

6. The Port of Melbourne.

BY C. W. K. ALLISON, M.I.E.AUST.

Engineer, Melbourne Harbour Trust.

The control and management of the Port of Melbourne is vested in the Melbourne Harbour Trust Commissioners. This body was constituted under an Act passed in 1876, as a result of public agitation and demands extending over a period of 34 years, to the effect that the cost of landing goods should be reduced, and the delays in receiving goods should be abolished. Both demands arose from the fact that vessels having a draft of more than 12 feet had to discharge into lighters in Port Phillip Bay. The river at that time had a depth of 12 feet 6 inches at low water with a width of 140 feet. To-day the depth of water is 37 feet at Port Melbourne, 34 feet at Williamstown, 30 feet in Victoria Dock and 28 feet in the Lower Yarra. Piers and wharves of a total length (including both sides of piers) of 12 miles have been built, and cargo sheds of a total area of nearly 29 acres have been erected. The effective berthage length in the port is 53,806 feet, or 10.2 miles, with an area of 62 acres of wharf space. Of this berthage a length of 18,541 feet has been provided with rails which connect to the general railway system. Vessels visiting the Port last year numbered 3,188 of a gross tonnage of 11,861,317, the largest vessel being the s.s. *Strathnaver* of 22,547 tons and that with the deepest draft the s.s. *Clan Urquhart* with a draft of 31 feet 10 inches.

The Port of Melbourne, as vested in the Melbourne Harbour Trust Commissioners, embraces an area of 20 square miles at the northern end of Port Phillip. Shipping under orders to call at the Port of Melbourne must of necessity navigate Port Phillip. This is an extensive bay having a tidal area of approximately 725 square miles. It is about 31 miles long north and south, by 20 miles wide at the middle where, on the west side, it forms an arm which extends W.S.W. for 15 miles to Geelong. At the northern end of the bay the waters contract, forming the portion known as Hobson's Bay.

The entrance to Port Phillip Heads, between Points Lonsdale and Nepean, is $1\frac{3}{4}$ miles wide, but the reefs projecting from these points reduce the navigation channel to a clear width of 6 cables. The channel in the centre is 1,000 feet wide, and has a depth of 43 feet. 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, West, Symond's and Cole's. The South and West channels are those used by vessels other than light draft craft, and the distance in nautical miles from the Heads to Melbourne Wharves is 35.9 via the west channel, and 47.1 via the south channel.

The first Commissioners, preparatory to putting developmental works in hand, engaged Sir John Coode, the well-known English harbour engineer, to inspect and report on the best means of improving the accommodation of the Port. Sir John Coode's report, which was issued

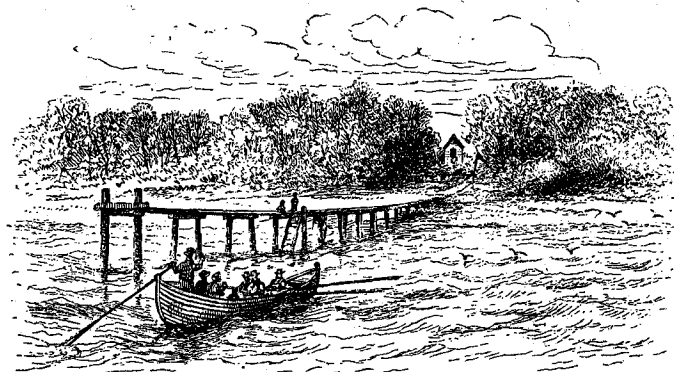
in 1879, was adopted by the Commissioners who immediately commenced the carrying out of the following works:—

1. The cutting of a new river channel, the Coode canal, through the flats to the south of Fisherman's Bend;
2. The construction of a wet dock at West Melbourne;
3. The widening and deepening of the River Yarra.

The Coode canal, 2,002 yards in length, having a depth of 20 feet at low water, was opened in 1886. It has since been dredged to a depth of 32 feet with a width of 430 feet at low water level, and, besides improving the navigation of the river has reduced the distance from the river entrance to the Melbourne wharves by one-and-a-quarter miles.

The Victoria Dock, four miles up the river with an area of 96 acres, was opened in 1892. The river which had a depth of 12 feet 6 inches at low water with a width of 140 feet, was deepened and widened.

Prior to 1889 all mail steamers and vessels of heavy draft had to lie at anchor in the Bay, and there discharge into lighters. One of the first works undertaken by the Commissioners was to make the Railway Piers at Williamstown available to these vessels. In 1893 a channel, over 8,000 feet in length and 600 feet in width, was dredged, running in a southerly direction from the Port Melbourne Railway Pier and having a navigable depth of 28 feet.



The First Pier at Sandridge (now Port Melbourne).

The Trust was reconstituted in 1913 and the new Commissioners set out a definite policy regarding general improvements to the Port. Prior to their appointment £3,415,102 had been spent on improvements, and from the beginning of 1913 to the end of last year this amount had been increased by £6,429,283, thus bringing the total expenditure on improvements to the Port to £9,844,385. Of this total £4,494,812 has been paid out of loan money and £5,349,573 from revenue. Of the total capital expenditure of £9,844,385, an amount of £962,495 representing capital expenditure on the area upstream from Spencer St. Bridge excised from the Trust's territory by

Act No. 3515, and on assets which have been sold or demolished, has been written off, leaving the value of existing assets at 31/12/33 at £8,881,890. *Note*—Capital expenditure figures above include plant.

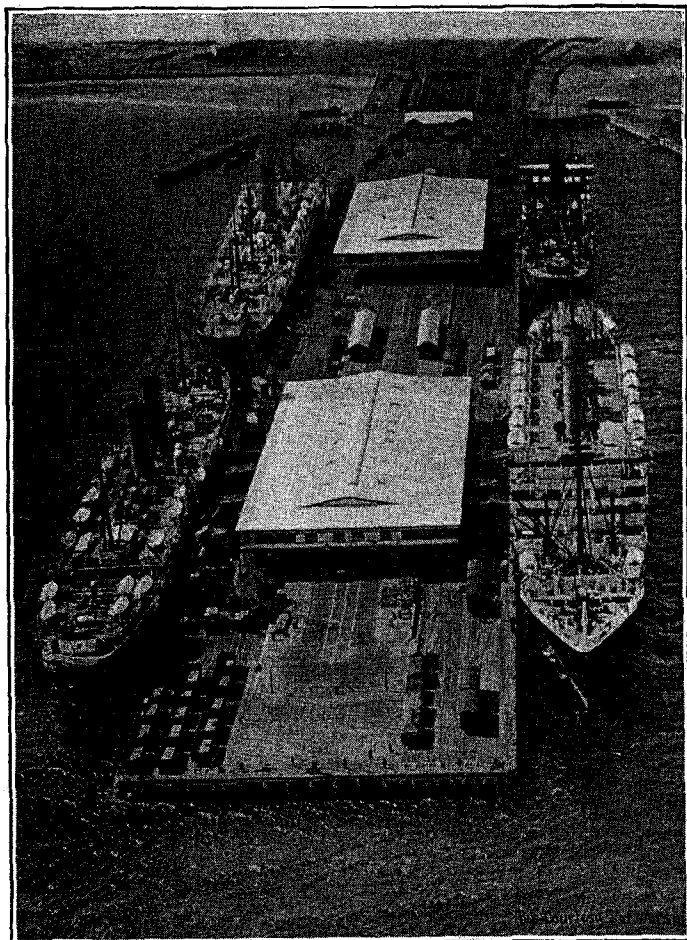
The Port at the present time provides accommodation for shipping at Port Melbourne, Williamstown, in the River Yarra up to Spencer Street, and in the Maribyrnong River as far as Napier St. Swing Bridge, and also in Victoria Dock.

A brief description of the works at these points follows.

PORT MELBOURNE.

There are three piers at Port Melbourne—Town pier, Prince's pier and Station pier—all connecting to a dredged area leading to the Port Melbourne channel.

Town pier is a very old structure and has been partially demolished. It affords only 850 feet of berthage with a depth of 28 feet at low water.



Station Pier, Port Melbourne.
(*S.S. Ceramic, S.S. Orsova, S.S. Barrabool and S.S. Orontes.*)

Prince's pier was completed in 1915 and is a timber structure 1,902 feet in length and 186 feet in width with a depth of 37 feet at low water. It is capable of accommodating four of the largest and deepest draft vessels now entering the port.

Station pier, which was placed in commission in 1930 is also a four berth pier, but has in addition two shore wings which provide four berths for Bay ferry steamers. This pier is 282 feet longer than Prince's pier and 9 feet wider, the extra width being provided to leave room for the 3-ton gantry cranes with which the pier is equipped. Both Prince's and Station pier have been equipped with two double-decked shelter sheds providing space for waiting rooms, customs examination rooms, shipping and other offices; moveable gangways from the upper decks of the sheds to the ship's side and elevators and stairs to the pier deck enable passengers to move freely between ship and shore without hindrance from train or motor traffic. Both piers are connected to the railway system of Victoria, and all imports are discharged into railway trucks and conveyed to Melbourne. The piers are provided with railway passenger platforms, and electric train services connect to the City. The Station pier, which was the last built, cost £627,723, including the cost of dredging. To provide for an uninterrupted flow of road traffic, a reinforced concrete bridge is now under construction at the shore line across the railway tracks leading to Station pier. This bridge will have approach ramps on the eastern and western sides and a ramp leading down to the motor road on Station pier. The length of the bridge and ramps parallel to the shore will be about 1,000 feet, and the work is being carried out under a contract amounting to £58,069.

From the dredged area round the three piers at Port Melbourne a channel, 600 feet wide and nearly four miles in length, has been dredged in a southerly direction. It was first dredged to 34 feet below low water and then deepened to 37 feet over half its width. Dredging is now in progress to obtain a depth of 37 feet at low water over the whole channel.

WILLIAMSTOWN PIERS.

At Williamstown three piers with railway tracks and a total berthage space of 4,798 feet have been constructed. These are used principally for the export wheat trade. The depths at the berths range from 28 to 33 feet. The channel leading to these piers is 600 feet in width and is being deepened from 34 feet at low water to 37 feet.

ACCOMMODATION IN THE RIVER YARRA.

The distance from the mouth of the River to Spencer Street bridge, the termination of berthage accommodation, is $5\frac{1}{2}$ miles. The width downstream from Spencer Street bridge is 300 feet, with 400 feet from the interstate swinging basin to Victoria Dockhead.

There are $3\frac{1}{2}$ miles of sheds on the river and the Victoria Dock wharves. The North Wharf has a berthage space of 7,089 feet and is provided with 28 sheds. This wharf is mainly used by vessels engaged in the interstate trade, and the depth of water at low water is generally 27 feet.

The South Wharf has 10,836 feet of berthage upon which 11 sheds have been erected, and, from the upper end of the interstate swinging basin to the lower limit of the wharves, has been reconstructed and extended during recent years, and the opportunity has been taken of widening the river by over 100 feet and enlarging the interstate swinging basin after the old structures had been demolished.

The Victoria dock, which is located four miles from the entrance to the river, was opened in 1892. It had a water area of 96 acres, but this has been reduced to 90 acres by the construction of the Central pier and by the widening of the wharves on both sides. It has a depth of 30 feet at low water and provides a berthage space of 10,313 feet with 18 open and 20 closed sheds of widths varying from 60 to 80 feet thereon. In 1915 the Central pier was constructed in the dock, having a length of 1,630 feet, a width of 250 feet, and a roadway 57 feet wide up the centre. The Victoria dock entrance has recently been greatly improved, both in alignment and width. All berths on the north-west side of the dock are provided with railway tracks and electric travelling cranes.

Practically all the overseas shipping, with the exception of the mail steamers and the White Star Line, is accommodated in either the River or Victoria dock.

OTHER WHARVES ON THE YARRA AND MARIBYRNONG RIVERS.

Wharves and dredged approaches thereto have also been provided at Footscray for a length of 860 feet, at Yarraville for a length of 2,177 feet and at Newport for a length of 800 feet.

An indication of the nature of the accommodation provided in the river and Victoria dock is to be found in the fact that vessels up to 15,000 tons gross register and 570 feet in length have berthed therein.

SWINGING BASINS.

The following swinging basins have been dredged to provide for navigation requirements:—

- (a) The Interstate swinging basin, 700 feet wide, one quarter of a mile below the Spencer Street Bridge in the River Yarra;

- (b) The Victoria swinging basin, 900 feet wide, in the River Yarra at the entrance to Victoria dock;
- (c) An area 1,020 feet wide inside the Victoria dock is used by vessels swinging;
- (d) The Appleton swinging basin, 1,090 feet wide, at the entrance to the Appleton dock (not completed);
- (e) The Holden swinging basin, 1,090 feet in diameter, at the junction of the Maribyrnong River and the Coode canal (nearing completion).

The greatest number of vessels (including only vessels working and not those laid up) in port at the one time has been:—

	No.	Gross Tonnage.
Ocean-going	30	177,923
Interstate	28	66,477
Intrastate	7	3,926
	<u>65</u>	<u>248,326</u>

DRY DOCKS, CRANES AND DREDGING PLANT.

There are in the port three dry docks of moderate size, and one small floating dock. The dockyard at Williamstown comprises an area of 21 acres, the Alfred graving dock, 459 feet by 97 feet, and a complete and efficient shipbuilding and repairing plant.

Cranes comprise one 60-ton steam crane; one 35-ton hydraulic crane; four 3-ton electric travelling jib cranes and three more are under construction.

The dredging plant includes six bucket ladder dredges, three clay cutting suction dredges and steam hopper barges, tugs, launches, a rock breaker and other smaller plant.

[Note: The foregoing article is a summary of information published by the Commissioners at various times in their handbook and in reports dealing with the Port of Melbourne.]

7. The Outer Ports of Victoria.

BY GEORGE KERMODE, M.C.E., A.M.I.E.AUST.

Engineer for Ports and Harbours, Public Works Department.

EXPLORATION.

In January, 1798, Surgeon George Bass, on a voyage of exploration in a whaleboat, discovered and entered Western Port, and on his way back to Sydney spent some time examining Wilson's Promontory. His was the first information about the Victorian coast-line.

Later, in 1800 and 1801, Lieut. James Grant of the *Lady Nelson* made some observations along the coast on his voyage from London to Sydney—the first west to east passage of Bass Strait—and in 1802 Lieutenant John Murray in the same vessel, and Captain Matthew Flinders in the *Investigator* practically completed the exploration of the Victorian coast.

Prior to the first permanent settlement of the colony—by the Henty's at Portland in 1834—a lucrative sealing and whaling industry had sprung up, flourished and fallen away with the disappearance of seals and whales along this coast. In this period, 1798 to 1833, practically all the bays and inlets along the coast were used by the sealers and whalers, most of whom have left no record behind

them. Rough shelters were established on shore at various places, and, at Portland, one of the sealers, Captain William Dutton, went so far as to erect a fairly substantial hut as early as 1829.

Apart from sealers and whalers, the first utilization of Victorian harbours was of Port Phillip by Colonel Collins during his temporary settlement at Sorrento in 1803-4, and of Western Port during the equally abortive occupation of 1826-28 under Captain Wright.

The real development began when Edward Henty in the *Thistle* reached Portland in 1834, and John Batman in the *Rebecca* crossed over to Port Phillip from Launceston in 1835, to be closely followed by John Pascoe Fawkner's schooner the *Enterprise* and the flood of shipping that brought the first rush of squatters and their flocks to the pastures of the newly-opened Port Phillip District.

Fawkner, within the first few months, established beacons to guide navigators from the Heads to Melbourne, and published sailing directions in a Tasmanian newspaper, the *True Colonist*.

The provision of facilities for shipping has been from the first a responsibility of the Government, and, in the following article, a brief description is given of the various works that have been carried out on the outer ports of the State.

PORTLAND.

Portland Bay is considered to be one of the finest open roadsteads in Australia, being deep, roomy, and sheltered from westerly winds and seas. The holding ground at the anchorage is good. The harbour is not sheltered from south-easterly gales which, however, are fortunately of rare occurrence.

The history of Portland shows that sailing ships landed immigrants and supplies there for the back country early in the existence of the State. It is recorded that £10,000 was paid in one day as duty on imports, and that 93 vessels with an aggregate tonnage of 17,880 tons visited the port in 1869.

In 1879, Sir John Coode submitted a scheme for Portland for both an inner and an outer harbour. Neither scheme was carried out, but as a result of his recommendations the breakwater, now known as "The Fishermen's Breakwater," was constructed in 1884 and has been effective in providing necessary shelter for the fishermen's craft.

The first section of the existing deep water pier known as the new railway pier was built in 1902. The pier, which was extended in 1912-1914, now consists of a timber structure 3,100 feet long and 120 feet wide projecting into 31 feet of water. This pier is connected with the Victorian railway system. Overseas vessels visit the port.

The railway jetty in the south-western corner of Portland Bay is 40 feet wide and projects 1,200 feet from the shore easterly into 16 feet of water.

PORT FAIRY.

On 25th April, 1810, a whaler named John Wishart anchored his cutter "*Fairy*" in the bay at the mouth of the river called by the aborigines Knarn Kolak and since known as the River Moyne. He named the harbour Port Fairy.

Port Fairy is situate on the Southern Ocean, 187 miles south-west from Melbourne. It is 43 miles from Portland in the west and 18 miles from Warrnambool on the east.

The general configuration of the bay and river at Port Fairy conduce to obtaining desirable natural conditions such as safe entry, freedom from wave disturbance, and permanency of depths. The sea approach is deep, roomy and free from dangerous reefs. The entrance to the river is protected from the south-west and south by a natural rock breakwater. The bay is exposed to south-east and east winds but these do not occur with sufficient strength to interfere with access to the port.

In its natural condition the entrance to the Moyne was obstructed by a sand spit, over which the depths varied from 1 to 3 feet, and vessels had to anchor in the open bay exposed to the full roll of the ocean during heavy weather. Cargoes were discharged and loaded by means of shallow draught lighters.

The bay was surveyed in 1854 and the construction of an ocean jetty was begun in 1856.

About 1865 a system of improvement works by training the river within rubble walls was begun, and by 1870 the basaltic reef in the river was removed to a depth of 10 feet and the bar had a depth of 8 feet.

The training walls of rubble are now 1,500 feet long, the width between varies from 350 to 200 feet, and the depth of water is from 10 to 12 feet.

At the wharves there is accommodation for two vessels of 10 feet draught.

WARRNAMBOOL.

Situate on the Southern Ocean, Warrnambool is 170 miles south-west from Melbourne.

Since 1850, when a jetty to project into 9 feet of water was commenced, works have proceeded in an endeavour to develop a harbour at Warrnambool.

The construction of the existing timber viaduct and of the first section of the existing combined concrete breakwater and wharf was undertaken after a scheme for their erection had been submitted by Sir John Coode. This section was intended to provide shelter for shipping of 12 to 13 feet draught. These works were started in 1884 and completed in 1890.

In 1914, the concrete breakwater was extended until it is now 1,250 feet long. The breakwater springs from Breakwater Rock which is connected by a timber viaduct with the shore at the east side of Merri Creek entrance.

Warrnambool may be considered the safest of the western ports of Victoria during south-easterly gales as the outer swell is broken on the bar fronting the harbour in that direction.

WESTERN PORT.

Western Port is an extensive bay protected from the sea by Phillip Island, between the western point of which and West Head is the west entrance to the port, the east entrance being a narrow channel separating the eastern end of Phillip Island from the mainland.

French Island occupies the centre of the bay northward of Phillip Island dividing the port into two arms, the north arm lying westward and northward of French Island and the east arm southward and eastward of it.

The western entrance is $3\frac{1}{2}$ miles wide, has a depth of 12 to 15 fathoms in mid-channel and 4 to 5 fathoms on either side. It is easy of access and affords sufficient room for vessels of any size to work in or out.

On 18th November, 1826, H.M.S. *Fly* sailed from Port Jackson for Western Port and on 24th November, 1826, a party landed on the north-east point of Phillip Island at Fort Dumaresq (Flagstaff Hill) and hoisted the British flag. A clump of pine trees locally known as Lock's Pines on the northern side of the hill, marks this spot.

Jetties have been constructed in Western Port at Flinders, Cowes, Newhaven, Rhyll, Tankerton, Stony Point, Hasings, Fairhaven, Tooradin, Lang Lang, Grantville, Settlement Point and San Remo, and there is a naval wharf at Hann's Inlet.

Near the inshore end of the jetty at Rhyll, a cairn has been erected to commemorate the discovery of Western Port by Bass in 1798, and subsequent visits by Grant and Murray in 1801 and 1802. Grant during his visit sowed wheat on Churchill Island, the first seed planted in Victoria, and Murray, in the following year, harvested the crop.

CORNER INLET.

Corner Inlet is an extensive inland basin situated immediately northward of and behind the high ranges of Wilson's Promontory. The various bays and coves outside

the inlet on the eastern side of the promontory are welcome havens to small powered vessels when the coast is swept by westerly and south-westerly gales.

Corner Inlet extends about 15 miles inland westerly and is about 10 miles wide. The greater portion of the area of the basin consists of sand and mud flats, dry at low water, between which run several deep tidal channels. There is a tide of 8 feet.

The main channels are Franklin Channel, 8 miles long, Bennison Channel, Lewis Channel and the channel leading to Toora.

Welshpool jetty is approached by Lewis Channel, 4 miles long, and vessels drawing 10 feet can be accommodated at the jetty at low water. The jetty has a rail connection to the Welshpool railway station about 3 miles distant.

Port Albert lies a little to the east of the entrance and has a direct channel to the ocean. A wharf, 170 feet by 45 feet with 12 feet of water alongside, has been constructed here, but the entrance to the port is now obstructed by a sand bar over which the depth is only 8 feet.

GIPPSLAND LAKES.

The several rivers which flow into the Gippsland Lakes and thence to the sea take their rise on the eastern and southern slopes of the Great Dividing Range, and the district which they drain is about 120 miles long from east to west and 100 miles wide from north to south.

The Lakes proper, that is Wellington, Victoria and King, and lagoons between the last named and the sea, cover about 160 square miles.

The northern branch of navigation extends to Bairnsdale, 28 miles from the sea. The western extremity of navigation is Sale, about 67 miles from the sea, this latter being limited to vessels with a draft of not more than 6 feet.

The natural entrance to the Gippsland Lakes was used in the early days by sailing vessels of small draught, and in the seventies the *P. S. Murray*, drawing about 6½ feet, used to enter the Lakes through the natural channel when sea and weather conditions were favourable, and the shifting sand banks permitted it. This natural entrance is now filled up by drifting sand.

The present entrance, about 263 miles by water from Melbourne, is 2 miles west of the old natural entrance. Having been started some time earlier, further work to make a new and permanent entrance was done in 1883, and in 1888. The entrance was finally completed in an unexpected manner during a storm when the sea broke through from the outside and cleared the passage desired.

After the break through, piers were built, and traffic through them was permitted in July, 1889. Since that time, considerable difficulties caused by dangerous scouring and the ravages of the *Teredo Navalis* have had to be overcome. The width between piers, which are now about 1,400 feet long, is 250 feet at the outer end. The piers consist of timber cribs filled with stone, with sea or outer ends constructed of concrete.

A sand bar exists across the entrance and the depth of water over it varies from time to time but generally the shallowest water is about 9 feet.

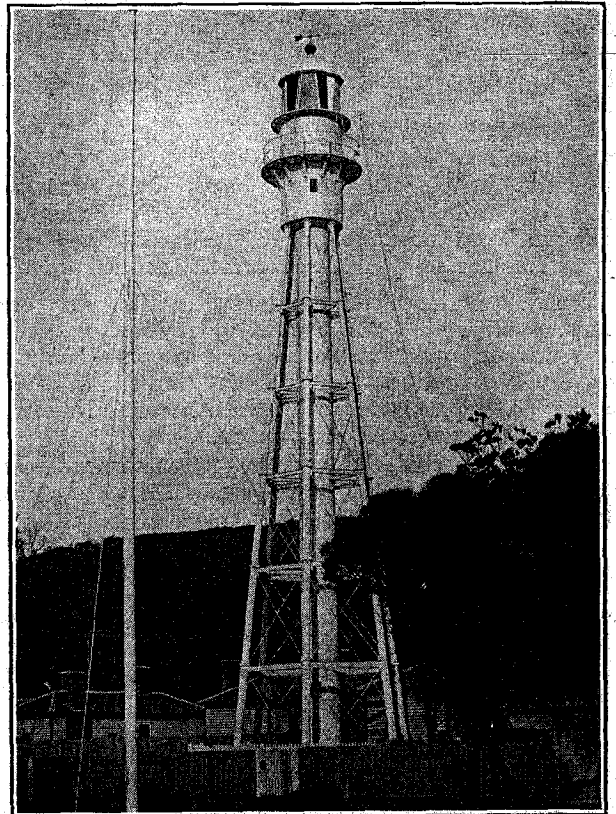
Amongst the jetties in the Lakes are South Jetty on the southern side of Cunninghame arm, Port Office Jetty,

Eastern Jetty on the northern side of arm, and those at Kalimna, Nyerimilang, Nungurner, Metung, Eagle Point, Bairnsdale, Paynesville, and Sale.

MINOR PIERS AND JETTIES.

Amongst the jetties built along the coast for the convenience of small craft are those at Port Campbell, Apollo Bay, Lorne, Inverloch, and Waratah Bay.

With the exception of the last named jetty, all the works mentioned have been constructed and maintained by the Ports and Harbours Branch of the Public Works Department, which controls also numerous piers and jetties at the bayside towns around Port Phillip Bay.



The Rosebud Light, Capel Sound, at Mouth of Port Phillip.

NAVIGATION LIGHTS.

Reference should perhaps be made to the navigation lights and life-saving apparatus provided to render assistance to mariners. The coast lights are situated at Cape Nelson, Cape Otway, Point Lonsdale, Cape Schanck, Cape Liptrap, Citadel Island, Wilson's Promontory, Clifty Island, Cape Everard and Gabo Island.

There are as well about 150 harbour, channel and pier-head lights, many of these being unattended automatic lights.

LIFEBOATS AND ROCKETS.

Lifeboat stations are established at Portland, Port Fairy, Warrnambool, Queenscliff and Port Albert, the boat at Queenscliff being a modern motor lifeboat, Watson type, 45 feet long, with a speed of 8 knots.

Life saving rocket apparatus is available at 22 places along the Victorian coast.