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VICTORIA  
GOVERNMENT GAZETTE

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THURSDAY, APRIL 16.

[1908.

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GENERAL NOTICE TO MARINERS

[RESPECTING

NAVIGATION IN VICTORIAN WATERS.

GENERAL NOTICE TO MARINERS.

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The subjoined embraces all existing Victorian Notices to Mariners, sailing directions for the Victorian coastal and inland waters, and particulars of lights, buoys, beacons, tides, berthing accommodation, distance tables, and miscellaneous information useful to mariners.

The sailing directions have been compiled from Admiralty and Departmental surveys.

The bearings given are magnetic, except where marked as true.

The distances are expressed in sea miles of 6,070 feet.

A cable's length is assumed to be equal to 100 fathoms.

The soundings are reduced to the depths of low water of Ordinary Spring Tides.

C. W. MACLEAN,  
Port Officer.

Department of Ports and Harbors,  
Melbourne, 1st August, 1907.

## LIST OF COAST, HARBOR, FLOATING, AND PIER HEAD LIGHTS.

### CHARACTERISTICS.

The lights may either show a steady uniform brilliance or be varied by flashes, occultations, &c. The lights at present exhibited are characterized as follows:—

C.—Catoptric.

D.—Dioptric.

C.D.—Catadioptric.

F.—Fixed. A continuous steady light.

Fl.—Flashing. Showing a single flash, the duration of darkness being greater than that of light.

G.P.Fl.—Group flashing. Showing groups of two or more flashes in succession, separated by eclipses.

F. and Fl.—Fixed and flashing. Fixed light varied by a single flash of same colour. Flashes preceded and followed by eclipses of longer duration than the flashes, but shorter than the period of fixed light.

Occ.—Occulting. A steady light suddenly and totally eclipsed several times in one minute, the duration of light being greater than, or about equal to, that of darkness.

### BEARINGS AND DISTANCES.

The bearings are magnetic and are given from seaward. The given distances from which the lights are visible are calculated in nautical miles as seen from a height of 14 feet above the sea.

Under certain atmospheric conditions, and especially with the more powerful lights, the glimmer of the light is visible considerably beyond the radius given, which is calculated for the actual flame of the light. With easterly and northerly winds and clear weather (*chiefly during the winter months*), lights are frequently rendered visible beyond the natural horizon by the effects of atmospheric refraction.

### CUTTINGS AND SECTORS.

Where adjoining sectors of different coloured light are shown from a lighthouse, the line of demarcation between the colours is not sharply defined, a small arc of uncertain colour being formed by the blending of the different coloured rays on either side of the cutting.

It should also be remembered that the light at the edge of a sector of visibility, when seen by an observer near, does not suddenly disappear, but fades gradually away after the line of bearing given as the limit of visibility has been crossed. Mariners should, therefore, on seeing the intensity of a light diminish, alter their course to open out the full power of the light.

COAST LIGHTS.

Name of Light (Fog Signals).	Lat. S.	Long. E.	Order of Illuminating Apparatus.	Character of Light.	Power of Appa- ratus in Light- house units of 1,000 candles.			Interval Flash.	Colour of Light.	Height above Sea-level. feet.	Miles seen in Clear Weather.	Arc of Illumination Bearing Magnetic and from Seaward.	Remarks.	For further Particulars see Page -
					White.	Red.	Green.							
Cape Nelson	38° 25' 45"	141° 32' 55"	D., 1st order	F.	4½	3½	..	White	250	19	S. 84° E. to S. 84° W.	Red sectors between the limits of white light and shore at either side	43	
Ditto— Auxiliary	-	-	..	F.	..	..	..	Red	..	3	180° seaward	Danger light, and may not be visible in misty weather	43	
Cape Otway	38° 51' 35"	143° 31' 00"	D., 1st order	Op. Fl.	24	..	1' 0"	White	300	24	S. 79° E. to S. 84° W.	Shows three flashes in quick succession every minute. The light shows red shoreward of the bearings given. The change of colour does not occur at once, but an intermingling of red and white flashes is seen	56	
Ditto— Auxiliary Fog signals	-	-	..	F.	..	..	..	Red	..	4-8	S. 79° W. to N. 79° E.	Danger light, and may not be visible in misty weather	56	
Split Point..	38° 28' 10"	144° 05' 45"	D., 1st order	F.	7½	5½	..	Red	220	18	N. 32° E. to S. 62° W.	White sectors between limits of red light and shore at either side	59	
Ditto— Auxiliary	..	..	..	F.	..	..	..	White	..	3	180° seaward	Danger light, and may not be visible in misty weather	59	

Cape Schanck	38° 29' 42"	144° 53' 02"	C.D., 1st order	F. 41 ft. E. 48 ft. Fl.	..	..	See re-marks	White	328	'23	S. 58° E. to N. 78° W.	Fixed 1 minute, eclipse 25 seconds, flash 10 seconds, eclipse 25 seconds, then fixed again. Within 6 miles eclipses scarcely visible, a faint light being seen between the flashes. Danger light, and may not be visible in misty weather	93
Ditto—Auxiliary	..	..	..	F. ..	..	..	..	Red	..	3	180° seaward	Danger light, and may not be visible in misty weather	93
Wilson's Promontory	39° 08' 00"	146° 25' 37"	C., 1st order	F. 27 ft.	..	..	..	White	342	24	N. 62° E. to S. 22½° W.	A ray of light is visible between the Anser Islands on an E.N.E. bearing	107
Coffy Island Fog Signals	38° 57' 11"	146° 42' 24"	D., 3rd order	Fl. ..	44	..	10' 12"	White	180	17	All round the horizon	Shows five flashes and eclipses alternately every minute. One fog rocket fired every 10 minutes	110
Cape Everard	37° 48' 07"	149° 16' 30"	D., 1st order	G.P. 30 ft. Fl.	12	..	0' 30"	White	185	21	N. 74° E. to S. 76° W.	Double flashing. Red sectors between the limits of white light and shore at either side	140
Ditto—Auxiliary	..	..	..	F. ..	..	..	..	Red	..	2	188° seaward	Danger light, and may not be visible in misty weather	140
Gabo Island	37° 34' 15"	149° 55' 10"	C.D., 1st order	F. 44 ft.	..	..	..	White	179	20	N. 45° E. to S. 34° W.	Red between N. 45° E. and N. 84° E., also between S. 14° W. and S. 34° W.	144
Ditto—Auxiliary Fog signals	..	..	..	E. ..	..	..	..	Red	..	3	180° seaward	Danger light, and may not be visible in misty weather Two fog rockets are fired in quick succession every 10 minutes	144

HARBOR AND CHANNEL LIGHTS.

Name of Light (Fog Signals).	Location.	Lat. S.	Long. E.	Order of Illuminating Apparatus.	Power of Apparatus in Units of 1,000 Candles.			Character of Light.	Colour of Light.	Height above Sea-level.	Miles Visible in Clear Weather.	Description of Structure.	Remarks.	For further particulars see Page—
					White.	Red.	Green.							
Portland ..	Whaler Point	38° 20' 24"	141° 36' 45"	D., 4th order	..	..	1	F.	Green	135 feet.	12	..	Visible from N. 50° W. to S. 34° W.	44
Port Fairy ..	East end of Griffith Island	38° 23' 33"	142° 15' 28"	D., 4th order	..	1 1/2	..	F. & FL.	Red	41	9	..	Visible from N. 62° E. to S. 17° E. Fixed 50 secs., eclipse 17 secs., flash 6 secs., eclipse 17 secs. Eclipses are not total within 3 miles	48
Ditto ..	Look-out Hill Entrance to Moyne River, South Wall	..	..	..	..	..	..	F.	Green Red & White	40 24	3 3	..	Visible from S. 56° W. to Sth. Red over foul ground from black buoy at entrance round to Griffith Island; white over river entrance	48 49
Warmahool (Upper Light) Lower Light	On hill in front of town	38° 23' 27"	142° 29' 15"	D., 4th order	1	..	..	F.	White	109	14	..	Visible from N. 45° W. to East 30° W.	52
Pt. Lonsdale	Near extremity of Point, west side of entrance, Port Phillip	..	..	D., 6th order	..	..	..	F.	Red	87	5	..	Visible from N. 2° E. to N. 30° W.	52
Fog signals	..	38° 17' 38"	144° 36' 51"	D., 2nd order	22	13	..	Occ.	White & Red	120	17	..	Red between S. 78° E. and N. 61° E.; white between N. 61° E. and N. 43° W.; Red between N. 43° W. and N. 88° W.; white between N. 88° W. and S. 78° W. Siren gives a high-pitched note of about 4 seconds duration every 2 minutes. If siren is disabled a fog rocket is fired every 5 minutes	61

Tidal signals	Latitude	Longitude	Order	Height	Color	Number	Day signals	Notes	Reference
Queenscliff (High Light)	38° 16' 26"	144° 39' 46"	C.D., 2nd order	2½	White	17	F.	Visible from N. 51° E. to N. 6° E.; within the Heads visible from N. 51° E. to S. 56° W.	63
Low Light	38° 16' 26"	144° 39' 46"	D., 3rd order	2	White and Red	14 R. 10	F.	White from N. 51° E. to N. 38° E. over Point Lonsdale dangers; red from N. 38° E. to N. 24° E. over the fairway, white from N. 24° E. to N. 79° W. over Pt. Nepean dangers, and inside the Heads to a line along the N. side of South Channel; red over S.W. entrance of West Channel from S. 63½° W. to S. 68° W.	63
Pile Light Fog signals Tide signals	38° 19' 55"	144° 51' 10"	D., 4th order	4	White and Red	28	F.	White from S. 22° E. to N. 42° E.; red from N. 42° E. to S. 84° W.; additional white sector from S. 84° W. to S. 76° W. over No. 15 buoy	70
Eastern Light	38° 21' 00"	144° 55' 42"	D., 3rd order	2½	White and Red	101	F.	White, from N. 73° E. to S. 48° E.; red from S. 48° E. to S. 17° W.	71
Portsea Buoy	"	"	Gas buoy	"	Red	10	F.	Visible all round	70
No. 10 Buoy	"	"	Gas buoy	"	White	10	F.	Visible all round	70
No. 12 Buoy	"	"	Gas buoy	"	Green	10	F.	Visible all round	70

HARBOR AND CHANNEL LIGHTS—continued.

Name of Light (or Signal).	Location.	Lat. S.	Long. E.	Order of Illuminating Apparatus.	Power of Apparatus in Lighthouse—Units of 1,000 Candles.			Character of Light.	Colour of Light.	Height above Sea-level.	Miles Visible in Clear Weather.	Description of Structure.	Remarks.	For further Particulars see Page—
					White.	Red.	Green.							
No. 15 Buoy	South Channel	"	"	Gas buoy	..	..	..	Occ.	White	10	5	Black buoy	Visible all round ..	70
Pope's Eye Beacon	West side of stone annulus	"	"	Gas beacon	..	..	..	Occ.	White	24	7	Red beacon	Visible all round ..	74
Observatory Point	Near west boundary Quarantine Station	38° 18' 27"	144° 40' 48"	Gas beacon	..	..	..	F.	White	55	7	White beacon	Visible from S. 4° W. to S. 24° W.	65
Royal George (No. 2)	N.E. end of Royal George shoal	"	"	Gas buoy	..	..	..	F.	Red	10	4	..	Visible all round ..	74
No. 12 Buoy	West Channel	"	"	Gas buoy	..	..	..	F.	White	10	5	Red buoy	Visible all round ..	74
Pile Light	West Channel, N.E. end of West Sand	38° 11' 39"	144° 45' 21"	D., 3rd order	2	1	..	F.	White and Red	35	11	On piles	White from N. 34° E. to N. 77° W. over channel; red from N. 77° W. to S. 80° W.; white from S. 80° W. to S. 14° E.; red from S. 14° E. to N. 34° E. over West Sand A gong and fog-horn sounded alternately every 5 minutes	73
Fog signals.	..	"	"	..	..	..	..	..	..	..	..	..	..	..
Prince George Bank	Off the N.E. end of the bank in 7 fathoms	"	"	Gas buoy	..	..	..	Occ.	White	10	6	Black buoy	Visible all round ..	76





HARBOR AND CHANNEL LIGHTS—continued.

Name of Light (Fog signals).	Location.	Lat. S.	Long. E.	Order of illumina- tion Apparatus.	Power of Ap- paratus in Lighthouse— Units of 1,000 Candels.			Character of Light.	Colour of Light.	Height above Sea-level, feet.	Miles Visible in Clear Weather.	Descrip- tion of Structure.	Remarks.	For further Parti- culars see Page—
					White.	Red.	Green.							
Lakes' Entrance	Pilot Station, east side of entrance	..	..	..	..	..	..	E.	White	50	5	Flag-staff	Visible all round. Is not a fairway light, and should only be used for making out the entrance	117
Ditto ..	At outer end of east pier	..	..	..	..	..	..	F.	White or Red	20	2	..	White light when entrance safe, and red light when dangerous	117
Ditto ..	At inner end of east pier	..	..	..	..	..	..	F.	Red	16	2	Lamp-post	Visible all round, and marks the south side of entrance to Cunningham Arm	118
Ditto ..	Outer end of Bullock Island	..	..	..	..	..	..	F.	White	20	3	Lamp-post	Visible all round, and marks the north side of entrance to Cunningham Arm	118
Ditto ..	Between Bancroft Bay and Lake King	..	..	..	..	..	..	F.	Red	35	2	Lamp-post	Visible all round ..	121
Ditto ..	Shaving Point	..	..	..	..	..	..	F.	Green	22	2	Red beacon	Visible all round, and marks the starboard side of the outer end of channel entering Tambo River	130
Ditto ..	Lake King	..	..	..	..	..	..	F.	White	18	3	Black beacon	Visible all round, and marks the port side of outer end of dredged channel leading to Mitchell River	123
Ditto ..	Mitchell River entrance	..	..	..	..	..	..	F.	Red	18	2	Red beacon	Visible all round, and marks the starboard side of Mitchell River mouth and west side of entrance to Jones Bay	128

Gippsland Lakes

Cippsland Lakes	Ditto ..	McMillan Strait, north entrance, on Raymond Island	White and Red	19	W. 5 R. 3	-	Red between S. 40° W. and S. 3° E. over Raymond Island bank; white between S. 3° E. and S. 12° E. over entrance channel to strait; white between S. 50° E. and N. 7° E. over McMillan Strait	124
		McLennan Strait, west entrance	White and Red	30	3	Lamp-post	.. ..	135
	Ditto ..	Laird River entrance	.. ..	..	..	Lamp-post	These leading lights in line bearing S. 63° W. lead to the entrance channel	136
		Upper Light	White	30	4	..		
	Reeves' Channel	Lower Light	White	20	3	..	White all round, except between S. 4° E. and S. 86° E., which shows red	120
		Rigby Island	White and Red	28	W. 5 R. 3	Iron beacon		
		At hill at Marlo, 1 1/2 miles west of the entrance	Red	100	6	Lamp-post		

## PIER HEAD LIGHTS.

Place.	Colour of Light.	Miles visible in Clear Weather.
Apollo Bay .. .. .	Red .. .. .	Miles. 2
Bairnsdale .. .. .	White .. .. .	3
Bowen .. .. .	White .. .. .	3
Brighton (Park-street) .. .. .	Red .. .. .	2
Cowes .. .. .	White .. .. .	3
Cunninghame (Post Office Jetty) .. .. .	Red .. .. .	2
" (Eastern Jetty) .. .. .	Red .. .. .	2
" (South Wharf) .. .. .	Green .. .. .	1½
Dromana .. .. .	Red .. .. .	2
Flinders .. .. .	White and Red .. .. .	3
Frankston .. .. .	Green .. .. .	1½
Grantville .. .. .	White .. .. .	3
Hastings .. .. .	White .. .. .	3
Lorne .. .. .	Green .. .. .	1½
McLennan Strait (Holland's Landing) .. .. .	Red and White .. .. .	3
Metung .. .. .	Green .. .. .	1½
Mordialloc .. .. .	Red .. .. .	2
Mornington .. .. .	Red .. .. .	2
Paynesville .. .. .	Red .. .. .	2
Picnic Point .. .. .	Red and Green .. .. .	2
Port Albert .. .. .	Red .. .. .	2
Portland (Railway Jetty) .. .. .	Red .. .. .	2
" (New Pier) .. .. .	Green .. .. .	1½
Portsea .. .. .	Red .. .. .	2
Quarantine .. .. .	Green .. .. .	1½
Queenscliff (New Jetty) .. .. .	Green .. .. .	1½
" .. .. .	Green .. .. .	1½
" (Old Jetty) .. .. .	Red .. .. .	2
Rosebud .. .. .	Green .. .. .	1½
Rye .. .. .	Red .. .. .	2
Sale .. .. .	White .. .. .	3
San Remo .. .. .	Green .. .. .	1½
Seacombe .. .. .	Green .. .. .	1½
Sorrento .. .. .	Green .. .. .	1½
St. Leonard's .. .. .	Green .. .. .	1½
St. Kilda .. .. .	Green .. .. .	1½
Stony Point .. .. .	White .. .. .	3
Warrnambool (Breakwater) .. .. .	Red .. .. .	2
" (Tramway Jetty) .. .. .	Green .. .. .	1½
Welshpool .. .. .	White .. .. .	3
Williamstown (Breakwater) .. .. .	White .. .. .	6

STATUTE TIME.

The following time standards are adopted by the Governments of the Australian Commonwealth and New Zealand:—

Victoria	...	10	hours	east	of	Greenwich.
New South Wales	...	10	"	"	"	"
Queensland	...	10	"	"	"	"
Tasmania	...	10	"	"	"	"
South Australia	...	9½	"	"	"	"
West Australia	...	8	"	"	"	"
New Zealand	...	11½	"	"	"	"

Victorian statute time, 10 hours east, is 20min. 5.8sec. in advance of Melbourne Observatory mean time.

The Time Ball exhibited from the tower of the old lighthouse, Williamstown, is dropped daily (Sundays excepted) at 1 p.m. Victorian statute time, equal to 15hr. 0min. 0sec. Greenwich mean time.

TIDES—FULL AND CHANGE.

TABLE showing the statute time of High Water, Full and Change, also rise at Spring and Neap Tides.

Name of Place.	High Water.		Spring Tides.	Neap Tides.
	H.	M.	ft. in.	ft. in.
Portland	1	3	3 0	..
Port Fairy	1	2	3 0	..
Warrnambool	1	7	3 0	..
Port Campbell	..	..	4 0	..
Apollo Bay	..	..	5 0	..
Lorne	..	..	5 9	..
Point Lonsdale	..	..	6 0	4 6
Point Nepean	..	..	..	..
Queenscliff	..	..	3 6	2 6
Pile Light, South Channel, Port Phillip	..	..	3 0	2 0
Dromana Bay	..	..	3 0	2 0
Schnapper Point	..	..	2 11	..
Pile Light, West Channel	..	..	3 0	2 0
Hopetoun Channel, Geelong	3	1	2 10	2 0
Williamstown, Hobson's Bay	2	40	2 8	2 0
Cowes, Phillip Island, Western Port	0	31	8 6	6 6
Woody Point, Phillip Island, Western Port	1	10	8 0	5 0
Spit Point, French Island	1	18	10 0	8 0
Bourchier Channel	1	32	10 0	8 0
Rutherford Creek	1	22	9 0	5 0
Venus Bay, Entrance Anderson Inlet	0	13	7 0	..
Waratah Bay	0	16	8 0	..
Glennie Islands	12	0	9 0	..
Refuge Cove	0	19	8 0	..
Rabbit Island	0	28	8 0	..
Port Albert	0	27	8 0	..
Lakes' Entrance, Gippsland	8	38	3 0	2 0
Snowy River, Entrance	8	41	3 0	2 0
Mallacoota Inlet	8	50	6 0	5 0
Gabo Island	8	50	6 0	5 0

Port Phillip Entrance.—Slack Water.—From observation it has been ascertained that the time of slack water, flood, full, and change in the fairway, Port Phillip Entrance, is 2h. 0min. or 40 minutes earlier than time of high water, F., and C. at Williamstown.

TABLE FOR THE REDUCTION OF THE TIME OF THE MOON'S PASSAGE OVER THE MERIDIAN OF GREENWICH TO THE TIME OF ITS PASSAGE OVER ANOTHER MERIDIAN.

Longitude.	Daily Variation of the Moon's Passage														Longitude.	
	Subtract in East Longitude.							Add in West Longitude.								
	Min. 40	Min. 42	Min. 44	Min. 46	Min. 48	Min. 50	Min. 52	Min. 54	Min. 56	Min. 58	Min. 60	Min. 62	Min. 64	Min. 66		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
30	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
40	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
50	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
60	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
70	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
80	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
90	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
100	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
110	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
120	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
130	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
140	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
150	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
160	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
170	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
180	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

AVERAGE TIME (STATUTE) OF HIGH WATER AT WILLIAMSTOWN, HAVING GIVEN TIME OF MOON'S UPPER TRANSIT AT GREENWICH.

MOON'S MERIDIAN PASSAGE IN INTERVALS OF 10 MINUTES.

Moon's Age	Min. 0.		Min. 10.		Min. 20.		Min. 30.		Min. 40.		Min. 50.	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
0	2 15	2 43	2 25	2 53	2 35	3 3	2 45	3 14	2 56	3 24	3 7	3 33
1	3 18	3 42	3 28	3 52	3 38	4 2	3 48	4 12	3 58	4 21	4 7	4 39
2	4 16	4 37	4 25	4 44	4 34	5 4	4 43	5 3	4 52	5 12	5 0	5 20
3	5 8	5 23	5 16	5 36	5 24	6 4	5 32	6 3	5 40	6 0	5 47	6 8
4	5 54	6 15	6 2	6 23	6 12	7 10	6 18	7 26	6 39	6 47	6 34	6 55
5	6 41	7 2	6 49	7 10	6 57	7 18	7 5	8 13	7 24	7 24	7 21	7 42
6	7 28	7 49	7 36	7 57	7 44	8 5	7 52	8 13	7 34	8 21	8 18	8 39
7	8 17	8 39	8 25	8 49	8 34	9 5	8 43	9 16	8 0	9 16	9 1	9 26
8	9 10	9 38	9 20	9 46	9 30	10 6	9 40	10 6	8 52	10 16	10 1	10 27
9	10 12	10 39	10 24	10 51	10 36	11 3	10 48	11 15	11 0	11 29	11 12	11 43
10	11 24	11 54	11 33	12 3	11 43	1 16	11 52	12 12	1 44	12 21	1 21	12 30
11	12 19	12 50	12 32	1 2	12 44	2 30	12 56	1 30	1 9	1 44	1 21	1 58
12	1 34	2 8	1 47	2 20	2 0	3 38	2 12	2 40	2 24	2 51	2 36	3 3
13	2 49	3 18	2 59	3 28	3 10	4 34	3 21	3 48	3 31	3 58	3 42	4 7
14	3 52	4 16	4 1	4 25	4 19	5 25	4 19	4 43	4 28	4 52	4 38	5 0
15	4 47	5 9	4 56	5 17	5 4	6 12	5 12	5 32	5 20	5 40	5 28	6 0
16	5 36	5 56	5 44	6 4	6 4	6 58	6 0	6 20	6 8	6 28	6 16	6 36
17	6 24	6 43	6 32	6 50	6 30	7 46	6 47	7 5	6 54	7 12	7 2	7 22
18	7 10	7 30	7 18	7 38	7 26	8 34	7 34	8 43	7 42	8 2	7 50	8 10
19	7 57	8 18	8 5	8 26	8 13	9 30	8 21	9 40	8 30	8 52	8 39	9 1
20	8 44	9 10	8 57	9 20	9 6	10 34	9 15	10 45	9 24	9 50	9 34	10 1
21	9 40	10 12	9 53	10 23	10 2	11 40	10 11	11 50	10 20	10 57	10 30	11 8
22	10 40	11 20	10 52	11 30	11 4	12 41	11 18	12 52	11 32	12 0	11 46	12 18
23	12 0	12 10	12 9	12 30	12 18	1 55	12 27	1 41	12 35	1 4	12 43	1 18
24	1 7	1 31	1 18	1 43	1 29	2 44	1 41	2 7	1 53	2 19	2 4	2 31

EXPLANATION.

The above table is calculated to give the average statute time of high water at Williamstown, having given the moon's upper meridian passage at Greenwich for intervals of ten minutes.

To find the time of high water from the table.—Take from the *Nautical Almanack* for the year, and page iv. of the month, the time of the moon's upper meridian passage on the date required. On the hour line and in the nearest minutes column of the table will be found the time or times of high water on the day required.

Example.—Required the time when it will be high water at Williamstown on 13th September, 1896—*Nautical Almanack*, 13th September, 1896. Moon's upper passage, 5hrs. 22min. High water from table at 5hrs. 20min.—6.57 a.m., 7.18 p.m.

THE AVERAGE TIME (STATUTE) of High Water at the Ports of the State and at the principal Ports of the other Australian States relative to the time of High Water at Williamstown, as shown by the previous table:—

	Earlier. H. M.	Later. H. M.
Victoria—		
Portland .. .. .	1 40	..
Port Fairy .. .. .	1 41	..
Warrnambool .. .. .	1 36	..
Point Lonsdale .. .. .	..	..
South Channel, Port Phillip .. .. .	..	..
West Channel .. .. .	..	..
Hopetoun Channel, Geelong .. .. .	..	..
Melbourne Wharfs .. .. .	..	..
Western Port .. .. .	1 43	..
Venus Bay .. .. .	2 30	..
Corner Inlet .. .. .	2 15	..
Port Albert .. .. .	2 17	..
Gippsland Lakes' Entrance .. .. .	..	5 5
Snowy River Entrance .. .. .	..	5 58
Mallagoota Inlet .. .. .	..	6 9
Gabo Island .. .. .	..	6 7
Western Australia—		
Fremantle .. .. .	..	..
King George Sound (Princess Royal Harbor) .. .. .	..	..
South Australia—		
Port Pirie .. .. .	..	..
Port Adelaide .. .. .	..	..
Murray River .. .. .	..	..
Port McDonnell .. .. .	..	..
Port Darwin .. .. .	..	..
Tasmania—		
King Island .. .. .	2 19	..
Kent Group .. .. .	3 23	..
Goose Island .. .. .	3 47	..
Tamar River, Pilot Station .. .. .	3 28	..
Launceston .. .. .	1 30	..
Derwent River, Hobart .. .. .	..	5 40
Macquarie Harbor Bar .. .. .	..	5 7
New South Wales—		
Twofold Bay .. .. .	..	5 35
Wollongong Harbor .. .. .	..	5 50
Port Jackson, Sydney .. .. .	..	6 51



THE AVERAGE TIME (STATUTE) of High Water at the Ports of the State, &c.—*continued.*

	Earlier. h. m.	Later. h. m.
New South Wales— <i>continued.</i>		
Newcastle .. .. .	.. .. .	6 10
Port Macquarie Bar .. .. .	.. .. .	6 20
Clarence River .. .. .	.. .. .	..
Queensland—		
Brisbane Bar .. .. .	.. .. .	7 10
Port Curtis .. .. .	.. .. .	6 28
Port Bowen .. .. .	.. .. .	6 43
Port Denison .. .. .	.. .. .	7 13
Mourilyan Harbor .. .. .	.. .. .	..
Cairns (Trinity Harbor) .. .. .	.. .. .	7 12

TABLE OF DISTANCES (HORIZON).  
TABLE SHOWING THE DISTANCE OF THE HORIZON AT DIFFERENT ELEVATIONS.

Height.	Distance to the Horizon.	Height.	Distance to the Horizon.	Height.	Distance to the Horizon.	Height.	Distance to the Horizon.	Height.	Distance to the Horizon.
Fect.	Nautical Miles.	Fect.	Nautical Miles.	Fect.	Nautical Miles.	Fect.	Nautical Miles.	Fect.	Nautical Miles.
1	1.15	33	6.60	85	10.59	245	17.98	450	24.36
2	1.62	34	6.70	90	10.90	250	18.16	460	24.63
3	1.99	35	6.80	95	11.19	255	18.34	470	24.90
4	2.30	36	6.89	100	11.49	260	18.52	480	25.16
5	2.57	37	6.99	105	11.77	265	18.70	490	25.42
6	2.81	38	7.08	110	12.05	270	18.87	500	25.68
7	3.04	39	7.17	115	12.32	275	19.05	510	25.94
8	3.25	40	7.26	120	12.58	280	19.22	520	26.19
9	3.45	41	7.35	125	12.84	285	19.39	530	26.44
10	3.63	42	7.44	130	13.10	290	19.56	540	26.69
11	3.81	43	7.53	135	13.35	295	19.73	550	26.93
12	3.98	44	7.62	140	13.61	300	19.89	560	27.18
13	4.14	45	7.70	145	13.83	305	20.06	570	27.42
14	4.30	46	7.79	150	14.06	310	20.22	580	27.66
15	4.45	47	7.87	155	14.30	315	20.38	590	27.90
16	4.59	48	7.96	160	14.53	320	20.55	600	28.13
17	4.74	49	8.04	165	14.75	325	20.71	610	28.37
18	4.87	50	8.12	170	14.97	330	20.86	620	28.60
19	5.01	51	8.20	175	15.19	335	21.02	630	28.83
20	5.14	52	8.29	180	15.41	340	21.18	640	29.06
21	5.26	53	8.36	185	15.62	345	21.33	650	29.28
22	5.39	54	8.44	190	15.83	350	21.49	660	29.51
23	5.51	55	8.52	195	16.04	355	21.64	670	29.73
24	5.63	56	8.60	200	16.24	360	21.79	680	29.95
25	5.74	57	8.67	205	16.44	370	22.09	690	30.17
26	5.86	58	8.75	210	16.64	380	22.39	700	30.39
27	5.97	59	8.82	215	16.84	390	22.68	710	30.60
28	6.08	60	8.90	220	17.03	400	22.97	720	30.82
29	6.19	65	9.26	225	17.20	410	23.26	730	31.03
30	6.29	70	9.61	230	17.42	420	23.54	740	31.24
31	6.40	75	9.95	235	17.61	430	23.82	750	31.45
32	6.50	80	10.27	240	17.79	440	24.09	760	31.66

TABLE OF DISTANCES (HEIGHT OF OBJECTS AT SEA).

TABLE of Distances at which objects can be seen at sea when they first appear before the horizon, according to their respective elevations and the elevation of the eye of the observer.

Heights in Feet.	Distances in Nautical Miles.	Heights in Feet.	Distances in Nautical Miles.	Heights in Feet.	Distances in Nautical Miles.	Heights in Feet.	Distances in Nautical Miles.
1	1.2	25	5.7	150	14.2	450	24.3
2	1.6	30	6.3	160	14.5	500	25.6
3	2.0	35	6.8	170	15.0	550	26.9
4	2.3	40	7.3	180	15.4	600	28.1
5	2.6	45	7.7	190	15.8	650	29.3
6	2.8	50	8.1	200	16.2	700	30.3
7	3.0	55	8.5	210	16.6	750	31.4
8	3.3	60	8.9	220	17.0	800	32.5
9	3.5	65	9.3	230	17.4	850	33.5
10	3.6	70	9.6	240	17.8	900	34.5
11	3.8	75	9.9	250	18.2	950	35.4
12	4.0	80	10.3	260	18.5	1,000	36.3
13	4.1	85	10.6	270	18.9	1,500	44.5
14	4.3	90	10.9	280	19.2	2,000	51.4
15	4.5	95	11.2	290	19.6	2,500	57.4
16	4.6	100	11.5	300	20.0	3,000	63.0
17	4.7	110	12.0	325	20.7	3,500	68.0
18	4.9	120	12.6	350	21.5	4,000	73.0
19	5.0	130	13.1	375	22.2	4,500	77.0
20	5.1	140	13.6	400	23.0	5,000	81.0

RULE.—Take out the distance corresponding to height of the eye of the observer above sea-level and add to it the distance corresponding to the height of the distant object.

EXAMPLE.—Gabo Island light, elevated 180 feet above the sea, will be visible to an observer, whose eye is 14 feet above the water, 19.7 nautical miles; thus from the table—

14 feet elevation distance visible 4.3 miles  
 180 feet elevation distance visible 15.4 miles  


---

 19.7 miles

TABLE OF COAST DISTANCES.  
(Nautical Miles.)

PORT PHILLIP HEADS TO ADELAIDE.

Port Phillip Heads.	Spitt Point.	Cape Otway.	Warnambool Harbor.	Port Fairy.	Cape Nelson.	Cape Northumberland.	Cape Jarda.	Cape Wiltouraby.	Cape Jarvis.	Port Adelaide Light.	Port Adelaide Wharfs.
0	27	65	122	132	163	213	301	397	411	464	473
	0	38	95	105	136	186	274	370	384	437	446
		0	57	67	98	148	236	332	346	399	408
			0	10	41	91	179	275	289	342	351
				0	31	81	169	265	279	332	341
					0	50	138	234	248	301	310
						0	88	184	198	251	260
							0	96	110	163	172
								0	14	67	76
									0	53	62
										0	9

PORT PHILLIP HEADS TO SYDNEY.

Port Phillip Heads.	Cape Schanck.	Cape Liptrap.	Wilson's Promontory.	Cliffy Island.	Cape Everard.	Gabo Island.	Cape Howe.	Montague Island.	Cape St. George.	Sydney Heads.	Sydney Wharfs.
0	17	72	103	120	262	297	303	309	449	534	540
	0	55	86	103	245	280	286	362	432	517	526
		0	31	48	190	225	231	307	377	462	468
			0	17	159	194	200	276	316	431	437
				0	142	177	183	259	329	414	420
					0	35	41	117	187	272	278
						0	6	82	112	237	243
							0	76	146	231	237
								0	70	155	161
									0	85	91
										0	6

Explanation of Tables.

Required distance from Cape Schanck to Gabo Island.—Look under Cape Schanck and along line beginning with 0 until reaching column under Gabo Island, which will be the distance required.

Examples.—Cape Schanck to Gabo Island = 280 miles.

Wilson's Promontory to Sydney Heads = 437 miles.

TABLE OF DISTANCES (PORT PHILLIP HEADS TO MELBOURNE).

(Nautical Miles.)

PORT PHILLIP HEADS TO MELBOURNE (via WEST CHANNEL).

Port Phillip Heads.	No. 2 Buoy, West Channel.	Swanspit, West Channel.	No. 12 Buoy, West Channel.	Pile Light, West Channel.	Point Gellibrand Light.	Entrance to River Yarra.	Melbourne Wharfs.
0	3.3	4.5	6.8	8.9	29.2	30.9	36.4
	0	1.2	3.5	5.6	25.9	27.6	33.1
		0	2.3	4.4	24.7	26.4	31.9
			0	2.1	22.4	24.1	29.6
				0	20.3	22.0	27.5
					0	1.7	7.2
						0	5.5

PORT PHILLIP HEADS TO MELBOURNE (via SOUTH CHANNEL).

Port Phillip Heads.	No. 4 Buoy, South Channel.	No. 5 Buoy, South Channel.	Pile Light, South Channel.	No. 15 Buoy, South Channel.	Point Gellibrand Light.	Entrance to River Yarra.	Melbourne Wharfs.
0	3.9	7.5	10.9	13.4	40.4	42.1	47.6
	0	3.6	7.0	9.5	36.5	38.2	43.7
		0	3.4	5.9	32.9	34.6	40.1
			0	2.5	29.5	31.2	36.7
				0	27.0	28.7	34.2
					0	1.7	7.2
						0	5.5

TABLE OF DISTANCES (PORT PHILLIP HEADS TO GEELONG).  
(Nautical Miles.)

PORT PHILLIP HEADS TO GEELONG (via WEST CHANNEL).

Port Phillip Heads.	No. 2 Buoy, West Channel.	Pile Light, West Channel.	Prince George's Bank Buoy.	Point Richards Buoy.	Wilson's Spt Buoy.	Beacon East End Hopetoun Channel.	Beacon West End Hopetoun Channel.	Geelong Wharfs.
0	3.3	8.9	14.3	19.9	26.9	29.8	31.8	33.9
	0	5.6	11.0	16.6	23.6	26.5	28.5	30.6
		0	5.4	11.0	18.0	20.9	22.9	25.0
			0	5.6	12.6	15.5	17.5	19.6
				0	7.0	9.9	11.9	14.0
					0	2.9	4.9	7.0
						0	2.0	4.1
							0	2.1

PORT PHILIP HEADS TO GEELONG (via SOUTH CHANNEL).

Port Philip Heads.	No. 1 Buoy, South Channel.	No. 15 Buoy, South Channel.	Pile Light, West Channel (abreast).	Prince George's Bank Buoy.	Point Richards Buoy.	Wilson's Spit Buoy.	Beacon East End Hopetoun Channel.	Beacon West End Hopetoun Channel.	Geelong Wharfs.
0	3.9	13.4	23.9	28.8	34.4	41.4	44.3	46.3	48.4
	0	9.5	20.0	24.9	30.5	37.5	40.4	42.4	44.5
		0	10.5	15.4	21.0	28.0	30.9	32.9	35.0
			0	4.9	10.5	17.5	20.4	22.4	24.5
				0	5.6	12.6	15.5	17.5	19.6
					0	7.0	9.9	11.9	14.0
						0	2.9	4.9	7.0
							0	2.0	4.1
								0	2.1

TABLE OF DISTANCES (MELBOURNE TO GEELONG).  
(Nautical Miles.)

MELBOURNE TO GEELONG (via POINT WILSON STEAM-BOAT BUOY).—  
LIGHT DRAFT TRACK.

Melbourne Wharfs.	Entrance to River Yarra.	Point Gellibrand Light.	Point Cook Buoy.	Red Buoy Halfway.	Red Buoy "Arthur the Great."	Red Buoy "Steam-boat Buoy."	Beacon East End Hopetoun Channel.	Beacon West End Hopetoun Channel.	Geelong Wharfs.
0	5.0	6.7	12.5	22.7	28.1	30.7	34.2	36.2	38.3
	0	1.7	7.5	17.7	23.1	25.7	29.2	31.2	33.3
		0	5.8	16.0	21.4	24.0	27.5	29.5	31.6
			0	10.2	15.6	18.2	21.7	23.7	25.8
				0	5.4	8.0	11.5	13.5	15.6
					0	2.6	6.1	8.1	10.2
						0	3.5	5.5	7.6
							0	2.0	4.1
								0	2.1

MELBOURNE TO GEELONG (via WILSON'S SPIT BUOY).—HEAVY DRAFT  
TRACK.

Melbourne Wharfs.	Entrance to River Yarra.	Point Gellibrand Light.	Point Cook Buoy.	Red Buoy Halfway.	Wilson's Spit Buoy.	Beacon East End Hopetoun Channel.	Beacon West End Hopetoun Channel.	Geelong Wharfs.
0	5.0	6.7	12.5	22.7	32.7	35.6	37.6	39.7
	0	1.7	7.5	17.7	27.7	30.6	32.6	34.7
		0	5.8	16.0	26.0	28.9	30.9	33.0
			0	10.2	20.2	23.1	25.1	27.2
				0	10.0	12.9	14.9	17.0
					0	2.9	4.9	7.0
						0	2.0	4.1
							0	2.1

TABLE OF DISTANCES (WITHIN PORT PHILLIP BAY).

From—	To—	Nautical Miles.
Gellibrand Light ..	Frankston .. ..	19
" " ..	Schnapper Point .. ..	21
" " ..	Dromana .. ..	27½
" " ..	Sorrento, <i>via</i> South Channel .. ..	37
" " ..	" West Channel .. ..	32
" " ..	Queenscliff, <i>via</i> South Channel .. ..	39½
" " ..	" West Channel .. ..	27
" " ..	Portarlington .. ..	19
Frankston ..	Schnapper Point .. ..	5¾
Schnapper Point ..	Dromana .. ..	8½
" " ..	Sorrento, <i>via</i> Capel Sound .. ..	18
" " ..	" South Channel .. ..	20
" " ..	Queenscliff, <i>via</i> South Channel .. ..	22
" " ..	" West Channel .. ..	20
" " ..	West Channel Pile Light .. ..	13
" " ..	Prince George's Bank Buoy .. ..	15
" " ..	Portarlington .. ..	19¾
" " ..	Geelong Wharfs .. ..	34½
Dromana ..	Sorrento, <i>via</i> Capel Sound .. ..	10¾
" " ..	" South Channel .. ..	12½
" " ..	Queenscliff, <i>via</i> Capel Sound .. ..	16
" " ..	" South Channel .. ..	14¾
" " ..	" West Channel .. ..	19¾
Sorrento ..	" .. ..	5½
" " ..	Portsea .. ..	2¼
Portsea ..	Queenscliff .. ..	3¾
Queenscliff ..	West Channel Pile Light .. ..	6½
" " ..	Portarlington .. ..	16½
" " ..	Geelong Wharfs .. ..	31½
Portarlington ..	" " .. ..	15½

TRUE BEARINGS FOR TESTING COMPASSES.—PORT PHILLIP ENTRANCE.

To enable vessels navigating Port Phillip Entrance to test the accuracy of adjustment of their compasses, the following true bearings of various beacons and marks are given. Magnetic variation in 1907 = 8° East.

WEST CHANNEL:

West Channel Pile Light on Cheviot Hill .. ..	S. 30° 38' W.
" " Swan Beacon .. ..	S. 41° 9' W.
" " High Light-house .. ..	S. 43° 31' W.
" " White Beacon, South Red Bluff .. ..	N. 76° 49' W.
Swan Beacon on High Light-house .. ..	S. 49° 6' W.
Pile, Pope's Eye Fort, on East Flagstaff, Quarantine .. ..	S. 6° 30' E.
" " Cheviot Hill .. ..	S. 35° 5' W.
" " West Channel Pile Light .. ..	N. 28° 43' E.

## SOUTH CHANNEL.

South Channel Pile Light on High Light-house...	...	N. 68° 48' W.
"    "    St. Paul's Hill ...	...	S. 72° 36' W.
"    "    White Cliffs ...	...	S. 41° 17' W.
"    "    Eastern Light ...	...	S. 72° 32' E.
West Flagstaff, Quarantine, on Cheviot Hill ...	...	S. 69° 23' W.
Pile, Pope's Eye Fort, on Swan Beacon ...	...	N. 10° 39' W.
"    "    West Channel Pile Light ...	...	N. 28° 43' W.

## OUTSIDE PORT PHILLIP HEADS.

Low Light-house on High Light-house ...	...	N. 42° 29' E.
Rock Beacon on Lonsdale Bight Beacon (black and white)	...	N. 33° 4' W.
"    High Light-house ...	...	N. 19° 28' E.
"    Swan Beacon ...	...	N. 34° 20' E.
"    Pile, Pope's Eye Fort ...	...	N. 57° 55' E.

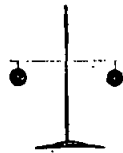
## GENERAL SIGNALS.

THE FOLLOWING SIGNALS ARE TO BE USED WHEN REQUISITE WITHIN THE PORTS OF VICTORIA.

Harbor Pilot ...	...	The ensign at the foremast-head.
Health Officer ...	...	Ensign at the mainmast-head, with blue flag underneath.
Quarantine ...	...	Yellow flag at the mainmast-head.
Sea Pilot ...	...	The pilot jack at the foremast-head.
Water Police ...	...	Day signal—The ensign at the mainmast-head.
		Night signal—Two lights vertical at any mast-head or the peak, having 5 feet between the two.
Customs boat ...	...	Pilot jack at the peak.
Tug-boats ...	...	Rendezvous flag at the peak or mizzenmast.
Explosives on board ...	...	Red burgee at the main.
Medical assistance... ..	...	Letter B at the peak.
Boarding Officer ...	...	Blue flag at the main.
Mails on board ...	...	White flag at the fore, to be kept flying till the mails are out of the ship.
Government emigrants on board	...	Ensign at the mizzenmast-head.
Clearance Officer outwards ...	...	White flag at the mainmast-head when the ship is ready for sea.
Launching vessels from patent slips or building yards	...	Square red flag to be hoisted on a flag-staff one hour before launching.
Ballast ...	...	Letter S at mizzen.
Water ...	...	Letter M at mizzen.

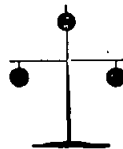
*Outport Signals.*

*Ball at Yard-arm.*



Sailing vessel in sight making for port from eastward or westward as ball is hoisted at east or west yard-arm. Hauled down when anchored.

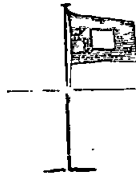
*Ball at Mast-head,*



Steamer in sight making for port from eastward or westward as ball is hoisted at east or west yard-arm. Ball remains at mast-head while steamer is in the bay.

*and at Yard-arm.*

*Bad Weather Signal.*



Cannot work in the Bay.

*P Flag (Commercial Code) at Mast-head.*

In pursuance of section 231 of the *Marine Act 1890*, the following night signals have been registered by the Marine Board of Victoria for use by steamships of the respective shipping companies hereinafter mentioned, while being navigated off the coast of Victoria.

The lights are to be shown from halyards, about amidships, and hung not less than 6 feet apart vertically.

- Four white lights ... .. McIlwraith, McEachern, and Co.
- Three lights, coloured respectively Melbourne Steam-ship Co.  
white, red, and white
- One red light over one white light ... James Patterson and Co.
- Three white lights ... .. Howard Smith Co.
- Two red lights with one white light below  
below Huddart, Parker, and Co.



## REGULATIONS FOR PREVENTING COLLISIONS AT SEA.

The following Rules are contained in the Schedules to Order in Council of 27th November, 1896, except Article 9, which was brought in force by Order in Council of 4th April, 1906.

The Orders dated 30th December, 1884, 24th June, 1885, and 18th August, 1892, copies of which are attached, will remain in force.

ORDER IN COUNCIL OF 27TH NOVEMBER, 1896.

### SCHEDULE I.

#### PRELIMINARY.

*These Rules shall be followed by all vessels upon the high seas and in all waters connected therewith, navigable by sea-going vessels.*

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 words "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.*

#### RULES CONCERNING LIGHTS, ETC.

*The word "visible" in these Rules, when applied to lights, shall mean visible on a dark night with a clear atmosphere.*

ARTICLE 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.

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 20 feet, and if the breadth of the vessel exceeds 20 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 40 feet, a bright white light, so constructed as to show an unbroken light over an arc of the horizon of 20 points of the compass, so fixed as to throw the light 10 points on each side of the vessel, viz., from right ahead to 2 points abaft the beam on either side, and of such a character as to be visible at a distance of at least 5 miles.

- (b) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard side, and of such a character as to be visible at a distance of at least 2 miles.
- (c) On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of 10 points of the compass, so fixed as to throw the light from right ahead to 2 points abaft the beam on the port side, and of such a character as to be visible at a distance of at least 2 miles.
- (d) The said green and red side-lights shall be fitted with inboard screens projecting at least 3 feet forward from the light, so as to prevent these lights from being seen across the bow.
- (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 15 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.*

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 6 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, exceeds 600 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 2 (a), except the additional light, which may be carried at a height of not less than 14 feet above the hull.

*Such steam vessel may carry a small white light abaft the funnel or after-mast for the vessel towed to steer by, but such light shall not be visible forward of the beam.*

ART. 4 (a). A vessel which from any accident is not under command shall carry at the same height as the white light mentioned in Article 2 (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 round the horizon at a distance of at least 2 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 2 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 2 (a), and, if a steam vessel, in lieu of that light, three lights in a vertical line one over the other, not less than 6 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 round the horizon, at a distance of at least 2 miles. By day she shall carry in a vertical line one over the other, not less than 6 feet apart, where they can best be seen, three shapes not less than 2 feet in diameter, of which the highest and lowest shall be globular in shape and red in colour, 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 cannot therefore get out of the way.

These signals are not signals of vessels in distress and requiring assistance. Such signals are contained in Article 31.

ART. 5. A sailing vessel under way, and any vessel being towed, shall carry the same lights as are prescribed by Article 2 for a steam vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

ART. 6. Whenever, as in the case of small vessels under way during bad weather, the green and red side-lights cannot 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 2 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 colour of the light they respectively contain, and shall be provided with proper screens.

ART. 7. Steam vessels of less than 40, and vessels under oars or sails of less than 20 tons gross tonnage, respectively, and rowing boats, when under way, shall not be obliged to carry the lights mentioned in Article 2 (a) (b) and (c), but if they do not carry them they shall be provided with the following lights:—

1. Steam vessels of less than 40 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 9 feet, a bright white light constructed and fixed as prescribed in Article 2 (a), and of such a character as to be visible at a distance of at least 2 miles.
  - (b) Green and red side-lights constructed and fixed as prescribed in Article 2 (b) and (c), and of such a character as to be visible at a distance of at least 1 mile, or a combined lantern showing a green light and a red light from right ahead to 2 points abaft the beam on their respective sides. Such lantern shall be carried not less than 3 feet below the white light.
2. Small steam boats, such as are carried by sea-going vessels, may carry the white light at a less height than 9 feet above the gunwale, but it shall be carried above the combined lantern, mentioned in subdivision 1 (b).
3. Vessels under oars or sails, of less than 20 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.
4. 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 4 (a), and Article 11, last paragraph.

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 round 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 coloured 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.

ART. 9. Fishing vessels and fishing boats, when under way and when not required by this Article to carry or show the lights hereinafter specified shall carry or show the lights prescribed for vessels of their tonnage under way.

- (a) Open boats, by which is to be understood boats not protected from the entry of sea water by means of a continuous deck, when engaged in any fishing at night with outlying tackle extending not more than 150 feet horizontally from the boat into the seaway, shall carry one all-round white light.

Open boats, when fishing at night, with outlying tackle extending more than 150 feet horizontally from the boat into the seaway, shall carry one all-round white light, and, in addition, on approaching or being approached by other vessels, shall show a second white light at least 3 feet below the first light and at a horizontal distance of at least 5 feet away from it in the direction in which the outlying tackle is attached.

- (b) Vessels and boats, except open boats as defined in subdivision (a), when fishing with drift nets, shall, so long as the nets are wholly or partly in the water, carry two white lights where they can best be seen. Such lights shall be placed so that the vertical distance between them shall be not less than 6 feet and not more than 15 feet, and so that the horizontal distance between them, measured in a line with the keel, shall be not less than 5 feet and not more than 10 feet. The lower of these two lights shall be in the direction of the nets, and both of them shall be of such a character as to show all round the horizon, and to be visible at a distance of not less than 3 miles.

Within the Mediterranean Sea and in the seas bordering the coasts of Japan and Korea sailing fishing vessels of less than 20 tons gross tonnage shall not be obliged to carry the lower of these two lights; should they, however, not carry it, they shall show in the same position (in the direction of the net or gear) a white light, visible at a distance of not less than one sea mile, on the approach of or to other vessels.

- (c) Vessels and boats, except open boats as defined in subdivision (a), when line-fishing with their lines out and attached to or hauling their lines, and when not at anchor or stationary within the meaning of subdivision (h), shall carry the same lights as vessels fishing with drift-nets. When shooting lines, or fishing with towing lines, they shall carry the lights prescribed for a steam or sailing vessel under way respectively.

Within the Mediterranean Sea and in the seas bordering the coasts of Japan and Korea sailing fishing vessels of less than 20 tons gross tonnage shall not be obliged to carry the lower of these two lights; should they, however, not carry it, they shall show in the same position (in the direction of the lines) a white light, visible at a distance of not less than one sea mile on the approach of or to other vessels.

- (d) Vessels, when engaged in trawling, by which is meant the dragging of an apparatus along the bottom of the sea—

1. If steam-vessels, shall carry in the same position as the white light mentioned in Article 2 (a), a tricoloured lantern so constructed and fixed as to show a white light from right ahead to two points on each bow, and a green light and a red light over an arc of the horizon from two points on each bow to two points abaft the beam on the starboard and port sides respectively; and not less than 6 nor more than 12 feet below the tricoloured lantern a white light in a lantern, so constructed as to show a clear uniform and unbroken light all round the horizon.

2. If sailing-vessels, shall carry a white light in a lantern, so constructed as to show a clear uniform and unbroken light all round the horizon, and shall also, on the approach of or to other vessels, show, where it can best be seen, a white flare-up light or torch in sufficient time to prevent collision.

All lights mentioned in subdivision (d) 1 and 2 shall be visible at a distance of at least 2 miles.

- (e) Oyster dredgers and other vessels fishing with dredge-nets shall carry and show the same lights as trawlers.
- (f) Fishing-vessels and fishing-boats may at any time use a flare-up light in addition to the lights which they are by this Article required to carry and show, and they may also use working lights.

- (g) Every fishing-vessel and every fishing-boat under 150 feet in length, when at anchor, shall exhibit a white light visible all round the horizon at a distance of at least one mile.

Every fishing-vessel of 150 feet in length or upwards, when at anchor, shall exhibit a white light visible all round the horizon at a distance of at least one mile, and shall exhibit a second light as provided for vessels of such length by Article 11.

Should any such vessel, whether under 150 feet in length, or of 150 feet in length or upwards, be attached to a net or other fishing gear, she shall, on the approach of other vessels, show an additional white light at least 3 feet below the anchor light, and at a horizontal distance of at least 5 feet away from it in the direction of the net or gear.

- (k) If a vessel or boat when fishing becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall, in day-time, haul down the day-signal required by subdivision (k): at night, show the light or lights prescribed for a vessel at anchor; and during fog, mist, falling snow, or heavy rain-storms make the signal prescribed for a vessel at anchor. (See subdivision d, and the last paragraph of Article 15.)
- (i) In fog, mist, falling snow, or heavy rain-storms, drift-net vessels attached to their nets, and vessels when trawling, dredging, or fishing with any kind of drag-net, and vessels line fishing with their lines out, shall, if of 20 tons gross tonnage or upwards, respectively, at intervals of not more than one minute, make a blast; if steam-vessels, with the whistle or syren, and if sailing-vessels with the fog-horn; each blast to be followed by ringing the bell. Fishing-vessels and boats of less than 20 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.
- (k) All vessels or boats fishing with nets or lines or trawls, when under way, shall, in day-time, indicate their occupation to an approaching vessel by displaying a basket or other efficient signal where it can best be seen. If vessels or boats at anchor have their gear out, they shall, on the approach of other vessels, show the same signal on the side on which those vessels can pass.

The vessels required by this Article to carry or show the lights hereinbefore specified shall not be obliged to carry the lights prescribed by Article 4 (a), and the last paragraph of Article 11.

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 12 points of the compass, viz., for six points from right aft on each side of the vessel, so as to be visible at a distance of at least 1 mile. Such light shall be carried as nearly as practicable on the same level as the side lights.*

ART. 11. A vessel, under 150 feet in length, when at anchor, shall carry forward, where it can best be seen, but at a height not exceeding 20 feet above the hull, a white light in a lantern so constructed as to show a clear uniform and unbroken light visible all round the horizon at a distance of at least 1 mile.

*A vessel of 150 feet or upwards in length, when at anchor, shall carry in the forward part of the vessel, at a height of not less than 20 and not exceeding 40 feet above the hull, one such light, and at or near the stern of the vessel, and at such a height that it shall not be less than 15 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 fairway shall carry the above light or lights and the two red lights prescribed by Article 4 (a).*

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 cannot be mistaken for a distress signal.*

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 ship-owners, which have been authorized by their respective Governments and duly registered and published.

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 2 feet in diameter.*

SOUND SIGNALS FOR FOG, ETC.

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 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.\* A sailing vessel of 20 tons gross tonnage or upwards 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, viz. :—

- (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 them.
- (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.
- (d) A vessel, when at anchor, shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.
- (e) A vessel, when towing, a vessel employed in laying or in 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 manœuvre as required by these 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, viz. : one prolonged blast followed by two short blasts. A vessel towed may give this signal, and she shall not give any other.

*Sailing vessels and boats of less than 20 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.*

\* 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 sea-going vessels.

## SPEED OF SHIPS TO BE MODERATE IN FOG, ETC.

ART. 16. Every vessel shall, in a fog, mist, falling snow, or heavy rain storms, go at 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.

## STEERING AND SAILING RULES.

*Preliminary—Risk of Collision.*

*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.*

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, viz. :—

- (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 windward shall keep out of the way of the vessel which is to leeward.
- (e) A vessel which has the wind aft shall keep out of the way of the other vessel.

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.

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 shall keep out of the way of the other.

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.



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 cannot 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 27 and 29.)*

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.*

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.*

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, i.e., 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 a crossing vessel within the meaning of these Rules, or relieve her to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel of the duty of keeping clear of the overtaken vessel until she is finally past and clear.*

*As by day the overtaking vessel cannot 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.*

ART. 25. In narrow channels every steam vessel shall, when it is safe and practicable, keep to that side of the fairway or mid channel which lies on the starboard side of such vessel.

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 fairway used by vessels other than fishing vessels or boats.*

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. *The words "short blast" 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, viz. :—

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 full speed astern."

*No Vessel under any Circumstances to neglect proper Precautions.*

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 look-out, 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.

## RESERVATION OF RULES FOR HARBORS AND INLAND NAVIGATION.

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.

## SCHEDULE II.

## 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, viz. :—

In the day-time—

1. A gun or other explosive signal fired at intervals of about a minute;
2. The International Code signal of distress indicated by N.C.;
3. The distant signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball;
4. A continuous sounding with any fog-signal apparatus.

At night—

1. A gun or other explosive signal fired at intervals of about a minute;
2. Flames on the vessel (as from a burning tar-barrel, oil-barrel, &c.);
3. Rockets or shells, throwing stars of any colour or description, fired one at a time, at short intervals;
4. A continuous sounding with any fog-signal apparatus.

ORDERS IN COUNCIL OF 30TH DECEMBER, 1884, AND 24TH JUNE, 1885.

ALTERNATIVE LIGHTS FOR TRAWLERS WHEN ENGAGED IN TRAWLING, HAVING THEIR TRAWLS IN THE WATER AND NOT BEING STATIONARY.

1884.—PART I.—STEAM VESSELS OF 20 TONS GROSS REGISTER TONNAGE OR UPWARDS.

(1) On or in front of the foremast head, and in the same position as the white light which other steam-ships are required to carry, a lanthorn, showing a white light ahead, a green light on the starboard side, and a red light on the port side; such lanthorn shall be so constructed, fitted, and arranged as to show an uniform and unbroken white light over an arc of the horizon of four points of the compass, an uniform and unbroken green light over an arc of the horizon of ten points of the compass, and an uniform and unbroken red light over an arc of the horizon of ten points of the compass, and it shall be so fixed as to show the white light from right ahead to two points on the bow on each side of the ship, the green light from two points on the starboard bow to four points abaft the beam on the starboard side, and the red light from two points on the port bow to four points abaft the beam on the port side; and (2) a white light in a globular lanthorn of not less than 8 inches in diameter, and so constructed as to show a clear, uniform, and unbroken light all round the horizon; the lanthorn containing such white light shall be carried lower than the lanthorn showing the green, white, and red lights as aforesaid, so, however, that the vertical distance between them shall not be less than 6 feet nor more than 12 feet.

1884.—PART II.—SAILING VESSELS OF 20 TONS NET REGISTER  
TONNAGE OR UPWARDS.

(1) On or in front of the foremast head a lantern having a green glass on the starboard side and a red glass on the port side, so constructed, fitted, and arranged that the red and green do not converge, and so as to show an uniform and unbroken green light over an arc of the horizon of twelve points of the compass, and an uniform and unbroken red light over an arc of the horizon of twelve points of the compass, and it shall be so fixed as to show the green light from right ahead to four points abaft the beam on the starboard side, and the red light from right ahead to four points abaft the beam on the port side: and (2) a white light in a globular lantern of not less than 8 inches in diameter, and so constructed as to show a clear, uniform, and unbroken light all round the horizon; the lantern containing such white light shall be carried lower than the lantern showing the green and red lights as aforesaid, so, however, that the vertical distance between them shall not be less than 6 feet and not more than 12 feet.

1885.—SAILING TRAWLERS OF ANY TONNAGE.

As regards sailing vessels engaged in trawling, such vessels having their trawls in the water, and not being stationary in consequence of their gear getting fast to a rock or other obstruction, if they do not carry and show the lights required by Article 6 of the Regulations aforesaid, or the other lights of the description set forth in Part II. of the Schedule to the Order in Council of the 30th of December, 1884, shall carry and show in lieu of the lights required by Article 6 of the Regulations aforesaid, or the other lights of the description set forth in paragraph 2 of the Schedule to the Order, other lights as follows, that is to say:—

A white light in a globular lantern of not less than 8 inches in diameter, and so constructed as to show a clear, uniform, and unbroken light all round the horizon, and visible on a dark night with a clear atmosphere for a distance of at least 2 miles; and also a sufficient supply of red pyrotechnic lights which shall each burn for at least 30 seconds, and shall, when so burning, be visible for the same distance under the same conditions as the white light. The white light shall be shown from sunset to sunrise, and one of the red pyrotechnic lights shall be shown on approaching, or on being approached by, another ship or vessel in sufficient time to prevent collision.

ORDER IN COUNCIL OF 18TH AUGUST, 1892.

LIGHTS TO BE CARRIED BY STEAM PILOT VESSELS.

A steam pilot vessel exclusively employed for the service of pilots, licensed or certified by any pilotage authority or the Committee of any Pilotage District in the United Kingdom, when engaged on her station on pilotage duty and in British waters and not at anchor shall, in addition to the lights required for all pilot boats, carry, at a distance of 8 feet below her white masthead light, a red light, visible all round 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 2 miles, and also the coloured side light required to be carried by vessels when under way.

When engaged on her station on pilotage duty and in British waters and at anchor she shall carry, in addition to the light required for all pilot boats, the red light above mentioned, but not the coloured side lights.

When not engaged on her station on pilotage duty she shall carry the same lights as other steam vessels.

## OIL ON ROUGH SEAS.

The Board of Trade desire to call attention to the following Memorandum, which has been issued by the Admiralty, on the USE OF OIL AT SEA FOR MODIFYING THE EFFECT OF BREAKING WAVES:—

“ Many further practical experiments at sea have been made since the report by Captain Chetwynd, R.N., to the Royal National Life-boat Institution, dated 30th September, 1884, on the use of oil for smoothing broken or troubled waters, which report was communicated to Commanders-in-Chief in Admiralty Circular Letter of 1st December, 1884, N.S.

“ As these further experiences go to show that the use of oil, under different circumstances, is of very extended and simple application, my Lords Commissioners of the Admiralty consider it desirable, in order that the facts may be generally known, to re-issue the report above mentioned, together with such other information as may serve for the guidance of officers, whose attention is hereby called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

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

- “ 1. On free waves, *i.e.*, waves in deep water, the effect is greatest.
  - “ 2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain; as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.
  - “ 3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.
  - “ 4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.
  - “ 5. It is useful in a ship or boat, both when running or lying-to, or in wearing.
  - “ 6. No experiences are related of its use when hoisting a boat up in a seaway at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.
  - “ 7. In cold water the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.
  - “ 8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from 1 to 2 gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.
- “ The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow—*e.g.*, from the cathead—and allowed to tow in the water.
- “ With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.
- “ Lying-to the weather bow and another position further aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward while the ship drifts.

"9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

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

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

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

## SPECIAL WARNING TO MARINERS.

### BUOYS AND BEACONS.

Wrecks have occurred through undue reliance on buoys and floating beacons always being maintained in their exact position.

They should be regarded simply as aids to navigation, and not as infallible marks specially when placed in exposed positions.

The lights shown by gas buoys cannot be implicitly relied on, as, if occulting, the apparatus may get out of order, or the light may be altogether extinguished.

A ship should always when possible be navigated by bearings or angles of fixed objects on shore and not by buoys or floating beacons.

### FOG SIGNALS.

Sound is conveyed in a very capricious way through the atmosphere. Apart from wind, large areas of silence have been found in different directions and different distances from the signals, in some instances even when in close proximity to the sound signal.

The mariner should not assume:—

1. That he is out of ordinary hearing distance because he fails to hear the sound.
2. That because he hears a fog signal faintly that he is at a great distance from it.
3. That he is near it because he hears the sound plainly.
4. That the distance from and the intensity of the sound on any one occasion is a guide to him for any future occasion.
5. That the fog signal has ceased sounding because he does not hear it, even when in close proximity.

### COMPASSES—HEELING ERROR.

The attention of mariners is hereby directed to the necessity of exercising a constant watchfulness in regard to the errors of their navigating compasses, more particularly to the heeling error, the neglect of which is doubtless a common, though often unsuspected, cause of the stranding of many vessels.

Serious changes frequently take place in the character and amount of the heeling error as the ship changes her magnetic lat.; (1) from the vertical force arising from the permanent magnetism of the ship, the error

from which is greatest in high lats., diminishes until the Equator is reached, where it is least, and increases again in the opposite hemisphere, but still retaining the same name; (2) from vertical induction in vertical soft iron, and transverse soft iron generally (such as beams, &c.), the error from which is greatest in high lats., diminishes until the Equator is reached, where it becomes nil, and increases again (but of an opposite name) as the vessel recedes from the Equator in the opposite hemisphere. It is difficult, therefore, to predict with any great accuracy the change that will take place, observations at every possible opportunity being the only reliable safeguard.

In the Nrn. Hemisphere in ships built with their heads from about S.E. through N. to S.W. (the usual effect of the permanent magnetism of the ship then conspiring with that of her vertical and transverse soft iron) the N. pt. of the compass needle, assuming the compass to be on the upper deck and on the after portion of the ship as usual, will, as a general rule, be drawn to windward or to the high side of the ship, the nearer the ship's head was to N. whilst building the greater the error that may be expected; the effect being to throw the ship to windward of her supposed position when steering on Nly. courses, and to leeward on Sly. courses, the error decreasing as the Equator is approached, and small, perhaps of a contrary name, in the Srn. Hemisphere.

In ships built with the heads from about S.E. through S. to S.W. (the usual effect of the permanent magnetism, and that of the transverse, &c., soft iron being then contrary to each other) the N. end of the compass needle may be drawn to leeward, depending upon whether the vertical force of the permanent magnetism or that of the induced magnetism of transverse and vertical soft iron predominates, but the error would then, as a general rule, be small in these lats. and large in the Srn. Hemisphere.

*It has been est. as a rule, however, that in the Nrn. Hemisphere (in compasses above the upper deck) in the majority of iron ships the N. pt. of the compass needle is drawn to windward or to the high side of the ship, the consequence being that if this is not allowed for a ship will go to windward of her supposed position on Nly. courses and to leeward on Sly. courses.*

The heeling error is always greatest with the ship's head at or near N. or S. by the disturbed compass, and least or nil with the ship's head E. or W. It is particularly important, therefore, should the vessel heel over either from the effect of the wind or the cargo when steering in a Nly. or Sly. direction, that the mariner should use every precaution and never lose an opportunity of ascertaining the errors of his compass.

The heeling error may be small or large, depending greatly upon the position of the compass—it has been known to exceed 2 degrees for every degree of heel of the ship—and is directly proportional to the amount of heel; consequently, if the error at N. or S. for 1 degree of heel is known, the error for any other direction of the ship's head and amount of heel can be found by the usual methods.

Mariners are further warned that the adjustment of compasses by magnets, soft iron, &c., which is for bringing the error within manageable limits and for equalizing the directive force of the needle, must only be considered approx. for the lat. in which the adjustment was made, and that they should lose no opportunity of verifying the error both in port and at sea, as it is usually constantly changing from numerous causes, the chief amongst which are heeling, change of lat., change of cargo, collision, after repairs, and from the ship remaining with her head in one direction for a length of time, &c.

## UNIVERSAL SYSTEM OF BUOYAGE.

The following rules of the "Universal System of Buoyage" have been adopted in Victorian waters:—

The term "Starboard Hand" denotes that side which would be on the right hand of the mariner, either going with the main stream of flood or entering a harbor, river, or estuary from seaward. The term "Port Hand" denotes the left hand of the mariner under the same circumstances.

Starboard Hand Buoys are called "conical," painted red with even numbers, and show the painted top of a cone above the water.

Port Hand Buoys are called "can," painted black with odd numbers, and show a flat top above the water.

Spherical Buoys show a domed top above water, and when used to mark middle grounds are distinguished by horizontal stripes of white colour.

Surmounting Beacons, such as Staff and Globe, are painted of one dark colour.

Staff and Globe are only used in Starboard Hand Buoys; Staff and Cage on Port Hand; Diamonds at the outer ends of middle grounds, and Triangles at the inner ends.

Mooring Buoys are painted red, and are either barrel, nun, or spherical buoys.

Cable Buoys, for marking submarine telegraph cables, are painted green, with the word "telegraph" painted thereon in white letters.

Buoys and marking of wrecks—

(a) All buoys and topsides of vessels used for marking wrecks are painted green, with the word "Wreck" painted thereon in white letters, and moored, where practicable, on the side of the wreck which is next to mid-channel.

(b) When a wreck-marking vessel is used it shall exhibit by day one ball on the side nearest the wreck, and two placed vertically on the other side at a height of 20 feet above the level of the sea. By night three fixed white lights similarly arranged, but not the ordinary white light, shall be shown from sunset to sunrise.

## REMARKS RELATING TO BUOYS AND MEANS OF FIXING POSITION OF VESSELS.

As no reliance can be placed upon buoys maintaining one position, they should therefore be regarded as warnings, and not as infallible marks for navigation. Mariners therefore, to fix their position should in preference use fixed objects and either bearings or angles to them from the ship. In the case of groundings and other casualties, pilots, exempt masters, and mariners generally should fix the position of the occurrence by sextant angles to prominent fixed objects where possible. In all such cases angles should be taken to several objects four to five in number, to obtain three to four angles between them; to insure greater accuracy, however, a complete round of angles should be taken, the addition of which should come to a little more or less than 360 degrees, according to the accuracy of the instrument and operation.

## SAILING DIRECTIONS.—VICTORIAN WATERS.

## FROM GLENELG RIVER TO CAPE HOWE.

**Glenelg River**, at the boundary between Victoria and South Australia, bears E.  $\frac{1}{2}$  N.  $15\frac{1}{4}$  miles from Cape Northumberland.

**Ruby Rock**.—Four miles W.S.W.  $\frac{1}{2}$  S. from the mouth of the Glenelg River, and about 2 miles from the shore, is Ruby Rock, with 3 feet of water over it at low water.

**Mount Ruskin**, 150 feet high, N.W. by W.  $1\frac{1}{2}$  miles from the mouth of the Glenelg, is situated on the boundary of South Australia and Victoria.

**The Coast**.—Eastward of the Glenelg River the coast in the bight is marked by a succession of hummocks about 150 feet high, partly covered with bushes, the sand in many places showing and reaching to the summits. Between 2 and 3 miles inland the ground rises to a height of about 300 feet, and is densely timbered.

This part of the coast should be given a wide berth, on account of the heavy swell which almost invariably rolls in.

At a distance of 12 miles N.W. of Cape Bridgewater the mariner is abreast of a range of hills 500 feet high, heavily timbered, and distant about 2 miles inland. At the western extremity of this range, and between it and the shore, is a group of high bare sand hummocks, and a large tract of sand is situated at from 4 to 7 miles from the cape.

**Mount Kincaid**, 692 feet high, lies N. by W.  $\frac{1}{2}$  W.  $12\frac{1}{2}$  miles from Cape Bridgewater, and about 4 miles from the shore. It is scarcely visible from seaward, its position being only indicated by a few trees slightly elevated above the surrounding country.

**Mount Richmond**, 711 feet high, lies  $7\frac{1}{4}$  miles N.  $\frac{1}{4}$  W. from Cape Bridgewater. It has a broad flat top, and is always conspicuous.

**Cape Bridgewater**, E.S.E. 39 miles from Cape Northumberland, has a flat summit 441 feet above sea-level, and falls gradually to the cliffy coast south and west of it, and to the cultivated land to the northward, the latter at its lowest part being elevated about 200 feet. The cape is visible 25 miles.

**Anchorage**.—Westward of Cape Bridgewater there is slight shelter from easterly winds, but as it is exposed to the prevailing winds and the heavy swell almost constantly rolling in it is not recommended, though steamers might use it with discretion.

**Bridgewater Bay**.—Eastward of Cape Bridgewater is the bight called Bridgewater Bay, but which, like the bay to the westward, cannot be recommended as an anchorage. A heavy swell rolls in during southerly and south-westerly breezes, and, except under favorable circumstances, vessels ride uneasily. The swell threatens to break in 20 fathoms, on a line between Capes Bridgewater and Nelson, and does actually break at nearly a mile off the shore. The current often sets outward along the shore of the cape.

In the bight between Capes Bridgewater and Nelson, but nearer the latter, there is a large conspicuous body of drift sand, just east of which is Mount Chaucer, a small peaked hill, 405 feet high.



**CAPE NELSON** lies E. by S. 7 miles from Cape Bridgewater, and is an irregular cape of jagged cliffs, 200 feet high, rising at the back and centre of the cape to lightly timbered and grassy hummocks, the highest of which is 459 feet high. Cape Nelson has an appearance somewhat similar to Cape Bridgewater, and is bold of approach to the south-eastward. From Cape Nelson the land trends northerly for nearly 3 miles, and thence easterly for 2 miles, where it suddenly turns S.E. to the promontory-shaped point, Cape Sir William Grant; this piece of coast is composed of limestone cliffs from 100 to 200 feet high.

**Cape Nelson Lighthouse**, on the southern extremity of the cape, in latitude 38 deg. 25 min. 45 sec. S., longitude 141 deg. 32 min. 55 sec. E., was first lighted in July, 1884. The tower is 79 feet high, constructed of stone, and painted white.

The light is a first order dioptric fixed white light, elevated 250 feet above the sea-level, and visible in clear weather at a distance of 19 miles.

The light is visible from seaward between the bearings of E.  $\frac{1}{2}$  S. (S. 84 degrees E.) and W.  $\frac{1}{2}$  S. (S. 84 degrees W.).

A red sector is shown to the eastward over the Lawrence Rocks, between the bearings of W.  $\frac{1}{2}$  S. (S. 84 degrees W.) and W.S.W.  $\frac{1}{2}$  W. (S. 73 degrees W.), and a red sector is also shown to the westward over the southernmost point of Cape Bridgewater, and 1 mile seaward of the cape, between the bearings of E.  $\frac{1}{2}$  S. (S. 84 degrees E.) and E. by S. (S. 79 degrees E.).

*Danger Light.*—A red light illuminating an arc of 180 degrees seawards is exhibited from the base of the tower, and so arranged as to be invisible to an observer 14 feet above sea-level until within 3 miles distant from the lighthouse. This auxiliary light was first exhibited in June, 1894.

*Caution.*—This auxiliary light is to warn mariners of their near approach to the shore, and when seen the course should be altered to seaward until beyond the range of the red light. In hazy or misty weather mariners should keep a good offing, and not rely on sighting this red light.

*Signal Station.*—Communication by International Code of signals. Signals telephoned to Portland, which is connected by telegraph.

*Life-saving Apparatus.*—A life-saving rocket apparatus is kept at the lighthouse.

**Cape Sir William Grant** lies N.E. by E.  $\frac{1}{2}$  E., 4 miles from Cape Nelson, and has a table summit the highest part of which is 222 feet high. It is a well-defined point, projecting 1 mile to seaward, with precipitous cliffs, about 150 feet high on all sides.

**Danger Point** lies N.E.  $\frac{1}{4}$  E. from the last-mentioned cape, forming a bight between, outside of which, at a distance of 6 cables south of the point, is a reef with 16 feet of water over it, and upon which the sea breaks heavily. A reef with 17 feet of water extends easterly, from the point to a distance of half-a-mile from the shore.

**Lawrence Rocks**, E.  $\frac{1}{4}$  N., 2 miles from Cape Sir William Grant, and S.E. by E., 1 mile from Danger Point, consist of two small but conspicuous islets of limestone. The larger rock has two summits, the higher of which is 132 feet above sea-level. The passage between Danger Point and the Lawrence Rocks is not recommended for shipping.

During the prevalence of strong southerly winds a current sets out through this passage, sometimes at the rate of 3 knots.

**Portland Bay** may be said to extend from Danger Point, N.E.  $12\frac{1}{2}$  miles, to the mouth of the Fitzroy River. The port of Portland consists of that portion of the bay contained within a line running due north from Danger Point to the opposite shore.

From Danger Point the south-west shore of Portland Bay trends N.W. by N. 1 mile to Blacknose Point, and thence in the same direction nearly 2 miles to Observatory Hill.

The shore about Danger and Blacknose Points is low, varying from 60 to 70 feet in height. Blacknose Point has a reef extending from it into 3 fathoms of water at a distance of nearly a quarter of a mile from the point.

From Observatory Hill the shore trends W.N.W. nearly half-a-mile to the entrance of Wattle Hill Creek, which winds westward by the southern boundary of the town of Portland; and from the entrance to the creek the shore curves along the front of the town northward for nearly a mile to Whaler Point.

**Whaler Point, or Look out**, is a limestone cliff 107 feet high, upon which stands the Portland Light-house. Off the point a reef of rocks extends a quarter of a mile, with 7 feet of water on its outer and shoalest part. There is no channel over this reef.

*Buoy*.—About a quarter of a mile east of Whaler Point, on the tail of the reef, a conical-shaped black and white chequered buoy is moored in 4 fathoms.

**Portland Harbor Light**.—This light-house previously stood on Observatory or Battery Hill, where it was erected in 1859, but was shifted to its present position on Whaler Point in March, 1890.

The tower, in latitude 38 deg. 20 min. 24 sec. S., longitude 141 deg. 36 min. 45 sec. E., is about 30 feet high, constructed of stone, and painted white.

The light is a fourth order dioptric fixed green light, elevated 135 feet above sea-level, and visible in clear weather at a distance of 12 miles; it is visible from seaward between the bearings of N.W.  $\frac{1}{2}$  W. (N. 50 deg. W.) and S.W. by S. (S. 34 deg. W.).

*Signals*.—All signals for vessels entering the port are made from the flagstaff near the light-house on Whaler Point.

*Pilot*.—There is a pilot stationed at Portland.

*The Shore* from Observatory Hill to Whaler Point, or what may be termed Portland Bay proper, is fronted by a sandbank which has been heaped up by the swell. The 3 fathoms edge of this sand bank lies a quarter of a mile from the shore, the water deepening outwards to 5 fathoms at a further distance of about  $3\frac{1}{2}$  cables.

**PORTLAND**, on the shore of the bay between Observatory Hill and Whaler Point, is the outlet of a large area of agricultural and pastoral country. It is a railway terminus, and 251 miles distant by rail from Melbourne, with which it has also water communication, two or three steam vessels calling during the week. It is a post and telegraph town.

**The Port of Portland** includes all inlets, rivers, bays, harbors, and navigable waters westward of and within a line bearing north from Point Danger to the opposite shore.

*Railway Jetty*, in the S.W. corner of Portland Bay, and in line with Julia-street, is 40 feet wide, and projects 1,200 feet from the shore in an E. by N. direction into 17 feet of water.

*Light.*—A fixed red light, visible in clear weather 2 miles distant, is shown from the outer end of the Railway jetty, and is cut to show from seaward between the bearings of W. by N.  $\frac{3}{4}$  N. (N. 70 deg. W.) and S. by W.  $\frac{1}{2}$  W. (S. 17 deg. W.).

*New Pier,* in line with Henty-street, and 700 feet northward of the Railway jetty, projects E. by N. 4 cables from the shore into 31 feet of water. This pier, at the outer end, is 40 feet wide for a length of 450 feet, with a least depth of 29 feet, low water. The outer end of the pier projects about 800 feet across the sector of red light shown from the Railway jetty.

*Light.*—A fixed green light, visible in clear weather, 2 miles distant, is shown from the outer end of the New Pier. This light is obscured so as to be invisible, from seaward, westward of a bearing of about N. 60 deg. W.

*Berthage.*—Vessels may berth at either side of the Railway jetty for 250 feet from the outer end if drawing 15 feet, and for 500 feet from the outer end if drawing 12 feet.

Mariners, unacquainted with all conditions of the port, are warned that it is considered unsafe to take oversea deep draught vessels alongside the New Pier unless under the supervision of the local pilot.

Traders to the port should supply themselves with good coir springs and all other necessary moorings.

*Life-boat.*—A life-boat with life-saving rocket apparatus is kept at the Railway jetty.

*Breakwater.*—Immediately to the eastward of the Railway jetty is a breakwater, built of open pile work at the inner end and of solid concrete at the outer end, and affords shelter to small boats from the swell that usually rolls into the bay.

*Anchorage.*—The best anchorage is with the light on the end of the Railway jetty bearing W. by S. in 6 to 7 fathoms at 5 cables off. At night vessels must not anchor outside the limits of the red light at end of Railway jetty.

*Explosives Anchorage.*—Eastward of an imaginary line bearing south to Observatory Point, and exceeding a distance of three-quarters of a mile from the shore.

*Directions—From the Westward.*—A vessel bound to Portland Bay from the westward should endeavour to pick up the high land of Cape Bridgewater, on nearing which Cape Nelson with its light-house will be seen; then steer to clear on the outside Lawrence Rocks, which lie E.N.E.  $\frac{1}{2}$  E. 6 miles from Cape Nelson and 1 mile from the coast. After clearing Lawrence Rocks, haul in to the northward into the bay until the light-house on Whaler Point is visible, when steer for it until breasting the houses of the township, when steer in for the jetty on the outer end of which is a small waiting shed; or, if intending to anchor, bring the end of the jetty to bear W. by S., and bring up in 6 to 7 fathoms. Should the wind be scant, a vessel may pass to the northward of the town until it bears S.W., and then back for the anchorage.

*By night.*—Vessels entering Portland Bay from the westward must not round the Lawrence Rocks until the green harbor light on Whaler Point becomes visible, or the light-house bears N.W.  $\frac{1}{2}$  W. (N. 50 deg. W.), after which a course may be shaped for the green light, the anchorage ground being reached when the red-light on Railway jetty bears W. by S.

*From the Eastward.*—A vessel bound to Portland Bay from the eastward should try and pick up Lady Julia Percy Island, which lies E.  $\frac{1}{2}$  N.  $15\frac{1}{2}$  miles from Lawrence Rocks, and may be passed at half-a-mile off; thence steer W. by N. for the port, when, if the weather be clear, Mount Clay on the northern shore of the bay and Cape Nelson to the westward may be seen.

*By night.*—Vessels from the eastward should pick up the green harbor light on Whaler Point on a bearing of about W. by N., steering for it until the red light at the outer end of the Railway jetty becomes visible, when a course may be shaped for the jetty or anchorage ground lying to the W.S.W. Care must be taken not to lose sight of the red light, which becomes invisible on nearing the chequered buoy marking the outer end of the reef off Whaler Point.

*Caution.*—Between Lady Julia Percy Island and the mainland, there is a passage 3 miles wide with dangerous rocks extending three-quarters of a mile off the mainland (Mills' Reef) with a breaking sea even further off. Owing to the heavy swell often found between the island and the mainland, the passage is not recommended for sailing vessels; but steamers using this passage should do so with caution, and give the north shore a wide berth.

*Tides.*—The extent of the rise and fall of the tide in Portland Bay is entirely dependent on the direction and force of the wind. It is high water, full, and change at 1 hr. 3 min.; springs rise about 3 feet.

**The Shore.**—From Whaler Point the land trends N. by W. for a quarter of a mile to a similar point, whence it recedes to the N.W. for nearly a mile, and then turning N. by E. for half-a-mile takes a long stretch N.E. for  $5\frac{1}{2}$  miles to the Surrey River, near which is the village of Narrawong. This long stretch of coast is only 6 to 12 feet above high water, but rises at a short distance back from the beach, and is densely timbered. A sandy beach fringes the coast, and off it is the Minerva Reef.

From the mouth of the Surrey River the land extends with a slight curve in an easterly direction nearly 8 miles to the mouth of Fitzroy River, the coast being a succession of steep sand hummocks, about 30 feet high, and nearly destitute of vegetation.

**Minerva Reef** extends almost the whole distance between the Surrey River and Whaler Point. Its shoal water of 9 feet does not lie more than half-a-mile from the shore, but 21 and 22 feet of water will be found at the distance of 1 mile. The whole forms a large area of uneven bottom on which the sea breaks heavily at times.

**Aspect.**—In clear weather, when off Portland Bay, Mount Napier, 1,400 feet high, is visible in the distance, and with Mount Clay, 612 feet high, at  $2\frac{1}{2}$  miles north of the mouth of Surrey River, will enable a stranger to identify the land in the vicinity. The appearance of Mount Clay is that of a flat-topped hill with a notch in the centre; but for the notch it would closely resemble Mount Richmond.

**The Coast.**—From the Fitzroy River, which is 12 miles to the north-east of Portland, the coast trends with a curve E. by S.  $\frac{3}{4}$  S. 10 miles to the entrance of Lake Yambuk, in a south-easterly direction from which is Mills' Reef.

From Lake Yambuk, Boulder Point bears S.E. by E.  $\frac{3}{4}$  E.  $5\frac{3}{4}$  miles. For the first half of this distance the coast is sandy, having bare sand and grassy hummocks immediately over it, the highest of which, Mount Hummock, is 213 feet high and 3 miles distant from Lake Yambuk. The remaining half of the distance is of a rocky character.

From Boulder Point the coast runs unevenly E.  $\frac{1}{4}$  N.  $4\frac{3}{4}$  miles to the south point of Griffith Island, and is strewn with boulders of various sizes, some uncovered at high water; a few sunken rocks lie about a quarter of a mile from the shore.

**Mills' Reef** lies 1 mile eastward of the entrance to Lake Yambuk and three-quarters of a mile from the shore, abreast of Lady Julia Percy Island. It consists of several rocks awash at high water and covered with masses of kelp, which help to denote its vicinity.

**Lady Julia Percy Island**, lying E.  $\frac{3}{4}$  N. 21 miles from Cape Nelson and  $4\frac{1}{2}$  miles from the mainland, is of triangular form, 155 feet high, flat-topped, and cliffy on all sides. From all points the island presents the same appearance, with the exception that the southern extremity is a few feet higher than the other parts, towards which the island has a slight decline. There is indifferent landing on the north side in a small bay.

**PORT FAIRY.**—For 7 miles on either side of Port Fairy the coast is low, that to the westward having grassy slopes with a few scattered trees, whilst that to the eastward is composed for the most part of bare sand hummocks about 60 feet in height.

In making this port from the southward the most remarkable land seen will be Tower Hill, lying 7 miles N.E.  $\frac{1}{2}$  N. from Griffith Island.

**Tower Hill**, 300 feet high, presents the appearance of a table-land, but that part more particularly named Tower Hill is a peak thrown up by volcanic agency in the centre of a fresh-water lake. From the westward Tower Hill itself is not usually visible, as it then appears in line with the higher table-land, which lies 1 mile to the eastward. When Tower Hill begins to bear northerly it opens out west of the table-land, and continues to be visible as a single conical peak. From the table-land, the land both to the eastward and westward is higher than the general coast line, and falls to about the same elevation at either side, that to the westward appearing to join Tower Hill.

Tower Hill is not only a good mark for Port Fairy, but also for the adjoining port of Warnambool, it being situated between the two places.

After making Tower Hill, Griffith Island will be the next conspicuous land visible.

**Griffith Island**, at the south end of the bay forming Port Fairy, extends in a north-easterly direction and is three-quarters of a mile long, half-a-mile wide at its broadest part, tapering away to the north eastward, where it is only 15 feet above high water. This low portion at its north-east end was formerly known as Rabbit Island, but has been joined to Griffith Island by artificial means, since which the sand has heaped up inside.

Griffith Island has two or three hummocks upon it, the highest of which, 74 feet high and standing as it does from the land, is more conspicuous than the adjacent part of the coast.

From the south extreme of the island, which is composed of large volcanic boulders, similar boulders extend to the eastward for a quarter of a mile, terminating in a hillock 10 feet high, known as Dusty Miller Island.

Sunken rocks extend for a distance of a cable from the southern shores of Griffith and Dusty Miller Islands, and continue to 1 cable off the eastern point of Griffith Island.

**The Port of Port Fairy** includes all inlets, rivers, bays, harbors, and navigable waters north-west of and within a line bearing N. 45 deg. E. from the eastern end of Griffith Island to the opposite shore.

**Port Fairy Harbor Light.**—This light-house, situated on the eastern point of Griffith Island; about 5 yards from high-water mark, in latitude 38 deg. 23 min. 33 sec. S., longitude 142 deg. 15 min. 28 sec. E., was built in 1859, the tower being circular, constructed of stone, and painted red.

The light is a fourth order dioptric fixed red light, varied by a bright flash every three minutes.

At a distance of 6 miles and upwards it will appear as a steady light for the space of 50 seconds, be suddenly eclipsed 17 seconds, then exhibit a bright flash for 6 seconds, and be again eclipsed for 17 seconds, when the steady light will re-appear.

When a vessel is within about 3 miles of the light the eclipses will be scarcely observable, a continued fixed light at that distance being in clear weather visible between the intervals of the bright flashes.

The light is elevated 41 feet above sea-level, and is visible from seaward between the bearings of N.E. by E.  $\frac{1}{2}$  E. (N. 62 deg. E.) and S. by E.  $\frac{1}{2}$  E. (S. 17 deg. E.) at a distance of 9 miles.

A white light is exhibited from one of the lower windows in the tower of the light-house and shows over the anchorage.

**Tidal Signals.**—The following signals, indicating rise of tide and depth of water in the River Moyne, are shown from the flagstaff at the light-house station, Port Fairy:—

10 feet of water in river	=	Low water.
10 $\frac{1}{2}$ " " "	=	A pennant.
11 " " "	=	A square flag.
11 $\frac{1}{2}$ " " "	=	A square flag and pennant.
12 " " "	=	Two square flags.
12 $\frac{1}{2}$ " " "	=	Two square flags and pennant.
13 " " "	=	Three square flags.

**Light—Look-out Hill.**—A green light, elevated 45 feet above sea-level, and visible in clear weather 3 miles distant, is exhibited from a house on Look-out Hill, near the shore end of the Port Fairy jetty, and is visible from seaward between the bearings of S.W. by W. (S. 56 deg. W.) and South.

**Back Passage** is a narrow channel between Griffith Island and the mainland, the western passage of which boats occasionally use in very calm weather. The bottom is rocky and uneven; the soundings varying from 4 to 12 feet. Just outside the line of sunken rocks at either side of the entrance to the passage the water suddenly deepens to 7 fathoms.

The coast to the westward of the passage is bordered by bare and sunken rocks, which extend from 1 to 2 cables from the shore. The shore itself is formed principally of large volcanic boulders.

**Moyne River**, flowing by on the east side of the town of Belfast, empties into Port Fairy north of Griffith Island. The entrance to the river has been improved by two stone training walls, which extend 1,500 feet from the shore in an E.N.E. direction. Between these walls a channel has been excavated to depths of 10 to 12 feet. From the entrance to the Belfast wharfs, the depth in mid-channel is about 10 feet at low water, but owing to the silt brought down and deposited during floods this depth cannot always be relied on. The width between the ends of the training walls at the entrance to the river is 350 feet, decreasing to 200 feet at the shore end of the works.

*Light—South Wall.*—A red and white light, visible in clear weather 3 miles distant, is exhibited from the outer end of the south wall at entrance to River Moyne. The light shows red to clear black buoy off entrance, and thence round southerly over foul ground to Griffith Island; and white from the black buoy round N. and W. over River Moyne entrance.

**Belfast**,\*—Situated on the west side of the Moyne River, and three-quarters of a mile from its mouth, is a post and telegraph town. It is a railway terminus 187 miles from Melbourne.

*Signal Station.*—Communication can be made by International Code.

*Wharfs.*—The depth of water at Belfast wharfs is about 10 feet at low water; there is berthage accommodation for two vessels of 10-ft. draught.

*Life-boat.*—A life-boat with life-saving rocket apparatus is kept on the east side of the river opposite the Government wharf.

*Buoy.*—From the light-house on the east point of Griffith Island a reef, dry at low water, extends east and north-east a cable from the shore. From the north end of the island rocky ground extends to the north and north-east, 3 and 2 cables from the shore respectively. The depth of water over this foul ground varies from 7 to 10 feet at its northern extremity, and in no place exceeds 15 feet. At its northern extremity a black nun buoy is moored in 17 feet of water, with Griffith Island light-house bearing S. by E. and flagstaff on Look-out Hill bearing S.W. by W.  $\frac{1}{4}$  W. This buoy lies about 480 yards off the Moyne River entrance, with the light on the south wall bearing S.S.W.  $\frac{1}{4}$  W. Vessels either steering for the anchorage or entering the Moyne River must pass this buoy on the port hand to avoid the foul ground to the southward of the buoy.

*Anchorage.*—The best anchorage for small vessels is in about 3 fathoms at about a cable's length north-west of the black nun buoy just described, with Griffith Island light-house bearing S.S.E. The anchorage for large ships is in 5 to 6 fathoms, with Griffith Island light-house bearing S.  $\frac{3}{4}$  W., and the flagstaff on Look-out Hill bearing S.W.  $\frac{3}{4}$  W.

Vessels trading to Port Fairy can pick up an anchorage in about 15 feet of water, a cable westward of the black nun buoy, but vessels anchoring during the continuance of a south-westerly gale may get as close in as their draught of water will permit.

The anchorage is bad with easterly winds, and no vessels are recommended to try and ride out a south-easterly gale.

*Explosives Anchorage.*—Eastward of an imaginary line bearing south-east to the eastern end of Griffith Island.

*Directions.*—After making out the hill on Griffith Island, steer so as to clear the reef which extends from the light-house, then haul up for the anchorage; or if bound to Belfast round the black nun buoy on the port hand, and then steer for the Moyne River entrance, keeping in mid-stream to the Belfast wharfs.

\* Also called Port Fairy.

*By Night.*—Vessels entering Port Fairy at night should steer in until the green light on Look-out Hill is opened out, when steer for it and anchor as convenient. In thick weather vessels should not attempt to enter the port.

*Caution.*—Vessels working in shore to the westward of Port Fairy must be careful not to bring the Griffith Island light-house to bear to the eastward of N.E. by E.  $\frac{1}{2}$  E., nor should the light be approached nearer than 1 mile until it bears W. by S., when a N.W. by W. course may be steered for the anchorage.

*Tides.*—It is high water, full and change, at Port Fairy at 1h. 02m.; ordinary springs rise 3 feet.

**The Coast.**—From the Moyne River entrance the coast trends N.N.W., and thence curves gradually round to the N.N.E. and E. by N. to Reef Point, which is N.E. by N.  $2\frac{1}{2}$  miles from the Griffith Island light-house. All this piece of coast has a sandy beach with grassy sand hummocks, until within a mile of Reef Point, when the hummocks are bare sand 50 to 65 feet high.

Off Reef Point volcanic boulders, from 2 to 9 feet in height, extend a distance of 2 cables, and sunken rocks extend half-a-cable further.

From Reef Point, Sisters Point bears E. by N.  $\frac{1}{2}$  N.  $1\frac{1}{2}$  miles, the coast between being a succession of bare sand hummocks 50 feet high. The whole distance between Reef Point and Sisters Point is filled with high water, half-tide, and sunken rocks.

**Sisters Point** is conspicuous from its having immediately over it two hummocks 65 feet high, so named from their similar appearance.

**Armstrong Bay.**—One mile E. by N. of Sisters Point is a small sand point fringed with boulders, north-east of which is Armstrong Bay. Sunken rocks are numerous and nearly fill it up. This bay is used by fishing boats.

From Armstrong Bay the coast is a sandy bight with grassy hummocks over it varying from 100 to 160 feet in height, and trends E.S.E. for about 6 miles to Middle Island west of Lady Bay. At between 1 and 2 miles from Middle Island is a tract of bare sand.

**Helen Rock** lies E.  $\frac{1}{4}$  S.  $2\frac{1}{2}$  miles from Sisters Point and S. by E.  $\frac{1}{4}$  E. from Tower Hill, at a distance of 1 mile from the shore, with 1 fathom over it and 8 to 10 fathoms close to it on all sides. The rock is of pinnacle shape, and so sharp that a lead would not rest on its summit. The sea rarely breaks on it, and coasters should give its vicinity a wide berth.

**Mount Warrnambool.**—In clear weather, and if a vessel be more than 5 miles from the shore, Mount Warrnambool will be visible; it has a round but not very even summit 707 feet above the sea-level. It lies from Warrnambool light-house N.E. by E.  $\frac{1}{4}$  E. 13 miles, and from Flaxman Hill N.  $\frac{3}{4}$  W. 14 miles. A low spur of the same hill lies about 3 miles to the westward.

**Lady Bay,** in which is included the port of Warrnambool, is an indentation of the mainland extending from the reef south of the Warrnambool breakwater, N. 71 deg. E.,  $1\frac{1}{2}$  miles to Hopkins River, from which Hopkins reef, awash at high water, projects one-third of a mile to the southward.

From Pickering Point at the west side of the Merri River mouth, the land trending W. by N.  $\frac{1}{2}$  N. for three-quarters of a mile, is composed of sand-stone cliffs, the shore having numerous indentations with half-tide



and sunken rocks lying off it, in some places to a distance of 3 cables. Immediately over this cliffy shore are numerous sand hummocks, in some cases grassed, but generally bare; the westernmost and highest of these is 115 feet high, the others vary from 60 to 80 feet. The northern shore of Lady Bay consists of low bare sand ridges with higher and well-wooded land at the back, on which is the town of Warrnambool, with its surrounding cultivated land. To the eastward of the Hopkins River the country is open, rising gradually from the shore eastward of the river, and terminating in a high grassy down, at  $1\frac{1}{2}$  miles from the coast.

**WARRNAMBOOL HARBOR.**—On the western side of Lady Bay are three small islands off which are numerous rocks. Inside these islands is the harbor of Warrnambool.

**Merri Island**, the westernmost island, lies 100 yards S.S.E. from Pickering Point, with which it is almost connected by half-tide rocks; it is 47 feet high and only about 200 yards in extent.

**Middle Island**, the central and largest of the three islets forming Warrnambool Harbor, is 250 yards long N.W. and S.E., and 100 yards broad; it lies S.E. of Merri Island, to which it is almost joined by rocks of various heights.

From Middle Island several half-tide rocks extend a cable's length in a southerly direction, and at a further distance of 4 cables is a dangerous rocky patch with 17 feet of water over it, upon which the sea breaks heavily; between this patch and the island the bottom is rocky and uneven.

**Breakwater Rock**, a small islet 18 feet high, lies about a cable to the eastward of Middle Island with a small rocky passage between with from 2 to 12 feet of water. One cable outside Breakwater Rock to the south and south-east are several half-tide ledges nearly joined to one another. Off these ledges again to the south-east at a distance of 1 cable is another half-tide reef with rocks awash at low water extending 1 cable from the reef and which terminate the rocky ground to the south-eastward of Breakwater Rock.

**The Port of Warrnambool** includes all inlets, rivers, bays, harbors, and navigable waters north of and within a line bearing S. 71 deg. 30 min. W. from the entrance of the Hopkins River to the outer end of the reef south of the Breakwater pier.

**Warrnambool Breakwater Pier**, built of concrete blocks, extends 1,000 feet in an E.N.E. direction from Breakwater Rock, and is connected with the shore at east side of Merri Creek entrance by a timber viaduct. The depth of water on the inside of the pier is subject to continual variation, especially at the outer end. Generally a depth of 15 feet can be got for a length of 500 feet, but at times sand patches with only 14 feet of water over them form for about 150 feet along from the outer end, and extend nearly 100 feet off the pier. Spring waling is provided on the inner side of pier. The pier is also connected by rail with the town of Warrnambool, and there is every facility for loading and unloading vessels at the port, an engine being in almost constant attendance on vessels supplying them with empty trucks as required.

**Life-boat.**—A life-boat with life-saving rocket apparatus is stationed at the inner end of the Breakwater pier.

**Pilot.**—There is a pilot stationed at Warrnambool.

*Signal Station.*—Communication by International Code. Warrnambool is connected by telegraph.

*Light.*—A fixed red light, visible in clear weather about 2 miles distant, is exhibited from a lamp-post on the end of the Breakwater pier. This light is obscured seawards, not being visible until in line with the Breakwater, when the light will bear about W.S.W.

*Buoy.*—A red cask warping buoy is moored 100 fathoms north of the end of the Breakwater in 21 feet of water.

**Warrnambool Tramway Jetty.**—About 2 cables north-west of the Breakwater pier, extends 800 feet from the shore in an E.S.E. direction, but is disused and closed against traffic.

*Light.*—A fixed green light, visible in clear weather about  $1\frac{3}{4}$  miles distant, is exhibited from a lamp-post at the inner end of the Warrnambool Tramway jetty.

**Warrnambool Harbor Lights.**—Consist of two leading lights, erected in 1871, and situated upon a ridge of hills immediately in front of the town.

The upper light in latitude 38 deg. 23 min. 27 sec., longitude 142 deg. 29 min. 15 sec., is a fourth order dioptric fixed white light, elevated 109 feet above the sea-level, and exhibited from a white stone tower. The light is visible from seawards between the bearings of N. 45 deg. W. and E. at a distance of 14 miles in clear weather.

The lower light, at 140 yards S.  $\frac{1}{4}$  W. from the upper one, is a fixed red light, elevated 87 feet above sea-level, and visible from seawards between the bearings of N. 2 deg. E. and N. 39 deg. W. at a distance of 5 miles in clear weather.

*Directions.*—The South Channel is the best entrance to Warrnambool Harbor, the leading marks for the fairway being the two light-houses on the northern shore, which, with the upper one just open west of the lower one, bearing N.  $\frac{1}{4}$  E., lead in in 6 fathoms water between the 5-fathom bank and the foul ground to the south-eastward of Breakwater Rock. In the centre of the channel are two rocky patches of 27 and 29 feet to the westward and clear of which the above marks lead; the bottom of the whole channel is rocky and uneven, varying from 9 to  $4\frac{1}{2}$  fathoms.

*From the Westward.*—Vessels approaching Warrnambool from the westward or southward will be greatly guided as to their relative position by Tower Hill, which is only 3 miles back from the coast and 7 miles west of Warrnambool.

Entering Warrnambool Harbor from the westward or southward vessels should take care to avoid the 17-ft. patch which lies S.S.E. nearly half-a-mile from Middle Island.

*From the Eastward.*—After approaching near enough to make out Warrnambool, either cross the bar to the south-eastward or, should it be discovered that the sea is breaking across the south-east entrance of the bay, haul off and stand to the westward until the line of leading light-houses be picked up, when steer in with them on as before directed.

Crossing the bar must depend entirely on the state of the weather, the great disadvantage being that vessels whilst crossing are broadside to the swell.

Vessels crossing the bar to the south-eastward are recommended not to approach too near the mouth of the Hopkins River, for in bad weather or with a heavy southerly swell the sea breaks a mile off the land. In fine weather, however, vessels cross in all directions, the bar extending S.W. from Hopkins Reef.

In working into the bay with the wind at N.W. care must be taken not to stand too near the Hopkins Reef, to avoid which it is advisable to fetch as near the S.E. reef as is consistent with safety before standing in on the port tack. By so doing, vessels with moderate sailing qualities should fetch far to windward of this danger, and in a tack or two gain an anchorage. Mariners are recommended to use the lead when standing in towards Hopkins Reef.

*By Night.*—Vessels entering Warrnambool Harbor from the westward or southward should first sight the red leading light (carefully avoiding the 17-ft. patch which lies S.S.E. half-a-mile from Middle Island), and bringing it in line with the white light, bearing north, steer in until the red light on the Breakwater pier or the green light on the jetty is opened, when steer for the pier or anchorage as desired.

From the eastward, either enter with the lights in one as just described or, if the weather be fine, cross the bar to the south-eastward, taking care not to shut in the white leading light nor bring it to bear to the westward of N.W. when standing towards the mouth of the Hopkins River.

*Caution.*—It is not safe to enter or leave Warrnambool Harbor in south-westerly or southerly gales, as the sea breaks across the entrance to the harbor with great violence.

*Remarks.*—Warrnambool Harbor may be considered the safest of the western ports of Victoria during south-easterly gales, owing to the outer swell being broken on the bar fronting the harbor to the south-eastward.

On the approach of a heavy south-westerly gale after making the land with night coming on, it is better to make for Portland Bay, which is easy of access, and affords good shelter until the gale abates.

*Anchorāge.*—Warrnambool Harbor is not adapted for large vessels to anchor in. The best anchorage is in about 15 feet water, W.N.W. 450 feet from the outer end of the breakwater; but vessels can anchor where most convenient, according to their draught of water, only endeavouring to take as much advantage of the shelter afforded by the breakwater as their own safety and convenience will permit.

All vessels using the port should be provided with good springs for their cables, as even in the finest weather there is a heavy range.

*Explosives Anchorage.*—Outside of an imaginary line bearing south to the seaward end of the Warrnambool breakwater.

*Signals.*—A danger signal for fishing boats and other small crafts, consisting of a chequered black and white cone, is shown from the eastern yard-arm at the signal station when the sea is breaking in the fairway rendering the entrance unsafe for such boats. It will be exhibited between sunrise and sunset only.\*

*Tides.*—It is high water, full and change, in Warrnambool Harbor at 1h. 07m.; springs rise about 3 feet. South-westerly winds cause the highest and easterly winds the lowest tides.

**The Coast.**—From 4 miles east of Warrnambool to Moonlight Head, which is 38 miles farther to the south-east, the coast is of a cliffy character, and presents an almost unbroken appearance, the only break to its uniformity being a broad-topped cultivated hill 220 feet high, over the east bank of Hopkins River, and a fall in the land 9 miles east of Warrnambool. The cliffs are higher as Moonlight Head is approached.

The coast from Hopkins River, at the eastern part of Lady Bay, to Flaxman Hill, E.S.E.  $\frac{1}{2}$  S., 14 $\frac{1}{2}$  miles, is nearly straight and apparently bold, but a heavy swell constantly rolls in and breaks in about 5 fathoms

\* Note.—Danger Signal.—A black ball at mast-head is shown from the flagstaff on the Breakwater Pier when the pilot considers it unsafe for vessels to enter the port.

of water; the coast thence continues to trend in the same direction, and is of the same character for a further distance of 3 miles, where it is locally known as the Bold Projection. Sunken rocks will here be found at a distance of a quarter of a mile from the shore. The Bold Projection is the only projecting part of the coast between Warrnambool and Moonlight Head, but otherwise is no more conspicuous than other parts of the coast in the neighbourhood.

**Flaxman Hill**, 262 feet high, bears S.E. by E.  $\frac{1}{2}$  E.  $14\frac{1}{2}$  miles from the mouth of the Hopkins River. At a quarter of a mile N.W. of Flaxman Hill is a second hill not quite so high, but sometimes more conspicuous, owing to its sandy appearance. The two hills together are a good guide to the locality of this part of the coast, which otherwise presents a great sameness of appearance, overhanging rocks forming the principal feature. About midway between Hopkins River and Flaxman Hill the coast range immediately over the cliffs is 242 feet above the sea-level, and rather higher than the adjacent land at either side. A large pile of stones has been built upon the summit of Flaxman Hill.

**Bay of Islands** is a small indentation of the coast S.E. by E.  $\frac{1}{2}$  E.,  $4\frac{1}{2}$  miles from Flaxman Hill and 18 miles from Warrnambool. The bay may be identified by its white cliffy appearance, varied by numerous small islands, all of the same character, the whole presenting a striking appearance to the eye.

From the western part of the Bay of Islands to Curdie Inlet, distant 4 miles E.S.E., the coast is irregular and cut into by bays, studded with small islands. The sea breaks heavily half-a-mile from the shore, and it is probable that sunken rocks are numerous and fringe the whole distance. It was not safe to sound off this piece of the coast, and therefore it should be carefully avoided.

**Curdie Inlet** is conspicuous from the sandy nature of the entrance, which is often barred across. Low sand-hills to the eastward of the entrance separate the waters of the inlet from the sea. At low water the fresh water discharges over the rocky ledge that stretches across the entrance. On the west side of the inlet, on the highest part of the coast, there is a conspicuous sand-patch which, together with the sand-hills to the eastward, make the location of the inlet discernible from their contrast with the cliffy coast on either side.

To the westward and close to the mouth of the inlet are several limestone rocks. On the east side of the entrance, and joined to the shore by a narrow neck of sand awash at high water, is the Schomberg rock, about 17 feet high, and other smaller rocks. Between these and the western rocks there is an opening one-third of a mile wide, across which the sea breaks violently as well as on the rocks at either side. From the Schomberg rock a ledge extends to the south-eastward, upon which the *Schomberg* was wrecked.

From Curdie Inlet, Hesse Point bears E. by S. 3 miles, the coast between being irregular and cliffy. From Hesse Point, the coast trends E. by N. 2 miles to the mouth of Port Campbell. At Curdie Inlet the appearance of the coast begins to change in consequence of the cliffs being backed by higher land.

**Port Campbell**, at the mouth of Campbell Creek, and about midway between Warrnambool and Cape Otway, is only suitable for small craft, being directly open to S.W. It is marked by two headlands, and is easily distinguished by Hesse Point at  $2\frac{1}{2}$  miles to the westward, and by a remarkable island, about 200 feet high and 2 cables off the shore, at  $1\frac{1}{2}$  miles to the eastward.

A sunken reef extends three-quarters of a mile in a S.W. by S. direction from the east head, and breaks heavily in all weather; and off the west head and the shore to the south-westward sunken rocks project from 1 cable at west head to 2 cables off at a quarter of a mile S.W. of the head.

Between these reefs is the entrance channel, which decreases from 600 feet wide at the seaward end of the reefs to 200 feet just inside west head, with depths likewise decreasing from 8 to  $3\frac{1}{2}$  fathoms.

*Jetty.*—There is a jetty at Port Campbell, about 150 feet long, 14 feet wide, with a T end 64 feet long and 18 feet wide, on the outside of which is a depth of 9 feet at low water.

*Buoys.*—There are two red cask buoys for warping purposes off the jetty at Port Campbell.

*Directions.*—Upon approaching Port Campbell from either side the sea will appear to break right across the entrance, but when the sandy beach becomes well open a passage will be seen between the breaks, and can be taken in moderate weather on the fairway marks.

*Fairway Marks.*—The left extreme of the east head in line with beacon on hummocks (N.E.  $\frac{1}{4}$  N.) leads between the east and west breaks until the two poles on Napier Bluff on the west side are in line (N. by E.  $\frac{1}{4}$  E.); which line is to be kept until the beacon on east head bears about E.  $\frac{1}{4}$  S., when steer for the jetty.

Mariners are reminded that a 6-ft. rock lies about 380 feet W.  $\frac{1}{4}$  S. from the beacon near the inner end of jetty, and eastward and southward of this rock is foul ground, with 7 to 8 feet of water over it at low water. This foul ground is a great protection, as the sea mostly breaks upon it, making the waters inside comparatively smooth.

*Tides.*—The mean rise and fall at Port Campbell is 4 feet. The set of the tide is principally south-easterly or outward across the east break.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus at Port Campbell.

*Telegraph.*—Port Campbell is connected by telegraph.

**The Coast.**—From Port Campbell the coast trends E. by S.  $\frac{1}{4}$  S. 3 miles to the Sherbrook River, and thence with a slight curve S.E. by E. 11 miles to Moonlight Head. Midway between Sherbrook River and the head is Ronald Point. At 1 and 2 miles east of the Sherbrook River are a few islets and rocks, known as the Sow and Pigs. At a distance of 1 to 3 miles west of Moonlight Head there are several ledges which cover and uncover, and which are skirted by a few sunken rocks at a quarter of a mile from the shore.

**Ronald Point**, lying midway between Sherbrook River and Moonlight Head, is a bluff 257 feet high, made conspicuous by a large body of drift sand to the eastward; the point forms the west head of the Gellibrand River. This river, though draining a large tract of country; is similar to Curdie's Inlet, Campbell Creek, and Sherbrook River, having a small mouth and barred across at intervals.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus kept at the adjacent village of Princetown.

**Moonlight Head** is bold, rounded, and densely timbered with an almost impenetrable undergrowth. The hills immediately over the coast are about 500 feet high, the highest being 546 feet; these hills form spurs of the Otway Ranges, which rise gradually at the back until at 2 or 3 miles from the coast they attain an elevation of over 1,000 feet.

The highest hill of the Otway Ranges west of Cape Otway is 1,800 feet high, and has a rounded summit, and lies N.E.  $10\frac{1}{2}$  miles from Moonlight Head.

Several rocks above water closely skirt the shore of Moonlight Head.

**The Coast** from Moonlight Head trends N.E. and E., and forms a bight to Lion Headland which is  $3\frac{1}{4}$  miles distant.

North-eastward of Moonlight Head, distant one-third of a mile, is Reginald Point with a small islet close to.

**Lion Headland** is formed of bold high cliffs, perhaps the highest on the coast of Victoria; here, too, the Otway Ranges have the greatest elevation when near the coast.

**Rotten Point** lies E. by S.  $\frac{1}{4}$  S. 4 miles from Lion Headland. Between these two points the coast forms a slight bend in which, at about 1 mile from Rotten Point, is Joanna River with a sand island at its mouth. Rotten Point is rocky, and has a rock awash at high water lying a quarter of a mile to the southward.

**The Coast** from Rotten Point trends S.E. by E. 7 miles to Cape Otway, with the Ayr River mouth nearly midway between. There are several conspicuous sand-patches about the mouth of Joanna River and Rotten Point, and there is a large body of drift sand just to the eastward of the Ayr River.

The coast between Rotten Point and Cape Otway is rocky, and the sea generally breaks in 5 fathoms of water; back from the shore are numerous sand-hills about 350 feet high and covered with stunted bush.

A conspicuous conical peak, 1,650 feet high, with a range of about the same elevation near it to the northward, lies N. by E. 10 miles from Cape Otway light-house.

**CAPE OTWAY**, E. by S.  $\frac{1}{4}$  S. 13 miles from Moonlight Head, and forming the northern point of the western entrance to Bass Strait, is a bluff cliffy head, 250 feet high, of a dark-brown colour, with patches of coarse sandstone rising to openly-timbered hummocks, not exceeding 350 feet in height. A rocky ledge, with 10 feet of water on its shoalest part, lies S.S.E. three-quarters of a mile from the cape; and a very heavy ripple extends 2 miles off shore with the light-house bearing N.N.W. to N. by E.

**Cape Otway Lighthouse**, on the south-western extremity of the cape, in latitude 38 deg. 51 min. 35 sec. S., longitude 143 deg. 31 min. E., was built in 1848. The present illuminating apparatus was first used in April, 1891. The tower is 62 feet high from ground to top of lantern, circular, constructed of stone, and painted white.

The light is a first order dioptric group-flashing white light, elevated 300 feet above sea-level, and visible in clear weather at a distance of 24 miles.

The light shows three bright flashes in quick succession every minute, and is visible from seaward between the bearings of E. by S. (S. 79 deg. E.) and W.  $\frac{1}{4}$  S. (S. 84 deg. W.). Between the limits of the white light and the coast on either side of the lighthouse the light shows red. The change of colour does not occur at once, an intermingling of red and white flashes being seen for some distance shorewards of the above bearings.

*Danger Light.*—A red danger light, illuminating an arc of 180 deg. seawards, is exhibited from the Cape Otway light-house, 48 feet below the main light. This light is so cut downward as to be obscured when approaching from seaward until 4 miles distant from the light-house, the light bearing N. by W., and will be visible until run out at 8 miles distant on a course bearing W. by S. or E. by N.

*Note.*—This red danger light is to warn mariners of their near approach to the shore, and when seen the course should be altered to seaward until beyond the range of the red light. In hazy or misty weather mariners should keep a good offing, and not rely upon sighting the red light.

*Caution.*—Vessels should not approach Cape Otway within a mile on a N.W. to N.N.E. direction, and to the westward not nearer than 2 miles, to avoid the reef to the S.S.E. of the cape. A heavy ripple extends nearly 2 miles off the cape.

Mariners should note the distinction between the Otway and Schanck lights.

The Otway light shows three bright flashes every minute.

The Schanck light shows one bright flash every two minutes.

*Signal Station.*—Communication by International Code of Signals. Signals telephoned to Apollo Bay, which is connected by telegraph.

*Fog Signals.*—One rocket is fired at intervals of ten minutes.

*Warning.*—The rockets explode at a height of about 600 feet above the sea-level, producing at the same time a sharp report which should be heard under favorable atmospheric conditions at a distance of from 5 to 6 miles, but circumstances may arise to prevent even the most powerful sound-signal from being heard 2 miles distant; therefore, when a signal is heard it should be assumed that the source of the sound is not more than from 1 to  $1\frac{1}{2}$  miles distant, and the necessary precautions taken accordingly.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus at Cape Otway light-house.

**The Coast.**— From Cape Otway the coast trends E. by N. 2 miles to Franklin Point, which is low and sandy, with some rocks lying near it.

From Franklin Point the coast trends nearly N.E.  $\frac{1}{4}$  N. 4.3 miles to Addis Point, and is characterized by high dark-coloured cliffs backed by densely wooded hills, which, at a distance of 2.5 miles N.N.E.  $\frac{3}{4}$  E. from Cape Otway, rise to a height of 2,297 feet, and extend to within 5 miles of Addis Point. At 8 miles N.E. of Addis Point the coast changes to sand hummocks with undulating hills at the back.

From Franklin Point the coast trends N.E. by N. 6 miles to Storm Point. Along this portion of coast, at three-quarters of a mile from Franklin Point, is the mouth of the Parker River, and at a further distance of  $2\frac{1}{2}$  miles from the point is the small bight, Blanket Bay, where the Cape Otway light-house stores are landed.

From Storm Point the coast trends N.N.E.  $\frac{1}{4}$  E.  $2\frac{1}{2}$  miles to Bunbury Point, with Point Hayley midway between, and from which Hayley reef; just above high water, projects half-a-mile from the shore.

**Henty Reef**, N.E.  $\frac{3}{4}$  E.  $9\frac{1}{4}$  miles from Cape Otway, lies about midway between Storm and Bunbury points, and  $1\frac{3}{4}$  miles from the shore. It is a dangerous reef, with 3 fathoms of water over it, on which the sea breaks heavily in moderate weather; there are 8 to 10 fathoms all round within a cable's length of its shoalest part.

*Beacons.*—Henty Reef is marked by the intersection of two lines drawn through four beacons on the mainland, each surmounted by a ball. The two south beacons, situated one-third of a mile S.W. from Point Hayley, bear from each other east and west, 200 yards apart, the rear one being painted white and the front one black. The two north beacons, situated on Bunbury Point, bear from each other S.E. and N.W., about 300 yards apart, the rear one being painted white and the front one red.

*Directions.*—If bound to the north-east, the black beacon near Point Hayley must be kept well open to the northward of the white one until the white beacon on Bunbury Point opens well to the north-eastward of the red beacon. In proceeding to the south-west, keep the red beacon on Bunbury Point well open southward of the white one until the white beacon near Point Hayley is well open south-westward of the black beacon.

**Apollo Bay**, on the north-east side of Bunbury Point, lies just under a high part of the Otway range, and may be known by the beacons on the point and the houses of the village of Krambruk along the shore of the bay.

A reef, on which the sea breaks heavily, extends off Bunbury Point for one-third of a mile.

*Anchorage.*—There is anchorage in Apollo Bay during west or south-west gales 8 cables off the shore in 6 fathoms water, with the white beacon on hill bearing S.W.  $\frac{1}{2}$  S. The holding ground is good, the bottom being shaly, with holes filled with sand. There is generally a swell in the bay, which is especially heavy during easterly or southerly winds.

*Jetty.*—Apollo Bay jetty extends from the shore E.N.E. 1,690 feet into 12 feet at low water.

*Light.*—A fixed red light, visible in clear weather 2 miles distant, is exhibited from the outer end of the new jetty at Apollo Bay.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus at Apollo Bay.

*Telegraphic Communication.*—There is telegraphic communication with Apollo Bay.

**The Port of Apollo Bay** includes all inlets, rivers, bays, harbors, and navigable waters west of and within a line bearing N. 20 deg. east from the eastern end of Hayley reef to the mouth of Wild Dog Creek.

**Cape Patton**, N.E.  $\frac{1}{2}$  E. 8 $\frac{1}{2}$  miles from Bunbury Point, is a bold dark-looking wooded head. S.W. by W., 1 $\frac{1}{2}$  miles from the Cape, a reef, with shoal water from 1 $\frac{1}{4}$  to 3 fathoms over it, projects half-a-mile from the shore.

**The Coast.**—From Cape Patton the coast trends N.E.  $\frac{1}{2}$  N. 1 $\frac{3}{4}$  miles to Hawdon Point, and forms a small bight. Nearly 2 cables off the point is the outer end of a rocky spit on which the shoalest water is 9 feet. From Hawdon Point the coast extends N.N.E.  $\frac{3}{4}$  E. 9 $\frac{1}{2}$  miles to Grey-Point, a low grassy projection with a low-water reef extending a quarter of a mile from it, and forming the south side of Loutitt Bay.

*Landings.*—Kennett River landing between the mouth of the river and Point Hawdon is 420 feet long, 8 feet wide, with a depth of 1 $\frac{1}{2}$  feet at low water at outer end. Rise of tide 5 $\frac{1}{2}$  feet.

Wye River landing, immediately to the northward of Point Sturt, is 320 feet long, 8 feet wide, with a depth of 5 feet at low water at outer end. Rise of tide 5 $\frac{1}{2}$  feet.

**Loutitt Bay**, at the head of which is the village of Lorne, lies about midway between Cape Otway and Port Phillip Heads.

**Loutitt Reef**, with 6 to 9 fathoms over it, extends off Grey Point E. by N. 1 $\frac{1}{2}$  miles.

*Anchorage* during S.W. and westerly gales may be obtained in Loutitt Bay to the north-westward of Loutitt reef in 5 fathoms water about 8 cables off the shore. The anchorage in this bay is preferable to that of Apollo Bay, there being less swell. Sailing vessels anchoring with westerly gales must prepare for a change of wind, as it often chops round to south and sometimes south-east.



*Jetty.*—Lorne jetty extends 580 feet from the shore in a N.E. direction, with 10 feet at low water alongside at the outer end.

*Light.*—A fixed green light, visible in clear weather  $1\frac{3}{4}$  miles distant, is shown from the outer end of Lorne jetty.

*Telegraphic Communication.*—There is telegraphic communication with Lorne.

**The Port of Lorne.**—Loutitt Bay includes all inlets, rivers, bays, harbors, and navigable waters west of and within a line bearing south 39 deg. east from the eastern side of Erskine River until abreast of the jetty.

**SPLIT POINT, or Eagle Nest Point,** N.E.  $\frac{1}{4}$  N.,  $7\frac{1}{2}$  miles from Grey Point, is of a reddish-brown colour, and appears like three cliffs together divided by dark ravines.

**Eagle Nest Reef,** which is awash, projects half-a-mile from the shore at two-thirds of a mile north-east of Split Point.

**Split Point Lighthouse,** situated on the southern extremity of the point (approximate) latitude 38 deg. 28 min. 10 sec. S., longitude 144 deg. 05 min. 45 sec. E. was first lighted in September, 1891. The tower is 83 feet high, constructed of concrete and colored white.

The light is a first order dioptric fixed red light, elevated 220 feet above sea-level, and is visible in clear weather at a distance of 18 miles. It is visible from seawards between the bearing of about N. 32 deg. E. and S. 62 deg. 30 min. W.

Between the limits of the red light and the coast at either side of the light-house the principal light shows white.

*Danger Light.*—An auxiliary white light, illuminating an arc of 180 deg. seaward, is exhibited 50 feet below the principal light, but is obscured to an observer 14 feet above sea-level until within 3 miles distance of the light-house.

*Note.*—These white lights are danger lights to warn mariners of their too close proximity to the land, and when seen the course should be altered to seaward to run them out.

*Signal Station.*—Communication by International Code of Signals. Signals are telephoned to Lorne, which is connected by telegraph.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus at Split Point light-house.

**Addis Point.**—From Split Point the coast trends N.E.  $\frac{1}{2}$  E.  $8\frac{1}{2}$  miles to Addis Point, with Roadknight Point lying about midway between.

**Demons Bay** lies between Roadknight and Addis Points. In the depth of this bay are Ingoldsby reefs, two rocks above water and surrounded by sunken rocks outside which there are 5 to 7 fathoms water. These rocks, upon which the sea breaks heavily, lie nearly three-quarters of a mile from the shore.

**Zealey Point** lies N.E.  $\frac{1}{4}$  N. 5 miles from Addis Point, and is fronted by a reef extending one-third of a mile from the shore and partially dry at low water. Close to this point to the south-westward is the outlet of Spring Creek, and to the north-westward is a small watering place known as Torquay.

From Zealey Point the coast trends about N.E. and E.  $9\frac{1}{2}$  miles to Barwon Head, and consists of low sand-hills.

**Victoria Reef**, on which there are 15 feet water, lies E.N.E. about  $1\frac{1}{4}$  miles from Zealey Point. The whole of the coast, for three miles to the north-eastward of Zealey Point, is fronted by rocky ledges extending one-half to 1 mile from the shore, and on which the sea at times breaks heavily. The depth of water over this foul ground at three-quarters of a mile off shore varies from  $2\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms.

**Ant Spit**, on which there are only 12 feet of water, lies W. by S.  $2\frac{1}{2}$  miles from Barwon Head, with its outer edge three-quarters of mile off shore.

**Charlemont Reef**, S.W. by W. 1 mile from Barwon Head, is a detached 9-ft. patch, with deep water about it.

**Barwon Head** is a saddle-shaped scrubby hummock 122 feet high, terminating seawards in Flinders Point, and appears from seaward like an island, on account of the low land in its rear. This head forms the south side of the Barwon River, which boats can only enter at high tide with smooth water, owing to the rocky ground at its mouth.

The **Port of Barwon River** includes all bays, inlets, rivers, and navigable waters westward and within a line bearing approx. N. 20 deg. E. from Point Flinders at the easternmost extremity of Barwon Head to a point at high water mark on the opposite shore in line with the western boundary of allotment 22, block IV., parish of Bellarine.

**The Coast**.—From Barwon Head a continuation of the low sandy coast curves eastward for 6 miles to Lonsdale Point, the outer western point of the entrance to Port Phillip.

A spit, having 9 to 15 feet of water on it, projects nearly 1 mile eastward of the mouth of the Barwon, whence a continuous rocky shoal, with 6 to 16 feet of water on it, fronts the shore for half-a-mile off, and extends almost to Lonsdale Point. From the outer edge of this shoal the soundings gradually increase to 10 fathoms at  $1\frac{3}{4}$  miles and 20 fathoms at  $2\frac{3}{4}$  miles off the shore.

**PORT PHILLIP** is an extensive bay, about 31 miles long north and south, and 20 miles wide at the middle, where, on the west side, it forms an arm (Western Arm) which extends W.S.W. for 15 miles to Geelong. At the north end of the bay the waters contract, forming the portion known as Hobson's Bay.

The **Port of Port Phillip** includes all inlets, rivers, bays, harbors, and navigable waters, not included in the ports of Melbourne and Geelong respectively, north of and within a line bearing S. 80 deg. E. from Point Lonsdale to Point Nepean.

**Port Phillip Heads**.—The entrance to Port Phillip, between Points Lonsdale and Nepean, is  $1\frac{3}{4}$  miles wide, but the reefs projecting from these points reduce the navigable channel to a clear width of about 6 cables. The line of leading lights at Queenscliff (see page 63) marking the fairway, so intersects the entrance that the navigable width to the westward of such line is 2 cables and to the eastward 4 cables. The least depth abreast of Point Lonsdale along the line of leading lights and for about 2,000 feet eastward therefrom is 37 feet; the least water for 250 feet westward of the line of leading lights is also 37 feet, but at about a cable westward of such fairway line the water shoals to 26 to 28 feet, continuing as foul ground of 24 feet to Lonsdale Rock.

**Point Lonsdale**, the western outer head of the entrance to Port Phillip, lies E.  $\frac{3}{4}$  N., 6 miles from Barwon Head, and can easily be distinguished by the new lighthouse near the extremity of the point, the look-out house and signal flagstaff, and the skeleton framework of the old wooden lighthouse.

**Lonsdale Reef**, which dries at half-tide, projects about  $2\frac{1}{2}$  cables S.E. from Point Lonsdale; and for a cable outside the dry reef in the same direction are several rocky patches with only 6 to 12 feet of water over them. At about 1 cable from Point Lonsdale, the reef is intersected by a channel carrying 5 feet at low water, which may be used in fine weather by boats.

**Lonsdale Rock**, in the western limit of the fairway, lies S.  $54\frac{1}{2}$  deg. E. 6 1-6th cables from the new lighthouse on Point Lonsdale and  $2\frac{1}{2}$  cables westward of the line of leading lights of the fairway. It is a small pinnacle rock with 3 fathoms of water over it and 4 to 5 fathoms close to.

**Point Lonsdale Lighthouse**, in latitude 38 deg. 17 min. 38 sec. S., longitude 144 deg. 36 min. 51 sec. E., is situated about 150 feet from the extremity of the point, and 530 feet S.  $54\frac{1}{2}$  deg. E. from skeleton tower of the old lighthouse. The tower was built in 1901, and is 70 feet high, constructed of concrete and painted white.

The light was first exhibited on the 20th March, 1902, and is a third order, dioptric, occulting white and red light, with periods of 12 seconds light and 3 seconds eclipse. It is elevated 120 feet above sea level and visible in clear weather for a distance of 17 miles.

From seaward the light shows as follows:—

Red	between the bearings of	S. 78 deg. E.	and	N. 61 deg. E.
White	"	"	"	N. 61 deg. E. "
Red	"	"	"	N. 43 deg. W. "
White	"	"	"	N. 88 deg. W. "
				N. 88 deg. W. "
				S. 78 deg. W.

**Signal Station.**—Communication by International Code. Point Lonsdale lighthouse is connected by telephone with the look-out station at Queens-cliff. The latter is connected by telegraph.

**Jetty and Life-boat.**—Just inside Lonsdale reef there is a jetty at which a life-boat and life-saving rocket apparatus are kept.

**Fog Signals.**—At Point Lonsdale station there is a fog signal, consisting of a siren apparatus of the fifth order, which is sounded in thick weather every two minutes, producing a high-pitched note of about four seconds' duration, which should be heard under favorable atmospheric conditions from 3 to 4 miles off. In the event of the siren becoming disabled, a fog rocket is fired every five minutes.

**Warning.**—The rockets explode at a height of about 600 feet above the sea-level, producing at the same time a sharp report which should be heard under favorable atmospheric conditions at a distance of from 5 to 6 miles, but circumstances may arise to prevent even the most powerful sound-signal from being heard 2 miles distant; therefore, when a signal is heard, it should be assumed that the source of the sound is not more than from 1 to  $1\frac{1}{2}$  miles distant, and the necessary precautions taken accordingly.

*Tides and Tidal Signals.*—The following signals with reference to the direction of the stream are exhibited daily from the tidal flagstaff near the Point Lonsdale lighthouse.

Quarter of Tide.	Flood Tide Signals.	Ebb Tide Signals.
1st quarter	Blue flag half-mast	Blue flag half-mast with ball under
2nd quarter	Blue flag mast-head	Blue flag mast-head with ball under
3rd quarter	Red flag half-mast	Red flag half-mast with ball under
4th quarter	Red flag mast-head	Red flag mast-head with ball under

*Night Signals.*—The following signals are exhibited each night between sunset and sunrise from the Point Lonsdale lighthouse, below the main light:—

Flood Tide.	Ebb Tide.
One Green Light	Two Green Lights

By attention to these signals a master will know the state of the stream whether flood or ebb, which cannot always be calculated in the usual manner owing to the influence of the winds.

The signal-keeper has instructions if he sees vessels approaching the Heads and running into danger to warn them by the International Code of Signals; strangers should therefore watch these signals.

**Point Nepean**, the eastern head of the entrance to Port Phillip, is the western termination of the peninsula between the south shore of Port Phillip Bay and the coast. This point is higher than Point Lonsdale, and marked by a white beacon on its extremity.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus kept at Point Nepean.

**Nepean Reef** projects from Point Nepean 5 cables in a westerly direction to Corsair reef, and is dry at low water out for  $3\frac{1}{2}$  cables. On the dry reef, at 2 cables from Point Nepean, is a red triangular-shaped beacon with ball on top known as Rock beacon. Nepean reef continues from Corsair rock to the northward of Point Nepean, where it is a cable off the point.

**Corsair Rock**, at the outer end of Nepean reef, is about 20 feet in diameter, with 8 feet of water over it, and 3 to 5 fathoms close to on the westward. This rock lies  $3\frac{1}{2}$  cables from Rock beacon, and is in line with it and the white beacon on Point Nepean on an easterly bearing.

**The Rip.**—For about half-a-mile just outside Port Phillip Heads there is a rocky flat with 6 to 8 fathoms over it. The water deepens outside this flat to 12 and 15 fathoms, and inside the Heads to as much as 15 to 42 fathoms. This inequality of depth, combined with tidal streams running 5 to 7 knots, causes the well-known "Race" or "Rip," which during or immediately after a south-westerly gale breaks so furiously as to be dangerous to small vessels. The time of slack water, flood, full, and change in the Rip is about 2h. 0m.

**Victory Shoal**, in the middle of the bight between Point Lonsdale and Shortland Bluff, has 11 to 14 feet of water on its outer edge at two-thirds of a mile from the shore and in line between Point Lonsdale and Shortland Bluff; the least depth of water on the shoal is about 6 feet. Owing to the dangerous foul ground in the bight, all vessels should avoid the locality.

**Shortland Bluff**, the inner western head of the entrance to Port Phillip, and about  $2\frac{1}{4}$  miles N.E. by E. from Point Lonsdale, is the south-western extremity of the peninsula between the entrance and Swan Bay to the northward. The bluff is about 50 feet high, and is well marked by the two lighthouses, obelisk, look-out and telegraph station, and flagstaff. The obelisk is a little to the eastward of the front lighthouse (low light), and is about 50 feet high, with its lower half painted white and upper half red.

Immediately to the northward of Shortland Bluff is the township of Queenscliff, a favorite sea-side resort.

**Signal Station.**—Communication by International Code. Queenscliff is connected by telegraph and telephone.

**QUEENSCLIFF LIGHTS.**—The High Lighthouse, situated on Shortland Bluff, is a tower 81 feet high, built of bluestone, which retains its natural colour.

The light is a second order catadioptric fixed white light, elevated 130 feet above high water, and is visible in clear weather at a distance of 17 miles.

From seaward the light is visible between the bearings of N. 51 deg. E. and N. 6 deg. E. Within Port Phillip Heads the light will be visible from N. 51 deg. E. through north and west to S. 56 deg. W.

**The Low Lighthouse**, situated S.W. by S. 355 yards from the high lighthouse, is a white tower from the top of which, at an elevation of 90 feet above sea-level, is exhibited a third order dioptric fixed white and red light. The white light is visible in clear weather about 15 miles, and the red light 12 miles.

From seaward the light shows white between the bearings of N. 51 deg. E. and N. 38 deg. E. over the dangers extending from Point Lonsdale; red between the bearings of N. 38 deg. E. and N. 24 deg. E. over the clear navigable channel between the Heads; white again between the bearings of N. 24 deg. E. and N. 79 deg. W. outside the Heads over the dangers of Point Nepean and round inside the Heads to a line from the lighthouse along the north side of the South Channel.

**Caution.**—Mariners entering Port Phillip Heads by night should keep within the sector of red light shown from the Low lighthouse; the change of colour of the low light from red to white indicates that the vessel is either approaching Lonsdale Rock on the western or Corsair Rock on the eastern side of the fairway.

A sector of red light is exhibited from the low lighthouse, visible between the bearings of about S. 64 deg. W. and S. 69 deg. W. This red sector only marks the S.W. passage of the West Channel between the buoys marking the Royal George Shoal and Nos. 1 and 3 black can buoys marking the edge of the bank to the northward.

**Leading Marks.**—The two lighthouses on Shortland Bluff kept in line bearing N.E. by N. (N. 34 deg. E.) lead through the fairway of entrance to Port Phillip is not less than 37 feet at low water.

The two beacons in Lonsdale bight kept in line bearing N.N.W. (N. 23 deg. W.) lead in through the Heads, in about 6 fathoms at low water. The outer or front beacon is triangle shaped, topped with a disc and painted white; and the inner or rear beacon is shaped to an inverted triangle, painted black with a vertical white central strip. Such beacons do not define the line of deepest water through the Heads, but may be used as leading marks for the navigation of vessels entering from or leaving towards the eastward.

To clear Lonsdale Rock.—Swan beacon (white with a red top), situated on S.E. shore of Swan Island, kept open of Shortland Bluff, bearing N.E.  $\frac{1}{2}$  N. (N. 39 deg. E.) leads 400 feet to the eastward of Lonsdale Rock. Swan beacon, bearing N. 39 deg. E., is in line with the inner lamp-post on the Queenscliff new pier, about 140 feet shoreward from the outer end.

To clear Corsair Rock.—Corsair Rock is cleared by keeping the low lighthouse on Shortland Bluff in line with the centre of the military officers' quarters, about 50 yards westward of the high lighthouse on a bearing N.N.E.  $\frac{1}{4}$  E. (N. 25 $\frac{1}{2}$  deg. E.), until the white beacon on Point Nepean is well open to the north of the red beacon (Rock beacon) when going in, or well open to the south when going out.

**Queenscliff Jetties.**—There are two jetties at Queenscliff, the old or northernmost one being 500 feet long, 20 feet wide, with a **T** end 240 feet long, on the outside of which is a depth of 9 feet at low water.

*Light.*—A fixed red light, visible 2 miles distant, is shown from near the southern end of the old jetty.

*New Jetty,* about 1,000 feet to the southward of the old jetty, is 26 feet wide, and projects from the shore in a S.E. by E. direction for about 2 cables, with an **L** end 300 feet long, 30 feet wide, on the outside of which is a depth of 11 feet at low water.

*Lights.*—Two fixed green lights, visible in clear weather 1 $\frac{3}{4}$  miles distant, are exhibited from lamp-posts erected on the new jetty, one at the inner angle of **L** end, and the other at 100 feet therefrom on the northern side of the jetty.

*Buoys.*—A black cask buoy, in 11 feet of water, is moored 2 cables S. 18 deg. W. from the southern end of the **L** portion of new jetty, and marks the outside of the rocky patch known as Draper's Reef, which extends eastward from the shore at the foot of the high light.

A red cask buoy, in 10 feet of water, is moored 2 cables south from the southern end of the **L** portion of new jetty. Shoal water of 8 to 9 feet extends for over a cable north-eastward of this buoy. Vessels using the South Channel to the new jetty should leave this buoy to starboard and steer straight for the jetty in not less than 10 $\frac{1}{2}$  feet at low water.

A red cask buoy, in 12 feet of water, is moored about East 1 $\frac{1}{2}$  cables from the N.E. end of the **L** portion of new jetty, and marks the port side of the North Channel leading to the Queenscliff new jetty. Vessels approaching the Queenscliff old jetty may pass this buoy on either side.

A black cask buoy, in 14 feet of water, is moored about 4 cables E.N.E.  $\frac{1}{4}$  E. from the northern extremity of the **L** end of the new jetty. This buoy lies about W.S.W.  $\frac{1}{4}$  S. 6 $\frac{1}{2}$  cables from No. 1 buoy, West Channel, and about half-a-cable shoreward of the north side of the fairway. All vessels should keep to the southward of this buoy to avoid the 'foul ground to the northward, on which there are patches with only 6 or 7 feet of water over them at low tide.

*Life-boat.*—A life-boat, with life-saving rocket apparatus, is kept at the Queenscliff new jetty.

**Swan Island**, to the north-eastward of the Queenscliff peninsula, from which it is separated by the shallow opening forming the south entrance to Swan Bay, is 2 miles long and 1 mile across at the broadest part. The island is low and marshy, with a ridge of sand hummocks along its south-eastern shore.

*Swan Island Beacon*, on the south-east shore of Swan Island, is about 75 feet high, painted white with a red top. Keeping the beacon open of Shortland Buff, bearing N.E.  $\frac{1}{2}$  N. (N. 39 deg. E.), clears Lonsdale Rock.

*Swan Island Bank*.—A bank with irregular depths of 3 to 15 feet extends out from the south-eastern shore of Swan Island, a distance of 5 to 7 cables eastwards of Swan Beacon; the edge of the bank is not well defined, and subject to constant change in depth, with formation of sandy knolls carrying 14 to 15 feet, and 19 to 20 feet between them.

**Quarantine Station** is situated about 3 miles inside Port Phillip Heads, on the southern shore of the Bay, its boundaries being marked by two flagstuffs about  $1\frac{1}{4}$  miles apart, the westernmost one lying  $1\frac{1}{4}$  miles east of Point Nepean. The whole of the shore fronting the quarantine station is steep-to, there being 3 fathoms at half-a-cable and 5 fathoms at 1 cable off.

*Quarantine Jetty*, about 4 cables west of the flagstaff marking the eastern boundary of the station, is 255 feet long, with a T end 63 feet long, 17 feet wide, along the outside of which there are 17 feet at low water.

*Light*.—A fixed green light, visible in clear weather  $1\frac{1}{2}$  miles distant, is shown from the outer end of quarantine jetty.

*Submarine Cables*.—Two submarine telegraph cables are laid between Swan beacon (Swan Island) and the quarantine west boundary flagstaff. Both cables cross the Royal George Shoal about 2 cables eastward of No. 1 Royal George buoy, whence they divide, one passing about half-a-cable eastward and the other  $1\frac{1}{2}$  cables westward of the stone annulus (Pope's Eye Fort). The cables lie respectively 1 and 2 cables eastward of the Pope's Eye buoy, whence they run almost in a direct line to a point on the southern shore about half-a-cable westward of the quarantine west boundary flagstaff. Mariners, boatmen, and others are, therefore, warned by Port Regulation No. 26 of 1904, under penalty not exceeding £100, not to anchor within 2 cables' length on either side of an imaginary line crossing Port Phillip Bay from Swan Beacon to the Pope's Eye Fort, and thence to the quarantine west boundary flagstaff on the southern shore.

**Observatory Point Light**, on the southern shore of Port Phillip, N. 74 deg. W. 2 cables from the quarantine west boundary flagstaff, is an iron skeleton beacon, from which at an elevation of 55 feet above high water is exhibited a fixed white light, visible in clear weather 7 miles distant. Such light illuminates an arc of 20 deg. between the bearings from seaward of S. 4 deg. W. and S. 24 deg. W., and when kept in line with the white occulting light of No. 2 gas beacon on Pope's Eye annulus, bearing S.  $18\frac{1}{2}$  deg. W. leads through the West Channel between the buoys southward of No. 12 gas buoy. The westernmost limit of the light cuts about a cable westward of the buoy marking the south-western end of the Royal George Shoal.

**Anchorage**.—Vessels having entered and cleared Port Phillip Heads may proceed north-eastward for the anchorage off Queenscliff; or, if of heavy draught, eastward for the anchorage off Quarantine Station.

*Off Queenscliff.*—Vessels detained inside Port Phillip Heads may, during northerly or westerly winds, anchor in  $6\frac{1}{2}$  fathoms, with the high light bearing W.  $\frac{1}{4}$  N., and in line with No. 1 buoy, West Channel, and Swan beacon; or, at night, with the white occulting light of No. 2 beacon, West Channel, bearing N  $\frac{1}{4}$  E. Vessels of light draught, when anchoring off Queenscliff, should, in order to keep the fairway to the West Channel clear, bring up as close as possible to the N.W. side of the channel. To avoid obscuration of the Observatory Point light, mariners are warned not to anchor within 2 cables on either side of the line of No. 2 beacon (Pope's Eye annulus) and No. 2 buoy on the north-eastern end of the Royal George Shoal.

*Off Quarantine Station.*—If from quarantine regulations, southerly gales, or other causes, it be necessary to anchor off the quarantine station, vessels may bring up abreast of the station in 8 to 9 fathoms at a half to three-quarters of a mile from the shore; and, at night, with the green light on quarantine jetty bearing south and the high light at Queenscliff bearing N.W.  $\frac{1}{4}$  W. (N. 53 deg. W.).

*Not to Anchor in the Channels.*—It is not advisable in bad weather to anchor in either the West or South Channels, on account of the stream and loose nature of the bottom. In S.W. gales, however, small vessels will find good shelter in 16 or 18 feet of water about a quarter-of-a-mile E. by N. from the N.E. end of Swan Island. Vessels bound up and caught in the South Channel with a northerly or north-westerly gale will find anchorage in Capel Sound in 5 to 7 fathoms, sandy bottom, by bringing up to the southward of the Pile lighthouse, with White Cliff bearing S.W., and the Eastern lighthouse bearing E.

**Directions for Port Phillip.**—From the Westward.—Vessels from the westward and bound for Port Phillip usually make the high bold land of Cape Otway. The cape is easily distinguished by its lighthouse, described on page 56, and vessels passing within signalling distance are recommended to show their numbers and communicate any public intelligence they may have.

It is desirable to round Cape Otway at a distance of not less than 3 or 4 miles, and when the light-house bears N. by W. 5 miles distant, the course and distance to Port Phillip Heads will be N.E. 65 miles, and giving an offing of  $2\frac{1}{2}$  miles outside Henty Reef, to avoid which see page 59. After passing Henty Reef vessels will be well clear of all dangers by giving the coast a berth of not less than 3 miles.

At 36 miles N.E. of Cape Otway is Split Point, which is marked by a light-house, described on page 60. After proceeding 13 miles past Split Point, vessels will now be inside pilot waters, and should not proceed further without the requisite pilot aboard; but, if exempt from pilotage, should keep on, picking up as soon as possible, on the port bow, the Point Lonsdale light-house (painted white), situated near the outer extremity of the western head of Port Phillip entrance, and the Queenscliff leading lights almost right ahead. When about 4 miles from the entrance bring the Queenscliff leading lights in line (N. 34 deg. E.), keeping them on or open to the eastward so that the High light is in line with the obelisk (situated 80 feet due east from the Low light), on a bearing of N.  $30\frac{1}{2}$  deg. E. until a good  $\frac{1}{2}$  mile inside the Heads. A course may now be shaped for the South Channel or West Channel, as desired.

*From Westward by Night.*—Mariners making Port Phillip Heads from the westward should not lose sight of the fixed red light on Split Point, until they see the white occulting light on Point Lonsdale, which should in clear weather be picked up after proceeding 10 miles from Split Point light abeam.



Soon after picking up Point Lonsdale white light, the fixed white lights from the Queenscliff High and Low light-houses will respectively come into view. After picking up the Queenscliff lights vessels will be in pilot waters, and should signal for the requisite pilot; but, if exempt from pilotage, should steer to get into the red sector shown from the Queenscliff Low light-house, which will be first seen on a bearing of N. 38 deg. E. Thence bring the Low light (red) in line with the High light (white), bearing N. 34 deg. E., and enter the Heads with the leading lights in line, or slightly open to the eastward, until the occulting light showing inside the Heads from Point Lonsdale light-house has been passed. A course may then be shaped for the South or West Channel, as desired.

Sailing vessels making Port Phillip Heads from the westward; and obliged to stand off and on shore between Split Point and the Heads, should not shoal the water to less than 20 fathoms, nor lose sight of the fixed red light on Split Point, until getting well within the range of the Point Lonsdale occulting white light, which marks the safe navigable waters approaching Port Phillip Heads.

*From the Eastward.*—Vessels from the eastward and southward usually make the land about Cape Schanck, which lies 17 miles to the south-eastward of Port Phillip Heads, and cannot be mistaken owing to its bold character. The Cape is a narrow cliffy headland, with the remarkable Pulpit Rock close off the extremity. The light-house (painted white) stands on the western and highest side of the Cape, about 4 cables from the extremity, and exhibits a fixed and flashing white light. A red danger light, to warn mariners of their too close approach to the shore, is shown about 30 feet below the main light, and only becomes visible when about 3 miles or less from the light-house.

It is recommended to sight Cape Schanck before running far into the bight for Port Phillip, and should the wind blow strong from the southward it is not safe to run without having seen it.

Vessels having passed Cape Schanck should keep a good offing in proceeding towards the Heads until they open out the light-houses at Queenscliff, which are not seen before bearing about N.  $\frac{1}{2}$  E., owing to the intervening land near Point Nepean.

*From the Eastward by Night.*—Vessels having passed Cape Schanck light about 3 miles off should pick up the occulting white on Point Lonsdale, which should be kept in sight until the leading lights at Queenscliff are brought in line, then steer through the entrance fairway as directed for vessels from the westward.

*Heavy Draught Steamers.*—Mariners in charge of heavy draught steamers are directed, when crossing the Rip Bank, to keep the High light in line with the obelisk (standing 80 feet east of the Low light), on a bearing N.  $30\frac{1}{2}$  deg. E., when entering, and the High light showing midway between the Low light and obelisk when clearing the Heads.

To insure keeping within the limits of the deep-water channel, mariners should not keep eastward of the line of the obelisk showing midway between the High light and Look-out house, bearing N.  $28\frac{1}{2}$  deg. E., when entering Port Phillip Heads, and not westward of the line of leading lights when clearing the Heads.

The Look-out house is situated about 60 feet N.W. by W. from the High light-house.

The line of the obelisk and High light bearing N.  $30\frac{1}{2}$  deg. E. now marks, approximately, the middle of deep-water channel.

*Caution not to Heave-to.*—On no account should a vessel be heave-to when waiting for daylight near Port Phillip Heads. Several vessels that have done so have drifted into danger from this cause, combined with inattention to the lead and the state of the tide.

**Causes of Wreck at the Heads.**—A careful inquiry into the casualties which have occurred at the entrance of Port Phillip has shown that in nearly every case they have taken place in consequence of the vessels either attempting to enter the Heads at night without a pilot or against a strong ebb stream, which, it must be remembered, runs partly athwart the entrance with great force, frequently at the rate of 7 knots, causing a high confused tumbling sea, which, in southerly or westerly gales, often breaks from point to point. The mariner must not suppose that because he has a fine fair wind outside the Heads he can always force his vessel against the ebb. To this error is attributable the loss of several vessels. The wind, although fresh outside, frequently falls light just as the vessel gets into the tide-ripple between the Heads, when she becomes unmanageable; and even with a strong breeze vessels often sheer athwart the tide, which hereabouts forms a series of strong irregular eddies.

**Pilots.**—The pilot establishment at Port Phillip Heads consists of two steam pilot vessels, one of which is kept constantly cruising outside, within the limits of the cruising ground, and the other at the inner station or anchorage off Queenscliff.

The cruising station extends seawards from Port Phillip Heads to a point distant 15 miles S.W. by S. from the centre of Port Phillip Heads. From this point the western boundary extends N.W. by N. towards the shore at Zealey Point, and the southern boundary E.  $\frac{1}{2}$  N. towards Cape Schanck until Arthur's Seat bears N.E.  $\frac{1}{4}$  N., which line towards the shore forms the eastern boundary of the station.

Pilot vessels during daylight carry, at the mainmast-head, a red and white flag in horizontal stripes, the upper half being white and the lower red. At night the pilot steamer shows a bright white light at the foremast head, a red light about 8 feet below the white, a flare-up light at intervals not exceeding fifteen minutes, and the coloured side lights required to be carried by vessels when under way. Pilot vessels on duty and at anchor shall carry all the afore-mentioned lights, except the coloured side lights; and when not engaged on duty shall carry the same lights as other vessels.

**Signals.**—Vessels steering for Port Phillip are bound to show the usual flag for a pilot when within pilot waters, and if the pilot vessel be in sight they must allow a reasonable time for a pilot to board; at night, vessels requiring a pilot should show a blue light every fifteen minutes; or a bright white light flashed or shown at short or frequent intervals, just above the bulwark, for about a minute at a time.

Vessels, in order to secure the services of a pilot off Port Phillip Heads, should stop dead or heave-to when nearing the pilot steamer, and at the same time give such steamer the lee, so as to avoid the possibility of accident and to enable the pilot to board with expedition and safety.

Vessels which are exempt from pilotage must, on reaching pilot waters, fly a large white flag at the mainmast-head until 6 miles within the entrance, under a heavy penalty, in order to prevent the pilots' time being unnecessarily taken up running after vessels which do not require their services.

**Fog Signals.**—In thick weather, the pilot steamer, when cruising outside or inside Port Phillip Heads, will sound two blasts on siren or steam-whistle every five minutes; the first blast short and the second long.

Vessels reaching pilotage waters under similar conditions of weather and requiring a pilot shall make a signal the reverse of the pilots, viz., two blasts, the *first long* and the *second short*. Signals to be made on whistle or siren by steamers, and on fog-horn by sailing vessels.

**PORT PHILLIP ENTRANCE.**— For  $2\frac{1}{2}$  miles within Port Phillip Heads the entrance is deep and free from danger, after which the bay widens out, and is filled with numerous sand-banks extending 8 miles to the northward and 12 miles to the eastward. Between these banks are four channels, viz., South, Symonds', West, and Cole's. The South, West, and Cole's Channels are buoyed off and available for navigation as hereafter described.

**Pope's Eye Bank**, or the shoal which separates the south-west entrance of Symonds' Channel from the West Channel, is marked by an annulus of stone 8 feet above water-level, which is known as the Pope's Eye Fort.

From the Pope's Eye Fort the main bank, 1 cable wide, extends E.N.E. three-quarters of a mile, carrying 6 to 14 feet of water, and the south tail of the shoal S.S.W.  $\frac{1}{2}$  W., 6 cables to the Pope's Eye Buoy, carrying 18 feet of water for  $2\frac{1}{2}$  cables from the fort, and gradually increasing to a depth of 30 feet at the buoy.

**Pope's Eye Buoy**, which marks the S.W. limit of the Pope's Eye Bank, is spherical shaped, and painted in horizontal stripes of black and white.

**Royal George Shoal**, occupying the waters between the Pope's Eye Bank and the bank off Swan Island, divides the S.W. entrance of the West Channel into two channels. The shoal extends about E. by N. and W. by S. for half-a-mile, with 13 to 16 feet water over it. The western extremity of the shoal is marked by an ordinary middle ground buoy, No. 1 Royal George, and the eastern extremity by a gas buoy showing a fixed red light, No. 2 Royal George.

**SOUTH CHANNEL**, available at low water for vessels drawing 30 feet, is  $9\frac{1}{2}$  miles long, from No. 1 black buoy at its western to No. 15 black buoy at its eastern end. The north edge of the channel is defined by eight black buoys, with odd numbers from 1 to 15 inclusive; No. 1 buoy is surmounted by a staff and cage, and No. 15 is a spherical-shaped gas buoy. The south edge of the channel is marked by four red cone buoys, with even numbers from 2 to 8 inclusive, the Pile light-house at the easternmost limit of the southern bank, and by two spherical-shaped gas buoys, Nos. 10 and 12, painted red and placed northwards of the Pile light-house, to mark the southern side of the dredged cut. An additional gas buoy, to mark the S.W. extremity of the shoals between Nos. 1 and 2 channel buoys, is moored in 32 feet of water, with Point King bearing S. 40 deg. E., and the Quarantine east boundary flagstaff bearing S. 30 deg. W.

**Dredged Cut.**— A channel, 400 feet wide, lying E. by S. and W. by N. with its southern edge  $1\frac{1}{4}$  cables north of the Pile light-house, has been dredged to a navigable depth of 30 feet, low water. The southern edge of the cut is marked by two spherical-shaped gas buoys, Nos. 10 and 12, moored about half-a-mile apart. No. 10 gas buoy marks the western end of the channel, and the eastern limit is marked by No. 12 gas buoy on

the south, and No. 11 black can buoy opposite on the north side of channel. It is contrary to clause 66A of the Port Rules and Regulations to navigate steam-ships in the dredged cut at a greater speed than 7 nautical miles per hour.

**Gas Buoys.**—To facilitate the navigation of the South Channel by night, four gas buoys have been placed as below:—*One* to mark the S.W. extremity of shoals in vicinity of leading lights, between Nos. 1 and 2 buoys; *two* to mark the southern edge of the dredged cut north of the Pile light-house, and *one* at No. 15 black buoy at the easternmost limit of the channel. The following lights, at an elevation of 10 feet above sea-level, are shown from these buoys:—

Buoy, S.W. extremity of shoals, between Nos. 1 and 2 buoys	Fixed red light, visible 3 miles, ordinary weather.
Western Buoy, south edge dredged cut, No. 10	Fixed white light, visible 5 miles, ordinary weather.
Eastern Buoy, south edge dredged cut, No. 12	Fixed green light, visible 3 miles, ordinary weather.
No. 15 Buoy, east end South Channel	Occulting white light, visible 5 miles, ordinary weather.

**Leading Lights.**—The South Channel fairway is marked by two leading lights—the pile light at eastern end of south side of channel and the eastern light on the shore at the foot of Arthur's Seat. These lights are  $3\frac{1}{2}$  miles apart, and when in line lead up through the fairway on an E.  $\frac{1}{4}$  S. (S.  $81\frac{1}{2}$  deg. E.) bearing.

**South Channel Pile Light-house**, in latitude 38 deg. 19 min. 55 sec. S., longitude 144 deg. 51 min. 10 sec. E., was built in 1874, and stands on wooden piles in about 21 feet of water. The light is a fourth order dioptric fixed white and red light, elevated 28 feet above sea-level, and visible in clear weather at a distance of 10 miles.

From seaward the light shows white between the bearings of S.S.E. (S. 22 deg. E.) and N.E.  $\frac{1}{4}$  N. (N. 42 deg. E.), and red between the bearings of N.E.  $\frac{1}{4}$  N. (N. 42 deg. E.) and W.  $\frac{1}{2}$  S. (S. 84 deg. W.)

From the Pile light-house an additional sector of white light, visible between the bearings of W.  $\frac{1}{2}$  S. and W. by S.  $\frac{1}{4}$  S., is shown over No. 15 buoy. This sector of white light was established in 1887 to enable pilots and masters when nearing the eastern entrance of the South Channel, from Melbourne or Geelong, to pick up the Pile light sooner than heretofore, and consequently to proceed with greater confidence towards the eastern or shore light, until the red sector of the Pile light is sighted.

**Fog Signal.**—In foggy weather a gong is sounded at intervals of five (5) minutes.

**Tidal Signals.**—The following tidal signals indicating the direction of the tidal currents in the channel, are exhibited from the flagstaff at the South Channel Pile lighthouse:—

	Flood Tide Signals.	Ebb Tide Signals.
By day ... ..	Red Flag ...	Red Flag with ball under
By night ... ..	One Green Light ...	Two Green Lights.

**Eastern Light-house**, situated on the shore at the foot of Arthur's Seat, in latitude 38 deg. 21 min. S., longitude 144 deg. 55 min. 42 sec. E., was built in 1874, the tower being constructed of iron and painted white. The light is a third order dioptric fixed white and red light, elevated 101 feet above sea-level, and visible in clear weather at a distance of 13 miles.

From seaward the light shows white between the bearings of E. by N.  $\frac{1}{2}$  N. (N. 73 deg. E.) and S.E.  $\frac{1}{4}$  E. (S. 48 deg. E.), and red between the bearings of S.E.  $\frac{1}{4}$  E. (S. 48 deg. E.) and S. by W.  $\frac{1}{2}$  W. (S. 17 deg. W.).

**Grounding in Channel.**—In the case of a vessel grounding in the South Channel, and thereby obstructing the navigation, the master or other person in charge of such vessel shall, in addition to the lights provided under the *Marine Act* 1890, exhibit between sunset and sunrise two red lights, placed vertically 6 feet apart in globular lanterns of not less than eight (8) inches diameter, and in such a position from the white light as to indicate as near as possible the position and extent of the obstruction, and he shall also have a man stationed as a look-out on board or in a boat to give warning to approaching vessels, and shall also, between sunrise and sunset, exhibit two balls or shapes in lieu of lights.—(Clause 67, *Port Rules and Regulations*.)

**Submarine Cable.**—A submarine telegraph cable is laid across the South Channel between the South Channel Fort and the southern shore between Points Franklin and Arthur, passing about  $1\frac{1}{2}$  cables N.W. of No. 5 black buoy, and  $1\frac{1}{2}$  cables S.E. of No. 2 red buoy. To avoid fouling such cable, mariners, boatmen, and others should not anchor nearer than 4 cables to an imaginary line drawn from the South Channel Fort to No. 2 red buoy, and thence to the southern shore midway between Points Franklin and Arthur.

**Shoals.**—A small shoal, carrying 23 feet, low water, lies about half-a-mile to the southward of the line of leading lights, with the quarantine eastern boundary flagstaff bearing S. 9 deg. W. 8 cables distant. This formation is approximately in the position formerly occupied by the shoal known as Nicholson Knoll.

An extensive shoal, consisting of a series of sand ridges, extends slightly athwart the centre of the South Channel for a length of about  $5\frac{1}{2}$  cables in an E. by N. and W. by S. direction with its eastern end about 4 cables W.S.W.  $\frac{1}{2}$  W. from No. 3 black buoy. The depths over this shoal along and in the vicinity of the line of leading lights vary from 26 to 32 feet, but the least water, viz., 24 feet, is found near the western end of the shoal at about 700 feet to the southward of the line of leading lights and about midway between such line and the gas buoy moored about 1,400 feet to the southward of the line of leading lights with Point King bearing S. 40 deg. E. and the Quarantine eastern boundary flagstaff bearing S. 30 deg. W.

Between No. 3 black buoy and the north side of the channel, which lies 3 cables from the buoy, the water shoals in two places to 17 and 18 feet.

About midway between Nos. 1 and 3 black buoys, South Channel, a shoal bank one cable wide runs parallel with the channel for a length of about  $2\frac{1}{2}$  cables, with its southern edge 2 cables northward of the line of leading lights. The soundings over this shoal vary from 20 to 27 feet, the 20 feet patch lying W. by N.  $4\frac{1}{2}$  cables from No. 3 black buoy.

**South Channel Directions.**—Vessels having cleared the dangers between Port Phillip Heads, and bound through the South Channel, should steer along the north side of the Nepean peninsula in 8 or 9 fathoms with Barwon Head just open of Point Lonsdale, bearing S. 83 deg. W., until abreast of No. 1 black perch buoy at west end of channel: Thence

steer between the black and red buoys which mark the northern and southern sides of the channel, bringing as soon as possible the Pile light-house in line with the Eastern light-house at the foot of Arthur's Seat. On picking up the line of leading lights keep them in one, bearing E.  $\frac{3}{4}$  S. (S.  $81\frac{1}{2}$  deg. E.) until between Nos. 9 and 8 buoys, when haul over to the northward to avoid the shallow water which extends half-a-mile westward of the Pile light-house, and steer through the dredged channel passing the gas buoys (red) close to on the starboard side. This dredged channel, lying E. by S. and W. by N., has been deepened to a navigable depth of 30 feet at low water for 400 feet wide. After clearing the dredged channel steer to pass, on the port hand, No. 13 buoy, and also No. 15 buoy, which latter is moored in  $7\frac{1}{2}$  fathoms, and marks the eastern end of the channel. If the vessel's draught is over 24 feet, mariners, either entering or leaving Port Phillip *via* the South Channel, should, to avoid the shoals in the vicinity of the line of leading lights between Nos. 1 and 2 buoys, leave the line of lights when about a mile off the gas buoy marking the S.W. extremity of such shoal ground, and steer to pass about 300 feet to the southward of the gas buoy after rounding which work gradually back to the line of leading lights. Mariners are warned against rounding such gas buoy too far to the southward, owing to the 23 feet shoal patch which lies W.S.W.  $4\frac{1}{2}$  cables from the gas buoy.

**Working Through.**—Vessels working through the South Channel must be guided by the lead, and should not stand into less than 4 fathoms at either side, nor outside the line of buoys; bearing in mind the tide streams set strongly over the banks. After passing the Pile light-house, there is plenty of room between the middle ground and the shore, which may be approached to three-quarters of a mile in 5 fathoms. When clear of the middle ground and to the northward of Mount Martha, a vessel may stand to the westward until Station Peak is open of the high land of Point George, bearing N.W. by W.  $\frac{1}{2}$  W., which will clear the north-eastern extremities of the banks at the entrance to Port Phillip.

**Directions by Night.**—Vessels having entered Port Phillip Heads and bound through the South Channel should, on losing the Point Lonsdale occulting light (white) steer about E. by N. to pick up the leading lights and keep them in line bearing E.  $\frac{3}{4}$  S. (S.  $81\frac{1}{2}$  deg. E.) until about 2 miles off the Pile light and abreast of No. 7 black buoy, when open the Eastern light northward of the Pile light until the white light at No. 10 gas buoy is on with the Eastern light, on which course (S. 78 deg. E.) steer through the dredged channel with the Eastern light ahead and passing the gas buoys close to on the starboard side. After passing the green light at No. 12 gas buoy, steer for the Eastern or shore light, until the Pile light shows red, and continue within the red light until abreast of the white occulting light at No. 15 gas buoy, when starboard and pass the white occulting light on the port hand; the vessel will now be clear of the middle ground, and a course may be shaped for either Melbourne or Geelong. Should the white occulting light at No. 15 buoy for any reason be invisible, then keep the Pile light red until the Eastern light shows red. Should the vessels' draught be over 24 feet mariners are directed, when navigating the western end of the channel between Nos. 1 and 2 buoys, to leave the line of leading lights, and keep to the southward of the gas buoy, showing a fixed red light, as previously advised in directions by day.

Vessels leaving for sea and bound through the South Channel should steer for the Eastern light (red) until the white occulting light at No. 15 gas buoy is picked up; then steer, passing the occulting light to starboard, on a S.S.W. course to get into the red sector shown from the Pile light, and

keeping within the same until nearing the green light shown from No. 12 gas buoy, whence steer through the dredged channel north of the Pile light, passing the green and white lights of Nos. 12 and 10 gas buoys close to on port hand; vessels will now be clear of the shoal water north of the Pile light, and may starboard to get on the line of leading lights. Should the white occulting light at No. 15 gas buoy not be visible, vessels should keep the Eastern light (red) until the Pile light opens out (red) upon a W.  $\frac{1}{2}$  S. bearing, when proceed as before directed.

Sailing vessels working down, and when to the northward and in the vicinity of the Middle Ground and Great Sand, will know they are getting into danger, when either the South Channel Pile light or the Eastern light under Arthur's Seat shows white.

They will also know their proximity to the eastern shore when the Eastern light ceases to be visible.

*Anchorage.*—Vessels will find safe anchorage in Capel Sound to the southward of the Pile light in 6 to 8 fathoms, with White Cliff bearing S.W. or with the Pile light showing red; the only danger is the Hurricane wreck, which lies S. 60 E. 11  $\frac{1}{2}$  cables from the Pile light-house, and is marked by a wreck buoy.

**West Channel** is available at ordinary low water for vessels of 17 feet draught, but as the tide may fall a foot below ordinary low water during spells of easterly to northerly weather, mariners in charge of vessels of 17 feet draught under such circumstances of weather should only navigate the channel on the flood tide. Average rise of tide about 2 ft. 6 in. The channel is about 5  $\frac{1}{2}$  miles long, and varies in width from 1  $\frac{1}{2}$  to 4 cables. The S.W. entrance to the Channel is divided into two passages by the Royal George shoal, both of which being available for navigation. The West Channel is well marked throughout by a gas beacon (No. 2) on the Pope's Eye annulus, two gas buoys, thirteen channel buoys, and the Pile lighthouse at the N.E. end of the Channel. The buoys on the S.E. or starboard side of the Channel are painted red, with even numbers, and are all cone-shaped excepting No. 12, which is a spherical-shaped gas buoy; the buoys on the N.W. or port side of the Channel are painted black with odd numbers, and are all can shaped (No. 3 replacing the Swanspit gas buoy). The two smaller black can buoys between Nos. 3 and 5 buoys are unnumbered. The Royal George shoal at the S.W. entrance of the Channel is marked at its western end by an ordinary middle ground buoy, No. 1 Royal George, and at its eastern end by a spherical gas buoy, No. 2 Royal George.

**West Channel Pile Light-house**, situated on the north-east end of the north-west bank of the channel, in latitude 38 deg. 11 min. 39 sec. S., longitude 144 deg. 45 min. 21 sec. E., was built in 1881, and stands on wooden piles in 15 feet of water.

The light is a third order dioptric fixed white and red light, elevated 35 feet above sea-level, and visible in clear weather at a distance of 11 miles.

From seaward the light shows white between the bearings of N.E. by N. (N. 34 deg. E.) and W.N.W.  $\frac{1}{4}$  W. (N. 77 deg. W.), red between the bearings of W.N.W.  $\frac{1}{8}$  W. (N. 77 deg. W.), and W. by S.  $\frac{1}{4}$  W. (S. 80 deg. W.), white between the bearings of W. by S.  $\frac{1}{4}$  W. (S. 80 deg. W.), and S. by E.  $\frac{1}{4}$  E. (S. 14 deg. E.), red between the bearings of S. by E.  $\frac{1}{4}$  E. (S. 14 deg. E.), and N.E. by N. (N. 34 deg. E.). The small red sector, showing eastward across the N.E. entrance of the channel is cut to warn mariners of;

their proximity to the entrance banks. The western sector of red light is cut to mark the gas buoy of Prince George's bank, and the proximity of the western side of the channel between the Pile light-house and No. 7 buoy.

Vessels passing the West Channel Pile light-house should keep at least three-quarters of a cable's length off to the eastward.

*Fog Signals.*—In thick and foggy weather warning signals are given from the West Channel Pile light-house by sounding a gong and fog-horn alternately every five minutes.

*Gas Beacon and Buoys.*—To facilitate the navigation of the West Channel by night, the following gas lights have been established:—

*Observatory Point Beacon*, on the southern shore near the western boundary of the Quarantine Station, is an iron skeleton beacon painted white, from which is shown a white fixed light elevated about 55 feet above sea-level, and visible for 7 miles through a sector of 20 deg. over the West Channel.

*No. 2 Gas Beacon*, on the western side of the stone annulus on Pope's Eye bank, is painted red, and exhibits a white occulting light, elevated 24 feet above sea-level, and visible all round through a distance of 7 miles.

*No. 2 Royal George Buoy*, on the eastern end of the Royal George shoal, is a spherical gas buoy, and exhibits a red fixed light, elevated 10 feet above sea-level, and visible all round through a distance of 5 miles.

*No. 12 Buoy*, at the elbow of the channel, is a spherical gas buoy, painted red, and exhibits a white fixed light, elevated 10 feet above sea-level, and visible all round through a distance of 5 miles.

*Directions from Seawards.—By Day.*—Vessels, having made Port Phillip Heads and bound through the West Channel, should steer from the fairway between Points Lonsdale and Nepean about N.E. by E. (N. 56 deg. E.), to pass between No. 1 Royal George buoy and the gas beacon on the Pope's Eye annulus, at the south-west entrance of the channel, and thence between the channel buoys.

Vessels with a scant wind and proceeding up against the ebb stream should not stand too near the eastern bank, as they are liable to be set upon it, especially at the north end of the channel.

*By Night.*—Vessels, having entered Port Phillip Heads and bound through the West Channel, should, on losing Point Lonsdale occulting light (white), steer about N.E. by E.  $\frac{1}{2}$  E. (N. 62 deg. E.) to pass to the north-westward of the white occulting light on the Pope's Eye annulus; thence steer to pass about a cable's length to the eastward of the fixed red light of No. 2 Royal George buoy, after passing which starboard gradually until the fixed white light on Observatory Point is slightly open eastward of the occulting white light on Pope's Eye annulus. Keep these leading lights in same position astern until nearing the fixed white light of No. 12 gas buoy, when get the leading lights in line astern, until about a quarter of a mile past the gas buoy; then port the helm to get the Pile light-house on the port bow, bringing the vessel's head on a N.E.  $\frac{1}{2}$  N. (N. 39 deg. E.) course, which course should be kept through the channel.

*Directions Outwards.—By Day.*—Vessels bound for sea through the West Channel should, on reaching No. 3 black can buoy (formerly known as the Swanspit), keep the channel to the north-westward of the Royal George shoal, and pass No. 2 Royal George buoy, two cables off on the port hand, and thence midway between No. 1 black can buoy and No. 1 Royal George buoy, for the fairway between Port Phillip Heads.

*By Night.*—Vessels bound for sea through the West Channel at night should pass about a good cable's length to the eastward of the Pile light-house, when get the fixed white light on No. 12 gas buoy about half a



point on the port bow, bringing the vessel's head on a S.W. by S. (S. 35 deg. W.) course. Keep this course until nearing No. 12 gas buoy, when starboard gradually to get the occulting white light on Pope's Eye annulus in line with the fixed white light on Observatory Point, bearing S. 18½ deg. W. Keep these leading lights in line for a mile past No. 12 gas buoy, when bring them slightly open to the eastward, keeping them in such position until entering the red sector of light shown from the Low light-house. Keep in such red sector by steering for the Low light-house until the fixed white light on Observatory Point is obscured, when vessels will be through the channel, and a course about S. 51 deg. W. may be shaped for the fairway between Port Phillip Heads.

*Note.*—Although the West Channel is available for vessels of 17 feet draught, yet, on account of its banks and knolls being so subject to change, masters should obtain the latest chart of the re-survey of the channel issued by the Department and kept corrected to date.

**Grounding in Channel.**—In the case of a vessel grounding in the West Channel, and thereby obstructing the navigation, the master or other person in charge of such vessel shall, in addition to the lights provided under the *Marine Act* 1890, exhibit between sunset and sunrise two red lights, placed vertically 6 feet apart in globular lanterns of not less than 8 inches diameter, and in such a position from the white light as to indicate as near as possible the position and extent of the obstruction, and he shall also have a man stationed as a look-out on board or in a boat to give warning to approaching vessels, and shall also, between sunrise and sunset, exhibit two balls or shapes in lieu of lights. (Clause 67 of the Port Rules and Regulations.)

**Symonds' Beacon.**—A single pile beacon, painted black, marks the north-east end of the west middle sand at the entrance to Symonds' Channel.

**Cole's Channel,** to the westward of the West Channel, and following the western shore of Port Phillip Bay at 4 cables off, is nearly 4 miles long and 2½ to 4 cables wide between its 2-fathom edges. The least depth of water in the fairway is 12 feet, shoaling gradually to the shore, but suddenly towards the bank (west sand) on the east side of the channel.

The channel is defined on its eastern or starboard side by three red conical buoys, lying in a N. ½ E. direction and spaced 1½ miles apart. The southernmost buoy in 18 feet of water is situated N.E. by N. 5½ cables from the north-east end of Swan Island, and W. ½ S. 5 cables from No. 3 West Channel buoy; the middle buoy in 20 feet of water lies E.N.E. ¼ E. 6 cables from Cole's beacon; the northernmost buoy in 18 feet of water lies East 4½ cables from South Red Bluff beacon.

**Cole's Beacon,** on the western shore and about midway between the north end of Swan Island and South Red Bluff, is a white beacon with a square top.

**South Red Bluff,** opposite the red conical buoy at the N.E. end of Cole's Channel, is a low red sandstone cliff about 40 feet high, and marked by a white beacon with a square top.

**St. Leonards.**—At 1 mile N. ½ E. of South Red Bluff is the small village of St. Leonards, at which there is a jetty 500 feet long with 7 end 115 feet long and 22 feet wide. At the outer end of the jetty there are 9½ feet at low water with a rocky bottom. This jetty has become unsafe through deterioration, and is closed against traffic. Persons therefore using it do so at their own risk.

*Light.*—A fixed green light, visible in clear weather at a distance of  $1\frac{3}{4}$  miles, is exhibited from a lamp-post at the outer end of St. Leonard's jetty.

*Buoy.*—A third-class can buoy painted black is moored 1 cable S.E. by S. from the end of St. Leonard's jetty in 9 feet of water.

*Warping Buoy.*—A red cask buoy for warping purposes is moored in 12 feet of water, N.E. by E. 300 feet from the north-eastern corner of the jetty.

**Prince George Bank.**—The whole of the shore from St. Leonard's jetty to Point George is fronted by the shoal water of Prince George's bank. At 1 mile from the jetty the outer edge of the bank lies about 1 mile from the shore, and is marked by two black can buoys. These buoys are moored in 20 feet of water and lie apart 5 cables N. by E. and S. by W., the southernmost one being 1 mile N.E. from the outer end of St. Leonard's jetty.

Midway between these buoys and the shore is a black ball beacon marking Governor reef, a patch with 1 foot of water over it. This beacon bears E.  $\frac{1}{2}$  S. 6 cables from North Red Bluff.

**Prince George Bank Gas Buoy** is a spherical-shaped black buoy, showing a white occulting light. The buoy is moored in 7 fathoms and marks the north-eastern extremity of Prince George bank, with extreme of Point Richards bearing W. by S. and extreme of Indented Head bearing S. by W.  $\frac{1}{4}$  W. The light is elevated 10 feet above sea-level, and is visible in clear weather 6 miles distant.

**Western Arm of Port Phillip**, in which is included the port of Geelong, may be said to commence at the mouth of the Werribee River on the north and Point George on the south side, where it is 8 miles across, and thence extends about W.S.W. for 15 miles to its western end, where it forms the Outer and Inner Harbors of Geelong.

The southern shore of the western arm of Port Phillip, commencing at Point George, trends about W.N.W. and west for a total distance of 3 miles to the jetty at Portarlington, and for the first  $1\frac{1}{2}$  miles is fronted by the north edge of Prince George's bank.

**Port of Geelong.**—The Port of Geelong includes all inlets, rivers bays, harbors, and navigable waters southward and westward of and within a line bearing north 39 deg. 24 min. west from a point in line with the east side of Mercer-street, Portarlington, to the west bank of the Little River.

**Portarlington Jetty** is 45 feet wide and projects 1,035 feet from the shore in a northerly direction into  $12\frac{1}{2}$  feet at low water, and has a shelter shed built on its outer end.

*Light.*—A fixed green light, visible in clear weather at a distance of  $1\frac{3}{4}$  miles, is shown from the outer end of Portarlington jetty.

**Point Richards** lies W.  $\frac{1}{2}$  N. 1 mile from Portarlington jetty, and has a gas buoy off it moored in about  $4\frac{1}{2}$  fathoms at 2 cables to the northward of the edge of the bank which extends from the point.

**Gas Buoy.**—This gas buoy is a black spherical-shaped buoy, showing, at an elevation of 10 feet above sea-level, a red occulting light, visible in clear weather 6 miles distant.

\* The particulars respecting the Port of Geelong have been supplied by the Geelong Harbor Trust, under whose jurisdiction the waters of such port are.

From Point Richards the shore trends S.W.  $4\frac{1}{2}$  miles to Drysdale jetty, and is fronted the whole distance by a sand-bank projecting 7 cables from the shore into 3 fathoms. On this bank at 3 and  $4\frac{1}{2}$  cables off the shore are several patches with only 3 to 6 feet of water on them.

**Drysdale Jetty** is 11 feet wide, and projects a distance of 500 feet from the shore into 5 feet at low water.

From Drysdale jetty the shore extends W.S.W.  $\frac{1}{2}$  W. for  $2\frac{1}{2}$  miles to a white beacon (Bellarine beacon) on the shore to the southward of Wilson's Spit gas buoy, and thence curves about W.N.W. for 4  $\frac{3}{5}$  miles to Point Henry. From Drysdale jetty to Point Henry the shore-bank extends about 6 cables out into 3 fathoms.

**Bellarine Buoys.**—Two black can buoys, moored in 23 feet of water, lie a quarter of a mile off the 3-fathom edge of the bank which projects from the shore at Bellarine beacon. These buoys, marking the south side of the fairway, lie about two-thirds of a mile to the southward of Wilson Spit gas buoy, and bear respectively N.  $\frac{1}{2}$  E. 7 cables and W.N.W.  $\frac{1}{4}$  N. 10 cables from Bellarine beacon on the shore to the southward. On about 1st March, 1907, the eastern buoy was removed and replaced by a black pile beacon, surmounted by a cage; and the western buoy permanently removed.

**Wilson's Spit** is the shallow ridge about a quarter of a mile wide and carrying 14 to 17 feet of water, which, commencing at the outer edge of the bank at  $1\frac{1}{3}$  miles off Point Wilson, projects  $1\frac{3}{4}$  miles in a southerly direction to its southern extremity, where it is  $1\frac{1}{4}$  miles from the southern shore.

**Wilson Spit Gas Buoy**, moored at the south end of the spit in 25 feet of water, is a spherical-shaped red buoy showing a white occulting light. This light is elevated 10 feet above sea-level, and is visible in clear weather 6 miles distant.

**Black and White Cheq. Buoy.**—This buoy, moored about 2 cables S. 35 deg. W. from the Wilson Spit gas buoy, marks the north side of a shoal patch which extends S.W. 3 cables from the buoy with 19 to 22 feet of water on it. Between this buoy and Wilson Spit gas buoy is the fairway passage, with a depth of 24 ft. 6 in. at ordinary low water.

*Caution.*—Mariners bound eastward are advised to starboard to get on their course after passing between Wilson Spit gas buoy and the black and white chequered buoy, as shoal water of 23 feet lies half-a-mile S. 73 deg. E. from midway between the buoys.

**Point Henry**, about W  $\frac{1}{2}$  N.  $3\frac{1}{2}$  miles from Wilson's Spit gas buoy, is the northern extremity of the projection of land on the southern shore of Geelong Harbor, about midway between Wilson Spit and Geelong wharfs. The extreme point is low and sandy, rising to a bluff about 30 feet high at a quarter of a mile off.

*Jetties.*—There are two private jetties at Point Henry, the one on the eastern side of the point being 1,850 feet long, with 11 feet of water at the outer end, and that on the western side being 1,200 feet long, with 4 feet of water at the outer end. These jetties are now in a ruinous condition and closed against traffic.

**HOPETOUN CHANNEL**, about  $2\frac{1}{2}$  cables to the northward of Point Henry and connecting the Geelong Outer and Inner Harbors, has been dredged through the bank which extends N. by W. from Point Henry. The channel runs E. by N.  $\frac{1}{2}$  N. and W. by S.  $\frac{1}{2}$  S., and between its extreme north beacons is 2 miles long, 130 feet wide, with a depth of  $24\frac{1}{2}$  feet at average low water.

**Beacon Lights.**—Hopetoun Channel is marked by seven beacons, four on the north side painted red and spaced 4,040 feet apart, and three on the south side painted black and placed alternately with the north beacons. These beacons are pile structures, surmounted by gas-holders, which show all round fixed gas lights from an elevation of 26 feet above sea-level. The lights on north side of channel are white, and those on south side red, the white lights being visible in clear weather 6 miles distant, and the red lights 4 miles distant.

**Pile Beacon.**—A triple pile beacon, surmounted by a lantern, is situated in 12 feet of water directly opposite No. 6 beacon, and in line with the black beacons on the south side of the channel. This pile beacon is to enable mariners to steer in mid-channel, and should not be approached within 40 feet. A fixed red light is shown from this beacon.

**Directions.**—Mariners in charge of steam-ships navigating the Hopetoun Channel shall reduce the speed to not exceeding 5 miles per hour, and no sailing vessel should enter the channel whilst any other vessel is proceeding through in the opposite direction. See No. 63 of Port Regulations. Vessels should steer as nearly in mid-channel as possible, taking care not to approach the beacons on either side of the channel nearer than 40 feet off. In the case of a vessel grounding in the Hopetoun Channel, and thereby obstructing the navigation, the master or other person in charge of such vessel shall, in addition to the lights provided under the *Marine Act* 1890, exhibit between sunset and sunrise two red lights, placed vertically 6 feet apart in globular lanterns of not less than eight (8) inches diameter, and in such a position from the white light as to indicate as near as possible the position and extent of the obstruction, and he shall also have a man stationed as a look-out on board or in a boat to give warning to approaching vessels, and shall also, between sunrise and sunset, exhibit two balls or shapes in lieu of lights. (For further information and direction, see page 81.)

**GEELONG INNER HARBOR**, to the westward of the sand-bank projecting N. by W. from Point Henry, is an almost land-locked bay with spacious and secure anchorage in 5 fathoms, stiff clay bottom. On the western side of the bay the water is deep close to the shore, there being 5 fathoms in some places at half-a-cable off and generally not more than 3 cables off.

The south-west portion of the Inner Harbor, from Limeburner's Point N.W. by W.  $\frac{1}{4}$  W.  $1\frac{3}{4}$  miles to Hutton's wharf, forms Corio Bay, on the south shore of which is the town of Geelong.

**Hutton's Wharf**, on the western shore of the Inner Harbor, and about 9 cables N.N.W. from the outer end of Geelong Railway Pier, is 550 feet long,  $7\frac{1}{2}$  feet wide, with about 8 feet at low water at the outer end.

**Freezing Works Pier**, N. by E.  $1\frac{1}{2}$  miles from Hutton's wharf, is 470 feet long, 40 feet wide at the outer end, with depths of 28 to 30 feet alongside the outer and wider portion of pier.

**Buoys.**—Two warping buoys in 30 feet of water are anchored 90 fathoms off the Freezing Works pier, and bearing respectively S. 80 deg. E. and S. 7 deg. E. from the outer end of pier.

**GEE LONG**, situated on the south shore of Corio Bay, lies 45 miles S.W. from Melbourne, with which it has direct daily communication by rail and steamer, post and telegraph. The town with its outlying suburbs has a population of 24,000, and, after Melbourne, is the most important shipping port of the State.

**Wharfage Accommodation.**—Eastern Pier is about 420 feet long, and built of stone for 260 feet from the shore, the remainder being of wood, and 52 feet wide at the outer end, where there is accommodation at low water for vessels of 9 feet draught.

*Light.*—A red light, visible in clear weather 2 miles distant, is shown from the outer end of the eastern pier.

**Yarra-street Pier**, at the foot of Yarra-street, is 830 feet long, 43 feet wide, with sufficient water for a width of 200 feet from both sides of the pier for vessels drawing 23 feet at low water.

*Lights.*—A fixed green light, visible in clear weather  $1\frac{3}{4}$  miles distant, is shown from the outer end of Yarra-street pier. The pier is further lit along its length by five ordinary electric lamps.

*Buoy.*—A warping buoy moored in 26 feet lies in line with the centre of Yarra-street pier and distant  $1\frac{1}{2}$  cables from the outer end.

**Moorabool Pier** (Steam-boat pier), in line with Moorabool-street and about 250 yards to the westward of Yarra-street pier, is about 300 feet long, 130 feet wide, with accommodation at both sides for vessels drawing 16 feet at low water.

*Lights.*—Two red lights, visible in clear weather 2 miles distant, are shown from the outer end of Moorabool pier (one at each corner). The pier is also lit by six ordinary electric lamps.

**Railway Pier**, about 200 feet to the westward of Moorabool pier, is 240 feet long, 44 feet wide, and is available (for 200 feet wide at either side) for vessels drawing 23 feet at low water.

*Lights.*—A red light, visible in clear weather 2 miles off, is shown from the outer end of the Railway pier. The pier is also lit by four ordinary electric lamps, and when a vessel is to work at night by five electric arc lamps.

*Buoys.*—Two warping buoys are moored to the westward of the Railway pier, the outer one in 26 feet water lies about N.N.W. 740 feet from the outer end of the pier; and the inner one in 14 feet water lies 375 feet off the pier, at 315 feet in from the outer end. For the convenience of mariners and others moving vessels from alongside the western side of the railway pier an anchor has been placed on the foreshore, marked by a piece of wood painted white, 446 feet N. 76 deg. W. from the intersection of the inner end of such pier and the stone coping of the foreshore.

**Compass Adjusting Buoy.**—To enable vessels to adjust these compasses, a red buoy is moored in 26 feet low water about N.E. by N. 850 feet from the outer edge of the Railway pier at Geelong. The magnetic bearings from the buoy to several conspicuous land marks are as follow:—

	Deg.	Min.
Station Peak, You Yangs ... ..	N. 6	05 E.
Conspicuous tree, Stingaree Bay ... ..	S. 84	41 E.
Flagstaff, Botanic Gardens ... ..	S. 57	33 E.
Conspicuous tree in hollow, Mount Anakie ... ..	N. 24	51 W.
Chimney, Geelong gasworks ... ..	N. 38	52 W.
Magnetic variation taken as ... ..	N. 7	52 E.

*Position of Buoy.*—Before testing compasses, adjusters and others should first satisfy themselves that the buoy is in its correct position by the following sextant angles:—

	Deg.	Min.
Lamp-post at end of Railway pier and gasworks chimney	102	50
Lamp-post at end of Railway pier and chimney, Volum's brewery	45	44

*Tides.*—It is high water, full and change, at Geelong wharfs at 3h. 17 min.

There are tide gauges at Yarra-street pier, Geelong, and on Nos. 2 and 8 beacons, Hopetoun Channel, the 24 ft. 6 in. mark of which corresponds to the low water datum to which all depths both in Hopetoun Channel and at Geelong wharfs are reduced. The average rise of tide is 1 ft. 9 in., but during a prevalence of westerly winds the tides may rise at high water 2 ft. 10 in. and at low water 1 foot above the zero mark, and during prevailing easterly winds the tides may rise at high water only 1 ft. 3 in. above and fall 1 foot below the zero mark.

*Explosives Anchorage.*—Port of Geelong (Inner Harbor).—Not to the southward of a line bearing W. by S.  $\frac{1}{2}$  S. to the Gasworks chimney, nor to the westward of a line bearing S. by W. to Limeburner's Point, nor to the northward of a line bearing west to the Freezing Works.

Port of Geelong (Outer Harbor).—Not nearer than a mile of the shore, nor in any channel or fairway.

*Pilot.*—There is a harbor pilot stationed at Geelong.

**DIRECTIONS, West Channel to Geelong.**—Vessels having rounded the West Channel pile light house and bound for Geelong should steer N. 11 deg. W.  $5\frac{1}{4}$  miles and pass eastward of the black gas buoy off the north-east extreme of Prince George bank. When 3 cables to the northward of the buoy, steer W  $\frac{1}{4}$  S. (S. 87 deg. W.)  $5\frac{1}{2}$  miles to the black gas buoy off Point Richards, and after passing it on the port hand about 2 cables off, haul up to S.W. by W. (S. 56 deg. W.) for the red gas buoy at the extremity of Wilson Spit. Wilson Spit buoy may be passed on either side unless the vessel's draught exceeds 14 feet, in which case pass to the southward of the buoy, and midway between it and the chequered buoy moored 2 cables to the south-westward. If drawing less than 14 feet, steer W.S.W. from Point Richards buoy, pass south of the red conical buoy nearly 2 miles N. by E.  $\frac{1}{2}$  E. from Wilson Spit buoy, and cross over the bank extending from Point Wilson.

**Working-up.**—From the West Channel to Geelong with a contrary wind between the West Channel light-house and the north-east extreme of Prince George bank, do not stand into less than 5 fathoms, nor bring the light-house east of S. by E. until north of the Prince George buoy, between which and the buoy off Point Richards do not stand into less than 5 fathoms, nor bring that point west of W. by S. From Point Richard to Point Henry, the south shore should not be approached to less than 4 fathoms, and the north shore to less than 5 fathoms, until west of Wilson Spit, which is marked by the red gas buoy off it.

*At Night.*—From about 2 cables eastward of West Channel pile light steer N. by W. (N. 11 deg. W.) keeping the pile light white, as it shows red over Prince George bank, and pass east of Prince George buoy, which shows an occulting white light. When 3 cables northward of the buoy, steer W.  $\frac{1}{4}$  S. (S. 87 deg. W.),  $5\frac{1}{4}$  miles to Point Richards buoy, which shows an occulting red light. Passing it on the north side, steer S.W. by W. (S.

56 deg. W.) and round the Wilson Spit buoy, which shows an occulting white light, at about 1 cable to the southward. If drawing less than 14 feet, steer S.W. by W.  $\frac{1}{2}$  W. (S. 62 deg. W.) from Point Richards buoy until the eastern fixed white light of the Hopetoun Channel bears W.  $\frac{3}{4}$  S. (S. 81 $\frac{1}{2}$  deg. W.), whence proceed on that bearing to the Outer Harbor.

*Anchorage.*—To anchor in the Outer Harbor of Geelong, steer about W.N.W. (N. 67 deg. W.) from Wilson Spit red gas buoy, and come to in 4 $\frac{1}{2}$  fathoms, with Point Henry bluff bearing W.S.W. (S. 67 deg. W.) at about 1 mile from the shore.

*From the Outer to the Inner Harbor.—Hopetoun Channel.*—From Wilson Spit red gas buoy steer about W.N.W. (N. 67 deg. W.) for the eastern light beacon. Then enter the channel and keep the beacons marking the north side of the channel on the starboard hand and the beacons marking the south side on the port hand. After clearing Hopetoun Channel, vessels are in the Inner Harbor, with Geelong wharfs about S.W.  $\frac{1}{4}$  W. (S. 48 deg. W.) 2 miles off.

*At Night.*—In navigating the Hopetoun Channel at night, leave the white lights marking the north side of the channel on the starboard hand and the red lights marking the south side of the channel on the port hand when entering from the Outer Harbor.

*Caution.*—Masters of vessels and others before proceeding through the Hopetoun Channel should straighten up their vessels on the line of the centre of the channel, as accidents have occurred through vessels entering with their heads athwart the channel. The speed of steam vessels navigating the Hopetoun Channel is not to exceed 5 miles an hour, and no sailing vessel is to enter the channel while any other vessel is proceeding through the channel in an opposite direction. Vessels proceeding outwards from Geelong should not leave the Hopetoun channel before being well clear of the outer red beacon (No. 2) which marks the eastern end of the channel, as accidents are liable to occur through leaving the channel after passing No. 1 black beacon, and steering for Wilson Spit gas buoy. (For further directions and information see page 78.)

**South Channel**, dredged through the tail of the bank separating the inner and outer harbors of Geelong, lies about 1 mile northward of the Hopetoun Channel, and is available for vessels of 14 feet draught under favorable circumstances. The channel runs S. 82 $\frac{1}{2}$  deg. W. about 1 mile between the outer and inner beacons with a navigable width of about 50 feet at its narrowest part opposite the dry bank.

*Beacons.*—The north or starboard side of the channel is marked by two large beacons at its outer and inner ends, with three single pile beacons between.

*Caution.*—As both flood and ebb streams set across the entrance of the South Channel, care must be taken that the vessel is kept under command, to prevent her being set on either bank. The speed of steam-vessels navigating the South Channel is not to exceed 5 miles an hour, and no sailing vessel must enter the channel while any other vessel is proceeding through the channel in an opposite direction. As the tidal currents are erratic off the dry bank, great caution is necessary in navigating the channel.

**North Channel**, available at ordinary low water for vessels up to 9 feet draught, lies about half-a-mile off the north shore, with its eastern entrance situated between Bird Rock beacon and the eastern beacon of the South Channel. From the red pile beacon, situated about 2 cables S.W. of Bird Rock beacon, the channel curves in a west-north-westerly direction for

8 cables to the eastern red dolphin beacon, with a general width of 600 feet. At the eastern red dolphin beacon the channel is about 400 feet wide, and thence runs S. 55 deg. W.  $1\frac{3}{4}$  cables to the western red dolphin beacon, and a further  $2\frac{3}{4}$  cables to the black single pile beacon at the western end of the channel. The width of the channel between the eastern and western red dolphin beacons is about 150 feet, increasing gradually to 400 feet at the black single pile beacon.

*Beacons.*—The channel is marked on the north side by two red single pile beacons and two red dolphin beacons, and on the south side by three black single pile beacons. These beacons, in the order passed when entering from the eastward, are placed as follow:—

East red single pile beacon, S. 45 deg. W. 1,150 feet from Bird Rock beacon.

East black single pile beacon, W. 2,780 feet from Bird Rock beacon.

West red single pile beacon, N. 81 deg. W. 3,870 feet from Bird Rock beacon.

Middle black single pile beacon, W. 4,900 feet from Bird Rock beacon.

East red dolphin beacon, N. 85 deg. W. 5,330 feet from Bird Rock beacon.

West red dolphin beacon, S. 55 deg. W. 1,080 feet from east red dolphin.

West black single pile beacon, S. 48 deg. W. 1,630 feet from west red dolphin.

*Directions.*—Having passed the easternmost beacon of the Hopetoun Channel, steer for the Bird Rock beacon, passing the red beacon at the eastern end of the South Channel on the port hand about a cable off. Leave the red pile beacon off Bird Rock about half-a-cable to starboard, and then steer between the black and red single pile beacons marking port and starboard sides of channel until abreast of the east red dolphin beacon, when steer to pass on starboard side the west red dolphin beacon about 80 feet off, and the black single pile beacon at western end of channel on port side about 100 feet off. After clearing the channel the course and distance to Yarra-street pier, Geelong, is S.S.W.  $\frac{1}{2}$  W. (S. 28 $\frac{1}{2}$  deg. W.)  $3\frac{1}{2}$  miles.

*Anchorage.*—Having cleared the western or inner beacon of Hopetoun Channel, steer about S.W.  $\frac{1}{2}$  W. (S. 51 deg. W.) nearly  $1\frac{1}{2}$  miles, and anchor in  $4\frac{1}{2}$  fathoms 3 cables northward of the Geelong wharfs; the bottom being soft mud with sand and clay, a long scope of chain is necessary to prevent the vessel from driving during strong winds. Having cleared the South Channel, steer S.W.  $\frac{1}{2}$  S. (S. 39 deg. W.) 3 miles and anchor off Geelong wharfs, as directed when coming from Hopetoun Channel.

**The Northern Shore** of the western arm of Port Phillip Bay from Point Lillias to Point Wilson, bearing E.  $\frac{1}{4}$  N. about 3 miles, forms a bay  $\frac{1}{2}$  mile deep with an island (Snake Island) at its head. The whole of this shore, as well as Snake Island, is bordered by mud and sandbanks with numerous rocks out to the 1-fathom line of soundings. A red conical buoy is moored in 13 feet, with Bird Rock beacon bearing N.W.  $\frac{1}{2}$  N. 9 cables distant. This buoy marks the outer edge of the bank which extends from between Point Lillias and Bird Rock.

**Bird Rock.**—From Point Lillias a narrow rocky ledge extends nearly S.S.W. for one-third of a mile to Bird Rock, which is marked by a red ball beacon 14 feet high. From Bird Rock a rocky shoal projects S.W. by S. 2 cables to the red single pile beacon in 8 feet of water, and marking the east side of the entrance to the North Channel.



**Point Wilson**, forming the N.E. limit of the port of Geelong, is low with numerous dry and sunken rocks off it for about 3 cables. A rock with about 1 foot of water on it lies about  $5\frac{1}{2}$  cables S.W. from Point Wilson, and is marked by a red ball beacon 9 feet high; at a cable's length inside of this rock there are 7 feet, and outside of it at the same distance are 10 feet of water.

**Steam-boat Buoy.**—From Point Wilson the bank extends S.S.E. for  $1\frac{1}{4}$  miles to the red conical buoy moored in 16 feet of water. This buoy is in line with the north beacons of Hopetoun Channel, and distant  $3\frac{1}{2}$  miles from the easternmost one. On 1st March, 1907, this buoy was removed and replaced by a single pile beacon painted red, and surmounted by a staff and globe.

From Point Wilson the shore curves N.N.E.  $\frac{1}{2}$  E. 4 miles to Kirk Point with the bank generally extending  $1\frac{1}{4}$  miles from the shore. About midway between the points the bank terminates on the outside as a 9-foot spit, running S.E. with its outer end distant  $2\frac{1}{2}$  miles from the shore.

**Buoy (Arthur the Great).**—The outer or south-eastern extremity of this spit is marked by a red conical buoy, moored in 20 feet of water and lying E.N.E.  $\frac{1}{2}$  N.  $2\frac{1}{4}$  miles from the extreme of Point Wilson with Station Peak bearing N.W. On 1st March, 1907, this buoy was removed and replaced by a single pile beacon painted red.

From Kirk Point the shore trends N.N.E.  $\frac{3}{4}$  E. for  $2\frac{1}{2}$  miles to the mouth of Little River with Beacon Point about midway between.

**Beacon Point** has a shoal spit extending off it E.S.E.  $\frac{1}{2}$  S. for a mile, at the outer end of which are two lumps about awash and separated from each other by 11 feet of water. A red ball beacon, 11 feet high and in 6 feet of water, marks the outer end of the spit off Beacon Point.

From the mouth of Little River the shore runs E. by N. for  $2\frac{1}{2}$  miles to an elbow point of land, and thence N.E.  $\frac{1}{2}$  N. for another  $2\frac{1}{2}$  miles to the mouth of the Werribee River, which may be considered the N.E. limit of the western arm of Port Phillip Bay.

From the elbow point of land between the Little and Werribee Rivers a spit with 1 to 4 feet of water on it projects from the shore in a S. by W. direction for 1 mile.

**Half-way Buoy.**—About half-a-mile from the outer end of this spit and  $1\frac{1}{4}$  miles from the shore is moored a red conical buoy in 14 feet of water on the north side of the fairway. Vessels drawing more than 15 feet must keep at least 4 cables to the southward of this buoy when passing it.

**Werribee Jetty**, about half-a-mile to the south-westward of the mouth of the Werribee River, is 1,760 feet long, and 18 feet wide, with 15 feet depth at low water at the outer end.

**Light.**—A fixed green light, visible in clear weather  $1\frac{3}{4}$  miles distant, is shown from the outer end of Werribee jetty.

**The North-western Shore** of Port Phillip from the mouth of the Werribee River trends N.E.  $\frac{1}{4}$  E. 6 miles to Point Cook. Between the Werribee River and Point Cook at 2 miles S.W. of the latter point there is a rocky shoal with 3 to 4 feet of water on it, and which extends half-a-mile from the shore.

**Point Cook** is low with a rocky spit, with 3 to 10 feet of water on it, projecting from it for 1 mile to the eastward.

*Buoy.*—About 2 cables outside the outer edge of Point Cook spit a black buoy is moored in 28 feet of water, with Point Cook bearing west  $1\frac{1}{2}$  miles distant.

**Truganina Jetty.**—There is a jetty for the transfer of explosives, about 550 yards north of the mouth of Skeleton Creek. This jetty is 1,600 feet long, the outer 100 feet being 40 feet wide, with 9 feet of water alongside at low water.

*Warping Buoys.*—Two red cask warping buoys are moored off Truganina jetty in  $9\frac{1}{2}$  feet of water, bearing N. 65 deg. E. and S. 35 deg. E., 360 feet from the outer end of jetty.

*Explosives Anchorage Buoy.*—A spherical shaped gas buoy showing a green occulting light, is moored in 28 feet of water, about S. 22 deg. W.  $8\frac{1}{2}$  cables from the black ball beacon marking the southern edge of Altona reef. Such buoy marks a suitable anchorage for vessels discharging and shipping explosives within the area defined by regulations for vessels anchoring with explosives on board.

**Altona Jetty.**—From Point Cook the shores run north and east for  $4\frac{1}{4}$  miles to Altona jetty, to the westward of which at  $1\frac{3}{4}$  miles is the outlet of Skeleton Creek. The jetty is 12 feet wide, and extends S. by E. from the shore for 1,300 feet into 9 feet at low water.

*Buoy.*—A black can buoy, moored in 3 fathoms, lies  $2\frac{1}{2}$  cables about S.E. from the outer end of Altona jetty. When approaching Altona jetty mariners and others should keep this buoy on the starboard hand.

*Beacon.*—To the westward of Altona jetty there are two rocky shoal patches, the outer one of which with only 2 feet of water on it lies nearly 1 mile from the shore, and is marked on its south edge by a black ball beacon, 10 feet above sea-level. From this beacon the outer end of Altona jetty bears W.  $\frac{1}{2}$  N. 1-1.0 miles, and Gellibrand light E. by N. 2-3.5 miles.

**Beacons.**—*Rifle Ranges, Williamstown.*—Two red spar buoys are placed off the rifle ranges at Williamstown at about 2,000 yards from the shore. The danger zone is marked by such buoys, and the Altona black ball beacon marking the southern edge of Altona reef. Boats are therefore cautioned against going inside these marks when firing is going on.

**POINT GELLIBRAND,** at the southern extremity of the projection of land which forms the west side of Hobson's Bay, is bordered by dry rocks with outlying foul ground extending off the shore to 3-fathom line of soundings, which between the lighthouse and the shore lies about 4 cables off.

**Point Gellibrand Pile Light.**—This light-house, in latitude 37 deg. 52 min. 43 sec. S., longitude 144 deg. 54 min. 53 sec. E., and situated in 5 fathoms of water, lies about half-a-mile off Point Gellibrand, with the end of the Breakwater pier bearing N. 3 deg. E.  $7\frac{1}{2}$  cables distant. The light-house, which was erected to replace the old floating light-vessel, stands on wooden piles, and is surmounted by a small cylindrical tower, painted white. The light was first shown on the 1st August, 1906, and is an occulting light, having periods of 15 seconds' light and 3 seconds' eclipse; it is elevated 50 feet above high water, and visible for a distance of 12 miles. The light has the following characteristic periods:—

From seaward, between the bearings of N.  $39\frac{1}{2}$  deg. E. and N. 33 deg. W.—White, 6 seconds; red, 3 seconds; white, 6 seconds.

From the waters adjacent to the western and eastern shores of Port Phillip, between the bearings of N.  $39\frac{1}{2}$  deg. E. and N. 63 deg. E., and between the bearings of N. 33 deg. W. and S. 63 deg. W.—Red, 15 seconds.

From Hobson's Bay, between the bearings S. 63 deg. W. and S. 3 deg. W.—White, 6 seconds; red, 3 seconds; white, 6 seconds.

The dioptric apparatus employed for projecting the light is of the 2nd order for the principal navigable waters of Port Phillip, and of the 4th order for Hobson's Bay and the waters adjacent to the eastern shore of Port Phillip.

*Fog Signals.*—In foggy weather a fog-horn will be sounded and a fog-rocket fired alternately every five minutes from the pile light-house.

*Warning.*—The rockets explode at a height of about 600 feet above the sea-level, producing at the same time a sharp report, which should be heard under favorable atmospheric conditions at a distance of from 5 to 6 miles, but circumstances may arise to prevent even the most powerful sound signal from being heard 2 miles distant; therefore, when a signal is heard, it should be assumed that the source of the sound is not more than 1 to  $1\frac{1}{2}$  miles distant, and the necessary precautions taken accordingly.

*Explosives Anchorage.*—Westward of an imaginary line bearing north-east to the Point Gellibrand Pile light-house, and exceeding a distance of three-quarters of a mile from the shore.

**Hobson's Bay.**—At the north end of Port Phillip Bay the waters contract, forming the portion known as Hobson's Bay, which between Point Gellibrand and Point Ormond is nearly  $3\frac{1}{2}$  miles across, and into which at the north-western corner the River Yarra empties itself.

**The Port of Melbourne\*** consists of all inlets, rivers, &c., within a line drawn from a point at the termination of north-west side of Fitzroy-street, St. Kilda, eastern shore, Hobson's Bay, to a point on western shore of Hobson's Bay, in line with north side of Little Nelson-street, Williamstown. The western portion of the Bay is the deep-water side, the soundings ranging from 18 to 28 feet at low water; the eastern side is mostly occupied by a flat bank, with 12 to 15 feet on it at low water, the 12-ft. line of soundings being about 600 yards from the shore.

**PORT MELBOURNE**, formerly called Sandridge, is situated on the north side of Hobson's Bay, 3 miles south-west of Melbourne, and has accommodation for vessels drawing 28 feet, low water.

**Piers.**—At Port Melbourne there are two piers, each about 2,000 feet long, known as the Railway and Town piers.

*The Railway Pier*, extending S.S.W. from the shore, has berthage accommodation for vessels drawing 28 feet, low water, and all facilities for loading and unloading.

*The Town Pier* extends about S.W. by S. from the shore, with berthage accommodation on the western side for vessels drawing 26 feet, low water, the depth on the eastern side of the pier being 24 to 26 feet, low water. The space between the two piers has been dredged to depths of 26 to 30 feet, low water.

\* The particulars respecting the Port of Melbourne have been supplied by the Melbourne Harbor Trust, under whose jurisdiction the waters of such port are.

**Channel.**—A channel leading to Port Melbourne Railway pier has been dredged 600 feet wide, to 28 feet at low water, and is being deepened to 30 feet, low water. The eastern or starboard side of this channel is marked by two buoys, bearing about N.  $\frac{3}{4}$  W. and S.  $\frac{3}{4}$  E.,  $6\frac{1}{2}$  cables apart; the outer buoy (gas), showing a red occulting light, is moored 5 cables E. from the end of Williamstown Breakwater pier; the inner buoy is red conical with perch. The green light on outer end of Railway pier, in line with red beacon shore light, leads through the channel on a bearing of about N.  $\frac{1}{2}$  W.

**Lights.**—One green on outer end of Railway pier; one red on outer end of Town pier; one red shore light (leading) about N.W. by W., 1,000 feet from inner end of Railway pier.

**Magnetic Buoys.**—Five compass-adjusting buoys are moored  $5\frac{1}{2}$  cables W.  $\frac{3}{4}$  S. from the outer end of the Port Melbourne Railway pier, in 15 feet of water. One compass-adjusting buoy about  $4\frac{1}{2}$  cables S.S.E. of Railway pier, Port Melbourne. One compass-adjusting buoy in centre of Victoria Dock, River Yarra.

**WILLIAMSTOWN**, on the south-west shore of Hobson's Bay, is situated 10 miles by rail from Melbourne.

**Piers.**—Breakwater pier extends N.E. 1,500 feet from the shore with berthage accommodation on north-west side for vessels drawing 28 feet, low water.

*Railway Pier* extends N. by E. 1,300 feet from the shore, the outer 700 feet being able to accommodate vessels drawing 28 feet, low water.

*Dock Pier* extends about N.E. 350 feet from the shore, with 28 feet, low water, along the outer 200 feet of length.

*New Railway Pier* extends about N.E. 500 feet from the shore, with accommodation for vessels drawing 28 feet, low water.

*Ann-street Pier* extends N. by E. about 500 feet from the shore, with depths at low water at 15 feet at inner to 20 feet at outer end.

*Gem Pier* extends N. by E. about 500 feet from the shore into about  $8\frac{1}{2}$  feet, low water.

**Channel.**—Dredging of a channel about 500 feet wide leading to the various piers at Williamstown, with a depth of 28 feet, low water, has been done. The port side of this channel is in line with the end of the Breakwater pier, bearing N.W. by W.

**Lights.**—One fixed green light on outer end Breakwater pier; one fixed green light on outer end Ann-street pier; one fixed red light on outer end Gem pier.

**Government Dock.**—The Alfred Graving Dock, opened in 1874, is about 100 yards westward of the Railway pier. Its dimensions are—Length over all, 470 feet; length on floor, 450 feet; available length on floor to side of caisson, 459 feet; breadth at entrance, 80 feet; width of dock at top, 97 feet; width of dock at bottom,  $55\frac{1}{2}$  feet; depth over sill, low water, ordinary springs, 25 feet; depth over sill, high water, ordinary springs, 27 feet. The s.s. *Armand Belic*, 507 feet long over all, and 486 feet over keel, was docked in the Alfred Graving Dock in 1895, the dock being temporarily lengthened by shifting the caisson outwards.

**Dry Docks, Slipways.**—Williamstown Slipway Patent Slip for vessels not exceeding 500 tons.

*Clement Blunt's Slip* for vessels not exceeding 80 tons, extreme length 64 feet, breadth at entrance or extreme 18 feet, depth of sill at ordinary high water 6 feet, at spring tides 7 feet, and neap tides  $5\frac{1}{2}$  feet.

*Melbourne Steam-ship Coy.'s Floating Dry Dock* to take vessels up to 900 tons, extreme length 216 feet, breadth at entrance or extreme 36 feet, depth of sill at ordinary high water 13 feet.

*Knight's Slip* for vessels not exceeding 80 tons, extreme length 350 feet, lifting power 100 tons.

*Knight's Slip* for vessels up to 75 tons, extreme length 120 feet, cradle 60 feet long.

**Entrance to River Yarra.**—A channel with 26 feet at low water has been dredged from the gas buoy moored about 2 cables E.N.E. from the outer end of the Williamstown Railway pier to the entrance of River Yarra. This channel is 450 feet wide at the gas buoy, and converges to a width of 300 feet at entrance to river. The aforesaid gas buoy, which shows an occulting white light, marks the port side of the channel.

Two lights are exhibited from beacons erected at the mouth of the river, the light on starboard side being white, and on the port side red.

**River Yarra.**—From the mouth of the river to berthage abreast of the Custom House, Melbourne, the distance is  $5\frac{3}{4}$  miles, the average breadth of the stream being about 300 feet, and the least depth of water 24 feet at low water, up to Spencer-street Dock.

**Lights.**—From the mouth of the river upwards the following lights are exhibited:—

At mouth of river	...	...	1 white on starboard side; 1 red on port side.
Mouth of river to 1 mile	...	...	1 green and 3 white lights on port side, placed a quarter of a mile apart.
1 mile to $1\frac{1}{4}$ miles	...	...	4 white lights on starboard side, placed about 330 yards apart.
2 miles (junction of Yarra and Stony Creek)	...	...	1 white on starboard side; 1 red on port side.
Thence	...	...	2 white lights on starboard side, placed on the timber jetties which jut about 250 feet into the river.
$2\frac{3}{4}$ miles (west end Coode's Canal)	...	...	1 red on port side; 1 white on starboard side.
$2\frac{3}{4}$ to $3\frac{1}{2}$ miles	...	...	2 white on port side.
$3\frac{3}{4}$ miles (east end Coode's Canal)	...	...	1 red on port side; 1 white on starboard side.

From thence to Melbourne the ordinary lamps on the wharfs.

**Tide Gauges.**—For guidance whilst navigating the river, tide gauges showing the depth of water are erected at the following:—

1. Red beacon, mouth of river, on starboard side.
2. Short-road Ferry, on starboard side.
3. At 2 miles (junction river and Stony Creek), on starboard side.
4. At  $2\frac{3}{4}$  miles (west end Coode's Canal), on port side.
5. At 4 miles (at Victoria Dock entrance), on port side.
6. At Johnson-street Ferry, on starboard side.
7. At Spencer-street Dock, on port side.
8. At Queen's Wharf, opposite Custom House, on port side.

**Docks (Wet).**—Four miles up the river, on the north bank, and adjacent to the city wharfs and Spencer-street Railway Station, a wet dock, having an area of about 95 acres, and a depth of 24 feet low water, has been excavated.

This dock is known as the Victoria Dock, and has at present 8,800 feet of berthage accommodation. On the south side there are six closed sheds, each 300 feet long, between each of which are similar lengths of open shed. On the north and east sides of the dock are lines of rails in connexion with the Victorian Railways.

**Spencer-street Dock.**—This dock is 400 feet long and 100 feet wide, with 12 feet at low water, and is used by small craft.

**Graving Docks.**—There are two Graving Docks on the south bank of the river about 200 yards below Spencer-street steam ferry:—

**Duke's Dock,** 520 feet long, width at entrance 61 feet on bottom and 71 feet on top; can take up to 65 feet beam. Depth of water on sill 20 feet at low water.

**Orr's Dock,** at present capable of taking vessels up to 300 feet in length and 40 feet beam. Depth of water on sill 17 feet 6 inches at low water. This dock is under reconstruction.

In the neighbourhood of these docks there are engineering and boiler-making yards for effecting repairs to vessels and machinery.

**Portsea Jetty,** in the small bay (Weeroona Bay) to the eastward of the east quarantine boundary flagstaff, is 500 feet long and 15 feet wide, with an L end 235 feet long and 25 feet wide. At the outer end of jetty there are 12 feet at low water.

**Light.**—A red fixed light, visible in clear weather 2 miles off, is exhibited from the outer end of Portsea jetty.

**Telegraph.**—There is telegraphic communication with Portsea.

**Point Franklin,** about 2 cables to the eastward of Portsea jetty, is a rocky point, and is marked by a flagstaff painted white.

**Buoy.**—About 250 feet off Point Franklin, and moored in 11 feet of water, is a 4th class cone buoy painted red.

**Point King,** about 1 mile E. by S.  $\frac{1}{2}$  S. from Port Franklin, is low and skirted by rocky ledges with outlying foul ground and shoal water extending to the sand-banks which lie 4 cables east of the point. Between Point Franklin and Port King the shore bank extends 2 cables off into 3 fathoms water. At Point King the shore takes a sharp bend to the S.S.E. to Sorrento.

**Buoys.**—Two barrel buoys marking the western end of the Sorrento Channel are moored off Point King bearing and distant from the point as follows:—North or black buoy E.  $\frac{1}{2}$  N. 2 $\frac{1}{2}$  cables in 8 $\frac{1}{2}$  feet low water; south or red buoy S.E. by E.  $\frac{3}{4}$  E. 2 $\frac{1}{2}$  cables in 7 $\frac{1}{2}$  feet low water.

**Sorrento Jetty,** about S.E. by S. three-quarters of a mile from Point King, projects 550 feet from the shore in a N.E. direction, with a  $\perp$  end 300 feet long and 22 feet wide, along the outer side of which are 10 $\frac{1}{2}$  feet of water at low water.

**Light.**—A fixed green light, visible 1 $\frac{3}{4}$  miles off, is shown from the outer end of Sorrento jetty.

**Buoys.**—Off Sorrento jetty are moored the following buoys, bearing and distant from the outer end of the jetty as below:—

*Black cask buoy*, on N.E. edge of channel in 18 feet of water, north 2 cables from the N.W. outer end of jetty.

*Black cask buoy* (small), on north edge of channel in  $6\frac{1}{2}$  feet of water, east 4 cables from the S.E. outer end of jetty.

*Note.*—Vessels entering Sorrento Channel at its western entrance off Point King should keep between the two buoys moored off the point, the minimum depth of water in the fairway being 9 feet at low water.

*Telegraph.*—There is telegraphic communication with Sorrento.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus kept at Sorrento.

**The Sisters**, S.E. by E. from the outer end of Sorrento jetty at 8 and 11 cables respectively, are the two points (The Sisters) between which is a sand beach.

*Buoy.*—A red barrel buoy, marking the south side of the eastern channel to Sorrento, and moored in 17 feet of water, lies N. by E.  $\frac{1}{2}$  E.  $3\frac{1}{2}$  cables from the east point of The Sisters, with Sorrento jetty light bearing W. by N.  $\frac{1}{2}$  N. distant  $10\frac{1}{2}$  cables.

**White Cliff**, E. by S.  $\frac{3}{4}$  S.,  $2\frac{1}{2}$  miles from the east point of The Sisters, is a conspicuous cliff of bare sand over 80 feet high.

**Canterbury Jetty**, about 1 mile to the westward of White Cliff, is 1,200 feet long, with 12 feet of water at the outer end.

**Buoys.**—A red cask buoy (warping), in  $6\frac{1}{2}$  fathoms, lies in line with Canterbury jetty at about half-a-cable off its outer end.

A black barrel buoy, moored in 4 fathoms, N. by W.  $\frac{1}{4}$  W., about  $2\frac{1}{2}$  cables from the outer end of Canterbury jetty, marks the southern edge of the bank which extends northward to the south side of the South Channel.

From White Cliff the shore extends about E.N.E. for nearly 6 miles to the Eastern light-house, and forms a sandy beach, off which, at  $4\frac{1}{2}$  cables, there are 3 fathoms water. Along this beach are the jetties at Rye and Rosebud.

**Rye Jetty**,  $5\frac{3}{4}$  cables E. by S. from White Cliff, projects 1,600 feet from the shore in a northerly direction, with 12 feet at low water along the outer side of its small  $\perp$  end.

*Light.*—A red fixed light, visible in clear weather 2 miles distant, is shown from the outer end of Rye jetty.

*Buoy.*—A warping buoy is moored in 40 feet of water, 65 fathoms off north-west corner of Rye jetty.

**Rosebud Jetty**, about 1 mile W.S.W.  $\frac{1}{2}$  S. from the Eastern light-house, is 500 feet long, with 5 feet of water at the outer end.

*Light.*—A fixed green light, visible in clear weather about  $1\frac{3}{4}$  miles distant, is shown from the outer end of Rosebud jetty.

**Arthur's Seat**, a conspicuous bluff, 975 feet high at its summit, lies in line with the South Channel leading lights, and  $1\frac{1}{8}$  miles eastward of the Eastern light-house. From its N.W. point, where it is very steep, it extends with a gradual fall to the S.S.W. Arthur's Seat shows up conspicuously for a considerable distance outside the Heads, and is therefore a good guide to distinguish the entrance to Port Phillip. On its summit the old light-house tower still stands.

**Dromana Jetty**, 2 miles N.E.  $\frac{1}{2}$  E. from the Eastern light-house at the foot of Arthur's Seat, is 28 feet wide, and projects 1,500 feet from the shore into 13 feet at low water. At 160 feet from its outer end, and pointing N.E., is a cross jetty 170 feet long and 25 feet wide, with 7 to 9 feet of water along it on the inside.

*Light*.—A fixed red light, visible in clear weather about 2 miles distant, is shown from the outer end of Dromana jetty.

**Buoys**.—Two red barrel buoys are moored as follows :—One in 15 feet of water, about 520 feet N.E. from the outer end of Dromana jetty; and the other in 3 feet of water, about 200 feet S.E. of the N.E. end of the cross jetty.

*Telegraph*.—There is telegraphic communication with Dromana.

**Dromana Bay**.—From Dromana jetty to Martha Point, which lies N. by E.  $\frac{1}{4}$  E.  $2\frac{3}{4}$  miles from the jetty, the shore recedes to the eastward, forming Dromana Bay, in which there are 3 fathoms of water at about 3 cables off the shore.

From Martha Point, at the N.W. end of Dromana Bay, the shore trends about N.N.E.  $1\frac{1}{2}$  miles to Martha Cliff, which forms the S.W. point of Balcolm's Bay; this shore is cliffy, and rises at the back to a flat-topped ridge, of which the S.W. and highest part is Mount Martha, 527 feet high, and bearing E. by N. 1 mile from Martha Point, and N.N.E.  $\frac{1}{2}$  E.  $4\frac{1}{4}$  miles from Arthur's Seat.

**SCHNAPPER POINT—MORNINGTON**.—Schnapper Point lies N. by E.  $\frac{1}{4}$  E.  $3\frac{3}{4}$  miles from Martha Cliff, with Balcolm's and Fisherman's Bays between; it is a narrow point about 50 feet high and projects about 2 cables from the line of shore with rocky boulders strewn about on its western side. Immediately behind Schnapper Point is the township of Mornington, a watering place with post and telegraph station and daily railway communication with Melbourne.

**Jetty**.—From Schnapper Point a jetty 35 feet wide projects about N.E. for 430 feet into 25 feet of water, shallowing to 16 feet at 200 feet in from end of S.E. side of jetty. On the S.E. side of the jetty at its inner end is the Firewood wharf, 200 feet long and 12 feet wide; close up alongside this wharf there are from 6 feet of water at its N.W. end to 13 feet of water at its S.E. end, and 12 to 15 feet of water all along at 25 feet off.

*Lights*.—On the top of Schnapper Point is a small wooden light-house about 10 feet high and painted white, from the top of which at an elevation of 50 feet above sea-level is exhibited a fifth order diotric fixed white light, showing all round to seaward for a distance of 10 miles.

*Jetty Light*.—A red light, visible in clear weather about 2 miles distant, is shown from the outer end of Mornington jetty.

From Schnapper Point the shore extends N.E. by N. for 4 miles to Davy Point, with 3 fathoms of water at 2 cables off. This shore is bold, being formed by high hills, the highest and most conspicuous of which is Mount Eliza, 527 feet high, lying  $1\frac{3}{4}$  miles back from the shore, and bearing E.N.E.  $\frac{1}{2}$  E.  $3\frac{1}{10}$  miles from Schnapper Point.



North 6 cables from Davy Point, and lying at the outer end of a sand-spit which projects N.W. from the shore, is a rock with only  $4\frac{1}{2}$  feet of water over it.

From Davy Point for 10 miles N.N.W. to Ricket Point the easternmost shore of Port Phillip Bay forms a large open bight about 3 miles deep in the middle, with 5 fathoms of water at 1 mile from the shore. Along the shore of this bight are the following jetties:—

**Frankston Jetty.**—N.E.  $1\frac{3}{4}$  miles from Davy Point, is 1,120 feet long and  $13\frac{1}{2}$  feet wide, with an **J** end 175 long and 20 feet wide, along the outer side of which are 14 feet of water at low water.

*Light.*—A fixed green light, visible in clear weather about  $1\frac{3}{4}$  miles distant, is shown from the outer end of Frankston jetty.

*Telegraph.*—There is telegraphic and railway communication with Frankston.

**Mordialloc Jetty,** N.N.W.  $\frac{1}{4}$  N.  $8\frac{1}{2}$  miles from the Frankston jetty, is 1,300 feet long and 14 feet wide, with 9 feet of water at low water at the outer end.

*Light.*—A fixed red light, visible in clear weather 2 miles, is shown from the outer end of the jetty at Mordialloc.

North of Mordialloc jetty the land forms a bay, the shore of which is low and sandy at each end, but rises gradually to steep cliffs 40 feet high at the west end.

*Telegraph.*—There is telegraphic and railway communication with Mordialloc.

**Mentone Jetty,** at 1.6 miles from Mordialloc jetty and about half a mile from the head of the bay just described, is 882 feet long, 20 feet wide, with 12 feet of water at the outer end.

*Telegraph.*—There is telegraphic and railway communication with Mentone.

**Ricket Point,** 4 cables westward of the west end of the bay north of Mordialloc, is a low point about 30 feet above high water, but rising to 60 feet at about 70 feet back.

From Ricket Point the shore runs N.W. for  $1\frac{3}{4}$  miles to the south point of Half Moon Bay, and is bordered by rocks and rocky shoals, some of which extend nearly half-a-mile from the shore, with 5 fathoms water at 1 cable farther off.

**Black Rock,** about half-way between Ricket Point and Half Moon Bay, is a detached piece of rock near high-water mark.

*Buoy.*—A red nun buoy is moored in 18 feet of water about 6 cables west of Black Rock, and marks the outer limit of the foul ground between the buoy and the shore.

**Red Cliff,** at the north end of Half Moon Bay, is 110 feet high, and conspicuous owing to its red face.

From Red Cliff the shore trends N.W. for  $1\frac{1}{4}$  miles to Picnic Point, with outlying shoal water and foul ground for about half-a-mile off.

**Anonyma Shoal,** between Red Cliff and Picnic Point, and three-quarters of a mile from the shore, is a rocky patch one-third of a mile long and 380 yards broad, with 1 foot of water on its shoalest part. At a cable off the outer or S.W. edge of the shoal there are 4 fathoms, and for a quarter of a mile between its inner or N.E. edge and the shore bank,  $3\frac{1}{4}$  fathoms is found.

*Buoy.*—A red cone buoy is moored S.S.W.  $\frac{1}{4}$  W. 7 cables from Picnic Point, and marks the N.W. end of Anonyma shoal.

**Picnic Point** is a well-defined projection with a grassy top and fringed with rocks. A 15-foot bank projects S.W. from Picnic Point to 3 fathoms half-a-mile off, and a rock carrying 3 feet of water with 12 feet all round lies  $3\frac{1}{2}$  cables south of the point. From the north side of the point a dry reef 120 yards wide extends N.W. for a cable; and from the outer end of the reef foul ground, 50 yards wide and carrying 3 to 5 feet of water, extends N.N.W. for 350 yards, where it is marked by a red nun buoy placed in 8 feet of water, N. 37 deg. W. 1 1-5 cables from outer end of jetty.

*Picnic Point Jetty*, just inside the dry reef which extends N.W. from the point, is 12 feet wide, and projects 820 feet from the shore in a N.W. direction into 9 feet at low water.

*Light.*—A fixed red and green light, visible in clear weather about 2 miles distant, is shown from the outer end of Picnic Point jetty.

The green light indicates a safe approach to the jetty, and the red light marks the foul ground and shoal water which lies to the westward of the jetty.

Vessels intending to use Picnic Point jetty should pass northward of the red nun buoy until in line with the jetty, when, if drawing not more than 6 feet, steer straight in; but if drawing up to 8 feet, keep over E.N.E. until the outer end of the jetty is in line with the extreme of Picnic Point, when steer in.

**Rock Patch.**—A patch of rock, carrying  $3\frac{1}{2}$  fathoms with 5 fathoms around it, lies about west  $1\frac{1}{4}$  miles from Picnic Point.

**Green Point.**—From Picnic Point the shore runs N.N.W.  $\frac{1}{4}$  W. for  $1\frac{1}{2}$  miles to Green Point.

**Brighton Beach Jetty**, about  $1\frac{1}{4}$  cables S.E. of Green Point, is 22 feet wide, and extends from the shore for 550 feet into 12 feet at low water.

From Green Point the shore trends N. by W. from  $1\frac{1}{2}$  miles to Point Cole, and forms the water frontage of the town of Brighton. Between Green Point and Point Cole at half-a-mile from the latter point is Park-street jetty, Middle Brighton. Along the whole of the shore from Green Point to Park-street jetty are numerous rocks with rocky patches extending in some places 3 cables off, and at 7 cables off the shore is the 3 fathoms line of soundings.

**Park-street Jetty** is 11 feet wide, and projects 1,080 feet W by N. from the shore into 9 $\frac{1}{2}$  feet at low water.

*Light.*—A fixed red light, visible in clear weather 2 miles distant, is shown from the outer end of Park-street jetty.

*Buoy.*—A red nun buoy is moored in 12 feet of water at 3 cables S. by W. from the outer end of Park-street jetty, and marks the outer limit of the foul ground between the buoy and the shore.

*Telegraph.*—There is telegraphic and railway communication with Brighton.

**Point Ormond**, the eastern point of Hobson's Bay, lies N.N.W.  $1\frac{1}{2}$  miles from Point Cole, and is a round sloping point of red sandstone about 40 feet high. For one-third of a mile northward of Point Ormond the bottom is rocky with 1 and 2 fathoms of water at 1 and 3 cables off respectively.

**St. Kilda Pier**, N.N.W.  $\frac{1}{2}$  W.,  $1\frac{1}{10}$  miles from Point Ormond is 25 feet wide, and projects W. by S. from the shore for 2,000 feet to an  $\perp$  end 200 feet long and 25 feet wide, with  $10\frac{1}{2}$  feet at low water on the outside. At 500 feet in from the outer end there is an inner  $\perp$  end 360 feet long and 25 feet wide with 6 feet at low water on the outside.

*Light*.—A fixed green light, visible in clear weather  $1\frac{3}{4}$  miles distant, is shown from St. Kilda pier at the inner angle of main pier with the outer  $\perp$  end.

*Telegraph*.—There is telegraphic and railway communication with St. Kilda.

**THE COAST**.—From Point Nepean the coast extends S.E.  $\frac{3}{4}$  E. 16 miles to Cape Schanck, and may be approached to 2 miles in 10 to 20 fathoms water.

**CAPE SCHANCK**, the southern extremity of the peninsula, which separates Port Phillip from Port Western, is a narrow clifly headland, 278 feet high; close off the cape is the remarkable Pulpit rock, with a smaller rock lying S. by E. nearly a quarter of a mile from the cape.

**Cape Schanck Lighthouse**, on the west side of the headland in latitude 38 deg. 29 min. 42 sec. S., longitude 144 deg. 53 min. 02 sec. E., stands upon the highest part of the cape, about half-a-mile N.N.W. from Pulpit rock. The light-house was built in 1859, and is a white circular stone tower about 70 feet high from ground to top of lantern.

*Light*.—The light is a first order catadioptric fixed and flashing white light, elevated 328 feet above sea-level, and visible in clear weather at a distance of 23 miles.

The light shows a bright flash every two minutes, and is visible from seaward between the bearings of S.E. by E.  $\frac{1}{4}$  E. (S. 58 deg. E.) and W. by N. (N. 78 deg. W.)

The light at a distance of 8 miles and upwards, according to the state of the atmosphere, will appear as a steady light for the space of one minute, be suddenly eclipsed for 25 seconds, then exhibit a bright flash for about 10 seconds, and be again eclipsed for 25 seconds, when the steady light will re-appear.

When within 6 miles from the light, the eclipses will be scarcely visible, and a continued faint light will be seen between the flashes.

*Danger Light*.—An auxiliary red fixed light, illuminating an arc of 180 deg. seaward, is exhibited from the light-house tower at 30 feet below the main light, and is so depressed as to be invisible to an observer 14 feet above sea-level, until at about 3 miles or less from the light-house.

This red-danger light, which was first exhibited in June, 1894, is to warn mariners of their too near approach to the shore, and when seen the course should be altered to seaward until the red light is run out. In thick weather mariners should not rely upon sighting the red light, but should keep a good offing.

*Life-saving Apparatus*.—A life-saving rocket apparatus is kept at Cape Schanck.

*Signal Station*.—There is a signal station at Cape Schanck light-house, and vessels can communicate by the International Code. Cape Schanck is connected by telephone to Dromana, which is connected with the telegraph system.

**The Coast**.—On the east side of Cape Schanck a rocky bight extends E. by N.  $\frac{1}{2}$  N.  $1\frac{1}{2}$  miles to Barker Point. From Barker Point the coast, which is closely bordered with rocks, trends E. by N.  $\frac{1}{2}$  N.  $5\frac{1}{2}$  miles to West Head.

**West Head.** the outer western point of the western entrance to Port Western, lies E. by N.  $\frac{1}{4}$  N. 7 miles from Cape Schanck, and is a narrow cliffy projection 85 feet high and enclosed by dry reefs and sunken rocks which at three-quarters of a mile westward of the head, extend from the shore for  $6\frac{1}{2}$  cables. A rock with 10 feet of water over it, lies S.E. 6 cables from the head.

**Port Western** is an extensive bay within whose limits are two large islands, viz., French Island, occupying the middle, and Phillip Island, fronting the bay to seaward. West and east of Phillip Island are the two entrances to the port. Inside of the island the waters separate into two arms, the western one flowing north and east along the west and north sides of French Island, and the eastern arm flowing to the north-eastward along the south-east shore of French Island.

**Grant Point**, at the western extremity of Phillip Island, lies E. by S.  $\frac{1}{2}$  S.  $4\frac{1}{2}$  miles from West Head, and forms the outer eastern point of the western entrance to Port Western. From Grant Point a reef extends W.S.W. a quarter of a mile to Round Island, which is 98 feet high; outside of Round Island at a distance of three-quarters of a mile S.W.  $\frac{1}{2}$  S. is Black Rock, 34 feet high, and bordered by a reef on which the sea breaks heavily during a southerly swell.

**The Port of Western Port** includes all inlets, rivers, bays, harbors, and navigable waters north of and within a line bearing S. 71 deg. E. from West Head to Grant Point, and also north of a line bearing N. 45 deg. E. from Cape Wollamai to the opposite shore.

**Western Entrance.**— From West Head the western shore of the western entrance extends about N.N.E.  $\frac{1}{2}$  E.  $7\frac{1}{2}$  miles, and thence E.  $\frac{3}{4}$  S. 5 miles to Sandy Point, the inner western point of the entrance; from this latter stretch of shore projects the Middle Bank Shoal for nearly 5 miles S.S.W. with its southern extremity about E.N.E.  $4\frac{1}{2}$  miles from West Head and about  $1\frac{1}{2}$  miles from the eastern shore. From Grant Point the eastern shore of the western entrance trends N.N.E. 4 miles to McHaffie Reef; from McHaffie Reef the shore runs N.E. 2 miles to Red Rock; from Red Rock the shore extends E. by N.  $2\frac{1}{4}$  miles to the jetty at Cowes.

**Buoys.**—A red conical buoy is moored off McHaffie reef, in 24 feet of water, and a red cask buoy is moored off Red rock in 18 feet of water.

The western entrance is  $3\frac{1}{2}$  miles wide between the 10-ft. rock off West Head and Black Rock off Grant Point, with 12 to 15 fathoms in mid-channel and 4 to 5 fathoms close to the rocks on either side; and being open and free from any other hidden danger, it is easy of access, and affords sufficient room for a vessel to work in and out. At 5 miles inside, the middle bank on the west side of the fairway reduces the navigable width of the channel to about 1 mile.

**Flinders.**— Immediately inside West Head about three-quarters of a mile to the north-westward is the telegraph station of Flinders.

**Jetty.**—At Flinders there is a jetty 1,070 feet long and 13 feet wide, with  $8\frac{1}{2}$  feet at low water at the outer end. Spring tides rise  $8\frac{1}{2}$  feet.

**Light.**—A fixed white and red light, visible in clear weather 3 miles distant, is shown from the outer end of Flinders jetty. The light shows white between the bearings of N.W.  $\frac{1}{4}$  N. (N. 42 deg. W.) and W.  $\frac{1}{2}$  S. (S. 84 deg. W.), and red northward of W.  $\frac{1}{2}$  S. The red light marks the anchoring ground and the white the position of the submarine telegraph cable which connects the State with Tasmania.

*Anchorage.*—Vessels anchoring off the jetty, to avoid fouling the submarine cable, should anchor off the jetty within the limits of the bearings of the red light by day, and with the red light in sight by night.

A red iron cask warping buoy is anchored 70 fathoms from the end of Flinders jetty in 14 feet of water.

**Cowes.**—Inside the western entrance, and on the north side of Phillip Island, is the township of Cowes, which has post and telegraph communication with Melbourne. Communication is by steamer to Stony Point, thence rail to Melbourne.

*Jetty and Light.*—There is a jetty at Cowes with an  $\Gamma$  end 125 feet long and 25 feet wide, with a least depth of 13 feet at low water on the outside. A fixed white light, visible in clear weather 3 miles distant, is shown from the outer end of the jetty.

*Tides.*—High water, full and change, at Cowes, oh. 31m. Springs rise  $8\frac{1}{2}$  feet, neaps  $6\frac{1}{2}$  feet.

*Buoy.*—A red iron warping buoy is moored in 45 feet of water N. 16 deg. E. from eastern end of jetty.

**Tortoise Head, E. by N.  $\frac{1}{4}$  N.  $1\frac{3}{4}$  miles** from Sandy Point, is the south end of the flat-topped island at the S.W. corner of French Island, and is a good leading mark for vessels entering Port Western by the western entrance. Reefs extend for a quarter of a mile from Tortoise Head and from the low projecting point to the northward. A 13-ft. spit projects S.W. three-quarters of a mile from the head. To the southward of this spit is the western end of the bank which extends along the S.W. side of French Island, from which it is divided by a channel of  $3\frac{1}{4}$  to 8 fathoms. The eastern portion of this bank dries at low water, and the western portion carries 1 to  $2\frac{1}{2}$  fathoms, and is marked at its western extremity by a red cask buoy, surmounted with a diamond and moored in four fathoms with Sandy Point bearing W.N.W.  $\frac{3}{4}$  N. and Tortoise Head N.N.E.  $\frac{1}{2}$  E.

*Directions.*—Vessels should enter the western entrance midway between West Head and Black Rock, and then steer N.E. for 3 miles when look out for the ripple on the banks which form the N.W. side of the channel. If the ripple cannot be trusted, steer for Tortoise Head bearing N.E.  $\frac{3}{4}$  E. passing to starboard the red buoys off McHaffie Reef and Red Rock. With ordinary caution, therefore, a vessel may arrive abreast of Sandy Point, when proceed northward or eastward as desired; if proceeding eastward be careful to avoid the shallow spit right ahead at about 3 miles eastward of the jetty at Cowes and 1 mile northward of the low point on the north side of Phillip Island (Observation Point.) Vessels may avoid this shoal by keeping half-a-mile off the north side of Phillip Island until abreast of Observation Point, 3 miles eastward of Cowes, when come to anchor in 8 fathoms, as the whole of the water to the eastward and south-eastward shoals rapidly (described page 98). Vessels should exercise caution when off the north side of Phillip Island, as the tide streams set strongly along the shore.

**Western Arm** of Port Western, from its entrance between Sandy Point and the Spit, S.S.W. of Tortoise Head, where it is 1 mile wide, trends N.  $\frac{1}{2}$  W. 10 miles to Watson Inlet, increasing to 3 miles wide between the inlet and Scrub Point at north end of French Island. The channel between the mud flats, which project 1 to 4 cables from the mainland and the banks which extend in some places nearly 2 miles from the west side of French Island, is three-quarters of a mile to 1 mile wide, with 6 to 11 fathoms in mid-channel. The banks on the east side of the arm

are separated from French Island by a passage about one-third of a mile wide, with  $3\frac{1}{2}$  to 8 fathoms, but is encumbered with shoal patches of 1 to 2 fathoms.

**Tea-Tree Point** on the east side of the western arm and  $1\frac{1}{2}$  miles northward of Tortoise Head, is provided with a jetty 560 feet long, 6 feet wide, with 7 feet high water at the outer end.

**Stony Point**, N.N.W.,  $2\frac{1}{4}$  miles from Sandy Point, is a railway terminus, and is provided with a jetty 914 feet long, 10 feet wide, with an  $\Gamma$  end 48 feet long and 14 feet wide. At the outer end of the jetty is a depth of  $12\frac{1}{2}$  feet at low water.

*Light.*—A fixed white light, visible in clear weather 3 miles distant, is shown from the outer end of the jetty.

From Stony Point the land trends N.N.W.  $1\frac{1}{2}$  miles to Crib Point. Between Crib Point and Long Island, at  $2\frac{1}{4}$  miles north, the low western shore forms a bight, in the southern part of which is Sandstone Island. This bight is filled with mud flats, through which a channel runs north-westward for about  $1\frac{3}{4}$  miles to the jetty at the township of Hastings. This channel has irregular depths of 1 to 4 fathoms, low water, and is marked on each side by single pile beacons, painted red on starboard and black on port side.

**Hastings** is a post and telegraph township having daily railway communication with Melbourne. There is a jetty at Hastings 380 feet long, 10 feet wide with an  $\Gamma$  end 77 feet long and 14 feet wide, on the outside of which there is a depth of 7 feet at low water; spring tides rise about 10 feet.

*Light.*—A fixed white light, visible in clear weather 3 miles distant, is shown from the outer end of Hastings jetty.

The northern portion of the Western Arm extends eastwards from between the north point of French Island (Scrub Point) and Quail Island for 9 miles, and at low water is chiefly intersected by numerous small channels. Between Scrub Point and Quail Island there are 6 to 14 fathoms in mid-channel, and two rocks, viz., Eagle rock on the north side at N.W. by N.  $1\frac{1}{4}$  miles, and Crayfish rock on the south side of the channel at N. by E.  $8\frac{1}{2}$  cables from Scrub Point. Eagle rock is awash at low water, and is marked by a black ball beacon 12 feet high, and Crayfish rock by a red beacon with a square top 15 feet high.

At  $1\frac{1}{4}$  miles E. by N.  $\frac{3}{4}$  N. from the Crayfish rock is the entrance to the channel which leads to Tooradin. This channel is shallow and tortuous, and only suitable for boats or flat-bottomed craft.

**Tooradin.**—There is a jetty at Tooradin 75 feet long, 12 feet wide, with a  $\perp$  end 64 feet long and  $13\frac{1}{2}$  feet wide, with 5 feet at low water along the outside. Spring tides rise  $6\frac{1}{2}$  feet.

The main channel of the northern portion of the Western Arm of Port Western, after running for about  $3\frac{1}{2}$  miles E.  $\frac{1}{2}$  N. from Crayfish rock into the mud flats, branches off into numerous smaller channels which wind through the flats, and finally terminate at about 1 mile from the shore. The depth at high water on these mud flats varies from 6 to 8 feet.

**French Island**, occupying the middle and separating the two arms of Port Western, is 11 miles long east and west, and  $7\frac{1}{2}$  miles broad between Tortoise Head and Scrub Point, whence it narrows to 4 miles

towards Spit Point, the east extreme of the island. With the exception of the low and marshy portion at the N.W. part the island is hilly and rises at its highest part, Mount Wellington, to 314 feet.

**Phillip Island**, the entrance to Port Western, is about 12 miles long on the south side, where it forms the line of coast, and is rocky, with 10 fathoms at half to three-quarters of a mile off. At 5 miles from its western extremity is a point close off which is the high needle-shaped Pyramid rock; to the eastward of Pyramid rock is a bay 7 miles wide and 2 miles deep, sheltered from north-west to north-easterly winds. The shore forming the north side of this bay consists of a low range of sand hills covered with scrub.

**Cape Wollamai**, the south-east extreme of Phillip Island, lies 22 miles E.  $\frac{1}{4}$  S. from Cape Schanck, and is a red granite headland rising abruptly from the sea to a height of 332 feet. The cape is fringed with dry and covered rocks, none of which extend beyond a quarter of a mile from the shore.

**Red Point**, north 1 mile from Cape Wollamai, and forming the outer western point of the eastern entrance to Port Western, is about 50 feet high and composed of red granite boulders.

**Eastern Entrance.**—The eastern entrance to Port Western lies between the east side of Phillip Island from Red to Woody Points and the shore of the mainland from Griffith to Davis Points. From the shore at either side of the entrance shoal banks project, that from the east side extending outward for about a mile with dry patches on it, and only 4 feet of water over the greater part of it. The fairway channel is available at high water for vessels of 12 feet draught. The following channel marks should be passed in entering from seaward:—

Port side	... Red Point beacon (black with square top 15 feet high).
Port side	... Black reef beacon (black with ball 15 feet high), on north edge of Black reef and half-a-mile N.W. of Red Point.
Starboard side	... Middle sand buoy (red nun), on west edge of sand and $4\frac{3}{4}$ cables N.W. by N. from Black reef beacon.
Starboard side	... Passage buoy (red cask), on west side of sand and $4\frac{3}{4}$ cables north of middle sand beacon.
Port side	... South Woody Point beacon (black with ball 12 feet high), on the east edge of the bank south of Woody Point.
Port side	... North Woody point beacon (black with square top 24 feet high), on the dry rock about 1 cable off Woody Point.
Starboard side	... Beacon (red about 12 feet above high water), on the west edge of the dry bank.
Port side	... Narrows buoy (black cask in 5 feet of water), on the east edge of the sand and about $2\frac{1}{2}$ cables N.E. of Woody Point beacon.
Starboard side	... Beacon (red pile in about 4 feet at low water).
Port side	... Beacon (black pile in about 1 foot at low water).
Port side	... Beacon (black pile in about 1 foot at low water).
Starboard side	... Beacon (red pile in about 4 feet at low water).

Port side ... Beacon (black pile in about 1 foot at low water).  
 Port side ... Fairway buoy (black cask in 9 feet of water), on the east edge of the sand, marks the inner end of the eastern passage at its western side.

**Maggie Shoal Buoy** (red cask), at about 7 cables E.N.E. from the Fairway buoy, marks the outer end of the 4-ft. shoal bank which extends for  $1\frac{3}{4}$  miles from the shore south of the Bass River.

**Davis Point**, the inner eastern point of the eastern entrance, is low and sandy. A mud flat, dry at low water, extends for 3 cables from the shore eastward of Davis Point.

**San Remo**, just inside Davis Point, is a watering place with postal and telegraphic communication with Melbourne. There is here a jetty 190 feet long, 9 feet wide, with a  $\perp$  end 46 feet long and 23 feet wide, on the outside of which is a depth of 9 feet at low water. Spring tides rise 8 feet, neaps  $5\frac{1}{2}$  feet.

*Light.*—A fixed green light, visible in clear weather  $1\frac{3}{4}$  miles distant, is shown from the San Remo jetty.

**Woody Point**, opposite Davis Point, is low, and forms the north-east corner of Phillip Islands. A dry reef borders the point to the southward, and to the eastward of it are two detached rocks, dry at low water. At Woody Point is the township of Newhaven, having postal communication with Melbourne. There is a jetty 240 feet long, 10 feet wide, with a  $\perp$  end 64 feet long and 11 feet wide, on the outside of which is a depth of 11 feet at low water. High water, full and change, at 11. 10m. Spring tides rise 8 feet, neaps 5 feet.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus at Newhaven.

**THE EASTERN ARM** of Port Western lies between Phillip and French islands and the mainland to the eastward. The portion to the eastward of Phillip Island is occupied by a shoal flat having  $1\frac{1}{4}$  to 3 fathoms of water over it at low water, and terminating to the westward in a narrow sandspit about 2 miles long, carrying 1 to 2 fathoms, with its western extremity 1 mile north of Observation Point.

**Reef Island**, on the east side of the Eastern Arm at about  $2\frac{1}{4}$  miles N.N.E.  $\frac{1}{2}$  E. from the Fairway buoy at the inner end of the eastern passage, is surrounded with rocks that also connect it with the shore of the mainland.

**Reef Island Beacon**, a red ball beacon 16 feet high, and marking the rocky ground off Reef Island, lies about one-third of a mile to the westward of the S.W. corner of the island.

**Loelia Shoal**, outside Reef Island beacon, consists of two patches with only 3 feet at low water over them, and is marked at its S.W. end by a black and white striped cask buoy, lying about W.S.W. 1 mile from Reef Island beacon, and N. by W.  $1\frac{1}{2}$  miles from the Fairway buoy at the inner end of the eastern passage.

**Observation Point**, at the east end of the north side of Phillip Island, is a low narrow point with a spit off it, the outer end of which is marked by a sunk beacon, 10 feet high, and painted red.



To the south-eastward of Observation Point there is a large mud flat filling the bight on the north-eastern shore of Phillip Island, and at the north end of this flat at about one-third of a mile off Flagstaff hill are the entrances to two small channels, the eastern one of which winds through the flat to Swan corner, and the western one to the jetty at Rhyll. The outer edge of the flat at the east side of the entrances to these channels is marked by a red pile beacon, and the channel to Rhyll jetty, in which there are about 6 feet at low water, is marked by two red beacons on starboard and one black on port side.

**Rhyll**, on the south side of Falstaff hill, at the N.E. end of Phillip Island, is a post town with a jetty 304 feet long, 7 feet wide, with an end 32 feet long and 11 feet wide, with 10 feet at low water on the outside.

The channel of the Eastern Arm of Port Western, commencing northward of the spit off Observation Point, sweeps round the S.E. side of French Island for 5 miles to Schnapper rock beacon, passing Elizabeth Island and Finger Point at 4 cables off on Port side. The channel is 4 to 6 cables wide, with 4 to 10 fathoms of water.

Schnapper rock divides the channel into two narrow passages of  $3\frac{1}{2}$  fathoms, but past the rock the channel widens to half-a-mile, with 5 to 6 fathoms for a distance of 2 miles, when it becomes blocked with shoal knolls and patches; after passing these obstructions the channel deepens to over 4 fathoms until off Spit Point, where it branches into several smaller channels, which run for 2 and 3 miles into the mud flats to the northward, and finally terminates almost meeting the similar branches of the northern portion of the Western Arm.

**Settlement Point**, E.N.E.  $1\frac{1}{2}$  miles from Finger Point, is the termination of the projection of the mainland, upon which is situated the township of Corinella. Viewed from the southward, the land in the vicinity of the point presents the appearance of cliffs of a reddish colour, about 50 feet high, with a rocky foreshore extending out about a cable at low-water mark. North-west and west of the point a reef of volcanic rocks projects therefrom about 2 cables to low-water mark.

**Pelican Islet**, 4 feet above high water, and 5 cables west from Settlement Point, is a cable long by half-a-cable wide, and covered by a few bushes. The reef forming the islet extends out all round about half-a-cable to low-water mark.

Between the islet and Settlement Point the bottom is rocky and uneven, not more than 10 feet obtaining in the deepest portion.

**Schnapper Rock**, 10 cables W. by N. from Settlement Point, is a half-tide reef about 2 cables long east and west and 1 cable wide, north and south to low-water mark. Between Schnapper rock and French Island is the main channel, 3 cables wide and 50 feet deep, communicating with the northern portion of Western Port. Between Schnapper rock and Pelican Islet the channel is about 2 cables wide and 14 feet deep in the shallowest part in the centre.

**Beacon**.—A red beacon, 16 feet high, with square top, marks the centre of the Schnapper rock, which covers at three-quarters flood.

**Settlement Point or Corinella Channel**.—From the entrance, at 2 cables N.W. from Settlement Point, the Corinella Channel extends easterly along the shore at an increasing distance therefrom for

1½ miles, and gradually decreasing in depth and width until it terminates in the mud flats of the bay. At half-tide the channel has a width of about 400 feet between the mud flats on either side for a distance of 5 cables from the entrance, and mean depth in the centre of 16 feet.

Across the entrance there is a bar of shoal ground, with 4 feet at low water over it.

**Beacon.**—A black sunken beacon, surmounted with a ball, is placed two cables west of Settlement Point, in 3 feet, and marks the port-hand side of the deepest water leading into Corinella Channel.

**Buoy.**—A red 50-gallon cask buoy is moored off the northern extremity of the reef at Settlement Point, and bears S. ½ E. 700 feet from the black ball beacon.

**Jetty.**—Settlement Point jetty, situated four cables east of the point is 360 feet long by 10 feet wide.

**Tenby Channel**, from 400 to 100 feet wide, and having a least depth of 6 feet at low water, extends southerly and easterly from the main channel towards Tenby Point, 3½ miles eastwards from Settlement Point. There is a private jetty at Tenby Point, 570 feet long, with 8 feet at the L. end at low water.

**Queensferry**, 1 mile E.S.E. from Tenby Point, is a small township, having postal and telegraphic communication with Melbourne. The jetty is 662 feet long, with a T head, 46 feet long, by 14 feet wide, with 6½ feet at high water alongside. As the jetty has become unsafe through deterioration, persons are cautioned against using it. Springs rise 9 feet.

**Grantville**, at nearly 1½ miles eastward of Queensferry, has postal and telegraphic communication with Melbourne. The jetty is 1,000 feet long and 10 feet wide; the outer 120 feet of this jetty is 16 feet wide, with a depth of 6 feet at high water at the outer end.

**Light.**—A fixed white light, visible in clear weather 3 miles distant, is shown from the outer end of the jetty.

**Directions** for entering by Eastern entrance. After rounding Cape Wollamai, haul in to the northward for Red Point, passing it at less than a cable's length off. Then steer between the beacons and buoys marking the sides of the channel (described on page 97), until breasting the Fairway buoy which marks the inner or north end of the passage; this passage from the Narrows buoy to the Fairway buoy has only a depth of 7 feet at low water. Vessels, after passing the Fairway buoy, will be clear of the mud flats, and may proceed according to their destination, being guided by the chart. Vessels drawing 12 feet can, by choosing a proper time of the tide, enter Port Western by the Eastern entrance, bearing in mind that the tide runs with great force through the Narrows.

**Anchorage.**—Western entrance, off Flinders. There is anchorage off Flinders jetty, sheltered from all except S.E. winds. Vessels of heavy draught may bring up about 2 miles E.N.E. of the jetty light (red) in 7 to 9 fathoms, but smaller vessels may approach to three-quarters of a mile off the western shore in 3½ fathoms. For the preservation of the submarine cable at Flinders no vessel shall anchor off the jetty there during the night within the arc of the white light exhibited to seaward from the end of the wharf, nor shall any vessel anchor during the day within the same area, viz., with the end of such wharf bearing between W. ½ S. and N.W. ¼ N.

*Off Sandy Point.*—There is anchorage off Sandy Point, the inner western point of the Western entrance, in 7 fathoms, at one-quarter of a mile off.

*Off Cowes.*—There is anchorage in 7 fathoms between  $\frac{1}{2}$  to 1 mile eastward of Cowes, and half-a-mile from the shore.

*Note.*—Mariners should bear in mind that the tide streams run strongly both off Sandy Point and Cowes.

*Eastern Entrance.*—Vessels will find anchorage in 3 to 4 fathoms, sheltered from all except S.E. gales, at the Eastern entrance, inside Red Point, between Red Point and Black Reef beacons; the available anchorage space is about  $1\frac{1}{2}$  cables broad and one-quarter of a mile long, the N.W. limit of the anchorage ground being about 2 cables off Black Reef beacon.

Vessels of 12 feet draught may, if necessary, proceed north-westward to the inner anchorage between Black Reef beacon, on Port and Middle Sand beacon, on starboard side of channel, taking care to bring up about a cable to the south-westward of a line joining the two beacons. Middle Sand beacon bears N.W. by N. from Black Reef beacon.

At the above anchorages in the Eastern entrance the tide usually runs from 2 to 3 knots.

*Explosives Anchorage.*—At a distance exceeding a quarter of a mile to seaward of any wharf or jetty.

**THE COAST.**—From Griffith Point, the coast, with a slight curve, trends E.  $\frac{1}{4}$  S.  $4\frac{1}{2}$  miles to Black Head; and thence S.E. 3 miles to the Powlett River, continuing on in the same direction for a further distance of 5 miles to Coal Point.

**Coal Point** has numerous sunken rocks off it for a distance of 1 mile to the southward, with one rock uncovering at low-water-springs. The heavy break shows the point to be dangerous of approach.

From Coal Point the land takes a S.E. by E.  $\frac{1}{2}$  E. direction for  $2\frac{1}{4}$  miles to Cape Patterson.

The whole coast from Black Head to Coal Point is little more than a succession of sandy hillocks from 100 to 140 feet high, and mostly covered with ti-tree scrub.

**Cape Patterson** is rounded and low, and the least conspicuous point along the whole coast. The highest part within a mile of the point is 27 feet above sea-level, and this elevation scarcely increases until joining the range of hills, 900 feet high, lying about 11 miles to the northward of the cape. A reef, dry at low water, extends 3 cables S.E. from Cape Patterson, and at 4 cables off 3 fathoms water will be found.

**Eagle's Nest Rock**, 59 feet high, and about 3 miles to the eastward of the cape, lies half-a-mile off the coast at its turn towards Anderson Inlet. This rock is conspicuous, and serves to point out Cape Patterson. In the vicinity of this rock the coast has a cliffy appearance.

From Cape Patterson the coast trends 2 miles in an E. by N. direction; and thence N.E., 4 miles to the mouth of Anderson Inlet.

**Petrel Rock**, about midway between Eagle's Nest and the mouth of Anderson Inlet, lies about half-a-mile from the shore. This rock is 2 feet above high water, with 3 fathoms close to, on the eastward; between the rock and the shore the whole distance is occupied by sunken and dry rocks.

**Anderson Inlet**, at the head of the bight known as Venus Bay, is only accessible for small steamers. The entrance to the inlet lies between Point Norman on the west and Point Smythe on the east, and can be distinguished, by the appearance of the sand hummocks, which, commencing at Point Smythe, form the east shore of Venus Bay. From its mouth at Point Norman the inlet extends N.E. and E. 3 miles to Screw Creek; and thence E. and S.E. 8 miles to its head at the Tarwin River.

The inlet, which contains an area of about 5,000 acres, mostly consists of mud flats uncovering at half tide, and intersected by narrow shallow channels, only navigable by boats and small craft. A large sand-bank, dry at low water, almost entirely occupies the mouth of the inlet, leaving only a narrow entrance channel between it and Point Norman. The channel, at half-a-mile seaward of Point Norman, is fronted by a bar nearly 2 cables wide, on which the depth may vary from 4 to 6 feet at low water.

From Point Norman a sandstone reef, more or less sand covered, projects in a southerly direction 4 cables, and along its eastern edge the deepest water is found. Off Point Norman the bottom is rocky, with the reef showing along the edge of the channel.

About three-quarters of a mile N.E. of Point Norman is Point Hughes, from which a sandstone reef projects. From Point Hughes a sandy beach, with the reef showing at intervals extends N.E. to the Government jetty at the town of Inverloch, and which forms the present terminus of ocean traffic.

**The Port of Anderson Inlet** includes all inlets, rivers, bays, harbors, and navigable waters, north of and within a line bearing North 74 deg. East from the Petril Rock to the opposite shore.

**Beacons.**—Two single-staff beacons, placed 224 feet apart, are erected on the foreshore north-east of Point Norman. The front one is surmounted by a diamond, and the rear one by a circular-shaped disc, and both painted white. A pile painted black, and marking the eastward or star-board side of the navigable channel, has been placed on the southern edge of the bank east of Point Hughes.

**Jetty.**—A small jetty with T end 50 feet long, extends 150 feet from the shore into 9 feet at low water.

**Explosives Anchorage.**—At a distance exceeding a quarter of a mile to seaward of any wharf or jetty.

**Life Saving Appliances.**—There is a life saving apparatus at Inverloch.

**The Coast.**—From Point Smythe, the east entrance point of Anderson Inlet, the coast trends S.E. 13½ miles, with a slight curve to Watercress Creek; all this stretch of coast is a succession of sand-hills 110 to 160 feet high, their faces for the last 5 miles being almost bare.

**Watercress Creek** is at the west foot of the table-land of Cape Liptrap. On the coast, three-quarters of a mile N.W. of the mouth of the creek, is a small rock of sandstone 15 feet above high water, out seaward from which for a distance of 4 cables are several sunken rocks. The coast at Watercress Creek is composed of low sandstone cliffs.

For 1 mile S. by E. from Watercress Creek is a very rugged piece of coast, and points of overhanging sandstone, with jagged and pointed rocks strewn along the shore.

Off the northern portion of this rugged coast, and at a distance of 2 cables, lies the Arch Rock, 82 feet high, with a natural arch on its eastern side, and an outlying rock awash at half-tide lying a cable to the W.S.W.

The same character of coast continues for a mile beyond Arch Rock in a S.E. by S. direction, having innumerable pinnacled rocks of various heights with outlying half-tide and sunken rocks, some of which extend nearly half-a-mile from the shore.

Hence the land trends S.S.E. 3 miles to a conspicuous islet, 63 feet high, off the western part of Cape Liptrap. Half this distance is a straight piece of sandy coast, with the table-land of Cape Liptrap getting nearer as the coast runs southward. From the islet the coast forms three small bays to the cape. The whole has outlying sunken rocks about 3 cables from the shore.

**Cape Liptrap**, 297 feet high, and nearly perpendicular, forms the S.W. extremity of a table-topped promontory 550 feet high.

Several outlying rocks, varying from 5 to 30 feet-high, partially fringe the coast southward and eastward of the cape, but none extend more than 2 cables from the shore.

**The Coast.**—From Cape Liptrap the land forms a bight to Grinder Point, which is 2 miles N.E. by E.  $\frac{1}{2}$  E. from the cape. This bight is fringed with low water and sunken rocks, which in some places extend 3 cables from the shore.

From Grinder Point the land takes a north-easterly direction for  $2\frac{1}{4}$  miles to Bell Point. This piece of coast is of similar character to the last, only somewhat lower, and a number of rocks from 10 to 30 feet high are found at short distances from the shore.

On the whole of the coast from Cape Liptrap to Bell Point the sea breaks heavily for nearly half-a mile off.

Bell Point, which forms the S.W. point of Waratah Bay, may be known by a large broad-topped rock about 40 feet high, and about a cable from the shore.

From Bell Point the land takes an abrupt turn into Waratah Bay, and runs about N.N.W. for 2 miles. Along this shore at 3 cables from Bell Point is a small islet 60 feet high, and at a further distance of 1 mile from the point are the Bird Rocks.

**Bird Rocks**, 40 to 60 feet high, and forming the south side of Waratah Bay proper, are three in number, the outer one lying 2 cables from the shore. These rocks serve as a guide to mariners using the bay, enabling them to ascertain their position.

**Waratah Bay**, from Bell Point at its western to Shallow Inlet at its eastern side, is 8 miles across, 4 miles deep in the middle, and affords good anchorage except in south and south-easterly gales. The depth of water in the bay varies from 5 to 10 fathoms, the former depth being found about 5 cables off any part of the shore.

In the depth of the bay at 4 miles from Bell Point, the coastline falls to a height of only 100 feet, when the ordinary features of sand-hills covered with ti-tree bush are again met with.

**Light.**—A fixed red light, 120 feet above sea-level, and visible all round, seaward in clear weather for about 2 miles distant, is exhibited from a lamppost erected on the shore at 2 cables length W.S.W. from the Bird Rocks.

**Anchorage.**—Vessels entering Waratah Bay will find anchorage in 6 fathoms water, with the light bearing S.W. distant 7 cables.

Vessels during south-westerly gales may anchor in good holding ground in the depth of the bay at a mile from the shore; and in the event of the wind chopping round to the eastward they will have plenty of room for working out.

*Jetty.*—In the recess immediately to the northward of Bird Rocks there is a jetty which projects from the shore into 10 to 12 feet of water. This jetty has been built by private enterprise, and is used by the small traders to the place.

*Directions.*—Vessels entering Waratah Bay should, after passing Bell Point, steer outside the outer Bird Rock, which may be passed a cable's length off; then steer for jetty or anchorage as desired.

*Tides.*—It is high water in Waratah Bay, full and change, at 12h. 16m., statute time. Range at spring tides, 8 feet.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus at Waratah Bay.

**Shallow Inlet.**—From the head of Waratah Bay the shore curves E.S.E. to Shallow Inlet, the entrance to which may be said to be the eastern limit of the bight forming Waratah Bay. The shore for 2 miles W.N.W. of Shallow Inlet is scarcely above high water, but rises to over 100 feet at the east point of the entrance to the inlet. Owing to prevailing winds and freshets, the depth of water at the entrance varies, the entrance being occasionally dry at low water, but sometimes having enough water for a large boat to enter.

From the mouth of Shallow Inlet the coast trends with a slight curve in a S.E.  $\frac{1}{2}$  S. direction for nearly 6 miles to Black Rock, which is about 30 feet high, and 1 cable from the coast.

From a position 4 miles N.W. of Shallow Inlet to about a mile from Black Rock, shoal water, with a sandy bottom, will be found extending about half-a-mile from the shore, and off the inlet this shoal water runs out nearly a mile. For about  $1\frac{1}{2}$  miles to the northward, and  $2\frac{1}{2}$  miles to the southward, of Black Rock the sandy bottom is interspersed with rocks, some of which uncover at low water.

**Shellback Island.**—About  $1\frac{1}{2}$  miles S.W. of Black Rock lies Shellback Island, 357 feet high; it is the northernmost of the islands on the west coast of Wilson's Promontory.

**Tongue Point.**—167 feet high, lies S.  $\frac{1}{2}$  E.,  $2\frac{1}{2}$  miles from Black Rock, the coast between forming a deep bight, in the middle of which are a few low red cliffs. Tongue Point has a remarkable conical white rock, 30 feet high, close off it to seaward. Inland from the point the shore is high and rises for a distance of about 4 miles to parts of the Promontory Ranges, which here are about 2,000 feet above sea-level.

**Mount Vereker.**—The N.W. mountain of the promontory, bearing N.E. by E. 6 miles from Tongue Point, is 2,092 feet high, with a spur 1,654 feet high, running N.W. from it for about 2 miles; this spur gradually falls in a westerly direction, and forms the north-west termination of the high land of the promontory.

From Tongue Point the land trends S.E.  $\frac{1}{2}$  S., forming a deep bight to Leonard Point, southward of which on the same bearing are Pillar and Norman Points, forming the southern sides of Leonard and Norman Bays.

**Norman Island** lies a little more than a mile south of Tongue Point, and may be known by its two peaks, the higher and northern of which is 315 feet high.

*Anchorage.*—At 1 and 2 cables off the eastern side of this island are 9 and 11 fathoms of water, where it may be found convenient to drop anchor during a prevalence of south-westerly winds. Coasting steamers of little power bound to the westward, and meeting a south-westerly gale after having rounded the promontory, might conveniently anchor here in preference to running back and anchoring in Waterloo Bay, to the eastward of the promontory.

**Oberon Bay**, lying southward of Norman Point, and extending to Oberon Point, is the largest of the three bays on this piece of coast, and affords the best anchorage. The bay is  $1\frac{1}{2}$  miles across, 1 mile deep, and has a sandy beach, upon which the sea breaks heavily. Landing can in general only be effected in the south-east corner. From the prevalence of south-westerly winds, none of these bays can be recommended as anchorages for other than steam vessels.

*Caution.*—From present experience of this locality, easterly gales appear to die away at east or north-east, but a south-westerly gale may spring up with scarcely any notice of its approach, when sailing vessels would find themselves on a lee shore with a swell setting them dead to leeward.

**The Coast** from Oberon Point at the S.W. corner of Oberon Bay trends for a mile in a S. by E. direction, and then gradually takes a more easterly turn to a moderately deep bight, whence it again runs S. by E. to south-west point. All this coast is bold and cliffy, the cliffs in some places being several hundred feet high, and rising again towards the mountain land of the promontory.

**Glennie Group** consists of four islands lying about 4 miles W.  $\frac{1}{4}$  S. to S.W.  $\frac{1}{4}$  W. from Oberon Point, the nearest land of Wilson's Promontory.

**Great Glennie Island**, the largest of the group, is 455 feet high, nearly 2 miles long, N.W. by N. and S.E. by S., saddle shaped and strewn over with blocks of granite, which give it a castellated appearance. A rock, 3 feet high, over which the sea generally breaks heavily, lies about 2 cables north of the northern extremity of the island; and another rock somewhat larger, and 15 feet high, lies about a cable off the north-east end of the island.

To the southward of Great Glennie lie the three smaller islands of the group, the southernmost one of which is 367 feet high, and called Citadel Island from its resemblance to an ancient fortress.

*Tides.*—It is high water, full and change, at the Glennie Islands at 12h., statute time; springs rise about 9 feet.

**Anser Group** consists of three islands, the largest of which, called Anser Island, lies about  $1\frac{1}{2}$  miles S.W.  $\frac{3}{4}$  S. from south-west point. This island is about 1 mile long, and  $\frac{1}{4}$  of a mile wide in the middle, and at its highest part rises to a nipple point 498 feet above sea-level; it is cliffy all round, but least so to the northward, where landing may often be effected.

**Cleft Island**, the most remarkable of the Anser Group, lies nearly  $1\frac{1}{2}$  miles S.W. from Anser Island. It is perpendicular, of rounded form, and may be known by its white appearance, and also by having a large slice cut out of its north-west side.

About midway between Anser and Cleft islands is the middle island of the group, about half-a-mile long, and rising to a height of 312 feet near its south end.

Two small islets, 40 to 50 feet high, lie between Cleft and the middle island of the group; and a third islet, not quite so high, lies a cable from the north-west point of the middle island.

**Carpentaria Rock**, to the westward of Anser Group, is a sunken rock of small extent, with 6 feet of water over it at low water, upon which the *Gulf of Carpentaria struck*, and afterwards sank. The following bearings and distances from the rock give its accurate position:—

The summit of Anser Island bears	N. 79 deg. E.,	distant 1.3 miles.
"    "    Middle    "    "	S. $57\frac{1}{2}$ deg. E.,	" 1.05 "
"    "    Cleft    "    "	S. $7\frac{1}{2}$ deg. E.,	" 0.8 "

Bearings magnetic—Variation, 9 deg. 40 min. E.

*Caution*.—Although there is deep water between the Glennie and Anser groups, mariners are cautioned against navigating the passages between North and South Anser islands, and between Cleft and Citadel islands.

**The Coast**.—From south-west point the land trends E. by S.  $\frac{1}{2}$  S.  $1\frac{1}{2}$  miles to a projecting low and stony point, called South Point, being the southernmost point of Australia.

Off this point, at a distance of 1 cable W.S.W., is a rock 15 feet high; and in the same direction, at a further distance of 2 cables, is Wattle Island, 270 feet high, and which from its close proximity to the shore, appears connected with it; but there is, however, a deep-water passage between, through which a strong tide constantly sets. A rock awash lies nearly 1 cable S.W. of the west end of Wattle Island.

Half-a-mile from south-west point a fresh-water creek discharges itself, and at a short distance inland to the eastward is a remarkable stone near the summit of the coast range; this stone is 740 feet above sea-level, and closely resembles a tower.

From South Point the coast trends in a generally E. by N.  $\frac{1}{2}$  N. direction for  $2\frac{1}{2}$  miles to the Wilson Promontory light-house. Along this stretch of coast are two deep bights, the westernmost one running more than half-a-mile up into the land, and forming at its termination a natural basin, into which flows a running stream.

From south-west point to the Promontory light-house the coast rises suddenly from the water's edge to an elevation of 1,000 feet.

**WILSON PROMONTORY** (the south extremity of Australia) is a lofty peninsula, 22 miles long in a north and south direction, and about 8 miles broad at the centre. It is connected with the mainland to the north-westward by a low sandy neck 10 miles long, and 3 to 5 miles broad, which separates Waratah Bay from Corner Inlet, lying to the north-eastward. This promontory consists of rugged mountain ranges, some of which are over 2,000 feet high, thickly wooded on their upper and less exposed parts, but towards the coast they are nearly destitute of vegetation, and descend abruptly to the sea.



**Wilson Promontory Lighthouse**, standing on the south-east point of the promontory, in latitude 39 deg. 07 min. 57 sec. S., longitude 146 deg. 25 min. 37 sec. E., was built in 1859. The tower is 64 feet high, circular, built of stone, and painted white.

*The Light* is a first order, catoptric, fixed, white light, elevated 342 feet above sea-level, and visible in clear weather at a distance of 24 nautical miles.

The light is visible from seawards between the bearings of N.E. by E.  $\frac{1}{2}$  E. (N. 62 deg. E.), and S.S.W. (S. 22 deg. W.). A ray of light is visible between the islands of the Anser Group on an E.N.E. (N. 67 deg. E.) bearing.

Vessels bound eastward round Wilson Promontory may first see the light bearing E.N.E. between the islands of the Anser Group; as they proceed to the southward and eastward it will be eclipsed for a few degrees by Cleft Island. When the light bears N.E. the channel between Cleft and Rodondo Islands will be open, and vessels may steer direct for the promontory.

Vessels to the eastward of the Seal Islands, and bound round the promontory, sighting the light bearing to the southward of S.W., will be to the northward of the fairway, and should haul out until the light bears S.W. by W., which bearing will lead them clear of Clifty and the other Seal Islands.

*Signal Station*.—Communication by International Code. The Wilson Promontory station is connected by telephone with Foster, which is connected by telegraph.

*Life-saving Apparatus*.—There is a life-saving rocket apparatus at this station.

*Landing*.—Landing can be effected at either side of Wilson Promontory light-house, according to the direction of the wind.

**Rodondo Island**, S.  $\frac{3}{4}$  W. 6 miles from Wilson Promontory light-house, is a conspicuous conical mass of granite, three-quarters of a mile in extent, rising to a distinct peak, 1,150 feet above the sea, and is visible, in clear weather, 30 miles from a ship's deck. It has high cliffs on all sides, and its top is covered with dense dwarf scrub. The island is steep-to in all directions.

As the tide about Rodondo Island runs with considerable velocity, sometimes 4 or 5 knots, the neighbourhood should be avoided.

Between Rodondo Island and the Forty-foot Rocks lying 2 miles off N.N.E.  $\frac{1}{4}$  E., there is a deep channel of 38 fathoms water.

**Forty-foot Rocks** (formerly Ten-foot Rocks) lie S.  $\frac{1}{2}$  E.  $4\frac{1}{4}$  miles from the Promontory light-house, and consist of three separate and distinct islets of granite, of which the largest and westernmost one is 165 feet long, and 50 feet broad near its centre; this islet is 20 feet high, and on its southernmost extremity there is a granite boulder another 20 feet high, making the rock in all 40 feet above high water. When the sea is breaking over, the portion formed by the boulder is probably the only part of these rocks visible. These rocks are steep-to in all directions.

**Moncœur Islands**.—West and East Moncœur Islands,  $1\frac{1}{2}$  miles apart, 318 and 331 feet high, lie nearly in line E. by N. from Rodondo Island, at 5 miles and  $6\frac{1}{2}$  miles respectively from it. The west island is nearly half-a-mile long north and south, and about 200 yards wide, with a

small islet about half-a-cable off it to the S.S.E. The east island is one-third of a mile long N. by W. and S. by E., and rather more than 200 yards wide. These islands, which are almost bare, are bold-to and apparently free from danger.

**The Coast.**—From the Wilson Promontory light-house the coast trends N.  $\frac{3}{4}$  E.  $2\frac{1}{2}$  miles to Waterloo Point, the southerly point of Waterloo Bay. At one mile from the light-house is an intermediate point with a small islet off it, but almost connected with the shore by large boulders; this islet does not extend beyond the line of shore, and immediately northward is an indentation nearly half-a-mile deep.

**Waterloo Bay**, extending from Waterloo Point N.E.  $2\frac{1}{4}$  miles to Cape Wellington, is  $1\frac{1}{3}$  miles deep, with 14 fathoms sand in the centre, whence the depth of water gradually decreases to 6 fathoms at 2 cables from the shore, but increases towards the outer points of the bay.

The south-western shore of Waterloo Bay forms the eastern end of a low valley 3 miles long, which stretches right across the promontory westward to Oberon Bay. This valley makes a conspicuous break between the high lands of the Boulder and Wilson ranges. At the east end of this valley a fresh-water stream empties into Waterloo Bay.

**Anchorage.**—The best anchorage is about 4 cables from the south-west shore in about 12 fathoms water. Steamers bound westward, and met by a S.W. gale, may anchor close into the land in a small cove under Waterloo Point. Waterloo Bay is not recommended as an anchorage for sailing vessels.

**Cape Wellington**, a hilly headland, 442 feet above the sea, and forming the north-east point of Waterloo Bay, projects  $1\frac{1}{2}$  miles south-east from the line of coast. At a mile N.W. of the cape is Kersop Peak, 729 feet high, and the most elevated part of the headland.

The bold eastern face of Cape Wellington extends N. by E. for half-a-mile; thence the land trends N.N.W. 1 mile to Brown Head, with a cove between running in a southerly direction.

From Brown Head the coast extends N. by W. for 1 mile to Horn Point, with Hobb's Head between. This piece of coast is cut into by three small deep-water bights, the central one of which is called Refuge Cove.

**Refuge Cove.**—W.N.W., half-a-mile from Brown Head, is the only anchorage on the east side of Wilson Promontory sheltered from the eastward. The cove is about one-third of a mile deep,  $1\frac{1}{2}$  cables wide, at its entrance, with 8 fathoms water at entrance, and shoaling to 3 and 4 fathoms in most places close to the shore, but near the sandy beaches at half a cable off.

Refuge Cove may be easily recognised from being distant midway between Kersop Peak and Horn Point, and from its having the first sandy beach which opens north of Cape Wellington.

Refuge Cove is not much used as an anchorage for sailing vessels, as the high land embaying it almost completely screens it from any winds off the land, and makes it difficult for working out. Vessels making use of the cove should anchor on the south part.

**Tides.**—It is high water, full and change, in Refuge Cove about the same time as at Rabbit Island, which is at oh. 19min. statute time; springs rise 8 feet.

Off Cape Wellington the tidal streams appear to meet and run in opposite directions, one portion of the flood stream which comes from the north-eastward turning and running along the shore to the northward, while the outer portion of the same stream continuing its course round the promontory to the westward. The ebb stream acts in an opposite manner.

**Sealers' Cove.**—From Horn Point, a cable off which N.W. by N. there is a 9-ft. rock, the coast trends about W. by N. for  $1\frac{1}{2}$  miles to the southern point of Sealers' Cove. The cove is 6 cables wide at its entrance, and three-quarters of a mile in extent within. There are depths of 4 and 5 fathoms at the entrance, shoaling to 3 fathoms at 4 cables and 2 fathoms at 2 cables off the western shore of the cove.

**Five-mile Beach.**—From the north point of Sealers' Cove the coast trends northerly and north-westerly  $1\frac{1}{2}$  miles to the south end of the Five-mile Beach, whence it extends with a slight curve N. by E.  $\frac{1}{4}$  E.  $4\frac{1}{4}$  miles, the beach being intersected at each end by a fresh-water creek. At the back of the beach is flat swampy ground, extending  $1\frac{1}{2}$  and 2 miles until met by the slopes of Mount Vereker. The beach may be approached to two-thirds of a mile in 5 and 6 fathoms of water.

At the north end of the Five-mile Beach the higher part of the promontory again approaches the shore, forming a small point, from which at about half-a-mile N.E. is another point. This latter point, which is abreast of Rabbit Island, is the easternmost point of Wilson Promontory, and off it in a S.S.E. direction is Rabbit Rock, 50 feet high, with a small detached rock close to on its west side.

**Rabbit Island.**—Lies east three-quarters of a mile from the east point of Wilson Promontory. It is nearly half-a-mile long, N.E. and S.W., and, being 194 feet high, is an excellent mark for vessels proceeding northward to Corner Inlet.

**Anchorage.**—There is good anchorage in all but south easterly or easterly gales in  $4\frac{1}{2}$  and 5 fathoms at 1 mile N.E. of Rabbit Island. Traders bound to the westward will find it convenient to anchor here during south-westerly gales.

**Tides.**—It is high water, full and change, at Rabbit Island at oh. 28m. ; springs rise 8 feet.

**Seal or Direction Islands.**—About 7 miles E.  $\frac{1}{4}$  N., from Rabbit Island is Seal Island, the northernmost and largest of the group. The group consists of four small islands and three rocks, which latter extend in a north-westerly direction from Seal Island. The largest of these rocks, named White Rock, is 33 feet high, and distant  $1\frac{1}{4}$  miles from Seal Island. The two other rocks, with rocks awash to the northward of each, lie W.N.W. 1 and 4 cables respectively from Seal Island, the one farther from the island being 8 feet above high water.

**Seal Island** is 154 feet high, and about 1 mile round, and covered with tufts of coarse grass.

**Notch Island** is 123 feet high, lies 1 mile S.E. of Seal Island, and is the second largest of the group. It has two hills upon it, and the valley between, giving it a notched appearance, has caused it to be called Notch Island.

**Rag Island.**—Three-quarters of a mile S.S.E. from Notch Island, is 94 feet high, with rocks awash off its west side.

**CLIFFY ISLAND.**—About  $1\frac{1}{4}$  miles E. by S. from Notch Island, is 144 feet high, with rocks awash extending for a cable's length off the north-east part of the island.

**Cliffy Island Light-house** in latitude 38 deg. 57 min. 11 sec. S. longitude 146 deg. 42 min. 24 sec. E. was built in 1884, the tower being 25 feet high, and constructed of stone.

The light is a third order dioptric flashing white light, giving five flashes and eclipses alternately in every minute. It is elevated 180 feet above sea-level, and is visible in clear weather all round the horizon for a distance of 15 nautical miles.

*Fog Signals.*—One fog rocket is fired every ten minutes.

*Warning.*—The rockets explode at a height of about 600 feet above the sea-level, producing at the same time a sharp report which should be heard under favorable atmospheric conditions at a distance of from 5 to 6 miles, but circumstances may arise to prevent even the most powerful sound signal from being heard 2 miles distant; therefore, when a signal is heard, it should be assumed that the source of the sound is not more than from 1 to  $1\frac{1}{2}$  miles distant, and the necessary precautions taken accordingly.

*Life-saving Apparatus.*—At Cliffy Island life-saving rocket apparatus is kept.

*Signals.*—In favorable weather signals are exchanged between Cliffy and Wilson Promontory stations.

**The Coast,** from the point abreast of Rabbit Island, trends N.N.W.  $\frac{1}{4}$  N. for about  $1\frac{1}{2}$  miles to another point, and then, after receding half-a-mile W. by N., takes a N. by W. direction for 2 miles and  $3\frac{1}{4}$  miles respectively to two defined points, the latter of which lies almost due east of Mount Hunter; from this latter point the land, which now becomes low and sandy, continues N. by W. for over 2 miles to Entrance Point, which forms the S.W. point of the entrance to Corner Inlet.

At  $1\frac{1}{2}$  miles to the westward of the Point, abreast of Rabbit Island, the coast rises to an elevation of 778 feet, from which height at  $1\frac{1}{2}$  miles N.N.W.  $\frac{1}{2}$  W. and 1 mile from the coast is Mount Roundback, 1,056 feet high.

At  $3\frac{1}{2}$  miles N. by W. of Mount Roundback, and 1 mile from the coast, is Mount Hunter, 1,175 feet high, which is conspicuous as being of a pyramidal shape, and the northern high hill of the Promontory.

Between Mounts Roundback and Hunter the range falls considerably, and about mid-way is a wedge-shaped hill 715 feet high. At  $2\frac{1}{2}$  miles N. by W.  $\frac{1}{2}$  W. of Mount Hunter, and on the northernmost point of the Promontory, is Mount Singapore, 480 feet high, and which forms a useful leading mark into Bentley Harbor.

**Corner Inlet** is the funnel-shaped bight which leads to Corner Basin, an extensive sheet of water lying between Wilson Promontory and the land to the northward.

**The Port of Corner Inlet and Port Albert** includes all inlets, rivers, bays, harbors, and navigable waters north of and within a line bearing N. 35 deg. E. from the south end of Rabbit Island to the entrance buoy at the eastern entrance to Port Albert.

**Entrance Channel and Shoals.**—Within the bight at the entrance to Corner Basin are two extensive sand banks, between which the channel lies.

The south-western bank fronts the east shore of Wilson Promontory from a point  $1\frac{1}{2}$  miles N. of Rabbit Island to Entrance Point. The outer or seaward portion of this shoal lies about 5 miles from the shore, where it terminates as a spit 3 miles wide, N.E. by N. and S.W. by S., with its southernmost limit lying N.E.  $\frac{1}{2}$  N., 2 miles from Rabbit Island.

**Buoys.**—The north-west edge of the south-western bank is defined by two black nun buoys, moored over 2 miles apart, with the north-west one lying about a mile E.S.E. from Entrance Point.

The north-eastern bank commences near the black and white striped buoy off the south-west corner of Latrobe Island, whence it projects E.S.E. for  $5\frac{1}{2}$  miles to its outer limit, where it is about 1 mile wide, with 10 to 12 feet at low water.

**Clearing Mark.**—Mount Latrobe, open south of Rabbit Island, bearing S.W.  $\frac{1}{4}$  S. (S. 42 deg. W.) leads a quarter of a mile south-east of the banks just described.

**Entrance Channel.**—The channel between the spits at the outer end of the banks is about half-a-mile wide, with a least depth of 21 feet at low water. After clearing these spits the channel is wider, with depths increasing from 5 at the outer black buoy to 18 fathoms at the neck of the inlet off Entrance Point.

*Note.*—No good mark can be given for entering Corner Inlet. The chart and the lead are the best guides, and mariners without local knowledge of the place should not attempt the entrance without a pilot.

*Pilot.*—The pilot at Port Albert Entrance is always on the look-out, and will come off if possible at any time.

After entering Corner Basin, the waters, at 2 miles inside, branch off into several channels, intersecting the extensive sand and mud flats which at low water mostly comprise the area of Corner Basin.

**Franklyn Channel,** the east end of which lies  $2\frac{1}{2}$  miles W. by N:  $\frac{1}{2}$  N. from the entrance at Entrance Point, extends in a westerly direction for about 5 miles, where it branches off into three smaller channels. On the north side of the channel for about  $3\frac{1}{4}$  miles from its eastern end is a ridge of sand about a cable wide, and dry at low water; between this ridge and the main bank is a 12-ft. channel. The east end of the ridge is marked by a black and white striped buoy. A black nun buoy marks the port side of entrance to Franklyn Channel.

To the northward of the shoal is the channel trending to the N.W. to Muddy Creek, near the outlet of which is the township of Toora; this channel is beacons off by pile beacons—red on starboard and black on port side; those on starboard being painted red and those on port hand black.

The three branches of the Franklyn Channel at its west end are as follows:—The north branch, trending north and west to the Franklyn River is beacons off by pile beacons—red on starboard and black on port side; the middle, called Stockyard Channel, runs W.N.W. to Stockyard Creek; the south branch extends about W.S.W. and W.N.W. to Golden Creek.

**Lewis Channel.**—The easternmost channel on the north side of Corner Basin curves north and east for  $4\frac{1}{4}$  miles from the black 3-pile beacon at its entrance to the jetty at Welshpool, and is beacons off

on both sides, those on starboard side being painted red and those on port side black. The third black beacon from the Welshpool jetty has been replaced by a black cask buoy.

**Welshpool Jetty** is 750 feet long and 15 feet wide, with **L** end 100 feet long and 22 feet wide, with 13 feet at low water on the outside; springs rise 8 feet.

*Light.*—A fixed white light, visible in clear weather about 3 miles distant, is shown from the outer end of Welshpool jetty.

*Explosives Anchorage.*—At a distance exceeding a quarter of a mile to seaward of any wharf or jetty.

**Bentley Harbor**, between the N.E. bank at Corner Inlet and the south shore of Latrobe Island, is a channel 1 to 2 cables wide, with depths at low water decreasing from 10 off Townsend Point at its east end to 3 fathoms at about half-a-mile from the west end of the passage. The west end of the passage is marked by a black and white striped buoy, at either side of which there are only 9 feet at low water. Bentley Harbor affords good anchorage during a continuance of strong easterly or southerly gales, and vessels will be protected from all winds, and have a strong ebb to assist them in working out.

*Note.*—A good leading mark to Bentley Harbor is Mount Singapore, open of the south point of Latrobe Island (Townsend Point), bearing W.  $\frac{1}{4}$  S. When abreast of Townsend Point keep along the shore, and anchor as convenient.

**Latrobe Island**, forming the shore between Corner Inlet and Port Albert extends from the point abreast of Entrance Point E. by S.,  $2\frac{1}{4}$  miles to Townsend Point, and thence curves inwards N.E.  $\frac{1}{4}$  E.  $4\frac{1}{2}$  miles to its easternmost point at the inner end of the western or Snake Channel entrance to Port Albert. The narrow portion of the island at its eastern end is over  $1\frac{1}{4}$  miles long, and is disconnected at high water from the main island, forming a separate island, which is locally known as Snake Island. Latrobe Island is low, but the trees on it give it an apparent elevation of 40 to 60 feet.

**PORT ALBERT.**—The entrance to Port Albert, between Snake Island on the west and the beach on the east side, is over 1 mile wide, but is barred by a large bank of sand extending for 2 miles in a southerly direction. With the exception of two patches on its east side, which are the entrance into two channels, the western one being called Snake 2 to 3 feet above high water, this bank is dry at low water, and divides Channel and the other the Eastern Channel.

**Snake Channel** is a narrow channel running close along the shore of Snake Island, and is only navigable for fishing boats.

**Eastern Channel.**—The Eastern Channel lies between the large sand bank occupying the middle of the entrance and the sand spit projecting from that portion of the beach to the eastward, once known as Clonmel Island. The passage is about  $2\frac{1}{4}$  miles long, the outer three-quarters of a mile consisting of a sand bar with only 6 feet on it at low water. The outer entrance to the channel is marked by a fairway buoy (on side), within which the channel has red buoys on starboard and black buoys on the port side, and vessels proceeding to Port Albert should endeavour to pass close to these buoys until reaching Port Albert Channel.

**Caution.**—Sailing vessels navigating the Eastern Channel should take every care, as the tide sets athwart the bar, and on no account should the bar be attempted without a commanding wind.

**Note.**—As the bar and entrance channel at Port Albert is liable to changes in position and depths, and as also the buoys frequently break adrift owing to their exposed positions, regular traders should use extreme care, and strangers should not attempt the entrance without the pilot.

**Tides.**—It is high water, full and change, at Port Albert entrance about noon; springs rise 8 feet. The tides generally are greatly influenced by the winds, and no reliance can be placed on calculated times of high water during unsettled weather. Strong W. to S.W. winds cause the flood to run from 1 to 1½ hours after and easterly winds 40 minutes sooner than the expected time of high water.

**Tidal Signals**, denoting the state of tide and depth of water on the bar in the Eastern Channel, are exhibited daily from sunrise to sunset from a flagstaff erected on Sunday Island as follows:—

Cone at eastern yardarm	... Ebb tide
Cone at western yardarm	... Flood tide
Cone half-mast	... Under 6 feet depth of water
One ball suspended from yard	... 7 feet depth of water
Two balls suspended from yard	... 8 feet depth of water
Three balls suspended from yard	... 9 feet depth of water
Four balls suspended from yard	... 10 feet depth of water
Five balls suspended from yard	... 11 feet depth of water
Six balls suspended from yard	... 12 feet depth of water
Seven balls suspended from yard	... 13 feet depth of water and over

The average depth of water over the bar is taken at 6 feet at low water; springs.

**Port Albert Channel.** — From the inner end of the Eastern Channel to Port Albert wharf, this channel is nearly 4½ miles long, and is well marked on both sides by pile beacons painted red on starboard and black on port hand. The shoalest water in the channel is 6½ feet at low water, with an available depth of 9 feet low water at the wharf.

**Light.**—A fixed white light, visible 5 miles, is shown from the flagstaff at the pilot station on Sunday Island. The light does not in any way mark the fairway entrance, and should only be used for the purpose of indicating the mariner's approach to Sunday Island.

**Light.**—A fixed red light, visible in clear weather 2 miles distant, is shown from the N.W. corner of Port Albert wharf.

**Life-boat.**—A life-boat is kept at Port Albert wharf, and a life-saving rocket apparatus at Sunday Island station.

**Pilot.**—There is a pilot and signal station at Sunday Island. Communication by International code, but there is no electrical communication between Island and Port Albert.

Port Albert is a railway terminus, and is connected by telegraph.

**Explosives Anchorage** not nearer than 2 miles of the wharf nor to the northward of Sunday Island.

**Directions.**—Vessels bound to Port Albert from the westward should after rounding Wilson Promontory, steer about N.N.E. for Cape Wellington. After passing the cape, keep Rodondo Island just open of it S. by W. ½ W., or, should Rodondo be obscured, keep Mount Latrobe open south of Rabbit Island S.W. ¼ S.; by using either of these leading

marks until Mount Singapore is in line with Townsend Point, bearing W.  $\frac{1}{2}$  S., vessels should be about a mile off the bar at the Eastern Entrance, when they will be certain to observe the break if not the outer buoys of the channel. It must be borne in mind that, as the shore of Latrobe Island is low, Townsend Point will not be visible off the bar, except from a height of about 15 feet.

*From the Eastward* vessels may approach the shore to a distance of 3 miles, when they should observe the break on the bar, or they may bring Mount Latrobe in line with Rabbit Island S.W.  $\frac{1}{4}$  S., and make out the bar from that line.

*Caution.*—Mariners are cautioned against attempting Port Albert entrance without a pilot. It is not recommended to approach Port Albert by night, but to keep a good offing until daylight, and attend to the lead.

Vessels bound for Port Albert should not approach the shore to the northward of the line of Mount Singapore in line with the extreme south end of Latrobe Island (Townsend Point) until they have picked up the outer buoys of either entrance channel, or have the pilot aboard.

**The Coast.**—From the Port Albert Eastern Channel to Shallow Inlet, about N.E.  $8\frac{3}{4}$  miles off, the coast curves inwards and consists of a low sandy beach, rising on nearing Shallow Inlet to several sand hummocks, the highest of which (about three-quarters of a mile westward of the inlet) is 42 feet, with a surveyor's station upon it.

**Shallow Inlet** is about 4 cables wide from shore to shore. From either side of the entrance sandspits extend in a southerly direction, the eastern for three-quarters of a mile, the western for half-a-mile, leaving a channel between them with not less than 3 feet at low water. The inlet is never used by shipping.

**The Coast.**—From the eastern shore of the inlet the coast trends N.E.  $\frac{1}{2}$  N. for  $3\frac{1}{2}$  miles, and thence N.E. by N. in a nearly straight line to Merriman Creek entrance. The distance from Shallow Inlet to Merriman Creek is  $24\frac{1}{2}$  miles; and, as the coast from Shallow Inlet ceases to have any more openings for a considerable distance, by which even boats may enter, this distance may be spoken of as the first portion of the Ninety-mile Beach, which may be said to end at Conran Point, though the Red Bluff at the entrance to the lakes is a break to its uniformity.

From Shallow Inlet to Merriman Creek the coast line is nearly separated from the land at the back (which is somewhat higher and thickly timbered) by fresh and salt lagoons or ti-tree swamps, generally salt. At a distance of 17 miles from the inlet a slightly elevated piece of country, thickly timbered, about 150 feet in height, nears the coast to half-a-mile, and just to the eastward of this is situated Lake Denison, whose waters discharge into and near the mouth of Merriman Creek.

This district is all low, having an elevation from 50 feet to the westward to only 25 feet to the eastward. Here and there the hummocks fall considerably, and much of the coast is scarcely above high water, while in heavy rains the water of the lagoons breaks through the coast line.

**Soundings.**—From 18 miles N.E. of Shallow Inlet to the neighbourhood of Port Albert is one immense flat with 6 to 9 fathoms at a mile from the shore, gradually increasing to 13 and 14 fathoms at a distance of 6 miles. Eastward of Seal Islands the depths are somewhat greater, especially off Cliff Island, where there are 20 fathoms at the distance of a cable. A depth of 10 fathoms runs from 2 to 3 miles off the coast about Merriman Creek inside the Seal Islands to the southern



shores of Sealers' Cove. From Seal Islands to the Moncœur Islands, which lies S.E. of Wilson Promontory at a distance of 7 and 8 miles, and towards the promontory, the depths gradually increase, but are no guide to the vicinity. The greatest depth of 43 fathoms, gravel, is about 3 miles S.S.W. of Wilson Promontory light-house.

**Ninety-mile Beach.**—The line of coast between Shallow Inlet and the Red Bluff is locally known as the Ninety-mile Beach. Landing may be effected on it, but such a measure is extremely dangerous, as the beach is treacherous, being what is commonly known as a double beach.

When only a few miles from the land on the western part of the Ninety-mile Beach nothing can be seen but the back ranges of mountains. These extend in a south-westerly direction for 27 miles, from Tom's Cap, 1,196 feet high, lying 19 miles west of Merriman Creek, to Mount Fatigue, which is 2,050 feet above the sea. The range between rises to summits of even greater elevation than Mount Fatigue, the highest being 2,453 feet. A range of hills, the highest of which is Mount Albert, 1,050 feet high, lies S.E. and E. of Mount Fatigue, at a distance of 6 to 12 miles.

From Corner Inlet north-eastward to the Red Bluff eastward of the entrance to the Gippsland Lakes the coast is a continuous sandy beach, much broken however by inlets and small streams, the latter breaking through the narrow strip of sand after a heavy rainfall. Although a sandy beach is again found north-eastward of the Red Bluff for a distance of 30 miles, yet this is not a part of the well-known and hitherto dreaded Ninety-mile Beach.

From Merriman Creek, which is N.E. by N.  $24\frac{1}{2}$  miles from Shallow Inlet, the coast stretches with a slight curve inwards N.E.  $\frac{1}{2}$  N. 47 miles to the entrance of the Gippsland Lakes. All this coast is low, from 40 to 85 feet in height, in some places densely covered with ti-tree, in others sparsely timbered with honeysuckle, the whole of so uniform and monotonous appearance that, with one exception, no objects easy of identification to the mariner present themselves. The exception is a group of houses immediately at the back of the entrance to Merriman Creek, known as Buckley's Station.

Lakes or lagoons extend close inside the sand hummocks the whole distance; inside these lakes the land is low and densely timbered, and the same low country, interspersed with lakes and marshes, extends for miles inland, much of it being subject to floods.

At distances from Merriman Creek of 18, 24, and 28 miles respectively are three hummocks (the easternmost is named Stockyard Hill) on two of which marks have been erected. The middle hummock is covered with ti-tree, and easily identified by coasters.

At a distance of 7 miles west of the entrance to the Gippsland Lakes, and 3 miles from the outer line of coast, is Tambo Bluff, 250 feet high, from which comparatively high land continues to Mount Barkly, at the entrance to the Gippsland Lakes, then follows to Red Bluff, skirts the arms and streams of Lake Tyers beyond it, and, following the line of the shore at about 2 miles inland, is not again lost, and giving, as it does, a higher appearance to the coast line, clearly marks the difference between the land to the east and that to the west of the entrance to the Gippsland Lakes.

**Mount Barkly.**—The most conspicuous portion of the land just described lies W. by S.  $\frac{1}{2}$  S.,  $4\frac{1}{2}$  miles from the Red Bluff, and half-a-mile from the outer line of coast. It is 233 feet high, and forms a useful mark in making for the Gippsland Lakes' Entrance.

**GIPPSLAND LAKES.**—The port of Gippsland Lakes includes Lakes Wellington, Victoria, King, Reeves, Bunga, and all inlets, rivers, bays, harbors, and navigable waters northward of and within a line bearing north 62 deg. east and S. 62 deg. west across the outer end of the eastern pier forming the entrance to the Gippsland Lakes.

**Gippsland Lakes' Entrance.**—The entrance to the Gippsland Lakes is situated W.S.W.  $4\frac{1}{2}$  miles from the Red Bluff, and in line with Mount Barkly, bearing north-west. The entrance is an artificial one, and became opened for traffic in July, 1889. The old or natural outlet of the lakes, situated about 2 miles to the eastward, is now non-existent, having been filled up by drifting sands.

The entrance works consist of two timber piers about 1,400 feet long, built of close piling and divided into cribs filled with stone. On the outside the piers are protected from the undermining action of the sea by aprons of stone to within a few feet of low water. From high-water mark the western pier extends seawards about 500 feet, and the eastern pier about 380 feet, with a clear width between them of 250 feet at the outer end. Beyond the existing heads of these piers stumps of piles, remaining from the destruction of the piers by the sea, extend seaward for 130 feet from the western and 75 feet from the eastern pier.

The vicinity of the entrance is easily recognised by Mount Barkly and by the flagstaff at the Pilot Station erected on the sand hummocks immediately to the eastward of the piers. The piers are of a dark colour, and surmounted by a footway with white hand-railing, which renders them fairly conspicuous from seaward.

*The Bar.*—A sand bar extends across the entrance in a semi-circular shape. The shoalest water in the line of fairway is usually maintained at 1,000 feet from the extremity of the piers, where 14 feet at low water can be obtained; and at 1,300 feet S.E. of the entrance is the southern extremity of the shallow ridge of the bar, which extends about N. by E. towards the shore east of the entrance, with depths from 7 to 5 feet at low water.

The conditions of the bar both as regards position and depths are influenced by the weather.

During the prevalence of south-west and westerly weather, the bar protrudes further to seaward and eastward of its general position, especially so if the lakes be in flood; but with long-continued easterly weather the bank approaches closer to the entrance, with a general decrease of depths from 1 to 2 feet, and during southerly and south-easterly gales a shoaling of as much as 5 feet may occur on the bar. After such gales, mariners should not depend upon having the depths which exist under ordinary circumstances.

Save in the finest weather the sea always breaks over the shoal ground eastward to the fairway. The swell generally rolls in across the fairway without breaking, except in heavy southerly to westerly weather, with the ebb tide running strong, when the bar and entrance becomes dangerous and unfit for navigation. During easterly gales the force of the sea is broken by the eastern portion of the bar, and is thus rendered harmless to navigation, besides affording protection to the pier-heads.

Within the bar the soundings vary considerably, gradually increasing from the crest of the bar to 65 feet between the pier-heads. At 300 feet inside the depth decreases to 21 feet, which is maintained until the inner bar is reached opposite Cunninghame Arm, where the channel shoals to 9 feet at low water.

*Lights.*—A fixed white light, elevated 50 feet above sea-level, and visible in clear weather 7 miles distant, is shown from the flagstaff at the Pilot Station at the east side of the entrance. This light is to indicate the mariner's proximity to the entrance, but does not in any way mark the fairway.

A light is shown from the outer end of the eastern pier to indicate the navigable state of the entrance, appearing white when the entrance is safe and red when dangerous.

*Tides and Tidal Signals.*—It is high water, full and change, at the Lakes' Entrance, at 8h. 38m.; range of tide at springs about 3 feet.

The flood makes from the eastward, and the ebb runs to the eastward, but a mile or two off shore the current is barely perceptible.

Within the entrance the tides are irregular, owing to its narrowness and the ever-varying volume of water in the various lakes. Between the piers the direction of the current is not dependent upon nor coincident with the time of high or low water, but is influenced by the state of the weather and the volume of water in the lakes. The flood and ebb current under ordinary conditions average from  $2\frac{1}{2}$  to 3 knots an hour; but under exceptional circumstances, as in time of floods, the current may attain a velocity of 7 knots.

From the flagstaff at the pilot Station, the following tidal signals are made:—

Tide running out	...	...	Ball at eastern yard-arm.
Slack water ebb	...	...	Two balls at eastern yard-arm.
Tide running in	...	...	Ball at western yard-arm.
Slack water flood	...	...	Two balls at western yard-arm.
Wait tide	...	...	One ball, half-mast.
Entrance dangerous	...	...	Two balls, half-mast.

All other signals shall be by International Code.

The depth of water on the bar is indicated by semaphores, &c., exhibited from the flagstaff, as follows:—

	ft.	in.	
One semaphore	...	9 0	depth of water.
Two "	...	9 6	" "
Three "	...	10 0	" "
Four "	...	10 6	" "
Five "	...	11 0	" "
Six "	...	11 6	" "
Ball at mast-head	...	12 0	" and over.

*Signals.*—Communications with the Pilot Station by International Code.

The station is connected by telegraph.

*Life-saving Apparatus.*—There is a life-saving rocket apparatus at the Pilot Station.

*Pilot Station.*—A pilot is stationed at the Gippsland Lakes' Entrance.

*Directions.*—Masters of vessels, having picked up Mount Barkly and the pilot flagstaff at the entrance, can stand in until the tidal signals can be made out, which will indicate the navigable condition of the bar and channel. The entrance to the fairway over the bar is made with the flagstaff bearing N:  $\frac{1}{4}$  W., which will lead over 14 feet at low water; after crossing the bar haul to the eastward until close up to the piers when keep midway between them when entering. As the outer ends of the piers have been destroyed by the sea, mariners are warned not to approach within 150 feet of the head of the Western pier nor within 100 feet of the head of the Eastern pier, so as to avoid fouling the stumps of the piles remaining.

The safest time to take the bar is at slack water, and then only when in tow or entering with a good commanding breeze from any point between S.W. and S.E. Mariners are warned against either entering or leaving unless with a good fair wind, as light winds are baffling between the high structures of the piers and on account of the wreckage at the outer portions of the piers.

If bound for Cunninghame Arm, it is better to wait for flood tide, and then only when under steam or in charge of a tug.

*By Night.*—Vessels under steam may enter at night, provided that the light on the outer end of the Eastern pier shows white, and the night sufficiently clear to distinguish the piers; the exhibition of a red in lieu of the white light indicates that the bar is dangerous.

*Caution.*—Mariners are warned that they incur danger by taking the entrance against the signals exhibited from the Signal Station.

**Cunninghame Arm.**—The entrance to Cunninghame Arm is 400 feet wide, and lies between the northern end of the Eastern pier and the extremity of the rocky wall which projects S.E. from Bullock Island. The arm extends N.E. 2 miles, and varies in width from 1,500 feet opposite the Pilot Station to 700 feet at  $1\frac{1}{2}$  miles from its eastern limit. Cunninghame Arm was formerly a portion of Reeve's River, which had its mouth at the eastern end of the arm. Since the opening of the present artificial entrance this has been blocked by sand accumulations, which are forming a succession of low sand dunes across the former entrance.

A channel about 300 feet wide extends to the South jetty, and is available for vessels of 10 feet draught. From the South jetty the channel extends about 2 cables along the southern side of the arm, then takes a turn north-easterly to Post Office jetty. This latter portion has recently been dredged for a width of 100 feet, and is available for vessels of 10 feet draught. From Post Office jetty the channel follows the northern shore, and is suitable for vessels of 10 feet draught, to Eastern jetty eastward of which the channel shoals to a few feet, which is gradually becoming less owing to sand deposits.

*Jetties.*—*South Jetty*—on the south side of Cunninghame Arm, about  $1\frac{1}{2}$  cables from the inner end of Eastern pier, and immediately below the pilot flagstaff—has a T end, with 10 feet of water alongside.

*Post Office Jetty.*—Six and a half cables from inner end of Eastern pier, on the northern shore of the arm. The jetty has a T end, with 9 feet of water alongside.

*Eastern Jetty.*—Four cables east of Post Office jetty, on the north side of the arm, has a T end, with 10 feet of water alongside. There is a swinging basin 425 feet long and 200 feet wide, with 10 feet of water at the Eastern jetty.

*Lights.*—Pier-head lights are exhibited from the jetties as under:—

South jetty—Green light, visible in clear weather	$1\frac{1}{2}$ miles.
Post Office jetty—Red	2 "
Eastern jetty—Red	2 "

*Lights.*—*Inner end, Eastern Pier.*—A red light, visible 2 miles in clear weather, is shown from the inner end of the Eastern pier of Lakes' Entrance, and marks the south side of entrance to Cunninghame Arm.

*Bullock Island.*—A white light, visible 3 miles in clear weather, is shown from the outer end of the rocky wall, extending south-easterly from Bullock Island, and marks the north side of entrance to Cunninghame Arm.

*Beacons.*—Four poles surmounted by discs painted white have been erected to mark the centre of the dredged cut south of Post Office jetty. Two of the poles are placed on the foreshore, about 150 feet west of Post Office jetty the remaining two being driven on the south shore, southerly and in line with the former ones.

*Directions.*—Vessels should not attempt to enter Cunninghame Arm save during slack water or flood stream.

Vessels coming from seaward should proceed to the basin opposite the North arm, and swing before entering the arm, unless strong winds prevail, when keep on until abreast of Kalimna jetty before swinging. Enter midway between the Bullock Island and Eastern pier lamp-posts or lights, and steer for the South jetty.

If bound for Post Office jetty, after passing South jetty keep about 200 feet from the south shore until nearing the line of beacons placed on north and south shores, when steer in towards northern shore, and keep the beacons in line until about 300 feet from Post Office jetty, when steer for the jetty.

To make the Eastern jetty.—After passing the Post Office jetty close to keep about 200 feet off the northern shore of the arm.

*Speed of Steamers.*—It is contrary to clause 66 of the Port Rules and Regulations to navigate steam-ships in the Cunninghame Arm of Reeves Channel at a greater rate of speed than 4 miles per hour.

*Submarine Cable.*—A submarine electric cable is laid across Cunninghame Arm, at a distance of about 2,000 feet from the entrance to the arm. The shore ends of the cable are marked by poles painted red, and mariners, boatmen, and others are warned not to anchor within 500 feet on either side of a line joining the red poles erected on north and south sides of the arm.

*Explosives Anchorage.*—Mid-way between the Post Office jetty and the Eastern jetty.

**Reeves Channel**, leading to the Gippsland Lakes, is situated between the high land of the mainland and the low-lying islands to the southward, and from Mount Barkly at its east end to its west end at Point Smyth, it is about 4 miles long and available for vessels of 10 feet draught.

Between the slopes of Mount Barkly and the N.E. side of Rigby Island, the channel is known as the Narrows, and is about 500 feet wide, with depths of 17 to 27 feet in the line of deepest water, which is about 150 feet off the high land on north side.

*Kalimna Jetty*, on the north side of the channel, and at the west end of the Narrows,  $4\frac{1}{2}$  cables from Mount Barkly, has 10 feet of water along the outer side of its  $\perp$  head.

At Kalimna jetty the waters widen out to 900 feet, increasing to 1,200 feet at Maringa, about half-a-mile W.S.W. The south shore of the channel from Kalimna to Maringa is formed by the N.W. side of Rigby Island, and is fronted by a bank with  $1\frac{1}{2}$  to 4 feet of water on it, which extends outwards for about 300 feet westward of the beacon light on Rigby Island, and 500 feet northward at No. 2 beacon abreast of Maringa. From No. 2 beacon, the bank continues in a westerly direction for  $4\frac{1}{2}$  cables to No. 4 beacon, forming between Fraser Island and the mainland a middle bank 600 to 800 feet wide, with its north side about 800 feet from the high mainland shore. On the south side of the middle bank there is an 8 feet channel 300 to 400 feet off the north side of Fraser Island, and continues between Fraser and Rigby islands with depths of 7 to 11 feet.

From Kalimna to Maringa, Reeves Channel is rather intricate owing to a spit with only 6 to 8 feet of water on it, projecting E. by S. from the shore on the western side of Maringa Creek and forming a central bank. The eastern extremity of this bank lies about S.W. 1,000 feet from Kalimna jetty, and is marked by a red perch buoy, eastward of which the channel is about 500 feet wide with 9 feet at low water, and southward of which 250 feet wide between the buoy and the bank to the southward with 11 feet at low water. Thence the channel has a uniform width of 250 feet with 11 feet at low water in mid-channel until about a cable from No. 2 beacon where the channel widens out to 600 feet. From No. 2 beacon to No. 4 beacon, a distance of nearly half-a-mile, the channel is about 600 feet wide between the beacons and the northern shore formed by the high mainland, with depths of 10 to 15 feet in mid-channel. Thence the channel gradually decreases in width from 600 to 300 feet at the black perch buoy moored about 2 cables W. by N. from No. 4 beacon. After passing the black buoy, the deep water widens out with 14 to 19 feet half-way between the shore on either side of the channel.

*Light.*—To facilitate navigation by night of Reeves Channel between Kalimna and Nyerimilang, a fixed light, elevated 28 feet above sea level, is shown from an iron skeleton beacon erected on the north-west side of Rigby Island near the leading beacons at about 2 cables S. 14 deg. W. from Kalimna jetty. The light appears white all round except within the arc between S. 4 deg. E. and S. 86 deg. E. which shows red to mark Maringa Spit near its eastern cutting, and the Nyerimilang black buoy near its western cutting.

*Caution.*—Mariners are advised that the western cutting of the red sector of light is intended to enable the Nyerimilang buoy to be picked up in approaching the light from the westward, but it is necessary to haul into the white sector after passing the buoy.

*Beacons and Buoys.—Starboard Hand.*—Entering from seaward a starboard hand 300-gallon cask buoy, surmounted by a basket perch, painted red, is moored on the eastern edge of the central shoal in 9 feet of water, Kalimna jetty bearing N. 40 deg. E. 192 fathoms distant.

*Port Hand.*—Entering from seawards three single pile beacons, painted black, mark the south side of the channel from opposite Maringa westwards.

The following are their positions relative from the beacon light on Rigby Island and each other:—

No. 2 beacon	...	S. 86 deg. W.	386 fathoms from Beacon Light	
No. 3 beacon	...	S. 89 deg. W.	197	No. 2 beacon
No. 4 beacon	...	N. 76 deg. W.	235	No. 3 beacon

A port hand 300-gallon cask buoy, surmounted by a small can-shaped perch, painted black, marks the shoal ground off the western end of the middle bank, and is moored in 11 feet of water, Nyerimilang jetty bearing N. 80 deg. W. 117 fathoms distant.

*Leading Beacons.*—Two temporary leading beacons are situated on Rigby Island, about 200 feet north-eastward of the Beacon light, to guide mariners in mid-channel from the eastern end of Maringa Spit to No. 2 beacon.

*Explosives Anchorage.*—West of Reeves Channel, off Rigby Island.

*Shore.*—From the western end of the middle bank the southern shore of Reeves Channel is formed by Flanagan Island, which is separated on the east from Fraser Island by a passage 200 feet wide, which is nearly dry

at low water. From the eastern to the western end of Flanagan Island, a distance of 2 miles, the width between the island and the mainland varies from  $2\frac{1}{2}$  to 4 cables, and depths of 13 and 14 feet to within half-a-cable off either shore, and 15 to 20 feet in the middle. Point Smyth, also known as Bell's Point,  $5\frac{1}{2}$  cables west from the western end of Flanagan Island, marks the entrance to the reach known as Bancroft Bay. Opposite Point Smyth the channel is 3 cables wide, 18 feet deep half-a-cable off, and 23 feet deep in the middle.

**Bancroft Bay** is horseshoe shaped, with high land heavily timbered on its northern side. There is 16 to 23 feet of water over its greater area, and not less than 15 feet at one cable off any part of the shore. On the south-west side of Bancroft Bay is the narrow strip of land washed on its further shore by the waters of Lake King, and upon which stands the village of Metung.

Mosquito Point, the northern extremity of the low southern shore of Bancroft Bay, is low and sandy, with 12 feet of water 100 feet off, and 20 feet at 300 feet off. A strong current is usually met with off the point.

*Metung Jetty*, situated on the south-west shore of Bancroft Bay, near the village of Metung, is 120 feet long, with T end 52 feet long, and 9 feet of water alongside.

*Light*.—A fixed green light, visible  $1\frac{3}{4}$  miles distant, is shown from the end of Metung jetty.

**Shaving Point** is the extremity of the peninsula separating Lake King from Bancroft Bay, and marks what may be considered the junction of Reeves Channel with Lake King. Here the channel narrows in width to about  $1\frac{1}{2}$  cables, with 20 feet of water close to the point, and as much as 34 feet in the centre. In this locality the tidal current attains a velocity of  $1\frac{1}{2}$  to 2 knots, both flood and ebb. When the rivers flowing into the lakes are in flood the level of Lake King has exceeded the level of Bancroft Bay at Metung by 9 inches, with a consequent seaward rush of water round Shaving Point at a velocity of 4 knots per hour.

*Light*.—A fixed red light, elevated 28 feet above high water, and visible 3 miles distant, is exhibited from a lamp-post on the south side of Shaving Point 3 cables S.S.E.  $\frac{1}{2}$  E. from the green light on Metung jetty.

**Directions**.—Vessels proceeding to the lakes through Reeves Channel should, after passing between the entrance piers, steer well over to the northern side of the channel, keeping Bullock Island and the mainland near Mount Barkly 200 feet off until abreast of Kalimna jetty, when haul over to the southward, keeping the red perch buoy on the starboard hand. After passing the buoy, keep the leading beacons on Rigby Island in line until nearly abreast of No. 2 beacon, whence steer to keep the high land shore on the starboard hand half-a-cable off until rounding the port hand black buoy, south of Nyerimilang jetty. From this point the better course will be in mid-channel until abreast of the western end of Flanagan Island, whence steer to round Point Smyth a cable off, and Mosquito Point  $7\frac{1}{2}$  cables further on at a distance of 1 cable off. Thence steer for Shaving Point, and round the point or light half-a-cable off into Lake King.

*Note*.—As the bar at the entrance to the Gippsland Lakes and the banks inside the entrance abreast of Bullock Island and between Kalimna jetty and Maringa are so subject to alterations, mariners, to insure safe navigation, should from time to time keep themselves conversant with the changes by obtaining the latest information from the pilot stationed at the Lakes' Entrance.

**SOUTH CHANNEL**, comprises the waters lying between Rigby, Frazer, and Flanagan islands and mainland on the south. From the Lakes' Entrance the South Channel extends in a westerly direction between Rigby Island and the mainland  $1\frac{1}{2}$  miles to the clay barrier at the south-west end of Rigby Island. The distance between the island and the southern shore varies in width from 500 to 1,000 feet, with depths ranging from 8 to 12 feet in the channel. Between the 6-ft. limit the channel is narrow, and generally follows the north bank until west of the central bend, where the deepest water will be found along the southern bank. Between the ends of the clay barrier there is a depth of 24 feet. This clay barrier formerly extended across and blocked the channel, until carried away by a heavy rush of water during a season of flood, in 1891.

**Southern Shore.**—From the clay barrier the southern shore extends westerly 6 cables, and north-westerly 2 cables to Kelly Head.

**Kelly Head**, about a cable wide, and projecting north-westerly 2 cables from the mainland, is low and covered thickly with ti-tree to the water's edge. From Kelly Head the mainland shore trends generally westerly 2 miles to Romley Point, which marks the south-westward end of the South Channel. The south shore, from the Lakes' Entrance throughout, is low and in most places fringed by a strip of ti-tree scrub to the water's edge, and extending inland from a few hundred feet to a quarter of a mile, where the land gradually rises to fern and gum-covered ridges.

**Main Channel.**—From the clay barrier the Main Channel trends about W.N.W.  $\frac{1}{2}$  W. 8 cables, with a least depth of 8 feet; thence S.W. by W.  $1\frac{1}{2}$  miles, with a least depth of  $5\frac{1}{2}$  feet, and a ruling depth of  $7\frac{1}{2}$  feet; thence W.N.W. 3 cables to its west end, between Romley Point and the west end of Flanagan Island, where it joins Reeves' Channel.

**Boat Channel.**—From the clay barrier a boat channel carrying 2 feet of water leads along the southern shore to Kelly Head, with a bank dry at low water (about 3 cables long east and west, and a cable wide) on its north side, opposite Frazer Island.

A sand bank, dry at low water, projects a cable north-west and 3 cables west from Kelly Head, along the eastern side of which the boat channel extends to its junction with the Main Channel; along the southern shore westward of Kelly Head 3 to 5 feet of water is found close to the ti-tree fringe, where yachts and small boats can make a landing. Off Romley Point a sandspit, dry at low water, extends northerly a cable out to the edge of the Main Channel.

**North Bank.**—The bank forming the north side of the channel extends about 2 cables from the south shore of Flanagan Island. South-west from the western end of Flanagan Island the bank projects 3 cables, and dries in places at low water. Between this bank and the sand-spit off Romley Point the Main Channel is only about 200 feet wide between the 6-ft. limits, with a least depth in the centre of 9 feet.

**Pelican Island**, the N.E. end of which lies about S.S.W. 4 cables from the western end of Flanagan Island, is  $3\frac{1}{2}$  cables long, east and west. At the west end of Pelican Island, a bank, carrying 2 to 4 feet of water, extends 2 cables northwards towards Bell's Point.

**LAKE KING**, though not the largest, may be considered, apart from its picturesqueness, the most important of the Gippsland Lakes.



It receives the waters of the Mitchell, Nicholson, and Tambo Rivers, which provide navigable waterways of fully 30 miles, and afford communication with the important and growing towns of Bairnsdale and Bruthen, that command the mineral and pastoral country lying beyond.

Lake King embraces an area of 26.2 square miles, with a shore line 40 miles in extent. Commencing at Shaving Point light, at the entrance to Reeves River, it is bounded on the west by an imaginary line drawn due south from Shaving Point light to the opposite shore, and from thence following the shore westward to Jones Point; thence from Jones Point by an imaginary line drawn to Point Scott on Raymond Island; thence from Point Scott northwards and southwards along the shore of Raymond Island to a point due east of Paynesville wharf light; thence west to Paynesville wharf light; thence travelling northwards, following the shore of the main land and across the mouths of the Mitchell, Nicholson, and Tambo Rivers back to the starting point at Shaving Point light.

Outside the shoal water contiguous to the shores of the lake, and hereafter described, the lake, with the exception of Jones Bay, has a nearly uniform depth of 21 feet, with a bottom of blue clay in the central portions. Beds of river silt are found at the mouths of the Mitchell and Tambo, and rock in the neighbourhood of Tambo Bluff.

**Southern Shore.**—From the point about due south of Shaving Point light the southern shore of Lake King extends W.  $\frac{1}{4}$  N. nearly a mile to Tyres Point, thence S.W. by S.  $1\frac{1}{4}$  miles to Round Head, the land being low and covered with dense ti-tree scrub to the water's edge, with salt-water marshes and lagoons at the back. From Round Head to Jones Point lying S.W. by W.  $1\frac{3}{4}$  miles, the shore forms a bay to the southward (Wollaston Bay).

**Banks.**—At the point of the southern shore opposite Shaving Point, the bank extends about a cable to the 12-ft. limit, and continues the same distance off shore to Tyres Point, whence it trends south-westward increasing to 3 cables off the shore north-westward of Round Head. Opposite Round Head the bank forms a spit running W.S.W. nearly a mile towards the beacon off Jones Point. The whole of these banks consist of sand and mud with 1 to 4 feet of water on them. From Jones Point a dry sand-spit about a cable wide extends northerly half-a-mile to Jones Point beacon which marks the south side of the entrance to Wollaston Bay.

**Wollaston Bay,** between Round Head and Jones Point, and fronted by the spit extending from Round Head, is a cable wide between the 12-ft. limits at its entrance north of Jones Point beacon. Thence the deep water of the bay runs in an easterly direction to within 1 cable of the shore south of Round Head with depths of 13 to 15 feet for a width of about 3 cables between the 12-ft. limits of the south edge of the spit extending from Round Head and the north edge of the bank which projects about 4 cables from the southern shore of the bay. From the eastern end of the bay a boat channel with 3 feet of water leads into Purran Corner which is used as a haven by fishermen.

**Raymond Island,** separating Lake King from Lake Victoria, is  $3\frac{1}{2}$  miles long by 1 mile wide, and consists of low gum and fern ridges, with marshy flats in the centre. It is utilized as a village settlement, the soil being well adapted for fruit-growing and root crops.

From Point Scott, at its south-eastern extremity, the land trends northerly and westerly to Point King, on which a prominent trigonometrical station is erected. In the vicinity of Point Scott the deep water approaches within half-a-cable of the shore, but gradually recedes therefrom to a cable and a half at 3 cables easterly from Point King, the sand-bank inshore carrying 6 inches to 1 foot of water. Immediately east of Point King deep water is found, half-a-cable off, and 3 feet close in shore, where pleasure and small boats can make a landing. From Point King the shore trends in a crescent south-westerly to McMillan Strait, and is fronted by a bank of mud and sand carrying 6 inches to 2 feet of water; north of Point King the bank extends 3 cables to the 12-ft. limit, and from thence westerly to the northern entrance to McMillan Strait at 5 cables from the shore.

*Beacons.*—This bank is marked at its eastern and western ends by two black pile beacons. The one on the eastern edge is N.  $\frac{3}{4}$  W. 2 cables from Point King in 11 feet of water; but, as the bank to the 12-ft. limit extends half-a-cable to the north-west of the beacon, vessels rounding it should keep fully that distance off.

The beacon at the west end of the bank is about due north  $6\frac{1}{2}$  cables from McMillan Strait light; and is the rounding point for vessels proceeding to and from the strait. (See McMillan Strait.)

**McMillan Strait**, separating Raymond Island from the mainland to the westward, and joining the waters of lakes King and Victoria, is considered to extend from Montague Point, 2 miles to the black pile beacon, which marks the north-western edge of the Raymond Island bank.

Entering the strait from Lake King the channel lies south-westerly off the black beacon, where it is a cable wide between the 18-ft. limits, but widening out to about 2 cables at the same distance southward of the beacon where the channel curves towards the strait proper at Cattle Point. At Cattle Point the distance from shore to shore is about 400 feet, but immediately widening out to the southward to about 900 feet, with 300 feet between the 12-ft. limits, until nearing Paynesville wharf, where the shores again approach to within 400 feet.

*Light.*—A fixed white and red light elevated 19 feet above water level is shown from a lamp-post on Raymond Island at the northern entrance to McMillan Strait. The light shows as follows:—

*Red* between the bearings of S. 40 deg. W. and S. 3 deg. E. over the bank off Raymond Island.

*White* between the bearings of S. 3 deg. E. and S. 12 deg. E., over the channel at northern entrance to McMillan Strait.

*White* between the bearings of S. 50 deg. E. and N. 7 deg. E. over McMillan Strait.

The white light is visible for a distance of 5 miles, and the red light 3 miles.

Mariners approaching McMillan Strait from the northward should, when about 1 mile off the light, steer to get into the white sector of the entrance channel, and thus avoid the north-western end of the Raymond Island bank, which lies due north  $6\frac{1}{2}$  cables from the light.

**Paynesville.**—Pleasantly situated on the mainland shore of the strait is the chief centre of the lakes fishing industry. Commanding as it does the deep water of the lakes, and also being admirably situated for communication with the surrounding country, it will no doubt become a place of importance in the future developments of the district.

*Jetty.*—The Paynesville wharf is 81 feet long with 9 feet of water alongside.

*Lights.*—A red light is exhibited from a lamp-post erected on the southern end of Paynesville wharf visible in clear weather 2 miles distant.

*The Shore.*—From Paynesville wharf to the western bank of McMillan Strait is low and marshy to Cattle Point. Five cables west of the jetty is a slipway (privately owned), suitable for vessels up to 200 tons. From Cattle Point the shore of Lake King trends westerly to Point Fullarton, forming a shallow bight between of 2 to 3 feet of water with the 6-ft. limit 3 cables off.

**Point Fullarton** is the termination of the low narrow neck of land covered with ti-tree and extending northerly 4 cables from the general shore line. On the extremity a trigonometrical station is erected. A sand bank with 6 inches of water upon it extends  $1\frac{1}{2}$  cables northwards from the point, dropping off suddenly to 15 feet.

**Eagle Bay.**—From Point Fullarton the shore trends westerly, then northerly and easterly to Point Foster, enclosing the sheet of water known as Eagle Bay. The shore for about a mile on the southern side is low and marshy, and lined with ti-tree from 3 cables to a cable back, where the land rises in partially-timbered slopes. The whole of the southern shore is fronted by a mud and sand bank with 2 feet of water over it extending in places 2 cables off to the 6-ft. limit. On the western side at the head of the bay the 6-ft. limit approaches within 200 feet of high-water mark. Here a small boat jetty and baths have been erected as an adjunct to the public park, which here extends from the water's edge in a gentle rise and conveniently wooded. Eagle Point, the most prominent point of the high land of the park, overlooks the Mitchell River, and commands an extensive view of Lake King, Bairnsdale, and surrounding country. A trigonometrical station is erected thereon. The northern shore of Eagle Bay to Point Foster forms three small indentations along the flat which borders the Mitchell River from Eagle Point to its mouth. Here the deep water approaches within a cable of the shore, whilst at Scrubby Point 14 feet can be obtained 150 feet from the shore.

A *Swinging Station*, consisting of four pile beacons placed approximately north, south, east, and west 300 feet from a central beacon at which vessels may be swung for the adjustment of compasses, is established in Eagle Point Bay in 13 feet of water. The central beacon bears N. 14 deg. 30 min. W. 6 cables from Point Fullarton.

The following magnetic bearings of the piles and of several conspicuous marks are taken from the central beacon:—

Pile No. 1	...	North 0 deg. 18 min. east—North nearly.
" 2	...	South 89 deg. 54 min. east—East nearly.
" 3	...	South 0 deg. 41 min. west—South nearly.
" 4	...	North 89 deg. 36 min. west—West nearly.

Light Beacon, entrance to Tambo River. North 57 deg. 2 min. east.

Trigonometrical Station N.E. end Raymond Island. North 76 deg. 31 min. east.

Cowl James hop kiln ... North 68 deg. 31 min. west.

Gap, Mount Lookout ... North 50 deg. 57 min. west.

Gap, Mount Taylor ... North 42 deg. 29 min. west.

Magnetic variations taken as 9 deg. 10 min. east.

From Point Foster the shore of Lake King extends 2 miles easterly along the low narrow strip of flat land bordering the Mitchell River to Point Dawson, the extremity of the south bank of the river. Along this portion the 12-ft. limit is half-a-cable to a cable and a half off. From

Point Dawson a sand bank extends easterly  $6\frac{1}{2}$  cables, through which is cut the channel leading to the Mitchell River. (See Mitchell River, page 128.)

**Jones Bay** is the shallow and extensive sheet of water lying between the Mitchell River flats on the south and the mainland on the north. It is  $5\frac{1}{2}$  miles long, by 1 mile wide, but contracts to 2 cables at its entrance between the north bank of the Mitchell River and Broome Point. The shore extending from the mouth of the Mitchell westerly is faced by shallow water, with soft muddy bottom, and save at Point Lardner, where 7 feet is obtained close to the point, extends along the shore of the bay to the right east of Point Norgate, where a firm and pebbly beach is met with. In the middle of the bay, north of Point Lardner, there is 8 feet of water, which gradually shoals to 6 feet opposite Point Norgate. From thence to the head of the bay the depth gradually decreases to a few inches, with soft muddy bottom, into which a 20-ft. pole can be pushed without touching solid ground. The greater extent of the shore of the bay is therefore unapproachable, except in punts and small boats.

**Nicholson River.**—(For Nicholson River and directions thereto see Nicholson River, page 129.)

**Lake King (NORTHERN SHORE).**—From Shaving Point the shore of Lake King trends north-west 1 mile, and west  $1\frac{1}{4}$  miles, to Tambo Bluff. Four cables from Shaving Point, and opposite the Metung jetty, the land rises, forming at a short distance from the shore wooded cliffs 60 to 100 feet high, the land beyond rising irregularly to form the higher wooded country beyond Metung and Tambo Bluff. Between Shaving Point and Tambo Bluff the bottom inshore is more or less rocky, with 12-ft. limit half-a-cable off, save in vicinity of Tambo Bluff, where it extends a cable off.

**Tambo Bluff.**—The most prominent headland of Lake King is about 70 feet high at the trigonometrical station erected on its westerly extremity. A point of low land, covered with ti-tree, extends from the bluff south-westerly 400 feet, from which a reef projects into the lake, forming the foul ground marked by the red beacon. A small creek has its outlet about 1 cable south-east from the bluff. The course of the creek forms a small valley separating the bluff from the land from the eastward. From 2 cables easterly of the bluff the depths inshore are irregular, with rocky and uneven bottom. There is a rocky patch; with 4 feet over it, bearing N. 53 deg. E. 2 cables to the bluff.

**Tambo Bluff Beacon** is a red pile beacon surmounted by a basket ball, placed in 9 feet, and marking the extremity of the rocky shoal west of Tambo Bluff, which bears N. 53 deg. 30 min. E.  $2\frac{1}{2}$  cables from the beacon.

Immediately inshore of the beacon is the 4-ft. patch already noted. At half a cable south-west from the beacon there is 20 feet of water, but vessels should not approach the beacon within a less distance.

From Tambo Bluff the shore trends northerly 2 miles, then south-westerly 1 mile, to South Point at the mouth of the Tambo River, forming between the large bight known as Tambo Bay. For 1 mile north of Tambo Bluff the land adjacent to the shore is similar to that in the neighbourhood of Tambo Bluff. Inshore the bottom is rocky, with a pebbly beach, and the 12-ft. limit half-a-cable to 1 cable off. At 1 mile north from Tambo

Bluff the land falls gradually to the level of the low delta of the Tambo. Inshore the bottom is sand, with sandy beach, and the 12-ft. limit  $1\frac{1}{2}$  cables off at the head of the bay.

From South Point the beach extends about 2 cables southerly to the 6-ft. limit, carrying 18 inches over the shallower parts, and almost united with a similar bank projecting from the north bank of the Tambo River.

**Tambo River** (See Tambo River, pages 129-130.)

From the extremity of the north bank of the Tambo River, the shore trends northerly three-quarters of a mile along the low delta of the Tambo to the head of Swan Bay, from whence it continues westerly 4 cables to the entrance to Salt Creek in the North-west head of the bay. From Salt Creek the shore continues southerly and south-westerly  $1\frac{1}{4}$  miles to Reef Point near the entrance to Jones Bay.

**Swan Bay**, the bight formed by the land just described, is shallow inshore, the 12-ft. limit being  $2\frac{1}{2}$  cables, and the 6-ft. limit 1 cable from the northern shore of the bay. Within the 6-ft. limit the water rapidly decreases to 2 and 3 feet.

**Salt Creek** is a tidal backwater extending 3 miles inland from the north-west corner of Swan Bay. It is of an average width of 70 feet, with depths ranging from 10 to 18 feet. Boats drawing 3 feet and under can enter from Swan Bay. The greater part of its course is blocked by snags and fallen timber which render it a favourite resort of perch, bream, and other lake fish during the spawning season.

Between Swan Bay and Reef Point and a mile off the latter, the sand bank which fronts the shore extends 1 cable to the 6-ft. limit and 2 cables to the 12-ft. limit. At half-a-mile east of Reef Point, the 12-ft. limit approaches 1 cable from the shore, then turns south-west half-a-mile across the River Mitchell entrance channel, and thence westerly towards Point Dawson. The 6-ft. limit approaches within half-a-cable of the shore at half-a-mile east of Reef Point, thence follows the line of the red pile beacons marking the northern edge of the Mitchell entrance channel to a point 700 feet from the end of the northern bank of the river, thence north-westerly along the northern shore of Jones Bay.

**Reef Point** is the nearest part of the shore to the Mitchell Entrance channel, and from which springs the reef that extends to the edge of the channel beyond which it has been removed by dredging. (See Mitchell River.)

From Reef Point the low shore extends northerly then south-westerly 5 cables to Broome Point, forming between the shallow corner known as Mullet Bay, 3 to  $1\frac{1}{2}$  feet deep.

From Broome Point the pebbly shore trends north-westerly in a curve to Thumb Point at the entrance to the Nicholson River, with 9 feet of water 100 to 300 feet off. (See Nicholson River.)

**Mitchell River**, one of the most important rivers of East Gippsland, is characterized by the remarkable manner of its extension into Lake King. From its mouth to Eagle Point, a distance of  $3\frac{1}{2}$  miles, the low flats on either bank average about 500 feet wide, while in some places, as at the head of Eagle Point Bay, the distance from the river to the bay is under 200 feet. These narrow strips of land are composed of rich alluvium, the fertility of which has caused the south bank of the river to be taken up for village settlement, and is now under cultivation.

The process by which this peculiar protrusion of the river bank into Lake King has been accomplished, is similar to that by which all deltas are formed, and still goes on continuously at the river's mouth, where successive freshes are depositing their burdens of silt and adding to the formation of the bank extending from Point Dawson eastward. A comparison of soundings taken in 1880 and 1894 shows that the bank has grown enormously in that interval, the 6-ft. limit in 1894 being 800 feet further east and 400 feet further south than in 1880. Nine inches to 1 foot of water obtains over this bank, through which a channel has been cut for half-a-mile easterly from the mouth of the river, and leads across the reef extending from Reef Point. This channel is 120 feet wide with a minimum depth of 10 feet at low water.

From Point Dawson the course of the river is westward 4 miles to Eagle Point, and thence northward about 5 miles to Bairnsdale wharf, which is the present terminus of the navigable portion of the river, although the tidal effect extends 2 miles further inland with fairly deep water.

Throughout the distance to Bairnsdale the river has a minimum width of 150 feet, and a least depth of 11 feet within the entrance near Point Dawson, the average depth throughout being 18 feet.

*Beacons.—Entrance to Mitchell River, Starboard Hand.*—The dredged cut leading to the Mitchell River is marked on the north or starboard side by seven red pile beacons, consisting of six single pile beacons 450 feet apart and one beacon light about 400 feet east of the extremity of the north bank of the river. This beacon light, in 7 feet of water, also marks the west side of the channel leading to Jones Bay and Nicholson River, the passage being between it and the single pile red beacon to the eastward.

*Port Hand.*—The outer end of the south or port side of the cut is marked by a black beacon light in 10 feet of water.

*Lights.*—The following lights, at an elevation of 18 feet above mean lake level, and visible in ordinary weather as below, are shown from the light beacons:—

White light, black beacon, outer end port side of channel visible 3 miles.

Red light, red beacon, inner end starboard-side of channel, visible 2 miles.

*Wharfs.—Eagle Point Wharf*, on south bank of Mitchell River, immediately westward of Eagle Point, is 42 feet long, with 12 feet of water alongside.

*Bairnsdale Old Wharf*, at the foot of the main street of the town, is 320 feet long, with depths alongside of 9 to 12 feet under favorable conditions. As this wharf is in the bend of the river, the depth of water is subject to alteration with every fresh, and therefore cannot be depended on.

*North Wharf*, on the north bank of the river, and opposite the old wharf, is 150 feet long, with about 9 feet of water alongside.

*New Wharf*, 800 feet south of the old wharf, on the west bank of the river, is 190 feet long, with 10 feet of water alongside.

*Directions.—By day.*—Vessels bound for the Mitchell River having picked up the entrance black beacon can steer keeping it on the port hand when nearing the channel, and getting the red pile beacons nearly in line steer so as to pass them close to on the starboard hand, which will lead to the river mouth, whence keep in the middle of the river to destination.

*By night.*—Having picked up the white light at the entrance to the channel, steer so as when nearing it to get the red light at the mouth of the

river a little open to the north of the white light, when the entrance can be made passing the white light on the port hand and keeping the red pile beacons close to on the starboard hand.

*Speed of Steamers.*—It is contrary to clause 64 of the Port Rules and Regulations to navigate steam-ships in the Mitchell River at a greater rate of speed than 5 nautical miles per hour.

**Nicholson River.**—The entrance to the Nicholson River may be considered to commence at the Mitchell mouth, between the red light beacon and westernmost red pile on the starboard hand of the Mitchell entrance channel, and thence traverses portions of Jones Bay to the entrance proper off Thumb Point. From the entrance between the aforesaid beacons the deep water channel trends north-westerly 3 cables, when it runs out from 19 feet to 9 feet, the general level of that portion of Jones Bay.

*Thumb Point*, 1 mile west from Broome Point, forms the south-east side of the small bay at the entrance to the river. From Thumb Point a gravel bank, with 3 inches of water over it, extends south-westerly 800 feet, and round which is the narrow channel leading to the mouth of the river. This channel is marked by four (4) starboard hand red pile beacons. The outer beacon, in 7 feet, and bearing S.W. by W.  $2\frac{3}{4}$  cables from Thumb Point, is placed to clear the gravel bank, which extends westward from the point. The three (3) inner beacons lead along the eastern edge of the channel in six (6) feet to the mouth of the river, the channel being about 80 feet wide and 7 feet deep at low water.

For 8 miles of its course the Nicholson River partakes of the character of a tidal backwater. The amount of fresh water it receives is small, and only after heavy rains is any downward current noticeable, the direction of the stream being governed in the lower portion by the state of the tide.

From the mouth, 2 miles to the Nicholson lift-bridge, the river is 300 feet wide, with a mean depth of 14 feet, and from the bridge it continues of good width for 3 miles through the range of hills separating the country known as the Upper and Lower Nicholson, with depths up to 27 feet. At 2 miles above the bridge the river takes a sharp turn to the westward, the bottom consisting of hard gravel or conglomerate, which continues throughout the reach for three-quarters of a mile, with an uniform depth of 8 feet.

From its opening out into the Upper Nicholson Valley the river begins to contract in width until it reaches 60 feet at the Sarsfield Bridge,  $7\frac{1}{2}$  miles from the mouth. Good depths, with a minimum of 9 feet, are maintained to within half-a-mile of the Sarsfield Bridge, from whence the stone used in the construction of the piers at the Lakes' Entrance was obtained.

*Directions.*—Having entered the Mitchell entrance channel, proceed through same until nearly abreast of the westernmost red pile, when steer north-west in the direction of Thumb Point, passing between the westernmost single red pile beacon and the red light beacon. When about 3 cables from the Mitchell channel steer to keep in the centre of Jones Bay until the mouth of the river opens out clear of Thumb Point; then steer in for the channel, passing the pile beacons close to on the starboard hand. If bound for the further-side of the bridge prior notice of intention to proceed should be given either by blast of the whistle or other audible signal, so as to allow of the bridge being cleared for passage.

The Nicholson River and channel leading thereto are navigable for vessels up to 7 feet draught of water.

**Tambo River** possesses many of the characteristic features of the Mitchell, such as its silt-carrying capacity and the peculiar extension of its

banks near the mouth, which are built up by accumulations of river silt, and protrude into Lake King, forming the eastern and western shores of Swan and Tambo Bays respectively.

The mouth of the river is enclosed by sand banks, which extend in a crescent shape over two cables out therefrom, and carrying a foot and a half of water on either side of the small channel leading to the mouth. This channel has been enlarged by dredging to a width of 140 feet and depth of 9 feet at low water, but is liable to continued shoaling by the deposition of river silt and from the exposure of the mouth to the heaping-up action of the lake waters.

The river is navigable for 13½ miles to Mossiface, where the tidal influence terminates.

It preserves a width ranging from 300 feet in the lower portion to 130 feet at Batten's Landing. From thence to Mossiface the width varies between 60 and 100 feet, which combined with sharp bends render navigation difficult.

*Depth.*—The Tambo is the shallowest of all the rivers flowing into the lakes. Immense quantities of silt are brought down periodically from the uplands, a large proportion of which has been deposited of late years in the neighbourhood of Bruthen, near which the gorge of the Tambo opens out into the fertile plains of the Upper Tambo. By these deposits the original bed of the river has been filled up and raised to such an extent as to cause a diversion from its former course, *via* Mossiface, across from Bruthen, in a southerly direction till it rejoins the original bed at Bridle Creek, near Batten's Landing. From that point downwards the river widens in places to nearly 300 feet with proportionate shoaling in depth.

The following are the approximate minimum depths from the entrance to the river to Mossiface wharf:—

Dredged Channel entrance to river	...	...	5 feet
Between the Mouth and Johnsonville Wharf	...	...	8 "
„ Johnsonville and Swan Reach Wharf	...	...	7 "
„ Swan Reach and Upper Tambo Landing	...	...	7 "
„ Upper Tambo Landing and Batten's Landing	...	...	7 "
„ Batten's Landing and Mossiface Wharf	...	...	5 "

WHARFS AND LANDINGS.

Name.	Distance from River's Mouth.	Length and Width.	Approximate Depths alongside.
	Miles.	Feet.	Feet.
Johnsonville ... ..	2½	52 × 14	10
Swan Reach ... ..	6	52 × 14	7
Upper Tambo ... ..	10½	52 × 14	7
Batten's Landing ... ..	11	52 × 14	7
Mossiface ... ..	13½	122 × 14	5

*Light.*—A green light elevated 22 feet above the mean lake level is shown from Tambo Beacon, situated 1,000 feet south from the mouth of the Tambo River. The light bears N. 57 deg. W. from Tambo Bluff Beacon, and N. 83 deg. W. from the white light at the entrance to Mitchell River.

*Beacons.*—The light beacon consists of a pile structure with platform surmounted by lamp-post and house painted white on the south edge of the bank extending from the river's mouth, and 1,000 feet therefrom in 6½ feet of water, and marking edge of the entrance channel on the east.



Two pile beacons painted red mark the eastern or starboard edge of the dredged channel between the light beacon and the mouth of the river.

*Navigable depth.*—The river is navigable for vessels of 5 feet draught to Batten's Landing, and  $4\frac{1}{2}$  feet to Mossiface Wharf.

*Directions.*—Having picked up the Tambo Beacon or light, open out the first reach of the river, and steer in for the mouth, passing the light beacon and pile beacons close to on the starboard hand. As the dredged channel at the entrance to the river is subject to frequent change in direction and depth, owing to siltation, mariners should from time to time obtain the latest information from the pilot stationed at the Lakes Entrance. After passing the mouth keep the centre of the stream. At Swan Reach there is a swing bridge, through the centre of which is the course for navigation.

**BACK LAKES** includes all the water southward of a line S.W. by W. from Jones Point to Point Wilson, the northern extremity of Sperm Whale Head. The entrance to the Back Lakes is about  $2\frac{1}{2}$  miles wide and consist of shallow mud and sand banks extending about a mile to the southward from Lake Victoria. Thence these waters branch off eastward and westward as long narrow arms running contiguous to the coastal sand-hills. The eastern arm, known as Lake Bunga, is about 7 miles long and 1 to 2 cables wide, with a channel of a general width of 400 feet and 6 to 7 feet deep to within a mile from the eastern end of the arm. The western arm of the Back Lakes, starting at the south-eastern extremity of Sperm Whale Head, where it is 5 feet deep, extends south-westerly for about 2 miles, where it dries out at low water.

**Aurora Channel** winding through the banks of the Back Lakes to Lake Bunga, varies in depth from 18 feet at its entrance from Lake Victoria to about 7 feet where it joins Lake Bunga. The channel is tortuous, and in places only 150 to 200 feet wide, but is available for small pleasure vessels desiring to reach Lake Bunga.

*Beacons.*—A leading pile beacon with triangle, and painted red, is placed on the western bank of the northern entrance to Aurora Channel. Red pile beacons with cross-pieces indicate the principal bends on the starboard side, and black pile beacons the principal bends of the port side of channel.

**Sperm Whale Head** is the terminal portion of the mainland lying between Lake Victoria and western arm of the Back Lakes, the north-eastern extremity of the head being known as Point Wilson. The land at Sperm Whale Head is the highest of any in the vicinity of the Back Lakes. The range of low hills which traverse the mainland south of Lake Victoria extend almost to the water's edge, between Point Wilson and Trapper Point, where they are about 60 feet high, and about 100 feet high half-a-mile back.

**Rotamah Channel**, running close to the eastern shore of Sperm Whale Head, is over a mile long, about  $1\frac{1}{2}$  cables wide, with depths decreasing from 17 feet at its entrance off Point Wilson to 6 feet off the south-eastern extremity of the Head.

**LAKE VICTORIA** includes all waters, backwaters, and bays, bounded on the east by a line extending S.  $33\frac{1}{2}$  deg. E. from the starting point at Point Scott, Raymond Island, to Jones Point; thence on the

south by an imaginary line drawn from Jones Point S.W. by W. to Point Wilson; thence from Point Wilson travelling south-westerly along the shore to the eastern end of McLennan Straits; thence travelling northerly and easterly along the shore of the mainland to Paynesville Jetty light; thence from Paynesville Jetty light due east magnetic across McMillan's Straits to the foreshore of Raymond Island; thence travelling southerly, westerly, and easterly along the shore of Raymond Island to the starting point at Point Scott.

From its eastern end off Point Scott, Lake Victoria extends in a south-westerly direction 17 miles to the entrance of McLennan's Strait, and varies in width from  $\frac{3}{4}$  of a mile off Sperm Whale Head to 2 miles at its western end. General depths of 23 and 25 feet are maintained from the eastern end of the Lake to Waddy Point, a distance of  $9\frac{1}{2}$  miles; thence to Storm Point, a distance of  $2\frac{3}{4}$  miles, the depths decrease to 17 feet. After passing Storm Point, the depths gradually decrease to 9 feet at  $1\frac{1}{2}$  miles off the entrance to McLennan's Strait.

**Campbell Channel**, comprising the deep water between Raymond Island on the north and the banks occupying the entrance to the Back Lakes, is about  $3\frac{1}{2}$  cables wide, with depths of 23 to 28 feet in the middle, and generally 18 feet at a cable off Raymond Island, except at Harrington Point where a reef runs out south-easterly 2 cables into 12 feet of water.

*Beacons.*—A red single-pile beacon is placed at the extremity of the reef S. by E.  $\frac{1}{2}$  E. 1,280 feet from Point Harrington, in 12 feet of water. A red single-pile beacon is placed in 13 feet of water S. by E.  $\frac{3}{4}$  E. 1,500 feet from Montague Point, the S.W. point of Raymond Island at entrance to McMillan Strait.

**McMillan Strait** includes the waters eastward of a line drawn from Montague Point to Goose Point on the mainland. The entrance to the strait from Lake Victoria, unlike that from Lake King, is deep for the greater part of its width with a depth up to 23 feet off Montague Point, which gradually decreases to 13 feet opposite Paynesville Jetty.

**Newlands Arm**, extending from the southern entrance of McMillan Strait for 2 miles in a westerly direction, is a backwater about 2 cables wide with a channel of 13 feet for a cable wide for 1 mile from its entrance; thence decreasing in depth to 8 feet at half-a-mile from the western end of the arm. The arm affords good shelter and anchorage for yachts or other small vessels.

**LAKE VICTORIA (Southern Shore).**—The southern shore of Lake Victoria extends from Sperm Whale Head in a south-westerly direction about  $1\frac{1}{2}$  miles to Greenhill Point, so named from the green fern ridge which rises to 50 feet immediately behind the point; thence the shore continues in the same direction for  $1\frac{3}{4}$  miles to Point Walker. At Point Walker, the shore recedes three-quarters of a mile to the southward, where it again takes a south-westerly trend for about 2 miles to Pelican Point. Between Point Walker and Pelican Point, the land rises abruptly from high-water mark, forming steep sandy slopes attaining a height of 150 feet.

From Pelican Point, the shore trends to the southward for a mile, and thence south-westerly  $1\frac{1}{2}$  miles to White Cliff. Between Pelican Point and White Cliff the land begins to rise in steep sand slopes from the

water's edge, culminating in White Cliff, a steep sand face 130 feet high, which, being bare of vegetation, shows up conspicuously from Lake Victoria.

From White Cliff, the shore trends south-west, west, and north-west nearly  $1\frac{3}{4}$  miles to Waverley Point; thence west, south-west, and north-west about 2 miles to Hydra Point; thence south-west, west, and north-west  $2\frac{1}{2}$  miles to Thalia Point, and thence north-west over a mile to the western end of the lake.

From Waverley Point to the south-west end of the lake, the shore is swampy, covered with dense ti-tree jungle, with higher ground a few hundred feet back. The shore of the lake at its western end in the neighbourhood of McLennan Strait is marked by lagoons and reedy swamps.

**LAKE VICTORIA (Northern Shore).**—The northern shore of Lake Victoria from the southern entrance of McMillan Strait for about 5 miles to the south-westward to Wattle Point is fairly bold, rising in steep wooded slopes to heights varying from 40 to 100 feet. Near Wattle Point is a large wattle plantation and bark mill.

*Jetty.*—A jetty is situated in the bight  $1\frac{1}{2}$  cables south of Wattle Point, and extends easterly, 200 feet from the shore with an L end 60 feet long and 10 feet of water alongside.

For  $1\frac{1}{2}$  miles south-westward of Wattle Point the shore is bordered with a low ti-tree swamp, extending back in places a distance of half-a-mile to the higher, wooded ground.

**Waddy Point**, about 2 miles S.W. by S. from Wattle Point, is the extremity of a conspicuous ridge sloping gently to the lake on all sides.

*Jetty.*—A jetty 200 feet long with T end extends N.E. by N.  $\frac{1}{2}$  E. from the shore at 2 cables north-west from Waddy Point in 7 feet of water.

From Waddy Point the shore runs S.W.  $2\frac{1}{2}$  miles, and thence S.E. half-a-mile to Storm Point. Storm Point is similar in appearance to Waddy Point, but the land behind is not quite so high. A sandbank carrying less than 2 feet surrounds the point with the 6-ft. limit a cable off southerly but approaching the point within 200 feet at a cable north-east therefrom. The extension of this bank forms a long spit 4 cables wide and deepening to 9 feet at 6 cables S.E. by S. from the point where it quickly falls off to 12 feet.

Prior to the formation of the new entrance to the lakes long marine grasses flourished over this bank and clearly marked its extent.

From Storm Point, the shore trends westerly about 2 miles, and S.W. half-a-mile to Cameron's Point, the coast being low and fringed with ti-tree backed by gently rising fern and gum covered country. From Cameron's Point the shore curves north-westerly 6 cables to Luff Point at the entrance to Blonde Bay. Blonde Bay, a shallow arm with muddy bottom, extends about 3 miles in a north-easterly direction. At the entrance of Luff Point it is 8 cables wide, and 5 feet deep in the centre, decreasing to 2 feet deep half-a-mile to the northward.

**Jones Bay**,  $1\frac{1}{2}$  miles to the westward of Blonde Bay, is 4 feet deep in the centre, with shallows of soft mud inshore. Tom's Creek in the north of the bay runs northerly through the swamp lands, which extend to the north and west for about a mile, and forms a tidal backwater 100 feet wide and 7 to 8 feet deep.

**Victoria Lagoon.**—The gutter leading to Victoria Lagoon lies 8 cables west of the S.W. corner of Jones Bay. Victoria Lagoon, the largest of a chain of lagoons which extend westerly in the direction of Roseneath, Lake Wellington, is about a mile wide by 2 miles in length. It is very shallow, with bottom of a soft peaty nature, and is nearly dry during the summer months.

From Jones Bay the shore runs southerly  $1\frac{1}{2}$  miles to the entrance of McLennan Strait, the whole foreshore being low and swampy.

From Blonde Bay to Jones Bay the shore consists of ti-tree flats and salt marshes, extending half-a-mile back to the higher ground, which rises in even slopes to 200 and 300 feet in height.

**McLennan Strait,** forming the channel of communication between Lakes Victoria and Wellington, is 5 miles in length, with an average width of 300 feet, and depths ranging from 14 to 47 feet; average depth, 17 feet. Throughout its whole length the land adjacent to the banks is low. For 1 mile in the vicinity of Seacombe the banks are about 5 feet above high water, but with that exception the contiguous country is swampy, and consists of salt marshes interspersed with lagoons, and patches covered with ti-tree, all liable to be flooded during spring tides or during a strong blow, when the waters of the lakes heap themselves against and overtop the low shores of Lake Victoria or Lake Wellington.

**Eastern Entrance Channel.**—From off Storm Point there is a continual decrease in the depth of Lake Victoria in the direction of McLennan Strait, where the natural depth in the vicinity of the entrance is  $6\frac{1}{2}$  feet with stiff clay bottom. A channel, 100 feet wide, has been dredged through a distance of 3,200 feet S.W. by W.  $\frac{1}{2}$  W. to the mouth, and has an available depth of 7 feet at low water.

**Beacons.**—Four port hand pile beacons, spaced 800 feet apart and painted black, are placed on the southern edge of the dredged channel, the outer beacon being 3,200 feet from the mouth of the strait. The beacons are in line in a bearing of S. 61 degrees W.

**Western Entrance, McLennan Strait**—The channel leading from the western entrance of McLennan Strait lies between the eastern shore of Lake Wellington and the bank extending from Plover Point at the northern extremity of the land west of the strait. The deeper water at the mouth of the strait lies in towards the western bank, where the channel has a minimum width of 200 feet between the 10-ft. limits. From thence the channel trends northerly, with a slight westerly curve towards the easternmost black beacon on the port side, where it is a cable wide for a depth of 10 feet. The eastern side of the channel continues to sweep along the shore at an increasing distance therefrom. From the easternmost black beacon the west bank trends westerly towards the westernmost black pile beacon, from whence it turns southerly into Lake Wellington.

**Beacons.**—The easternmost black pile beacon is 10 feet is 7 cables N.N.W. from Plover Point, and about 4 cables westerly from the shore light on the starboard hand. The westernmost black pile beacon is placed about 1 mile N.W.  $\frac{1}{2}$  N. from Plover Point, and 4 cables westerly from the easternmost beacon in 10 feet. These beacons are in line bearing W.  $\frac{1}{2}$  N. and E.  $\frac{1}{2}$  S.

**Lights, McLennan Strait.**—*Eastern Entrance and Jetty Light.*—A red and white light, visible in clear weather about 3 miles distant, is exhibited from a lamp-post erected on the north-eastern corner of Holland's

wharf. This light is cut to show a beam of white light over the entrance to the dredged channel leading to the strait, but to the south-east and north-west of the channel the red light only will be seen. Mariners when entering the channel should keep the white light visible.

*Seacombe Wharf.*—A green light, visible  $1\frac{1}{4}$  miles, is exhibited from a lamp-post erected on Seacombe wharf.

*Western Entrance Light.*—A red and white light, visible in clear weather 3 miles distant, is exhibited from a lamp-post 23 feet high situated on the eastern shore of Lake Wellington, three-quarters of a mile north of the entrance to the strait and 100 feet north of a line drawn through the black pile beacons which mark the first side of the entrance channel. The light is cut to show white from the outer black pile beacon round northerly to Roseneath Point, and red from the outer pile beacon round southerly and easterly to the south side of the entrance to the strait. The light is merely to indicate the vicinity of the entrance, and thus to enable mariners and others to pick up the leading beacons.

**LAKE WELLINGTON** is a somewhat oval-shaped shallow basin, 10 miles in length, between Mount Cunninghame on its eastern to the head of Grebe Bay on its western shore, with an average width of 5 miles. It embraces an area of about 55 square miles and averages 8 feet in depth at low water, and is thus both the shallowest and largest of the Gippsland Lakes. It is also the least naturally and commercially interesting. The country contiguous to its shores on the east, south, and west consists generally of swamp lands so little removed above the level of the lakes as to be incapable of drainage, and sandy ridges adapted only for the growth of the indigenous vegetation with which they are clothed. On the north the partially cleared pasture land rises about 200 feet with variable slopes from the shore, merging into the undulating grass and timbered land comprising the parishes of Meerlieu and Nuntin.

**Southern Shore.**—From Plover Point at the entrance to McLennan Strait the southern shore of Lake Wellington trends south-westerly 5 miles; thence north-westerly 1 mile to Tucker Point. The shore throughout is low, and for 3 miles from Tucker Point undefined, as it is bordered by reed swamps with isolated clumps of reeds a quarter of a mile out from the general mass.

The water gradually deepens to 6 feet at 1 mile out from the reedy fringe, with soft muddy bottom. At Tucker Point the land rises slightly above high-water mark, with a ridge of higher land close to on the south.

From Tucker Point the shore trends southerly half-a-mile; thence westerly 3 miles, from whence it curves northerly and easterly to the south entrance point of the Latrobe River. The shore between is little removed above high-water level, and fringed with reed beds in soft mud, the water gradually deepening to 6 feet at half-a-mile off.

**Western Shore.**—From the entrance to the Latrobe River the low shore trends westerly, northerly, and easterly 4 miles to Marley Point, forming between the shallow bight of Grebe Bay. For 3 miles from the mouth of the Latrobe a morass covered with reeds and clumps of ti-tree extends back 1 mile from the shore. In the neighbourhood of Marley Point the land is slightly higher and fit for cultivation. From Marley Point the shore trends northerly and easterly  $2\frac{1}{2}$  miles to the mouth of the Avon River. At about a mile from Marley Point the land falls to form the Clydebank morass which extends 4 miles along the west bank of the Avon River.

**Avon River**, about 200 feet wide, is subject to tidal influence for 4 miles from its mouth to Clydebank station, with depths of water from 9 feet up to 25 feet. The downward current due to the influence of fresh water is very slight save in times of freshes. The channel extending out from the mouth of the river runs out at 3 cables to 5½ feet, which is the general depth of Lake Wellington across the line of the entrance.

*Directions.*—Mariners wishing to proceed up the Avon River should straighten up for the mouth when 5 or 6 cables off, bringing the first reach of the river into view on a bearing N.W. by N. ¾ W., which will lead between the shallower water extending out from the extremity of the banks on either side.

**Perry Creek** joins the Avon on the east bank half-a-mile from the mouth, and trends northerly and easterly 1½ miles, where the tidal influence ceases. It is 100 feet wide and 11 feet deep throughout the first mile, gradually decreasing in width and depth to the end of the backwater.

**Northern Shore.**—From the mouth of the Avon River the shore trends north-easterly and southerly 2 miles to Swell Point, forming a bight between. At half-a-mile from the Avon, a sandy beach begins and continues easterly round the shore to McLennan Strait. From Swell Point the shore trends easterly 4 miles to Roseneath Point, thence northerly half-a-mile to the head of a small bay, from whence it trends south-easterly and southerly 3½ miles to the entrance to McLennan Strait. One and a half miles north of McLennan Strait is the conspicuous wooded hummock of Mount Cunninghame, 80 feet high, and one of the points used in the geodetic survey.

**Latrobe River and Entrance.**—Latrobe River, flowing easterly into Lake Wellington, maintains a minimum width of 100 feet, with depths ranging from 21 to 30 feet through a distance of 8 miles from its mouth, where it is joined by the Thomson River. Above the confluence of the two streams the courses are sinuous and narrow, rendering navigation difficult even for small craft.

The Thomson River has been rendered navigable by the removal of obstructions through 1 mile of its course to the entrance of the Sale canal leading to the basin forming the port of Sale.

*Entrance.*—The Latrobe River is approached from Lake Wellington on a W.S.W. bearing. Across the mouth of the river is an extensive mud bank through which a channel which curves southerly to the river's mouth has been cut and marked by six starboard and six port hand beacons spaced 500 feet apart with a width between of 200 feet. The outer or eastern starboard and port hand beacons are triangular in shape, the starboard or red beacon being surmounted by a basket ball. The remaining beacons are single-pile beacons.

*Depth.*—There is a navigable depth of 7 ft. 6 in. at low water for a width of 100 feet through the marked channel, gradually deepening to 27 feet opposite the light at the mouth of the river.

*Lights.*—Two leading lights, 668 feet apart, are exhibited from posts situated on the northern bank of the Latrobe River. The upper or westernmost light is elevated about 30 feet and the lower about 20 feet above high-water level. In clear weather the upper light is visible through a distance of about 4 miles and the lower 3 miles. These leading lights, kept in line, will lead to the entrance of the channel on a bearing of S. 63 deg. W., and passing the red outer beacon 45 feet off.

**Caution.**—As the entrance channel to the Latrobe River is not straight, but curved, mariners and others approaching the river should, after passing the red outer beacon, be guided by the piles marking the edge of such channel on the port and starboard sides, and should not cross to the southward of the alignment of lights until passing the westernmost or inner piles of such channel.

**Sale Canal** from its junction with the Thomson River is 7,500 feet in length, with a width of 80 feet, and navigable depth of 8 feet. The Swinging Basin is 500 feet long by 240 feet wide, with depths ranging from 6 to 14 feet. The wharf on the eastern side of the basin provides 300 feet of berthage, with 10 feet of water alongside.

**Speed of Steamers.**—It is contrary to clause 65 of the Port Rules and Regulations, to navigate steam-ships in the Sale Canal at a greater rate of speed than 4 miles per hour, and contrary to clause 66B to navigate steam-ships in the Thomson River between Latrobe bridge and the Sale canal at a greater rate of speed than 5 miles per hour.

**THE COAST.**—**Red Bluff**, lying E.N.E.  $4\frac{1}{2}$  miles from the Lakes Entrance, is over 100 feet high, and conspicuous from its red colour. It rises gradually at the back to a height of over 200 feet, and, like the land about it, is thickly timbered, but not so much near the coast as inland. The Bluff has a few rocks off it, none of which, however, extend far seaward.

From Red Bluff the coast, of similar appearance as the land about the bluff, trends N.E. by E.  $\frac{1}{4}$  E.,  $1\frac{1}{2}$  miles to the entrance of Lake Tyers.

**Lake Tyers.**—The entrance to Lake Tyers is generally barred across during the dry seasons by a sandbank, but after heavy rains the lake breaks through the bank, forming one or two channels to the sea. This entrance is unfit for navigation. A settlement for the education and religious instruction of the aborigines is formed on the northern shore of the lake.

**Aspect.**—When off the Ninety-mile Beach, unless near its eastern part, nothing will be visible except the high mountainous ranges to the west, north-west, and north. The coast being generally about 60 feet high is not visible from a ship's deck unless she is within 10 or 12 miles. As the eastern part of the Ninety-mile Beach is approached the ranges at the back gradually near the shore, and take the character of high and distinct hills or separate hilly ranges.

**Mount Taylor**, the first hill of importance, is 1,630 feet high, and lies W.N.W.  $\frac{1}{4}$  W.,  $22\frac{1}{2}$  miles from the Lakes' Entrance; as the trees on the summit have been cut down, it presents a table-like appearance. A hill of greater extent, but not so high, lies 2 miles west and N.W. of Mount Taylor.

**Little Dick**, a conspicuous mountain lying N.E. 22 miles from Mount Taylor, and N. by W.  $\frac{1}{4}$  W., 24 miles from the Lakes' Entrance, is 3,154 feet high, and shows generally with three rounded summits.

**Mount Willie**, S.E. of Little Dick, and 10 miles back from the coast at Lake Tyers, is 1,182 feet high with a flattish top, and is conspicuous owing to its proximity to the coast.

**The Coast.**—From the entrance of Lake Tyers, the coast trends with a curve E. by N.  $\frac{3}{4}$  N., 21 miles to the Snowy River entrance. This piece of coast is similar to that west of the Lakes' Entrance, though the sand hummocks are higher, especially towards the Snowy River, near which they attain a height of 176 feet. Immediately at the back of the hummocks, and extending the whole distance, is a fresh-water morass, from the northern margin of which densely timbered back country rises to a height of about 200 feet at a distance generally not more than half-a-mile from the coast. A geodetic station, built of logs on the highest part of the sand hummocks, and W.  $\frac{3}{4}$  S.,  $2\frac{1}{2}$  miles of the Snowy River entrance, is a conspicuous mark.

**Shoal Patch.**—Westward of the Snowy River entrance, and 3.6 miles due south of the geodetic station just mentioned, is a patch of uneven rocky bottom upon which the least depth is 8 fathoms, deepening to 13 fathoms all round at 5 cables off.

**Snowy River.**—The port of Snowy River includes all inlets, rivers, bays, harbors, and navigable waters north of and within a line bearing N. 78 deg. E. and S. 78 deg. W., south of the entrance to the Snowy River in 12 feet of water.

**Entrance.**—The entrance to the Snowy River lies about 4 miles west of Point Ricardo, and is the outlet of the Snowy and Brodribb Rivers. There is a sand-bar at the entrance, the depth of water on which varies from 5 feet at high water in dry to 6 to 8 feet in wet seasons. After passing in through the entrance there is usually a good channel for  $1\frac{1}{2}$  miles to Marlo, with depths of 6 to 9 feet at low water.

**Caution.**—Owing to the shifting nature of the bar at the entrance, the above information can only be given as reliable generally, and masters without some local knowledge of the bar and inside waters are cautioned against navigating the place.

**Jetty.**—There is a jetty at the foot of the hill at Marlo. No definite information can be given regarding the depth of water at the jetty, as it varies with the volume of water coming down the river.

**Light.**—About 1 mile westward of the entrance and 3 cables from the line of coast a red light, elevated 100 feet above high water and visible in clear weather 4 miles distant, is shown from a post erected on the hill at Marlo. This light does not in any way mark the fairway entrance over the sand-bar, but simply indicates the mariner's proximity to the entrance.

**Explosives Anchorage.**—At a distance exceeding a quarter of a mile off any wharf or jetty.

**Signals.**—The following signals, when required for the direction of vessels off the entrance to the Snowy River, are made from a flagstaff erected on the hill at Marlo:—

Tide running in	...	...	Ball at western yard-arm.
Tide running out	...	...	Ball at eastern yard-arm.
Wait tide	...	...	Ball half-mast.
Bar dangerous	...	...	Two balls half-mast.
Wait till to-morrow	...	...	Ball at each yard-arm.
Come in	...	...	Flag at mast-head.
Wait night tide	...	...	Ball under flag at mast-head.
No chance this tide	...	...	Flag under ball at mast-head.
Steamer will come out	...	...	Two balls at eastern yard-arm.
Steamer cannot come out	...	...	Two balls at western yard-arm.
Flood rising	...	...	Two balls with flag between at eastern yard-arm.



Flood falling	...	...	Two balls with flag between at western yard-arm.
Bar closed, go to Cunninghame			Two flags with ball between at eastern yard-arm.
Bar closed, go to Melbourne	...	...	Two flags with ball between at western yard-arm.
Bar not altered	...	...	Flag under ball at western yard-arm.
Yes	...	...	Flag at western yard-arm.
No	...	...	Flag at eastern yard-arm.
4 feet on bar	...	...	Ball under flag at eastern yard-arm.
4½ feet on bar	...	...	Two balls under flag at eastern yard-arm.
5 feet on bar	...	...	Flag under ball at eastern yard-arm.
5½ feet on bar	...	...	Two flags under ball at eastern yard-arm.
6 feet on bar	...	...	Two balls above flag at eastern yard-arm.
What water do you draw	...	...	Two flags above ball at eastern yard-arm.
Strong set to the eastward	...	...	Two flags at eastern yard-arm.
Strong set to the westward	...	...	Two flags at western yard-arm.

*Snowy and Brodribb Rivers.*—After passing Marlo the Snowy River is usually navigable at high water for about 4 miles for vessels drawing not more than 5 feet. At 1¼ miles past Marlo is the junction of the Snowy and Brodribb Rivers, whence the latter winds inland in a direction generally north-easterly for 4¼ miles to the wharf at Richardson's saw-mill. The Brodribb River is 120 to 250 feet wide and 4½ to 10 feet deep in the middle at low water, with a muddy bottom.

There is considerable settlement on the banks of the Snowy River, the cultivation of maize and the rearing of stock being carried on to an important extent.

**Ricardo Point**, lying E. ½ N. nearly 4 miles from the Snowy River entrance, is a rocky point with sunken rocks extending 3 cables from the shore in all directions. At the back of the low sandy shore which extends from Snowy River entrance to Ricardo Point there is a backwater marking the old course of the Snowy River, the entrance to which was, many years since, close to and westward of Ricardo Point.

**Mount Raymond**, N.N.W. 6 miles inland from Ricardo Point, is 992 feet high at its northern elevation, and is conspicuous from its proximity to the shore.

**Conran Point** lies E. ½ N. 5 miles from Ricardo Point, the coast between forming a sandy bight, in the centre of which is a very conspicuous sand hummock 163 feet high. Conran Point, at its highest part, is 192 feet above sea-level, but is not easily distinguished. From the eastern part of the point to one-third of a mile from the shore are numerous sunken rocks, upon which the sea breaks heavily.

*Landing.*—In fine weather there is landing to the westward of Conran Point.

**Beware Reef**, due east  $2\frac{1}{2}$  miles from Conran Point, is 8 feet above high water, with sunken rocks lying one-third of a mile off to the east and south-east.

**Pearl Point** lies E. by N.  $\frac{3}{4}$  N.  $7\frac{1}{2}$  miles from Conran Point, the coast between forming a sandy bight, with the ranges at the back rising to a height of about 300 feet. Pearl Point has to the westward two conspicuous conical sand cliffs, which make the point easy to identify. Scattered rocks lie off Pearl Point to the southward for 2 cables, and 1 mile to the eastward of it sunken rocks extend from the shore for 4 cables.

**The Coast** from Pearl Point trends about E. by N. in a nearly straight line for 19 miles to Cape Everard. Along this stretch of coast, at about 7 miles from Pearl Point is Sydenham Inlet, the outlet of the Bemm River and Lake, and at a further distance of  $5\frac{1}{2}$  miles is the mouth of the Tamboon River. The whole coast from Pearl Point to the Tamboon River consists of a sandy beach, over which the hummocks rise about 100 feet.

Between the Tamboon River and Cape Everard, and 2 miles from the former, is a rocky piece of coast with sunken and other rocks, the highest of which, Cloke Rock, is 25 feet high, and about a cable off the shore. At the back of this rocky coast, and only  $1\frac{1}{2}$  miles inland, is Double Hill, which is 924 feet above the sea.

**CAPE EVERARD** lies E.  $\frac{1}{4}$  S.  $6\frac{1}{2}$  miles from the Tamboon River, and is easily recognised by a sandy peak, at 1 mile inland to the northward of the cape. This peak is 538 feet high, and is most remarkable when viewed from the westward, presenting on that side a gradually falling face of bare sand.

Cape Everard has four points, the southernmost of which projects nearly  $1\frac{1}{2}$  miles from the line of coast, with a deep but exposed bight on its east side.

A rock above high water and several others awash or sunken lie 2 cables off the southern points of Cape Everard.

**Dangers of Cape Everard.**—A dangerous rock, 3 feet above low water or just about covered at high water, lies E. by S.  $\frac{3}{4}$  S. three-quarters of a mile from the southern extremity of the cape, and another the same distance E.  $\frac{1}{2}$  N. from the same point of the cape, with only 7 feet on it at low water.

**Cape Everard Light-house**, on the southernmost point of the cape, in (approximate) latitude 37 deg. 48 min. 07 sec. S., longitude 149 deg. 16 min. 30 sec E., was built in 1890. The tower is circular, built of concrete, and is 120 feet high from ground to top of lantern.

The light is a first order holophotal double-flashing white light, showing a double flash every 30 seconds; it is elevated 185 feet above sea-level, and visible in clear weather at a distance of 21 miles.

The white light is visible from seawards between the bearings of E.N.E.  $\frac{1}{2}$  E. (N. 74 deg. E.) and W. by S.  $\frac{1}{4}$  S. (S. 76 deg. W.), illuminating an arc of 178 deg. seaward, while between these limits and the coast on either side of the light-house the light shows red.

**Danger Light.**—An auxiliary red light is exhibited from the lower portion of the light-house tower, and illuminates an arc of 188 deg. seaward,

visible between the bearings of E.  $\frac{1}{2}$  N. and W. by S.  $\frac{1}{2}$  S. This light is cut downward so as to be invisible to an observer, 14 feet above sea-level, until within 2 miles distant of the light-house.

*Caution.*—These red lights are danger lights to warn mariners of their too close proximity to the cape and its outlying dangers, and when seen the course should be altered to seaward to run them out. In thick weather mariners should not rely upon sighting these red lights, but should keep a good offing.

*Landing.*—There is landing to be made, in fine weather, in the bight to the westward of the cape, where the sandy beach commences.

*Life-saving Apparatus.*—A life-saving rocket apparatus is kept at the light-house.

*Signals.*—There being no electric communications with, and only weekly mails to Cape Everard, the station is not a signal one.

**Everard Hill**, 5 miles north of Cape Everard, is 1,200 feet high, densely timbered, and makes a conspicuous landmark.

**THE COAST** from Cape Everard runs in a north-easterly direction for 2 miles to the mouth of the Toolaway River, and thence E. by N. for  $5\frac{1}{2}$  miles to Island Point. From Cape Everard to Island Point the coast consists of sandy beaches with rocky points, having reefs lying outside for 2 cables off; about midway, and close to the coast, is a group of conspicuous bare sand hummocks.

**Island Point**, so named from a rock, 30 feet high, lying close off it to the southward, is 233 feet high, and bordered by half-tide and sunken rocks for more than a cable off. At 2 cables S.S.E. of the point is a small rock 1 foot above high water.

From Island Point the land trends with a curve E. by N.  $2\frac{1}{2}$  miles to Rame Head. Between Cape Everard and Rame Head the coast rises gradually inland, until at 2 or 3 miles from the shore it attains an elevation of about 600 feet. It is all densely-timbered undulating country, the summits of the various hills being generally undefined.

**Rame Head**, E.N.E., 10 miles from Cape Everard, is of granite formation, and rises to an elevation of 378 feet on its eastern side, with another summit of the same height close to the south-westward. To the northward the land falls, but again rises gradually, until at 4 miles distance it attains an elevation of 896 feet. The western part of the head is fringed with rocks, and a rock awash lies close S.E. of the extreme point of the head.

**Wingan Point**, forming the eastern side of the entrance to Wingan Inlet, lies from Rame Head N.E. by N. 2 miles. Wingan Inlet is difficult of access, but a landing may sometimes be effected outside the inlet to the westward of Wingan Point. West of Wingan Inlet there is a sandy beach nearly a mile long.

**The Skerries.**—Off Wingan Point to the southward are the Skerries Rocks, three in number, the highest and central of which is 42 feet above high water. Close to the Skerries are several detached rocks, the outer one of which is just covered at high water, and lies 1 cable's length from the south Skerries, and half-a-mile off Wingan Point.

**Sand-patch Point**, N.E. by E.  $\frac{1}{2}$  E. 4 miles from Wigan's Point has a large body of drift sand extending from its west to east side and which, being always visible, makes the point very conspicuous. The only part of the coast at all resembling Sand-patch Point is Cape Everard, where the sand drift is higher, but not so conspicuous when seen from the eastward.

**Danger off Sand-patch Point.**—At S.  $\frac{1}{2}$  E., nearly half-a-mile from Sand-patch Point, is a pinnacle rock, with  $1\frac{1}{2}$  fathoms on it at low water, and known on the old charts as Long Reef. It is a dangerous rock, on which the sea only occasionally breaks. A rock awash lies close to Sand-patch Point, to the south-eastward.

**Little Rame Head** lies N.E.  $\frac{1}{2}$  E.  $4\frac{1}{4}$  miles from Sand-patch Point, the coast between being about 300 feet high, and forming a rocky bight, with a few sandy beaches. Upon a hill 240 feet high, immediately over the head, a geodetic station is erected. East of the head, at a distance of 2 cables, is a rock 10 feet above sea-level.

**Off Little Rame Head**, in a south-east direction, at a distance of 4 miles, 19 fathoms with rock bottom, will be found near 35 fathoms sand; and at a distance of 7 miles in the same direction 25 fathoms will be found near 50 fathoms. This uneven bottom extends over a distance of 3 miles, and causes such a confused sea in heavy weather that small craft should avoid the place.

**Bastion Point** lies N.N.E. 8 miles from Little Rame Head, the coast between being about 300 feet high, with outlying sunken rocks extending nearly 2 cables off. Owing to the continuous swell on the coast between Little Rame Head and Bastion Point it should not be approached nearer than 1 mile.

Bastion Point, forming the outer point of the west side of Mallagoota Inlet, is low, being only 75 feet high, but the land at the back rises to a height of about 300 feet, and is densely timbered.

One mile to the south-westward of Bastion Point is a conspicuous sand patch.

Off Bastion Point are numerous rocks, one, with  $1\frac{1}{2}$  fathoms over it, lies 3 cables S.E., and another, 3 feet above high water, lies 3 cables to the south-westward.

**MALLAGOOTA INLET.**—From Bastion Point the rocky coast trends north-westerly 6 cables, thence in a northerly direction about 5 cables to Captain's Point, in Mallagoota Inlet.

Mallagoota Inlet, or Lake, is divided into two portions, called the upper and lower lakes, connected by a narrow passage about 1 mile long.

**Entrance.**—At 4 cables north-west of Bastion Point the sandy beach forming the shore to the eastward commences, through which the tidal waters and the waters of the lake force their way and form a bar entrance, with 3 to 4 feet over it at low water.

The channel is a shifting one, and may be found close in to the rocky south side of the inlet, or 2 to 3 cables therefrom.

This uncertainty of position, combined with shallow bar depths, and exposure to the heavy swell that obtains along this portion of the coast, save in the finest weather, renders the navigation of entrance hazardous, and compels the necessity of a good personal knowledge of the locality combined with great caution in navigators approaching thereto.

From Captain's Point, an inner sand barrier stretches south-easterly, with not more than 2 feet over it at low water.

Close to the point a gutter about 50 feet wide and 5 feet deep is sometimes found, and constitutes the only avenue for small craft to reach the lake proper.

Across the lake, north of Captain's Point, a chain of islets extends eastwards, with small channels between. The deepest water, of 6 to 10 feet, is found along the southern shore.

**The Shore.**—From Captain's Point the shore of the inlet runs in a westerly direction, and consists of a shelving pebbly beach for a quarter of a mile, then merging into banks of clay and river drift. This continues until opposite the northernmost islet, when a sandy beach commences and continues for upwards of a mile, when it gives way to rocky timber-covered slopes, from 50 to 300 feet high, which characterize the shores of the lake and river banks.

The east side of the inlet is bounded by low ridges, of sandy formation. On the north the shores rise in rocky spurs forming indentations with deep water close to.

**Channels.**—North of the entrance the larger and central area of the inlet is shallow ground with sandy bottom, through which there is a sinuous channel of about 13 feet deep communicating with the strait connecting the upper and lower lakes. The strait is 800 to 1,000 feet wide, with deep water and bold high land on either side.

The upper lake is a fine sheet of water, with bold foreshore and pebbly beaches.

**Genoa River,** which opens into the western end of the upper Mallagoota Lake, is wide and deep 4 miles to Gipsy Point, where it is joined by the Wallagaraugh River. From Gipsy Point,  $7\frac{1}{2}$  miles to Genoa Settlement, the course of the river is tortuous with shallow reaches of 3 to 4 feet of water. At Genoa the tidal influence ceases, and the river becomes a mountain stream.

**Wallagaraugh River,** from its junction with the Genoa at Gipsy Point, is navigable through 13 miles. At that distance, which is 2 miles into New South Wales territory, the tidal influence ceases, and the river bed rises forming a series of water-holes in dry seasons. The river varies in width from 100 to 500 feet, shoaling in places to 2 and 3 feet, with bottom of shifting gravels and drift. The general depth throughout the river is about 7 feet.

**Tides.**—Off the entrance, and on the bar, springs rise about 6 feet; neaps, 5 feet. Within the entrance, off Captain's Point, 1ft. 6in. is a good rise of tide, and 1 foot in the lake and rivers.

**Tullaburga Island,** 28 feet above high water, lies E.N.E. 4 miles from Bastion Point.

At  $1\frac{1}{2}$  miles to the south-westward of Tullaburga Island is a patch of rocky uneven bottom, over which nothing less than 7 fathoms water was found.

**GABO ISLAND**, lying E.  $\frac{1}{2}$  N. 3 miles from Tullaburga Island is nearly  $1\frac{1}{2}$  miles long, half-a-mile broad at the middle and southern extremity and tapers gradually to a point at its northernmost end. The north end of the island consists of low granite boulders separated from the mainland by a channel about 1 cable wide. Near the centre of the island are a few sandhills, whose bare sides face the south-east; the highest of these hills reaches an elevation of 171 feet. The island is steep to in all directions except to the northward.

**Gabo Island Light-house**, on the south-east extremity of the island, in latitude 37 deg. 34 min. 15 sec. S., longitude 149 deg. 55 min. 10 sec. E., was built in 1862, the tower being constructed of red granite, which retains its natural colour.

*The Light* is a first order catadioptric fixed white light, elevated 179 feet above sea-level, and visible in clear weather from a distance of 20 miles and between the bearings of N.E. (N. 45 deg. E.) and S.W. by S. (S. 34 deg. W.).

Between the limits of the white light and the coast at either side of the light-house red sectors of light are shown; one over Cape Howe, between the bearings of S. by W.  $\frac{1}{4}$  W. (S. 14 deg. W.), and S.W. by S. (S. 34 deg. W.); and the other from 1 mile south of Little Rame Head on a bearing N.E. (N. 45 deg. E.) to E. by N.  $\frac{1}{4}$  E. (N. 84 deg. E.).

The arc of red light over Cape Howe is to warn mariners coming from the eastward of their close proximity thereto, and a course should not be taken to the westward until the full power of the white light is visible.

The arc of red light off Little Rame Head is to warn mariners of their near approach to the shore.

*Danger Light*.—From the base of the light-house tower an auxiliary red light, illuminating an arc of 180 deg. seaward, is exhibited, and so depressed as to be invisible to an observer whose eye is 14 feet above sea level until at a distance of 3 miles or less from the light.

*Caution*.—The red danger light is intended to warn mariners of their too close approach to the shore, and when seen the course should be altered to seaward until the red light is run out. In thick weather mariners should not rely upon sighting the red light, but should keep a good offing.

*Fog Signals*.—In thick weather two explosive fog rockets are fired in quick succession every ten minutes.

*Warning*.—The rockets explode at a height of about 600 feet with a sharp report, which, under favorable atmospheric conditions, should be heard at a distance from 5 to 6 miles, but mariners are warned to take due precautions on hearing the report, as sometimes the sound signal may not be heard at 2 miles distant.

*Life-saving Apparatus*.—A life-saving rocket apparatus is kept at the Gabo Island light-house.

*Signal Station*.—There is a signal station at the light-house, and communication may be made by the International code. Gabo Island light-house is connected by telephone with Green Cape; thence *via* Twofold Bay to Sydney.

*Tides*.—It is high water, full and change, at Gabo Island, at 8h. 50m.; springs rise 6 feet.

*Anchorage.*—On the north-west side of Gabo Island is a small sandy bay with 5 fathoms in the central part, where there is anchorage for one vessel in all but south-westerly gales. In this bay there is a small jetty used for landing stores for the light-house.

Sailing vessels using the anchorage should at once get under weigh when the swell reaches into the bay.

**Cape Howe**, lying N.N.E.  $\frac{1}{4}$  E. nearly 5 miles from Gabo Island light-house, is a low point over which are hummocks covered with ti-tree. A geodetic station, 148 feet above sea-level and 1 cable inland, is erected on nearly the highest part of the point, and marks the boundary between Victoria and New South Wales.

South-west by south 1 mile from Cape Howe is a point of similar appearance as the cape. From this point a rocky ledge, the highest part of which is 8 feet above high water, extends about 2 cables off with sunken rocks for half-a-mile to the south south-eastward on which the sea nearly always breaks.

At nearly 1 mile S. by W. of the same point is a reef with 19 feet of water on its shoalest part, and on which the sea breaks heavily during a swell. This reef is a quarter of a mile outside a line drawn from Cape Howe to Gabo Island light-house, and about 2 miles from the cape.

THE UNIVERSITY OF CHICAGO

612