of Lopez is the southern entrance to **Upright Channel**, between Shaw and Lopez islands, leading to East and Lopez sounds.

At **Turn Island**, San Juan Channel turns westward for about 9 miles, connecting at its northern end with Haro Strait and President Channel. With but few exceptions the channel is free from dangers, with deep water.

Turn Rock, about ¼ mile eastward from Turn Island, is a ledge bare at half tide; it is marked by a spindle, and should be given a berth of not less than 100 yards.

Reid Rock lies in mid-channel about 1¼ miles westward from Turn Rock Spindle. There is a depth of 13 feet over it, rising abruptly from deep water. It is marked by a buoy (nun, red and black horizontal stripes) placed in 18 feet on the eastern side of the rock. Vessels should pass eastward of the buoy.

Friday Harbor, on the eastern shore of San Juan Island about 1 mile westward from Turn Rock is a small cove about 1 mile long and nearly as wide. **Brown Island**, wooded and about ½ mile long, occupies the center

* See footnote on page 149.

of the bight; shoals extend about 200 yards from its eastern end and southern shore. A **shoal**, with 15 feet over it, lies 300 yards westward from the western end of the island, nearly in mid-channel. **Friday Harbor** is a small settlement and post office on the southern shore of the cove. Anchorage may be had off the wharves in 6 to 7 fathoms. Entrance may be made either side of Brown Island. *Entering eastward* of the island, favor the eastern point at the entrance to the cove to avoid the shoal extending eastward from the island. *Entering westward* of the island, favor the western shore to avoid the rock nearly in mid-channel off the western end of the island.

Parks Harbor, immediately eastward of George Point, on Shaw Island, about 2 miles northward of Turn Rock Spindle, is about ½ mile long and ¼ mile wide. It affords good anchorage for small vessels in 6 to 8 fathoms, soft bottom. The entrance is clear and there are no dangers.

Between **Neck Point**, the western end of Shaw Island, and **Steep Point**, the southwestern point of Orcas Island, about 1½ miles, are a number of islands, rocks, and sunken ledges. Between them are several narrow channels, but the ones in general use are **North** and **Pole** passages, close under the Orcas Island shore. These connect eastward with **West Sound**, in Orcas Island, and with **Harney Channel** between Shaw and Orcas islands. The currents have considerable velocity and the channels are navigated only by small vessels with local knowledge.

Jones Island, wooded and about ¾ mile in extent, lies about ⅜ mile westward from the southwest point of Orcas Island. **Spring Passage**, separating the two islands, is clear, with the exception of a shoal projecting about 250 yards eastward from Jones Island, about ¼ mile from the eastern point.

Flattop Island, prominent in the northern approaches to San Juan Channel, lies 1¼ miles northeastward from the eastern end of Spieden Island. It is about 100 feet high, flat on top, and sparsely covered with underbrush and trees. Gull Rock, about 30 feet high, of small extent and bare, lies about ¼ mile westward of the island.

Waldron Island, steep and rocky on the eastern side but flat with sandy beaches on the west side, lies about 1¼ miles westward from Orcas Island. It is irregular in shape, about 3 miles in length, with an extreme width of 2½ miles. The highest point, 580 feet, is near **Disney Point**, its southern end. On the north and east sides of the island is a high, yellow sand bluff, terminating abruptly in **Point Hammond**.

Bare (Penguin) **Island**, small, grassy, and bare of trees, ½ mile northwestward, and **Skipjack Island**, wooded, 1¼ miles westward of Point Hammond, should be avoided on account of the velocity of the currents in their vicinity. A small, bare rock lies off the eastern end of Skipjack Island, and another lies about midway between it and Bare Island. A **rock** with 1 foot over it lies about ½ mile northeastward from Point Hammond and is usually marked by kelp. **Cowlitz Bay**, on the southern shore, is a broad, open bight affording anchorage in fair weather. The western point of the bay is shoal, depths of 3¾ and 4 fathoms being found over ½ mile southward of Sandy Point. **Mouatt Reef**, with 3 feet over it and marked by kelp, lies ½ mile inside the eastern point at the entrance and about 600 yards offshore.

White Rock, 35 feet high, lies halfway between Flattop and Waldron islands. Rocks, bare at low water and marked by kelp, extend nearly 600 yards northwestward.

Danger Rock, with 8 feet over it and marked by kelp, lies 600 yards southeastward from White Rock.

The northern and western sides of Orcas Island are particularly steep and thickly wooded. **Mount Constitution**, 2,409 feet high, in the eastern part of the island, and **Orcas Knob**, 1,060 feet high, conical and bare on the summit, in the western part of the island, are prominent and easily recognized from northward and southward.

President Channel, separating Waldron and Orcas islands, is about 5 miles in length, with a least width of about 1¼ miles. The depths are generally great and the passage is free from dangers. The currents range from 2 to 5 miles in velocity and the rips and eddies are heavy, especially off the northern point of Waldron Island.

SAILING DIRECTIONS, SAN JUAN AND PRESIDENT CHANNELS.

These directions are available for vessels of any draft, and may be followed if bound to Georgia Strait or if bound to points eastward of San Juan Channel. These channels are used generally by local craft and seldom by large vessels.

1. ***From Race Rocks Lighthouse to the Southern Entrance to San Juan Channel.***—Having come through Juan de Fuca Strait, from a position 4¼ miles *S.* ¾ *E.* from Race Rocks Lighthouse, steer **NE.** ⅝ **N.** for about 27 miles. This course made good should pass about 4½ miles southward of Discovery Island Lighthouse, about 2½ miles

northwestward of Hein Bank, and about ½ mile southeastward of Salmon Bank buoy (spar-shaped, black, No. 1). At the end of the course Cattle Point Post Light should bear *NW.* ¼ *N.*, distant 1½ miles. Then follow the directions in section 2, following.

Caution.—In crossing the entrance to Haro Strait, allowance must be made for the set of the current.

Remarks and dangers.—At the end of the course, **Goose Island**, on the western side of the channel inside Cattle Point, **Turn Island**, and **Orcas Knob** should be in range; this range, in approaching, clears Salmon Bank.

Hein Bank and **Salmon Bank** are described on page 153.

1 A. ***From Point Wilson Lighthouse to the Southeastern Entrance to San Juan Channel.***—Having come from Admiralty Inlet, pass midway between Point Wilson and Admiralty Head and steer **WNW.** ½ **W.** for about 8 miles, passing 1¾ miles southward of Partridge Bank buoy (can, black, No. 1). Then bring the eastern end of the high land of Point Wilson astern, bearing *SE.* by *E.* ¼ *E.*, and steer **NW.** by **W.** ¼ **W.** This course made good for a little less than 4 miles should bring Smith Island Lighthouse to bear *NE.* ¼ *N.*, distant about 3¾ miles. Then bring Orcas Knob to bear **NNW.** ⅝ **W.** and steer for it on that bearing. This course made good should lead to a position about 1¼ miles eastward of Salmon Bank buoy with Cattle Point Post Light bearing *NW.* ¼ *N.*, distant 1½ miles. Then follow the directions in section 2, following.

Caution.—In crossing from Smith Island to San Juan Channel the tidal currents setting to or from Rosario Strait and San Juan Channel, with an estimated velocity of 2 to 3 miles at strength, should be kept in mind.

Remarks and dangers.—See Remarks and dangers, section 1 A, Sailing Directions, Haro Strait, page 152. On the **NNW.** ⅝ **W.** course, as the entrance to the channel is approached, **Goose Island**, on the western side and inside of Cattle Point, should be seen in range with **Orcas Knob**; **Turn Island**, about 5 miles inside the channel on the western side and appearing as a point of San Juan Island, should also be in range. This range clears Salmon Bank southward of Cattle Point. The course passes about 3½ miles westward of Smith Island and about 4 miles eastward of Hein Bank.

Hein Bank and **Salmon Bank** are described on page 153.

2. ***Entering and passing through San Juan Channel.***—Having followed the directions in section 1 or 1 A, when Cattle Point Post Light bears *NW.* ¼ *N.*, distant 1½ miles, steer so as to pass midway between Cattle Point and White Rocks. Continue a mid-channel course between Goose Island and the western shore of Lopez Island until the southeastern point of Griffin Bay on the western shore is abeam. Then steer about **NNW.** ¼ **W.**, giving the eastern shore a berth of not less than ¼ mile to clear Shark Reef; continue the course for nearly 4 miles and pass about ¼ mile eastward of Turn Rock Spindle. Round Turn Rock Spindle and steer about **WNW.** ½ **W.** so as to pass about 400 yards northward of Reid Rock buoy and midway between it and Shaw Island. Continue the course about 3 miles beyond the buoy until Yellow Island, the westernmost of the Wasp Islands, is abeam, distant about ½ mile. Then steer **NW.** for about 2 miles, until the northern point of Jones Island bears *NE.*, and follow the directions in section 3, following.

If bound into the passages eastward of San Juan Channel, after passing through the narrows at the southern entrance follow the eastern shore at a distance of about ½ mile and steer a mid-channel course through Upright Channel, passing southeastward of Canoe Island.

Caution.—The tidal currents attain a velocity of 3 to 6 miles at the southern entrance and in the vicinity of Turn Rock, with heavy swirls, making it difficult to steer compass courses; with a southeast wind the tide rips are dangerous at the southern entrance. At the northern entrance heavy tide rips occur off Limestone Point, the western point at the entrance.

Remarks and dangers.—In approaching the entrance several small islands and rocks off the southwest point of Lopez Island will be seen. **White** (Whale) **Rocks**, two black rocks about 3 or 4 feet above water and about 200 yards apart, are the westernmost of the group. A **ledge** with about 6 feet over it extends about 400 yards southward from them. The rocks should be given a berth of not less than ¼ mile, as the currents set toward them.

Goose Island, small and low, lies about ½ mile northward of Cattle Point and close to the western shore of the channel; with the knob on Orcas Island and the eastern tangent to Turn Island it forms a range for clearing Salmon Bank in entering from southward.

Salmon Bank is described on page 153.

On the **NNW. ¼ W.** course the buildings and wharf in the settlement of **Argyle**, in North Bay on the western shore, and of **Lopez**, on the eastern shore of the channel, will be plainly seen as Turn Rock is approached. When nearly up with Turn Rock, **Upright Channel** will be fully opened, bearing about **NNE.**

Shark Reef, awash at low water, extends about 250 yards from Lopez Island, about 1¼ miles northward from the eastern point at the entrance to the channel.

Turn Rock, about ¼ mile eastward from Turn Island, is a small ledge bare at half tide; it is marked by a spindle. The currents set over it with great velocity and it should be given a good berth.

The **WNW. ½ W.** course heads for **Limestone Point**, the northern point of San Juan Island, and leads about midway between **Reid Rock buoy** and **Shaw Island**. **Yellow Island** will be seen on the starboard bow, and when abeam, **Flattop Island**, 100 feet high and wooded, and **Green Point**, grassy, the eastern point of Spieden Island, will be seen northwestward.

Reid Rock lies in mid-channel, about 1¼ miles westward from Turn Rock spindle; there is a depth of 13 feet over it, rising abruptly from deep water. It is marked by a buoy (nun, red and black horizontal stripes) placed in 18 feet on the eastern edge of the rock; vessels should pass eastward of the buoy.

Yellow Island, the westernmost of the Wasp Islands, is small, grassy, and nearly bare of trees. The western and southern ends of the island are foul, a shoal extending about 300 yards, with a rock, bare at low water and marked by kelp, at its outer end. The island should be given a berth of not less than ½ mile.

The **NW.** course heads for the eastern side of **Flattop Island** and passes about 600 yards westward of **Jones Island**, which is wooded, but bare and grassy on its western points. At the end of the course **Spieden Channel** westward and **President Channel** northward will be well open, and **White Rock**, 35 feet high and bare, will be seen just open of the low, western point of Waldron Island.

3. ***From San Juan Channel to Patos Island Post Light, through President Channel.***—Having followed the directions in section 2, preceding, from a position about ½ mile southwestward from the extreme northwestern point of Jones Island, steer **N. ¾ E.** for about 6½ miles, heading for the western end of Sucia Islands until Point Hammond, the north point of Waldron Island, is abeam, bearing *W. ¾ N.*, distant about 1½ miles. From this position a **NNW. ½ W.** course made good for 5 miles leads into Georgia Strait, passing a little over ½ mile westward of Patos Island Post Light.

Caution.—The tidal currents through President Channel have a velocity of 2 to 5 miles, and off the north point of Waldron Island and between Waldron and Patos islands cause heavy swirls and tide rips, especially with an adverse wind. The rips are generally heaviest with the ebb current. Rips and swirls are also heavy off Limestone Point and the eastern end of Spieden Island.

Remarks and dangers.—The **N. ¾ E.** course leads practically in mid-channel, but favors slightly the western shore, which can be approached safely within ¼ mile, except at the northern end of Waldron Island. **Point Doughty**, on Orcas Island, bare and terminating in a small knob at its outer end, will be seen ahead on the starboard bow. At the end of the course the northeast end of **Skipjack Island** should be just open northward of Point Hammond, and **Saturna Island Lighthouse** should bear **NW. ⅞ W.**

Freeman Island is a small islet in the broad, open bight southward of Point Doughty. Foul ground marked by kelp extends about 350 yards westward from the southern point at the entrance to the bight, about 1¼ miles southward of Point Doughty.

The **NNW. ½ W.** course passes over ¾ mile eastward of the reef northward of Point Hammond and over 1¼ miles westward of **West Bank** (Plumper Reef). Northward of Waldron Island the currents are irregular in both direction and velocity and a set toward West Bank should be avoided.

A rock, marked by kelp, with 1 foot over it, lies about ½ mile northeastward from Point Hammond. There is deep water between it and the point, but on account of the strong currents in its vicinity vessels should pass eastward of the rock, giving the point of the island a berth of not less than 1 mile.

West Bank (Plumper Reef), within the 10-fathom curve, is about 1 mile long in a general east and west direction, with an average width of ¼ mile. The shoalest point, 10 feet, lies 2½ miles **N.** by **W.** ⅞ **W.** from Point Doughty, and nearly 1 mile **SW.** by **W.** from the western end of the southernmost of the Sucia Islands. Depths of 3½ fathoms are found ½ mile eastward of the shoalest point.

ROSARIO STRAIT*

is about 20 miles in length and varies in width from 5 miles at the southern entrance to 1½ miles about midway through the channel. The water is deep as a rule, but there are several dangers, the more important of which are marked by aids to navigation.

Burrows Bay, on the western shore of Fidalgo Island, is a broad, open bight, affording anchorage in the northern part in 15 to 16 fathoms, soft bottom. Protection from westward and northward is afforded by **Burrows** and **Allan islands,** but the bay is exposed in southerly weather. The southeastern part of the bay has depths of 6 to 9 fathoms over sandy bottom. Eastward of the passage between Allan and Burrows islands is a middle ground with a least depth of 5¼ fathoms. Vessels using Deception Pass bound to or from ports in the islands or Bellingham Bay pass through Burrows Bay and the passage northward of Burrows Island. The eastern end of the passage is marked by a post light (see table, page 26) on the end of the small wharf on the north shore. **Williamson Rocks,** a cluster of bare rocks of small extent, lie about ½ mile southward of the south point of Allan Island. **Dennis Shoal,** bare at low water, lies about 500 yards off the southern shore of Allan Island and ⅝ mile **NW.** by **W.** from Williamson Rocks. A small, bare rock lies 700 yards **NE.** by **N.** from **Langley Point,** the southern point at the entrance to the bay, and about 500 yards offshore. A **rock awash** lies about ⅞ mile **N.** ¾ **E.** from Langley Point, and 650 yards off the southern point of a small cove on the eastern shore.

Thatcher Pass, Obstruction Pass, and the channels between Rosario Strait and San Juan Channel are described on pages 164–165.

Bellingham Bay and tributaries are described under a separate heading on pages 161–164.

SAILING DIRECTIONS, ROSARIO STRAIT.

These directions are available for vessels of any draft in clear weather. At night, or in thick weather, strangers are advised to take a pilot. A range should be steered when possible, so as to insure making the compass courses good.

1. ***From Race Rocks Lighthouse to the Southern Entrance to Rosario Strait.***—Having come through Juan de Fuca Strait, from a position 4¼ miles *S.* ¾ *E.* from Race Rocks Lighthouse, steer **NE.** ½ **E.** for about 25¼ miles. This course made good should pass about 1½ miles southeastward of Hein Bank and should bring Smith Island Lighthouse to bear *SE.* ½ *E.*, distant about 2½ miles. From this position steer **NNE.** ¼ **E.** for nearly 6 miles, heading for the eastern end of Allan Island, and pass about 1 mile eastward of Davidson Rock buoy (can, black, No. 1). When the highest point of Cypress Island bears **N.** by **W.** ⅜ **W.**, steer for it, keeping the bearing, and follow the directions in section 2.

Caution.—The tidal currents setting to or from Rosario Strait and San Juan Channel with an estimated velocity of 2 to 3 miles at strength should be kept in mind.

Remarks and dangers.—The **NE.** ½ **E.** course passes midway between Discovery Island Lighthouse and New Dungeness Lighthouse and about 1½ miles southeastward from Hein Bank. Smith Island will be seen ahead on the starboard bow, and Watmough Head will be seen on the port bow.

Hein Bank and **Smith Island** are described on pages 152–153.

Watmough Head, 450 feet high, flat-topped and wooded, rises immediately back of **Point Colville,** the southeastern point of Lopez Island, and the western point at the entrance to Rosario Strait.

The **NNE.** course passes about 1¼ miles eastward of Colville Island. **Castle Rock,** high and precipitous, and appearing as a part of Point Colville, will be seen on the port bow and westward of the point proper. **Cypress Island,** wooded, and highest on the northern part (1,500 feet), and **Bird Rock,** 30 feet high and bare, about in mid-channel, will be seen as the strait is opened.

*See footnote on page 149.

Colville Island, 40 feet high, small and bare of trees, lies 1 mile **SSW.** from Point Colville, and should be given a berth of not less than 1 mile.

Davidson Rock, bare at extreme low water, lies about ¼ mile eastward from Colville Island. It is marked by a buoy (can, black, No. 1) in 26 feet immediately eastward of the rock. Heavy kelp extends westward to Colville Island.

Lawson Reef lies a little over 1½ miles **SW.** by **W.** ½ **W.** from the west point of Deception Island at the entrance to Deception Pass. It is of small extent, with a least depth of 17 feet, and is marked by a buoy (bell, red and black horizontal stripes) in 6 fathoms on the eastern edge of the shoal.

A **shoal** with a least depth of 5¾ fathoms lies midway between Davidson Rock and Lawson Reef; the course passes about ½ mile westward of the shoalest point.

1 A. ***From Point Wilson Lighthouse to the Southeastern Entrance to Rosario Strait.***—Having come from Admiralty Inlet pass midway between Point Wilson and Admiralty Head and steer **NW.** by **W.** ¼ **W.** for about 5½ miles, passing about 400 yards southward of Point Partridge bell buoy. When up with the bell buoy bring the highest point of Cypress Island to bear **N.** by **W.** ⅜ **W.** and steer for it on that bearing. This course made good for 12 miles leads to the entrance of Rosario Strait. Then follow the directions in section 2, following:

Caution.—The current on the flood has a tendency to set a vessel eastward toward Whidbey Island; it also sets strongly through Deception Pass and up Rosario Strait.

Remarks and dangers.—The **NW.** by **W.** ¼ **W.** course draws gradually inshore in approaching Point Partridge. Partridge Bank buoy (can, black, No. 1) should be ahead a little on the port bow and Smith Island Lighthouse should be seen on the starboard bow. Vessels should not pass eastward of the bell buoy.

Partridge Bank is described on page 152.

The **N.** by **W.** ⅜ **W.** course passes about 2 miles eastward of Partridge Bank buoy and about 2¾ miles eastward of Smith Island Lighthouse. **Minor Islet** (described on page 153), lying 1 mile northeastward of Smith Island, will be left 2 miles on the port hand. The course draws gradually offshore after passing Point Partridge bell buoy and passes about 1½ miles westward of Lawson Reef bell buoy and nearly 2¼ miles eastward of Davidson Rock buoy. **Watmough Head** will be prominent on the port bow and at the end of the course should be abeam.

Watmough Head, Davidson Rock, and **Lawson Reef** are described in section 1, preceding.

2. ***From the Southern Entrance of Rosario Strait to Georgia Strait.***—Having followed the directions in section 1, or 1 A, steer **N.** by **W.** ⅜ **W.,** heading for the highest point of Cypress Island, to a position ½ mile eastward of Belle Rock buoy (can, black, "Belle Rock"). Then steer **NNW.** ½ **W.** for about 5½ miles, passing ½ mile westward of Cypress Island. When Marsh Point, the western point of Cypress Island, is abeam, steer for the northernmost of the Peapod Rocks (marked by a post light) until Carter Point, the eastern point of Lummi Island, is opened northward of Sinclair Island. Then haul northward, course about **N.** ¼ **E.,** passing about ½ mile eastward of the northernmost Peapod Rock, until Point Lawrence, the eastern point of Orcas Island, is abeam. Then steer **NW.** ¼ **N.,** passing ¾ mile eastward of Clark Island, until Point Migley, the northwestern point of Lummi Island, is abeam, distant about 1¾ miles. Then,

If bound to British Columbian or Alaskan points, steer **WNW.** ½ **W. Westerly,** with the highest point of Lummi Island astern, pass 1¼ miles northward of Matia Islands, about midway between Clement Reef buoy (nun, red) and Alden Bank buoy (can, red and black horizontal stripes), and about 2¾ miles southward of Point Roberts and Fraser River Lighthouse. This course made good for 43 miles from Point Migley should lead to a position with Gabriola Reefs beacon bearing *SSW.*, distant 3 miles. Then follow the directions in United States Coast Pilot, Pacific Coast, Alaska, Part I.

If bound for Semiahmoo Bay or Drayton Harbor, continue the **NW.** ¼ **N.** course for 13 miles after passing Point Migley, leaving Alden Bank buoy about 1¼ miles on the port hand. When up with Birch Point follow the directions for Semiahmoo Bay, page 153, in this volume.

Caution.—The tidal currents run with considerable velocity, ranging from 3 to 7 miles. Heavy tide rips and swirls are found off Black Rock, Obstruction Passes, Peapod Rocks, and Lawrence Point, the northeastern point of Orcas Island.

Remarks and dangers.—These courses lead through the strait and give a safe berth to all the dangers, the majority of which are marked by aids. With a favorable current no difficulty should be experienced. Bound northward against a strong ebb current, a vessel can work up along the Cypress Island shore until up with Marsh Point, and then haul over to the western side of the channel and hug the Orcas Island shore up to Point Lawrence, passing westward of Peapod Rocks. After passing Point Lawrence, entrance to Georgia Strait may be had either side of Barnes and Clark islands. Less ebb current will be found and the flood current makes first along the Lummi Island shore.

Lawson Reef and **Davidson Rock** are described in section 1, preceding.

Kellet Ledge, about 2 miles northward from Point Colville, lies about 600 yards offshore; it is of small extent, marked by kelp, and has about 6 feet over it.

Williamson Rocks, a small cluster of bare rocks about 20 feet high, lie about ½ mile southward of the southern point of Allan Island.

Dennis Shoal, bare at extreme low water, lies about 500 yards off the southern shore of Allan Island and ⅝ mile **NW.** by **W.** from Williamson Rocks.

Bird Rock, almost in mid-channel, about 4 miles northward from Point Colville, consists of 3 rocks close together, the southernmost being the largest and 30 feet high. There is deep water close-to and passage may be made on either side.

Belle Rock, bare at extreme low water, lies about ½ mile **N.** by **E.** ¾ **E.** from Bird Rock. It is marked by a buoy (can, black, "Belle Rock") outside the kelp, in 9 fathoms. If passing eastward, to clear the rock keep Marsh Point, the western point of Cypress Island, on with Point Lawrence, the northeastern point of Orcas Island, until Guemes Channel is open. If passing westward, keep Bird Rock well open eastward of Point Colville until up with James Island.

When **Guemes Channel** is well opened the buildings and wharves in the town of Anacortes, on the south shore, will be prominent and Thatcher Pass will be open on the port hand.

White Rock, about 16 feet high, lies about ¼ mile off the southeastern shore of Blakely Island on the northern side of the entrance to Thatcher Pass.

Black Rock, 4 feet above high water, lies ¾ mile **NE.** by **N.** from White Rock and ½ mile from Blakely Island; it is marked by a spindle surmounted by a barrel with black and white horizontal stripes. Passage may be had between White and Black rocks and Blakely Island, but it is not recommended.

A **shoal** extends about 500 yards southward from Reef Point, the southern point of Cypress Island; the outer end is marked by a buoy (can, black, No. 1) in 4½ fathoms about ½ mile southward of the point.

Strawberry Island, small and low, lies about ¼ mile from the western shore of Cypress Island; passage may be had eastward of it but is not recommended. An indifferent anchorage may be had in the small cove in Cypress Island northward and eastward of Strawberry Island in 7 fathoms; it is seldom used.

Lydia Shoal, of small extent with a least depth of 3¾ fathoms, lies about 1 mile **NE.** ¾ **E.** from the post light on the eastern end of Obstruction Island.

A remarkable rocky **cone,** 840 feet high, is situated at the northern end of Cypress Island.

Rock Island, small, round, and wooded, lies about 400 yards northward of Cypress Island. The passage between them is used by local vessels, especially those bound to or from Bellingham Bay and Obstruction Passes.

Cypress Reef is a dangerous, rocky patch westward of Rock Island. The southern point, bare at low water, lies 550 yards **W.** ½ **S.** from Rock Island; from the southern point it extends northward for 650 yards with depths of 9 to 15 feet. It is well marked by kelp.

Buckeye Shoal, with a least depth of 4 fathoms, lies about 1 mile **NW.** by **W.** ¾ **W.** from Rock Island and is in range between Rock Island and the middle Peapod Rocks.

Peapod Rocks are a cluster of small rocks extending about 1 mile in a general north-northeast and south-southwest direction, parallel to and a little over ½ mile from the Orcas Island shore. They are bare of trees, the northernmost being the higher and larger and marked by a fixed white post light. The southern rock lies about 3 miles **N.** by **E.** ⅜ **E.** from the post light on the eastern end of Obstruction Island. A little westward of a line drawn between them is a rock covered at extreme high water. Vessels should not attempt to pass between them, but the passage westward between them and Orcas Island is clear.

Sinclair Island, northward of Cypress Island, is wooded and comparatively low. The northern shore is foul. **Bowlder Reef** is a dangerous shoal, extending over ½ mile **WNW.** from the northwest point of the island; portions uncover at half tide, and a large bowlder is at the inner part of the reef. It is well marked by kelp, but this is frequently drawn under by the current. The outer end of the reef is marked by a buoy (nun, red, No. 2) in 12 fathoms. Cypress Cone open westward from Rock Island, or Rosario Strait well open between Cypress and Blakely islands, leads westward of the reef.

Lummi Island is about 8 miles long and wooded. The northern half is low, but the southern half is occupied by Lummi Mountain, over 1,700 feet high. A small, double, rocky islet lies off the southern shore about 3 miles from its southeastern point. Shoals extend for over ½ mile from Point Migley, the northwestern point;

the northwestern extremity of the shoals is marked by a buoy (nun, red and black horizontal stripes) in 6 fathoms about ½ mile **W.** by **N.** from Point Migley. Sinclair Island open westward of Village Point clears the shoal.

Clements Reef, with 8 feet over it, lies about ½ mile northward from Sucia Islands, with several shoals and rocks covered at high water between it and the islands. It is marked by a buoy (nun, red, No. 2) in 13 fathoms about ¼ mile northeastward from the reef.

Alden Bank, within the 10-fathom curve, is about 3 miles long in an east and west direction with a greatest width of about 1½ miles. The shoalest part, 16 to 17 feet, covering a considerable area, is at the eastern end and lies about 3¼ miles **N.** by **W.** from the western end of Matia Island and 5 miles **W.** by **N.** from Point Migley, the western point of Lummi Island. A buoy (can, red and black horizontal stripes) is placed near the shoalest point in 21 feet, and should be given a berth of at least 1 mile. The position of the bank is well indicated by numerous fish traps and weirs, which are visible from a considerable distance.

BELLINGHAM AND PADILLA BAYS.*

These bays lie eastward of Rosario Strait and extend about 20 miles in a north-northwest and south-southeast direction, and vary from 2 to 5 miles in width. **Lummi, Cypress, Sinclair, Guemes,** and several smaller islands lie in the entrances, Lummi and Cypress islands being the highest and most prominent. There are four principal channels in entering, **Guemes** and **Bellingham** from southward, the western and widest between Lummi and Sinclair islands, and **Hale Passage** from northward. The depths in the channels are great, as a rule, with the exception of Hale Passage, which at its northern end has a bar with but 13 feet over it. The depths in the bays are moderate, and except in a few places anchorage may be made almost anywhere.

Padilla Bay, the southernmost, is largely filled with flats, the greater portion of which bare at low water. The deepest part of the bay is on the eastern and southern sides of Guemes Island. Entrance to the bay may be had from Rosario Strait through Guemes Channel or from Bellingham Bay eastward of Guemes Island. **William Point,** the eastern point at the northern entrance, is wooded and about 100 feet high. Owing to the low land back of it, it generally appears as an island. The western end of the point is marked by a post light (see table, page 26). From William Point, flats and shoals forming the eastern side of the northern channel extend southeastward to **Saddlebag, Dot,** and **Hat islands,** which lie about 1 mile eastward of the eastern point of Guemes Island. **Huckleberry Island,** small and low, lies nearly in mid-channel between Guemes and Saddlebag islands. **March Point,** low and wooded, on the southern shore of the bay, is marked by a post light (see table, page 26) that serves as a leading mark for the channel eastward of Guemes Island. **Fidalgo Bay,** small and shoal, lies westward of March Point.

Guemes Channel, about 3 miles long, with a least width of ½ mile, leads eastward from Rosario Strait to Padilla Bay, southward of Guemes Island; the depths range from 9 to 18 fathoms. **Shannon Point,** the southern point at the western entrance, is low and rounding; a rocky shoal marked by a buoy (nun, red, No. 2) at its northern extremity extends about 200 yards northward from the point. The velocity of the tidal currents does not exceed 3 miles as a rule.

City of Seattle Rock, with 9 feet over it, lies about 200 yards offshore on the southern side of the channel, about 2 miles eastward from Sherman Point; it is marked by a buoy (nun, red, No. 2) close to and eastward.

Anacortes is a small town at the eastern end of Guemes Channel, on the south shore, at its junction with Padilla Bay. The main commercial interest is the salmon-canning industry, but some lumber is exported. There are several wharves, the depths varying from 12 to 20 feet, according to locality. Water and a limited amount of supplies can be obtained. Communication is by daily steamers and rail, and by telegraph. Anchorage may be had off the wharves in 10 to 12 fathoms.

Bellingham Channel, the one most in use by vessels from southward, leads between Cypress and Guemes islands and between Sinclair and Vendovi islands, and is the most direct. The depths vary from 17 to 60 fathoms in mid-channel. Between Cypress, and Guemes and Sinclair islands, the velocity of the current is nearly as great as in Rosario Strait, but between Sinclair and Vendovi islands is much less.

The **channel** from northward, leading from Rosario Strait between Lummi and Sinclair islands and between Viti Rocks and Lummi or Vendovi islands is the widest and is used by deep-draft vessels. It varies from a width of 1¾ miles between Lummi and Sinclair islands to a least width of ¾ mile between Viti Rocks and Carter Point, the southeastern extremity of Lummi Island. The depths vary from 25 to 50 fathoms, with no outlying dangers other than those extending northward from Sinclair Island, see page 160.

Hale Passage, northward of Lummi Island, is about 6 miles long with an average width of ¾ mile. The depths range from 20 fathoms near the eastern end to 13 feet on the bar at the western end of the channel.

*Shown on chart **6300**, scale $\frac{1}{200,000}$, price $0.50; and in part on chart **6378**, scale $\frac{1}{40,000}$, price $0.25.

Lummi Point, on the south side of the passage about 1 mile eastward of Point Migley, the northwestern end of Lummi Island, is marked by a post light (see table, page 26).

From Point Frances, the northern point at the eastern entrance, a shoal extends to Eliza Island. The depths range from 4½ fathoms to 8 feet about midway between the point and the island; the shoalest spot, 8 feet, is marked by a buoy (can, red and black horizontal stripes) placed close-to and southeastward. The end of the spit making eastward from Point Frances is marked by a buoy (spar, red, No. 0).

Bellingham Bay from William Point to the head is about 14 miles long and 3 miles wide. The depths over the greater portion vary from 6 to 15 fathoms. The holding ground is not good, and in southeasterly weather, which is heavy, vessels frequently drag. In the southeastern part is **Samish Bay,** with flats that bare for a considerable distance at low water. It is of no commercial importance. **Chuckanut Bay,** on the eastern shore, is a small cove affording shelter to small vessels; it is of no commercial importance.

Whatcom and **Fairhaven** are two small towns at the head of the bay on the eastern shore. The former is the outlet for the coal mines in the vicinity besides exporting lumber and fish; some wooden vessels are also built here. Fairhaven has a lumber mill and canneries. The depths at the wharves vary from 12 to 27 feet, according to locality. Coal and provisions can be obtained; water can be had at the wharves. Repairs to wooden vessels and limited repairs to machinery can be made. Communication is by daily steamers and by rail.

For **tides** see page 15.

SAILING DIRECTIONS, BELLINGHAM BAY.

These directions are available in clear weather for vessels of any draft, except in Hale Passage, where the draft is limited to about 13 feet at low water by the bar at the northern entrance.

1. ***From Southward through Guemes Channel and Padilla Bay.***—Having followed the directions for Rosario Strait in section 2, page 159, when Bird Rock bears *WSW.* ½ *W.*, distant 1 mile, steer **N.** ¾ **E.**, heading for the eastern point of Cypress Island. When Guemes Channel is opened, haul eastward and keep in mid-channel southward of Guemes Island until abreast the eastern point of the island. Round the point at a distance of ¼ mile and passing in mid-channel between Huckleberry and Saddlebag islands steer **NW.**, heading for Vendovi Island. When William Point Post Light bears *NE.*, distant about 1⅛ miles, steer **N.** by **W.**, passing ¾ mile eastward of Vendovi Island and about ½ mile eastward of Eliza Island. This course made good for 10 miles leads to a position 1 mile westward of the rounding point immediately southward of Fairhaven and about 2½ miles southward of the wharves. From this position shape a course to the wharves as desired, passing 100 yards westward of Starr Rock buoy (nun, red, No. 2).

Remarks and dangers.—These courses lead clear of all dangers and may be followed with safety in clear weather. In thick weather strangers should take a pilot.

The **N.** ¾ **E.** course passes nearly ¾ mile eastward of **Belle Rock** buoy (can, black, "Belle Rock") and about the same distance westward of **Burrows Island** and **Green Point,** and over ¾ mile eastward of **Reef Point** buoy (can, black, No. 1), off the southern point of Cypress Island. As Guemes Channel is opened the north point of **Hat Island** will be seen open northward of Anacortes.

The mid-channel course through Guemes Channel passes about 500 yards northward of **"City of Seattle" Rock,** near the western part of Anacortes, about 200 yards offshore. The rock has about 9 feet over it and is marked by a buoy (nun, red, No. 2).

Foul ground extends about 250 yards northeastward from Shannon Point, the south point at the western entrance to Guemes Channel. A buoy (nun, red, No. 2) marks the outer limit of the shoal.

The **NW.** course, heading for Vendovi Island, after passing between Huckleberry and Saddlebag islands draws gradually westward from the flats and shoals extending southeastward from William Point. If bound to Padilla Bay and Guemes Channel from northward, March Point Post Light, just open eastward of Huckleberry Island, leads clear of the flats.

The **N.** by **W.** course leads clear of all dangers. **Vendovi Island,** 300 feet high and wooded, should be left ¾ mile, and **Eliza Island,** low and wooded, about ⅜ mile on the port hand. Hale Passage will be open westward from Eliza Island. Care should be taken to give the rounding point southward of Fairhaven a berth of not less than ½ mile to clear the shoals extending ¼ mile southward and westward from the point.

In going to the wharves vessels should give the water front of Fairhaven a berth of over ¼ mile to avoid Starr Rock.

Starr Rock, with 6 feet over it, lies about 250 yards offshore, a little northward of the sawmill wharf at Fairhaven. It is marked by a red nun buoy, placed close to and westward of the rock; vessels should not pass eastward of the buoy.

1 A. ***From Southward through Bellingham Channel.***—Having followed the directions for Rosario Strait, section 2, page 159, when Bird Rock bears *WSW.* ½ *W.*, distant 1 mile, steer **N.** ¾ **E.,** heading for the eastern point of Cypress Island. As Cypress Island is approached, haul eastward and steer so as to pass in mid-channel between it and Guemes Island. Continue the mid-channel course until midway between the eastern Cone Island (low, small, and wooded, off the eastern shore of Cypress Island) and Clark Point, the northern point of Guemes Island. Then steer for the southeastern end of Eliza Island, course **NNE.** for about 2½ miles, until ⅜ mile westward of the western end of Vendovi Island. From this position steer **NE.** by **N.** for about 2½ miles, so as to pass about ½ mile eastward of Eliza Island, and follow the directions in section 1, preceding.

Remarks and dangers.—These courses may be followed with safety in clear weather. Bellingham Channel is about ¾ mile wide in its narrowest part and is free from dangers. **Cone Islands,** a group of several small islands and rocks, lie off the northeastern face of Cypress Island. The passage between Sinclair and Cypress islands is clear and used by vessels bound to or from Obstruction Passes to points in Bellingham Bay; they usually go between Rock and Cypress islands, passing southward of Cypress Reef.

The **NE.** by **N.** course passes a little over ½ mile southward of **Viti Rocks,** which are about 100 feet high and of small extent; they lie ¾ mile southwestward from **Carter Point,** the southeastern end of Lummi Island.

See also "Remarks and dangers," section 1, preceding.

1 B. ***From Northward.***—From a position 1 mile southwestward from Village Point steer **ESE.,** heading for Viti Rocks until Lummi Rocks are abeam on the port hand, distant about ¼ mile. Then haul eastward so as to pass midway between Viti Rocks and Carter Point, and when Eliza Island is open clear of Lummi Island, steer **NE.** by **E.,** passing over ¼ mile southward of Eliza Island. When the southeastern point of Eliza Island bears *W.*, distant about ½ mile, steer **N.** by **W.** and follow the directions in section 1.

Remarks and dangers.—On the **ESE.** course Viti Rocks should be open eastward of Vendovi Island, and Lummi Rocks should be a little on the port bow. The southern shore of Lummi Island eastward of Lummi Rocks is bold and may be approached closely, giving it a berth of about 150 yards. **Lummi Mountain,** over 1,500 feet high, at the eastern end of the island, and Cypress Island are prominent in approaching from northward.

Lummi Rocks lie a little over ⅛ mile off the south shore of Lummi Island, about 3 miles westward from Carter Point. There are three bare rocks, the highest 100 feet, connected at low water. The passage between them and Lummi Island is clear but seldom used.

See also "Remarks and dangers," section 1, preceding.

1 C. ***From Northward through Hale Passage.***—These directions are available for a draft of about 15 feet at high water; there is a least depth of 13 feet at low water over the bar at the western end of the passage.

Bring the eastern point at the entrance to Lummi Bay to bear **ESE.** and steer for it on that bearing, crossing the bar at a point about ⅜ mile northward of Lummi Island. When Lummi Point Post Light bears *SSE.*, haul southward and follow a mid-channel course, passing about ¼ mile northward of Lummi Point Post Light and nearly the same distance southward of the buoy (nun, red, No. 2) near the eastern entrance. When up with the buoy steer **E.** ½ **N.** for about 1½ miles, passing close to and southward of the buoy (spar, red, No. 0) marking the spit off Point Frances. From this buoy a **NNE.** ¼ **E.** course made good for about 5 miles leads to the water front of Fairhaven and Whatcom.

Remarks and dangers.—This passage is used mainly by vessels with local knowledge bound to or from Drayton Harbor and vicinity. The depths are irregular and range from 20 fathoms to a least depth of 13 feet on the bar at the western end; several shoals with depths of 13 to 18 feet are on the south side of the passage. Strangers should use it only in daytime.

Lummi Point, on the north shore of Lummi Island about 1¼ miles eastward of Point Migley, is marked by a post-light (see table, page 26).

The eastern point at the entrance to Lummi Bay is low and sandy, with a few scattered trees near the end, and is ⅝ mile **E.** by **N.** from Lummi Point Post Light.

Point Frances is a rounding cliff about 200 feet high at its highest point. **Foul ground** extends nearly ½ mile eastward from the point, the outer limit being marked by a buoy (spar, red, No. 0).

Several **rocks,** with depths of 8 to 17 feet, lie 1¼ miles northwestward from the western point of Eliza Island. These are marked on their southern edge by a buoy (can, red and black horizontal stripes).

See also "Remarks and dangers" in section 1, preceding.

WASHINGTON SOUND, MINOR PASSAGES.

North Passage, close under Steep Point, the southwestern point of Orcas Island, is about ¼ mile in width between the point and Reef Island, the northwesternmost of the cluster lying between Shaw and Orcas islands. It is free from outlying dangers, but a **rock** with 11 feet over it lies ¼ mile **ENE.** from the northern point of Reef Island. The passage is used principally by small vessels with local knowledge.

Deer Harbor, at the eastern end of North Passage, extends northward into Orcas Island for about ¾ mile. It affords good anchorage in 6 to 7 fathoms about ¼ mile from the head. **Fawn Island,** wooded and of small extent, lies near the entrance and about 200 yards from the western shore. The eastern point at the entrance is marked by Pole Pass Post Light (see table, page 26). **Deer Harbor** is a small settlement and post office on the eastern shore near the head. There is a small wharf extending to deep water. A mid-channel course leads clear through North Passage and to the anchorage northward of Fawn Island. The eastern shore of the harbor should not be approached closer than 300 yards, on account of shoals which in places extend over 200 yards offshore.

Pole Passage, between Crane and Orcas islands, is very narrow, the width between the 18-foot curves being about 75 yards. Eastward of Crane Island it connects with **Wasp Passage,** coming from westward along the shore of Shaw Island. Neither of these passages should be attempted without a pilot and then only with a quick-working vessel. The north shore of Crane Island is foul, shoals extending in places over 250 yards from shore. A **sunken rock** with 5 feet over it lies 250 yards off the northern shore about ⅜ mile **W.** ¾ **S.** from Pole Pass Post Light.

Bell Island, wooded and of small extent, lies about ¼ mile eastward of Crane Island. Vessels using Pole Passage keep the north shore of this island close aboard to avoid the reefs and shoals extending from the western point at the entrance to West Sound. A **rock,** bare at low water, lies about 300 yards eastward of Bell Island; it is marked by a buoy (can, black, No. 1) placed in 34 feet close-to and eastward of the rock.

West Sound, in the western part of Orcas Island on the southern shore, extends northwestward for about 2¾ miles with an average width of about ¾ mile. The depths range from over 20 fathoms at the entrance to 7 and 8 fathoms at the head. **Double Island,** two small islands connected at low water, lie close to the western shore near the entrance. A small island lies close to the western shore about ¼ mile northward from Double Island. **West Sound** is a small settlement and post office in a small cove on the eastern shore of the inlet about 2 miles above the entrance. A wharf has been built out to about 12 feet of water. **Sheep Island,** low, is in the southern part of the cove and is connected with the beach at low water; a **shoal** projects about 150 yards westward from the island.

Harbor Rock, with 4 feet over it, lies in mid-channel ¾ mile from the head of West Sound; the rock is of small extent and is surrounded by depths of 4 to 10 fathoms.

Anchorage may be had anywhere in the sound northward of Double Island in from 7 to 12 fathoms, soft bottom.

Harney Channel, between the north shore of Shaw Island and Orcas Island, leads from the entrance to West Sound to the entrances of **East** and **Lopez** sounds. At its eastern end it is joined by Upright Channel, leading from San Juan Channel between Shaw and Lopez islands. Harney Channel is about 2¼ miles long with an average width of ½ mile; the depths range from 10 to 25 fathoms. There are no outlying dangers, and a mid-channel course is clear. **Orcas,** a small settlement and post office, is situated on the northern shore in a small cove at the western end. A wharf has been built out to about 12 feet of water. A **rock** with 15 feet over it lies about 125 yards southward of the wharf; there is deep water between the rock and the beach. **Blind Bay** is a small, unimportant cove on the southern shore of the channel; the bay is shoal and there are several reefs. A small islet lies in the entrance, and a **reef,** bare at low water, extends about 200 yards from the western point of the cove.

Upright Channel is about 3 miles long with an average width of about ¾ mile. **Canoe Island,** near the southern entrance, contracts the passage to a width of about 600 yards. A **rock,** bare at lowest tides, lies 300

yards southward from the southern point of Canoe Island. A **sunken rock** marked by kelp lies 300 yards eastward from the western point at the southern entrance. The depths in the channel range from 20 to 35 fathoms and, excepting the rocks mentioned above, it is free from dangers. **Anchorage** for small vessels may be had in the cove westward of Canoe Island in 6 to 7 fathoms, soft bottom.

East Sound, on the south shore of Orcas Island, extends northwestward for 6 miles. It varies in width from 2 miles at the entrance to less than ½ mile, the narrowest part being about halfway up the inlet. The depths vary from 15 fathoms at the entrance to 9 and 10 fathoms less than ¼ mile from the head. There are no outlying dangers and a mid-channel course is clear to the head; the shores may be approached to ¼ mile with safety. **Shag Rock**, marked by a spindle, lies 300 yards offshore about ⅝ mile eastward from the western point at the entrance. The rock shows at high water, but the ledge extends about 150 feet northward. **Newhall** is a small settlement in the small cove on the eastern shore about 3 miles above the entrance; there is a small wharf extending to about 9 feet. **East Sound** is a small settlement and post office in the western one of the two small coves at the head of the inlet; there is a small wharf extending to about 10 feet. **Anchorage** may be had anywhere in the inlet in from 15 to 17 fathoms, soft bottom, and at the head in 10 to 12 fathoms.

Obstruction Passes, immediately eastward of the entrance to East Sound, connect with Rosario Strait. **Obstruction Island** is marked on its eastern and southern ends by post lights (see table, page 26). The north pass is about 350 yards wide in its narrowest part, with a least depth of 7¾ fathoms on a mid-channel course, which can be followed with safety. The south pass, generally known as **Peavine Pass**, is the straighter and shorter of the two. It is a little over 200 yards wide at its narrowest part, with a least depth of 6¼ fathoms on a mid-channel course, which can be followed with safety. A **rock**, with 3¾ fathoms over it, lies 1 mile **NE.** by **E.** from the post light on the eastern end of Obstruction Island. This is a danger in entering or leaving the northern passage. In entering the southern pass from Rosario Strait a cluster of rocks, bare at high water and marked by a spindle, lies about ¼ mile from the Blakely Island shore. The currents through the passes reach a velocity of over 2 miles per hour, and eastward of Obstruction Island form heavy tide rips.

Westward of Blakely Island the depths as a rule are good with but one danger of importance. A **rock** with 10 feet over it lies a little over ½ mile westward from the northern part of Blakely Island and 1⅝ miles **S.** by **W.** ¼ **W.** from the post light on the southern point of Obstruction Island.

Thatcher Pass, between the southern point of Blakely Island and the north shore of Decatur Island, is about ½ mile wide in its narrowest part. The passage is clear and deep, with the exception of **Lawson Rock**, in mid-channel in the eastern end, that bares at extreme low water; the rock is marked by a buoy (can, red and black horizontal stripes) placed on the southern edge of the rock.

Lopez Sound, at the western end of Thatcher Pass, extends southward for 4¾ miles, with an average width of a little over 1 mile. The greater portion of the inlet has depths of 3 to 5 fathoms, muddy bottom, but a narrow, deeper channel runs along the eastern shore to Trump and Center islands. The inlet is of little importance at present.

Lopez Pass, at the southern point of Decatur Island, leads from Rosario Strait into Lopez Sound at a point about 2 miles from its head. It is very narrow, with depths varying from 9 to 12 fathoms; it is little used. The southern point of Decatur Island is marked by a fixed white post light.

BIRCH BAY, BOUNDARY BAY, SEMIAHMOO BAY, AND DRAYTON HARBOR.*

Birch Bay, on the eastern shore of Georgia Strait, about 10 miles northwestward of Point Migley, is an open bight, affording anchorage in 4 to 5 fathoms. It is open southward and westward, but affords some protection from northward. The bay is circular in shape and about 2 miles deep; flats, bare at low water, occupy a considerable area at the head. It is little used and no directions are considered necessary.

Boundary and Semiahmoo Bays are included between Birch Point, the western point at the entrance to Birch Bay, and Point Roberts, about 10 miles westward from Birch Point. Nearly all of Boundary Bay and a considerable part of Semiahmoo Bay lie northward of the international boundary.

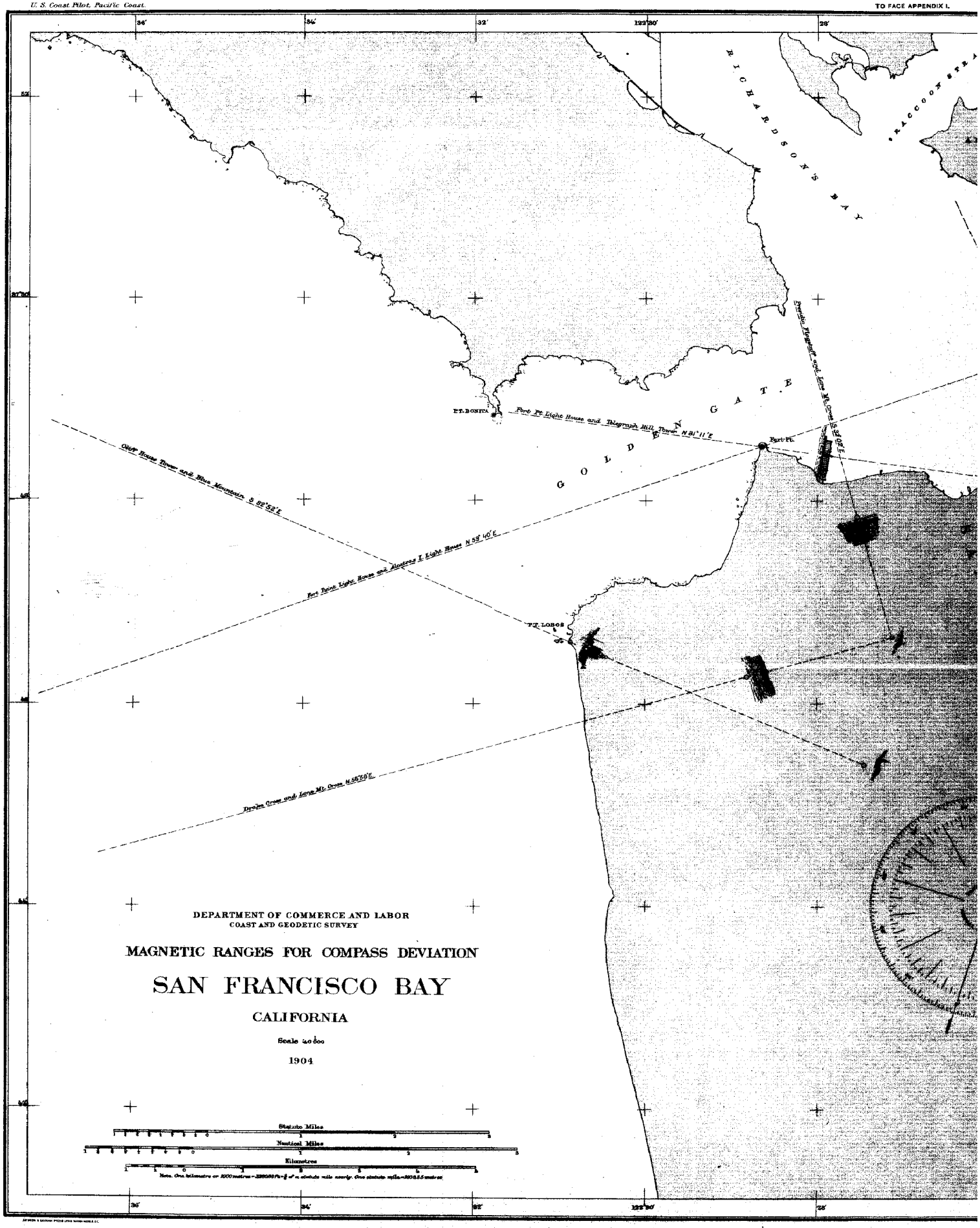
Point Roberts is the prominent feature in approaching from either northward or southward. The eastern face is about 180 feet high and is composed of white, vertical bluffs. The point is well wooded, and owing to the low land behind it, is usually made as an island, especially from southward.

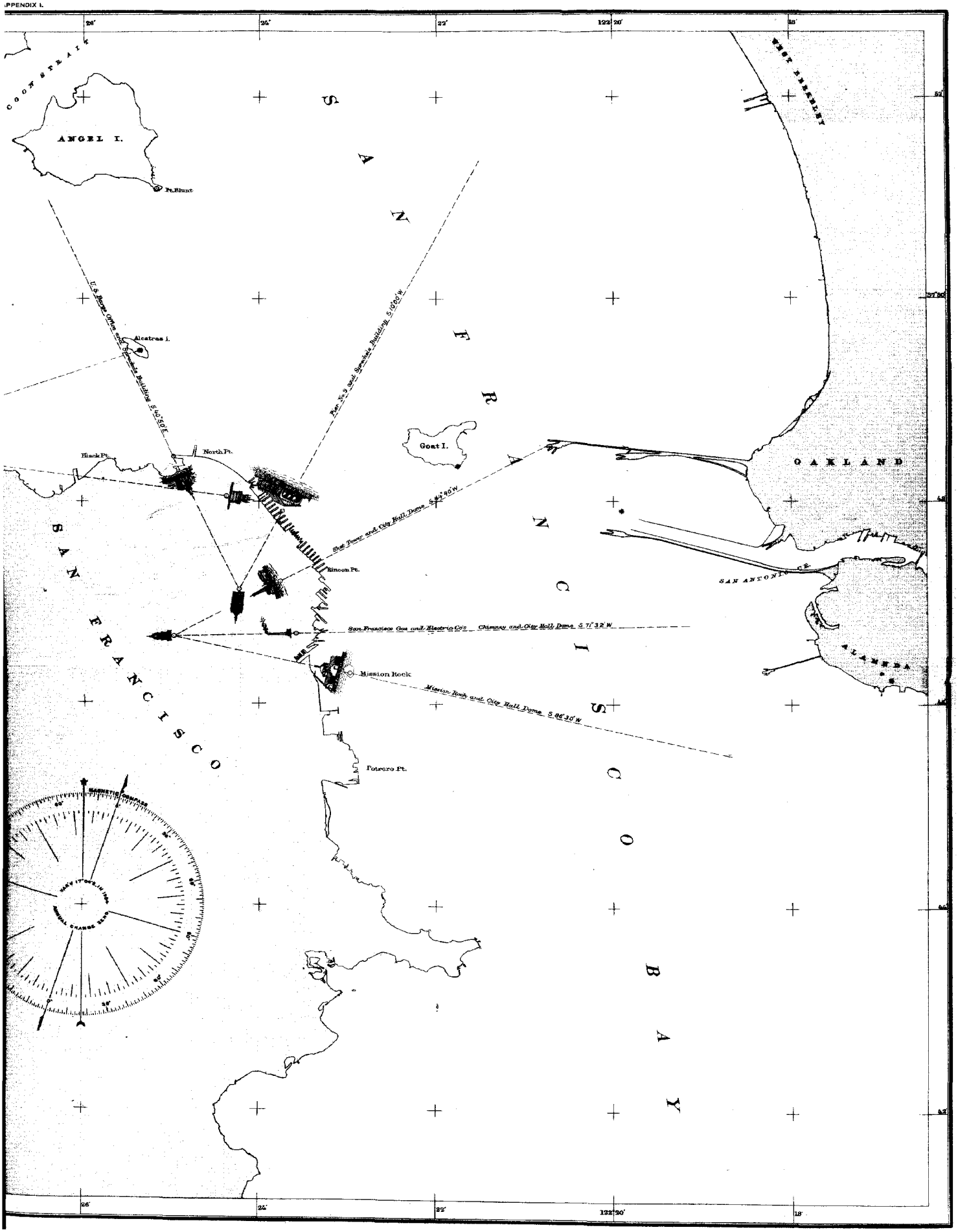
Boundary Bay, from Point Roberts to Kwomais Point, is about 6½ miles long and about 4 miles wide. The greater portion of the bay is filled with flats, bare at low water; in the eastern part of the bay these are intersected by several channels leading to the Nicomeckl and Kwatisalic rivers.

*Shown on chart **6300**, scale $\frac{1}{200,000}$, price $0.50. Semiahmoo Bay and Drayton Harbor are shown on chart **6399**, scale $\frac{1}{30,000}$, price $0.15.

Semiahmoo Bay, immediately eastward of Boundary Bay, has its entrance between Birch and Kwomais points. It is funnel-shaped and is connected at its eastern end by a narrow channel with **Drayton Harbor.** The eastern part of the bay is shoal. Anchorage may be had in the bay in 5 to 9 fathoms, but it is exposed southward and westward.

Drayton Harbor is a small basin-like cove formed by the extension of a sand spit northward from Birch Point. It is about 2 miles in diameter, but flats, bare at low water, occupy a large area in the eastern and southern parts of the harbor. The anchorage within the 18-foot curve is limited to a small area, less than ⅜ mile square, eastward of the northern end of the spit. The depths range from 4 to 7 fathoms, with muddy bottom. The shelter is excellent and the tidal currents have little velocity. The entrance is about ¾ mile wide, but the navigable channel is contracted to a width of about 300 yards by flats, bare at low water, extending from the northern shore; depths in the channel range from 4½ to 12 fathoms. Semiahmoo Post Light (see table, page 26) stands in 4 fathoms on the south side at the entrance. Flats, bare at low water, extend ½ mile westward from the sand spit; the outer limit is marked by a buoy (spar, red, No. 2). Several long wharves, some of them occupied by canneries, extend from the north shore to the edge of the flats. The town of **Blaine** is situated on the north shore near the entrance. Several buildings and sawmills, constituting the town of **Semiahmoo,** are at the northern end of the sand spit. The depths at the wharves vary from about 12 to 18 feet, according to locality. Lumber and canned salmon are the principal exports and general merchandise is imported. Water can be had at the wharves, but only a small amount of coal; provisions can also be had. Communication is by rail and regular steamers; there are also telegraph and telephone facilities. The sailing directions for Haro and Rosario straits (pages 153, 159) lead to the entrance. Strangers are advised not to enter without a pilot, which can generally be had from the canneries or sawmills.


36'
34'
32'
122°30'
28'
RICHARDSON'S BAY
RACCOON STRAIT
GOLDEN GATE
PT. BONITA
Fort Pt. Light House and Telegraph Hill Tower N 81°11'E
Presidio Flagstaff and Lone Mt. Cross S 82°05'E
Fort Pt.
Cliff House Tower and Blue Mountain S 82°52'E
Fort Point Light House and Alcatraz I. Light House N 53°40'E
PT. LOBOS
Drakes Cross and Long Mt. Cross N 56°50'E
DEPARTMENT OF COMMERCE AND LABOR
COAST AND GEODETIC SURVEY
MAGNETIC RANGES FOR COMPASS DEVIATION
SAN FRANCISCO BAY
CALIFORNIA
Scale 40/000
1904
Statute Miles
Nautical Miles
Kilometres


26'
24'
22'
122°20'
18'
52'
50'
48'
46'
44'
COOK STRAIT
ANGEL I.
Pt. Blunt
SAN FRANCISCO BAY
INNER SEA
U.S. Bonded Office and Spreckels Building S 40°50'E
Alcatraz I.
Pier 35 and Spreckels Building S 9°02'W
Goat I.
OAKLAND
Black Pt.
North Pt.
Star Tower and City Hall Dome S 44°40'W
Rincon Pt.
SAN ANTONIO C.
ALAMEDA
San Francisco Gas and Electric Co's Chimney and City Hall Dome S 71°32'W
Mission Rock
Mission Rock and City Hall Dome S 86°30'W
Potrero Pt.
MAGNETIC COMPASS
VARY 17° EAST IN 1906
ANNUAL CHANGE 12'.0

APPENDIX I.

MAGNETIC RANGES IN THE BAY OF SAN FRANCISCO, CALIFORNIA,

FOR DETERMINING THE DEVIATION OF THE COMPASS.

These ranges comprise such objects as can be seen in ordinary weather, and used by vessels under way, approximately in mid-channel either leaving or entering port, between the entrance to the bay and vicinity of Mission Rock.

It is hoped that there will be no difficulty in locating the different ranges from the chart here published.

It seems possible for the captain of a ship to find or check the deviation of his compasses on such points as he would use on a trip up or down the coast without much loss of time.

The variation 17° E., used in determining the ranges, is for 1904, and the change at present is so slight that for purposes of navigation the bearings of the ranges will not alter for years.

As it is believed that this work will be of great benefit to all classes of seamen, their cooperation is invited. It is desired that mariners will send to the Coast and Geodetic Survey Office, Washington, D. C., the location of any and all ranges, with names and description of objects, which they think suitable for such purposes.

These will be examined, and those selected will have their positions determined as soon as opportunity offers. When so determined, the data necessary for their use will be published by this office.

HOW TO FIND THE DEVIATION OF THE COMPASS.

The vessel should be steadied from two to three minutes on the compass course whose deviation is required before arriving on the range selected.

The difference between the bearing of range by compass and the magnetic bearing of range will be the deviation of the compass for the point on which the ship heads, keeping in mind that if the magnetic bearing of range is to the right of the bearing of range by compass the deviation will be East, and if to the left, West.

EXAMPLES.

1. Ship's head, when on range, NW. per compass:

Magnetic bearing of range	S. 44° 40′ W.
Bearing of range by compass	S. 40° 00′ W.
Deviation per compass for ship's head NW	4° 40′ E.

2. Ship's head, when on range, SE. per compass:

Magnetic bearing of range	N. 53° 40′ E.
Bearing of range by compass	N. 50° 00′ E.
Deviation per compass for ship's head SE	3° 40′ E.

3. Ship's head, when on range, NE. per compass:

Magnetic bearing of range	S. 32° 02′ E.
Bearing of range by compass	S. 30° 00′ E.
Deviation per compass for ship's head NE	2° 02′ W.

HOW TO FIND THE COMPASS ERROR.

Those desiring the compass error, on any heading, should apply the variation 17° 00′ E. (1904) to the deviation found on that heading, always keeping in mind that the *error* is composed of the *deviation* and *variation* combined according to their signs, remembering that Easterly deviation and variation is represented by a plus (+) sign, and Westerly deviation and variation by a minus (—) sign. Then we have the formula:

$$e=d+v$$

Where e=error, (—) W., (+) E.
d=deviation, (—) W., (+) E.
v=variation, (—) W., (+) E.

EXAMPLES.

Wishing to get the error from the previous examples, variation at San Francisco being 17° 00′ E., or, using sign, +17° 00′:

1. Deviation per compass for ship's head NW. was found to be 4° 40′ E., or, using sign, +4° 40′. Remembering the formula $e=d+v$, we have $e=+4° 40′+17° 00′=+21° 40′$, or the error on NW. is 21° 40′ E.

2. Deviation per compass for ship's head SE. was found to be 3° 40′ E., or +3° 40′. Variation same as above.

Then $d=+\ 3° 40′$
$v=+17° 00′$
$e=+20° 40′$, or the error on SE. is 20° 40′ E.

3. Deviation per compass for ship's head NE. was found to be 2° 12′ W., or −2° 12′. Variation same as above.

Then $d=-\ 2° 02′$
$v=+17° 00′$
$e=+14° 58′$, or the error on NE. is 14° 58′ E.

APPENDIX II.

PILOTS AND PILOTAGE, HARBOR CONTROL, QUARANTINE, ETC.

CALIFORNIA.

PILOTS AND PILOTAGE.

Extracts from the Civil Code of California, 1901.

Section 2036. On entering or leaving a port, harbor, or river, the master of a ship must take a pilot if one offers himself, and while the pilot is on board, the navigation of the ship devolves on him. Pilotage.

Extracts from the Political Code of California, 1885.

Sec. 2432. All vessels, their tackle, apparel, and furniture, and the master and owners thereof, are jointly and severally liable for pilotage fees, to be recovered in any court of competent jurisdiction. Vessel owners, etc., liable for pilotage.

Sec. 2433. If any pilot, in endeavoring to assist or relieve any vessel in distress, suffers loss or damage in his boats, sails, tackle, rigging, or appurtenances, the master, owner, or consignee of such vessel must pay the value of such loss or damage, to be ascertained by the commissioners. Owners to compensate pilots for loss.

Sec. 2434. Every pilot, on boarding a vessel, when required by the master thereof, must exhibit his commission as pilot. A refusal so to do subjects him to a forfeiture of his commission or license. * * * Pilots to show commission or license, when.

Sec. 2435. Every pilot carried to sea against his will, or unnecessarily detained on board of a vessel when a pilot-boat is in attendance to receive him, is entitled to receive the sum of eight dollars per day while necessarily absent or detained, not to exceed in the aggregate the sum of one thousand dollars in any one case, which sum may be recovered by action against the master or owner of the vessel so taking him away. Pilots carried to sea or detained.

Sec. 2436. Pilots for all the ports in this State, other than San Francisco, Mare Island, Benicia, and Humboldt Bay, are governed by the following regulations: Pilots for ports other than San Francisco, Mare Island, Benicia, and Humboldt Bay.

3. They shall receive for piloting every vessel into or out of port the sum of eight dollars per foot draught;

4. When the person commanding any vessel refuses to take a pilot, the pilot first offering his services is entitled to half pilotage;

Sec. 2437. When cruising off or standing out to sea, pilots must go to a vessel nearest to shore, or in the most distress, under a penalty of one hundred dollars. For refusing to go on board a vessel when required, a like penalty may be imposed. * * * Further duties of pilots.

Sec. 2439. Any person not the master or owner, and not holding a commission or license as a pilot, who pilots any vessel into or out of any harbor or port of this State for which there are commissioned or licensed pilots, must be punished therefor * * * , and must pay to the pilot entitled to pilot such vessel the amount of pilotage or towage collected by him. Piloting vessels without license.

HARBOR CONTROL.

Extracts from the Penal Code of California, 1901.

Sec. 374½. Every person * * * who shall discharge, or deposit, or shall cause or suffer to be discharged or deposited, or to pass, in or into the waters of any navigable bay, or river, in this State, any coal tar or refuse or residuary product of coal, petroleum, asphalt, bitumen or other carbonaceous material or substance, is guilty of a misdemeanor, * * * . Discharging coal tar, etc., into waters.

Sec. 613. Every person who, within the anchorage of any port, harbor, or cove of this State, into which vessels may enter for the purpose of receiving or discharging cargo, throws overboard from any vessel the ballast, or any part thereof, or who otherwise places or causes to be placed in such port, harbor, or cove any obstructions to the navigation thereof, is guilty of a misdemeanor. Throwing overboard ballast, or obstructing navigation.

PORT-WARDENS.

Extracts from the Political Code of California, 1885.

Number of port-wardens.

Sec. 2501. There are four port-wardens for the port and harbor of San Francisco, and one for each and every other port of entry within this State.

Duty of wardens.

Sec. 2503. The port-wardens, when required by any person interested in either vessel or cargo, must survey any vessel arriving in distress, or which has sustained damage or injury at sea, and survey in whole or in part the cargo thereof; and must survey the hatches, stowage, and cargo of all vessels laden with general or assorted merchandise belonging or consigned to various parties.

Fees for surveys and certificates.

Sec. 2510. For each and every survey the port-warden is entitled to fifteen dollars, to be paid by the owners, masters, or consignees, the amount not to exceed altogether for any one vessel the sum of seventy-five dollars. Foreign vessels, not admitted by treaty on terms of equality with American bottoms, must pay fifty per cent advance on this rate. For all separate certificates of surveys required by different consignees he is entitled to a fee of two dollars and a half, and for each order of sale he is entitled to ten dollars.

Penalty for anyone to act as such who is not a port-warden

Sec. 2511. Any person other than a port-warden, appointed according to law, who performs any of the duties of such officer prescribed in this article is liable to a penalty * * * .

QUARANTINE.

Extracts from the Political Code of California, 1885.

Board of supervisors may adopt Art. III (Quarantine laws for San Francisco).

Sec. 3059. The board of supervisors of any county in which there is a port of entry or harbor, for which there is not otherwise provided health and quarantine regulations, may by an ordinance adopt the whole or any part of the provisions of Article III (quarantine laws for San Francisco) of this chapter, appoint a board of health, or health officer, locate quarantine grounds when necessary, and provide for the enforcement of health and quarantine regulations.

Board of health to be established in incorporated cities and towns.

Sec. 3061. It shall be the duty of the board of trustees, council, or other corresponding board, of every incorporated town and city of this State, to establish, by ordinance, a board of health for such town or city, * * * .

The trustees, council, or other legislative board, by whatever name known, of any incorporated city or town of this State, may by ordinance adopt any portion of Article III (quarantine laws for San Francisco) * * *, for some definite period of time, as may seem proper for the regulation of sanitary matters within their town or city.

Extracts from the Penal Code of California, 1901.

Violation of quarantine laws by masters of vessels.

Sec. 376. Every master of a vessel subject to quarantine or visitation by the quarantine officer, who refuses or omits:

1. To proceed with and anchor his vessel at the place assigned for quarantine, at the time of his arrival;

2. To submit his vessel, cargo, and passengers to the examination of the quarantine officer, or to furnish all necessary information to enable that officer to determine to what length of quarantine and other regulations they ought, respectively, to be subject; or,

3. To remain with his vessel at the quarantine during the period assigned for her quarantine, and while at quarantine to comply with the regulations prescribed by law, and with such as any health officer, by virtue of authority given him by law, shall prescribe in relation to his vessel, his cargo, himself, his passengers, or crew;

Is punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding two thousand dollars, or both.

SAN DIEGO BAY.

PILOTAGE.

Extracts from an act of the legislature, approved March 26, 1872.

Mooring of vessels.

Sec. 8. It shall be the duty of every pilot in charge of a vessel arriving in the harbor of San Diego to have the vessel safely moored in such a position as the master may direct.

Sec. 13. When two or more pilots shall offer their services to a vessel outside of a line from Punta Lomas and the southeast end of Zuinga shoal, the pilot first offering his services shall have the preference; and if the master of any vessel shall refuse to observe such rule of preference, and to take the pilot entitled to be preferred on board, the vessel, her appurtenances, the master and owner thereof, shall be jointly and severally liable to the pilot entitled to such preference for one-half of the amount of pilotage he would have been entitled to claim had his services been accepted. Rights of pilots to preference.

Sec. 14. The following shall be the rates of pilotage into and out of the harbor of San Diego: All vessels under five hundred tons, five dollars per foot draught; all vessels over five hundred tons, five dollars per foot draught, and four cents per ton for each and every ton of registered measurement; all vessels engaged in the whaling or fishing trades, one dollar per foot draught. When a vessel is spoken and the services of a pilot are declined, one half of the rates shall be paid. All vessels coasting between San Diego and any port in Oregon, or in Washington and Alaska Territories, and all vessels coasting between ports of this State, and all steamers from Panama connecting with the Panama railroad, touching at said port of San Diego, bound to other coast ports, shall be exempt from all charges for pilotage unless a pilot be actually employed. Rate of pilotage.

(See also the extracts from the general pilotage law of the State on page 169).

HARBOR CONTROL.

Extracts from an act of the legislature, approved March 18, 1889.

Sec. 2575. A Board of State Harbor Commissioners for the Bay of San Diego, to consist of three persons, is hereby constituted * * *. Harbor commissioners for Bay of San Diego.

Sec. 2577. * * * The Chief Wharfinger must station, berth, and regulate the position of vessels in the docks and harbors * * *. Subject to such regulations, he must assign berths to vessels in the order of their application after entering the harbor. * * * And it shall be his duty to execute and enforce the rules and regulations which may be established by such Board pursuant to the provisions of this article, and he is also empowered to determine cases of collision by consent of all parties interested, and where damages do not exceed three hundred dollars, the decision is final. * * * And it shall be the duty of all pilots, masters of tugboats, masters, owners, and consignees of vessels, to obey all lawful orders and directions of the Chief Wharfinger in relation to the stationing, anchoring, and removing of vessels under and pursuant to such rules and regulations. Chief wharfinger.

Sec. 2579. The Commissioners shall have possession and control of the entire Bay of San Diego * * * and said Commissioners are hereby authorized and required to make * * * all needful rules and regulations * * * in relation to the moving and anchorage of vessels in said harbor, * * * nor shall any person or company place or caused to be placed any obstructions in the Bay of San Diego * * *. Control of bay.

Sec. 2594. If any master, agent, or owner of any water craft shall refuse or neglect to obey the lawful orders or directions of the Chief Wharfinger in any matter pertaining to the regulations of said harbor, or the removal, or stationing of any water craft, such master, agent, or owner so refusing or neglecting is guilty of a misdemeanor, * * *. Refusal to obey orders of wharfinger.

Sec. 2595. All persons are forbidden to deposit or cause to be deposited, in the waters of the harbor of San Diego, * * *, any substance that will sink and form an obstruction to navigation, without first obtaining permission in writing of the Board of State Harbor Commissioners * * *. Obstructions to navigation.

BAY OF SAN PEDRO AND PORT OF WILMINGTON.

PILOTAGE.

Extracts from an act of the legislature, approved March 19, 1889.

Sec. 8. When two pilots offer their services to a vessel outside of a line from Point Firmin Lighthouse and the southeast end of the twenty-six fathoms bank, the pilot first offering his services shall have the preference, and if the master of any vessel shall refuse to observe such preference, and to take the pilot first offering his services on board as pilot, the master, the vessel, her appurtenances, and furniture shall be jointly and severally liable Rights of pilots to preference.

to the pilot entitled to the preference for one half of the pilotage fees he would have been entitled to claim had his services been accepted.

Rates of pilotage.

Sec. 9. The following shall be the rates of pilotage into and out of the Bay of San Pedro, at the outer anchorage: All vessels under five hundred tons five dollars per foot draught; all vessels over five hundred tons, ten cents per ton for each and every ton gross registered tonnage. For all vessels engaged in the whaling or fishing trade the rate of pilotage shall be one dollar per foot draught. When a vessel is spoken and the services of a pilot are declined the pilot shall be entitled to one-half pilotage rates. All vessels engaged in the coasting trade between ports of the United States on the Pacific Coast shall be exempted from all charges for pilotage, unless a pilot shall actually be employed. All vessels over five hundred tons gross register shall, when piloted into or out of the harbor of San Pedro or Wilmington over the bar, adjoining Dead Man's Island, pay pilotage rates as follows: five dollars per foot draught, and five cents per ton for each ton gross registered tonnage.

(See also the extracts from the general pilotage law of the State on page 169.)

SAN FRANCISCO BAY.

PILOTAGE.

Extracts from the Political Code of California, 1885, with amendments to 1901.

Duty of pilots to arrest.

Sec. 2459. Every pilot in charge of a vessel arriving in the port or harbor of San Francisco must safely moor the vessel in such position as the master of the vessel or harbor master may direct. He must prevent all persons (except officers of the State or Federal governments, owners or consignees of the vessel or cargo, and persons admitted on the express orders of the master) from boarding such vessel until she has been safely moored. To enforce the provisions of this section and other police regulations for the harbor, every pilot in charge of a vessel entering the harbor of San Francisco is authorized and empowered to arrest every one who, in opposition to the master's orders, persists in boarding such vessel, or who, having boarded her, refuses to leave on command of such master or pilot; when so arrested, he must be immediately brought before the police judge's court, or admitted to bail, as provided in the Penal Code.

Certain pilotage to be agreed on.

Sec. 2465. The pilotage inside the heads to the anchorage opposite San Francisco and about the harbor, or between the harbor of San Francisco and the ports of Mare Island, Vallejo, or Benicia, must be at such rates as agreed on between the parties, not to exceed five dollars per foot draught.

Rates of pilotage.

Sec. 2466. The following shall be the rates of pilotage into or out of the harbor of San Francisco: All vessels under five hundred tons, five dollars per foot draught; all vessels over five hundred tons, five dollars per foot draught, and four cents per ton for each and every ton registered measurement. When a vessel is spoken inward or outward bound, and the services of a pilot are declined, one-half of the above rates must be paid. In all cases where inward bound vessels are not spoken until inside of the bar, the rates of pilotage and one-half pilotage above provided shall be reduced fifty per cent. Vessels engaged in the whaling or fishing trades shall be exempt from all pilotage, except where a pilot is actually employed.

Vessels exempt from pilotage, where.

Sec. 2467. Any vessel in tow of a steam-tug, between the harbor of San Francisco and the ports of Mare Island, Vallejo, or Benicia, shall be exempt from all charges for pilotage, unless a pilot is actually employed.

Coasting vessels exempt from pilotage.

Sec. 2468. All vessels sailing under an enrollment, and licensed and engaged in the coasting trade between the port of San Francisco and any other port of the United States, shall be exempt from all pilotage unless a pilot be actually employed. All foreign vessels, and all vessels from a foreign port or bound thereto, and all vessels sailing under a register between the port of San Francisco and any other port of the United States, shall be liable for pilotage and half-pilotage as provided in section 2466 of this Code.

When two pilots offer services.

Sec. 2469. When two or more pilots shall offer their services to any vessel inward bound, the pilot first offering, or one connected with the same boat, shall have preference, and if the services of another be accepted, the vessel, her appurtenances, and the master and owner thereof, shall be jointly and severally liable to the pilot entitled to such preference for one-half the amount of pilotage he would have been entitled to had his services been accepted.

Sec. 2470. Any pilot bringing a vessel into the harbor of San Francisco (or one connected with his boat) shall be entitled to take such vessel to sea again when she next departs; *provided*, such pilot and those connected with his boat have not in the mean time become in any manner disqualified or incapacitated; and if such preference be disregarded by the master of such vessel, the vessel, master, and owner shall be liable to the pilot entitled to such preference for one-half the amount to which he would be entitled if his services had been accepted.

Pilot bringing in vessel entitled to take same out.

HARBOR CONTROL, PORT OF SAN FRANCISCO.

Extracts from the Political Code of California, 1885.

Sec. 2539. The Chief Wharfinger shall keep an office in some convenient place upon the city front, between Market and Pacific streets, which shall be kept open every day (Sundays and holidays excepted), from 7 a. m. till 6 p. m. * * * . And it shall be the duty of all pilots, masters of tugboats, masters, owners, and consignees of vessels, to obey all lawful orders and directions of the Chief Wharfinger in relation to the stationing, anchoring, and removal of vessels under and pursuant to such rules and regulations. The Chief Wharfinger is empowered to determine cases of collision by consent of all parties interested, and where damages do not exceed three hundred dollars the decision is final.

Office and duties of Chief Wharfinger.

Sec. 2541. If any master, agent, or owner of any water-craft shall refuse or neglect to obey the lawful orders or directions of the Chief Wharfinger in any matter pertaining to the regulations of said harbor, or the removal or stationing of any water-craft, such master, agent, or owner so refusing or neglecting is guilty of a misdemeanor, * * * .

Refusal to obey lawful orders of Chief Wharfinger.

Sec. 2542. All persons are forbidden to deposit, or cause to be deposited, in the waters of the harbor of San Francisco, as described in the preceding sections, any substance that will sink and form an obstruction to navigation, without first obtaining permission in writing of the board of State harbor commissioners, * * * . Any person violating the prohibition contained in this section is guilty of a misdemeanor.

Obstruction to navigation.

Extracts from a pamphlet edition of the Harbor Rules, Regulations, and Rates adopted by the Board of State Harbor Commissioners, 1902.

ANCHORAGE REGULATIONS, PORT OF SAN FRANCISCO.

1. Vessels must not be anchored, nor moored, between a line drawn from the outer end of Jackson Street Pier (Pier No. 5) through the most southerly point of Yerba Buena Island, locally known as Goat Island, prolonged to the intersection with the three-fathom contour on Oakland side of the bay, and a line drawn from the outer end of Mission Street Pier No. 1 (Pier No. 2) to the Ferry Slip of the South Pacific Coast Railroad Company, on the Alameda side of the bay; nor must they be anchored so as to permit them to swing between the said lines.

1½. Vessels must not be anchored, nor moored, in the space enclosed on the south by a line drawn from the light on Yerba Buena (Goat) Island to the easterly end of the pier of the S. P. Co. on the Oakland shore, on the north, by a line drawn from the easterly end of the pier of the S. P. Co. on the Oakland shore to the northeasterly end of Yerba Buena (Goat) Island and on the west by the easterly shore of Yerba Buena (Goat) Island.

2. Vessels must not be anchored, nor moored, between a line drawn from the intersection of the north line of Townsend Street with the easterly line of the Pacific Mail Steamship Company's wharf to the extreme westerly end of the north training wall of Oakland Harbor, and a line drawn from the outer end of Berry Street Pier to the extreme westerly end of the south training wall of Oakland Harbor; nor must they be anchored so as to swing between the said lines, nor within the eight hundred feet of the Hay Wharf.

3. Vessels must not be anchored, nor moored, between a line drawn from the most easterly point of Point Blunt (on Angel Island), passing over Blossom Rock as marked by buoy, and intersecting the five-hundred-yard limit at a point directly north of the outer end of Lombard Street Pier (Pier No. 27). This line if projected would touch the outer end of Washington Street Pier (Pier No. 3) and a line drawn from the northwesterly end of the grain shed of Section I of the seawall, with the light on Alcatraz Island; and from there to Point Knox on Angel Island; nor must vessels be anchored so as to permit them to swing between said lines.

4. Vessels must not be anchored, nor moored, between a line drawn from the outer end of Mission Street Wharf No. 1 to the westerly point of Point Richmond; and a line drawn

from the outer end of Lombard Street Wharf through the buoy anchored at the southerly spit of Southampton Shoal and prolonged to opposite Point Richmond.

5. Vessels must not be anchored, nor moored, within five hundred yards of a line drawn from the extreme northerly end of the seawall, southerly through the extreme outer ends of the piers, to the outer end of Berry Street Wharf.

HARBOR REGULATIONS, PORT OF SAN FRANCISCO.

6. Vessels propelled by steam must not run inside of a line five hundred (500) feet distant from and parallel to a line drawn through the outer ends of the piers.

7. Vessels propelled by steam, except when going to or leaving the seawall, must not run inside of a line eight hundred feet distant from, and parallel with, the said seawall.

8. A vessel will not be entitled to a berth until an application shall have been made to the Chief or Assistant Chief Wharfinger; and such application must state the length, draught of the vessel, kind of cargo, and locality desired. No application shall be entertained unless the vessel be in the harbor and ready to be docked. Berths shall be assigned in the order of application, provided that vessels ready to discharge cargo shall have preference over those ready to receive cargo. No one except the Chief or Assistant Chief Wharfinger has authority to assign berths to vessels. When a vacant berth is assigned to a vessel, said assignment will hold good twenty-four hours after it becomes vacant.

9. Vessels must haul or go into the stream at their own expense when ordered to do so by the Chief or Assistant Chief Wharfinger. Upon failure to obey such order the Chief or Assistant Chief Wharfinger shall have power to cause such removal at the expense of such vessel or vessels.

10. Vessels when being moved into a slip or alongside the wharf must approach "head on" and when at a wharf must lie head toward the shore. The studding-sail booms and sprit-sail yards must be rigged in; their off-shore anchors suspended ready for dropping; their lower and topsail yards braced "sharp up" on their in-shore braces, except when in actual use discharging or loading cargo; and, when required by the Wharfingers, their movable fore-and-aft spars, jibboom, and martingale must be rigged in.

10a. Vessels lying at a wharf are strictly prohibited from stretching mooring lines across the slip to the opposite wharf, without first obtaining the permission of the Chief Wharfinger.

11. A vessel anchored or moored in the harbor, or lying in a slip or dock, must, at all times, have on board at least one seaman capable of taking proper care of such vessel. If it become necessary, a vessel may be removed by order of the Chief Wharfinger at the expense of the owner, and the owner and the vessel shall be liable for all damage that shall arise thereby.

12. A vessel while anchored or moored in the harbor must at all times of the night show lights.

13. When ballast, stone, coal, bricks, ashes, cinders, dust, rubbish, or other loose matter or material that will sink, is being landed from a vessel upon a wharf, or is being transferred from one vessel to another, a canvas chute or other contrivance, to the satisfaction of the Wharfinger, must be used to prevent any part of such substance from falling into the slip.

14. Fire must not be used on board of any vessel at the wharves or in the slips for heating pitch, tar, or other inflammable substances, but may be used on floating stages or boats for the purpose of heating such substances for repairing vessels; provided, such fire is constantly in charge of a person capable of taking proper care of the same.

17. No substance that will sink or form an obstruction to navigation shall be deposited in the waters or on the shore of the harbor without first obtaining permission, in writing, from the Harbor Commissioners.

20. No person shall have authority to collect dockage, wharfage, tolls, or rents, unless authorized by the Board of State Harbor Commissioners, except on wharves held under lease pursuant to acts of the Legislature. Lessees of wharves authorized to collect dockage, wharfage, or tolls must charge and collect the same rates as those fixed by the Board for the wharves not under lease.

21. If any vessel leaves a wharf, slip, dock, channel or basin, unless forced to do so by stress of weather or fire, without first paying the dockage or tolls due, such vessel will be placed upon the delinquent list, and must not be permitted to use any wharf, slip, channel or basin without first paying double the bill incurred and $10 in addition thereto, except by permission of the Commissioners.

24. Dockage commences upon the vessel when she makes fast to the wharf, or comes within a dock, slip, basin, channel or canal; and each twenty-four hours thereafter, or part thereof, constitutes a day's dockage.

25. No deduction will be made for Sundays, holidays, or rainy days.

26. A vessel arriving from leased or private premises will be charged at the same rate and in the same manner as if arriving from the stream.

27. If a vessel occupies two berths on the same day she will be charged dockage at each wharf, unless she obtains a transfer on receipt for payment of dockage at the wharf first occupied.

28. Vessels may be assigned berths to repair at quarter dockage rates; but to entitle any vessel to the benefit of this rule, her owner, consignee, or captain must apply to the Chief Wharfinger, who may assign her, in writing, a berth, pursuant to such application. And in no case must the quarter rate commence before the date of the order assigning the berth, but must, in every instance, commence contemporaneously therewith, or at such a subsequent date as may be specified in the order.

29. Vessels while lying across the end of any pier or wharf will be responsible for any and all damage to themselves or to any other vessel while occupying that position.

36. Every vessel shall be obliged to pay to the Collector, at his office, having in charge the section of water front at which she moors or makes fast, the amount due for tolls upon the merchandise or cargo discharged from or received upon such vessel. Tolls are due and payable on vessels intending to discharge before any merchandise is discharged; on vessels loading or receiving cargo, before the same is placed on board, when possible to ascertain the amount, or before the departure of the vessel from the wharf or slip, except as provided in rule 31.

37. In case any person shall discharge from, or allow to be discharged from, any vessel made fast to or using any wharf, slip, any merchandise or other article before the tolls thereon have been paid, or permit any watercraft to leave any wharf or slip, unless forced to do so by stress of weather, or fire, before the tolls on any merchandise or cargo received while at such wharf or slip, have been paid (except such person is upon the credit list), he shall be prosecuted therefor. * * *

38. The Collector or Wharfinger is authorized to enter upon and inspect any vessel to ascertain the kind and quantity of merchandise or cargo thereon, and no person shall hinder or molest any Collector or Wharfinger, or refuse to allow him to enter upon any vessel for the purposes specified in this rule.

39. No gunpowder or explosives shall be discharged on or loaded from any wharf or structure, except by permission of the Chief Wharfinger, and must be immediately removed.

40. Acids, coal oil, and all fibrous materials shall not be permitted to remain overnight on any wharf. Unless removed by the owners or consignees by 5 o'clock p. m. of each day, the Chief Wharfinger shall have them removed at the expense of whom it may concern. Hay and straw may be allowed to remain over night on the hay wharf.

41. The terms "dockage," "tolls," and "wharfage," as used in these rules and regulations, signify:

42. *Dockage.*—The charge made for vessels occupying berths at the wharves, or moored in any slip or channel.

43. *Tolls.*—The charge made for merchandise passing over State premises.

44. *Wharfage.*—The charge made for leaving merchandise on State premises longer than the time specified in these rules.

RATES OF DOCKAGE, PORT OF SAN FRANCISCO.

Each rate is for a day of twenty-four (24) hours, or any part thereof.

50. For all ocean vessels, steam or sail, and all sail vessels, steamboats, and barges navigating the bay of San Francisco and the rivers and other waters flowing into it, of two hundred net registered tons or under, 2 cents per ton; for all such vessels of over two hundred net registered tons, $4 for the first two hundred tons, and three-quarters of a cent for each additional ton.

51. All vessels docking at a wharf with freight on board shall be charged full rates, unless additional cargo is to be taken on board. All vessels discharging shall be charged full rates until ready for "stiffening," when they may be placed on half rates. After receiving "stiffening," they shall be charged full rates until through discharging.

52. Vessels while taking in cargo, or receiving or discharging ballast, or lying idle, or occupying outside berths, or moored in docks, slips, basins, or canals, are subject to only half rates of dockage; provided, that vessels not used for carrying freight or passengers, or that are engaged in towing, shall not be entitled to such half rates.

53. When the per diem dockage of a vessel, as above prescribed, is not a multiple of five it must be reduced or increased, as the case may be, to the nearest such multiple; provided, that if it be equally near to two such multiples, it must be increased to the first such multiple above.

54. All bills for dockage must be paid when due, whether approved by the master or not. Failure to pay said bills on presentation will subject the vessels to be placed on the delinquent list, and to the penalties provided by law. Errors, if any, will be rectified by the Board.

55. When a vessel of any kind is charged or has paid dockage at a wharf for any day, she may use the same or any other wharf during that day without further charge, no

matter how often she may leave and return; provided, a receipt for payment or transfer card from the Wharfinger at the first wharf be produced; and on application of the master the Wharfinger is required to issue such transfer card.

56. A dockage rate of 1 cent per ton per day will be charged on all lighters in the following cases:

When discharging or loading at a wharf.

When discharging into or loading from a vessel lying at a wharf, or when lying at a wharf or in a slip with cargo on board.

When transporting from a wharf to a vessel, or from a vessel to a wharf, but one dockage will be made per day.

QUARANTINE LAWS, PORT OF SAN FRANCISCO.

Extracts from the Political Code of California, 1885.

Quarantine grounds.

Section 3004. The quarantine grounds of the bay and harbor of San Francisco are at the anchorage of Sausalito.

Shipmasters to report infected vessels.

Sec. 3013. Shipmasters bringing vessels into the harbor of San Francisco, and masters, owners, or consignees having vessels in the harbor, which have on board any cases of Asiatic cholera, small-pox, yellow, typhus, or ship fever, must report the same, in writing, to the quarantine officer before landing any passengers, casting anchor, or coming to any wharf, or as soon thereafter as they, or either of them, become aware of the existence of either of the diseases on board of their vessels.

Passengers and freight not to be landed without permit.

Sec. 3014. No captain or other officer in command of any vessel sailing under a register, arriving at the port of San Francisco, nor any owner, consignee, agent, or other person having charge of such vessel, must, under a penalty of not less than one hundred dollars nor more than one thousand dollars, land, or permit to be landed, any freight, passengers, or other persons from such vessel until he has reported to the quarantine officer, presented his bill of health, and received a permit from that officer to land freight, passengers, or other persons.

Duties of pilots.

Sec. 3015. Every pilot who conducts into the port of San Francisco any vessel subject to quarantine or examination by the quarantine officer must:

1. Bring the vessel no nearer the city than is allowed by law;

2. Prevent any person from leaving and any communication being made with the vessel under his charge, until the quarantine officer has boarded her and given the necessary orders and directions;

3. Be vigilant in preventing any violation of the quarantine laws, and report, without delay, all such violations that come to his knowledge to the quarantine officer;

4. Present the master of the vessel with a printed copy of the quarantine laws, unless he has one;

5. If the vessel is subject to quarantine, by reason of infection, place at the mast-head a small yellow flag.

Penalty for neglect of masters of vessels to comply with sanitary regulations.

Sec. 3016. Every master of a vessel subject to quarantine or visitation by the quarantine officer, arriving in the port of San Francisco, who refuses or neglects either:

1. To proceed with and anchor his vessel at the place assigned for quarantine, when legally directed so to do; or,

2. To submit his vessel, cargo, and passengers to the quarantine officer, and furnish all necessary information to enable that officer to determine what quarantine or other regulations they ought respectively to be subject; or,

3. To report all cases of disease and of deaths occurring on his vessel, and to comply with all the sanitary regulations of the bay and harbor;

—Is liable in the sum of five hundred dollars for every such neglect or refusal.

Vessels from infected ports subject to quarantine.

Sec. 3017. All vessels arriving off the port of San Francisco from ports which have been legally declared infected ports, and all vessels arriving from ports where there is prevailing, at the time of their departure, any contagious, infectious, or pestilential diseases, or vessels with decaying cargoes, or which have unusually foul or offensive holds, are subject to quarantine, and must be, by the master, owner, pilot, or consignee, reported to the quarantine officer without delay. No such vessel must cross a right line drawn from Meiggs's wharf to Alcatraz Island until the quarantine officer has boarded her and given the order required by law.

Sec. 3018. The quarantine officer must board every vessel subject to quarantine or visitation by him, immediately on her arrival, make such examination and inspection of vessels, books, papers, or cargo, or of persons on board, under oath, as he may judge expedient, and determine whether the vessel should be ordered to quarantine, and if so, the period of quarantine. Examination and inspection of infected vessels.

Sec. 3019. No captain or other officer in command of any passenger-carrying vessel of more than one hundred and fifty tons burden, nor of any vessel of more than one hundred and fifty tons burden, having passengers on board, nor any owner, consignee, agent, or other person having charge of such vessel or vessels, must, under a penalty of not less than one hundred dollars nor more than one thousand dollars, land or permit to be landed any passenger from the vessel until he has presented his bill of health to the quarantine officer and received a permit from that officer to land such passenger, except in such cases as the quarantine officer deems it safe to give the permit before seeing the bill of health. Passengers not to be landed without permit.

Sec. 3020. The following fees may be collected by the quarantine officer: For giving a permit to land freight or passengers, or both, from any sailing vessel of less than five hundred tons burden, from any port out of this State, two dollars and fifty cents; over five hundred and under one thousand tons burden, five dollars; each additional one thousand tons burden, or fraction thereof, an additional two dollars and fifty cents; for steam vessels, propelled in whole or in part by steam, of one thousand tons burden or less, five dollars, and two dollars and fifty cents for each additional one thousand tons burden, or fraction thereof; but vessels not propelled in whole or in part by steam, sailing to and from any port or ports of the Pacific States, of the United States, or Territories, and whaling vessels entering the harbor of San Francisco, are excepted from the provisions of this section. Fees of health officer.

Sec. 3021. The board of health may enforce compulsory vaccination on passengers in infected ships, or coming from infected ports. Compulsory vaccination.

HUMBOLDT BAY AND PORT OF EUREKA.

PILOTAGE.

Extracts from the Political Code of California, 1885.

Sec. 2478. All pilots licensed or appointed for Humboldt Bay must be attached to a steamboat well furnished and fitted for the service, having the necessary hawsers and spring lines suitable to cross and tow vessels over Humboldt bar in ordinarily rough weather. Any damage to a vessel in tow of a pilot boat, resulting from negligence or carelessness, may be recovered of the pilot boat, its owners, or the pilots in charge thereof at the time the injury occurred; they are jointly and severally liable therefor. Pilots to be attached to steamboats — Damages.

Sec. 2479. The pilot who brings any vessel into the port has priority in piloting or towing the same out, and the master of the vessel outward bound must apply for pilotage or towage on board the pilot boat which brought the vessel in, and tender the pilotage or towage fee. Such pilot, or a suitable substitute, must immediately render the required service, and for a failure so to do forfeits his appointment. If the pilot, in bringing the vessel in, was guilty of negligence or carelessness, he thereby forfeits his right of priority. Pilot having priority.

Sec. 2480. The following fees are collectible by the pilots of Humboldt Bay: Pilotage and towage.

1. For piloting vessels eight dollars per foot draught;

2. For towage, an amount to be agreed upon between the parties.

Sec. 2488. The master, owner, or consignee of any vessel to whom any pilot may have rendered, upon request of either of them, any extra service for the preservation of such vessel while in distress, must pay such pilot, in addition to his regular fees, such amount as the commissioners determine to be a reasonable and just reward, if no special agreement has been made between such master, owner, or consignee of such vessel and the pilot. Extra services.

Sec. 2489. A pilot boarding any vessel displaying a signal for a pilot is entitled to receive full pilotage. Full pilotage.

HARBOR CONTROL, PORT OF EUREKA.

Extracts from an act of the legislature, which became a law February 28, 1901.

Office of harbormaster.

Sec. 2570. The harbormaster of the port of Eureka, which office is hereby created, shall be appointed by the governor of this State * * * . He must enforce and carry into effect such rules and regulations as the board of harbor commissioners may from time to time adopt * * * . If any master, agent, or owner of any water craft shall refuse or neglect to obey the lawful orders or directions of the harbormaster in any matter pertaining to the regulations of said harbor, such master, agent, or owner so refusing or neglecting is guilty of a misdemeanor, * * * .

Extracts from the Rules and Regulations of the Board of Harbor Commissioners, and in force 1901.

1. Vessels lying at a wharf must be so moored thereto as not to interfere with any other vessel approaching or leaving any wharf or navigating Humboldt Bay.

2. A vessel lying at a wharf and not engaged in loading or unloading, must give place to another vessel when the berth occupied is required by such other vessel for either of said purposes; and the master or owner of any vessel not removed after being notified by the Harbor Commissioners so to do, shall forfeit and pay the sum of one hundred dollars.

4. No raft, scow, boat or vessel shall lie at anchor for more than twelve hours in that part of Humboldt Bay which intervenes between Woodley's Island, or the points and shoals extending therefrom, and the city of Eureka; and for non-removal of the same within six hours after being notified by the Harbor Master so to do, the owners, master or person having charge of any such raft, scow, boat or vessel shall forfeit and pay the sum of twenty-five dollars.

5. Dockage is the toll or charge allowed for each boat, scow or vessel lying at or moored to any wharf or pier; and if to more than one wharf or pier, to be paid to the owners or lessees of each in proportion to the front occupied, and is allowed as follows:

For each vessel under 50 tons per day	$0.50
For each vessel of 50 tons, under 75 tons, per day	.75
For each vessel of 75 tons, under 100 tons, per day	1.00
For each vessel of 100 tons, under 150 tons, per day	2.00
For each vessel of 150 tons, under 250 tons, per day	3.00
For each vessel of 250 tons and upwards, per day	5.00

OREGON.

Extracts from the Codes and Statutes of Oregon, 1902.

PILOTAGE.

COLUMBIA RIVER BAR AND COLUMBIA AND WILLAMETTE RIVERS.

Piloting vessel without license.

Sec. 1973. Any person who pilots any vessel upon or over the bar or river pilot grounds, not being then a licensed pilot therefor, nor the master or owner thereof, or any pilot who shall demand or receive any greater compensation for piloting a vessel over or upon either of said grounds than is allowed by law, is guilty of a misdemeanor, * * * .

Bar and river pilotage grounds defined.

Sec. 3991. The bar pilotage ground shall be deemed to extend from the uppermost dock or wharf at the port of Astoria or Knappton to the open sea at least ten miles beyond the uttermost buoy; and the river pilotage ground shall be deemed to extend from the lowermost dock or wharf at the port of Astoria to the head of navigation on the Columbia and Willamette rivers and their tributaries; and the branches or warrants issued by the board of pilot commissioners hereinafter provided for to pilots appointed by them shall define the ground covered by the pilot's authority, and the fees to which he is entitled.

License must be exhibited.

Sec. 4012. A pilot, on boarding a vessel, if required by the master thereof, must exhibit his license before he is authorized to act as a pilot thereon.

Sec. 4014. A pilot licensed under this act is authorized to take charge of any seagoing vessel over one hundred tons of burden, not then in charge of such a pilot, anywhere upon the pilot ground for which he is licensed, and to navigate her upon and over the same, and demand and receive therefor the compensation allowed by law. Authority of pilot.

Sec. 4015. In the following cases a vessel is exempt from compulsory pilotage, and is not required to pay a pilot unless one is actually employed: Vessels exempt from compulsory pilotage.

1. A vessel engaged in the whaling or fishing trade;

2. A vessel licensed and engaged exclusively in the coasting trade between any port in Oregon and any port on the Pacific coast.

Sec. 4016. The compensation allowed for piloting a vessel upon or over the bar pilot grounds shall be as follows: For piloting an inward or outward bound vessel to or from Astoria over the bar, or from within the bar to the open sea, all vessels shall pay five dollars per foot draught, and two cents per ton for each and every ton registered measurement from or within the bar. Compensation for bar service.

Sec. 4017. The compensation allowed for piloting a vessel upon the river pilot ground between Astoria and Portland, whether ascending or descending, shall be two dollars per foot draught and two cents per ton registered measurement; and the board is authorized to prescribe a proportionate compensation for pilot services between other points on said ground; and for moving a vessel in port from one dock to another, or from one part of a dock to another part of the same dock, the charge shall be a sum not exceeding seven dollars and fifty cents, and the pilot on being thereunto requested by the master or person in charge of a ship shall promptly do such work for such compensation: *Provided, however,* That it shall be optional with the master or person in charge of any such vessel whether he accepts or demands the service of any such pilot; and if the master or person in charge of any vessel declines to accept the services of a pilot upon the river pilot ground aforesaid, the vessel shall not be liable for pilotage. Compensation for river service.

Sec. 4018. The pilot who first speaks a vessel not exempt from compulsory pilotage, as provided in section 4015, or duly offers his services thereto as pilot, on or without the bar pilot grounds, is entitled to pilot such vessel over the same; but the master may decline to accept, and may navigate his vessel over said pilot grounds without a pilot, but, nevertheless, he shall, if inward bound, pay to such pilot the full amount of pilotage to which such pilot would have been entitled if his offer had been accepted and his services performed accordingly; and if outward bound, one-half such amount. Right of pilot first speaking vessel.

Sec. 4019. When a vessel outward bound takes a pilot, and is thereafter prevented from going to sea on account of stress of weather, and the pilot remains therein at the request of the master, such pilot shall be entitled to compensation therefor at the rate of five dollars per day, which additional compensation and per diem shall be considered and recovered as pilotage. Delay by stress of weather, pilot's compensation.

Sec. 4020. A pilot on the bar pilot grounds must speak inward bound vessels in the order of their coming to the bar, and take the first vessel spoken that desires the service of a pilot; but in case there is a vessel in immediate danger, this rule is to be regarded as not applicable, and such vessel must be spoken and taken without regard to the order of the coming, at least until she is out of the danger. Pilots must speak vessels in their order.

Sec. 4021. A pilot who is carried to sea by a vessel under his charge as such pilot, without justifiable cause, is entitled to compensation therefor at the rate of one hundred and fifty dollars per month during his necessary absence from his pilot grounds, for which he may sue the master, owner, or vessel as for claims for pilotage. Damage for being carried to sea.

Sec. 4022. In addition to the lien of the pilot upon the vessel for any sum due him for piloting or offering to pilot the same, the master, owner, and consignee or agent are jointly and severally liable to him therefor. Master, owner, etc., liable to pilot for pilotage.

UMPQUA RIVER.

Sec. 4032. Whenever any pilot or pilots keep and maintain a boat of not less than fifty tons burden, full deck and seaworthy, at the mouth of the Umpqua, they shall be entitled to the sole pilotage on the bar of all such vessels as they shall board outside of the bar; * * * . Pilots maintaining boat, have exclusive right.

Sec. 4033. This board of pilot commissioners are authorized to determine all fees for pilotage, and direct all arrangements that may be necessary to promote the commerce of the Umpqua river. Authority of Board.

Master piloting his own vessel, what fees shall pay.

Sec. 4035. Any master of a vessel who may choose to pilot his own vessel from outside of the bar into said river after the establishment of the service required by section 4032 shall pay to the regular pilot, who shall offer his services outside of the bar, full pilotage for entering the river, and one-half pilotage on leaving the harbor without a pilot, providing one shall offer his services.

HARBOR CONTROL.

Attempting to board or boarding vessel, when unlawful.

Sec. 2074. If any person not acting in an official capacity shall board or attempt to board any ship or other vessel on the Willamette or Columbia rivers, not engaged in the carrying of passengers for hire, without the consent first obtained of the captain, master, or other officer in command thereof at the time, such person, on conviction thereof * * * , shall be fined * * * , or be imprisoned * * * .

Discharging ballast in navigable waters.

Sec. 2107. If any person, whether he be an officer of a vessel or not, shall discharge the ballast of any vessel into the navigable portions or channels of any of the bays, harbors, or rivers of this State, or within the jurisdiction of this State, so as to injuriously affect such portions or channels of such bays, harbors, or rivers, or to obstruct the navigation thereof, such person upon conviction thereof, shall be punished * * * .

Right to control waters to be improved.

Sec. 4638. * * * The Port of Portland shall have and is hereby granted full control of the Willamette river in the harbor at the city of Portland, and of the Willamette and Columbia rivers between said harbor and the sea, with full power * * * to make, establish, charge, modify, or abolish such rules and regulations for the use or navigation * * * of the said Willamette and Columbia rivers * * * as it may deem * * * necessary, * * * , and the said rules and regulations so made by it, to enforce by such fines, penalties, and punishments as, it, * * * may deem necessary; * * * .

HARBOR REGULATIONS, PORT OF PORTLAND.

Extracts from a pamphlet edition of Ordinance No. 9071, approved December 20, 1894, and in force 1902.

The City of Portland does ordain as follows:

Sec. 1. The officer of the City of Portland designated as Harbor Policeman, shall be ex-officio the Harbor Master of the City of Portland, and in addition to the duties provided by law for said Harbor Policeman he shall perform the duties provided for in this ordinance.

Sec. 2. Vessels arriving within the corporate limits of the City of Portland, if obliged to anchor, shall be anchored below Albina Ferry, and on the west side of the main ship channel; such vessels shall be moored with bow anchor forward, and a stream anchor out astern, to prevent the vessel from swinging across the main ship channel and obstructing the same. Vessels moving from the docks or wharves to anchor in the river while waiting for cargo, shall be moored in the same manner as other vessels, so as to leave a clear channel for vessels coming up or going down the river. Vessels must not be anchored or moored in the fairway channel within the city limits, neither must they moor or anchor within 400 feet of any bridge or ferry line.

Vessels moving from one dock or wharf to another, or from one place to another, when necessary to pass through the draw of any bridge or cross the line of any ferry boat, or when moving from a dock or wharf on one side of the Willamette River to a dock or wharf on the opposite side of said river, shall, in order to prevent the obstruction of travel, be required to have the service of a tug, unless the master or person in charge of such vessel obtain the written permission of the Harbor Master to dispense with the same, and for any violations of the provisions of this section, the Master, or other person in charge of vessels shall be deemed guilty of a misdemeanor, and upon conviction before the Municipal Court shall be fined by said court not less than twenty-five nor more than one hundred dollars.

Sec. 3. All square rigged vessels while laying along side of any dock, wharf or landing must have their off-shore anchor suspended ready for dropping; their lower yards braced sharp upon their in-shore braces, except when in actual use discharging and unloading cargo, and when required by the Harbor Master their movable fore and aft spars, martingales and jib booms must be rigged in.

Sec. 4. A vessel anchored or moored in the harbor or laying at the dock, must at all times have at least one seaman on board capable of taking proper care of the vessel. If it becomes necessary, a vessel may be removed by order of the Harbor Master at the expense of the owner, and the owner and vessel shall be liable for all damages and costs that shall arise thereby.

Sec. 5. A vessel while anchored or moored in the harbor must at all times of night show the regulation lights not less than fifteen feet above the deck.

Sec. 6. When ballast of stone, earth, sand, gravel, mud, coal or other loose matter or things that will sink is being loaded or unloaded from a vessel upon a wharf, or is being transferred from one vessel to another, a canvas chute or other contrivance, to the satisfaction of the Harbor Master, must be used to prevent any part of such substances from falling into the dock or river * * * .

Sec. 7. No fire must be used on board of any vessel at the docks or in the vessels for heating pitch, tar, or other inflammable substances, but may be used on floating stages, or boats for the purpose of heating such substances for repairing vessels, provided, that such fires shall be constantly in the charge of a person capable of taking proper care of the same.

Sec. 9. It shall be unlawful for any person or persons, firm or corporation to dump, deposit or throw, or cause to be dumped, deposited or thrown into the Willamette River within the limits of the City of Portland, any sawdust, slabs, gravel, loose earth or other debris which may tend to obstruct the channel of said river * * * .

Sec. 10. The Harbor Master is hereby authorized to enter upon and inspect any vessel to ascertain the kind and quality of merchandise or cargo thereon, or her condition in any respect, or the condition of her crew, and no person shall hinder or molest the Harbor Master or to refuse to allow him to enter upon any vessel for any purposes specified in this section.

Sec. 12. The Harbor Master shall at all times execute the orders of the Health Officer of the City of Portland in abating nuisances, injurious to the health of the city, which may be found in the harbor or on any dock, wharf, landing, vessel or water craft within the city limits. * * *

Sec. 13. The Harbor Master shall have the right to call on the Chief of Police to aid him in the execution of his duties, and he shall have full power to arrest any person or persons who obstruct or resist or refuse to obey his legal orders and requirements and bring him or them before the proper court or courts having jurisdiction in the case, for punishment.

Sec. 15. The Harbor Master shall particularly see to it that sections 1, 2 and 4 of Ordinance No. 3175 of the City of Portland, entitled, "An Ordinance Regulating the Landing, Storage, and Transportation of Explosive Compounds," and all ordinances passed in lieu of or as amendatory thereof, to be strictly complied with; said sections as they now stand are as follows:

"*Sec. 1.* It shall be unlawful for any steamship, vessel or other water craft to enter the city limits while having on board any blasting powder, gunpowder, dynamite, or other explosive compounds used for blasting purposes. But that this shall in no wise be construed as to include water craft of any description having any such cargo on board which may be passing up or down the Willamette River to points outside the city limits."

"*Sec. 2.* No person shall discharge blasting powder, gunpowder, dynamite, or other explosive substances from any vessel or steamship except from ship's sides or tackles, and before the vessel shall have been hauled up to the wharf. No water craft shall be permitted to remain at the wharf longer than twenty-four hours after receiving gunpowder, blasting powder, or other explosive substances on board. All gunpowder, blasting powder, dynamite or other explosive substances deposited on the wharf for shipment, shall be immediately passed on board the vessel which is to receive the same."

Sec. 18. It shall be the duty of the Harbor Master to enforce the provisions of all ordinances regulating the use of wharves, piers, landings, docks, vessels or of the harbor.

QUARANTINE.

Extracts from the Codes and Statutes of Oregon, 1902.

Health officer at Astoria and duties.

Sec. 3906. There shall be appointed by the governor, and removed at pleasure, a health officer to reside at the port of Astoria, * * * whose duty it shall be to board and take charge of every ship and vessel arriving

from the sea which shall have on board any persons or goods infected with smallpox, cholera, leprosy, or other contagious diseases, or which shall have had on board any such infection during the voyage, or which shall be in such condition by reason of the bad health of the people on board, or the filthiness of the ship, or the decaying state of the cargo, as to endanger the health of the inhabitants of this State.

Infected vessel, where to anchor.

Sec. 3907. Every pilot who shall bring into the said port any ship or vessel in bad sanitary condition, or which he suspects may be capable of propagating disease, shall anchor such ship or vessel below Smith's Point, and give immediate notice to the health officer.

Examination of vessel by health officer.

Sec. 3908. When the health officer shall board a ship or vessel to investigate her sanitary condition, he shall raise a red flag at the mainmast, which will suspend all intercourse with the shore, except by permission of the health officer. He shall then proceed by personal inspection, and by the examination of witnesses sworn by him, to ascertain if there be cause for her detention, and if not, he shall give to the master a certificate to that effect, and strike his flag; but if he shall find on board the ship any case of contagious disease, or that the ship's people or cargo are infected with such disease, or if, for any reason, he shall believe that she is likely to propagate disease if allowed to go into port, he shall cause the ship to be anchored at a safe and convenient place, to be designated by him, and to be subjected to such cleansing and renovation, and her cargo and hold to such ventilation and other treatment, as he shall think necessary for their purification; and he shall cause such of the people as are sick or infected to be subjected to such sanitary treatment, on the ship or shore, as he shall think necessary for their speedy recovery; and the reasonable and necessary expenses of such treatment shall be borne by the persons treated, or by the ship, if they shall make default; and when he shall deem it safe to do so, he shall give to the master a certificate of health, and strike his flag.

Care of ship and people by health officer.

Sec. 3909. It shall be the duty of the health officer, during all the time that any ship may be under his flag, to give all his time and care to such ship and her people, without charge for professional or other service.

Coos Bay, Gardiner, and Yaquina City, health officer for.

Sec. 3911. There shall likewise be appointed a health officer to reside at Coos Bay, and one to reside at Gardiner, near the mouth of the Umpqua River, and one to reside at Yaquina City, near the mouth of Yaquina Bay, * * * whose duties and liabilities shall be the same as are prescribed by this chapter for the health officer at Astoria.

Refusal to submit ship to examination of health officer, etc.

Sec. 2136. It shall be the duty of every shipmaster to submit his ship to a full and free examination by the health officer, and to obey and perform all the lawful orders and directions of such officer, and every shipmaster who shall fail or refuse so to do, or who shall permit his ship to enter the Columbia River with the smallpox on board, without displaying a yellow flag, shall, on conviction, be fined * * *, or imprisoned * * *, or by both such fine and imprisonment.

WASHINGTON.

Extracts from the Codes and Statutes of Washington, 1897, with amendments to 1901.

PILOTAGE ON PUGET SOUND.

Puget Sound Board of Pilot Commissioners.

Sec. 3216. It shall be the duty of the governor to appoint three competent persons * * * who shall constitute a board of pilot commissioners for the different ports on the straits of Fuca, Puget Sound, and their branches.

Duties of Board.

Sec. 3219. The commissioners shall make bylaws * * * for the direction and government of the pilots * * *.

Authorized to appoint pilots.

Sec. 3222. The commissioners shall have power to appoint * * * such number of pilots for said ports as they may deem necessary.

License must be exhibited on demand.

Sec. 3226. Every pilot on boarding a vessel shall, at the request of the master, exhibit his license, and on refusal so to do, shall be liable to a penalty of fifty dollars.

When responsibility pilot ceases.

Sec. 3231. It shall be the duty of every pilot in charge of a vessel arriving at any of the ports of Puget Sound or its branches to have the vessel safely moored or anchored in such position as the master of the vessel may direct, when his responsibility shall cease.

Sec. 3233. No person except those licensed by the commissioners shall pilot vessels in and out of the bays or harbors on Puget Sound, Juan de Fuca Strait, or to or from the Pacific Ocean through said strait, for hire, under the penalty of three hundred dollars for each and every offense. This penalty is not incurred where a master of a vessel acts as his own pilot; *Provided*, That the master or owner of any vessel shall not be compelled to take a pilot under the provisions of this article.

Penalty for piloting without license, exception.

Sec. 3235.—Pilots taken to sea against their wills, when a boat is in attendance to receive them, shall be entitled to receive five dollars per day while absent, which sum shall be paid by the master or owner of the vessel by which the pilot was taken away.

Taking pilot to sea, penalty.

Sec. 3236.—If any pilot offers himself to any vessel requiring his services as pilot, outside of a line drawn from the west end of Waadda Island to Observatory Point on the east of Port San Juan, British Columbia, if inward bound he shall have the preference, if a pilot's services are required by the vessel when bound to sea, or a pilot from the same pilot boat.

Pilot entitled to preference.

Sec. 3239.—The pilots shall at all times keep a boat in good condition cruising on the Strait of Fuca or at sea, the number of pilots to be on any one boat to be determined by the commissioners.

Pilot boat to cruise on Straits or at sea.

Sec. 3241.—The board of pilot commissioners shall fix the rate of pilotage between the open sea and ports on Puget Sound. But such rates shall not exceed eight dollars per foot draft to vessels who engage pilot outside Waadda Island to port of entry or other ports on Puget Sound. To vessels from British Columbia to port of entry or other ports on Puget Sound, not to exceed six dollars per foot draft. To vessels from Port Townsend to any of the ports on Puget Sound, not to exceed four dollars per foot draft; *Provided*, That nothing in this article shall be construed as requiring half pilotage, to be paid when services are not actually performed: *And provided further*, That every pilot bringing a vessel from sea shall take her to her port of destination, if required, when that port is above the port of entry, without additional charges. But after twenty-four hours' delay at the port of entry, the pilot shall be entitled to additional pay of five dollars per day for every day so delayed.

Rates of pilotage.

Sec. 3242.— * * * and any person piloting a vessel in any of the waters aforementioned, without having a valid license, shall be deemed guilty of a misdemeanor * * * .

Violations.

HARBOR CONTROL.

Sec. 7303.—Every person who shall in any manner obstruct the navigable portion or channel of any bay, harbor, or river or stream within or bordering upon this State, navigable and generally used for the navigation of vessels, boats, or other water crafts, * * * , shall, on conviction thereof, be fined in any sum not exceeding three hundred dollars; * * * .

Obstructing navigations.

Sec. 7304. Every master or mate, or other officer or other person, belonging to or in charge of any vessel, who shall discharge or cause to be discharged the ballast of such vessels into the navigable portions or channels of any of the inlets, bays, harbors, or rivers within or bordering on this State, where the water is less than twenty fathoms deep, shall, on conviction thereof, be fined in any sum not less than seventy-five dollars, nor more than five hundred dollars; *Provided*, That nothing in this section shall be so construed as to prevent any such person from discharging ballast from such vessel on the beach at or above ordinary high tide in all waters where the tide ebbs and flows, and that no ballast shall be discharged on any of the flats included within the boundary of any city or townsite or extension thereof; *and provided further*, That in harbors within or in front of any incorporated city, where the waters are less than twenty fathoms deep, a section of said harbor may be set aside and designated by the city council of said city as a ballast ground, where ballast may be discharged under control of a harbor master to be appointed by the council.

Discharging ballast in navigable waters.

QUARANTINE.

Sec. 2957. The State Board of Health shall have * * * supreme authority in matters of quarantine, and may declare and enforce it when none exists, may modify, relax or abolish it when it has been established. * * * It shall be the duty of all local boards of health, * * * and all other officers and employees of the State, or any county, city, or

Supervision of board and supreme authority.

township thereof, to enforce such quarantine and sanitary rules and regulations as may be adopted by the State Board of Health, * * * .

County boards—Duties—Health officer.

Sec. 2972. The county commissioners * * * are hereby created and constituted a board of health for said county, whose duty it shall be to make such regulations respecting the quarantine of ships or vessels, * * * as in their opinion the public safety requires; and the board of health so constituted shall appoint a health officer, * * * .

Duties of health officer—Vessels to be disinfected.

Sec. 2973. The health officer * * * shall require all vessels having on board any person or persons infected with smallpox, plague, pestilential or malignant fever, or other malignant, infectious, or contagious diseases, or who shall have been so infected during the voyage, or having on board any goods reasonably supposed to have any infections of such disease, to perform quarantine * * * .

Fees.

Sec. 2974. * * * that the fees of the health officer shall be fixed by the board of health provided for in this act, but shall not exceed the sum of five dollars for each vessel boarded or examined in the daytime, and ten dollars in the night time, between the hours of ten p. m., and five a. m., nor the sum of fifteen dollars for fumigating a vessel, which fee * * *, shall be a lien on said vessel until paid, and no vessel shall receive a bill of health or clearance until such fee is paid, * * * .

Disobedience of regulations, penalty for.

Sec. 2975. Any owner, master, supercargo, officer, seaman, consignee, or any other person who shall refuse or neglect to obey the orders and regulations of the board of health in regard to such quarantine on the purification and cleansing of such vessel shall be punished by fine * * *, or by imprisonment * * *, or both.

Infected person taken ashore, expenses of.

Sec. 2976. Any person sick on board any such vessel may be sent on shore by said health officer, at some place appointed and limited for the purpose, and shall there be maintained, provided, and cleansed by or under the direction of the health officer, at the expense of such sick or infected person, if able, otherwise at the expense of the vessel * * * .

Violation of quarantine, penalty.

Sec. 2977. If any person shall come on shore from any vessel, infected or justly suspected of being so, subject to or performing quarantine, or shall leave the place appointed for the sick or for purification, being employed or placed there by the health officer, without permission of said officer, he or she shall be fined * * *, or imprisoned * * *, or both.

Penalty for going on quarantined vessel or district.

Sec. 2978. If any person shall, without permission of the health officer, go on board any vessel ordered for or performing quarantine, or go within the limits appointed by the health officer for the reception of infected persons and property on shore, he or she shall be considered as infected, and shall be held to undergo purification in the same manner and under the same regulations and penalties as those who are performing quarantine, and shall remain there at his or her own expense until discharged by the health officer, * * * .

Quarantine flags, penalty for not hoisting.

Sec. 2979. A red flag, at least six feet long and four feet wide, shall be hoisted from sunrise to sunset at the main truck of any and all vessels ordered for and performing quarantine, * * * .

Landing infected vessels or making false declarations, penalty.

Sec. 2980. If any master, owner, supercargo, officer, seaman, or consignee of any vessel, or any other person knowing such vessel to be subject to quarantine, shall bring or suffer the same to be brought to or near any wharf, store, or dwelling house, or other building not in use for the purpose of the health officer in his official capacity as such, or shall make any false declaration as to the port or place from which such vessel came, or in regard to the condition and health of any person on board any such vessel, or shall cause, aid, or permit the landing of any person or property, of any nature or kind whatever, from such vessel without the permission of the health officer, he shall be punished * * * .

Master to notify health officer, penalty for failure.

Sec. 2982. The master of every vessel arriving at any port in any county in the State of Washington, or at any port in the waters bordering on said State, having on board any person infected with plague, smallpox, or other malignant, infectious, or pestilential disease, or who have been so infected during the voyage, or having on board any goods which may reasonably be supposed to have any infection of such disease, shall forthwith give notice thereof to the health officer; if any such master or other person having charge of such vessel shall neglect to give such notice, he shall be fined * * * , or may be imprisoned * * * , or both.

Person from infected district must answer questions—Forfeiture.

Sec. 3001. If any master, seaman, or passenger of any vessel * * * refuses to answer, on oath, such questions as are asked him relating to such infection or disease, by the municipal or health officer of the town or city

to which such vessel comes, * * * he shall forfeit not exceeding two hundred dollars, or be imprisoned not more than six months.

Vessels to anchor below city, when—Permits to come ashore.

Sec. 3002. When a vessel or steamer arrives at any seaport in this State, having on board any person infected with any malignant disease, the master, commander, or pilot theerof shall anchor it at some convenient place below the town or city of such seaport, at a distance safe for the inhabitants thereof and the persons on board other vessels or steamers in the port; and no person or thing on board shall be brought on shore until the municipal or health officers give them written permit so to do.

Vessel to perform quarantine when required.

Sec. 3004. The municipal or health officers of any seaport town or city may cause any vessel or steamer arriving there to perform quarantine at such place and under such regulations as they may judge expedient, when they think the safety of the inhabitants requires it; and whoever neglects or refuses to obey such orders and regulations shall forfeit not exceeding five hundred dollars, or be imprisoned not exceeding six months.

Quarantine notices to pilots.

Sec. 3005. When such officers of a seaport town or city think it necessary to order all vessels or steamers, arriving there from any particular port or ports, to perform quarantine, they shall give notice thereof to the pilots of their port, who shall make it known to the master or commander of all vessels or steamers which they board * * * .

Municipality to provide flags—Duty of master, etc.

Sec. 3007. The municipal or health officer of any seaport town or city requiring vessels or steamers to perform quarantine shall provide, at the expense of such town or city, a suitable number of red flags, at least three yards in length; and the master or commander of every vessel or steamer ordered to perform quarantine shall cause one of them to be continually kept, during the term thereof, at the head of the mainmast of his vessel or steamer, and no person shall go on board such vessel or steamer during said term unless by permission of said officers. * * *

Health officers to perform quarantine duties, when.

Sec. 3008. In every seaport town or city where there is a health committee or health officer, he or they may perform all the duties and exercise all the authority of municipal officers in requiring vessels or steamers to perform quarantine.

Expense of quarantine to be paid by whom.

Sec. 3009. All the expenses incurred on account of any person, vessel, or steamer or goods under quarantine regulations shall be paid by him or the owner of the vessel or steamer, or goods, as the case may be.

HARBOR REGULATIONS, PORT TOWNSEND.

Extracts from Ordinance No. 618, approved January 22, 1897.

The city council of the city of Port Townsend do ordain as follows:

Sec. 1. It shall be unlawful for the master, mate or other officer or person having charge of any vessel, boat or water craft, to discharge or deposit any ballast in the harbor of the city of Port Townsend, without having first obtained the written permit of the harbor master of the city of Port Townsend, and then only in strict accordance with such permit, and in not less than twenty fathoms of water.

Sec. 2. It shall be unlawful for any person to discharge or throw overboard into the harbor of the city of Port Townsend, from any steamboat or vessel or from any boat, float or scow, while the same is lying at any wharf in said city, or from any wharf in said city, any cinders, ashes or any other substance, material or article, that will sink.

Sec. 3. It shall be unlawful for any master, mate or other officer or person, having charge of any vessel, boat or water craft to anchor the same in the harbor of the city of Port Townsend, or moor or fasten the same to any wharf in said city or to any other vessel in said harbor or rig the same so that such vessel, boat or water craft, shall be dangerous to any other vessel, boat or water craft, previously anchored or moored in said harbor or be in the fairway of vessels and steamers arriving and departing from said harbor.

Sec. 5. It shall be unlawful for any master, mate or other officer or person, having charge of any vessel, boat or water craft, having on board gun powder, giant powder, blasting powder, dynamite or other explosive compounds, to dock, or allow such vessel, boat or water craft to lie or be at any wharf in the city of Port Townsend without first having obtained the written permit of the harbor master of the city of Port Townsend.

Sec. 6. The harbor master of the city of Port Townsend shall, upon application therefor, and payment of the fees hereinafter prescribed, grant the following permits: For discharge of ballast, designating the place of such discharge, the character of same and number of tons, upon being paid by the person requiring the same, the sum of $3. For the docking of any vessel with explosives, to be discretionary with the harbor master, designating the length of time required, upon payment by the person requiring the same, the sum of $2. The harbor master shall receive for serving any notice of the violation of the provisions of

this ordinance, on board of any vessel, the same to be paid by the person in charge of such vessel, the sum of $1, and when necessary to board any vessel with a small boat for the purpose of serving notices, 50 cents additional. For the renewal of any permit which shall have expired, one-half of the fees for the original.

Sec. 7. Any person violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and upon conviction, shall be punished by a fine not exceeding one hundred dollars, or by imprisonment not exceeding thirty days.

HARBOR REGULATIONS, CITY OF SEATTLE.

Extracts from city ordinances.

Sec. 1. It shall be unlawful for the master or any person having charge of any vessel or other water craft to allow the same to be or lie at anchor in the waters of Elliott Bay within the corporate limits of the City of Seattle, north of a line drawn from the westerly end of the coal bunkers of the Oregon Improvement Company to Duwamish Head, without first having obtained the written consent of the Harbor Master of the City of Seattle so to do, which written consent shall state definitely the place at which said vessel or other water craft shall be allowed to lie at anchor, and the time during which she will be allowed to lie at anchor at such place; *Provided*, that the provisions of this section shall not apply to any vessel or other water craft lying at any wharf in the City of Seattle. * * * (*Ordinance No. 892.*)

Sec. 3. It shall be unlawful for any master or other person having charge of any vessel or other water craft having on board gun powder, giant powder, blasting powder, dynamite or any other explosive compounds, to allow such vessel or other water craft to lie or to be at any wharf, dock, slip or incline, within the corporate limits of the City of Seattle, without first having obtained the written permit of the Harbor Master of the City of Seattle, which written permit shall state the place at which such vessel or other water craft shall be allowed to lie, and the time during which she be allowed to lie at such place; but in no case shall a permit be granted for a longer time than twenty-four hours; and every master or other person having the charge of any vessel or other water craft having on board any gun powder, giant powder, blasting powder, dynamite or other explosive compounds, shall immediately upon the landing of such vessel or other water craft, immediately discharge such explosives, and the same shall be immediately taken by the owner or consignee thereof from the tackles of such vessel or other water craft and immediately loaded upon drays or other vehicles, and transported at once to the powder magazine in the City of Seattle. And every master or other person having charge of any vessel or other water craft arriving at the City of Seattle, shall within twenty-four hours after such arrival, Sunday excepted, report to the Harbor Master of such City the name and tonnage of such vessel, the character and quantity of cargo or ballast thereon. (*Ordinance No. 1002.*)

Sec. 4. Every master or other person having charge of any vessel or other water craft arriving at the City of Seattle with any gun powder, giant powder, blasting powder, dynamite, or other explosive compounds on board, shall, within three hours after the arrival of such vessel or other water craft within the corporate limits of the City of Seattle, notify the Harbor Master of the arrival of such vessel or other water craft, and of the amount of the gun powder, blasting powder, dynamite or other explosive compound on board. * * * (*Ordinance No. 892.*)

Every master or other person in charge of any vessel arriving in the City of Seattle with explosives on board, shall before discharging any part and within three hours after arrival give notice to the Chief of Fire Department, stating amount of such substance, name of consignee and destination thereof. All such combustibles shall be discharged under the supervision of the Chief of Fire Department. (*Ordinance No. 3205.*)

Sec. 7. No vessels having combustibles on board shall remain within the limits of the city for longer than 12 hours, and shall be removed by the Chief of Fire Department, or by the Port Warden, at the request of said Chief, at the expense of owner and master. (*Ordinance No. 3186.*)

Sec. 8. All vessels or other water craft anchored or moored in the harbor of the City of Seattle shall, between sunset and sunrise; exhibit, where it can be best seen, but at a height not exceeding twenty feet above the hull, a white light, in a globular lantern at least eight inches in diameter, and so constructed as to show a clear, uniform and unbroken light, visible all around the horizon, and at a distance of at least one mile. Whenever there is a fog or thick weather, by day or night, all vessels or other water craft anchored in the harbor of Seattle, shall sound a bell at intervals of not more than five minutes, and no vessel or other water craft shall be left without some person in charge of her, by night or by day, while lying at anchor or moored in the harbor of the City of Seattle. * * * (*Ordinance No. 892.*)

Sec. 9. That whenever the master or any person in charge of any vessel or other water craft in the harbor of the City of Seattle, shall fail or refuse to change the position of such

vessel or other water craft, or to arrange the rigging thereon, as directed by the Harbor Master, in accordance with the provisions of this ordinance, it shall be the duty of the Harbor Master to forthwith board such vessel or other water craft, with such assistance as may be necessary, and to change the position of such vessel or other water craft, or arrange the rigging thereon, as had been directed by him, and the expense of changing the position of such vessel or other water craft, or of arranging the rigging thereon, may be recovered from the master or owner of such vessel or other water craft by a suit in the name of the City in any court of competent jurisdiction. * * * (*Ordinance No. 892.*)

Sec. 1. No master of a vessel or any other person whomsoever shall deposit, discharge or throw into, or cause to be deposited, discharged or thrown into the waters of Elliott Bay, within the corporate limits of the City of Seattle, any ballast whatsoever, or any material whatsoever that will sink, except in pursuance of a written permit authorizing the same, signed by the Harbor Master of the City of Seattle. (*Ordinance No. 893.*)

Sec. 5. That it shall be unlawful to land any freight or property upon any wharf, slip or incline owned or constructed, or which may hereafter be owned or constructed, by the City of Seattle, without first procuring permission so to do from the Port Warden, and paying to said Port Warden the rates of wharfage hereinbefore prescribed. * * * (*Ordinance No. 1924.*)

Extracts from Ordinance No. 3100.

Sec. 1. Whenever any master, owner, or other person having charge of any vessel or other water craft, raft, boom or other floating body, shall attach the same to any of the buoys belonging to the city located in the harbor, such person shall within twenty-four hours thereafter report in writing to the Port Warden giving the name or other designation of the vessel or other craft or body, and the probable length of time during which the same will be attached to such buoy: *Provided*, That any such owner or other person may apply to the Port Warden for a written permit to attach any such vessel or other craft or floating body to any such buoy before attaching the same, and if such permit be issued, it shall not be necessary to make the report aforesaid.

Sec. 2. The Port Warden shall have full charge and control of all buoys belonging to the city moored in the harbor. * * *

Sec. 3. Every vessel or other craft or other floating body which shall be moored or attached to any such buoy shall pay to the Port Warden for the use of the city for the privilege of the use of such buoy a fee of not less than five dollars nor more than ten dollars, as follows:

Any sailing vessel of five hundred tons, or less	$5.00
Any sailing vessel of over five hundred tons	10.00
Any steam vessel of five hundred tons, or less	5.00
Any steam vessel of more than five hundred tons	10.00
Any boom or raft of saw logs or piles containing six sections, or less	5.00
Any boom or raft of saw logs or piles containing more than six sections	10.00
Any scow, raft or other floating body not above mentioned	5.00

All such fees shall be paid before the vessel or other craft or floating body is attached to such buoy, or within seven days thereafter, and in any event before leaving the harbor. Any vessel, craft or body which shall be removed by the Port Warden for any cause from any buoy, as well as the master and owners thereof, shall be liable for and shall pay the whole cost and expense of such removal, to be recovered by a civil action in the name of the city in any court of competent jurisdiction.

HARBOR REGULATIONS, CITY OF TACOMA.

Extracts from a pamphlet edition of Ordinance No. 1247, approved October 29, 1897.

Be it ordained by the City of Tacoma:

Section 1. Vessels must not be moored or anchored in the harbor of Commencement Bay in such manner as to interfere with vessels approaching or leaving the wharves.

Sec. 17. That no vessel shall anchor in the waters of Commencement Bay, between a line extending from St. Paul and Tacoma Lumber Company's wharf to the Tacoma Warehouse and Elevator Company's elevator, and west shore line of Commencement Bay, in the City of Tacoma, without written permission from the Harbor Master.

Sec. 2. A vessel will not be entitled to a berth at any public wharf or dock until an application shall have been made to the Harbor Master. Such application must state the draft of the vessel, kind of cargo and locality desired. No application entertained unless the vessel be in the harbor and ready to be docked. Berths will be assigned in the order of the application. No one except the Harbor Master has authority to assign berths to vessels.

Sec. 3. To make room for vessels requiring immediate accommodation, idle vessels must haul or go to anchor at expense of such vessel, when required to do so by the Harbor Master.

Sec. 4. When it is necessary for a vessel to move to allow exit or entrance of other vessels, she must do so at her own expense.

Sec. 5. Vessels when lying at the wharf or slip shall lie with lower and topsail yards braced up, unless being used in discharging or taking cargo, and jib boom and movable spars rigged in if required by the Harbor Master.

Sec. 6. A vessel anchored or moored in the harbor or lying in a slip or dock, must at all times, as well by night as by day, have on board at least one seaman capable of taking proper care of such vessel. If it becomes necessary a vessel may be removed by the Harbor Master at the expense of the owner, and the owner and the vessel shall be liable for all damages that shall arise thereby.

Sec. 7. When ballast, stone, coal, brick, ashes, cinders, dust, rubbish or loose matter or anything that will sink, is being landed from a vessel upon a wharf or landing, or is being transferred from one vessel to another, a canvas chute or other contrivance to the satisfaction of the Harbor Master, must be used to prevent any part of such substance from falling into the dock or water.

Sec. 8. Fire must not be used on board of any vessel for heating pitch, tar or other inflammable substance, but may be used on floating stages or buoys for the purpose of heating such substance for repairing vessels, provided such fire is constantly in the care of a person capable of taking proper care of the same while lying at the dock.

Sec. 9. All condemned or dismantled vessels must be removed to such places as the Harbor Master shall direct.

Sec. 10. No substance that will sink or form an obstruction to navigation must be deposited in the water on the shores of the harbor without first obtaining permission in writing from the Harbor Master, and no permission will be granted to discharge ballast in the bay where there are less than twenty-two fathoms of water at low tide.

Sec. 11. All vessels at anchor shall be required to toll a bell during the continuance of foggy weather, and shall keep an anchor light burning from sunset to sunrise, at some point of said vessel where best seen, at least twelve feet from the deck.

Sec. 12. Vessels may moor at the city buoys upon the payment of the sum of ten dollars for a period of fifteen days or any part thereof, which shall be paid to the Harbor Master, who shall receipt for and pay the same over to the City Treasurer. Vessels leaving a buoy temporarily after having moored, prior to the expiration of said fifteen days, shall have a right to return to any unoccupied buoy designated by the Harbor Master at any time prior to the expiration of said fifteen days, without charge; but in case all buoys are occupied and remain so occupied to the expiration of the fifteen days, then in such case, said vessel forfeits all right to return to a buoy without charge. Vessels mooring at city buoys do so at their own risk in all respects. Not more than one vessel shall be allowed to moor at a buoy at the same time. The Harbor Master shall have power at any time to remove any vessel from said buoys at the risk and expense of said vessels.

Sec. 13. The master, agent or owner of a vessel refusing or neglecting to obey the order of the Harbor Master in any matter pertaining to the regulation of the harbor or the removal or stationing of such vessel, or failing to toll said bell or keep said anchor light burning, as provided herein, is guilty of a misdemeanor, * * *.

Sec. 15. It shall be unlawful to run any water craft at a greater speed than six miles per hour in the harbor or in any water way in the City of Tacoma, south of the center of South Fourth street prolonged.

Sec. 16. Any master, agent, owner, or other person having control of any vessel violating any of the provisions of this ordinance, shall be deemed guilty of a misdemeanor, and fined in a sum not less than ten dollars nor more than one hundred dollars.

APPENDIX III.

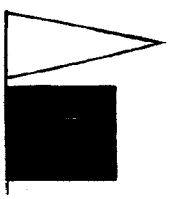
STORM WARNING DISPLAYS OF THE U. S. WEATHER BUREAU.

STORM DISPLAYS ALONG THE SEACOAST.

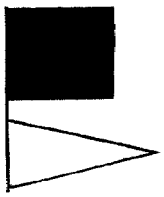
A red flag with a black center indicates that the storm is expected to be of marked violence.

The pennants displayed with the flags indicate the direction of the wind; red, easterly (from north through east to south); white, westerly (from south through west to north). The pennant above the flag indicates that the wind is expected to blow from the northerly quadrant; below, from the southerly quadrant.

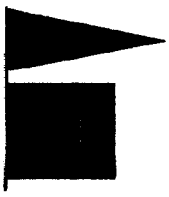
STORM WARNING FLAGS.



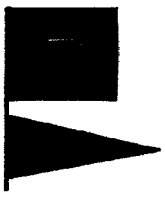
Northwesterly winds.



Southwesterly winds.



Northeasterly winds.



Southeasterly winds.

By night a red light will indicate easterly winds and a white light above a red light will indicate westerly winds.

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APPENDIX IV.

REGULATIONS U. S. PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

APPROVED NOVEMBER 21, 1902.

(*Extracts.*)

DUTIES OF COMMISSIONED OFFICERS.

PROFESSIONAL DUTIES.

116. The professional duties of commissioned officers are to examine all applicants for relief, to prescribe for and furnish out-patient or hospital treatment as may be required, and to make physical examinations of the seamen of the several Government services and the merchant marine, under such regulations as shall hereinafter appear.

Professional duties defined.

117. Commissioned officers will, upon the application of the United States shipping commissioner, or of the master or owner of any United States vessel engaged in the foreign, coastwise, or inland navigation trade, examine as to his physical condition any seaman brought to them for that purpose, and will give a certificate as to his fitness or unfitness for service. They will physically examine, in accordance with existing regulations governing physical examinations, any foreign seamen sent them for that purpose by the duly authorized agent of a foreign line or by the consul representing the nation to which the vessel belongs. A fee of $1 will be charged for each examination of a foreign seaman, and fees so received will be deposited with the collector of customs in the same manner as donations to the marine-hospital fund. Officers will also, upon the application of the proper authority, examine cadets, enlisted men, and persons desiring to enlist in the Revenue-Cutter, Life-Saving, Coast-Survey, and Light-House services, or to instruct them in the mode of resuscitating persons apparently drowned. No fee will be charged for this service. They will also examine alien immigrants when detailed for that purpose. They will also, when officially requested, furnish to commanding officers of revenue cutters certificates as to the physical condition of enlisted men of the Revenue-Cutter Service who may be under treatment in hospital or as out-patients. * * *

To examine seamen, cadets, enlisted men, etc., as to their physical condition.

119. Whenever officially requested by the local inspectors of steam vessels or other proper officers, commissioned officers will examine applicants for pilot's license as to sense of hearing, color perception, and general visual capacity, and will give a certificate accordingly.

To examine applicants for pilot's license.

120. No fee will be charged by any officer of the Public Health and Marine-Hospital Service for the medical examination or professional treatment of seamen of the United States merchant marine or for making a certificate as to their physical condition, and no officer shall accept a fee for professional service relating to the public service.

No fee to be charged.

SANITARY DUTIES.

123. It shall be the duty of commissioned officers to enforce the national health and quarantine laws and regulations; but no additional compensation shall be allowed said officers by reason of such service as they may be required to perform except actual and necessary traveling expenses.

To enforce national quarantine rules and regulations. Apr. 29, 1878, s. 3; Feb. 15, 1893.

127. Upon the outbreak of smallpox at or near a relief station, commissioned officers will vaccinate such seamen as may come to the marine-hospital officer for the purpose; and officers are authorized at all times to visit vessels to examine and vaccinate crews.

To vaccinate seamen.

RELIEF STATIONS.

Definition.

404. A relief station of the Public Health and Marine-Hospital Service is a port or place where an officer of the Service is on duty to extend relief to seamen, or where an officer of the customs service is specifically authorized to extend said relief.

Classes.

405. Relief stations shall be divided into the following classes:

Class I. United States marine hospitals.

Class II. All other stations under command of a commissioned officer.

Class III. All stations under charge of an acting assistant surgeon where there is a contract for the care of sick and disabled seamen.

Class IV. All other relief stations not included in the above classes.

Provisions for relief.

406. At all relief stations where the number of patients warrants, an officer of the Service will be assigned to the command of the station, and whenever practicable the patients of the Service will be treated in hospitals maintained exclusively for their benefit. * * *

Provision for marine-hospital dispensaries.

408. At each relief station of the first and second class, and whenever practicable at each relief station of the third class where an acting assistant surgeon of the Service is on duty, there shall be a marine-hospital office, where applicants for relief shall be received and examined, and the necessary action taken according to the regulations.

Location of offices and dispensaries.

409. The marine-hospital office shall be located at the custom-house whenever practicable and suitable office room for that purpose shall be set apart by the custodian of the custom-house building, subject to the approval of the Secretary of the Treasury.

BENEFICIARIES.

Persons entitled to relief.

411. The persons entitled to the benefits of the Public Health and Marine-Hospital Service are those employed on board in the care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States, or in the service on board of those engaged in such care, preservation, or navigation. Officers and crews of the Light-House Establishment, officers and crews of the Revenue-Cutter Service, seamen employed on the vessels of the Mississippi River Commission, seamen employed on the vessels of the Engineer Corps of the Army, and keepers and crews of the United States Life-Saving Service are entitled to the facilities of the hospitals and relief stations under special rules hereinafter prescribed.

Coast and Geodetic Survey entitled to relief.

412. Officers on vessels of the Coast and Geodetic Survey and seamen thereon, who are not enlisted men from the Navy, are entitled to the benefits of the Service.

Yachtsmen entitled.

413. Seamen employed on yachts are entitled to treatment, provided the said yachts are enrolled, licensed, or registered as vessels of the United States.

Seamen on United States Army transports, etc., entitled to treatment.

414. Seamen employed on United States Army transports or other vessels belonging to the Quartermaster's Department, United States Army, when not enlisted men of the Army, are entitled to the benefits of the Service.

Exceptions, R. S., s. 4804.

415. No person employed in or connected with the navigation, management, or use of canal boats engaged in the coasting trade shall, by reason thereof, be entitled to any benefit or relief from the Service.

Wrecked seamen entitled.

417. Seamen taken from wrecked vessels of the United States are entitled to the benefits of the Service if sick or disabled, and will be furnished care and treatment without reference to the length of time they have been employed.

Seamen sent by consular officers entitled. U. S. Rev. Stat., s. 4577.

418. Seamen employed on merchant vessels of the United States returned to the United States from foreign ports by United States consular officers, if sick or disabled at the time of their arrival in a port of the United States, shall be entitled to the benefits of the Service without reference to length of service.

Seamen must make application for relief.

419. A sick or disabled seaman, in order to obtain the benefits of the Service, must apply in person, or by proxy if too sick or disabled so to do, at the office of the Public Health and Marine-Hospital Service, to an officer of that Service, or to the proper customs officer acting as the agent of the said Service at stations where no medical officer is on duty, and must furnish satisfactory evidence that he is entitled to relief under the regulations.

Evidence to be presented by applicant.

420. Master's certificates and discharges from United States shipping commissioners, made out and signed in proper form, showing that the applicant for relief has been employed for sixty days of continuous service "in a registered, enrolled, or licensed vessel of the United States," a part of which

must have been during the sixty days immediately preceding his application for relief, shall entitle him to treatment. The phrase "sixty days continuous service" shall not be held to exclude seamen whose papers show brief intermission between short services that aggregate the required sixty days.

U. S. Rev. Stat., 4803

421. The certificate of the owner or accredited commercial agent of a vessel as to the facts of the employment of any seaman on said vessel may be accepted as evidence in lieu of the master's certificate in cases where the latter is not procurable.

Certificates from owners or agents as evidence.

422. Masters of documented vessels of the United States shall, on demand, furnish any seaman who has been employed on such vessel a certificate (Form 1915) of the length of time said seaman has been so employed, giving the dates of such employment. This certificate will be filed in the marine-hospital office or office of the customs officer when application is made for relief, whether the relief is furnished or the claim rejected.

Masters must furnish certificate of service.

423. Any master of a vessel or other person who shall furnish a false certificate of service, with intent to procure the admission of a seaman into any marine hospital, shall be immediately reported to the nearest United States attorney for prosecution.

False certificates.

424. When an interval has occurred in the applicant's seafaring service by reason of the closure of navigation on account of ice or low water, such interval shall not be considered as excluding him from relief unless the sickness or injury for which he applies for relief be the direct result of employment on shore.

Exceptions.

425. During the season when navigation is closed at any port, by reason of ice or low water, seamen applying for relief at such ports shall be entitled to same, provided they present the documentary evidence required in paragraph 420, which must show that the applicants were employed within sixty days immediately preceding the said closure of navigation, and provided it does not appear that the disease or injury is the result of employment on shore, or the result of vicious habits.

Closure of navigation.

426. The time during which a seaman has been under treatment in hospital as a patient of the Service shall not be reckoned as absence from vessel in respect to debarring him from further relief.

Period of treatment not to be reckoned as absence from vessel.

427. Whenever an applicant for relief presents himself at the marine-hospital office or the custom-house without a master's certificate or shipping commissioner's discharge and it is impracticable to obtain such certificate, the affidavit of the applicant as to the facts of his last employment, stating names of vessels and dates of service, may be accepted as evidence in support of his claim for the benefits of the Service.

Affidavits may be accepted as evidence.

428. When the period of the seaman's service as shown by his certificate on last vessel is less than sixty days, his affidavit as to previous service may be accepted.

Brief service on last vessel not a bar to relief.

431. When a seaman applies for relief after an absence of sixty days or more from his last vessel, and it satisfactorily appears that such absence was due to sickness or injury acquired in the line of duty, and that it was impracticable for him to apply to the proper officer for treatment, a statement of the facts, together with a copy of the application and other papers in support of same, shall be forwarded, with the recommendation of the medical officer, to the Surgeon-General for decision.

Applications for relief after sixty days' absence from vessel.

432. Any seaman who is able to write will be expected to sign his name upon the face of the master's certificate issued to him before said certificate is signed by the master of the vessel. * * *

Seamen to sign certificates.

434. When a seaman who has received continuous treatment at the out-patient office for a period of two months applies for further treatment he must, to entitle him to treatment, furnish a new certificate of service, showing that he is still following his vocation as seaman, or give satisfactory evidence that such service has been prevented by closure of navigation or by sickness, the latest dates of service and, in case of lack of recent service, its explanation, to appear in each new relief certificate.

Out-patients to furnish new service certificates.

435. The expenses of caring for sick and disabled seamen incurred during a voyage will not be paid by the Service.

Expenses for sickness during voyage.

436. The expenses for the care and treatment of seamen suffering from contagious diseases, who are entitled to the benefits of the Service, and who, in accordance with the State or municipal health laws and regulations are taken to quarantine or other hospitals under charge of the local health authorities, will not be paid unless such seamen were admitted at the time by the request of an officer of the Service.

Seamen admitted to local quarantine hospitals.

Money not to be paid to seamen for expenses of sickness.

437. In no case shall money be paid to a seaman or to his family or friends by the Service as reimbursement for expenses incurred during his sickness or disability.

Seamen injured in brawls not to receive treatment.

439. Seamen who may be injured in street brawls or while committing a breach of the peace, and are therefore confined in jail or taken to civil hospitals by the local authorities for such acts, shall not receive treatment at the expense of the Service.

Seamen taken ill on vessel entitled.

440. Seamen taken sick or injured while actually employed on a documented vessel shall be entitled to treatment at relief stations without reference to the length of their service.

Certificates of discharge.

441. A certificate of discharge may, at the discretion of the officer in charge of the case, be given to a hospital patient, but such certificate when presented at another relief station shall not be taken as sufficient evidence of the applicant's title to marine-hospital relief, but may be considered as collateral to other satisfactory data submitted by the seaman.

Only temporary relief contemplated.

442. Temporary relief only is contemplated, and admission to hospital is not intended to permit an indefinite residence therein for cause other than actual disease or injury.

THE REVENUE-CUTTER SERVICE.

Admitted without regard to length of service.

444. The officers and crews of the Revenue-Cutter Service will receive hospital or out-patient treatment, as hereinafter provided, on certificate signed by the commanding officer or executive officer of a revenue cutter, without regard to length of service. The certificate shall contain a description of the applicant for relief. Officers on leave or waiting orders may sign their own certificate.

THE ENGINEER CORPS, UNITED STATES ARMY.

Seamen employed on vessels of the Engineer Corps, U. S. A., entitled.

453. Seamen employed on vessels under the charge of the Engineer Corps of the United States Army shall be admitted to the benefits of the Marine-Hospital Service without charge at stations of the first, second, and third class upon the written request of the commanding officers of said vessels.

THE LIGHT-HOUSE SERVICE.

Officers and crews of the Light-House Establishment entitled.

460. Officers and crews of the several vessels belonging to the Light-House Establishment, including light-ships, may be admitted to the benefits of the Public Health and Marine-Hospital Service upon the application of their respective commanding officers. No charge will be made for care and treatment.

UNITED STATES ARMY AND NAVY.

Officers and seamen of various Government services may be admitted.

461. Officers and enlisted men of the United States Army and Navy may be admitted for care and treatment as patients of the service only upon the written request of their respective commanding officers. Every such admission shall be immediately reported to the Surgeon-General by the officer in charge of the station, on a daily report (Form 1957) or relief certificate (Form 1916), accompanied by a copy of the request upon which such officer or enlisted man was admitted. They shall be furnished treatment at stations of the first, second, and third class only. The rate of charge to be made for the care and treatment of the said officers and enlisted men will be fixed by the Department at the beginning of each fiscal year, and will be announced to officers and others in the annual circular entitled "Contracts for care of seamen." Patients of the above-named class are not subject to the provisions requiring transportation to marine hospitals.

FOREIGN SEAMEN.

Foreign seamen may be treated. Sec. 6, act Mar. 3, 1875; 18 Stat. L., 485.

462. The accommodations provided for the care and treatment of the patients of the Public Health and Marine-Hospital Service are also available to foreign seamen at relief stations of the first, second, and third class upon the application of the consular officer of the nation under whose flag they are sailing; or upon the application of the masters of the vessels upon which said seamen serve, provided satisfactory written security is given for the payment of the expenses of such care and treatment, at rates fixed annually by the Department.

463. A bill (Form 1928) in duplicate must be rendered by the officer of the Service * * *. One copy of this bill shall be delivered to the collector of customs, who shall at once collect the amount * * *. Bills for care and treatment. Form 1928.

464. Customs officers acting as agents of the Public Health and Marine-Hospital Service shall collect all bills for the care and treatment of seamen of the classes enumerated in paragraphs 461 and 462 * * *. Monthly accounts to be rendered.

465. Collectors of customs will notify the commanding officer of the vessel of the class enumerated in paragraphs 461 and 462, upon whose request the seaman was admitted, of the amount of the bill, and when paid will give a receipt therefor. * * * Notification of amount of bill.

466. The rate of charge to be made for the care and treatment of foreign seamen will be fixed by the Department at the beginning of each fiscal year, and will be announced to officers and others in the annual circular entitled "Contracts for care of seamen." Foreign seamen are not subject to the provision of paragraphs 493 and 501 requiring transportation to marine hospitals. Charges for care and treatment.

RELIEF.

OUT-PATIENT RELIEF.

467. Sick and disabled seamen entitled under these regulations to the benefits of the Service whose diseases or injuries are of such a nature that they can properly be relieved by medicines, dressings, or advice, without admission to hospital, shall be treated as out-patients, and furnished medicines, dressings, surgical appliances, or advice, as the case may require. Cases to be treated as out-patients.

468. Seamen will not be furnished relief at their own homes, except by special authority from the Surgeon General, and then only an allowance for medical attendance and medicines will be made at rates fixed by the Treasury Department. No relief furnished at homes of patients.

HOSPITAL RELIEF.

480. A sick or disabled seaman entitled to the benefits of the Service shall be admitted to hospital only in cases where the gravity of the disease or injury from which he suffers is such as to require hospital treatment in the opinion of an officer of the Service, or of a reputable physician designated by the Department to act at a place where no officer is stationed. Cases for hospital treatment.

STATIONS OF THE FIRST CLASS.

483. A bed ticket (Form 1919) shall be prepared and delivered to the applicant for relief in a sealed envelope addressed to the officer or other person authorized to receive the patient. The seaman should at the same time be informed that unless presented on the day it is issued the ticket will be invalid. To be valid only for day of issue.

STATIONS OF THE SECOND CLASS.

491. A bed ticket (Form 1919) shall be prepared and delivered to the applicant for relief in a sealed envelope addressed to the officer or other person authorized to receive the patient. The seaman should at the same time be informed that unless presented on the day it is issued the ticket will be invalid. To be valid only for day of issue.

STATIONS OF THE THIRD CLASS.

499. Customs officers, or acting assistant surgeons, when in charge of the station by special authority of the Bureau, shall issue hospital permits for the care and treatment of such applicants as may be found to be entitled to the benefits of the Service and require hospital treatment. The period for which treatment is authorized by the permit * * * should in no case exceed twenty days. Permits for hospital relief.

STATIONS OF THE FOURTH CLASS.

512. Customs officers, or acting assistant surgeons, when in charge of the station by special authority of the Bureau, shall issue hospital permits for the care and treatment of such applicants as may be found to be entitled to the benefits of the Service and require hospital treatment. The period for which treatment is authorized by the permit * * * should in no case exceed twenty days. Permits for hospital relief.

Permits valid only on day of issue.

515. The hospital permit, before being delivered to the applicant for relief, must be inclosed in an envelope, sealed, and addressed to the person authorized to receive the patient. The seaman should at the same time be informed that unless presented on the day it is issued the permit will be invalid.

Foreign seamen et al. not treated.

479. Foreign seamen or employees of the various Government services, not beneficiaries, shall not be treated.

INSANE SEAMEN.

Relief for insane seamen. Mar. 3, 1875.

531. Insane seamen entitled to the benefits of the Service may be admitted to the Government Hospital for the Insane, Washington, D. C., upon the order of the Secretary of the Treasury.

DECEASED SEAMEN.

Relatives to be notified.

538. On the death of a patient while under the charge of the Service, notice to receive his effects shall be given by letter or otherwise to his nearest known relative. * * *

Burial expenses.

539. The necessary expenses of a plain burial for deceased patients of the Service will be paid, but no part of the expenses of the burial of any deceased seaman will be paid for at the expense of the Marine-Hospital Service unless said seaman was at the time of his death a patient of the Service. When friends or relatives of a deceased seaman claim the body and assume charge of the funeral arrangements, no part of the expenses of the same will be paid by the Marine-Hospital Service.

NATIONAL QUARANTINES.

QUARANTINE LAWS.

AN ACT granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service.

(*Extracts.*)

[Approved February 15, 1893, and amended August 18, 1894, and March 2, 1901.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall be unlawful for any merchant ship or other vessel from any foreign port or place of [to] enter any port of the United States except in accordance with the provisions of this act and with such rules and regulations of State and municipal health authorities as may be made in pursuance of, or consistent with, this act; and any such vessel which shall enter, or attempt to enter, a port of the United States in violation thereof shall forfeit to the United States a sum, to be awarded in the discretion of the court, not exceeding five thousand dollars, which shall be a lien upon said vessel, to be recovered by proceedings in the proper district court of the United States. In all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 2. That any vessel at any foreign port clearing for any port or place in the United States shall be required to obtain from the consul, vice-consul, or other consular officer of the United States at the port of departure, or from the medical officer where such officer has been detailed by the President for that purpose, a bill of health, in duplicate, in the form prescribed by the Secretary of the Treasury, setting forth the sanitary history and condition of said vessel, and that it has in all respects complied with the rules and regulations in such cases prescribed for securing the best sanitary condition of the said vessel, its cargo, passengers, and crew; and said consular or medical officer is required, before granting such duplicate bill of health, to be satisfied that the matters and things therein stated are true; and for his services in that behalf he shall be entitled to demand and receive such fees as shall by lawful regulation be allowed, to be accounted for as is required in other cases.

The President, in his discretion, is authorized to detail any medical officer of the Government to serve in the office of the consul at any foreign port for the purpose of furnishing information and making the inspection and giving the bills of health hereinbefore

mentioned. Any vessel clearing and sailing from any such port without such bill of health, and entering any port of the United States, shall forfeit to the United States not more than five thousand dollars, the amount to be determined by the court, which shall be a lien on the same, to be recovered by proceedings in the proper district court of the United States. In all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

The provisions of this section shall not apply to vessels plying between foreign ports on or near the frontiers of the United States and ports of the United States adjacent thereto; but the Secretary of the Treasury is hereby authorized, when, in his discretion, it is expedient for the preservation of the public health, to establish regulations governing such vessels.

SEC. 5. That the Secretary of the Treasury shall from time to time issue to the consular officers of the United States and to the medical officer serving at any foreign port, and otherwise make publicly known, the rules and regulations made by him, to be used and complied with by vessels in foreign ports, for securing the best sanitary condition of such vessels, their cargoes, passengers, and crew, before their departure for any port in the United States, and in the course of the voyage; and all such other rules and regulations as shall be observed in the inspection of the same on the arrival thereof at any quarantine station at the port of destination, and for the disinfection and isolation of the same, and the treatment of cargo and persons on board, so as to prevent the introduction of cholera, yellow fever, or other contagious or infectious diseases; and it shall not be lawful for any vessel to enter said port to discharge its cargo, or land its passengers, except upon a certificate of the health officer at such quarantine station certifying that said rules and regulations have in all respects been observed and complied with, as well on his part as on the part of the said vessel and its master, in respect to the same and to its cargo, passengers, and crew; and the master of every such vessel shall produce and deliver to the collector of customs at said port of entry, together with the other papers of the vessel, the said bills of health required to be obtained at the port of departure and the certificate herein required to be obtained from the health officer at the port of entry; and that the bills of health herein prescribed shall be considered as part of the ship's papers, and when duly certified to by the proper consular officer or other officer of the United States, over his official signature and seal, shall be accepted as evidence of the statements therein contained in any court of the United States.

SEC. 6. That on the arrival of an infected vessel at any port not provided with proper facilities for treatment of the same, the Secretary of the Treasury may remand said vessel, at its own expense, to the nearest national or other quarantine station, where accommodations and appliances are provided for the necessary disinfection and treatment of the vessel, passengers, and cargo; and after treatment of any infected vessel at a national quarantine station, and after certificate shall have been given by the United States quarantine officer at said station that the vessel, cargo, and passengers are each and all free from infectious disease, or danger of conveying the same, said vessel shall be admitted to entry to any port of the United States named within the certificate. But at any ports where sufficient quarantine provision has been made by State or local authorities the Secretary of the Treasury may direct vessels bound for said ports to undergo quarantine at said State or local station.

SEC. 7. That whenever it shall be shown to the satisfaction of the President that by reason of the existence of cholera or other infectious or contagious diseases in a foreign country there is serious danger of the introduction of the same into the United States, and that notwithstanding the quarantine defense this danger is so increased by the introduction of persons or property from such country that a suspension of the right to introduce the same is demanded in the interest of the public health, the President shall have power to prohibit, in whole or in part, the introduction of persons and property from such countries or places as he shall designate, and for such period of time as he may deem necessary.

SEC. 10. That the Supervising Surgeon General, with the approval of the Secretary of the Treasury, is authorized to designate and mark the boundaries of the quarantine grounds and quarantine anchorages for vessels which are reserved for use at each United States quarantine station; and any vessel or officer of any vessel or other person, other than State or municipal health or quarantine officers, trespassing or otherwise entering upon such grounds or anchorages in disregard of the quarantine rules and regulations, or without permission of the officer in charge of such station, shall be deemed guilty of a misdemeanor and subject to arrest, and upon conviction thereof be punished by a fine of not more than three hundred dollars or imprisonment for not more than one year, or both, in the discretion of the court. Any master or owner of any vessel, or any person violating any provision of this Act or any rule or regulation made in accordance with this Act, relating to inspection of vessels or relating to the prevention of the introduction of contagious or infectious diseases, or any master, owner, or agent of any vessel making a false statement relative to the sanitary condition of said vessel or its contents or as to the health of any passenger or person thereon, shall be deemed guilty of a misdemeanor and subject to arrest, and upon conviction thereof be punished by a fine of not more than five hundred dollars or imprisonment for not more than one year, or both, in the discretion of the court.

SEC. 11. That any vessel sailing from any foreign port without the bill of health required by section two of this Act, and arriving within the limits of any collection district of the United States, and not entering or attempting to enter any port of the United States, shall be subject to such quarantine measures as shall be prescribed by regulations of the Secretary of the Treasury, and the cost of such measures shall be a lien on said vessel, to be recovered by proceedings in the proper district court of the United States and in the manner set forth above as regards vessels from foreign ports without bills of health and entering any port of the United States.

QUARANTINE REGULATIONS.

(*Extracts.*)

INSPECTION OF VESSELS LEAVING FOREIGN PORTS AND PORTS IN THE POSSESSIONS OR OTHER DEPENDENCIES OF THE UNITED STATES FOR PORTS IN THE UNITED STATES OR ITS POSSESSIONS OR OTHER DEPENDENCIES.

5. The officer issuing the bill of health shall satisfy himself, by inspection if necessary, that the conditions certified to therein are true, and is authorized, in accordance with the law, to withhold the bill of health or the supplemental bill of health until he is satisfied that the vessel, the passengers, the crew, and the cargo have complied with all the quarantine laws and regulations of the United States.

6. Inspection is required of—

(*a*) All vessels from ports at which cholera, yellow fever, or plague prevails, or at which smallpox or typhus fever prevails in epidemic form.

(*b*) All vessels carrying steerage passengers; but need only include the inspection of such passengers and their living apartments, if sailing from a healthy port.

7. Inspection of the vessel is such an examination of the vessel, cargo, passengers, crew, personal effects of same, including examination of manifests and other papers, food and water supply, the ascertainment of its relations with the shore, the manner of loading and possibilities of invasion by small animals as will enable the inspecting officer to determine if these regulations have been complied with.

8. When an inspection is required, it should be made by daylight, as late as practicable before sailing. The vessel should be inspected before the passengers go aboard, the passengers just before embarkation, and the crew on deck; and no communication should be had with the vessel after such inspection except by permission of the officer issuing the bill of health.

INSPECTION.

59. Every vessel subject to quarantine inspection, entering a port of the United States, its possessions or dependencies, shall be considered in quarantine until given free pratique. Such vessel shall fly a yellow flag at the foremast head from sunrise to sunset, and shall observe all the other requirements of vessels actually quarantined.

60. Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

(*a*) All vessels from foreign ports except those enumerated in paragraph 4.

(*b*) Any vessel with sickness on board.

(*c*) Vessels from domestic ports where cholera, plague, or yellow fever prevails, or where smallpox or typhus fever prevails in epidemic form.

(*d*) Vessels from ports suspected of infection with yellow fever, having entered a port north of the southern boundary of Maryland without disinfection, shall be subjected to a second inspection before entering any ports south of said latitude during the quarantine season of such port.

61. The inspections of vessels required by these regulations shall be made between sunrise and sunset, except in case of vessels in distress.

64. No person, except the quarantine officer, his employees, United States customs officers, pilots, or other persons authorized by the quarantine officer, shall be permitted to board any vessel subject to quarantine inspection until after the vessel has been inspected by the quarantine officer and granted free pratique, and all such persons so boarding such vessel shall, in the discretion of the quarantine officer, be subject to the same restrictions as the personnel of the vessel.

65. Towboats or any other vessels having had communication with vessels subject to inspection shall themselves be subject to inspection.

QUARANTINE.

68. Vessels arriving under the following conditions shall be placed in quarantine:

(*a*) With quarantinable disease on board or having had such disease on board during the voyage.

(*b*) Any vessel which the quarantine officer considers infected.

(*c*) If arriving at a port south of the southern boundary of Maryland in the season of close quarantine, May 1 to November 1, directly or via a northern port, from a tropical American port, unless said port is known to be free from yellow fever.

(*d*) In case of vessels arriving at a northern port without sickness on board from ports where yellow fever prevails, the personnel shall be detained under observation at quarantine to complete five days from the port of departure.

(*e*) Towboats and other vessels having had communication with vessels subject to quarantine shall themselves be quarantined if they have been exposed to infection.

69. Vessels arriving under the following conditions need not be subject to quarantine:

A. Vessels from yellow fever ports bound for ports in the United States north of the southern boundary of Maryland, with good sanitary condition and history, having had no sickness on board at ports of departure, en route or on arrival, provided they have been five days from last infected or suspected port.

B. Vessels engaged in the fruit trade may be admitted to entry without detention, provided that they have complied in all respects with the special rules and regulations made by the Secretary of the Treasury with regard to vessels engaged in said trade.

GENERAL REQUIREMENTS AT QUARANTINE.

71. No direct communication shall be allowed between any vessel in quarantine and any person or place outside, and no communication whatever between quarantine or any vessel in quarantine and any person or place outside except under the supervision of the quarantine officer.

SPECIAL REGULATIONS RELATING TO NAVAL VESSELS.

151. Vessels of the U. S. Navy may be granted the hereinafter stated exemptions from quarantine regulations, but are subject to quarantine inspection upon arrival at a port of the United States.

152. The certificates of the medical officers of the U. S. Navy as to the sanitary history and condition of the vessel and its personnel may be accepted for naval vessels by the quarantine officer boarding the vessel in lieu of an actual inspection.

153. Vessels of the U. S. Navy having entered the harbors of infected ports, but having held no communication which is liable to convey infection, may be exempted from the disinfection and detention imposed on merchant vessels from such ports.

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APPENDIX V.

RULES TO PREVENT COLLISIONS OF VESSELS.

Compiled for insertion in volumes of the U. S. Coast Pilot, Atlantic Coast.

AN ACT in regard to collisions at sea.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in every case of collision between two vessels it shall be the duty of the master or person in charge of each vessel, if and so far as he can do so without serious danger to his own vessel, crew, and passengers (if any), to stay by the other vessel until he has ascertained that she has no need of further assistance, and to render to the other vessel, her master, crews and passengers (if any), such assistance as may be practicable and as may be necessary in order to save them from any danger caused by the collision, and also to give to the master or person in charge of the other vessel the name of his own vessel and her port of registry, or the port or place to which she belongs, and also the names of the ports and places from which and to which she is bound. If he fails so to do, and no reasonable cause for such failure is shown, the collision shall, in the absence of proof to the contrary, be deemed to have been caused by his wrongful act, neglect, or default.

SEC. 2. That every master or person in charge of a United States vessel who fails, without reasonable cause, to render such assistance or give such information as aforesaid shall be deemed guilty of a misdemeanor, and shall be liable to a penalty of one thousand dollars, or imprisonment for a term not exceeding two years; and for the above sum the vessel shall be liable and may be seized and proceeded against by process in any district court of the United States by any person; one-half such sum to be payable to the informer and the other half to the United States.

SEC. 3. That this act shall take effect at a time to be fixed by the President by Proclamation issued for that purpose.

Approved September 4, 1890. Proclamation dated November 18, 1890, to take effect December 15, 1890.

INTERNATIONAL RULES.

I.—ENACTING CLAUSE, AND SCOPE.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following regulations for preventing collisions at sea shall be followed by all public and private vessels of the United States upon the high seas and in all waters connected therewith, navigable by sea-going vessels.

ART. 30. Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbor, river, or inland waters.

PRELIMINARY DEFINITIONS.

In the following rules every steam-vessel which is under sail and not under steam is to be considered a sailing-vessel, and every vessel under steam, whether under sail or not, is to be considered a steam-vessel.

The word "steam-vessel" shall include any vessel propelled by machinery.

A vessel is "under way" within the meaning of these rules when she is not at anchor, or made fast to the shore, or aground.

II.—LIGHTS AND SO FORTH.

The word "visible" in these rules when applied to lights shall mean visible on a dark night with a clear atmosphere.

ART. 1. The rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such time no other lights which may be mistaken for the prescribed lights shall be exhibited.

STEAM VESSELS—MASTHEAD LIGHT.

ART. 2 A steam-vessel when under way shall carry—(*a*) On or in front of the foremast, or if a vessel without a foremast, then in the fore part of the vessel, at a height above the hull of not less than twenty feet, and if the breadth of the vessel exceeds twenty feet, then at a height above the hull not less than such breadth, so, however, that the light need not be carried at a greater height above the hull than forty feet, a bright white light, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side, and of such a character as to be visible at a distance of at least five miles.

STEAM VESSELS—SIDE LIGHTS.

(*b*) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least two miles.

(*c*) On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible at a distance of at least two miles.

(*d*) The said green and red side-lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

STEAM VESSELS—RANGE LIGHTS.

(*e*) A steam-vessel when under way may carry an additional white light similar in construction to the light mentioned in subdivision (*a*). These two lights shall be so placed in line with the keel that one shall be at least fifteen feet higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper one. The vertical distance between these lights shall be less than the horizontal distance.

STEAM VESSELS WHEN TOWING.

ART. 3. A steam-vessel when towing another vessel shall, in addition to her side-lights, carry two bright white lights in a vertical line one over the other, not less than six feet apart, and when towing more than one vessel shall carry an additional bright white light six feet above or below such light, if the length of the tow measuring from the stern of the towing vessel to the stern of the last vessel towed exceeds six hundred feet. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light mentioned in article two (*a*), excepting the additional light, which may be carried at a height of not less than fourteen feet above the hull.

Such steam-vessel may carry a small white light abaft the funnel or aftermast for the vessel towed to steer by, but such light shall not be visible forward of the beam.

SPECIAL LIGHTS.

ART. 4. (*a*) A vessel which from any accident is not under command shall carry at the same height as a white light mentioned in article two (*a*), where they can best be seen, and if a steam-vessel in lieu of that light, two red lights, in a vertical line one over the other, not less than six feet apart, and of such a character as to be visible all around the horizon at a distance of at least two miles; and shall by day carry in a vertical line one over the other, not less than six feet apart, where they can best be seen, two black balls or shapes, each two feet in diameter.

(*b*) A vessel employed in laying or in picking up a telegraph cable shall carry in the same position as the white light mentioned in article two (*a*), and if a steam-vessel in lieu of that light, three lights in a vertical line one over the other not less than six feet apart. The highest and lowest of these lights shall be red, 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 two miles. By day she shall carry in a vertical line, one over the other, not less than six feet apart, where they can best be seen, three shapes not less than two feet in diameter, of which the highest and lowest shall be globular in shape and red in color, and the middle one diamond in shape and white.

(*c*) The vessels referred to in this article, when not making way through the water, shall not carry the side-lights, but when making way shall carry them.

(*d*) The lights and shapes required to be shown by this article are to be taken by other vessels as signals that the vessel showing them is not under command and can not therefore get out of the way.

These signals are not signals of vessels in distress and requiring assistance. Such signals are contained in article thirty-one.

LIGHTS FOR SAILING VESSELS AND VESSELS IN TOW.

ART. 5. A sailing-vessel under way and any vessel being towed shall carry the same lights as are prescribed by article two for a steam-vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

LIGHTS FOR SMALL VESSELS.

ART. 6. Whenever, as in the case of small vessels under way during bad weather, the green and red side-lights can not be fixed, these lights shall be kept at hand, lighted and ready for use; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides. To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the color of the light they respectively contain, and shall be provided with proper screens.

LIGHTS FOR SMALL STEAM AND SAIL VESSELS AND OPEN BOATS.

ART. 7. Steam-vessels of less than forty, and vessels under oars or sails of less than twenty tons gross tonnage, respectively, and rowing boats, when under way, shall not be required to carry the lights mentioned in article two (*a*), (*b*), and (*c*), but if they do not carry them they shall be provided with the following lights:

First. Steam-vessels of less than forty tons shall carry—

(*a*) In the fore part of the vessel, or on or in front of the funnel, where it can best be seen, and at a height above the gunwale of not less than nine feet, a bright white light constructed and fixed as prescribed in article two (*a*), and of such a character as to be visible at a distance of at least two miles.

(*b*) Green and red side-lights constructed and fixed as prescribed in article two (*b*) and (*c*), and of such a character as to be visible at a distance of at least one mile, or a combined lantern showing a green light and a red light from right ahead to two points abaft the beam on their respective sides. Such lanterns shall be carried not less than three feet below the white light.

Second. Small steamboats, such as are carried by seagoing vessels, may carry the white light at a less height than nine feet above the gunwale, but it shall be carried above the combined lantern mentioned in subdivision one (*b*).

Third. Vessels under oars or sails of less than twenty tons shall have ready at hand a lantern with a green glass on one side and a red glass on the other, which, on the approach of or to other vessels, shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

Fourth. Rowing boats, whether under oars or sail, shall have ready at hand a lantern showing a white light which shall be temporarily exhibited in sufficient time to prevent collision.

The vessels referred to in this article shall not be obliged to carry the lights prescribed by article four (*a*) and article eleven, last paragraph.

LIGHTS FOR PILOT VESSELS.

ART. 8. Pilot-vessels when engaged on their station on pilotage duty shall not show the lights required for other vessels, but shall carry a white light at the masthead, visible all around the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed fifteen minutes.

On the near approach of or to other vessels they shall have their side-lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side, nor the red light on the starboard side.

A pilot-vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the masthead, and may, instead of the colored lights above mentioned, have at hand, ready for use, a lantern with a green glass on the one side and a red glass on the other, to be used as prescribed above.

Pilot-vessels when not engaged on their station on pilotage duty shall carry lights similar to those of other vessels of their tonnage.

A steam pilot-vessel, when engaged on her station on pilotage duty and in waters of the United States, and not at anchor, shall, in addition to the lights required for all pilot-boats,

carry at a distance of eight feet below her white masthead light a red light, visible all around the horizon and of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least two miles, and also the colored lights required to be carried by vessels when under way.

When engaged on her station on pilotage duty and in waters of the United States, and at anchor, she shall carry in addition to the lights required for all pilot boats the red light above mentioned, but not the colored side lights.

When not engaged on her station on pilotage duty, she shall carry the same lights as other steam vessels.

LIGHTS, ETC., OF FISHING VESSELS.

ART. 9. [*Article 9, act of August 19, 1890, was repealed by act of May 28, 1894, and article 10, act of March 3, 1885, was reenacted in part by act of August 13, 1894, and is reproduced here in part as article 9. It will be the object of further consideration by the maritime powers:*]

Fishing-vessels of less than twenty tons net registered tonnage, when under way and when not having their nets, trawls, dredges, or lines in the water, shall not be obliged to carry the colored side-lights; but every such vessel shall in lieu thereof have ready at hand a lantern with a green glass on the one side and a red glass on the other side, and on approaching to or being approached by another vessel such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

The following portion of this article applies only to fishing-vessels and boats when in the sea off the coast of Europe lying north of Cape Finisterre:

(*a*) All fishing-vessels and fishing-boats of twenty tons net registered tonnage or upward, when under way and when not having their nets, trawls, dredges, or lines in the water, shall carry and show the same lights as other vessels under way.

(*b*) All vessels when engaged in fishing with drift nets shall exhibit two white lights from any part of the vessel where they can be best seen. Such lights shall be placed so that the vertical distance between them shall be not less than six feet and not more than ten feet, and so that the horizontal distance between them, measured in a line with the keel of the vessel, shall be not less than five feet and not more than ten feet. The lower of these two lights shall be the more forward, and both of them shall be of such a character and contained in lanterns of such construction as to show all around the horizon, on a dark night, with a clear atmosphere, for a distance of not less than three miles.

(*c*) All vessels when trawling, dredging, or fishing with any kind of drag-nets shall exhibit, from some part of the vessel where they can be best seen, two lights. One of these lights shall be red and the other shall be white. The red light shall be above the white light, and shall be at a vertical distance from it of not less than six feet and not more than twelve feet; and the horizontal distance between them, if any, shall not be more than ten feet. These two lights shall be of such a character and contained in lanterns of such construction as to be visible all around the horizon, on a dark night, with a clear atmosphere, the white light to a distance of not less than three miles and the red light of not less than two miles.

(*d*) A vessel employed in line-fishing, with her lines out, shall carry the same lights as a vessel when engaged in fishing with drift nets.

(*e*) If a vessel, when fishing with a trawl, dredge, or any kind of drag-net, becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall show the light and make the fog signal for a vessel at anchor.

(*f*) Fishing-vessels may at any time use a flare-up in addition to the lights which they are by this article required to carry and show. All flare-up lights exhibited by a vessel when trawling, dredging, or fishing with any kind of drag-net shall be shown at the after-part of the vessel, excepting that if the vessel is hanging by the stern to her trawl, dredge, or drag-net they shall be exhibited from the bow.

(*g*) Every fishing-vessel when at anchor between sunset and sunrise shall exhibit a white light, visible all around the horizon at a distance of at least one mile.

(*h*) In a fog a drift-net vessel attached to her nets, and a vessel when trawling, dredging, or fishing with any kind of drag-net, and a vessel employed in line-fishing with her lines out, shall, at intervals of not more than two minutes, make a blast with her fog horn and ring her bell alternately.

LIGHTS FOR AN OVERTAKEN VESSEL.

ART. 10. A vessel which is being overtaken by another shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

The white light required to be shown by this article may be fixed and carried in a lantern, but in such case the lantern shall be so constructed, fitted, and screened that it shall throw an unbroken light over an arc of the horizon of twelve points of the compass, namely,

for six points from right aft on each side of the vessel, so as to be visible at a distance of at least one mile. Such light shall be carried as nearly as practicable on the same level as the side lights.

ANCHOR LIGHTS.

ART. 11. A vessel under one hundred and fifty feet in length, when at anchor, shall carry forward, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light in a lantern so constructed as to show a clear, uniform, and unbroken light visible all around the horizon at a distance of at least one mile.

A vessel of one hundred and fifty feet or upward in length, when at anchor, shall carry in the forward part of the vessel, at a height of not less than twenty and not exceeding forty feet above the hull, one such light, and at or near the stern of the vessel, and at such a height that it shall be not less than fifteen feet lower than the forward light, another such light.

The length of a vessel shall be deemed to be the length appearing in her certificate of registry.

A vessel aground in or near a fair-way shall carry the above light or lights and the two red lights prescribed by article four (*a*).

SPECIAL SIGNALS.

ART. 12. Every vessel may, if necessary in order to attract attention, in addition to the lights which she is by these rules required to carry, show a flare-up light or use any detonating signal that can not be mistaken for a distress signal.

NAVAL LIGHTS AND RECOGNITION SIGNALS.

ART. 13. Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal-lights for two or more ships of war or for vessels sailing under convoy, or with the exhibition of recognition signals adopted by shipowners, which have been authorized by their respective Governments and duly registered and published.

STEAM VESSEL UNDER SAIL BY DAY.

ART. 14. A steam-vessel proceeding under sail only but having her funnel up, shall carry in daytime, forward, where it can best be seen, one black ball or shape two feet in diameter.

III.—SOUND SIGNALS IN FOG, ETC.

PRELIMINARY.

ART. 15. All signals prescribed by this article for vessels under way shall be given:

First. By "steam-vessels" on the whistle or siren.

Second. By "sailing-vessels" and "vessels towed" on the fog horn.

The words "prolonged blast" used in this article shall mean a blast of from four to six seconds' duration.

A steam-vessel shall be provided with an efficient whistle or siren, sounded by steam or by some substitute for steam, so placed that the sound may not be intercepted by any obstruction, and with an efficient fog horn, to be sounded by mechanical means, and also with an efficient bell. (In all cases where the rules require a bell to be used, a drum may be substituted on board Turkish vessels, or a gong where such articles are used on board small seagoing vessels.) A sailing vessel of twenty tons gross tonnage or upward shall be provided with a similar fog horn and bell.

In fog, mist, falling snow, or heavy rain-storms, whether by day or night, the signals described in this article shall be used as follows, namely:

STEAM VESSEL UNDER WAY.

(*a*) A steam-vessel having way upon her shall sound, at intervals of not more than two minutes, a prolonged blast.

(*b*) A steam-vessel under way, but stopped, and having no way upon her, shall sound, at intervals of not more than two minutes, two prolonged blasts, with an interval of about one second between.

SAIL VESSEL UNDER WAY.

(*c*) A sailing vessel under way shall sound, at intervals of not more than one minute, when on the starboard tack, one blast; when on the port tack, two blasts in succession, and when with the wind abaft the beam, three blasts in succession.

VESSELS AT ANCHOR OR NOT UNDER WAY.

(*d*) A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.

VESSELS TOWING, ETC.

(*e*) A vessel when towing, a vessel employed in laying or picking up a telegraph cable, and a vessel under way, which is unable to get out of the way of an approaching vessel through being not under command, or unable to maneuver as required by the rules, shall, instead of the signals prescribed in subdivisions (*a*) and (*c*) of this article, at intervals of not more than two minutes, sound three blasts in succession, namely: One prolonged blast followed by short blasts. A vessel towed may give this signal and she shall not give any other.

SMALL SAILING VESSELS AND BOATS.

Sailing vessels and boats of less than twenty tons gross tonnage shall not be obliged to give the above-mentioned signals, but, if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.

SPEED IN FOG.

ART. 16. Every vessel shall, in a fog, mist, falling snow, or heavy rain storms, go at a moderate speed, having careful regard to the existing circumstances and conditions.

A steam-vessel hearing, apparently forward of her beam, the fog-signal of a vessel, the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

IV.—STEERING AND SAILING RULES.

PRELIMINARY.

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

SAILING VESSELS.

ART. 17. When two sailing-vessels are approaching one another, so as to invoke risk of collision, one of them shall keep out of the way of the other, as follows, namely:

(*a*) A vessel which is running free shall keep out of the way of a vessel which is close-hauled.

(*b*) A vessel which is close-hauled on the port tack shall keep out of the way of a vessel which is close-hauled on the starboard tack.

(*c*) When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(*d*) When both are running free, with the wind on the same side, the vessel which is to the windward shall keep out of the way of the vessel which is to the leeward.

(*e*) A vessel which has the wind aft shall keep out of the way of the other vessel.

STEAM VESSELS.

ART. 18. When two steam-vessels are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other.

This article only applies to cases where vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two vessels which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are when each of the two vessels is end on, or nearly end on, to the other; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own; and by night, to cases in which each vessel is in such a position as to see both the side-lights of the other.

It does not apply by day to cases in which a vessel sees another ahead crossing her own course; or by night, to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

TWO STEAM VESSELS CROSSING.

ART. 19. When two steam-vessels are crossing, so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

STEAM VESSEL SHALL KEEP OUT OF THE WAY OF SAILING VESSEL.

ART. 20. When a steam-vessel and a sailing vessel are proceeding in such directions as to involve risk of collision, the steam vessel shall keep out of the way of the sailing vessel.

COURSE AND SPEED.

ART. 21. Where, by any of these rules, one of two vessels is to keep out of the way, the other shall keep her course and speed.

NOTE.—When in consequence of thick weather or other causes, such vessel finds herself so close that collision can not be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision. (See articles twenty-seven and twenty-nine.)

CROSSING AHEAD.

ART. 22. Every vessel which is directed by these rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

STEAM VESSEL SHALL SLACKEN SPEED OR STOP.

ART. 23. Every steam-vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

OVERTAKING VESSELS.

ART. 24. Notwithstanding anything contained in these rules every vessel, overtaking any other, shall keep out of the way of the overtaken vessel.

Every vessel coming up with another vessel from any direction more than two points abaft her beam, that is, in such a position, with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's side-lights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

As by day the overtaking vessel can not always know with certainty whether she is forward of or abaft this direction from the other vessel, she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

NARROW CHANNELS.

ART. 25. In narrow channels every steam-vessel shall, when it is safe and practicable, keep to that side of the fair-way or mid-channel which lies on the starboard side of such vessel.

RIGHTS OF WAY OF FISHING VESSELS.

ART. 26. Sailing vessels under way shall keep out of the way of sailing vessels or boats fishing with nets, or lines, or trawls. This rule shall not give to any vessel or boat engaged in fishing the right of obstructing a fair-way used by vessels other than fishing vessels or boats.

GENERAL PRUDENTIAL RULE.

ART. 27. In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

SOUND SIGNALS FOR PASSING STEAMERS.

ART. 28. The words "short blasts," used in this article, shall mean a blast of about one second's duration.

When vessels are in sight of one another, a steam-vessel under way, in taking any course authorized or required by these rules, shall indicate that course by the following signals on her whistle or siren, namely:

One short blast to mean, "I am directing my course to starboard."

Two short blasts to mean, "I am directing my course to port."

Three short blasts to mean, "My engines are going at full speed astern."

PRECAUTION.

ART. 29. Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

ART. 30. [See p. 229.]

DISTRESS SIGNALS.

ART. 31. When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, namely:

In the daytime—

First. A gun or other explosive signal fired at intervals of about a minute.

Second. The international code signal of distress indicated by N. C.

Third. The distance signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball.

Fourth. A continuous sounding with any fog-signal apparatus.

At night—

First. A gun or other explosive signal fired at intervals of about a minute.

Second. Flames on the vessel (as from a burning tar barrel, oil barrel, and so forth).

Third. Rockets or shells throwing stars of any color or description, fired one at a time, at short intervals.

Fourth. A continuous sounding with any fog-signal apparatus.

INLAND RULES.

NOTE.—*The paragraphs indicated by a vertical line are identically the same as corresponding paragraphs in the International Rules.*

I.—ENACTING CLAUSE AND SCOPE.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following regulations for preventing collision shall be followed by all vessels navigating all harbors, rivers, and inland waters of the United States, except the Great Lakes and their connecting and tributary waters as far east as Montreal, and the Red River of the North and rivers emptying into the Gulf of Mexico and their tributaries, and are hereby declared special rules duly made by local authority:

ART. 30. The exhibition of any light on board of a vessel of war of the United States or a revenue cutter may be suspended whenever, in the opinion of the Secretary of the Navy, the commander in chief of a squadron, or the commander of a vessel acting singly, the special character of the service may require it.

PRELIMINARY DEFINITIONS.

In the following rules every steam-vessel which is under sail and not under steam is to be considered a sailing-vessel, and every vessel under steam, whether under sail or not, is to be considered a steam-vessel.

The word "steam-vessel" shall include any vessel propelled by machinery.

A vessel is "under way," within the meaning of these rules, when she is not at anchor, or made fast to the shore, or aground.

II.—LIGHTS AND SO FORTH.

The word "visible" in these rules, when applied to lights, shall mean visible on a dark night with a clear atmosphere.

ART. 1. The rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such time no other lights which may be mistaken for the prescribed lights shall be exhibited.

STEAM VESSELS—MASTHEAD LIGHT.

ART. 2. A steam-vessel when under way shall carry (*a*) on or in front of the foremast, or, if a vessel without a foremast, then in the forepart of the vessel, a bright white light so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side, and of such a character as to be visible at a distance of at least five miles.

STEAM VESSELS—SIDE LIGHTS.

(*b*) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least two miles.

(*c*) On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible at a distance of at least two miles.

(*d*) The said green and red side-lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

STEAM VESSELS—RANGE LIGHTS.

(*e*) A sea-going steam-vessel when under way may carry an additional white light similar in construction to the light mentioned in subdivision (*a*). These two lights shall be so placed in line with the keel that one shall be at least fifteen feet higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper one. The vertical distance between these lights shall be less than the horizontal distance.

(*f*) All steam-vessels (except sea-going vessels and ferry-boats) shall carry in addition to green and red lights required by article two (*b*), (*c*), and screens as required by article two (*d*), a central range of two white lights; the after-light being carried at an elevation at least fifteen feet above the light at the head of the vessel. The head-light shall be so constructed as to show an unbroken light through twenty points of the compass, namely, from right ahead to two points abaft the beam on either side of the vessel, and the after-light so as to show all around the horizon.

STEAM VESSELS WHEN TOWING.

ART. 3. A steam-vessel when towing another vessel shall, in addition to her side-lights, carry two bright white lights in a vertical line one over the other, not less than three feet apart, and when towing more than one vessel shall carry an additional bright white light three feet above or below such lights, if the length of the tow, measuring from the stern of the towing vessel to the stern of the last vessel towed, exceed six hundred feet. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light mentioned in article two (*a*) or the after range light mentioned in article two (*f*).

Such steam-vessels may carry a small white light abaft the funnel or aftermast for the vessel towed to steer by, but such light shall not be visible forward of the beam.

LIGHTS FOR SAILING VESSELS AND VESSELS IN TOW.

ART. 5. A sailing-vessel under way or being towed shall carry the same lights as are prescribed by article two for a steam-vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

LIGHTS FOR SMALL VESSELS.

ART. 6. Whenever, as in the case of vessels of less than ten gross tons under way during bad weather, the green and red side-lights can not be fixed, these lights shall be kept at

hand, lighted and ready for use; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides. To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the color of the light they respectively contain, and shall be provided with proper screens.

LIGHTS FOR ROWING BOATS.

ART. 7. Rowing boats, whether under oars or sail, shall have ready at hand a lantern showing a white light which shall be temporarily exhibited in sufficient time to prevent collision.

LIGHTS FOR PILOT VESSELS.

ART. 8. Pilot-vessels, when engaged on their station on pilotage duty, shall not show the lights required for other vessels, but shall carry a white light at the masthead, visible all around the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals which shall never exceed fifteen minutes.

On the near approach of or to other vessels they shall have their side-lights lighted, ready for use, and shall flash or show them at short intervals to indicate the direction in which they are heading, but the green light shall not be shown on the port side nor the red light on the starboard side.

A pilot-vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the masthead, and may, instead of the colored lights above mentioned, have at hand ready for use, a lantern with a green glass on the one side and a red glass on the other, to be used as prescribed above.

Pilot vessels, when not engaged on their station on pilotage duty, shall carry lights similar to those of other vessels of their tonnage.

A steam pilot vessel, when engaged on her station on pilotage duty and in waters of the United States, and not at anchor, shall, in addition to the lights required for all pilot boats, carry at a distance of eight feet below her white masthead light a red light, visible all around the horizon and of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least two miles, and also the colored lights required to be carried by vessels when under way.

When engaged on her station on pilotage duty and in waters of the United States, and at anchor, she shall carry, in addition to the lights required for all pilot boats, the red light above mentioned, but not the colored side lights.

When not engaged on her station on pilotage duty, she shall carry the same lights as other steam-vessels.

LIGHTS, ETC., OF FISHING VESSELS.

ART. 9. (*a*) Fishing-vessels of less than ten gross tons, when under way and when not having their nets, trawls, dredges, or lines in the water, shall not be obliged to carry the colored side-lights; but every such vessel shall, in lieu thereof, have ready at hand a lantern with a green glass on one side and a red glass on the other side, and on approaching to or being approached by another vessel such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

(*b*) All fishing-vessels and fishing-boats of ten gross tons or upward, when under way and when not having their nets, trawls, dredges, or lines in the water, shall carry and show the same lights as other vessels under way.

(*c*) All vessels, when trawling, dredging, or fishing with any kind of drag-nets or lines, shall exhibit, from some part of the vessel where they can be best seen, two lights. One of these lights shall be red and the other shall be white. The red light shall be above the white light, and shall be at a vertical distance from it of not less than six feet and not more than twelve feet; and the horizontal distance between them, if any, shall not be more than ten feet. These two lights shall be of such a character and contained in lanterns of such construction as to be visible all around the horizon, the white light a distance of not less than three miles and the red light of not less than two miles.

LIGHTS FOR RAFTS OR OTHER WATER CRAFT.

(*d*) Rafts, or other water craft not herein provided for, navigating by hand power, horse power, or by the current of the river, shall carry one or more good white lights,

which shall be placed in such manner as shall be prescribed by the Board of Supervising Inspectors of Steam Vessels.*

LIGHTS FOR AN OVERTAKEN VESSEL.

ART. 10. A vessel which is being overtaken by another, except a steam-vessel with an after range-light showing all around the horizon, shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

ANCHOR LIGHTS.

ART. 11. A vessel under one hundred and fifty feet in length when at anchor shall carry forward, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light, in a lantern so constructed as to show a clear, uniform, and unbroken light visible all around the horizon at a distance of at least one mile.

A vessel of one hundred and fifty feet or upward in length when at anchor shall carry in the forward part of the vessel, at a height of not less than twenty and not exceeding forty feet above the hull, one such light; and at or near the stern of the vessel, and at such a height that it shall be not less than fifteen feet lower than the forward light, another such light.

The length of a vessel shall be deemed to be the length appearing in her certificate of registry.

SPECIAL SIGNALS.

ART. 12. Every vessel may, if necessary, in order to attract attention, in addition to the lights which she is by these rules required to carry, show a flare-up light or use any detonating signal that can not be mistaken for a distress signal.

NAVAL LIGHTS AND RECOGNITION SIGNALS.

ART. 13. Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal lights for two or more ships of war or for vessels sailing under convoy, or with the exhibition of recognition signals adopted by shipowners, which have been authorized by their respective Governments, and duly authorized and published.

STEAM VESSELS UNDER SAIL BY DAY.

ART. 14. A steam vessel proceeding under sail only, but having her funnel up, may carry in daytime, forward, where it can best be seen, one black ball or shape two feet in diameter.

III.—SOUND SIGNALS IN FOG, ETC.

PRELIMINARY.

ART. 15. All signals prescribed by this article for vessels under way shall be given:

1. By "steam-vessels" on the whistle or siren.
2. By "sailing-vessels" and "vessels towed" on the fog horn.

The words "prolonged blast" used in this article shall mean a blast of from four to six seconds' duration.

A steam-vessel shall be provided with an efficient whistle or siren, sounded by steam or by some substitute for steam, so placed that the sound may not be intercepted by any obstruction, and with an efficient fog horn; also with an efficient bell. A sailing-vessel of twenty tons gross tonnage or upward shall be provided with a similar fog horn and bell.

**Resolved*, That all coal boats, trading-boats, produce boats, canal boats, oyster boats, fishing boats, and other water craft navigating any bay, harbor, or river, propelled by hand power, horse power, sail, or by the current of the river, or which shall be moored in or near the channel or fairway of any bay, harbor, or river, shall carry one bright white light forward, not less than 6 feet above the rail or deck.

Rafts of one crib and not more than two in length shall carry one bright white light on a pole not less than twelve feet high; three or more cribs in length, shall carry one white light at each end of the raft at the same height. Boom rafts with cross binders towed ahead of steamers on the Mississippi and Ohio rivers, and other waters flowing into the Gulf of Mexico, and on the Red River of the North, shall carry a white light *twelve feet high* at the forward end of the raft, and one such light at each side midway between the forward and after end.

Rafts of more than one crib abreast shall carry one white light on each outside corner of the raft, making four lights in all. Bag or boom rafts navigating or anchored in the fairway of any bay, harbor, or river shall carry a white light at least twelve feet high at each end of the raft, and one of such lights on each side midway between the forward and after end.

Rowboats shall carry one white light two feet above the stem.

JAS. A. DUMONT,
Supervising Inspector General,
President Board of Supervising Inspectors.

Approved, February 16, 1891.

A. B. NETTLETON,
Acting Secretary.

In fog, mist, falling snow, or heavy rain-storms, whether by day or night, the signals described in this article shall be used as follows, namely:

STEAM VESSEL UNDER WAY.

(*a*) A steam-vessel under way shall sound, at intervals of not more than one minute, a prolonged blast.

SAIL VESSEL UNDER WAY.

(*c*) A sailing-vessel under way shall sound, at intervals of not more than one minute, when on the starboard tack, one blast; when on the port tack, two blasts in succession, and when with the wind abaft the beam, three blasts in succession.

VESSELS AT ANCHOR OR NOT UNDER WAY.

(*d*) A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.

VESSELS TOWING, ETC.

(*e*) A steam-vessel when towing shall, instead of the signals prescribed in subdivision (*a*) of this article, at intervals of not more than one minute, sound three blasts in succession, namely, one prolonged blast followed by two short blasts. A vessel towed may give this signal and she shall not give any other.

RAFTS OR OTHER WATER CRAFT.

(*f*) All rafts or other water craft, not herein provided for, navigating by hand power, horse power, or by the current of the river, shall sound a blast of the fog horn, or equivalent signal, at intervals of not more than one minute.

SPEED IN FOG.

ART. 16. Every vessel shall, in a fog, mist, falling snow, or heavy rain-storms, go at a moderate speed, having careful regard to the existing circumstances and conditions.

A steam-vessel hearing, apparently forward of her beam, the fog-signal of a vessel, the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

IV.—STEERING AND SAILING RULES.

PRELIMINARY.

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

SAILING VESSELS.

ART. 17. When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other as follows, namely:

(*a*) A vessel which is running free shall keep out of the way of a vessel which is closed-hauled.

(*b*) A vessel which is close-hauled on the port tack shall keep out of the way of a vessel which is close-hauled on the starboard tack.

(*c*) When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(*d*) When both are running free, with the wind on the same side, the vessel which is to the windward shall keep out of the way of the vessel which is to the leeward.

(*e*) A vessel which has the wind aft shall keep out of the way of the other vessel.

STEAM VESSELS.

ART. 18. RULE I. When steam-vessels are approaching each other head and head, that is, end on, or nearly so, it shall be the duty of each to pass on the port side of the other; and either vessel shall give, as a signal of her intention, one short and distinct blast of her

whistle, which the other vessel shall answer promptly by a similar blast of her whistle, and thereupon such vessels shall pass on the port side of each other. But if the courses of such vessels are so far on the starboard of each other as not to be considered as meeting head and head, either vessel shall immediately give two short and distinct blasts of her whistle, which the other vessel shall answer promptly by two similar blasts of her whistle, and they shall pass on the starboard side of each other.

The foregoing only applies to cases where vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own, and by night to cases in which each vessel is in such a position as to see both the side-lights of the other.

It does not apply by day to cases in which a vessel sees another ahead crossing her own course, or by night to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light or a green light without a red light is seen ahead, or where both green and red lights are seen anywhere but ahead.

RULE III. If, when steam-vessels are approaching each other, either vessel fails to understand the course or intention of the other, from any cause, the vessel so in doubt shall immediately signify the same by giving several short and rapid blasts, not less than four, of the steam-whistle.

RULE V. Whenever a steam-vessel is nearing a short bend or curve in the channel, where, from the height of the banks or other cause, a steam-vessel approaching from the opposite direction can not be seen for a distance of half a mile, such steam-vessel, when she shall have arrived within half a mile of such curve or bend, shall give a signal by one long blast of the steam-whistle, which signal shall be answered by a similar blast, given by any approaching steam-vessel that may be within hearing. Should such signal be so answered by a steam-vessel upon the further side of such bend, then the usual signals for meeting and passing shall immediately be given and answered; but, if the first alarm signal of such vessel be not answered, she is to consider the channel clear and govern herself accordingly.

When steam-vessels are moved from their docks or berths, and other boats are liable to pass from any direction toward them, they shall give the same signal as in the case of vessels meeting at a bend, but immediately after clearing the berths so as to be fully in sight they shall be governed by the steering and sailing rules.

RULE VIII. When steam-vessels are running in the same direction, and the vessel which is astern shall desire to pass on the right or starboard hand of the vessel ahead, she shall give one short blast of the steam-whistle, as a signal of such desire, and if the vessel ahead answers with one blast, she shall put her helm to port; or if she shall desire to pass on the left or port side of the vessel ahead, she shall give two short blasts of the steam-whistle as a signal of such desire, and if the vessel ahead answers with two blasts, shall put her helm to starboard; or if the vessel ahead does not think it safe for the vessel astern to attempt to pass at that point, she shall immediately signify the same by giving several short and rapid blasts of the steam-whistle, not less than four, and under no circumstances shall the vessel astern attempt to pass the vessel ahead until such time as they have reached a point where it can be safely done, when said vessel ahead shall signify her willingness by blowing the proper signals. The vessel ahead shall in no case attempt to cross the bow or crowd upon the course of the passing vessel.

RULE IX. The whistle signals provided in the rules under this article for steam-vessels meeting, passing, or overtaking, are never to be used except when steamers are in sight of each other, and the course and position of each can be determined in the daytime by a sight of the vessel itself, or by night by seeing its signal lights. In fog, mist, falling snow, or heavy rain-storms, when vessels can not so see each other, fog-signals only must be given.

TWO STEAM VESSELS CROSSING.

ART. 19. When two steam-vessels are crossing, so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

STEAM VESSEL SHALL KEEP OUT OF THE WAY OF SAILING VESSELS.

ART. 20. When a steam-vessel and a sailing-vessel are proceeding in such directions as to involve risk of collision, the steam-vessel shall keep out of the way of the sailing-vessel.

COURSE AND SPEED.

ART. 21. Where, by any of these rules, one of the two vessels is to keep out of the way, the other shall keep her course and speed.

CROSSING AHEAD.

ART. 22. Every vessel which is directed by the rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

STEAM VESSEL SHALL SLACKEN SPEED OR STOP.

ART. 23. Every steam-vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

OVERTAKING VESSELS.

ART. 24. Notwithstanding anything contained in these rules, every vessel overtaking any other shall keep out of the way of the overtaken vessel.

Every vessel coming up with another vessel from any direction more than two points abaft her beam, that is, in such a position with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's side-lights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

As by day the overtaking vessel can not always know with certainty whether she is forward of or abaft this direction from the other vessel she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

NARROW CHANNELS.

ART. 25. In narrow channels every steam-vessel shall, when it is safe and practicable, keep to that side of the fair-way or mid-channel which lies on the starboard side of such vessel.

RIGHTS OF WAY OF FISHING VESSELS.

ART. 26. Sailing-vessels under way shall keep out of the way of sailing-vessels or boats fishing with nets, or lines, or trawls. This rule shall not give to any vessel or boat engaged in fishing the right of obstructing a fair-way used by vessels other than fishing-vessels or boats.

GENERAL PRUDENTIAL RULE.

ART. 27. In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

SOUND SIGNALS FOR VESSELS IN SIGHT OF ONE ANOTHER.

ART. 28. When vessels are in sight of one another a steam-vessel under way whose engines are going at full speed astern shall indicate that fact by three short blasts on the whistle.

PRECAUTION.

ART. 29. Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

ART. 30. [See page 236.]

DISTRESS SIGNALS.

ART. 31. When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, namely:

In the daytime—

A continuous sounding with any fog-signal apparatus, or firing a gun.

At night—

First. Flames on the vessel, as from a burning tar barrel, oil barrel, and so forth.

Second. A continuous sounding with any fog-signal apparatus, or firing a gun.

ADDITIONAL RULES.

SEC. 2. That the supervising inspectors of steam-vessels and the Supervising Inspector-General shall establish such rules to be observed by steam-vessels in passing each other and as to the lights to be carried by ferry-boats and by barges and canal-boats when in tow of steam-vessels, not inconsistent with the provisions of this Act, as they from time to time may deem necessary for safety, which rules when approved by the Secretary of the Treasury, are hereby declared special rules duly made by local authority, as provided for in article thirty of chapter eight hundred and two of the laws of eighteen hundred and ninety. Two printed copies of such rules shall be furnished to such ferry-boats and steam-vessels, which rules shall be kept posted up in conspicuous places in such vessels.

PENALTY.

SEC. 3. That every pilot, engineer, mate, or master of any steam-vessel, and every master or mate of any barge or canal-boat, who neglects or refuses to observe the provisions of this Act, or the regulations established in pursuance of the preceding section, shall be liable to a penalty of fifty dollars, and for all damages sustained by any passenger in his person or baggage by such neglect or refusal: *Provided*, That nothing herein shall relieve any vessel, owner, or corporation from any liability incurred by reason of such neglect or refusal.

SEC. 4. That every vessel that shall be navigated without complying with the provisions of this Act shall be liable to a penalty of two hundred dollars, one-half to go to the informer, for which sum the vessel so navigated shall be liable, and may be seized and proceeded against by action in any district court of the United States having jurisdiction of the offense.

LINES ESTABLISHING HARBORS, RIVERS, AND INLAND WATERS OF THE UNITED STATES, WITHIN WHICH THE INLAND RULES APPLY.

(*Bearings are magnetic and given approximately.*)

San Diego Harbor: From Point Loma Lighthouse S. $\frac{7}{8}$ E. to San Diego Bay Outside Bar Whistling Buoy; thence NNE. $\frac{1}{8}$ E. to tower of Coronado Hotel.

San Francisco Harbor: From Point Bonita Lighthouse SE. $\frac{1}{8}$ S. to Point Lobos.

Columbia River Entrance: From Cape Disappointment Lighthouse SE. $\frac{1}{8}$ E. to Point Adams Lighthouse.

INDEX.

A.

	Page.
Abalone Point	93
Aberdeen, Town of	125
Adams Cove	52
Adams, Point	110, 117
Admiralty Head	130
Admiralty Inlet	133–136
Agate Passage	140
Agencies for sale of Coast and Geodetic Survey publications	7
Aids to Navigation	9
Ala Spit	149
Alameda, Town of	66
Alamos Anchorage	50
Alava, Cape	122
Albina, Town of	116
Albion, Post Village of	91
Albion River and Landing	91
Alcatraz Island	65
Alcatraz Landing	47
Alden Bank	161
Alder Creek	57
Alexander Island	121
Alki (Battery) Point	135, 142
Allen Island	158
Alseya Bay	107
Alseya Peak	107
Amesport, Town of	60
Anacapa Island	49–50
Anacapa Passage	49
Anacortes, Town of	161
Anchorages, *see* General Description and	10
Anderson Cliff	94
Angel Island	65
Angeles, Port, Juan de Fuca Strait	132
Angeles, Port, Town of	132
Anita Rock	73
Annas Bay	138
Año Nuevo, Point	36, 59
Appendix I	167–168
Appendix II	169–188
Appendix III	189
Appendix IV	191–199
Appendix V	201–215
Apple Cove Point	135
Arachne Reef	152
Arago, Cape	85, 106
Arcata, Village of	100
Arch Cape	110
Arch Cape Rock	110
Arch (Fin) Rock	105
Arch Rock, Point Grenville	119
Arena Cove	89
Arena, Point	76, 90
Arena Rock	76, 81, 90
Arguello, Point	32, 35, 47
Argyle Shoal	154
Argyle, Village of	154
Astoria, Town of	116
Avalon, Post-Office of	48
Avila, Town of	54
Aviadero, Point	66, 73

B.

Bainbridge Reef	141
Baker Bay	116
Balch Passage	145
Bald Islet	122
Bald Mountain, near Cape Meares	109
Bald Mountain (Pilot Knob), near Port Orford	105
Ballard, Town of	141
Ballast Point, Catalina Harbor	48
Ballast Point, San Diego Bay	38
Baltimore Rock	86
Bandon	111

B.

	Page.
Bar Rock	103
Bare (Penguin) Island	155
Bare Islet	153
Battery (Alki) Point	135, 142
Battle Rock	105
Bay Center, Village of	123
Beacon Reef	51
Bear Harbor Landing	94
Bearings and Distances, Table of	11–12
Becher Bay	51
Bee Rock	51
Beggs Rock	31, 49
Belle Island	164
Belle Rock	160
Bellingham and Padilla Bays	161–164
Bellingham Channel	161–163
Bells Mountain	93
Bells Point	93
Belvedere, Town of	66
Benicia, Town of	69
Bennet, Point	52
Berkley, Town of	66
Big Flat	94
Big Gulch	59
Big Lagoon	98
Big River	91
Big White Rock	94
Bihler Point Landing	89
Birch Bay	165
Bird Rock, Rosario Strait	158, 160
Bird Rock, Santa Catalina Island	48
Bishop Rock	39
Black Rock	160
Blacklock Point	106
Blaine, Town of	166
Blake Island	140, 141
Blakely Harbor	140
Blakely Rock	140
Blakely, Town of	140
Blanco, Cape	84, 106
Blanco Reef	85, 106
Blank Rock	97
Blind Bay	164
Blossom Rock	73
Blue Mountain	72
Blunt, Point	65, 74
Blunts Reef	77, 82, 95
Bodega Bay	88
Bodega Head	76, 80, 88
Bodega Rock	88
Bodelteh Islets	122
Boiling Reef	154
Bolinas Bay	63
Bolinas Lagoon	63
Bolinas Point	63
Bonita Channel	64, 72
Bonita Cove	64
Bonita, Point	63
Boundary Bay	165
Bowens Landing	89
Bowlder Reef	160
Breckenridge Bluff	125
Bremerton, Town of	140
Bridgeport Landing	90
Brockway Point	51
Brothers, The	66, 74
Brown Island	154
Brown, Point, Grays Harbor	119
Brown Point, Puget Sound	136
Brown Rock	83, 99
Bruhels Point	93
Buchon, Mount	32, 35, 54
Buchon, Point	54

B.

	Page.
Buckeye Shoal	160
Bucksport, Village of	100
Budd Inlet	146
Buoyage, system adopted in United States waters	5
Burrows Bay	158
Burrows Island	158

C.

Cabrillo, Point	92
Cahto Mountain	93
Cake Island	121
California:	
Harbor Control	169–170
Pilotage	169
Port Wardens	170
Quarantine	170
Camano Head	147
Camano Island	147
Cambria Rock	56
Can Rock	52
Cañada Honda	52
Canoe Island	164
Capitola, Village of	61
Cardwell Point	51
Carmel Bay	58
Carmel Cove	58
Carmel, Mount (Boulder Peak)	58
Carmel, Point	58
Carpenteria Landing	46
Carrington Point	50
Carrol Islet	122
Carrs Inlet	144
Carter Point	163
Cascade Head	108
Case Inlet	145
Cases Shoal	139
Casper Anchorage	92
Castle Rock, Cape Blanco	106
Castle Rock, Point Colville	158
Castle Rock, Point St. George	83, 99
Castle Rock, San Miguel Island	52
Castro Rocks	65
Catalina Harbor	48
Cattle Point	153, 154
Cayucos Landing	56
Cayucos Point	55
Center Reef	151
Centissima Rock	64, 72
Channels, *see* General Description.	
Charleston	140
Chart:	
Cape Mendocino to and including Juan de Fuca Strait,	Faces page 77
San Diego to Cape Mendocino	Faces page 9
Charts, agencies for sale of	7
Chehalis River	125
Chetko Cove	84, 103
Chimikin Creek	137
Chinese Harbor	50
Chuckanut Bay	162
City of Seattle Rock	161, 162
Clallam Bay	131
Clements Reef	161
Cleone (Laguna) Landing	93
Cliff House	62, 72
Cluster Cone	94
Coal Oil Point	46
Coast, Description of:	
Cape Blanco to Columbia River	106–111
Cape Mendocino to Point St. George	96–100
Columbia River to Juan de Fuca Strait	119–123
Point Arena to Cape Mendocino	90–96
Point Arguello to Point Buchon	52–54
Point Buchon to Point Sur	55–58
Point Hueneme to Point Arguello	45–47
Point Loma to Point Vincente	40–41
Point Reyes to Point Arena	87–90
Point St. George to Cape Blanco	102–106
Point Sur to Point San Pedro	58–60
Point Vincente to Point Hueneme	44–45

C.

	Page.
Coast and Geodetic Survey Suboffice	67
Colby Reef	81
Columbia River:	
Description of	116–118
General Directions in Approaching	118
Harbor Control	180–181
Pilotage	178–179
Quarantine	181–182
Colville Island	159
Colville, Point	158
Colvos Passage	144
Colvos Rocks	137
Commencement Bay	143–144
Commission Rock	69
Communication, *see* General Description and	10
Conception, Point	32, 34, 47
Cone Islands	163
Cone Peak	32, 36, 57
Cone Rock, near Cape Blanco	84, 102
Cone Rock, near Trinidad Head	98
Conical Rock	82, 95
Conical White Rock	105
Constantine Rock	56
Constitution, Mount	155
Cooper Reef	152
Coos Bay	111
Coos Head	107
Coos River	112
Copalis Head	119
Coquille Point	106
Coquille River	111
Coquille Rock	85
Coquille, Town of	111
Cordell Bank	70
Cormorant Passage	145
Coronado, Town of	37
Coronado Islands	37
Corral Harbor	49
Cortes Bank	39
Cosmopolis, Village of	125
Costa, Port	69
Cottaneva Rock	93
Coupeville, Village of	148
Couskie Creek	95
Coveland, Village of	148
Cowlitz Bay	155
Cowlitz River	116
Cow Point Bar	125
Cox Rock	107
Coxcomb Hill	117
Coxo Anchorage	47
Crescent City Cove	83
Crescent City Lighthouse	99
Crescent City, Town of	99
Crescent Harbor	148
Crescent, Port	131
Crescent Reef	131
Crook Point, San Miguel Island	52
Crooks Point, Oregon	104
Cuffeys Cove	90
Currents:	
California, Oregon, Washington	11
Columbia River	118
Grays Harbor	126
Hood Canal	139
Humboldt Bay	101
Juan de Fuca Strait	128–129
President Channel	157
Richs Passage	141
San Diego Bay	38
San Francisco Bay	67
San Juan and President Channels	156
San Pedro Bay	43
Tillamook Bay	115
Washington Sound	150
Willapa Bay	124
Cuylers Harbor	52
Cypress Island	158
Cypress, Point	59
Cypress Reef	160
Cypress Rock	59

D.

	Page.
Dabop Bay	138
Daby Island	100
Dakin Cove	48
Dallas Bank	130, 133
Dallas, Mount	153
Dana Passage	145
Danger Rock	155
Danger Shoal	150
Davidson Rock	159
Day Island Anchorage	144
Deadmans Island	41
Decatur Reef	140, 141
Deception Island	149
Deception Pass	149
Deer Harbor	164
Delgada, Point	81, 94
Dennis Shoal	158, 160
Destruction Island	120
Devils Gate Rock	77, 95
Diablo, Point	64
Dinner Island	154
Disappointment, Cape	110
Discovery, Port	133
Disney, Point	155
Dot Island	161
Double Arch Rock	108
Double Bluff	135
Double Cone Rocks	94
Double Headed Rock	109
Double Island	164
Double Point	63
Double Rock, near Point Gorda	95
Double Rock, Rogue River Reef	104
Doughty, Point	157
Dragon Channel	82, 100
Drakes Bay	62
Drayton Harbor	166
Drayton Passage	145
Dumbarton (Potrero) Point	66, 73
Dume Cove	45
Dume, Point	34, 45
Duncan Rock	79, 87, 123
Dungeness, Post Office of	132
Duntze Rock	79, 87, 123
Duxbury Point	63
Duxbury Reef	63, 72
Duwamish Head	135, 142

E.

Eagle Harbor	139–140
Eagle Island	145
Eagle Island Shoal	145
East Clallam	131
East Point, Santa Rosa Island	50
East Portland	116
East Rock, St. George Reef	100
East Sound	165
Ediz Hook	132
Eel River	96
Eld Inlet	146
Eliza Island	162, 164
Elizabeth, Cape	119
Ellensburg, Town of	104
Ellice Point	117
Elliott Bay	141–143
Emeryville, Town of	66
Empire, Town of	112
Espada, The	32, 35, 47
Esteros Bay	55
Esteros Point	55
Eureka, Town of	100
Everett, Town of	148

F.

Fairhaven, Town of	162
Falcon, Cape	110
Falcon Rock	110
False Cape Rock	77, 83, 95, 96
False Klamath Rock	83, 99
False Point, see Point La Jolla	40
False Sur	32, 36, 57
Fanny Shoal	62

F.

	Page.
Farallones	62
Father and Son	122
Fauntleroy Rock	77
Fawn Island	164
Fermin, Point	41
Ferrelo, Cape	103
Fidalgo Bay	161
Fields Landing	101
Fin (Arch) Rock	105
Fish Rock Landing (Havens Anchorage)	89
Fish Rocks	89
Fisherman Bay	154
Fisherman Harbor	48
Fisk Mill Cove	88
Five Mile Point	106
Flat Rock, Cape Elizabeth	120
Flat Rock, St. George Reef	100
Flat Rock, Trinidad Harbor	97
Flattery, Cape	87, 123
Flattery Rocks	122
Flattop Island	155, 157
Flint Rock Head	98
Florence, Town of	114
Fog:	
California, Oregon, Washington	11
Juan de Fuca Strait	128
San Diego Bay	38
San Pedro Bay	42
Forbes Point	148
Forney Cove	50
Fort Bragg Landing	92
Fort Bragg, Post Office of	93
Fort Point	64
Fort Point Ledge	65, 71
Fort Ross Cove	80, 88
Fort Ross Reef (Pinnacle Rocks)	88
Fortunas (False), Cape	77, 83, 96
Foulweather Bluff	135, 139
Foulweather, Cape	108
Four Fathom Bank	63
Fox Rock	105
Frances, Point	162, 164
Frankfort Landing	104
Freeman Island	157
Freshwater Bay	132
Friday Harbor	154
Friday Harbor, Post Office of	155
Fuca Pillar	123

G.

Gamble, Port	138
Gammon Shoal	40
Gardiner	113
Garibaldi	115
Gaviota Landing	46
Gaviota Pass	46
Gedney Island	148
General Description:	
Admiralty Inlet	133–134
Bellingham and Padilla Bays	161–162
Blakely Harbor	140
Coast:	
Cape Blanco to Columbia River	106–111
Cape Mendocino to Point St. George	96–100
Columbia River to Juan de Fuca Strait	119–123
Point Arena to Cape Mendocino	90–96
Point Arguello to Point Buchon	52–54
Point Buchon to Point Sur	55–58
Point Hueneme to Point Arguello	45–47
Point Loma to Point Vincenta	40–41
Point Reyes to Point Arena	87–90
Point St. George to Cape Blanco	102–106
Point Sur to Point San Pedro	58–60
Point Vincente to Point Hueneme	44–45
Columbia River	116–118
Colvos Passage	144
Commencement Bay, Tacoma Harbor	143–144
Coos Bay	111–113
Coquille River	111
Eagle Harbor	139–140
Elliott Bay (Seattle Harbor)	141–142
Grays Harbor	125–126

G.

Page.

General Description—Continued.
- Haro Strait 150–151
- Hood Canal 138–139
- Humboldt Bay 100–101
- Juan de Fuca Strait 127
- Karquinez Strait 69
- Ludlow, Port 137–138
- Madison, Port 139
- Orchard, Port 140–141
- Possession Sound and Tributaries 147–149
- Puget Sound 133–134
- Puget Sound, south of Tacoma 144–147
- Quartermaster Harbor 144
- Rosario Strait 158
- San Diego Bay 37–38
- San Francisco Bay and Approaches 61–69
- San Juan and President Channels 154–155
- San Luis Obispo Bay 54
- San Pablo Bay 68–69
- San Pedro Bay and Harbor 41–43
- Seattle Harbor, Elliott Bay 141–142
- Shilshole Bay 141
- Siuslaw River 114
- Suisun Bay 69
- Tacoma Harbor, Commencement Bay 143–144
- Tillamook Bay 115
- Townsend, Port 136–137
- Umpqua River 113–114
- Washington Sound 149–150
- Washington Sound, minor passages 164–165
- Willapa Bay 123–124

General Directions, *see* Sailing Directions.

General Remarks:
- Approaching Coos Bay 113
- Approaching and Entering Juan de Fuca Strait 127
- Approaching and Sailing along the Coast 30
- Approaching San Diego Bay 38–39
- Approaching San Francisco Bay 69–70
- California, Oregon, Washington 9–11

Gerstle Cove 88
Gettysburg Landing 131
Giants Graveyard 121
Goat Island, Northern California 84, 103
Goat Island, San Francisco Bay 65
Gold Bluffs 98
Golden Gate 64–65
Goleta Landing 46
Goleta Point 46
Gorda, Point, Northern California 77, 95
Gorda, Point, Southern California 46
Gorda Rock 77, 82, 95
Gordons Hill 93
Gooch Island 152
Goose Island 154, 157
Grayback, Mount 78
Grays Harbor 125–126
Great Break, Blunts Reef 77, 82, 96
Great Break, St. George Reef 100
Green Hill 115
Green Point 157
Green Rock 98
Greenwood Landing 90
Grenville, Point 119
Griffin Bay 154
Guano Island 73
Guano Rock 112
Guemes Channel 161–162
Gull Island 50
Gull Rock, Cape Blanco 106
Gull Rock, near Russian River 88
Gull Rock, San Juan Channel 155

H.

Hackney Island 148
Hadlock Port 136
Hale Passage, Washington Sound 161, 163
Hales Passage, Puget Sound 144
Half Moon Bay 60
Halibut (Low) Island 152
Hammersley Inlet 146
Hammond, Point 155, 157
Hand Rock 122
Hansen, Point 110

H.

Page.

Harbor Control:
- California 169–170
  - Humboldt Bay 178
  - San Diego 171
  - San Francisco Bay 173–176
- Oregon 180
  - Port of Portland 180–181
- Washington 183
  - Port Townsend 185–186
  - Seattle Harbor 186–187
  - Tacoma Harbor 187–188

Harbor Reefs 48
Harbor Rock, West Sound 164
Hardy Creek Landing 94
Harford, Port 54
Harlech Castle Rock 57
Harney Channel 164
Haro Strait 150–154
Harris Point 51
Hat Island 161
Havens Neck 89
Haynes Slough 112
Haystack 109
Hearst Shoal 62, 71
Hecate Bank 79
Hecate Head 107
Hein Bank 153
Henderson Inlet 145
Henry Island 150
Herron Island 145
Herron Point 141
High Bluff 98
Hoar, Mount 46
Hobsonville, Town of 115
Hoh Head 120
Hoh River 120
Holmes Harbor 148
Hood Canal 138–139
Hood Head 138–139
Hookton, Village of 100
Hoopah, Mount 78, 97
Hope Island 149
Hoquiam 125
Hoquiam River 125
Horseshoe Point 89
Hospital Cove 65
Howell Rock 55
Huckleberry Island 161
Hudson, Point 136
Hueneme Landing 45
Hueneme, Point 32, 34, 45
Hug Cape 110
Humboldt Bay:
- Description of 100–101
- General Directions on Approaching 101–102
- Harbor Control 178
- Pilotage 177

Humbug Mountain 85, 105
Hump Rock 100
Hunter Cove 104
Hunter Creek 104
Hunter Rock 102
Huntington Rock 121
Hydrographic Office, Branch of 67, 136

I.

Ilwaco, Village of 116
Indian Island 100
Invincible Rock 74
Irondale 136
Island Knob 93
Island Rock 85, 105
Islands off the coast of Southern California 47–52
Isthmus Cove 48
Itsami Shoal 145

J.

Jagged Islet 122
James Island 121
Johns Island 151
Johns Pass 151
Johnson, Cape 121
Johnsons Lee 51

J.

	Page.
Jonathan Rock	100
Jones Island	155, 157
Juan de Fuca Strait	127–130
Juan de Fuca Strait and Tributaries	126–133
Judge Rock	52

K.

Kaluna Cliff	94
Karquines Strait	69, 75
Kellers Shelter	45
Kellet Bluff	152
Kellet Ledge	160
Kelp	9
Kelp Reefs	152
Kilisut Harbor	136
Kincheloe Point	115
King Peak	77, 94
Kismet, Mount	78, 97
Kiwanda, Cape	109
Klamath River	98
Klas Rock	137
Klooqueh Rock	85, 105
Knox, Point	65

L.

La Conner, Town of	149
La Cruz Rock	57
Laguna Point, near Point Hueneme	45
Laguna Point, Northern California	93
La Jolla, Point	40
Langley Point	158
Lapush, Indian Village	121
Large Brown Rock	106
Las Pitas, Point	45
Lasuen Point	41
Lawson Reef, Juan de Fuca Strait	159
Lawson Rock, Thatcher Pass	165
Lead, The	30
Leadbetter, Point	119
Leaning Rock	103
Lewis River	116
Life-Saving Stations, Table of	13
Lighthouse Districts	16–17
Lighthouses and Fog Signals, Table of	16–29
Lime Point	64
Limestone Point	157
Lines within which the Inland Rules of the Road apply	215
Lion Rock	54
Little Head	97
Little River	91
Little River Rock	97
Little Sur River	58
Little Trinidad River	97
Lobos, Point	62
Lobos Rocks	58
Loma, Point	38
Lompoc Landing	53
Lone Rock	53
Long Brown Rock	106
Long Island	154
Long Rock, St. George Reef	100
Lookout, Cape	86, 109
Lookout Hill	34, 46
Lookout Rock	104
Lopez Pass	165
Lopez Point	36, 57
Lopez Rock	36, 57
Lopez Sound	165
Lopez, Village of	154
Los Angeles, Port, Cal	44
Ludlow, Port	137–138
Lummi Island	160
Lummi Mountain	163
Lummi Point	162, 164
Lummi Rocks	163
Lydia Shoal	160

M.

Mack Arch	103
Mack Arch Cove	103
Mack Arch Reef	103
Mad River	97
Madison, Port	139

M.

	Page.
Main Ship Channel, San Francisco Entrance	64, 71
Malaga Cove	44
Mal Pass	90
Mansfield Bank	100
Map:	
Index for Charts	Faces page 7
Magnetic Ranges, San Francisco Bay and Harbor	Faces page 167
Mare Island	68
Mare Island Strait	68
Marin Islands	65, 74
Marine Hospital	10
Marine-Hospital Service Regulations	191–196
Marine Reporting Stations	13
Marrowstone Point	136, 137
Marshfield, Town of	112
Martinez, Town of	69
Marys Peak	108
Mattole River	95
Maylor Split	148
McKenzies Head	111
McNears Landing	68
Meares, Cape	109
Mendocino Bay	91
Mendocino, Cape	77, 95, 96
Mendocino, Post Village of	91
Mid-channel Bank	136
Middle Ground Shoal	40
Middle Point, Juan de Fuca Strait	130
Middle Point, near Point Mugu	45
Middle Point, Richs Passage	141
Middle Rock	52
Middle Rock, Hoh River	120
Midway Cliff	110
Midway Point	99
Mile Rocks	64
Millers House	103
Minor Islet	153
Montara Mountain	33, 60, 62
Montara, Point	33, 37, 60
Monterey Bay	60–61
Monterey Harbor	60
Moresby Island	152
Mores Landing, see Goleta Landing	46
Morro Bay	55
Morro, Post Village of	55
Morro Rock	36, 55
Morse Island	150
Moss Landing	61
Mouse Rock	56
Mowatt Reef	155
Muckilteo	148
Mugu, Point	45
Mukkaw Bay	122
Mussel Point	98
Mussel Rock	100

N.

Nahcotta, Village of	123
Napa Creek	68
Narrows, Puget Sound	144
Nasal River	123
National City	37
National Quarantines	196–199
Navarro Head	91
Navarro Landing	91
Neah Bay	130–131
Neah-kah-nie Mountain	110
Neah, Post Office	131
Needle (Sail Rock) Point	59
Needle Rock Landing	94
Needle Rock, Rogue River Reef	104
Nehalem River	109
Nemotolipse River	119
Nestugga River	108
Netarts Bay	109
Netarts, Post Village of	109
New Dungeness Bay	132
Newhall, Post Village of	165
Newhaven Landing	90
Newport Bay	41
Newport Beach, Post Office of	41
Newport Landing	41
Newport, Yaquina Bay	115

N.

	Page.
Nisqually Reach	145
Noonday Rock	62
North Bay, Grays Harbor	125
North Bay, San Juan Channel	154
North Bend	112
North Head	111
North Passage	164
North River	123
North Rock, near Hoh Head	120
North Rock, near Rogue River	84, 104
North Slough	112
Northwest Anchorage	51
Northwest (Clemente) Harbor	47
Northwest Rocks	104
Northwest Seal Rock	78, 100
North Whaler Island	53
Noyo Anchorage	92
Noyo, Post Village of	92
Noyo River	92

O.

Oak Harbor	148
Oakland, City of	66
Obstruction Island	165
Obstruction Passes	165
Oceanside, Town of	40
Ocosta, Town of	125
Off Trinidad Rock	97
Old Tacoma	143
Olympia Harbor	146
Olympia Shoal	146
Olympia, Town of	146
Orcas Knob	153, 155
Orcas, Village of	164
Orchard, Port	140–141
Orchard Rocks	141
Oregon:	
Harbor Control	180
Pilotage	178–180
Quarantines	181–182
Orford, Port	105
Orford Reef	78, 84, 85, 105
Ork Reef	113
Oro Bay	145
Osborn Bank	31
Otter Rock	108
Ozette Indian Village	122
Ozette Island	122

P.

Padilla Bay	161
Parks Harbor	155
Partridge Bank	130, 152
Partridge Point	130, 152
Patos Island	153
Peapod Rocks	160
Peavine Pass	165
Pecho House	55
Pecho Rock	53
Pedernales, Point	47
Peel Passage	146
Pender Island	153
Penn Cove	148
Perkins Reef	120
Perpetua, Cape	107
Petaluma Creek	68
Pfeiffer Point	36, 57
Pico Blanco (Sur Peak)	58
Pico Rock	56
Pickering Passage	147
Piedras Blancas, Point	36, 56
Pigeon Point	37, 59
Pillar Point, Cal	59
Pillar Point, Juan de Fuca Strait	131
Pillar Rock, Morro Bay	55
Pilot Rock	97
Pilotage:	
California	169
Humboldt Bay	177
San Diego Bay	170–171
San Francisco Bay	172–173
San Pedro Bay	171–172

P.

	Page.
Pilotage—Continued.	
Oregon	178–180
Columbia River	178–179
Umpqua River	179–180
Washington	182–183
Juan de Fuca Strait and Puget Sound	182–183
Pilots:	
California, Oregon, Washington	Appendix II, 10
Juan de Fuca Strait and Tributaries	127
See also General Description.	
Pin Rock	48
Pine Hill	40
Pinnacle Rocks	80
Pinole Point	68
Pinole Shoal	75
Pinos, Point	36, 59
Pitt Passage	145
Point of Arches	122
Pole Passage	164
Polnell, Point	148
Portage Head	122
Porter, Village of	112
Portland, City of	116
Port Orford Head	105
Portuguese Bend	41
Possession Point	135
Possession Sound and Tributaries	147–149
Potato Patch	63
Pratts Cliff	120
President Channel	155
Presidio Shoal	73
Preston Peak	78
Prevost Harbor	151
Prince Island, Northern California	84, 102
Prince Island, San Miguel Island	51
Prisoner Rock	97
Prisoners Harbor	50
Prominent Features, *see* General Description.	
Promontory Rock	78
Protection Island	133
Puget Navy Yard	140
Puget Sound	133–136
Puget Sound, southward of Tacoma	144–147
Pully Point	135
Purissima, Point	35, 53
Pyramid (Smugglers) Cove	47
Pyramid Head	47
Pyramid Point	102
Pyramid Rock, Cape Blanco	85, 106
Pyramid Rock, Rogue River Reef	104
Pysht River	131

Q.

Quarantine	Appendices II and IV, 10
Quarantine Laws and Regulations:	
California	170
San Diego Bay	38
San Francisco Bay	67, 176–177
Oregon	181–182
United States	196–199
Washington	183–185
Quarry Point	65, 74
Quartermaster Harbor	144
Queets River	120
Queniult Indian Reservation	119
Queniult River	119
Quillayute Needle	121
Quillayute River	121

R.

Race Rocks	127
Raccoon Strait	74
Raft Rock	120
Ragged Point	57
Ravenswood Point	73
Red Bluff	90, 96, 101
Red Rock	65, 74
Redding Rock	83, 98
Reddish Rocks	85, 105
Redondo Beach	44
Redwood City Creek	73
Reef Point	160

R.

	Page.
Reid Harbor	151
Reid Rock	154, 157
Remarks, *see* General Remarks.	
Repairs, *see* General Description and	10
Restoration Point	140
Reyes, Point	62, 76
Reynolds Rock	95
Richardson Bay	66
Richardson Landing	133
Richardson, Post Office of	133
Richardson Rock	31, 52
Richmond, Point	65
Richs Passage	140
Ridge (Bare) Island	152
Rincon Point	46
Roberts, Point	153, 165
Robinson, Point	136
Robinson (Walalla) Reef	80, 89
Roche Harbor	150
Rock Island	160
Rockport Landing	94
Rocky Point, Holmes Harbor	148
Rocky Point, near Trinidad Head	78, 83, 98
Rocky Point, Point Arguello	47
Rocky Point, San Francisco Entrance	63
Rocky Point, Santa Monica Bay	44
Rocky Prairie	103
Rodes Reef	51
Rodgers Break	82, 95
Rogue River	104
Rogue River Reef	78, 84, 104
Rosario Strait	158–161
Rosedale Rock	130
Round Rock	99
Rounded Islet	121
Royal Roads	127
Rules of the Road:	
Inland	208–215
International	201–208
Russian River	88
Russian River Reef	76

S.

	Page.
Sacramento River	69
Saddlebag Island	161
Saddle Mountain	79, 110
Saddle Peak	32
Sail (Pillar) Rock, Half Moon Bay	59
Sail Rock, near Point Arena	89
Sailing Directions:	
Admiralty Inlet and Puget Sound	134–136
Bellingham Bay	162–164
Bellingham Channel	163
Columbia River Entrance, Approaching	118
Elliott Bay (Seattle Harbor)	142–143
General Remarks on approaching and sailing along the coast	30
Grays Harbor, Approaching	126
Guemes Channel	162
Halo Passage	163
Haro Strait	151–154
Humboldt Bay Entrance, Approaching	101
Inshore, Point Loma to San Francisco	33–37
Inshore, Point Reyes to Cape Flattery	79–87
Juan de Fuca Strait	129–130
Outside, San Diego to San Francisco	31–33
Outside, Point Reyes to Cape Flattery	76–79
Port Ludlow	138
Port Orchard	141
Port Townsend	137
Possession Sound and Tributaries	149
Puget Sound, Admiralty Inlet and	134–136
Puget Sound, southward of Tacoma	147
Rosario Strait	158–161
San Diego Bay	39–40
San Francisco Bay and Approaches	70–75
San Juan and President Channels	155–158
San Luis Obispo Bay	54–55
San Pedro Bay and Harbor	43–44
Seattle Harbor (Elliott Bay)	142–143
Willapa Bay, Approaching	124
Sal, Point	35, 53
Salinas River, Valley of	33
Salmon Bank	153, 154
Salmon Bay	141
Salmon Cone	57
Salmon Point	91
Salt Point	88
Samish Bay	162
Samoa, Town of	100
San Antonio (Oakland) Creek	66
San Bruno, Point	66, 73
San Clemente Island	47
San de Fuca, Town of	148
San Diego Bay:	
Description of	37–38
Harbor Control	171
Pilotage	170–171
Sailing Directions	38–40
San Diego, Town of	37
San Francisco Bar	63–64
San Francisco Bay:	
Anchorage Regulations	173, 174
Approaches to	61–65
Description of	65–69
Harbor Control	173–176
Magnetic Ranges	167–168
Pilotage	172–173
Quarantine	176–177
Rates of Dockage	175–176
Sailing Directions	69–75
San Francisco, City of	66
San Joaquin River	69
San Juan Island	150
San Juan Point	41
San Juan and President Channels	154–158
San Luis Hill	54
San Luis Obispo Bay and Port Harford Landing	54–55
San Luis Obispo, Town of	54
San Luis, Point	35, 53
San Martin, Cape	36, 57
San Martin Rocks	36, 57
San Mateo Point, Southern California	40
San Mateo, Point, San Francisco Bay	66, 73
San Miguel Island	51–52
San Miguel Passage	49
San Nicolas Island	31, 49
San Pablo Bay	68–69, 74–75
San Pablo, Point	66, 74
San Pedro Bay and Harbor:	
Description of	41–43
Pilotage	171–172
Sailing Directions	43–44
San Pedro Hill	41
San Pedro, Point, outside coast	37, 60, 62
San Pedro, Point, San Pablo Bay	66, 74
San Pedro, Town of	42
San Quentin, Point	65, 74
San Simeon Bay	56
San Simeon Point	56
Sand Hill Bluff	59
Sand Island	116
Sand Point	46
Sand Point Anchorage	51
Sandy Point, Santa Rosa Island	51
Sandy Point, Saratoga Passage	148
Santa Barbara Island	31, 48–49
Santa Barbara Islands	49
Santa Barbara Point	34, 46
Santa Barbara, Town of	46
Santa Catalina Island	31, 48
Santa Cruz Channel	49
Santa Cruz Harbor	61
Santa Cruz Island	50
Santa Cruz, Point	59
Santa Cruz, Post Village of	61
Santa Lucia Mountain	32, 57
Santa Monica Bay	44
Santa Rosa Island	50–51
Santa Rosa Reef	53
Saratoga Passage	148
Saturna Island	153
Saunders Reef	76, 80, 89
Sauquel Cove	61
Sausalito	66
Scarboro Hill	117

S.

	Page.
Scatchet Head	135
Seabeck, Town of	138
Seacoast Telegraph Stations	12
Sea Lion Rock, near Cape Elizabeth	120
Sea Lion Rock, near Point Gorda	95
Seal Rock, Alsea River	86, 107
Seal Rock, Orford Reef	106
Seal Rock, Point Sal	35, 53
Seal Rocks, Point Lobos	62
Sears Rock	64, 72
Seattle, City of	142
Seattle Harbor:	
Description of	141–142
Harbor Regulations	186–187
Sailing Directions	142–143
Sebastian, Cape	104
Selby Smelting Works	68
Semiahmoo Bay	165–166
Semiahmoo, Village of	166
Sentinel Island	151
Sentinel Rock	151
Serena, Post Office of	46
Shag Rock, East Sound	165
Shag Rock, San Francisco Bay	73
Shannon Point	161
Shark Reef	157
Sharp Point	98
Sharp Island	164
Shelter Cove	81, 94
Shilshole Bay	141
Shoalwater, Cape	119
Sierra Nevada, Point	57
Sierra Point	66
Siletz River	108
Sinclair Island	160
Sisters, Hood Canal	139
Sisters Rocks, near Rogue River	99, 104
Sisters, The, San Pablo Bay	74
Siuslaw River	114
Skagit Bay	149
Skipjack Island	153, 155
Skunk (Channel) Point	50
Slay Rock	51
Slip Point	131
Smith Cove	142
Smith Island	152
Smith Point	117
Smoke	11
Smugglers Cove, Santa Cruz Island	50
Snake Rock	137
Snakeland (Watsak) Point	148
Soberanes Point	58
Sonora Reef	87, 119
South Bay, Golden Gate	64
South Bay, Grays Harbor	125
South Bend, Town of	123
South Channel, San Francisco Entrance	54, 71
South Cove	106
South Point, Santa Rosa Island	51
South Slough	112
South Vallejo, Town of	68
Southeast Anchorage	51
Southeast Black Rock	105
Southeast Reef	59
Southampton Shoal	74
Southport, Village of	100
Southwest Seal Rock	100
Souza Rock	53, 55
Sow and Pigs	115
Spieden Island	151
Spike (Sail) Rock	122
Split Rock, California	98
Split Rock, Washington	120
Spring Passage	155
Squamish Harbor	139
Square White Rock	106
Squaxin Passage	146
Star (Four Mile) Rock	100
Starr Rock	168
Steamboat Rock, Cape Mendocino	77, 95
Steamboat Rock, Orford Reef	105
Stellacoom, Town of	145

S.

	Page.
Stewarts Point Landing (Fisherman Bay)	89
St. George Channel	82, 99
St. George, Point	78, 99
St. George Reef	78, 83, 100
St. Helens, Mount	117
Stillwell Point	91
Stone Lagoon	98
Storm Warning Displays:	
Explanation of	189
List of Stations	12
Strawberry Island	160
Stuart Island	151
Sucia Island	153
Sugar Loaf Rock	77, 95
Suisun Bay	69
Summerland, Village of	46
Supplies, *see* General Description and	10
Sur, Point	32, 36, 57
Sur Rock	57
Susan, Port	148
Swamish Slough	147, 149
Sydney, Town of	140

T.

Table Bluff	83, 96, 101
Table Mountain	37
Table of:	
Bearings and distances	11–12
Life-Saving Stations	13
Lighthouses and Fog Signals	16–29
Marine Reporting Stations	13
Seacoast Telegraph Stations	12
Storm Warning Display Stations	12
Tides	14–15
Variation of the Compass	13
Table Rock	105
Tacoma, City of	143
Tacoma Harbor:	
Description of	143–144
Harbor Regulations	187–188
Tala Point	137
Talcott Shoal	51
Tamalpais, Mount	62
Tanner Bank	39
Tatoosh Island	87, 123
Teawhit Head	121
Ten Foot Rock	55
Ten Mile Creek	107
Tennessee Point	72
Thatcher Pass	165
Three Arch Rocks	86, 109
Three Peaks	94
Three Sisters	106
Tiburon, Town of	66
Tichenor Rock	105
Tidal Currents, *see* Currents.	
Tide Indicator, San Francisco Bay	67
Tide Plane, reference	5
Tide Rock	57
Tides, General Table	14–15
Tillamook Bay	115
Tillamook Head	110
Tillamook Rock	110
Tillamook, Town of	115
Timber Cove	88
Time Ball:	
San Francisco	67
Mare Island Navy Yard	68
Titusi Bay	145
Tokeland	123
Toleak Point	121
Toliva Shoal	144
Tolo Bank	94
Tomales Bay	88
Tomales Point	87
Tongue Point, Columbia River	117
Tongue Point, Port Crescent	191
Toscup, Mount	76, 98
Totten Inlet	146
Towboats, *see* General Description and	10
Tower Rock	106
Townsend, Port	136

T.

Page.
Townsend, Port:
Description of 136–137
Harbor Regulations 185–186
Sailing Directions 137
Town of 136
Tranquillon Mountain 32, 35, 47
Trial Island 151
Trinidad Harbor 97
Trinidad Head 78, 97
Trinidad, Post Village of 97
Trinity Mountain 78, 97
Tulalip Bay 148
Tumbo Reef 154
Tuppers Rock 111
Turn Island 154
Turn Rock 154, 157
Turtle Rocks 98
Twin Peak 36, 57
Tyler Bight 52
Tzues Indian Village 122

U.

Umatilla Reef 79, 87, 122
Umpqua River:
Description of 113–114
Pilotage 179–180
Union, Town of 138
Upright Channel 156, 164
U. S. Life-Saving Stations 13
U. S. Navy Yard, Mare Island 68
U. S. Navy Yard, Port Orchard 140
U. S. Public Health and Marine-Hospital Service 10
Regulations 191–196
Usal Landing 94
Usal Rock 94
Usal Valley 94

V.

Vallejo, Town of 68
Vancouver, Town of 116
Variation of the Compass 13
Vendovi Island 162
Ventura Landing 45
Ventura Rocks 58
Villa Canyon 57
Vincente, Point 41
Vizcaino, Cape 93

W.

Waaddah Island 131
Waatch Indian Village 123
Waatch Point 123
Waatch Slough 122
Walalla Point Island 89
Walalla River 89
Waldron Island 153, 155
Washington:
Pilotage, Juan de Fuca Strait and Puget Sound 182–183
Harbor Control 183
Quarantine 183–185
Washington Harbor 133
Washington Sound 149–165
Washington Sound, Minor Passages 164–165

W.

Page.
Wasp Passage 164
Watmough Head 158
Weather 10
West Bank 158
West Clallam, Village of 131
West Point 135, 142
West Seattle, Town of 142
West Sound 164
Westcott Shoal 52
Westdahl Rock 53
Westport, Grays Harbor 125
Westport Landing, Cal 93
Whaler Island, Crescent City 99
Whaler Island, San Luis Obispo Bay 35, 53
Whaler Rock 58
Whalers Knoll 58
Whales Head 103
Whatcom, Town of 162
White Cove 48
White Rock, Haro Strait 155, 157
White Rock, near Cape Alava 122
White Rock, near High Bluff 98
White Rock, near Point Esteros 56
White Rock, near Trinidad Head 98
White Rock, Point St. George 83
White Rock, Rosario Strait 160
White Rock, Santa Catalina Island 48
White Rocks, Juan de Fuca Strait 154
Whitesboro Landing 91
Whiting Rock 74
Whollochet Bay 144
Willamette River 116
Willapa Bay 123–124
Willapa River 123
William Point 161
Williams, Port 133
Williamson Rocks 158, 160
Willoughby Rock 120
Wilmington Lagoon 42
Wilmington, Town of 42
Wilson (Driggs) Cove 47
Wilson Point 130
Wilson Rock, near False Klamath Rock 99
Wilson Rock, San Miguel Island 51
Winchester Bay 113
Winchuk River 102
Winds:
California, Oregon, Washington 10
Juan de Fuca Strait 128
San Diego Bay 38
San Pedro Bay 42
Wing Point Reef 139
Wyckoff Ledge 52

Y.

Yachats Creek 107
Yankee Point 58
Yaquina Bay 114–115
Yaquina Head 108
Yaquina Reef 86
Yaquina, Town of 115
Yellow Island 157
Yellow Rock 103