

TIDES AND TIDAL STREAMS

By DIVISION OF PORTS AND HARBORS, VICTORIA

As the entrance to Port Phillip Bay is less than two nautical miles in width, and as the tidal area within the Heads is approximately 725 square miles, the tidal range in the bay is less than that at the entrance, and the times of high water at places within the bay lag behind that at the entrance.

Table 1 shows the average differences of the times of occurrence of high water at various places within Port Phillip from the time of occurrence of high water at Port Phillip Heads, and the average rises of the tide at springs and neaps.

The water level within the bay is much affected by meteorological conditions. Prolonged southerly and southwesterly winds cause a rise in the level of the bay, whilst easterly and north-easterly winds cause the water level to fall substantially.

The velocities of the stream are dependent upon the difference in water levels inside and

outside the bay. Consequently, it will be seen that at high and low waters when the differences in levels are greatest, the velocities of the streams will be at their peaks. Again meteorological conditions will cause substantial changes in stream velocities.

Table 2 shows the average stream velocities and directions for various places in the bay.

Slack water occurs at the Heads when the water level inside the bay equals that outside in Kings Bight. This occurs at approximately half tide and the phenomena of a falling tide and an ingoing or flood stream and a rising tide and an outgoing or ebb stream occur. This is caused by the impeding effect of the constricted entrance and the delta formation of the sandbanks in the bay opposite the entrance.

The foregoing comments refer only to surface tidal streams, but direction and velocity measurements at varying depths are soon to be undertaken.

TABLE 1

Average differences of the times of occurrence of high water at various places within Port Phillip from the time of occurrence of high water at the Standard Port of Port Phillip Heads, and the average rises of the tide at springs and neaps.

	TIME DIFFERENCE		AVERAGE RISE OF TIDE (FT.)	
	H.	M. later	Springs	Neaps
Port Phillip Heads	0	0	5.8	4.0
Point Nepean Jetty	0	09	3.5	2.5
Portsea Jetty	0	29	3.0	2.0
Sorrento Jetty	2	11	2.0	1.5
Dromana Jetty	2	33	3.0	2.0
Mornington Jetty	2	42	3.0	2.0
Frankston Jetty	3	07	3.0	2.0
Black Rock Breakwater	3	02	3.3	2.0
Williamstown (Breakwater Pier)	3	15	2.3	2.0
Portarlington Jetty	2	50	3.0	2.0

TABLE 1 (Continued)

	TIME DIFFERENCE		AVERAGE RISE OF TIDE (FT.)	
	H.	M. later	Springs	Neaps
Indented Head	2	47	3·0	2·0
St. Leonards Jetty	2	44	3·0	2·0
Swan Island Dock	1	59	3·0	2·0
Queenscliff Jetty	0	03	4·0	3·0
West Channel (Northern End)	2	37	3·5	2·5
West Channel (Southern End)	0	15	4·0	3·0
South Channel (Eastern End)	3	18	3·0	2·0
South Channel (Western End)	0	15	4·0	3·0

TABLE 2

Average stream velocities and directions of the tide at various places within Port Phillip Bay.

	FLOOD		EBB	
	Direction	Velocity	Direction	Velocity
Port Phillip Heads	038°	2-3 knots	200°	2-3 knots
South Channel (Main stream)	108°	1·5 knots	260°	2 knots
South Channel (Eastern End)	045°	1·5 knots	180°	1·5 knots
Great Sand Channels	045°		225°	
Quarantine Jetty	108°	0·8 knots	280°	0·8 knots
Portsea Jetty	Feeble		Feeble	
West Channel (Main stream)	024°	1·5 knots	204°	1·5 knots
West Channel (Southern End)	055°	1·5 knots	250°	1·5 knots
West Channel (Northern End)	010°	1 knot	205°	1 knot
Coles Channel	015°	0·8 knots	195°	1 knot
Portarlinton Jetty	Feeble		Feeble	
Mornington Jetty	Feeble		Feeble	
Williamstown	Feeble		Feeble	

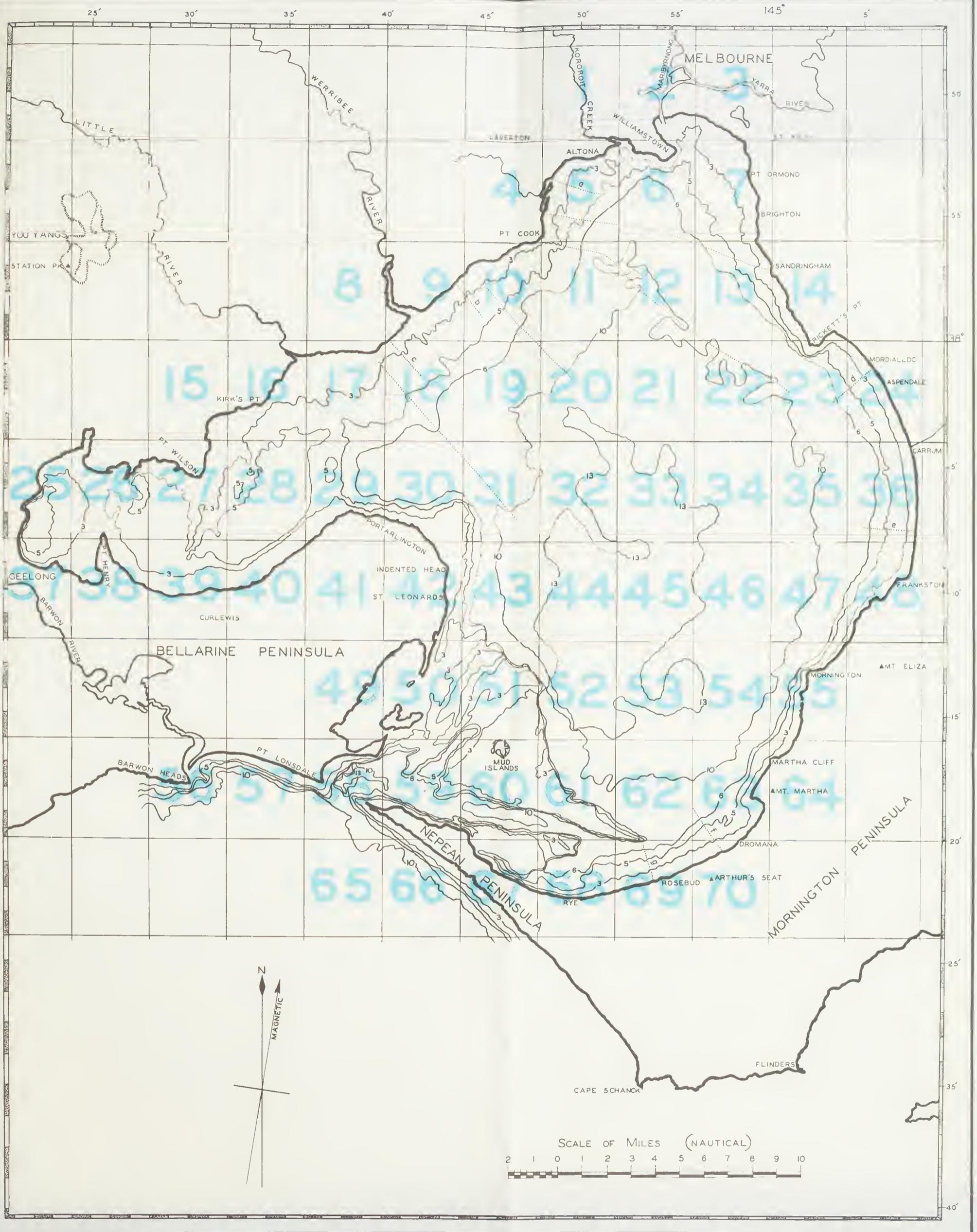
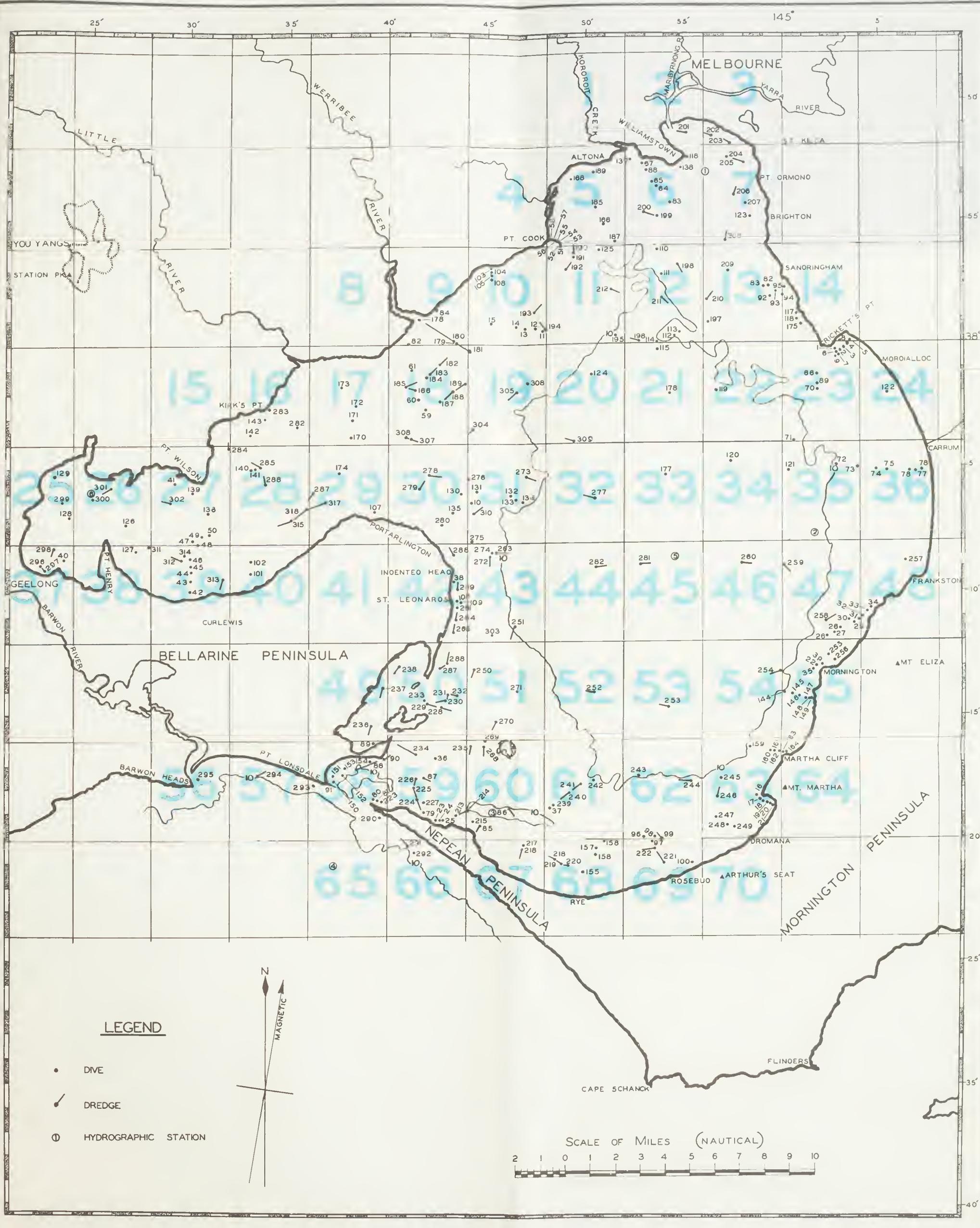


Chart I.—Bathymetric Chart of Port Phillip Bay showing the 3, 5, 6, 10 and 13 fathom contour-lines.



LEGEND

- DIVE
- ⚓ DREDGE
- ⓪ HYDROGRAPHIC STATION

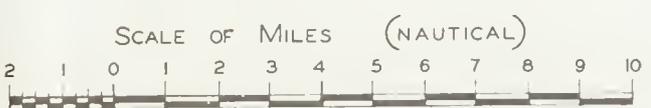


Chart 2.—Port Phillip showing sampling stations and positions of hydrographic stations.