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THE PORTS OF OTAGO & BLUFF

A Geographic Comparison and Contrast.

Thesis presented for the Degree of Master of Arts and Honours in Geography.

University of New Zealand
1952.

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Alfred E. Ferrant.
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Johnson Studios, Invercargill. Plate. 17.
Commercial Studios, Invercargill. Plate, 44.
PREFACE.

Geography seeks to describe places or areas as entities in themselves as well as in their relations to other places or areas. The complex interaction of physical and cultural features combining in varied ways to form dynamic functioning units can be more clearly understood and some clue can be gained as to the causes of differences by arriving at an areal differentiation. The essential geographic character of any place is made more distinctive when it is compared or contrasted with that of any other place.

This study in economic geography seeks to describe and in part, account for the character of two ports in the South Island of New Zealand. It is believed that such a comparative account which compares and contrasts the differential character of the ports, thereby gives a fuller understanding of the separate character of each port and its tributary areas, than if the ports are studied separately. Important factors are emphasised when there are contrasts between places, while similarities between them frequently serve to show that they do not necessarily lead to, or are derived from, similar circumstances.

Furthermore places do not in fact exist in isolation. They have reciprocal relations with other places and areas. This is undoubtedly true of ports wherever they are situated, but especially where adjacent ports such as the
Ports of Otago and Bluff serve a common area. There are no insurmountable physical barriers between the ports, and the effects of history, invention, politics, customs and economics are invoked to illustrate how complexes of all or some of these factors have interacted with the physical features of the landscape to give these ports their distinctive present day characters. The economy of New Zealand is directed towards the overseas marketing of a pastoral surplus.

This study seeks to show how dependent upon the maintenance of a regular flow of trade are the rural and urban areas of the portion of New Zealand served by these ports. The motto of the Otago Harbour Board, "By Ships We Live!" succinctly describes this situation.

The writer wishes to thank the executive officers of both Harbour Boards for their assistance in supplying statistics and patiently answering many questions. Numerous business men, local body officials, workers in industries and local residents have made varying contributions to the writer's study.
(a) In relation to the ports of New Zealand and the World.

The Ports of Bluff and Otago are the southernmost of the main trading ports of New Zealand. (figure 1). For half a century, Otago has ranked last of the four main ports of the Dominion, while Bluff is shown among the foremost of the lesser ports. By sea the distance between the two ports is 147 nautical miles; a distance considerably less than that between any two of the major ports. The Port of Otago is 200 nautical miles from Lyttleton, 343 from Wellington and 638 from Auckland. Bluff is the closest port in New Zealand to an Australian port, being 931 miles from Hobart and 1211 from Melbourne, while comparable figures for Wellington are 1295 and 1518 miles. Bluff is in fact nearer to Hobart than to Auckland, being 985 miles distance from the latter. They are the ports closest to the Island Dependencies and Ross Dependency to the south of New Zealand. Whalers and Anarctic explorers have frequently made use of these, the world's most southerly ports, when replenishing stores and refuelling before proceeding south. On several occasions damaged whaling vessels and icebreakers have limped back to the Port of Otago for repairs.

The latitude of the Port of Otago is almost 46 degrees South and the Port of Bluff over 46½ degrees South. The
LOCATION OF THE PORTS IN THE PACIFIC

SCALE: ONE INCH EQUALS (400 MILES. (APPROX.)
Port of Bluff is about 5 degrees distant from the Port of Wellington, 41½ degrees South, and almost 10 degrees distant from the Port of Auckland, almost 37 degrees South. Although they are more distant from the manufacturing export centres of the United States of America and the United Kingdom, than are other ports of the North Island, and have not participated to the same extent as those in New Zealand's external trade, this deficiency in latitudinal position is somewhat offset by the importance of their trade in the economy of the Dominion.

Like many of New Zealand's ports, (with the notable exceptions of Auckland, Wellington and Lyttleton) Bluff and Otago are not endowed by nature with those attributes which make a fine natural port and harbour, and these difficulties are accentuated as ships increase in size. Problems of silting and changing channels, adverse winds and strong currents, they share with other ports, and man, by construction of mole, and retaining wall, by rock blasting and dredging, has improved on the work of nature. Their land-locked sites have more in common with those of Auckland, Wellington and Lyttleton, than the exposed coastal sites of Omuru, Timaru and Napier.

On the west coast the Otago Province has a series of magnificent harbours in the fiords, but inaccessibility prevents their development as ports. On the south and east coasts there are several harbours, but few of these are suitable for large craft. River mouth harbours often have shifting and turbulent bars or shallow reaches, such
Harbours occur at the mouths of the Waiau, Aparima, Oreti, Mataura, Catlins, Clutha, Taieri and Kakanui rivers. At other places prominent projections on an otherwise fairly regular coastline, form harbours sheltered from some winds, but dangerous when the wind is blowing from a quarter where shelter is unavailable. Such harbours are the Nuggets, Karitane, Shag Point, Moeraki and Oamaru. At the latter an artificial harbour has been constructed in the lee of Cape Wanhorn. At only two places on the coast are there harbours with adequate shelter in all weathers and comparatively safe entrances for large vessels. These are Otago and Bluff harbours and due to these other initial advantages over sites they have developed into ports.
(b) Site of Bluff.

Bluff Harbour is a tidal lagoon on the east side of a low range of hills, stretching for about 9 miles in a North West - South East direction (figure 2).

The range, which averages 1\(\frac{1}{2}\) miles in width includes Bluff Hill 868' and the Greenhills Range, which are separated by a narrow dune-covered isthmus at Ocean Beach. The range is composed of lava rocks, metamorphosed by an intrusive mass of norite (1) in the late Palaeozoic. At that time the present day peninsula was an island. Aggradation by the rivers flowing south through the range and basin topography of Southland extended the lowlands into the shallow sea and finally connected the island to the mainland by a narrow and low lying gravel plain. (2) Subsequent moderate shoreline submergence is inferred from a raised beach platform at Bluff and terraces on the connecting gravel plain.

The harbour with an area of about 4000 acres of almost land-locked water is connected to Foveaux Strait by an entrance channel (plate 1) of varying width.


Aerial view of Bluff Hill and Borough showing the narrow entrance to the harbour between Tewai Point in the left background, and the peninsula. Dog Island and its lighthouse is visible in the extreme right background. Bare granitic rock is evident on the exposed west side of Bluff Hill. The narrow dune-covered isthmus at Ocean Beach, linking Bluff Hill to the Greenhills range is the site of the Ocean Beach Freezing works. The reservoir below the summit of Bluff Hill supplies the borough and shipping.
700 yards between Bluff Hill and the low rocky promontory of Tiwai Point to the end of a long sandspit. Much of the harbour is so shallow that extensive areas of sand are exposed at low tide. The main channel skirts the foot of Bluff Hill and its depth of 30 feet is maintained by tidal scour. A smaller tidal lagoon, Mokomoko Inlet lying to the north of Bluff Harbour drains northwards into the Estuary of the New River (plate 2) which leads up to the site of Invercargill.

Bluff harbour is protected by the range on the western side from the prevailing South West winds and the strong currents from Foveaux Strait. Foveaux and Cook Straits have the strongest winds in New Zealand, averaging an equal number of gales per year (3). Conflicting currents in the Strait cause turbulent seas especially just near the entrance to Bluff Harbour in the area which the local inhabitants call the "rip".

Bluff Borough at the foot of the hill is connected with Invercargill, 17 miles distant, across almost unproductive and swampy country, by an excellent sealed road and single track railway (figure 3). The railway and road network radiates from Invercargill to all parts of the

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Aerial view of Bluff Harbour looking north. The entrance channel is marked by beacons. The sheltered side of Bluff Hill is forested. In the background is the entrance to the New River estuary and part of the low lying plain which connects the peninsula to the mainland. In the left background is the Mokomoko Inlet. To the west of the main wharves is the outline of the sandbank which is to be reclaimed. (appendix IV).
Southland Plain, and the road and rail communications run side by side from Invercargill to Bluff.
(c) Site of Otago.

Otago Harbour is a long inlet running in a North East - South West direction between two ranges of steep lava-capped hills (figure 4). Otago Peninsula, once an island but now attached to the mainland by a tombolo, about 1 mile square runs in a North East - South West miles direction for about 14 from Taiaroa Head to Anderson's Bay, and forms the eastern side of the harbour. Its width varies from 1-5 miles and its coastline is rugged and irregular, in places as at Highcliff on the seaward side sheer cliffs rise over 200 feet from the water's edge, while in other places such as Papanui and Hoopers Inlet sand bars all but enclose shallow tidal bays. The highest points are reached in Harbour Cone 1050', Sandymount Ridge 1300', and Mt. Charles 1338'. The western shores of the Harbour are flanked by the more rugged Mt. Cargill 2016', Flagstaff 2186' ridge. Both roads and dwellings are situated either at the foot of the hills following the many small bays, or near the summit, because of the steepness of the intervening slopes on both Peninsula and mainland.

A summary of the geological history of the area gives some explanation of the harbour's present formation. Sedimentary rocks laid down under the ocean were changed by intense pressure to mica-schists about 200 million years ago. Folding took place and the hills were worn down to stumps and sank beneath the sea. Coal seams were then formed, muds, marls and impure limestone were deposited
When the land was once more raised river action stripped the more elevated marine sediments and laid bare the ancient mica-schists. Thus about 5 million years ago the area had a low gently rolling surface but this was modified during later Pliocene times by volcanic action. Levee flows poured on to the old surface and associated with it intense warping of the land took place. This resulted in a complex of fold ridges and intervening fold troughs running East-North East and South-South West, in the main depression of which, now lies Otago Harbour. Minor folds also crossed the main syncline at right angles as for instance the Portobello Peninsula - Quarantine Is. - Goat Is. - Port Chalmers Peninsula Chain, (plate 3). Rivers running to the North East and South West shaped the trough but when the whole region about 1000', the eastern anticline ridge became an island and the sea broke through gaps in the minor ridge running across the main syncline. Southerly winds and currents carrying gravel and debris from the rivers flowing to the East Coast e.g. Clutha and Taieri built bars and spits over the mouths of bays leaving only a small entrance at the South East or East extreme e.g. Hooper's Inlet, Papanui Inlet and Purakanui Inlet. (4) The tombolo between the island and the mainland was similarly formed. The process still continues; the silting

(4) A. H. McLintock, "The Port Of Otago." Chapter 1 In The Beginning.
Aerial view of Otago Harbour looking towards the entrance. The Port Chalmers Peninsula - Goat Island - Quarantine Island - Portobello chain is in the centre background. The Port Chalmers wharves are on the far side of the left-hand peninsula. Suburbs cover the lower end gentler slopes of the Peninsula. Anderson’s Bay inlet is in the centre foreground. The tombolo connecting the Peninsula to the mainland is covered with houses and recreation grounds. At the extreme right foreground breakers from the Pacific Ocean break on dune lined St. Kilda beach. The Ravensbourne wharf adjoins the Dominion fertiliser Company at left centre. Short sections of the winding coastal road and the hill-top road are visible on the Peninsula.
of the harbour approaches and the inlet itself being a constant danger to navigation.

The harbour has an area of 11,860 acres divided by the island chain into the Upper Harbour, 5670 acres and the Lower Harbour of 6,190 acres. Large areas of sandbank are exposed in the harbour at low tide, and shipping has to keep to the narrow channel the depth of which has been maintained by tidal scour and dredging.

About the head of the inlet (figure 5) lies the city of Dunedin extending over gentler hills, tombolo and over 700 acres of reclaimed land. In Koputai Bay at the western end of the island chains, 8 miles from Dunedin is the deep water port of Port Chalmers. The Port of Dunedin and the Port of Port Chalmers together constitute the Port of Otago. The main trunk railway reaches Port Chalmers from the north after a steep ascent and passing through tunnels, then follows the shoreline to Dunedin by means of reclaimed embankments linking bay heads. To the south, the railway again runs through tunnels to the Taieri Plain. The main from the north crosses the anticlinal ridge at about 1200' to reach Dunedin but does not pass through Port Chalmers. This section of the port is linked to Dunedin by a sealed but narrow and winding road.
railways
roads
road under construction
scale: one inch equals four miles
(d) Comparison and Contrast.

Both Bluff and Otago are natural harbours in that they have extensive areas of sheltered water all but enclosed by land, the entrance channel in each case being narrow. In both cases the formation of the harbour is partly due to the connecting of a former island to the mainland. Extensive silting is a problem common to both harbours, in each case there being only a single narrow channel with sufficient water for shipping at low tide. Tidal scour is the life blood of both ports, the swift currents preventing additional silting in the channels. It is for this reason that additional reclamation of the foreshores is not favoured, especially by the Otago Harbour Board Authorities. The larger the area available for receiving the incoming tidal water, the stronger and more effective is the tidal scour as it ebbs and flows.

The contrasts between the Ports, however, are more evident than the similarities. Otago is located on the east coast of the South Island. Bluff faces southwards on to turbulent Foveaux Strait, linking the Tasman Sea and the Pacific Ocean. Otago is surrounded by steep hills often rising abruptly from the water's edge and has only a few square miles of flat land at its head. Bluff has low, gently sloping hills at its south west edge, while low lying swampy land lies elsewhere about it and the entire Southland Plain stretches away from its head. Otago Harbour is long, narrow and almost divided in two by a
partly submerged chain of low hills: Bluff is broad, almost circular in shape, its expanse only broken by two or three low rocky islets. Large vessels can proceed only two miles into Bluff Harbour but almost fifteen miles up Otago Harbour.

A peninsula in each case protects the enclosed water surface from prevailing winds. However, strong winds often hinder shipping attempting to enter or leave either harbour. Otago Peninsula, the major promontory south of Bank's Peninsula, receives the full strength of the South East winds following the passage of fronts while Bluff Peninsula is exposed to the full force of westerlies from a Southerly to Northerly quarter. During a North East wind fog often hinders navigation in Otago Harbour, but Bluff is free from this hazard. Very strong tidal currents are a further hindrance to shipping and especially at Bluff, ships usually wait until "slack" water at high or low tide before entering. Such are the physical features which characterize and distinguish the Southernmost Ports of New Zealand.
CHAPTER 11

PORT GEOGRAPHY OF THE PAST

(a) Selection. (1800-1848)

The selection of the Port of Otago as a base for permanent white settlement was the result of deliberate planning. The New Zealand Company instructed its agents to select a suitable site for a Scottish settlement in the South Island of New Zealand. In 1842, Captain Smith, surveyor of the New Zealand Company inspected the harbour and recommended the neighbourhood of Portobello on the south east side of the lower harbour as a site for a future town because it had a deep water anchorage. There had previously been settlements on this side of the lower harbour but not both permanent and white. The Maoris had long had one of their chief settlements in the South Island at Otakau (Otago), undoubtedly because it was one of the few harbours sheltered in all weathers on the coast. At a later date whalers had recognised the usefulness of the haven and Otakau settlement became popular for trying out oil and replenishing ships with food and water. The Weller Brothers had a whaling station here from 1831-1840 but it was abandoned when whale catches were reduced. In 1838, 616 tons of whale oil, valued at £9,860 had been sent to Sydney from Otakau. Following on Captain Smith's report the New Zealand Company in 1844 ordered its surveyor Frederick Tuckett to select and purchase 400,000 acres
for the Scottish settlement. By now the reckless whaling era had passed and Otago Harbour was seldom used by large vessels. Tuckett carefully examined the coast from Bank's Peninsula to Riverton before selecting the Otago Block extending from the Otago Harbour southward to Nugget Point for the new Edinburgh settlement. He planned for a town, Dunedin, at the head of the harbour linked by road with its deep water port at Koputai Bay (now Port Chalmers) at the head of the lower harbour. Of the harbour he said, "It offers an ornamental and commodious site for a town, most suitable in every respect save the distance from the deep water port of the lower harbour; the channel throughout is on the west side and generally narrow, and a fathom and a half of water would be found to within two miles of the extremity of the harbour. Two thirds of the space covered by the flood is left dry at the ebb."(5)

Tuckett decided that Captain Smith's recommended site near Portobello was too difficult of access by land. Comparing its site with that of Port Cooper (Lyttleton) he claimed that there was more land available for a settlement on its shores and it would be easier to construct a road to the interior. William Wakefield the Company's agent who accompanied Tuckett stated that Otago Harbour had an advantage over Port Cooper in the abundance of

(5) F. Tuckett. "Diary" 27th. April 1844

In T. M. Hooken "Contributions to the Early History of New Zealand" (London) 1898.
timber and firewood growing on the shores. He advocated the use of a small steam-tug plying between the port and town "in order to make it the most safe and commodious harbour of New Zealand."(6)

In 1848 the first settlers arrived, settlements being established at Dunedin and Port Chalmers, in accordance with the Plan.

The early development of Bluff Harbour was different from that of Otago in that it was not planned in advance. Rather the Port of Bluff grew to fulfil a demand from outside its immediate locality; it was not selected as a site for permanent settlement.

Cook had not discovered the strait between the South Island and Stewart Island and there are no records of early whalers discovering the harbour. In May 1813 the "Perseverence" of Sydney in quest of New Zealand flax was at Port William, Stewart Island when her ships boats discovered a harbour 21 miles away across the strait N.N.E. of Port William. (7) The Maoris had called it Awarua (two tides and two streams). Port Macquarie as it was now named was not entered by a European sailing vessel until 1822. It thereafter became a regular port of call and shelter for whaling vessels, but there was very little

T. M. Hooken, ibid.
(7) R. McNea. "Murihiku and the Southern Islands".
(Invercargill) 1907. P. 146.
settlement until John Jones established a whaling station there in 1836. Like the whaling station on Otago Harbour this had a short life. One early visitor makes the disparaging remark, "a fine day for Bluff, we saw the sun and were not blown off our legs." (8)

Captain Smith who also inspected Otago Harbour in 1842 preferred Otago to Bluff because, "it is more easy of access, has more room for shipping, a better site for a town and has more land fit for grazing and agricultural purposes in its immediate neighbourhood." (9) The bleak swampy strip of land between Bluff and Invercargill did not impress Captain Smith. Tuckett in 1844 inspected both the Bluff and New River Harbours. He noted that the harbours had extensive areas of sand banks at ebb tide, that rough weather often prevented entrance to the New River and that Bluff had two main channels. As to its suitability for a trading settlement he merely noted that Bluff Harbour was more suitable than the New River Harbour.

Thus at the beginning of the planned development of Otago in 1848, Bluff Harbour, after a brief episode as a port for whaling activities was virtually only a

(8) Attributed to a Mr. Barnicoat. Historical Outline of Early Bluff History. Unpublished manuscript.
(Invercargill Public Library)

sheltered haven for vessels waiting to enter the New River. This advantage of an early start the Port of Otago has retained.
(b) Early Trade (1848-1861)

The early trade of the ports is connected with that of the smaller ports along the coast. Most settlements up to 1861 were located on or near the coast and most transport was by sea. Small schooners and cutters, usually of less than fifty tons and drawing 6-7 feet when loaded, plied between river mouth and bay ports. Harbours used can be divided into a northern group comprising Oamaru, Kakanui, Moeraki, Waikouaiti, Otago, Taieri River, and Molyneux River, and a southerly group comprising Catlins River, Waikawa River, Mataura River, Bluff, New River, Jacobs River and Te Waewae Bay. (figure 6)

A regular traffic was developing between Otago Harbour and the northern group of harbours. The peak period of the year was in the summer and autumn months when grain, potatoes, dairy produce and wool were brought to Otago Harbour by the smaller coasters, for local consumption or transshipment for export to other provinces or overseas. The "Otago Witness" 11th July 1857 says, "Nearly the whole of the imports from the neighbouring colonies and from the home country are brought to the principal town where they are distributed to all parts of the Province either by land carriage or by coaster which ply backwards and forwards to the various small". (10) Now called the Clutha River but in the early years of settlement called the Molyneux.
harbours on the coast from whence they bring back wool and other produce of the outlying districts.

Bluff was by no means as important as Otago, partly because there was no correspondingly large settlement on its shores, but also because it was difficult of access to sailing vessels, for the "New Zealand Pilot" 1859 says of Bluff, "Its narrow entrance and very strong tides render it...at all times very difficult of access to sailing vessels. The extensive and magnificent plains which stretch from it without interruption for eighty miles to the north-west must render it a place of considerable importance as soon as steam navigation is introduced."(11) However, it was important enough for the Otago Provincial Council to appoint a sub-collector of Customs there in 1856.

At this time both ports had few facilities. Vessels tied up to small wooden jetties or in the case of deeper draught vessels going to Dunedin anchored 300 yards off the jetty in what was called "The Pool" and were discharged or reloaded by a barge or lighter. The head of Otago Harbour was very shallow and silted rapidly, so that the main jetty was lengthened several times. All going to or from Port Chalmers, which was as far as most overseas vessels ventured sent or received cargo to and from Dunedin by means of the

(11) "The New Zealand Pilot" 1859 edition. Published as a companion guide to navigators using the Admiralty charts of New Zealand.
shallow draught lighters.

Comparison of figures for trade in 1856, (figure 7) the first year for which comparative figures are available reveal that the Port of Otago had an overwhelmingly greater trade. Imports to Otago were valued at £50,529-11-0 as against £9,781-2-9 for Bluff. Prominent items of imports to both ports were, clothing, dried fruit, cattle, sheep, tobacco, hardware, oatmeal, horses, beverages and liquors, approximately equal amounts coming from the United Kingdom and Australia to Otago, and from Australia only to Bluff. The import of clothing, beverages and oatmeal, nowadays produced locally, and of livestock, indicates the reliance of the recently settled communities for basic commodities and on means of progress on an overseas source. Exports for Otago were valued at £25,136-15-6 and only £600-11-3 for Bluff. Exports including wool, wheat, sheepskins, spars and potatoes were exported to Australia only. The published statistics give a misleading impression of the trade of the province because at this time Invercargill on the New River had a trade of three to four times the value of that of Bluff. However, even making full allowance for this, they do show the great disparity between the ports with which we are more precisely concerned.

Source 1
TRADE IN 1856

OTAGO

Imports

British Colonies

Exports

U.K.

British Colonies

BLUFF

Imports

British Colonies

Exports

TRADE IN 1863

Otago

Imports

United Kingdom

Exports

United Kingdom

Australia

Imports

Australia

Exports

Australia

Millions of £5

Share of total N.Z. Imports
61%

Share of total N.Z. Exports
76%

gold dust

wool

Boats ports

Other ports

Invercargill

Invercargill & subports.
(c) The Gold Rushes. (1861-1871).

With the discovery of gold in various fields in Central Otago in the 1860's, a great impetus was given to immigration. Between 1861 and 1871 the population increased sixfold to total 69,481, 26% of the population of New Zealand in 1871. In the same period £23 millions of gold were won.

Many overseas vessels visited the Port of Otago bringing fortune seekers, equipment and supplies. The waterfront especially at Port Chalmers was frequently crowded. During 1864, 580 vessels arrived at the port. At this time there was 21 feet of water at the bar, 11 feet to within ½ miles of Dunedin and only 6½ feet at the jetty. Although a narrow and tortuous road between Dunedin and Port Chalmers was completed in 1862, the water transport by lighters between the town and port was still cheaper.

The Invercargill - Bluff railway, which was opened in February 5th, 1867, had a branch line from near Awarua to the Mokomoko Inlet, it being believed at this stage, that the New River was to be the main harbour and Bluff an outlet. The opening of the railway did not immediately boost the trade of Bluff.

Thompson the surveyor of Invercargill, made the mistake of greatly over-estimating the possibilities of the New River estuary for navigation purposes. In moderate weather the New River was accessible for vessels drawing 15-18 feet this being the depth of water on a rapidly changing bar. Entrance was often difficult and vessels often had to wait
The jetty at Dunedin early in 1861 just before the gold rushes of the sixties.
several days in stormy weather to cross the bar. Larger vessels could go as far as the Lower Port about 2 miles past a jetty at the Mokomoko Inlet, vessels of less than 10 feet to the Upper Pool, one mile from the Invercargill jetty, and vessels of 8 feet to the jetty itself. (12) Bluff Harbour had a safer entrance and could take the largest vessels, but it was 17 miles by land from the large community at Invercargill and transport by land was costly. Goods were taken to Invercargill in approximately equal quantities, by small steamer and lighter from the Bluff.

A road was built between Bluff and Invercargill about 1860-1862 but for many years, Invercargill remained the chief port and Bluff the outport.

Statistics for 1863 (figure 8) give a fuller picture of the nature of the trade of the province as four ports are listed for the province. The Port of Otago with imports valued at £3,413,356 had a boosted import figure as a result of the gold rush, then followed Invercargill with £717,473, Bluff, £22,344 and Riverton, £56209. Imports were chiefly from the United Kingdom and Australia with smaller amounts from the United States of America. Exports including much gold dust, grain, hides, sheepskins, tallow and wool were valued at £2,569,718 from Dunedin and £1,698 from Invercargill.

A busy water front scene late in 1861 when the rush to the goldfields had commenced. All berths are full and some of the larger vessels are moored in the “Pool”. At the far end of the jetty the funnels of some of the first steamships are to be seen. Contrast this view with Plate 4, taken from the same position shortly before the gold rushes. The street beside the hill running from the shore is Rattray St. and it joins the present main street, Princes St. which here almost skirts the shore. The present wharves would be about the position of the two most distant vessels while the area occupied by jetty and vessels has been reclaimed.
and its two ports.

Dunedin was exporting to the United Kingdom and Australia and the other ports to Australia only. At this time these four southern ports handled about 70% in value of the total New Zealand trade.
(d) Adaptation to New Techniques.

The differing characters of the ports during three distinctive periods has been sketched. The essential present characters of the ports were formed in these early years. Since 1871 there have been many changes and modifications in response to numerous dynamic factors, internal and external. The final period covers the eighty-one years to the present day. In this period significant events are described and an attempt is made to show how they have modified the character of one or both of the ports. Such events may be initiated in the country behind the ports as in the extension of communications and development of farmlands, at the ports themselves as in the completion of the Victoria Channel, and in the lands thousands of miles away when there arose new forms of demand for New Zealand primary products.

It was the development of transport by rail that hastened the decline of the smaller ports, as it also accelerated the growth of the larger ones. Rail transport even for short distances was cheaper than road transport in the days before the motor traction. No longer was shipping the only effective means of transport between South Island coastal settlement. The small ports had a final burst of prosperity as the railways were built because stores and materials for the construction had to be transported by sea. Then they sank into oblivion when the railway was completed. The Bluff-Invercargill line, the second in New Zealand, was opened for traffic on February 5th, 1867. Then came the Dunedin
rail links were first in New Zealand to connect a port with such a large part of its hinterland.

This same period saw an increase in the use of steamships. These have been plying the Tasman and long coastal routes since the 1650's but it was mainly the small sailing ships which traded with the small ports. When the cheaper and more regular railway transport brought about the decline of the small ports it paved the way for increases in the size of ships and the use of steamships. The Union Steam Ship Company was founded in 1875 and gradually engulfed the small companies or drove them out of business. "The small coastal ports with their simple harbour facilities, their small steamers and numerous sailing coasters, their primitive land communications - these were all features of an era which was passing. The larger ports with their growing and elaborate harbour works, their harbour boards with wide administrative and financial powers, their larger and more efficient vessels the U.S. Company and the Main Trunk Railway - these were the features of the new era of mechanisation and increased efficiency which was approaching. (14)

These figures of vessels entering the Otago Harbour show the increasing size of ships.

<table>
<thead>
<tr>
<th>Year</th>
<th>Vessels</th>
<th>Tonnage</th>
<th>Average Tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1856</td>
<td>86</td>
<td>2,487</td>
<td>27</td>
</tr>
<tr>
<td>1878</td>
<td>1,235</td>
<td>215,235</td>
<td>174</td>
</tr>
<tr>
<td>1884</td>
<td>893</td>
<td>357,120</td>
<td>400</td>
</tr>
</tbody>
</table>

Continued bar difficulties and increasing size of ships combined to begin Invercargill's gradual demise as a main port and the compensatory development of Bluff.

In 1878 (figure 9) Dunedin's imports were valued at £2,679,728 and those of Bluff and Invercargill at £226,874. Imports were from the United Kingdom, Australia and the United States of America.

In export trade Dunedin's exports were valued at £1,619,954 and Invercargill and Bluff at £391,970. Gold, wool, wheat and preserved meat were the chief exports. By now most of the export trade was with the United Kingdom, a feature of New Zealand trade which has always been prominent.

With one third of the total New Zealand trade in the year 1878, the southern ports did not command such a large proportion of it as they had done in the days of the gold rushes.

The introduction of refrigeration brought a great change to the economy of the whole of New Zealand. Without refrigeration the character of much of our present day agriculture and industry would not be what it is. And because much of our trade by sea is dependent on primary industry
TRADE IN 1878

**Gold Dust**

**Wool**

Share of total NZ imports
34% 100%

Share of total NZ exports
332% 100%

**TRADE IN 1893**

**Gold Dust**

**Wool**

Share of total NZ imports
26% 100%

Share of total NZ exports
21% 100%

**OTAGO**

**BLUFF & INGILL**
so too, the present day character of our ports owes much to the advent of refrigeration. Without it neither dairy produce nor meat could be exported economically and in large quantities. It was from Port Chalmers on February 15th, 1882, that the steam ship "Dunedin" sailed with the first shipment of frozen produce (4,909 carcasses and 256 kgs of butter) to leave New Zealand. But this event brought no initial advantage to the Port of Otago. There was no sudden boom in the export of frozen produce. Ships had to be specially fitted with freezing chambers, farmers had to modify their farming methods, facilities had to be provided for the killing of animals and storage of carcasses and other produce and finally the British buying public had to establish a firm demand for frozen produce. It is only in the last thirty years that the advent of refrigeration has prominently imprinted its stamp in the character of our economy and trade. The export of frozen meat from Otago fluctuated between 1,768 tons and 4,844 tons until the First World War when the exports doubled. The same trend is apparent in the export of frozen meat from Bluff, except that Bluff exports are generally slightly higher. Nowadays more than ever before, the shipping of frozen produce contributes to the character of both ports.

The Victoria Channel, a seven mile long man-made waterway extending from Dunedin to the midway islands is of greater importance in the character of the Port of Otago than the hinterland behind it. The channel is the "raison d'être" of the wharves at Dunedin. Opened on December 30th,
1881, the Victoria Channel then had a depth of 14'. That depth has gradually increased due to the combined efforts of dredging and tidal until to-day it is 22'. As the channel has deepened so has a greater percentage of the trade of the port passed through Dunedin. In the decade 1930-1940 it saved in railage and railway sorting charges more than £100,000 yearly so that its cost of £500,000 is recouped once every five years. In those years the railway charges between Port Chalmers and Dunedin were 7/9 per ton but in recent years they have been 16/6 per ton and therefore £250,000 is now saved yearly (15). Maintenance dredging over the nine years period 1933-1941 was only £700 per annum. Tidal water is still the life blood of the Port of Otago, because it has been found that as land has been reclaimed tidal scour has been reduced and channels become shallow. The policy of the Harbour Board then, is not to carry out any further extensive reclamation. Before World War II for every ton of cargo handled at Dunedin and Ravensbourne, in 1944 8 tons were handled at the latter wharves to every ton at Port Chalmers; in 1956 it is anticipated that there will be 16-17 tons at Dunedin and Ravensbourne to every one handled at Port Chalmers. (16)

and Letter to the Editor of the "Evening Star". June 4th 1952.
(16) ibid. $25.
Port Chalmers waterfront in the late eighties, showing the large sailing vessels. Contrast the larger size of these vessels with those shown in Plate 5. The Bowen Pier is connected by rail and several railway wagons are on the wharf. The wharf under construction is the Export wharf and the small in the foreground is in the position of the present main George St. wharf. A little reclamation has since taken place at the foot of the steep hill and along the foreshore.
Bluff in the nineties. Large vessels both steam and sailing are at berth. Railway wagons line the foreshore. The large building at the right is a wool or grain store. The present out-of-date wharves still incorporate a portion of the structure shown in the photograph.
After the boom the ports imported manufactures and food stuffs, and exported wool, skins, tallow and timber, but refrigeration gave a new impulse to expansion of trade and development of hinterlands. Dairying and sheep fattenings became profitable and as this was possible on smaller holdings the rural population increased. From the 1890's until 1914 large quantities of grain were exported from Bluff and Otago, more from Bluff because in the vicinity of Bluff there were more areas suitable for growing wheat and oats. With the increasing use of motor power and the decreasing number of horses throughout New Zealand, this trade was subsequently much reduced. (figure10). However it has left its mark on the ports to the present day. At both Bluff and Port Chalmers there are large stores usually in the form of corrugated iron sheds, once grain stores, but now disused or adapted to other purposes. (e.g. wool dumping). Dairying brought about the erection of numerous cheese factories especially in the Bluff hinterlands, while sheep fattenings brought about the erection of the six freezing works in Otago Province. With efficient transport, suitable insulated railway wagons, and wharves connected to the main railway system the ports became major centres for the export of dairy products and frozen meat. At Dunedin and at Bluff there are large cool stores for the storage of perishable primary products. In these products too, the Bluff hinterland is greater than that of Otago, if not in actual areal extent, at least in value of the product and its expression in the
EXPORTS OF GRAIN 1900-1950

Figure 10

Otago

Bluff
Comparison of trade figures for 1893 (figure 11) and 1912 (figure 12) reveals the changing volume and direction of trade. Both ports recorded increases in imports, though Bluff's share is still relatively small. Increasing proportions of imports came from the United Kingdom. The changing trade of New Zealand is shown in the export and import figures. In 1893 (figure 12) the four ports, Otago, Auckland, Wellington and Lyttleton have comparable figures for total imports, by value of goods handled, in contrast to the era in the sixties when Otago was predominant. By 1912 however the proportion of New Zealand trade going to the other ports has increased and the Port of Otago is clearly only in 4th place in imports while in exports the developing port of Napier has taken 4th place and Otago has become 5th. (figure 13)

In 1893 Bluff's exports were valued at a little over half the value of exports from Otago, but by 1912 Bluff export totals, having increased in value at a relatively more rapid rate had almost equalled those of the Port of Otago.

The changing nature of the trade since 1920 is well illustrated by the graphs for Frozen Meat (figure 14), cheese (figure 15), wool (figure 16) and grain (figure 10), the latter declining while the former three increased.

Due to several favourable factors, including freedom from Maori Wars, the gold boom and the characteristics of the original settlers, the City of Dunedin developed rapidly. Although Dunedin served its countryside as a collecting
FROZEN PRODUCE EXPORTS 1920-1950

Otago

Bluff

Thousands of tons

1920 25 30 35 40 45 50
EXHIBIT OF CHEESE 1920-1950

Otago
Bluff

Thousands of tons

1920 25 30 35 40 45 50
EXPORTS OF WOOL 1920 - 1950

Otago
Bluff

Thousands of tons

1920 25 30 35 40 45 50
and distributing centre, at the same time its own population created new needs for itself. This large urban centre became the foremost commercial and manufacturing centre in New Zealand. Large quantities of manufactures and raw materials for secondary industry were imported through the port. Even to-day when Dunedin no longer has pride of place among urban centres of New Zealand the influence of historical development is expressed in the character of the port. The hinterland for imports through Otago often extends to Invercargill and Bluff itself. The volume of imports of Bluff is small compared with that of Otago. Invercargill has very few secondary industries. Because of this large import trade the Dunedin wharves are to-day served by transit sheds, whereas the Dunedin wharf of rail port, fitted with handling, there are none of these at Bluff. The contrast is even seen in the unloading of cargoes. Only three men per gang are required to receive cargo into railway wagons, as against up to twelve men per gang to receive, sort and stack general cargo into a cargo shed. It is evident then, that the development of the hinterlands has contributed much to the character of the ports.
(c) Comparison and Contrast.

Throughout their historical evolution the development of Bluff and Otago has been broadly similar. Both have developed from sheltered harbours without facilities to become the outlets for large areas of productive hinterland. Essentially they are concerned both with exporting and importing and much of this trade serves the agricultural communities behind the ports. Both owe much of their increasing importance to the development of railways.

There are, however, contrasts in the evolution of the ports which explain differences between them to-day. Otago was a deliberately selected harbour whereas the selection of Bluff was fortuitous. A settlement which had to be served was planned on Otago harbour; Bluff grew as its port functions developed. Hence from the beginning Otago handled more trade, especially in importing, and it still does so to-day. The building of the Victoria Channel set the seal to Otago's predominance as an importer, for nowhere else in the South Island could overseas ships unload virtually within a city. Furthermore constructional work at the harbour entrance improved the channel there. This initial settlement and presence and growing importance of a prosperous commercial and industrial community which required the services of a port even if it had to be an artificial one, accounts for this contrast in total trade and nature of the trade between the ports to-day.
CHAPTER III

PRESENT DAY CHARACTER OF THE PORTS

(a) The Ports and their Functions.

Critchfield well says of Bluff, "Its harbour is the only excuse for its existence." (16) Bluff Borough had a population of 2253 in 1951. It is not possible to determine exact numbers in different occupations because much of the work is seasonal and much of the labour is transient. However approximations give a good indication of the nature of the functions of the port. About 250 watersiders are regularly employed, 170 of them living in Bluff, the remainder travelling daily from Invercargill and small places nearer to Bluff. Fishing and oyster ing engages about 150 men during the mid-February to end of September season, wool stores and the coal stores have about 50 permanent employees. The Bluff Harbour Board has a permanent staff of 75 and the railways about 35. This gives a total of about 470 workers living in Bluff who are concerned with the activities of the port. In the Borough of Bluff there are 583 homes so we can see that a high proportion of the workers is directly concerned with port functions. Most of the remainder may be accounted for as indirectly serving the port but nevertheless being just as

Aerial view showing the Borough of Bluff. The grid pattern of the streets runs parallel to the main street, Gore St. skirting the foreshore. The large buildings fronting the main street are wool stores, hotels and shops and administration buildings. On a small area of reclaimed land is the prominent Cool Stores and a group of petroleum installations. Rail access to the main wharf is by the two piers connecting the wharf to the shore. The presence of two overseas vessels at the wharf and refrigeration wagons in the railway marshalling yards suggests that frozen meat is being loaded. The oyster fleet is at berth on the left side of the main wharf. The light colourings of the water at right centre is due to the shallow sandbank which is to be reclaimed. (appendix 1).
doctors, shopkeepers, hotel workers and council employees serve
the port community in providing its community services.

Bluff is a "one street" town in that the retail business
area is confined to one side of Gore Street which follows the
narrow stretch of level land along the foot of Bluff Hill. (fig. 17)
This street does not follow a continuous straight line but swings
westward to conform to the coast at its southern end. The railway
line runs beside the street and next to the harbour. Several large
buildings facing the main street are wool stores, liquor stores
and a sheep's tongue canning factory. A few acres of reclaimed
land between the street and the wharves affords sites for the
railway marshalling yards, the cool stores, a rabbit cleaning
factory, oyster canning factory, several small fish depots,
petroleum installations and the waterside workers block. The
first length of wharf next to the reclaimed area accommodates
coastal vessels, the tug, ferry vessel and some of the fishing
fleet. It is served by a single rail track. The main wharf is
larger and built further out in the channel. It is connected to
the shore by two piers, carrying rail tracks connected to the
five parallel lines on the seaward side of the wharf, the land-
ward side being occupied by the oyster fleet and the remainder
of the fishing fleet.

The residential section of Bluff extends up the gentle lower
slopes of the Bluff Hill immediately behind the main street.
The street pattern is rectangular but midway, it swings
westward, in order that the streets should run roughly parallel
to the main street, which originally followed the shoreline.
PLAN OF BLUFF

0. OIL INSTALLATIONS
1. COOL STORE
2. RABBIT PACKING FACTORY
3. FISH SHEDS
4. OCEAN BEACH FREEZING WORKS
5. OYSTER WHARF
6. MAIN WHARF

railway
retail shopping
commercial & industrial
residential

scale: one inch equals approx. 1000 feet
shoreline.

The Ocean Beach freezing works situated on the narrow sandy isthmus linking Bluff Hill and the Greenhills Range is outside the borough boundary. Its executives consider that it is no more intimately related to the port than are the other Southland freezing works at Mekarawa and Mataura. Its site about three miles from the port gives it no special advantages over other works, as it does not reduce handling of produce.

As a port therefore, Bluff has a predominant commercial function and much less important primary industrial and residential functions. Other functions, educational, administrative and recreational serve the needs of the port community.

Commercial:

Bluff has a large export trade in comparison with its import trade, in 1948 119,108 tons, valued at £10,252,797, and a smaller import trade, in 1948, 70,589 tons, valued at £1,279,257. The exports amounted in value to 7% of the New Zealand total of £128,230,692. The trade of the port will be considered in detail in Chapter I11c.

Primary Industries:

(a) Fishing: In Bluff there are eight small fish companies which handle the catch of the Bluff fishing fleet and that of the larger Stewart Island fleet. Export is organised through two agencies, to other parts of New Zealand and to the east coast of Australia. A recent development has been
An older aerial view of Bluff wharves and nearby industries showing the layout of rail tracks, on the wharves and in the marshalling yards. The many wagons and the full amount of berthing ships, indicates considerable activity on the waterfront.
the export of crayfish (Jesus Islandii) tails to the United States of America. The fish from the Stewart Island fleet is frozen locally, transported to Bluff by the ferry vessel, M.V. Waipu and stored in cool stores while awaiting shipment. Omitting seamen employed on oyster boats, the numerical strength of the combined Stewart Island and Bluff fleet is about one hundred. In 1950 the export of fish, chiefly Blue cod (Percis colias) and Groper (Oligorus gigas) amounted to 693 tons.

(b) Oystering: Foveaux Strait, with its strong currents and tides provides an excellent feeding ground for the large mud oysters (Ostrea sinuata) for which it is famed. The particular character of this industry is unique in the world. From mid-February to the end of September, nine small diesel trawlers operate daily, weather permitting, dredging the oysters from the ocean bed. The condition of the several beds in Foveaux Strait is closely watched, the boats take turns prospecting for new beds and the Marine Department decide the length of the "open" season according to the reported conditions of the beds. This is, in fact well planned farming of the sea bed and it is showing increasing returns.

The vessels, manned by a crew of five, sail down tide dragging two purse-shaped scoops. These are raised alternately several times an hour and the oysters are separated by hand from the unwanted refuse of the ocean bottom. An average daily catch is seventy sacks (sixty dozen per sack). At the port a special wharf, connected to the main railway system, has bays beneath it where the oysters are stored and kept alive by the
IMPORT OF OYSTERS

BLUFF 1920-1950

1920 25 30 35 40 45 50

thousands of tons

[Graph showing the import of oysters from 1920 to 1950]

On what basis is the curve simplified?
tide which covers them twice a day. Oysters exported to the North Island are not shipped from Bluff, because speed is necessary in transit. Instead they are hauled by express train to Lyttelton and taken by ferry steamer to the North Island. The annual catch fluctuates from year to year according to the number of boats engaged, length of the open season, condition of the beds and weather conditions (figure 18). In 1950 the season yielded 6,334 tons, whereas in 1948 there was a record yield of 9,589 tons. The average catch for the last decade is about 7,500 tons. A small oyster canning factory, exporting to Australia closed down during the last war, but has recently reopened.

(c) **Processing:** Two small factories process animal products for export. These are the rabbit freezing and sheep tongue canning industries. In 1950, 1333 tons of frozen rabbits were exported overseas, this total however, also including rabbits processed by the two Southland frozen meat companies. Like other Bluff industries this work is seasonal, the rabbit factory closing for 2-3 months in the summer and the canning factory operating from January to about June.

(d) **Storage:** Two large wool storage and dumping establishments occupy grain stores of a former period—production and export of grain having greatly decreased since the 1890’s the stores are no longer necessary for their original purpose. In "dumping" two ordinary bales of wool weighing approximately 400lbs each are compressed and bound together in the space formerly occupied by one. This is advantageous in saving space in the holds of
overseas vessels.

The cool stores are vital to the port. Established in 1917 for cool storage of cheese and butter, they have been extended from time to time, and today rabbits, fish, oysters and apples are also stored.

The installations of two petroleum companies are located on areas of naturally level and reclaimed land. There are three liquor stores in Bluff, their existence not being due to the port, but because the Invercargill Licensing Trust has a monopoly of the distribution of liquor in that city and its jurisdiction does not include Bluff. The Bluff stores distribute liquor throughout the Southland district.

Other functions:

Bluff is the mainland terminal of the Bluff-Oban (Stewart Island) government ferry service. M.V. Wairua makes the 2 1/2 hour crossing of the 22 mile strait twice weekly and more frequently during the holiday season, when large numbers of tourists visit the Island. The Wairua also services Puysegur Point and Æntre Island lighthouse, at regular intervals takes Maoris to and from the islands about Stewart Island during the mutton bird season and at present occasionally carries building materials and stores to Milford Sound where a government hostel is being built.

It is a possibility that Bluff may become a terminal for a Hobart-Bluff or Melbourne-Bluff seaplane route in the near future (Appendix 1). Overseas experts have not favoured the development of Otago Harbour for this purpose, but Bluff with
its broad surface of sheltered water and absence of eddying winds (such as is set up by adjacent hills) is a more favourable site for this purpose. At the present time, winds are being tested for directions and speed, and runways are being sounded.
Facilities of the Port of Bluff.

The wharves are situated on the south side of the harbour about 2½ miles from the entrance buoy. Ships usually enter at slack water at either high or low tide with maximum working draughts of 29' 6" and 21' respectively.

The port is designed and operated as a railway port with discharge directly into and from railway wagons. The layout on the Main Wharf with five tracks enables the wagons to be "set up" on the tracks beforehand—so as to reduce to a minimum, cargo delays, due to shunting during loading operations. Cargo can be worked 3 tracks out from the ship's side and most tracks are flush decked to enable the slings to be used to this distance. There are no transit sheds at Bluff and because it is a railway port it does not require mobile cranes, tractors or trailers.

The distributing and marshalling centre for cargoes passing through the port is Invercargill 17 miles distant. Here is the Customs Office and the railway goods sheds which store the cargoes.

The wharves provide 4300' of berthing at two wharves enabling three large and one medium sized overseas vessels, together with a large coaster, the Stewart Island ferry steamer and the oyster fleet to be accommodated at one time. In addition there is a special wharf 1 mile to the west for the storage and handling of fresh oysters.

A light locomotive moves trucks to and from the wharves while the electric capstans are used to manoeuvre wagons to and from the loading point. The railway system is considered adequate to cope with the trade but frequently overseas vessels cannot find
berthage at the wharves and are diverted to other ports. For this reason the Harbour Board has recently planned an entirely new series of wharves to replace the old ones. (Appendix I)

The Port of Otago consists of the Port of Dunedin at the head of the Upper Harbour and Port Chalmers at the head of the Lower Harbour. (figure 4). It is unique amongst New Zealand ports in that it has two separate sets of wharves, several miles apart and each is operated under a different system of cargo handling. Port Chalmers is the smaller port, acting as an outport, i.e. ships which cannot reach Dunedin, load and unload there, as they can draw deeper water. To-day Port Chalmers the same relation to Dunedin as Bluff bore to Invercargill in the 1860's, i.e. it is the outport for the larger urban centre. The Borough of Port Chalmers had a population of 8,680 in 1951. Although there are about 800 houses in the borough only about 330 of the workers are directly connected with the functioning of the port, a considerable portion of the population merely residing there and being employed in the shops, offices and factories of Dunedin. About 220 workers are on the waterfront. Fishing and fish processing employs 75-80 and about half of the 50 marine engineering workers live in the borough. At Dunedin about 300 men are employed on the waterfront while large numbers of others in transport services and warehouses, help in the functioning of the port though it is impossible to give a figure covering those working solely on port servicing.
PLAN OF PORT CHALMERS

1. MARINE ENGINEERING & SHIP REPAIRING
2. SHIPBUILDING
4. FISH FREEZER
6. BOWEN PIER

3. DRY DOCKS
5. GEORGE ST. WHARF
7. EXPORT WHARF

railway

commercial & industrial

retail shopping

residential

scale: one inch equals approx. 1000 feet.
Aerial view of Port Chalmers. The main street (George St.) runs over the low neck of land from the wharves to the reclaimed area of Mussel Bay in the centre background. The Export wharf is on the extreme left, Bowen Pier to its right and George St., wharf in the centre. Near where the three wharves converge the railway enters the tunnel which pierces the hill as far as Mussel Bay. The dry docks, one being in use, are to the right of the photograph.
At Port Chalmers the main street, (George St.) runs from the main wharf across the isthmus of the small peninsula, while the residential section spreads up the hills on each side and on to the reclaimed Mussel Bay on the Upper Harbour side of the peninsula. (figure 19). The main engineering works, wool stores, dry docks and fish packing and fertiliser manufacturing works are scattered about the head of the bay close to the wharves.

The wharves at Dunedin are parallel to the rectangular pattern of the streets, and the warehouses and factories intimately connected with the functioning of the port are necessarily found close to the wharves. (figure 20).

The Port of Otago has a predominant commercial function as well as important primary and secondary industrial functions. The entire urban area of Dunedin and Port Chalmers cannot be included in the port proper as was done in the study of Bluff because the purely port functions are the concern of a minority of the community. The port relies on the urban complex, but unlike Bluff, the urban complex does not exist solely because of the harbour.

**Commercial:**

The Port of Otago has a large import trade: in 1948, 374,299 tons valued at £10,720,897 and a smaller export trade, in 1948, 143,696 tons valued at £8,946,460. The imports amounted to in value, 8% of the New Zealand total of £123,200,692 and the exports amounted to 6% of the New Zealand total of £147,872,862. The trade of the port will be treated in section 111c.

**Industry:**

**Fishing:** Sixty eight men are employed in the fishing industry,
fleets operating from Otakeu on the Otago Peninsula side of the Lower Harbour and Port Chalmers. At Port Chalmers waste products are converted into fish fertilisers and fish oil. The surplus is exported after the local market is supplied. In 1950 the export of fish, as at Bluff, Blue Cod and Groper, to East Australia, amounted to 1,718 tons.

Storage: Wool and seed stores are located on the reclaimed ground, (figure 21) near the waterfront at Dunedin and in the former grain stores at Port Chalmers. The cool stores at Dunedin, established in 1917, store butter, cheese, fish, egg pulp, apples and citrus fruit. A large area of reclaimed land is occupied by five groups of oil installations.

Ship repairing and engineering: At Port Chalmers there are two dry docks, the Otago and Port Chalmers docks capable of accommodating vessels of 530 and 335 feet respectively. Two large engineering company's do all classes of ship repairing and marine engineering. Although originally built to serve ships only, nowadays only about 40% of their work is concerned with shipping, as ordinary engineering is also undertaken. During World War II several small vessels were built for the New Zealand Navy at Port Chalmers but in times of peace only fishing craft are constructed.
RECLAIMED AREAS

PORT OF OTAGO

scale:

reclaimed areas
Aerial view looking eastwards across the commercial area of Dunedin. The railway yards make a break between the mixed commercial and industrial area on one side and the industrial area and the reclaimed land between the railway end the wharves. Groups of oil installations are conspicuous on the reclaimed land. The sport's grounds extending to the extreme left are on the site of the former Lake Logan – a tidal flat. To the left of the main wharves is the enclosed boat harbour and the end of the Ravensbourne wharf is visible further down the harbour. The line of the Victoria Channel is clearly shown, as are the numerous sandbanks in the Upper Harbour.
Facilities of the Port of Otago.

The Port of Otago comprises two distinct ports - a main port at Dunedin and an outport at Port Chalmers. At Port Chalmers there is 4,300' of berthing providing 3 berths for large overseas ships with up to 30' draught. Like Bluff Port Chalmers is designed and operated as a railway port, all cargo unloaded into railway wagons is sent to a Dunedin railway goods shed for sorting, or is despatched directly to its destination. In recent years with heavy overseas imports, there has frequently been congestion at this goods shed, cargo often having to remain stored in railway wagons. Small railway marshalling yards at Port Chalmers makes shunting and "setting up" of wagons difficult.

At Dunedin there is 5,070' of berthing with depths alongside ranging from 22-27' L.W.O.S.T. (Low water ordinary spring tide.), 3070' being connected to the railway system. The Rattray St. and Cross wharves (which provide berths for coastal shipping) are not connected with the railways. Adjoining the wharves are transit sheds capable of holding over 15,000 tons of cargo. About 70% of the cargo handled at Dunedin passes through these sheds. Transport of cargo to and from these sheds is by motor lorry. The use of transit sheds requires more handling of cargo but is much more convenient for the many merchants and importers of Dunedin.

Two miles down the harbour from Dunedin is the Ravensbourne wharf, 384' in length, with 26' of water alongside. Raw material, principally rock phosphate and
Aerial view of part of the wharves at Dunedin. For names of wharves see figure 20. Note the extent of transit sheds paralleling the wharves. Several of the buildings on the far side of the railway yards are wool and seed stores. The buildings near the wharves house a variety of light industries.
sulphur, are unloaded here for the Dominion Fertiliser works situated on the reclaimed strip of land beside the wharf.

In addition to the Revesbourne and Dunedin facilities there is an enclosed boat harbour for small craft, situated midway between the two. 30-35 light pleasure launches and yachts are moored there.

The Harbour Board has four five ton, three three ton and five smaller electric cranes on its wharves, two of the largest being at Port Chalmers. When a ship's derricks are not capable of supporting a heavy lift at Bluff, the lift has to be made at Port Chalmers by the cranes. Nine small tractors are used for shunting purposes.
(b) The Hinterlands.

The port is a transit area - a gateway through which goods and people move to and from the sea by rail and road. The region to and from which this movement is directed is commonly and vaguely described as the hinterland. To give geographical meaning to the term we must give it definition. A boundary can only be determined by reference to the activities of the port, i.e. the movements of goods and passengers.

There is no impassable physical barrier such as a stretch of water or a range of mountains separating the areas served by the ports, neither is there an effective political barrier between the areas served by each of the two ports. In fact the greatest barrier is that of the hills immediately confining the Port of Otago. Two sets of railway tunnels have pierced these and after these have been passed the rail and main roadways have been extended readily over the province so utilising natural routeways, valleys, plains and gapes that at no stage is the gradient excessive or does the routeway rise above the altitude of cultivated land. (figure 22).

The rail pattern of the province is that of a main line close to the coast (except where it runs inland to Gore), with numerous small branch lines leading generally westward into larger valleys. The road network is more complete, often feeding railheads, and also running beside the railway. The combined communication pattern is such
that there is no sharp break between areas focussing upon one port and areas focussing upon the other.

Neither does the character of land use change abruptly at any one point on the continuous belt of agricultural land between the two metropolitan areas of Dunedin and Invercargill. The hinterlands do not comprise single geographical regions, with distinguishing characteristics, e.g. the character of Central Otago with its distinctive soils, climates, population distribution, landforms and economic activities, differs from that of the Southland-East Otago or Canterbury-North Otago regions, but it does not fall entirely within the hinterland of either port. Usually it is in the area served by the Port of Otago, but for some commodities parts of this geographical region are in the hinterland of Bluff. Similarly the Southland-East Otago geographical region is served by both ports, the respective areas of the region served by each port depending upon the nature of the trade for a particular commodity. Therefore there is no sharp delimitation of hinterlands to be recognised but rather a series of overlapping hinterlands for different commodities.

"The hinterland of a port comprises in reality a series of separate hinterlands, one for each commodity according to its nature." (19).

The Taieri Plains, an area of dairying, fat lamb and beef production in the hinterland of the Port of Otago. The plains are separated from the port by the low chain of hills in the left background.

The Waimea Plains to the north-west of Gore, an area of fat lamb production and grain growing. Store sheep are bred on the hills in the background. This area may be in the hinterlands of both ports from time to time.
of much of the character of the ports.

The province of Otago is an area of strongly contrast-
ing landscapes. There are gently sloping plains and steep
sided mountains messes; areas of superhumid and subhumid
climate; areas of tussock covered hill sides and intensive
market gardening; of unsettled tracts and densely populated
urban centres. Within these extremes the features that go
to make up the landscape exhibit great diversity, both in
themselves and in the inter-relations they have with other
features. A naturally diversified physical landscape has
long existed here, and in the last century it has been
influential in the production of an equally diversified
cultural landscape. Extensive areas of pastoral farming
for store sheep frequently come into being where natural
grasslands on adequately watered slopes were available and
the new inhabitants had already had experience in this
form of farming. Areas of adequately watered flat or rollim
plains with a long growing season, now produce dairy products
and frozen meat principally because there has been an
inse tiable demand for these products overseas. If there
were no facilities for export, these lands would not produce
as they do. The character of the agricultural land use in
Otago is strongly influenced by the proximity of the ports.
Reciprocally the character of the ports is strongly
influenced by the character of the agricultural land use.

Quite extensive tracts of land are agriculturally
unused. (Figure 23). These include the highest portions
of mountain ranges where the climatic conditions are too severe for the growth of vegetation, areas in native forest as in the Catlins, Fiordland and most of Stewart Island, urban areas and areas of recent afforestation as in the Tapanui district.

Extensive pastoral farming with sheep, producing fine wools, occupies the highest and most rugged of agricultural areas. These sheep are frequently wintered on lower country and in the summer migrate to the higher levels. Areas of this type of farming include the humid slopes of northern Southland, and the subhumid range and basin country of Central Otago. Store sheep are often raised on farms which also produce fine wools. Store sheep graze on the lower slopes of hills in Southland and East Otago. Replacements bred in the hills are sold to low country farmers for fat lamb production while other stock are finally fattened on sown grasses or crops on the lowlands.

In the province there are one large and several small areas of lowland. These are devoted to more intensive farming, usually of a mixed dairy-fat lamb economy. Fat lamb farming alone, often extends over low rolling hills as a link between the lowland areas, but dairying is confined to isolated pockets. Dairying areas include the Southland Plains, lower Waiau Valley, Inch Clutha, Tokomairiro, Taieri Plains, lower Shag Valley, the North Otago downs and lower Waitaki Valley, Maniototo Plain, Manukerikia Valley and Hawea Flat. Some localities of this type of
A centre of industry in the Southland Plains. On the left, the paper mills and on the right, the freezing works at Mataura. The mill is in the hinterland of both ports and the freezing works in the hinterland of the Port of Bluff.

Fescue harvesting near Lumsden. An area concentrating on grass seed and wool production. It is in the hinterlands of both ports.
farming in Central Otago are provided with irrigation, but in most areas the problem is drainage rather than irrigation. Long rotation grasses occupy most of the land of the plains and lower hill slopes, being rotated with root crops and greenfeed, for supplementary feeding of cattle and sheep. Areas in the Waimea Plains and North Otago downlands have a greater proportion of the land in crops, the additional area generally being used for wheat and oat production. The province produces considerable quantities of grass seeds and legumes.

Smaller and very sharply delimited areas of land in parts of Central Otago where irrigation is available, are in pip and stone fruit orchards, while small areas at Outram on the Taieri Plains and Totara on the "black tar" soils near Oamaru are used for market gardening.

These types of land utilisation and the resulting products are responsible for the bulk of the exports of the province. Except for Dunedin, the urban centres of the province exist primarily to serve the agricultural areas. Dunedin has considerable secondary industry but most of this exists to serve the agricultural areas or to process the raw materials. It can therefore be confidently stated that the trade of the province, both export and import is intimately related to the agriculture. It is a corollary that the character of the Ports of Otago and Bluff is intimately related to the agriculture of their hinterland, the Province.
Port Districts: (figure 24) For the purpose of election of members to the Bluff Harbour Board the First Schedule of the Harbour Act 1950 lists the following districts and urban areas which elect the twelve members: City of Invercargill, Bluff, Gore, Mataura, Riverton, Winton, Arrowtown and Queenstown, town districts of Nightcaps, Outautau, Lumsden, Wyndham and the Counties of Wallace and Lake. The area is known as the Port District and in the "Trade and Shipping Statistics" trade of New Zealand ports is computed, also value of trade per head of population of the port district. By the same Act the twelve members of the Otago Harbour Board are elected by City of Dunedin, Borough of St. Kilda, Port Chalmers, West Harbour, Lawrence, Roxburgh, Tapanui, Balclutha, Milton, Keitangata, Green Island, Mosgiel, Waikouaiti, Palmerston, Alexandra, Cromwell and Naseby, and the Counties of Tuapeka, Clutha, Bruce, Taieri, Waikouaiti, Peninsula, Waihemo, Vincen and Maniototo. Together these two Port Districts embrace all of the Otago Province except the counties of Waitaki, Fiord and Stewart Island. Fiord county has little present economic importance or population. Stewart Island has its own port and the Port District of the Port of Oamaru includes the Waitaki County and part of Waitaki County. This is an arbitrary system of defining areas served by ports for the purpose of statistics and representation. At the best it is a rough approximation of the areas served by each port, and an area for administrative convenience. Goods produced in any area are free to be exported through either port, similarly imports through one port are not hindered from entry into another Port District.
PORT HINTERLANDS

scale: one inch equals thirty two miles.

port districts

frozen meat is brought for export

cheese

transitional for frozen meat

Incompletes
**Tributary areas for Export Items.** By discussing the tributary areas to the ports for some of the more important exports (figure 24) some idea can be gathered of the dynamic and ephemeral nature of the hinterlands. Frozen meat and wool are the most important items at both ports and cheese is the third most valuable item at Bluff. For reasons given later they are the most convenient to discuss.

**Cheese:** The Port of Otago has never had a very large trade in this product. In 1950, 1843 tons of cheese were exported. The hinterland for cheese export is a narrow coastal strip from Goodwood near Palmerston to Fairfield in the Clyde district, the two chief producing areas being the Taieri Plains and the Lower Clutha Valley. Eleven Cheese factories are contained in this area. In the future it is possible that the area will decrease in size, two factories to the north of Dunedin—Waikouaiti and Merton—have been closed in recent years, while Goodwood production is low and declining.

The Port of Bluff serves a larger and more productive area. Cheese exports have been stable for many years, the 1950 figures being 10,919 tons. The area exporting through Bluff includes all factories bounded by Pukerau to the east, Arrowtown to the north and Tustepere to the west. 37 factories are included in this area. Two or three factories have been closed recently but production is still stable and the area served has not decreased. Arrowtown
is a lone centre of dairying remote from the two major areas of the Southland Plains and coastal Otago and on the map it is responsible for a considerable extension of the Bluff hinterland for cheese.

**Frozen Meat:** There are six freezing works in the Otago Province and it is planned to build another works in Southland. Pukeuri, (7 miles north of Cameru), Burnside (4 miles west of Dunedin) and Finegand, (2 miles south of Belclutha) export via the Port of Otago; Mataura, Ocean Beach and Makarewa (6 miles north of Invercargill export via the Port of Bluff. Refrigerated vessels are usually of deep draught and therefore at the Port of Otago vessels are usually loaded at Port Chalmers. Only one overseas refrigerated vessel is loaded at a time, each of the three works contributing a share of the cargo. Insulated wagons are often in short supply, there being sufficient only to supply adequately three ships in the South Island, at one time, although there are four export ports, i.e. Otago, Bluff Timaru and Lyttleton.

Frozen meat products consist predominantly of lamb with mutton much less significant in total. Lambs may be collected from long distances especially if a works has to seek for lambs in good condition. Unfavourable weather may retard the growth of lambs in one district and in that case the local works is supplied with lambs from a district where growth has been more favourable. Farmers receive the same prices from all companies and have to
pay transport costs for the distance to the nearest works. If on any account lambs travel further than this distance the extra cost is met by the company. Southland buyers operate north-eastward as far as Taupahi on the main trunk railway to Tapetui, south of the Blue Mountains and northward as far as Arrowtown. Very often Otago companies buy stock in north and east Southland. It is estimated that 200,000-400,000 stock go from Southland to Otago works in this way annually. This is one reason why the Royal Commission of 1951 investigated the need for a new freezing works in Southland. However, if the new works exports through Bluff the allocation of refrigerated ships to the ports will have to be increased or at least made more regular because in the past season works had to reduce output at times as ships were not available and all storage space was full.

Finagend and Burnside works export through the Port of Otago only but Pukeuri exports about 30% of its output through Timaru. Since World War II there has been no overseas trade through the Port of Oamaru so that the balance of 80% of Pukeuri exports goes through the port of Otago. The Pukeuri works draws stock from the North Otago and also from beyond the provincial boundary from the Hekateramea Valley and from South Canterbury as far north as St. Andrews.

The tributary areas of the ports for frozen meat are increasing in area as new land is developed e.g. pioneer
farms in the Tuatapere district and the Catlins, while there has been in recent years a considerable increase in production from well established producing districts. The boundary between the areas served by the ports in respect of frozen meat is one which changes with the influence of such factors as capacity of works, weather, availability of shipping and transport. This commodity therefore illustrates the dynamic nature of the hinterlands.

Wool: The hinterlands for wool are ones liable to rapid fluctuations according to the influence of such factors as overseas demand for wool, the quality of the clips, the date of sales, and the type of wool. Whereas dairy products and to a lesser extent frozen meat do have definable hinterlands, it is difficult to determine any such well defined hinterlands for wool. It is a commodity which can be cheaply stored for years, is easily transported, not requiring any specialised conveyances and need not be transported rapidly. Other factors beside proximity to a port determine the port of export. More wool is exported through Otego than through Bluff (Figure 15) and nearly all goes overseas. Dunedin has a wool sale earlier in the year than Invercargill and many Southland farmers send their clip to Dunedin in the hope of receiving a higher price. The sale of fine wools (i.e. Merino and three-quarter bred) also by custom takes place in Dunedin, and hence much of the high country clip is exported via Dunedin. The wool handled by the brokers is classed, in both Dunedin
Plate 18. The powerful tug "Awarua" at Bluff. The strong tides and currents of Foveaux Strait make a large tug necessary for handling large vessels in the narrow entrance.

and Invercargill. After sales it is exported if a vessel is in port or stored until required. To facilitate handling and to make the most of the shipping space, "double dumping" is resorted to.

During World War II the government was responsible for selling all wools and wool growers had to send their wool to a specified centre. Fluctuations in export during and after the war have been due to the lack of shipping during the war period and disposal of accumulated surplus stocks afterwards. Definite hinterlands for each port cannot be delimited though the Port of Otago has the greater total trade in this export.

There are many other items of export, though none is as important as the three chief items discussed. Their port of export may depend on many factors both social and economic. The Port of Otago being the greater import centre has more frequent sailings and is the export port of many minor primary products. Factories situated between the ports export as shipping is available, e.g. oatmeal mill at Gore, paper mill at Mataura and sugar of milk factory at Edendale, and no other minor item of primary produce shows a definite hinterland.

Imports: The Port of Otago has a far greater import total, in both tonnage and value than the Port of Bluff. Bluff has few imports and these are usually of a bulky variety e.g. motor spirit, and manures. The Port of Otago on the other hand has a greater variety of imports whether
raw material, semi-processed goods or fully manufactured commodities. Because of its earlier beginning, because it was once the chief manufacturing city of New Zealand, (and it is still important in this field) and because it has a greater concentration of population in its vicinity, (Dunedin 1950, 91,200 in the urban area) the Port of Otago is the chief importa of the province. Thus for many items the hinterland of the Port of Otago covers the whole province, even including Bluff itself.

A survey of the more important items on the import schedule shows the large areal extent of the hinterlands of the Port of Otago, as well as the indecisive nature of boundaries between port hinterlands.

**Petroleum:** Petroleum and other motor spirits are stored in terminals constructed on reclaimed land at both ports. At Bluff only two companies have installations and these are supplied by a small coastal tanker because the capacity of the installations does not warrant visits by overseas tanker. At Otago overseas tankers operate regularly and make Dunedin their last port of call in New Zealand because of the relatively shallow draught of Victoria Channel. Depots are supplied by rail tanker from the ports and distribution to retailers is by road tanker. One of the companies at Bluff has a depot at Invercargill and supplies an area bounded by Edendale, Wyndham, Fortrose, Tokanui, Winton, Hedgehope? tustapere. Its Gore depot which serves northern Southland is supplied from Dunedin. The other

Plate 21. Bluff. Waterfront showing at left the dredge, tug, an oyster boat and a fishing boat.
company at Bluff has small depots supplied from its major ones at Invercargill and Gore and all its depots serve an area bounded by Waierere South, Heriot, Tapenui, Riversdale, Balfour, Lumsden, Five Rivers, Mossburn, Te Anau and Tuatapere. All other companies operating from five groups of installations at Dunedin, supply their Southland retailers and depots from Dunedin. Oil men agree that the Waitaki River is a very real boundary to the area supplied from Dunedin. Special grades of petroleum and oil which require separate installations are all distributed from Dunedin only. There is a possibility that definite hinterlands for petroleum may develop as more installations are to be erected at Bluff, but at present there are no distinctive hinterlands for this commodity.

Manures: Some bagged phosphate from Sfax and basic slag are imported through Bluff, but most manures arrive in the raw material form and have to be processed before distribution to farmers. At Ravensbourne and Burnside about 60% of the South Island's fertiliser is produced. The main products of superphosphate, and reverted serpentine super are distributed as far north as the Rangitata River in Canterbury while serpentine super is sent by coastal vessel to Nelson. One by-product is sulphuric acid and this supplies all the freezing works as far north as Timaru, and Hydrochloric acid is supplied for the whole of the South Island and Wellington city.

Cement: Four percent of the raw materials for cement
consists of gypsum imported from Australia and the local company near Dunedin supplies the South Island from Timaru south.

Machinery: A representative large firm importing agricultural implements, tractors and refrigerators has branches at Dunedin and Invercargill, but estimates that about 75% of the supplies for the southern branch are raided from Otago Port. The Dunedin branch operates northward as far as the Waitaki River.

Automobiles assembled in the Hutt Valley come by coaster to the Port of Otago and only occasionally to the Port of Bluff while nearly all new pre-assembled cars come by overseas vessel to the Port of Otago.

The Boundary to the North: R.H. Wheeler in an unpublished thesis, "The Port of Timaru" (20) excludes the Hekateramese Valley from the hinterlands of that port, as it has closer ties with North Otago than South Canterbury from which it is isolated by the mountainous Hunter Hills.

It is not considered that the Port of Oamaru affects the area served by the Port of Otago. In the Oamaru list of imports for 1950 the largest item is 4,890 tons of wheat from Australia. Small tonnages of sugar, timber and 4,628

Plate 22. Bluff. Scene on the main wharf. At left the railway line runs from the pier connecting the wharf to the shore.

Plate 23. Bluff. Rail tracks on the wharf.
tons of other goods comprise the coastal imports. Such imports would be insufficient for the Port Districts requirements. Exports of Oamaru are chiefly flour, lime, oats, pollard and bran, potatoes and seeds and these go by coaster. All overseas produce has to be exported via Timaru or the Port of Otago, and it is considered that the Port of Otago has a greater share of this trade.

Hinterlands for imports are thus seen to be partly dependent on destination of shipping and partly on the nature of the items, as well as methods of distribution. For some imports Bluff has its own small hinterland but usually the Port of Otago has a hinterland covering the entire province and sometimes including parts of Canterbury, the whole South Island and even to parts of the North Island.

By examining the economic, social and political factors which affect the spheres of influence of the ports we do not thereby conclude that any one line may be drawn dividing the province into areas in which one or the other port has a dominant interest. However these factors and their implications do assist us to understand the nature of the differences between places and to evaluate the differential character of the two ports.

Plate 25. Bluff. The marshalling yards. In the background are the Cool Stores and at the left the oyster cannery.
(c) The Trade.

The port exists for and because of the flow of trade to and from the hinterland. Without trade there would be no justification for the existence of either the Port of Otago or the Port of Bluff. They are not terminals for passenger traffic, naval depots, coal ports or other types of ports which are found in other ports of New Zealand and the world. It is the export and import trade on which their prosperity is based. In the following pages the exports and imports of the ports will be separately described in order to show their contribution to the port character.

**Import Trade of Bluff:** A considerable proportion of the imports of Southland arrives via the Port of Otago and is re-routed south. Shipping companies prefer their vessels to call at as few ports as possible, when unloading a cargo because each port visited means extra harbour dues to meet. Few overseas vessels unload at Bluff so Southland importers wishing to have early delivery of their goods have them despatched to Otago.

This means increased cost of transport on the 157 miles of railway from Dunedin to Invercargill. Unless items are urgently needed, however, the importers prefer to have their cargoes despatched to Bluff.

The 1950 schedule of cargoes (appendix 1) handled through Bluff shows that of the 25,128 import tons only 32,770 (i.e. just over two fifth's) (figure 35) came
OTAGO & BLUFF

EXPORT & IMPORT TONNAGE

1950

Figure 25

thousands of tons

- imports
- exports

Coastal

Overseas
ANNUAL IMPORT TONNAGE 1920-1950

Otago

Bluff

Thousands of tons

1920 25 30 35 40 45 50
by coaster being imports from other ports of New Zealand including transhipments from overseas vessels calling at the larger ports—usually Wellington or Auckland.

Analysis of the coastal import schedule shows the local catch of oysters and fish as two of the chief items, and motor cars, chassis, tractors, fencing wire and netting are imported for the farms and towns of the province.

Motor spirit is stored by two companies in installations at Bluff, most of the imports coming in the Shell Company's tanker "Tamar" which operates around New Zealand. Sugar from the Chelsea refinery in Auckland is another large item in the coastal import schedule.

Overseas and intercolonial imports often have the same items as coastal imports, but other items come by these vessels only. Foodstuffs include fresh and preserved fruit, salt, (for freezing works as well as for private use) and sugar, artificial manure, chiefly bagged. Basic slag and phosphate, supplies a little of the province's requirements for top dressing for farmland.

Wood pulp from Scandinavia supplies the New Zealand paper mills at Mataura. Tin plate, iron and steel supplies come in there for the Engineering shops of the province. The imports of Bluff are small in volume (figure 26) of little total value (figure 27) usually manufactured or processed goods, and comprise relatively few items. (figure 28)

Harbour Board Government statistics do not show the country of origin of imports but in general terms this
IMPORTS BY VALUE 1920 - 1948 figure 27

Otago
Bluff
PERCENTAGE IMPORT TONNAGE 1950  figure 28

OTAGO

other goods

BLUFF

other goods

manures  sugar

motor spirit  fruit

timber  oysters
information can be gained by local knowledge supplemented by interviews with industrialists and importers. Artificial manures consists chiefly of bagged phosphate from Sfax in Tunis in North Africa and basic slag from the foundries of Belgium, the United Kingdom. This type of cargo often arrives in chartered tramp steamers. Although most of the motor spirit comes by coastal tanker, it is imported from Bahrein Islands within the Persian Gulf. Sugar is imported via the Chelsea refinery at Auckland, from Fiji and Queensland. Timber hardwoods come from Southern Australia, principally Coff's Harbour in New South Wales. Wood pulp for the Metaura works comes from Scandinavia. Most machinery and manufactured goods are imported from the United Kingdom and to a lesser extent from Australia.

Import Trade of the Port of Otago: By far the greatest proportion of the imports of the area south of the Waitaki River enters the Port of Otago. (figure 26) The 1950 schedule of cargoes (appendix III) handled through Otago shows that of the 375,519 import tons (4½ times the Bluff volume of imports) - 91,955 tons arrived by coaster, and 283,564 tons by intercolonial and overseas vessels (figure 25). In the same period the Port of Gensaru imported 4,901 tons from overseas, this being one shipment of wheat from Australia. In comparison with Bluff a much higher proportion of Otago's imports arrives by overseas vessels (i.e. almost four fifths) but at the same time, it also received twice

Plate 27. Bluff. Oyster boat at berth.
the volume of the Bluff coastal import trade.

Analysis of the coastal import schedule shows a miscellaneous variety of goods, about 83% of the imports coming under the heading "other goods". Important enumerated imports are sugar, milk products, liquor and hides. "Other goods" include numerous foodstuffs, machinery and machine parts, processed or assembled in the North Island.

Overseas and intercolonial imports include fresh and preserved fruit, sisal, artificial manures, motor spirit and kerosene, sugar, hard and soft timber, wheat and liquor. Other goods include a multitude of manufactured and semi-processed metal and textile goods, machinery, implements, salt, steel, iron and raw materials for local industries. Some of the more important secondary industries using imported raw materials are, engineering shops, cement works, two fertiliser factories, woolen mills, rope works, furniture factories, linseed oil refinery, a steel rolling mill and the railway workshops.

Again as the Harbour Board and Government Statistics do not show the origin of imports, it was necessary to supplement local knowledge with interviews with local importers and individual industrialists. Preserved (i.e. canned fruits) are shipped from ports in the North Island, Australia and South Africa. Fresh fruit, principally citrus fruit, bananas and pineapples are exported from a wide area including Fiji Islands, Cook Islands, Samoan Islands, Jamaica, Queensland and South Australia. Artificial
Plate 28. The harvest of the sea. A net of oysters dredged from the bed of Foveaux Strait.

Plate 29. "Culching" oysters - sorting the fully grown oysters from the smaller ones and other debris from the ocean floor.
fertilisers include a variety of raw materials used in the manufacture of super-phosphates and muriatic acid. Sulphur is imported from Texas, phosphate rock from Nauru and Ocean Islands and the Tuamotu Archipelago, and nitrate of soda from South America. Chemical fertilisers including sulphate of ammonia, sulphate of potash, muriate of potash are imported from the United Kingdom and Western Europe. The Milburn Lime and Cement Works imports gypsum from Australia. Motor spirit and kerosene comes from Bahrain Island. Sisal for a local rope works originates in East Africa. Hides from the North Island supply a local tannery. An occasional shipment of wheat from Australia supplies the local flour mill.

Importing firms estimate that about 75% of all implements, machinery parts and accessories coming into Otago Province arrive through the Port of Otago. It is further estimated that 95% of such imports are from overseas, chiefly from the United Kingdom and Australia.

For New Zealand as a whole in 1949, 55.13% of imports came from the United Kingdom, 12.79% from Australia, and 9.62% from the United States of America, these being the main exporters to New Zealand. The extent to which New Zealand trade is dependent upon British Commonwealth countries is shown by the figure 79.87% of imports from these sources. There seems to be no reason why these percentages should not generally apply to the Ports of
Bluff and Otago.

The Export Trade of Bluff: The continued development of the Port of Bluff when many other lesser ports on the New Zealand coast had declined is due to its export trade (figure 23). The "Railway Age" has not resulted in the stagnation or decline of Bluff as it has for instance for Patea or Oamaru. Rather it has enhanced Bluff's qualities as a port of export. Rapid road and rail communication from all parts of the hinterland is necessary for the export of primary produce especially that which requires storing in cooling or freezing chambers. The Southland plains extending from Invercargill allow such rapid communication to the natural export focus of the Port of Bluff.

Insignificant quantities of exports are sent by coaster to larger ports for transhipment to overseas vessels; of the 105,278 export tons in 1950, (appendix 11) only 17,659 tons (i.e. 17%) were despatched by coaster and of this not 100 would be transhipped. (figure 25). Exports to other ports of New Zealand, principally the North Island, Nelson and Marlborough were soft woods and sugar of milk products, seeds, paper, oats and oat products. Other goods comprised only 2,260 tons so it is apparent that local exports comprise relatively few primary products.

Overseas exports in 1950 totalled 87,619 tons i.e. 83% of the total. They consist of relatively few primary products and only 526 tons (i.e. less than 5%) come under
ANNUAL EXPORT TONNAGE 1920-1950

Otago

Bluff
the heading of "other goods". Itemised overseas exports include frozen and preserved meat, wool, cheese, tallow, milk products, seeds, pelts, frozen rabbits, softwoods, sugar of milk, fish and a small amount of whey butter.

Bluff oysters are not exported by sea from Bluff. Because of the need for rapid transport, this perishable delicacy is consigned in sacks to the North Island, railed to Lyttleton and taken by the inter-island ferry steamer to Wellington.

The destination of exports cannot be determined from port statistics (21) but as in the case of imports field work can elicit much of this information. Soft woods, chiefly silver birch (Nothofagus menziesii) is exported.

(21) STATISTICAL NOTE:

There are several important items of detailed trade statistics which would be welcomed but are not available, such as destination of goods from each port, value of such exports, country of origin of imports to each port and value of such imports. The annual publication "Trade Shipping" was discontinued in 1945 although Part 1 of 1946 was published in 1952, and the Year Books do not give such detailed analysis. Trade values are published for provinces e.g. Otago Province but do not distinguish between the ports making up that total, e.g. Oamaru, Otago and Bluff. Some analysis are published in detail for the four chief ports of New Zealand, i.e. Auckland, Wellington, Lyttleton, and Otago and the minor ports are combined under the heading "Others". For this study in comparison and contrast between Otago and Bluff, such figures have not been available for Bluff and such general grouping of statistics is of no use for this study. Statistics published in Harbour Board returns are not always comparable because different weight measures are used, e.g. varying numbers of bales of wool or crates of cheese to the ton. The figures collected by the Government Statistics Department since 1922 are based on a standard system and thus are the only truly comparable figures.
Plate 30. Port Chalmers. General scene of the waterfront. The Union Steam Ship Company's repair yards are in the right foreground.

Plate 31. Port Chalmers. Congestion at the deeper berths. One vessel is "double-berthed". A cargo of tallow is awaiting loading at the near end and frozen meat at the far wharf.
to the North Island and Australia. Almost the whole of the indigenous timber export from Otago and Southland is via Bluff, the reason stated being that Dunedin has but one berth adequately connected to rail and it is an awkward port from which to handle timber. Milk products and sugar of milk is exported to the North Island and the United Kingdom. Paper manufactured from the Mataura Mills is exported from both Otago and Bluff to other parts of New Zealand. The port of export for paper depends on the availability of coastal shipping and refrigerated wagons which are the best available railway rolling stock, and are used to carry paper. Therefore when both ports are busy loading frozen meat these suitable wagons are not available for paper.

Oats and oat products, the latter including rolled oats and "creamoats" produced at Gore are exported to the North Island and again from either Otago or Bluff depending on the availability of shipping.

Grass seed including, dogstail, timothy, cocksfoot, chewings fescue, red montgomery clover, brown top and ryegrass is exported from both ports to other parts of New Zealand, North America and Western Europe.

Others going to the United Kingdom include, frozen meat (figure 14) which in recent years has become Bluff’s most important export both in volume and value; cheese (figure 15) which has been one of the most constant exports in volume; and frozen rabbits, an export which fluctuates frequently. Tallow, pelts, wool and rabbit skins have a
Plate 32. Port Chalmers. Two "Port Line" vessels at the George Street wharf. The wharf is completely flush-decked. The tall cranes can take heavy lifts.

Plate 33. Port Chalmers. Overseas vessel in the "Otago" drydock.
wide dispersal especially in Europe and North America. Cod fish are exported to Melbourne and Sydney and crayfish tails to the United States of America.

Export Trade of Otago: Whereas the imports of the Port of Otago are far greater in volume and value than those of Bluff, the exports of Otago and Bluff are similar in volume (figure 29) and value (figure 30). Of the 134,319 export tons from Otago in 1950, 72,907 tons (i.e. 54½%) were exported by coaster and the remaining 61,412 tons (i.e. 45½%) were exported by overseas vessel. (figure 25). These percentages contrast with the 17½% and 83½% respectively of Bluff. Although Bluff has a smaller export tonnage its exports have greater value ton for ton with the result that there is very little difference in the value of exports from either port in any one year, e.g. in 1948 Otago's 143,696 tons were valued at £8,946,460 and Bluff's 119,108 tons were valued at £10,252,797. Enumerated coastal exports from Otago in 1950 include, pollard and bran, potatoes, seeds, liquor, oats and oat products, milk products (other than butter and cheese), artificial manures, peas and beans. However, these primary products accounted for only 14,579 tons of the 72,907 coastal tons in 1950. The remaining 58,329 tons of other goods consists of the processed and manufactured goods of the secondary industries of Otago and Southland. Some of these include linseed oil, textiles, soap, biscuits and confectionery, paper and chemicals. Overseas exports in 1950 totalled 61,412 tons, consisting
EXPORTS BY VALUE 1920-1948 figure 30

Otago
Bluff
like those of Bluff, of relatively few primary products. Only 3,042 tons, that is less than 3%, of the overseas exports come under the heading "other goods". The most important exports are frozen meat, wool, seeds, peas and beans, cheese, fish, tallow, pelts, frozen rabbits, milk products, hides and skins and a little whey butter. (figure 31)

Destinations in no way vary from those stated for Bluff for similar products. For New Zealand as a whole in 1949, 73.39% of exports went to the United Kingdom, 1.56% to Canada, 2.5% to Australia, 5.21% to France and 3.75% to the United States of America. Exports to British Commonwealth countries accounted for 79.44% of all exports. These figures are generally true for the ports of Bluff and Otago, with Bluff sending a greater percentage of exports to the United Kingdom, because Bluff's chief export, frozen meat, is an export that almost exclusively goes to the United Kingdom.

Figures 32 and 33 illustrate the relative importance of the ports in volume and value for total trade, while the division of the trade into export and import both coastal and overseas illustrates significant differences in the character of the ports, the fundamental difference is that the Port of Otago has more trade than the Port of Bluff.
Figure 32

TOTAL TONNAGE OF TRADE 1920-1950

Otago

Bluff

Thousands of tons

1920 25 30 35 40 45 50
(d) The Position of the Ports in the Trade of New Zealand and the World.

Relations with New Zealand:

The days are gone when the Port of Otago handled two-thirds of the trade of New Zealand. In 1871 the province of Otago contained 26% of the population of New Zealand, but from that time a gradual decline set in relative to the total population of the country, so that by 1950 the province included only 12%. As the effect of the gold rushes subsided and as the North Island was increasingly developed, so did the relative importance of the Port of Otago in the country's trade wane. Nowadays, the combined trade of the ports of Otago and Bluff is about 12% of the Dominion total. This is the same proportion of the country's total trade as the population of Otago Province bears to that of the whole country. There are however, distinctive contrasts in the relative proportion of imports and exports to Dominion totals. In 1949 the combined export values represented 14.2% of the New Zealand total value and in 1945 the latest year for which import values were available, they comprised 10% of the New Zealand total value of imports. The export values per capita of the provincial population are therefore markedly above the New Zealand average while the import values per capita are below it. This reflects the value of the primary products of the province and the concentration of overseas shipping bringing imports to the two
Plate 34. Dunedin. A coastal and two overseas vessels at the Rattray Street wharf.

Plate 35. Dunedin. Cranes dominate the skyline at Birch Street wharf.
major North Island ports. During the war there was an even greater concentration of imports there. Ports ranking above the southern ports considered individually for exports in 1949 (figure 34) were Auckland with 35.7%, Wellington with 20.7%, Napier with 10% and Lyttelton with 9.2%. Ranking for 1948 imports (figure 35) placed Wellington first with 38.7%, then Auckland with 38%, followed by Lyttelton with 11.7%. These figures show that there is not such a concentration for export items as there is for imported goods at the two main ports. Still considering them separately, the two southern ports show further contrasts in detail with other New Zealand ports. In 1949 the Port of Otago had 6.1% of the total value of New Zealand exports, ranking sixth. For 1948 imports the port had 8% of the New Zealand total and ranked a clear fourth.

As an exporter of primary produce the position of the Port of Otago amongst New Zealand ports, for important items of primary produce was, wool 5th., frozen meat 8th., cheese 5th., tallow 8th., and seeds second. (figure 36).

In 1949 the Port of Bluff had 8.1% of the total value of New Zealand imports, ranking 5th. (figure 35). As an exporter of primary products its ranking was, wool 6th., frozen meat 4th., cheese 4th., tallow 4th., and seeds 3rd. (figure 36) Although figures for the Port District of Bluff which includes the Counties of Lake, Wallace and Southland state that the per capita value of the exports is twice
VALUE OF EXPORTS
NEW ZEALAND
1949

millions of £'s

Auckland
New Plymouth
Napier
Wellington
Lyttleton
Timaru
Otago
Bluff

figure 34
VALUE OF IMPORTS

NEW ZEALAND

1948

Figure 35

Auckland
Napier
Wellington
Lyttleton
New Plymouth
Timaru
Otago
Bluff

millions of £'s
the Dominion average this may not give a true indication of the situation. The figures are for the population of the Port District and the value of exports recorded as passing through the port. As was emphasised in the section on hinterlands all the exports of the Port District of Bluff do not pass through the port. It was shown particularly that in respect of wool and frozen meat the Port District was encroached upon by the Port of Otago. It is suggested therefore that the export values per capita for the true hinterlands of Bluff would be considerably greater than twice the national average.

When compared with other New Zealand ports the Port of Otago is revealed as being similar to Auckland, Wellington and Lyttleton in that there is both a large export and a large import trade. In contrast to this the Port of Bluff is similar to Napier, Whangarei and Timaru in that it has a very small import trade and a large export trade.

In contrast to the situation respecting Bluff, it may be noted that the centralization of shipping, particularly for imports, is associated with a decline in coastal trade, and the subsequent loss of total trade of many minor North Island ports. Tand communications are increasingly being utilized to transport produce to and from main ports. Year Book statistics show that several smaller ports have a declining export trade, often no import trade and in
Plate 36. The reclaimed area at the head of Otago Harbour. The area behind the wall is still to be reclaimed. New railway marshalling yards are to be built on part of the vacant land.

Plate 37. Dunedin. "B" shed where imports arriving via Port Chalmers are sorted. In recent years with a large volume of imports there has frequently been congestion at this shed.
some cases trade has entirely ceased in the last decade. For instance the value of overseas exports declined from £1,213,600 in 1939 at Whanganui to only £162 in 1949. At Oamaru the 1939 overseas exports were valued at £352,771 and those of 1949 were nil. Whanganui and Tokomaru Bay are no longer visited by overseas vessels. Neither overseas nor coastal vessels now visit Foxton. Bluff, however, shows no sign of declining statistics, as its vigour and financial prosperity is reflected in the plans now being put into the first stages of operation, for entirely new wharves. Coastal services, however, do show a decline. Before World War II, Bluff had regular coastal services to Napier, Gisborne, Whanganui and Auckland. In recent years the service has worked to and from the Port of Otago only. The irregular and infrequent visits of coastal vessels to Bluff has forced the reilage of goods between Invercargill and Dunedin. Importers prefer to specify direct shipment to the Port of Otago or Bluff and perhaps thereby delaying its arrival in New Zealand but nevertheless usually arriving earlier at its ultimate destination than if it is subjected to delays if re-exported via coaster from Auckland or Wellington. It has become recognised that it is quicker to ship goods to Dunedin from Britain than to ship them from Auckland. Relation with the world: Statistics show the importance of the trade of the ports of Bluff and Otago with other lands. Figure 37, based on the values of imports and countries of reported origin, and figure 38, based on the values
VALUE OF IMPORTS FROM PRINCIPAL COUNTRIES

1944

Millions of £

1

2

OTAGO

BLUFF

AUSTRALIA
INDIA
U.S.A.
UNITED KINGDOM
OTHERS

BRITISH W. AFRICA
NORTH AFRICA
TUAMOTU ARCHIPELAGO
PERU
CANADA
CEYLON
INDIA
U.S.A.
AUSTRALIA
UNITED KINGDOM
OTHERS

0.056
0.06
0.06
0.086
0.02
0.14
0.03
0.06
0.09
0.1
0.11
0.41
0.48
0.52
1.44
0.95

figures as decimals of one million pounds.
VALUE OF EXPORTS TO PRINCIPAL COUNTRIES 1944

Millions of £'s

Canada
Australia
Egypt
U.S.A.
United Kingdom

Figures as decimals of one million pounds
of exports and reported destinations, illustrate the number and relative importance of parts of the world trading with the ports. If it were not for the export of primary produce there would be little reason for the existence of large port facilities. The 1951 Bluff Harbour Board Report lists the country of departure of vessels calling at Bluff. The country of departure is by no means the country of the origin of the imported article or raw material, but it does give some idea of the widespread nature of source regions. Of the 29 overseas vessels calling at Bluff in 1951, 5 were from London, 5 were from the west coast of the United Kingdom and Liverpool, 3 from Canada, 3 from Scandanevia, 2 from Calcutta, 2 from the Persian Gulf, 1 from North Africa, 1 from Japan, 1 from Trinidad, 3 from Sydney and 3 from Melbourne. A similar distribution of sources is true of the Port of Otago. Some vessels may unload only small quantities of general cargo, especially in the case of ships from the United Kingdom, which may call only to load frozen meat, wool and other primary products. Other vessels may unload considerable quantities of bulk cargo such as cement, bagged phosphate and wood pulp. At the Port of Otago most vessels unload some cargo very few calling exclusively to load.

Figures for the destination of ships leaving the port give some indication as to the market for exports. Some exports may be unloaded at other ports en route or transshipped to another country after arrival at the stipulated
Plate 38. DunedIn. Industries on reclaimed land. The emblems of three major Oil Companies are prominent.

Plate 39. DunedIn. Carters taking delivery of goods from the transit sheds at Rottrey Street wharf.
port. Again some vessels departing may not have loaded any
cargo and may be returning in ballast or loading at some
other port. The 1951 Bluff Report states that of the 36
vessels leaving the port, 20 were bound for the United
Kingdom and the continent, 5 for North America, 3 for the
East Indies, 1 for Japan, 4 for Sydney and 3 for Melbourne.
The majority of vessels are bound for the United Kingdom.
The importance of trade with the United Kingdom was noted
in the section on trade of the ports (section 111c). At
all times the bulk of the trade is with the United Kingdom
but the proportions vary as political conditions, trade
agreements, demands and prices vary. New Zealand is perhaps
more dependent upon overseas trade than any other country
in the world. The Port of Bluff shares this dependency.

The Ports of Otago and Bluff are places where goods
change from land to water or water to land transport.
The land routes radiating from the focal points almost
completely serve the province of Otago; the water routes
radiating from the same focal points assist in serving
widely scattered places on the earth's surface.
Thus the character of the ports is influenced by both the
area immediately behind them and the greater diversity of
areas reached by the sea-lanes.
Plate 40. Dunedin. Maintenance dredging by the dredge "Otakou" in the swinging basin.

Plate 41. Dunedin. A portion of the boat harbour. Most craft are pleasure launches and yachts.
(e) Comparison and Contrast.

**Function**: Both ports have a commercial function in servicing large areas of country behind them. The existence of Bluff and Port Chalmers is almost entirely due to the existence of the ports as such, but the Dunedin section of the Port of Otago grades into a larger urban complex which has no immediate connection with the port per se. Thus both ports have an import and export function which serves similar primary and secondary industries. In contrast the Port of Otago has a far greater import function than the Port of Bluff. They also differ in respect of certain local but smaller specialised functions e.g. the oyster industry and ferry service terminal at Bluff and ship repairing at the Port of Otago.

The facilities of the ports provide further contrasts. Otago has more than twice the berthing accommodation of Bluff, extensive use of transit sheds is made at Otago, as opposed to the absence of such transit sheds at Bluff; whereas Otago uses cranes and small tractors to help move cargo, Bluff relies on the derricks of modern cargo ships and electric capstans.

If however we omit the Dunedin wharves and compare Bluff with Port Chalmers we find many similarities. They have almost precisely the same berthing, can accommodate a similar number of vessels, have similar working draughts both are exclusively railway ports, the marshalling of
Plate 42. Dunedin. Cranes unloading general cargo at Barof Street Wharf. Motor trucks are frequently used on the wharves at Dunedin.

Plate 43. Dunedin. The chartered vessel "Ivybark" unloading cargo of molasses and sulphur at Victoria wharf.
traffic, sorting of goods and customs procedure being
at another centre i.e. Invercargill and Dunedin respectively.
When we remember that at one time Invercargill was itself
an important port and Bluff was the outport occupying a
relation similar to that of Port Chalmers to that of
Dunedin to-day, the comparison is enhanced.

Man has deepened the six foot channel in the Upper
Otago to its present depth of 28ft., thus making Dunedin
the chief section of the port, whereas the six foot
channel to Invercargill was allowed to silt and shoal
thereby yielding to Bluff the status of Southland's chief
port. We might possibly have had comparable ports and out-
ports rather than distinctive contrasts to-day, had it
been possible to deepen the channel of the New River in a
way similar to that carried out at Otago.

The Hinterlands: It has been shown that there are no
two sharply defined areas separately serviced by either
port. Rather there are a series of hinterlands for
various imports and exports which have unstable bound-
aries, the fluctuations being due to the incidence of
numerous natural and artificial factors.

The hinterlands of the ports are similar in that they
cover heterogeneous areas of country-plain, hill,
plateau, and mountain and a corresponding range of land
utilisation. Both ports have hinterlands for a similar
range of primary exports but the import hinterland of
Otago is by far the greater. Here Otago has always
been predominant but such is the value of the primary exports of the Bluff hinterland that it is not likely that the trade of the Port of Bluff will be encroached upon by its larger rival. Improved communications to, or cargo handling facilities at, either port could at any time enlarge the hinterland of one and reduce that of the other. At the present time it appears that with more agricultural development taking place in the Southland District, with the possible establishment of a fourth port works there and the active steps being taken by the Bluff Harbour Board to expand and improve its facilities, there will be no diminution of the Bluff export hinterlands. Whether the Coal Creek hydro-electric scheme will attract new industries to the Otago Province, and if so where they will be located and which port will serve them, can only be surmised at this early stage of the scheme's development. The Trade: A study of the trade of the ports brings out two very important features. Firstly, the similar value of the export trade of both ports is striking. This may certainly very considerably from the average in some years but generally it is remarkably similar for both. Volume of Otago export trade is greater, indicating greater value per weight unit than that of the Bluff exports. Secondly, the sharp contrast in the importance of the import trade of the ports is evident. At the Port of Otago the volume and value of imports is far greater than that of the Port of Bluff.
The range of exports is similar, being chiefly of raw or processed primary products, prominent items being frozen meat, wool, and dairy products.

In contrast to the great variety of imports entering the Port of Otago there are relatively few bulky imports entering the Port of Bluff.

Trade with New Zealand and the World: The Port of Otago is an important import centre in New Zealand and occupies fourth position, whereas Bluff although in fifth position is a minor import centre. While Auckland and Wellington are easily the chief export centres the ports of Lyttleton, Napier, New Plymouth, Otago and Bluff all have a comparable export trade.

The export hinterland of the Port of Bluff contrasts with that of the Port of Otago in that the per capita value of its produce is at least twice that of the latter. Although the Port of Otago has trading connections with a greater number of countries than does the Port of Bluff, the great bulk of the trade of both ports is carried on with the United Kingdom, North America and Australia.

Such are the present day features of function, hinterland and trade which characterize and distinguish the southernmost trading ports of New Zealand.
APPENDIX I

Bluff Harbour Development

The Bluff Harbour Board has plans to improve berthing and port facilities. Expected to cost £5,000,000 and to be completed in 8-10 years it is planned to build a 124 acre island where there is at present a large sand bank to the west of the present wharves. (Plate 44)

The "island" will be connected to the shore by both road and rail bridges and there is to be a complete railway lay-out including marshalling yards and independent service to all berths. Provision is made for transit sheds served by road if they are required. Berthage is to be provided for six overseas berths of 700ft length and two coastal berths of 450ft length. The present accommodation is sufficient for three overseas and two coastal vessels. One overseas berth is to be laid out for handling bulk cargoes such as timber and manures. A new wharf for the berthing of oyster vessels and storage of oysters is planned to replace the old wharf. It is planned to speed the loading of frozen meat by erecting a cool store at the wharves, where sufficient carcasses for a cargo could be stored, and to load meat into ships by a covered conveyor system which will permit vessels being worked in wet and windy weather.

The possibility of establishing a marine airport at Bluff has been favourably investigated. At present an anemometer is sited on a small islet in the harbour for the purpose of finding the direction of prevailing winds throughout the year before the runways are prepared.
In 1948 the Tynan's Commission on Civil Aviation (1) reported that "with careful layout of channels, adequate marking and perhaps some dredging, Bluff harbour would be suitable for the regular operation of flying boats ...... "

---

Plate 44. Aerial view of Bluff Hill and harbour showing the large sand bank in the centre of the harbour. The stippled outline indicates the area where the new wharves and facilities are to be built.
### APPENDIX II

**Details of CargoesHandled Through the Port of Aluff**

For Year ended 30th September, 1950

<table>
<thead>
<tr>
<th>Cargo Description</th>
<th>Import Coastal Tons</th>
<th>Import Overseas Tons</th>
<th>Export Coastal Tons</th>
<th>Export Overseas Tons</th>
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<tbody>
<tr>
<td>Barley</td>
<td>9</td>
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<tr>
<td>Beans &amp; Peas</td>
<td>229</td>
<td>115</td>
<td>1</td>
<td>230</td>
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<tr>
<td>Butter</td>
<td>4</td>
<td>10</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Biscuits &amp; Confectionery</td>
<td>345</td>
<td>40</td>
<td>20</td>
<td>10919</td>
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<tr>
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<td>520</td>
<td>486</td>
<td>679</td>
<td>693</td>
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<td>40</td>
<td>20</td>
<td>10919</td>
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<tr>
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<td>10919</td>
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<td>Coal</td>
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<td>61</td>
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<tr>
<td>Fruit, preserved</td>
<td>520</td>
<td>486</td>
<td>679</td>
<td>693</td>
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<td>19</td>
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<td>Coastal</td>
<td>Overseas</td>
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### APPENDIX III

Details of Cargoes Handled Through the Port of Otago

For Year Ended 30th September, 1950

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</tr>
<tr>
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<td>Tons</td>
<td>Tons</td>
<td>Tons</td>
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<tr>
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<td>4</td>
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<tr>
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<tr>
<td>Cheese</td>
<td></td>
<td></td>
<td></td>
<td>97</td>
<td>1833</td>
</tr>
<tr>
<td>Coke</td>
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<td>615</td>
<td></td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Fish - frozen and fresh</td>
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<td>Flour</td>
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<td>Hemp, fibre &amp; tow</td>
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<tr>
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<td>Honey</td>
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<td>Livestock, Small cattle</td>
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<td>Meat, frozen, Beef Mutton Lamb</td>
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<td>Milk products, other than Butter and cheese</td>
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<td>399</td>
<td>630</td>
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<td>Imports Overseas</td>
<td>Tons</td>
<td>Exports Coastal</td>
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<td>-----------------</td>
<td>------</td>
<td>------------------</td>
<td>------</td>
<td>-----------------</td>
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<tr>
<td>Tallow</td>
<td>96</td>
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<td></td>
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<td>9603</td>
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### APPENDIX IV

**Sample Cargoes**

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<th>Tons</th>
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<td>&quot;Taranaki&quot; for London 19/2/48</td>
<td>231,196 Carcasses Lamb</td>
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<td></td>
<td>12,691 Carcasses Lamb Tags</td>
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<tr>
<td></td>
<td>14 Carcasses Mutton</td>
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<tr>
<td></td>
<td>10649 Pkgs. Offals</td>
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<tr>
<td></td>
<td>24605 Crates Cheese</td>
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<tr>
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<td>8565 Bales Wool</td>
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<td>60 Bales Skins</td>
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<td></td>
<td>187 Casks Pelts</td>
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<tr>
<td></td>
<td>150 Casks Tallow</td>
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<td>18 Sacks Seed</td>
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<td>81 Sacks Horns</td>
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| "Napier Star" for London 15/5/48 | 126,547 Carcasses Lamb | 126547 |
|                                   | 8613 Carcasses Lamb Tags | 8613 |
|                                   | 36,466 Carcasses Mutton | 36466 |
|                                   | 1547 Carcasses Beef | 1547 |
|                                   | 2 Sides Veal | 2 |
|                                   | 4040 Pkgs. Offals | 4040 |
|                                   | 12456 Crates Cheese | 12456 |
|                                   | 13552 Crates Frozen Rabbits | 13552 |
|                                   | 72 Sacks Seed | 72 |
|                                   | 30 Casks Casing | 30 |
|                                   | 979 Bales Wool | 979 |
|                                   | 5 Dumps Sheepskins | 5 |
|                                   | 47 Bales Rabbitskins | 47 |
|                                   | 307 Casks Pelts | 307 |
|                                   | 635 Sacks Peas | 635 |
|                                   | Quantity General | 6 |
|                                   | Total | 5362 |

<p>| &quot;Paparoa&quot; for Cardiff July,1951 | 217,262 Carcasses Lamb | 217262 |
|                                  | 2603 Bags Boneless Mutton | 2603 |
|                                  | 26147 Pkgs. Offals | 26147 |
|                                  | 3000 Crates frozen Rabbits | 3000 |
|                                  | 1444 Casks Tallow | 1444 |
|                                  | 214 Bales Wool | 214 |
|                                  | Total | 5239 |</p>
<table>
<thead>
<tr>
<th>Vessels</th>
<th>Cargo</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Nottingham&quot;</td>
<td>761 Tons Salt</td>
<td></td>
</tr>
<tr>
<td>from Liverpool</td>
<td>310 Tons Tinplate</td>
<td></td>
</tr>
<tr>
<td>and Glasgow</td>
<td>305 Tons Steel</td>
<td></td>
</tr>
<tr>
<td>July 1951</td>
<td>14 Motor Cars</td>
<td></td>
</tr>
<tr>
<td></td>
<td>43 Tons Wines &amp; Spirits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>493 Tons General Cargo</td>
<td>1910</td>
</tr>
<tr>
<td>&quot;Durham&quot;</td>
<td>211,342 Carcasses Lamb</td>
<td></td>
</tr>
<tr>
<td>for London and</td>
<td>51,082 Carcasses Mutton Taggs</td>
<td></td>
</tr>
<tr>
<td>Continent</td>
<td>5,696 Csa. Beef</td>
<td>5401</td>
</tr>
<tr>
<td>19/6/46</td>
<td>15,045 Pkgs. Frozen Sundries</td>
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</tr>
<tr>
<td></td>
<td>10 Sides Veal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1400 Crates frozen rabbits</td>
<td>527</td>
</tr>
<tr>
<td></td>
<td>7101 Crates Cheese</td>
<td>592</td>
</tr>
<tr>
<td></td>
<td>1795 Boxes Butter</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>615 Casks Pelts</td>
<td>266</td>
</tr>
<tr>
<td></td>
<td>15 Casks Casings</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>69 Dumps Sheepskins</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>6760 Bales Wool</td>
<td>1040</td>
</tr>
<tr>
<td></td>
<td>31 Sacks Seed</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>90 Sheep</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Quantity General</td>
<td>7,985</td>
</tr>
</tbody>
</table>


A. Books.

B. Articles in Periodicals.
Morgan, F.W., "The Pre-War Hinterlands of the German Baltic Ports", Geography. Vol.34. 201-211.

C. Unpublished.
D. Statistical.
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F. Miscellaneous.
Roberts, W.H.S., "Southland in 1856" (Invercargill) pp 93.
Thompson, R.S., "Port of Otago" (Dunedin) second edition. 1945. pp 57.
Bluff Harbour Board. Evidence presented to the Royal Commission of Inquiry upon the Waterfront Industry.
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