1932.

NEW ZEALAND.

MARINE DEPARTMENT.

ANNUAL REPORT FOR 1931-32.

Presented to both Houses of the General Assembly by Command of His Excellency.

YOUR EXCELLENCY,— Marine Department, Wellington, 6th September, 1932.

I do myself the honour to transmit for Your Excellency's information the report of the Marine Department of the Dominion for the financial year ended the 31st March last.

I have, &c.,
JOHN G. COBBE,
Minister of Marine.

His Excellency the Governor-General of the Dominion of New Zealand.

REPORT.

THE SECRETARY, MARINE DEPARTMENT, to the Hon. the MINISTER OF MARINE.

SIR,— Marine Department, Wellington, 5th September, 1932.

I have the honour to submit the annual report on the operations of the Marine Department for the financial year ended 31st March, 1932.

FINANCIAL.

The following statement summarizes the revenue and the expenditure of the Department (excluding Westport Harbour) for the past four years in comparison with the figures for 1922-23 :—

Branch.	1922-23.	1928-29.	1929-30.	1930-31.	1931-32.
		Revenue.			
Shipping Branch—	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Light dues	39,688 16 8	80,979 13 11	82,710 19 6	84,062 0 5	78,334 6 0
Engagement and discharge fees	3,179 11 0	2,583 2 9	2,614 3 0	2,235 3 6	2,002 13 0
Survey fees	3,095 9 0	5,123 8 6	5,037 12 6	4,184 18 11	3,809 5 0
Examination fees, &c.	395 12 6	268 8 0	296 5 0	367 1 0	252 13 6
Miscellaneous	1,289 0 4	1,745 9 4	2,236 4 2	1,736 15 1	1,543 7 3
Harbours—					
Pilotage, port charges, &c.	764 14 6	1,998 18 5	2,206 1 4	1,431 17 4	1,293 4 1
Foreshore revenue	1,126 14 1	5,582 0 5	4,817 17 9	4,559 17 3	2,611 18 9
Inspection of Machinery—					
Inspection fees, &c.	17,126 19 6	19,922 9 4	20,790 14 9	22,535 16 4	22,801 19 8
Examination fees, &c.	667 0 0	402 5 0	369 7 0	384 17 6	384 7 0
Fisheries—					
Net profit from sale of oysters	2,546 9 6	1,160 0 11	1,850 3 4	1,392 6 3	839 6 10
Fishing-boat license fees, &c.	324 9 6	542 0 6	668 3 8	638 15 10	691 0 3
Rental of toheroa-beds	10 0 0	300 0 0	300 0 0	300 0 0	309 0 0
Government steamers—					
Freight, passage-money, &c.	1,785 0 7	4,046 7 3	1,733 2 6	1,213 3 9	756 10 10
Ross Sea revenue	..	13,961 17 6	7,871 5 0	2 10 0	600 0 0
Miscellaneous revenue	2,800 11 4	41 6 4	15 11 4	14 8 10	26 1 7
Totals	74,800 8 6	138,657 8 2	133,517 10 10	125,059 12 0	116,255 13 9
		Expenditure.			
Head Office	9,612 2 8	9,397 4 4	9,273 9 10	9,708 14 1	8,931 6 9
Harbours	4,826 13 2	4,059 18 4	3,846 14 8	3,225 6 7	2,409 16 0
Lighthouses	27,834 14 8	23,919 13 11	26,793 14 5	23,691 3 4	21,244 8 4
Mercantile marine	15,150 17 11	25,266 9 2	27,142 19 10	27,373 3 1	21,216 13 0
Inspection of Machinery	27,015 0 0	21,573 2 7	21,957 5 10	24,652 11 7	22,800 13 1
Fisheries	4,545 3 2	3,281 12 10	3,727 1 2	3,147 16 11	3,035 13 11
Government steamers	21,697 19 6	21,559 12 3	20,820 19 5	21,257 3 11	17,557 3 1
Miscellaneous services	2,655 3 8	2,146 4 0	361 19 4	130 10 8	1 14 8
Grants and subsidies	1,510 0 0	260 0 0	1,350 0 0	175 0 0	125 0 0
Depreciation	8,035 4 9	9,662 2 8	9,748 17 5	9,806 11 5	13,055 5 7
	122,882 19 6	121,126 0 1	125,023 1 11	123,168 1 7	110,377 14 5
Interest on capital	15,716 7 3	17,285 17 5	17,434 15 2	18,256 11 2	20,194 11 10
Totals	138,599 6 9	138,411 17 6	142,457 17 1	141,424 12 9	130,572 6 3

An analysis of these figures shows that the operations of the Department result in a surplus after providing full depreciation, but before charging interest on capital.

Briefly, the financial results obtained during the past eleven years are as follows:—

Year.	Before paying Interest on Capital.	After paying Interest on Capital.
	£ s. d.	£ s. d.
1921–22	Deficiency 74,146 4 2	Deficiency 95,153 14 11
1922–23	,, 48,082 11 0	,, 63,798 18 3
1923–24	,, 9,759 8 1	,, 27,231 4 9
1924–25	,, 2,144 4 11	,, 19,882 0 6
1925–26	Surplus 517 2 2	,, 17,294 8 10
1926–27	,, 5,881 5 2	,, 12,124 0 10
1927–28	,, 5,941 6 0	,, 12,178 12 0
1928–29	,, 17,531 8 1	Surplus 1,474 15 2
1929–30	,, 8,494 8 11	Deficiency 8,940 6 3
1930–31	,, 1,891 10 5	,, 16,365 0 9
1931–32	,, 5,877 19 4	,, 14,316 12 6

From this it will be seen that the Department's financial position has improved considerably since the commercial balance-sheet system came into operation, but, unfortunately, the standard reached in 1928–29 could not be maintained owing to the loss of revenue from whaling operations in the Ross Dependency. In 1921–22 the deficiency was £95,153 14s. 11d., while during 1931–32 this figure was reduced to £14,316 12s. 6d., a net improvement of £80,837 2s. 5d.

In view of the decline in revenue consequent upon the prevailing financial depression, the Department adopted a policy of rigid economy during 1931–32. The numbers of staff in all branches were reduced to a minimum, and every item of expenditure was closely overhauled and curtailed wherever possible. Excluding interest on capital and depreciation, the expenditure showed a decrease of £16,040 compared with the figures for 1930–31. The charges for depreciation and interest on capital show a marked increase owing to the purchase of the new lighthouse vessel, which is capitalized at £80,000, in comparison with £20,000 for the old tender "Tutanekai."

The full extent of economies initiated during 1931–32 is not reflected in the year's accounts, and consequently a still further saving in expenditure may be anticipated during the current year.

Negotiations for the transfer of the control of Hokianga Harbour from the Department to the Hokianga County Council reached a successful conclusion during the year, with the result that a saving of approximately £500 per annum will be effected in the departmental accounts.

The loss on the working of the Inspection of Machinery Branch for the year has been reduced from £5,397 16s. 10d. to £2,954 13s. 5d., principally due to the exemption of farm machinery not exceeding 6 horse-power from annual inspection, with a resultant reduction of eight in staff and a saving in salaries and travelling-expenses. However, the full benefit of the saving is not reflected in the year's accounts, as special legislation was necessary to give effect to the step taken, and this was not passed until late in the financial year. It is anticipated that this branch will now be self-supporting, despite a general reduction of 10 per cent. in fees which was put into operation on the 1st May last.

At the present time the fees for the inspection of machinery are based upon the horse-power of prime movers, but this is giving rise to anomalies so far as electrical machinery is concerned. The Department is now collecting data which will enable a new scale to be drawn up and the fees assessed on a more equitable basis.

Westport Harbour.

The following statement shows the revenue and expenditure in respect of Westport Harbour for the past eleven years:—

Year.	Expenditure.	Revenue.	Year.	Expenditure.	Revenue.
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
1921–22 ..	63,950 1 10	25,836 19 3	1927–28 ..	65,828 1 7	65,909 8 1
1922–23 ..	50,738 17 5	38,700 8 1	1928–29 ..	68,871 13 0	64,214 5 6
1923–24 ..	46,619 1 11	42,285 7 4	1929–30 ..	64,877 10 5	66,274 17 3
1924–25 ..	44,666 14 0	50,378 11 0	1930–31 ..	53,436 16 9	53,013 2 11
1925–26 ..	51,909 4 11	57,539 12 11	1931–32 ..	46,149 4 8	34,602 12 9
1926–27 ..	52,769 12 6	62,976 13 10			

The loss for the year under review amounted to £11,546 11s. 11d. after making full provision for all charges in the way of depreciation, interest, and sinking fund. This loss was due to the abnormal depression in the coal trade which, unfortunately, is showing no signs of improvement.

The bunkering trade has fallen away very considerably, the number of vessels which called at Westport for bunker coal during the past seven years being as follows :—

Year.	Number of Vessels.	Year.	Number of Vessels.
1925–26	20	1929–30	57
1926–27	44	1930–31	24
1927–28	51	1931–32	10
1928–29	54		

In the past, tramp steamers calling at Westport for bunker coal were frequently subjected to considerable delay owing to sufficient coal not being available when it was required, and this, combined with the fact that the present rate of exchange is so favourable to the purchase of Australian coal, has caused a loss of trade which will be difficult to regain.

The following statement shows the net tonnage of shipping entered the port, the tonnage of coal shipped, and the financial result for each year since the Department has had control of the harbour :—

Year.	Net Tonnage of Shipping entered.	Tonnage of Coal shipped.	Financial Result.	£	s.	d.
1921–22	273,706	480,873	Deficiency	38,113	2	7
1922–23	332,401	573,487	,,	12,038	9	4
1923–24	275,762	442,070	,,	4,333	14	7
1924–25	334,827	556,669	Surplus	5,711	17	0
1925–26	386,669	552,949	,,	5,630	8	0
1926–27	459,670	637,165	,,	10,207	1	4
1927–28	466,021	623,256	,,	81	6	6
1928–29	458,712	604,778	Deficiency	4,657	7	6
1929–30	479,623	625,835	Surplus	1,397	6	10
1930–31	352,228	513,503	Deficiency	423	13	10
1931–32	234,936	336,873	,,	11,546	11	11

From the year 1924–25 to 1930–31 (inclusive), there was an average annual surplus of £2,849 11s. 2d., but during 1931–32, when there was a decline of 176,630 tons in coal export, the harbour fell far short of making ends meet despite very drastic cuts in expenditure.

When the coal output dropped to such an extent that the revenue became insufficient to meet the ordinary maintenance of the port, the Department was forced to reduce expenditure in every possible direction. The extension of breakwaters had to be discontinued, and the bucket dredge "Maui" laid up, with consequent heavy reductions in staff. The suction dredge "Eileen Ward" has been kept in commission, but this has meant further borrowing from the Consolidated Fund, as the present revenue from the port is insufficient to meet working-expenses in addition to interest and sinking-fund charges.

As practically the whole of the revenue from Westport Harbour is dependent upon coal, there is no prospect of improvement in the port's finances until the depression in the coal industry lifts. An export of at least 40,000 tons of coal per month is necessary to provide sufficient revenue for the maintenance of essential port services, but at the present time the monthly average does not reach 30,000 tons.

Harbour Board's Legislation.

Auckland Harbour Board and other Local Bodies Empowering Act, 1931.—This Act dealt with the following matters :—

(*a*) It validated a deed of agreement entered into between the Harbour Board and the Auckland City Council with respect to the Orakei Waterfront Road.

(*b*) It validated a deed of agreement entered into between the Auckland and Suburban Drainage Board and the Auckland City Council, with respect to the control and maintenance of certain sewage-tanks along the said road.

(*c*) It authorized the transfer of a portion of Harbour Board land in Hobson Bay to the Auckland City Council for a plantation reserve.

(*d*) It authorized the lease of a small portion of reclaimed land, the property of the Harbour Board, to the Auckland Electric-power Board.

(*e*) It authorized the lease of a portion of land known as Onepoto Basin, in Shoal Bay, to the Northcote Borough Council for recreation purposes.

(*f*) It authorized the Takapuna Borough Council to lease to the Board a small portion of land, the property of the Council, for a control station for the new electric beacon on Rangitoto.

(*g*) It authorized the Board and the bearer of any debenture of the Board to enter into an agreement, on the application of the bearer, to change the place fixed for payment of principal and interest.

HARBOUR-WORKS.

Westport Harbour.—During the previous financial year an active policy of breakwater construction was being proceeded with, but, unfortunately, early in the present period the drop in harbour revenue due to the general slackness in the shipping business and the industrial depression throughout the country necessitated the observance of rigid economy. In order to effect this, all breakwater construction was suspended and work in the quarries was stopped; dredging was reduced as much as possible consistent with the necessity to maintain the necessary depths on the bar and in the channel, and all expenditure was reduced to a minimum. The average mean depths at the entrance and in the river have been maintained at the same figure as last year, and the maximum and minimum depths also compare favourably with the previous period.

The suction dredger "Eileen Ward" removed a total quantity of 392,654 cubic yards from the bar on which she was employed for 83 per cent. of her time, and the "Maui" was employed in the river and at the berthages till about half-way through the year, since when she has been laid up. Generally speaking, the total amount of dredging carried out shows a decrease of 111,070 cubic yards as compared with 1931.

The year was an exceptionally wet one, the rainfall totalling 114·55 in., and the number of wet days 178.

When work was discontinued at the breakwater, approximately 120 ft. of the projected 300 ft. extension had been raised above high-water level, but subsequent heavy seas have caused a slight flattening out of the batters; 7,751 tons of stone quarried and tipped up to the time work was stopped, with the amount put in previously, give a total amount placed in the Western Breakwater of 30,148 tons.

A length of river-bank above the existing plantation, which suffered erosion by the flood in April, has been planted with willows and fenced off, while any gaps in the existing plantations have been made good.

All plant and material have been maintained, and the signal station, beacons, and harbour lights have all been painted.

Karamea Harbour.—I regret that the unfavourable state of the fairway has persisted during the year. Enormous quantities of fine earthquake debris are still being brought down by the river, and deposited in the tidal areas. A serious flood occurred on the 3rd April, 1931, which considerably altered conditions in the harbour. Whereas previously approximately 60 per cent. of the water flowed over the Karamea Bar, the remainder finding its way to the Otumahana Lagoon, after the flood only 20 per cent. flowed over the bar.

An attempt was made to encourage the river to return to its original course by means of a pile and netting wall at Bessies Straits, but this work after a short period of usefulness was breached by a flood. At times the river would appear to be clearing itself and the channel deepening, but such improvements were only of a temporary nature.

The rubble wall replacing the old timber pile training-wall was completed to full height, and heavy stone was tipped at the end to prevent any scour and to enable the wall to stand up to heavy seas if required; 10,960 tons of stone were quarried and tipped during the period.

When the quarry was closed down sufficient stone had been quarried at Oparara to complete the training-wall. The plant is being overhauled.

The large accumulations of earthquake debris which have been deposited at the lower reaches rendered the original wharf high and dry at low tide, so a temporary wharf was built at the outlet to the Overflow Channel.

The large shed at the Karamea Wharf, which was undermined and collapsed during the April flood, was re-erected at the temporary wharf and an access road formed along the foreshore. Generally speaking, there has been sufficient depth for boats to work this wharf at spring tides, but as the channel has been unserviceable, the wharf has had practically no real use.

Little Wanganui.—Owing to the difficulty in working Karamea the majority of the shipping for the surrounding districts has had to be dealt with at Little Wanganui, although since the loss of the "Kotiti" there has been only one boat working the port.

The erosion of a large earthquake slip situated about a quarter of a mile above the wharf has been causing the formation of a sandbank at the upstream end of the wharf.

In order to turn the river on to the sandbank a permeable type timber groyne 114 ft. long was built, and this has had a beneficial effect in preventing further accretion.

Waikokopu.—The breakwater, which has been in course of erection during the past two years, has been completed, 7,506 tons of large stone having been deposited during the period. This breakwater has been very effective in stilling the range at the wharf, and now it is only very occasionally that boats cannot work the wharf.

The approach to the wharf has been protected with limestone rock, and the port facilities generally have been adequately maintained.

Shipping has been less this year than usual, as the burning of the Wairoa Freezing-works, which have not yet been rebuilt, meant the loss of the frozen-sheep trade. At the same time considerable use has been made of the port for the transport of fat sheep to the Hawke's Bay Freezing-works during the summer.

Waitangi Wharf, Chatham Islands.—Plans and specifications were prepared for the erection of a wharf at Waitangi. Tenders were called, but owing to the financial position the tenders were declined, and the matter held over until conditions improve.

Matiotitawa Wharf.—The approach to this wharf has been metalled with limestone.

Tikinui Wharf.—A new wharf 118 ft. long has been constructed in hardwood and approach work is in hand.

Ivydale Ramp.—A complete survey and investigation of this proposal has been carried out.

Whitianga Wharf.—A contract for the erection of this wharf was let by the Coromandel County Council during the year, and the structure was almost completed at the end of the period. This wharf is of hardwood construction with turpentine-pile foundation, and is provided with a wharf-shed and also a cattle-run.

General.

A number of applications have been received from local bodies and private individuals for the approval of works involving marine interests. Among the various applications were the following :—

Foreshore Licenses.—Taipa Village, Mangonui ; Opononi, Hokianga, Kopuku Landing, Maramarua Survey District ; Kaimanawa, Waihou River ; Uwhiroa Creek ; Pounawea, Otago ; Tikinui, Wairoa River ; Port Fitzroy, Great Barrier Island ; Motukaraka, Hokianga Harbour ; Dargaville, Wairoa River ; Rawene, Hokianga Harbour ; Horeke, Waihou River, Hokianga Harbour ; Port Craig, Buckland's Beach, Tamaki ; Paremata ; Ferrymead, Heathcote River ; Seal Island, Woodpecker Bay ; Narrows, Hokianga Harbour ; Tamaki Strait ; Mapua, Waimea River ; Aoroa, Wairoa River, Kaipara Harbour ; Mercury Bay, Coromandel ; Paradise Estate, Northern Wairoa ; Te Hapua, Parengarenga Harbour ; Whangarei Harbour ; Mapuna, Northern Wairoa River ; Taikata Creek, Auckland Harbour.

Wharves and Jetties.—Tikinui, Wairoa River ; Pitt Island, Chathams ; Seal Island, Woodpecker Bay ; Huntly ; Taupiri, Hamilton ; Mercury Bay, Coromandel ; Oyster Wharf, Bluff Harbour ; Miranda, Thames ; Mercer ; Whangarei Harbour ; Thorndon Breastwork, Wellington ; Hataitai, Wellington.

Boat Sheds and Skids.—Lowry Bay, Wellington Harbour ; Evans Bay, Wellington ; Jervois Quay, Wellington ; Whakatakataka Bay, Auckland Harbour ; Worser Bay, Wellington.

Bridges.—Radly Street, Princes Street, Sheldon Street, Heathcote River, Christchurch.

Retaining-walls and Stop-banks.—Kohimarama, Auckland Harbour ; Blockhouse Bay, Manukau Harbour ; Mahurangi River ; Rangaunu Bay, Awanui, Wharewharekauri, Hokianga Harbour ; Horahora River ; Waihou River, Hokianga Harbour ; Waima River, Hokianga Harbour ; Oruru River, Mangonui Harbour ; Whangaroa Harbour ; Onehunga, Manukau Harbour.

Transmission-lines.—Lake Rotoiti ; Churchill, Waikato River ; Taupiri, Waikato River.

River-improvement.—Waimakariri River.

Harbour-works.—Otago Harbour ; Quarantine Island, Motueka Harbour ; New Plymouth ; Miranda, Thames.

Reclamations.—St. Mary's Bay, Auckland Harbour ; Wairoa River, Kaipara, Onepoto Basin, Shoal Bay, Auckland Harbour ; Blockhouse Bay, Auckland Harbour ; Paihia, Bay of Islands ; Bluff Harbour ; Taruheru River, Gisborne.

Lighthouses.

During the past year there has been less activity in the installation of new lights and the improvement of existing ones due to the reduction in available finance, and several works which it was anticipated would be put in hand have had to stand over.

Akaroa : Peninsula—East Head.—The apparatus for this light, which consists of an automatic open-flame flashing signal with a 75-litre burner in an 800 mm. catadioptric lens was received and duly erected. The light, which is fitted with a sunvalve for automatic operation, should be of great assistance to shipmasters trading between southern and northern ports, and will supplement the Godley Head light, which is being altered to a more modern type.

Godley Head.—The necessary apparatus for converting this lighthouse from a fixed to a flashing characteristic has been received and the work of installation is in hand. The range of this light is being slightly reduced since, with the installation of the light on East Head, that on Godley Head becomes more or less a harbour light.

Baring Head.—This light, which is situated about three miles seaward of Pencarrow, is intended to take the place of the high-level light at the latter place, and, being on a distinctive headland, is more truly a coastal light. The necessary land has been acquired, an access road has been formed, and a bridge built across the Wainuiomata Stream. Arrangements were being made to order the apparatus and let a contract for the tower and necessary buildings, keepers' houses, &c., but it has been decided to defer the work until financial conditions improve. In the meantime shelter-belts and fencing are being completed.

Jackson's Head.—The range of this light, which is an automatic acetylene one, has been increased by providing a new burner which is twice the candle-power of the original.

Kahurangi Point.—The lens at this station, which was recently damaged by a secondary earthquake, was sent home to England for repair, and has now been reinstated. It was anticipated that a new keeper's house would have been erected this year, but that also has had to stand over.

The Brothers.—Extensive repairs were carried out at this station, new foundations being put under the tower, a new crane and tramway erected, and all buildings given a thorough overhaul.

A number of minor repairs have been effected at various stations, and the buildings, &c., have been well maintained at all stations during the period.

Lighthouse Tender "Matai."

This vessel has been engaged for the whole year on her ordinary work of tendering the lighthouses, and has functioned in an extremely satisfactory manner.

A comparison of her running and maintenance costs, as compared with those of her predecessor, for a full year shows a substantial reduction in the vicinity of £3,500. While part of this saving is due to the statutory reduction in wages, the general economical result is most satisfactory.

The Nautical Almanac and Tide-tables.

This publication for 1932 (thirtieth edition) was published on 1st November, so as to make it available in ample time before the end of 1931, for the use of vessels proceeding beyond New Zealand.

Adjustment and Inspection of Ships' Compasses.

The regulations for the adjustment of compasses have been carefully administered, and compasses have been maintained in a good state of efficiency. The results of the investigation of the adjustments required by the regulations show that the work of the Compass Inspectors and Adjusters has been satisfactorily performed. It has been necessary for the Compass Inspectors to exercise extra supervision in some cases, owing to the changes taking place in the magnetic forces affecting the compass.

Shipping Casualties.

During the year casualties at or near our coasts varied considerably in their nature, and unfortunately were accompanied by loss of life.

The usual number of minor casualties by stranding, fires, collision with wharves, &c., continue to occur, and preliminary inquiries into them have been held by departmental officers when such was considered necessary.

The circumstances attendant on some of the casualties warranted Magisterial inquiries being held, into the loss of the m.v. "Kotiti," which foundered with the loss of seven lives; the loss of the "Progress," which was wrecked at Ohiro Bay, with the loss of four lives; the stranding of the "Port Hobart" off Turakirae; the stranding of the "Kini" near Bare Island; the stranding of the "Breeze" in Gore Bay, and the stranding of the "Storm" near Akaroa.

Notices to Mariners.

Information relative to changes in navigational aids, and to the discovery of obstructions, wreckage, or other dangers to navigation, and information of general interest to mariners, have been published in the form of Notice to Mariners.

Fifty-two such notices were issued during the year, and distributed locally and to countries which reciprocate such matters.

Admiralty Charts.

The stock of Admiralty charts kept by the Department is still being increased as the demand necessitates. To ensure that purchasers receive these charts corrected to date, many corrections, due to the alteration or information affecting navigation, have been made to them here during the year. The importance of procuring up-to-date charts cannot be too strongly urged on mariners, as the value of a chart used for navigation depends upon its showing a complete record of changes reported since its publication.

During recent years alterations to harbour-works, minor changes in navigational aids and other information, have been made which, through not being reported to the Hydrographer or to the Department, have resulted in some of the charts not agreeing with conditions existing at the port. In order to get the information necessary for the correction of charts, the Department requested Harbour Boards to supply the latest information, and, as a result, plans and charts were received for Auckland, Wellington, Lyttelton, Oamaru, Otago, Bluff, and Greymouth, and forwarded to the Hydrographer.

Examination of Masters and Mates.

The examinations have been held as usual in Wellington, Auckland, and Lyttelton, and conducted in accordance with the new regulations which came into force on the 1st January, 1931.

The new procedure of dividing the examination into signalling, written, and oral parts is working satisfactorily. It is a distinct improvement on the old system, and must be considered a definite advantage to candidates who have gained a partial pass, as they are required to pass only the remainder of the examination and not the whole of it, as was formerly the case.

The new examinations require candidates to have a much wider knowledge of their profession, and demand more consideration on many matters which formerly were committed to memory without an understanding of them. The navigation problems are modelled as near as possible on the every-day practice of navigation, and candidates are allowed to solve them by the methods which they have been accustomed to use, provided the principles are correct. Candidates, in the majority of cases, have presented themselves well prepared for examinations, and, in view of the changes made in the syllabus, have reached a higher standard than was expected.

The number of candidates shows a decrease from last year, which is no doubt due to junior unemployed officers, owing to the number of ships laid up, being unable to get an opportunity to serve the time necessary for their higher certificate.

During the year fifty-eight examinations were held, of which four were for signalling, three for compass syllabus, two for yacht-master in New Zealand waters, and one for certificate of efficiency in navigation for the R.N.V.R. The percentage of passes for certificates of competency was 46·8, a slight increase on last year. The percentage of total failures was only 27·7, the remaining 25·5 being partial passes.

Sight-test Examinations.

A total of forty-three sight-test examinations was held at Auckland, Wellington, and Lyttelton: of this number one candidate failed in the lantern test, and one in the letter test.

"New Zealand Pilot."

The revision of this publication, last issued in 1919, was completed during the year and published in December last by the Hydrographer to the Admiralty. This revised edition should be of great value to mariners. Copies are on sale at the Government shipping offices at the main ports.

Survey of Ships.

The following table shows the number of certificates of survey issued to ships during the year, the figures for the previous year being shown in parentheses.

	Number.	
Sea-going steamships and motor-vessels	153	(186)
Sea-going sailing-vessels	5	(12)
Restricted-limits steamships and motor-vessels	401	(442)
	559	(640)

The returns show a reduction of eighty-one in the number of surveys for certificates, compared with the previous year. Eighteen vessels were surveyed for the first time, of which four were sea-going vessels and fourteen were restricted-limits vessels. One of the sea-going vessels, the m.v. "Tiri" is a new cargo-vessel built of wood at the yard of Mr. G. T. Niccol, Auckland. Her gross and registered tonnage are 169 and 62·6 respectively, and she is propelled by a single set of imported Diesel engines of 210 brake horse-power. After one trip, foreign, to Norfolk Island, the vessel has been engaged in the coastal trade. Another of the sea-going vessels surveyed for the first time is the "Holmglen," formerly the "Argus," a steel cargo motor-vessel built in Germany in 1928. On arrival in New Zealand alterations were carried out to suit local conditions, and she is now engaged in the coastal trade.

Two hundred and twenty-eight vessels were surveyed for seaworthiness and efficiency under section 226 of the Shipping and Seamen Act. There were also twenty-nine other surveys made, making a total of 257 surveys carried out in addition to the usual annual surveys, as against a total number of 245 additional surveys in the previous year. Of the seaworthiness surveys the most extensive was the survey of damage and repairs to the m.v. "Hauraki," which stranded when berthing at New Plymouth in February, 1931, and floated under her own power on a rising tide an hour after stranding. The hull was pierced forward under the tanks, but as the tank tops were undamaged, the vessel was able to proceed to Auckland for dry-docking and repairs. The repairs included the renewal of a large amount of hull plating, and internal structure in tanks, and the removal, fairing, and replacing of several hull plates. The vessel was in dry-dock for a period of over ten weeks. Another important seaworthiness survey was in connection with the s.s. "City of Kimberley," which lost her propeller and a portion of the tail-shaft in the Pacific Ocean on passage from Panama to Auckland. The vessel was towed to Auckland, a distance of over 1,300 miles, by the m.v. "Opawa," and when surveyed in port, in addition to the loss of the propeller and a part of the tail-shaft, it was found that the main-engine crank-shaft was damaged and the stern tube fractured. The owners decided to import a new tail-shaft, propeller, stern tube, and M.P. crank-shaft from England and the vessel was in port two and a half months waiting the arrival of these parts.

During the year several cases of broken tail-shafts of small vessels engaged in coastal service were reported. There were no less than nine failures altogether. The cause of failure in each case, with the exception of one which resulted finally in the loss of the vessel, was carefully investigated. Material from three of the shafts for which the causes of failure were not clear, was sent to the School of Engineering, Canterbury College, for mechanical tests and laboratory examination, and the result of the tests showed that one failure was due to hidden corrosion cracking under the liner caused primarily by galvanic action between the different metals of the shaft and the liner, and the other two were considered to have been due to the use of material of inferior quality. The Department's requirements are that material for shafting shall be of suitable quality verified by mechanical tests of a sample of the material.

The new regulations relating to the survey of steel cargo-vessels have been in operation since the 1st October, 1931, and are giving satisfaction to the Department and shipowners.

A departmental circular relating to equipment of fire-extinguishing appliances on board all classes of vessels was published in pamphlet form in August, 1931, and copies were made available for purchase by the public. The whole question of the proper provision of fire-extinction appliances was considered and the requirements as to the best means of dealing with fires on board ship were embodied in the circular. The requirements for passenger steamships and oil-launches were based on Imperial Board of Trade Instructions and those for cargo-steamers on the recommendations of the Merchant Shipping Advisory Committee, London, modified in some cases to suit local conditions.

In addition to adequate arrangements for a supply of water, a number of chemical-fluid fire-extinguishers is required in all vessels. Where oil is used for generating steam or power a system of froth or foam appliances is required, this agent being proved to be the best available means for dealing with oil fires.

When the circular was issued there was some difficulty in obtaining supplies of suitable chemical extinguishers, of makes approved by the Department, but stocks are now plentiful in the Dominion.

It is interesting to note that a Christchurch firm has for some months past manufactured portable chemical extinguishers which have been tested and accepted by the Department for use on board ship.

Safety and Load-line Conventions.

Load-line Rules.

As required by subsection (3) of section 208 of the Shipping and Seaman Act, the Department fixes load-lines for ships in accordance with the load-line tables from time to time used by the Imperial Board of Trade.

The Board of Trade has now provided for the survey and marking of ships for load-line purposes in accordance with the International Load-line Convention, 1930, which was signed unanimously and without reservation by the representatives of twenty-nine countries, including New Zealand. The following extract from the report of the delegation of the United Kingdom to the International Load-line Conference, dated the 5th July, 1930, may be of interest:—

"The convention will apply to practically the whole of the merchant ships of the world. It is the first international agreement which has been made fixing loading-limits for merchant ships, although there has been for some years a considerable measure of uniformity in the rules adopted by the principal maritime nations. The new convention is an improved and extended version of the rules that have prevailed hitherto. It will make the rules in the different countries completely uniform, and it has a far wider application than the old system ever had.

"The Conference contained technical and nautical representatives of all the principal maritime nations, and it is their considered opinion that the new rules are a marked improvement on anything which has gone before. In that opinion we concur, and we are satisfied that the new rules will raise the standard of safety of the merchant ship throughout the world.

"It has sometimes been suggested that any alteration of the original Plimsoll mark must be to the detriment of seamen, but this is based upon misapprehension. The Act of 1875, which first made it compulsory to place a load-line on British ships, enacted, 'That the centre of the disc shall indicate the maximum load-line in salt water to which *the owner* intends to load the ship *for that voyage*,' and left it to the owner to fix the load-line and vary it from voyage to voyage. No rules were then in existence to determine the right and safe point at which the load-line should be placed on different kinds of ships, and it was not until 1890 that it was made compulsory to place the load-line at a point prescribed by definite rules approved by the Government. The Act of 1890 made definite provision for the rules being modified as knowledge and experience were gained, and modifications were made from time to time, the last important modifications being made in 1906.

"Statements have been made that the alterations in the load-line rules made in 1906 made ships unsafe, and these statements were very carefully investigated by the Committees which examined the question of load-line in 1913–15 and 1927–29. It was found that there was no reason whatever to think that the alterations made in the load-lines had made ships less safe.

"The amount of cargo which any ship can carry safely across the ocean must depend on her size, strength, and other characteristics, and rules governing the maximum loading of ships must have regard to these points. The original rules which formed the basis of the rules adopted by the Government in 1890 were the expression of the best loading practice of those days, and very great improvements have been made in ship design, construction, and equipment since that time.

"A complete revision of the load-line rules was initiated in 1913, and this revision would probably have been brought in force and made the basis of an international agreement if it had not been for the war. A further very comprehensive revision was made by the committee of 1927–29, and the present convention is based on the work of this latter committee.

"The outstanding points to which attention should be drawn are the emphasis that is laid in the new convention on the protection of all deck openings and the safety of the crew, and the introduction, for the first time on British ships, of special load-lines for timber ships and tankers. The extreme importance of protecting all weather deck openings in a ship against the sea in bad weather is recognized by all seamen, and the rules on this subject are made more definite and more emphatic than they have ever been before.

"The experience of other nations has shown that under clearly defined conditions, ships carrying deck loads of timber, and tankers, can safely be allowed to load deeper than ordinary cargo-ships; but neither the extent of the deeper immersion nor the conditions under which it can be allowed had been settled internationally. This has now been done for the first time. The deeper immersion of tankers and timber ships is a new thing so far as British shipping is concerned, and we would have preferred that it should have commenced on a rather more moderate scale than that indicated in the convention until further experience had been gained on British ships. But we could not question the evidence brought forward by our foreign colleagues that their ships have for many years, with perfect safety, been allowed to load more deeply than is now permitted by the convention, and the limits now fixed in the convention are a compromise which was arrived at after very full discussion. In view of the conditions under which alone the deeper immersion is to be allowed, we think that compromise can safely be accepted.

"The convention establishes for the first time uniform loading-rules for the ships of all nations; it lays stress on the importance of protecting the openings in ships and safeguarding the crew; and it will lead, we believe, to a closer and more uniform enforcement of the loading-rules on all merchant ships throughout the world."

The new Board of Trade rules make it compulsory in the case of new ships—*i.e.*, those the keels of which were laid after the 30th June, 1932, for the freeboard to be computed in accordance with the new rules. In the case of existing ships—*i.e.*, those the keels of which were laid before the 1st July, 1932, the owners have the option of a freeboard computed under the new rules or that found by the previous rules, but in any event, existing ships will be required to comply with the conditions of assignment in principle and detail so far as is practicable and reasonable, having regard to the efficiency of the protection of openings, the guard rails, the freeing ports, and the means of access to the crew's quarters provided by the arrangements, fittings, and appliances existing on the ship at the time when she is first surveyed under the new rules.

It has been reported that the general effect of the new rules is that the new freeboards will agree approximately with those computed by the previous rules, except in the case of "tankers" and ships carrying deck loads of timber. These classes of ships will benefit by deeper loading under the new rules, but they will be required to comply with special conditions to ensure their safety with reduced freeboards. It has been estimated that the reduction of freeboard of tankers will be about 15 per cent. In the case of timber-carrying vessels, it is impossible to say what will be the general increase in the draft now permissible.

Whilst the general effect of the new rules on ordinary types of cargo-vessels is small, there will be individual ships which will gain or lose a few inches in freeboard. The exact difference in freeboard of a particular ship can be determined only from a close investigation of the design, construction, dimensions, and condition of the vessel.

It would appear that the effect of the new rules on the flush-deck type of ship will be to increase freeboards slightly, whilst ships with long erections such as the poop, bridge, and forecastle type or long bridge and forecastle type, or shelter-deck type, will obtain a few inches deeper loading.

The freeboard of a ship is the distance between the deck-line and the load-line. On existing ships the deck-line, known as the "statutory deck-line" is a point squared out from the inner edge of a waterway of assumed width. In future, on all ships, both existing and new, the deck-line will be marked at the point of intersection of the upper surface of the freeboard deck with the outer surface of the hull-shell plating.

The new Load-line Rules differ from the previous rules in one other important respect, and that is they define particularly the localities or zones and the season for which each load-line is appropriate. Previously the Winter North Atlantic and the Indian Summer load-lines marked the oading for these localities within specified months of the year, but no such particular definition was given regarding the winter and summer seasons in other localities.

In the new rules a schedule of zones and seasonal areas and also a chart are given showing precisely the permanent tropical and summer localities, and the summer and winter periods in other localities. In respect to New Zealand, the northern boundary of the seasonal winter zone meets the west coast at approximately the centre of the South Island. On the East coast this boundary-line leaves the coast at Cape Saunders and continues off and approximately parallel to the coast to a point north-east of Auckland. Vessels, therefore, proceeding south from Dunedin will be limited to the winter load-line during the period from 16th April to 15th October inclusive.

On certain occasions a vessel leaving Wellington, which is in the permanent summer zone, and bound for Panama will, on the Great-circle Track between these two ports, pass into the seasonal winter zone approximately 200 miles from Wellington, and continue in that zone for well over 2,000 miles on her journey. Such a vessel must be loaded not wholly with regard to the load-line for the zone in which the voyage is commenced, but also with regard to the consumption of fuel, stores, &c., and her draught when she will enter the winter zone.

The Board of Trade rules apply not only to ships to which the International Load-line Convention applies, but also to other load-line ships, which will be known as "local load-line ships"

Safety of Life at Sea Convention.

The International Convention for the Safety of Life at Sea was signed at London on the 31st May, 1929, and a Bill was passed by the British Parliament on the 17th March, 1932, providing for the survey of ships by the Imperial Board of Trade in accordance with the provisions of the convention relating to the construction of passenger-ships, life-saving appliances for passenger ships, and wireless telegraphy installations on passenger and cargo ships. Provision is made for the issue of a safety certificate, after inspection and survey, to every passenger-ship which complies in an efficient manner with the requirements relating to construction, life-saving appliances, and wireless telegraphy, and for the issue of a safety radio-telegraphy certificate to ships other than passenger-ships. The convention rules do not vary much in principle from the rules hitherto recognized as contributing to the safety of life at sea, but they will tend to promote uniformity in interpretation and to reconcile more thoroughly the opposing and sometimes vexatious factors of safety and economy in design, construction, and operation. The convention was unanimously agreed to and signed by eighteen maritime countries, and it is expected that it will be brought into operation on the 1st January next. The necessary steps are being taken to effect accession to it on behalf of New Zealand.

In order to give full effect to the provisions of this and the Load-line Convention certain legislation is necessary and the preparation of this is in hand.

Safety Cargo-working Hook.

The advisory committee appointed to consider the large number of specimen cargo-working hooks submitted in connection with this competition, for which prize-money amounting to £100 was provided by Government, completed its work in December last.

The committee, which consisted of representatives of the shipowners, the waterside workers, and the Marine Department, carefully examined all the hooks, over one hundred and seventy, submitted, and selected seven for trial under working-conditions at various ports and in vessels using the various kinds of cargo gear. On receipt of the reports on these seven hooks the Committee again met, and after further consideration came to a unanimous opinion that none of the hooks sufficiently complied with the conditions of the competition, or was of such outstanding merit as to justify the Committee in recommending that any of the hooks should be specified to be used to the exclusion of all other hooks; or to award the full prize to any of them.

It was therefore decided to determine the competition, and to award the sum set aside under the conditions of the competition as follows, in recognition of their endeavours to solve the safety cargo-hook problem: A. A. E. Penncfather, £60; Simplex Safety-hook Syndicate, £25; A. H. Rowson, £15.

REGISTRATION OF SHIPPING.

On the 31st December, 1931, there were on the register of vessels in the Dominion 65 sailing-vessels of 5,892 tons register; 231 steamers of 95,929 tons register; and 234 motor-vessels of 8,118 tons register, as compared with 65 sailing-vessels of 5,892 tons register; 242 steamers of 98,305 tons register; and 224 motor-vessels of 7,773 tons register, at the end of the previous year.

The number of seamen and boys employed on board was 3,597, as compared with 3,680 for the year 1930.

Government Shipping Offices.

In the Government shipping offices the administration of the Shipping and Seamen Act has been efficiently carried out. Appended is a statement showing the number of seamen engaged and discharged at the various ports during the year, and the fees received for such transactions. The total number engaged and discharged was 10,985 and 10,911 respectively, as against 12,235 and 12,697 respectively during the previous year. The transactions at the four main ports were as follows, the figures in parentheses being those of the previous year.

Port.	Engagements.	Discharges.	Fees.
			£ s. d. £ s. d.
Auckland	3,515 (3,606)	3,363 (3,860)	634 3 0 (692 5 0)
Wellington	4,104 (5,200)	4,271 (5,156)	781 17 0 (913 14 0)
Lyttelton	1,116 (979)	1,106 (979)	188 11 0 (164 3 0)
Dunedin	883 (1,015)	814 (1,121)	162 4 0 (190 3 0)

Engagement of Seamen.

This service has been maintained. A record of seamen applying for work is kept for the purpose of filling vacancies.

Sick and Injured Seamen.

The total amount paid by shipowners to sick and injured seamen under the provisions of the Shipping and Seamen Act, 1908, and its amendments was £12,498 4s. 5d., as against £16,025 4s. 2d. for the previous year, a decrease of £3,526 19s. 9d.

Examination of Marine Engineers.

In the course of the year 208 candidates were examined for marine engineers' certificates of competency at the various examination centres throughout the Dominion.

Of these, 112 were examined for third-class certificates, second-class and first-class ordinary and motor certificates of Imperial validity. Of the 61 third-class candidates who presented themselves for examination, 27 were successful and 34 unsuccessful; of the 28 second-class ordinary and motor candidates examined, 16 were successful and 12 unsuccessful; and of the 23 candidates examined for first-class ordinary and motor certificates and motor endorsements, 12 passed and 11 failed in the examinations.

In the case of second-class candidates, the particulars given above comprise 23 candidates for ordinary certificates, 13 of whom were successful, and 5 candidates for motor certificates, 3 of whom were successful.

In the case of first-class candidates, the foregoing return comprises 15 candidates for ordinary certificates, 5 of whom were successful, 1 candidate for motor certificates who was successful, and 7 candidates for motor endorsements of ordinary certificates, 6 of whom were successful.

The examination for the endorsement of ordinary certificates for service in motor-ships, and also of motor certificates for service in steamships, is not so extensive as the full ordinary or motor examination. The former consists of two divisions only—viz., engineering knowledge, written and verbal.

The remaining 96 candidates were examined for certificates of competency which are valid in New Zealand only. Of these, 56—33 of whom were successful—were examined for service in sea-going vessels propelled by some motive agent other than steam; 35—31 of whom were successful—for service in vessels propelled by some motive agent other than steam plying within restricted limits; and 5—3 of whom were successful—for service in steam-driven vessels plying within restricted limits.

During the year the Board of Trade of the United Kingdom formally recognized as having equal value with certificates of the same grades issued by the Board the first- and second-class motor certificates and endorsements, issued by the Department under the revised regulations relating to the examination of marine engineers which came into force on the 1st March, 1931.

The examinations for first and second-class ordinary and motor certificates, and also for third-class certificates, are now held at the four main centres only. Examinations for certificates of competency which are valid in New Zealand only are held at fifteen centres throughout the Dominion.

Inspection of Boilers and Machinery.

Boilers and Pressure Vessels.

The following is a statement of the number of inspections made during the year, the corresponding figures for the previous year being shown in parentheses.

	Number.	
Boiler and steam pressure vessels inspected for the first time	226	(261)
Air receivers inspected for the first time	142	(193)
Total inspections of all boilers and pressure vessels	7,914	(8,144)

Pending the issue of the land-boiler specifications which the British Standards Institution has now in hand and which the Department will consider adopting, amendments were made during the year to the land-boiler rules relating to stayed surfaces. The opportunity was taken to consolidate the various amendments which have been made from time to time to the Department's rules, and consolidated rules have now been printed and are available for purchase by the public. The amendments made to the rules conform to modern authoritative practice in land-boiler design, and the fact that they permit of the cost of construction being reduced will, no doubt, be appreciated in these times.

The only boiler explosion reported during the year was of a small low-pressure boiler used for generating vapour necessary for working timber in a boat-builder's yard. The boiler was not subject to inspection under the Inspection of Machinery Act. It exploded with considerable violence and was projected over a 6 ft. fence and landed 150 ft. away. The mishap appears to have been due to a pipe having been plugged. This pipe served the dual purpose of atmospheric pipe and filling-pipe. Fortunately, no person was injured, but the violence of the explosion illustrates the danger of tampering with the free exhaust of steam from boilers working at atmospheric pressure, of which there are a number now in use in farming districts for sterilizing purposes.

A mishap occured early in the year to a large Lancashire boiler in a freezing-works. The boiler had been opened up for cleaning purposes over a week-end and shortly after it had been refilled and steam raised, several gusset-stay rivets were found leaking in the end-plate. The fires were drawn and it was found that each furnace tube had collapsed at the third course. A further examination inside the boiler showed that the furnace tops and sides were heavily coated with oil, and oil was adhering to the end-plates and shell at the water-level. The presence of oil in the boiler was the direct cause of the over-heating of the furnaces and the collapse of the plates. The boiler was filled from a tank supplied with condensate from the engines, with extra feed-water through a cock controlled automatically by a float. Oil was freely used in the engines and was skimmed from the feed-tank daily. It is assumed that when pumping up the boiler, the float-controlled cock failed to operate and the tank was emptied and the free oil pumped into the boiler. Since the accident a feed-water-treating plant, additional float cocks, and a low-water electric alarm signal have been installed in the feed-tank.

An air-receiver exploded in August, 1931. It was less than 5 cubic feet capacity and was, therefore, not subject to inspection under the Inspection of Machinery Act. The longitudinal joint, which was welded by the electric process, failed under working-pressure, and close examination of the joint after the explosion showed that the weld metal was not completely fused through the whole thickness of the plate. The explosion caused considerable material damage, but fortunately no person was injured.

Machinery.

The total number of machinery inspections for the year was 37,692. Among these 13 cranes and 27 lifts were inspected for the first time.

By the Inspection of Machinery Amendment Act, 1931, machinery used exclusively for farming purposes, the motive power of which does not exceed 6 horse-power, was exempted from annual inspection, and the inspection of this class of machinery ceased in November, 1931. Farming machinery is still, however, required by the Act to be so guarded as to afford adequate protection to all persons working the machinery or in connection therewith, or who may be in the vicinity thereof. The 1931 Amendment gives the Department power, which it did not hitherto have, to require that any machinery must be adequately guarded before it is sold or otherwise disposed of, and Inspectors of Machinery have instructions to report any farm machinery which is being sold without proper safety devices.

It is estimated that the exemption of this machinery has reduced the annual machinery inspections by approximately 24,200, and in consequence eight Inspectors were retired and the machinery districts throughout the Dominion rearranged. Offices in Gisborne and Timaru were closed, these districts being worked from Napier and Christchurch respectively.

There were reported during the year 5 fatal and 42 non-fatal accidents, the corresponding numbers for last year being 11 and 67 respectively. One fatality, asphyxiation by escaping gas from an ammonia-cylinder, which exploded due to a faulty forge weld, was not an accident in respect of which the Department has any responsibility, the defective cylinder being exempt from inspection. One

fatal accident occurred at a transmission shaft. A worker who neglected to stop the machinery before he reached over an unfenced shaft to feel a bearing which was running warm had a part of his clothing caught up by the shaft. The shaft has now been completely boxed in. In another case a worker died from injuries received when a motor-car hoist crashed from the first floor of a building to the ground floor, a distance of 16 ft. A motor-car was placed on the platform and the hoisting gear lowered. For a reason which is not clear, the platform did not descend till about 4 ft. 6 in. of the chain was slack and the impact of the fall through this distance was sufficient to carry away the overhead beams and the hoisting-gear. The machine had been reported idle for some years, and the owners were prosecuted for working an uncertificated machine. The fourth fatal accident occurred at a tractor running on wheels and used for hauling logs on a sawmill tramway. Due to the slipping of a key, the tractor got out of control on an incline and a worker, when jumping off, was thrown under the wheels. A brake which had been removed before the accident has now been reassembled and the machine is now reported to be safe. The remaining accident occurred when an attendant was fatally burned whilst lighting up an oil-burner of an oil-fired boiler, The gas exploded in the furnace and flames and heated oil were driven out of the furnace-doors over the workman. A damper in the flue was found closed after the accident but it is not certain whether the damper was closed purposely or accidentally. When lighting up a cold boiler there is difficulty in procuring a circulation of air through the flues if a mechanically driven fan is not provided. The gases lie in the furnace and when the temperature is raised to the point of ignition the danger of a blow-back through the furnace-doors occurs. The practice which had been adopted of lighting the burner with a piece of newspaper did not allow of the fireman standing clear of a possible flare-back. A safer means of lighting the burner is now being used, and the damper has been removed from this boiler.

A fatal accident which occurred on 26th February, 1931, was, owing to investigations into the causes of the accident being incomplete, not reported for the year ending 31st March, 1931, but was fully inquired into during the year. A digester used in a large freezing-works in Otago for the extraction of fats from meats and offal was fully charged and heated to a temperature of 200° Fahr. The top door was then placed in position and steam turned on. After working a few minutes it was decided to remove the door and put in a quantity of fat, which had been inadvertently left out, and the steam valve was shut. Five minutes later a cry was heard and the attendant was found fatally scalded by partially cooked fat which, on removal of the door, had been ejected from the digester. It is clear from evidence given at the inquest that there was no pressure visible by gauge when it was decided to reopen the digester, but it is assumed that there was a slight pressure of vapour within the chamber and a certain amount of steam under pressure contained beneath a layer of melted fat. The sudden removal of the large door relieved the vapour and, on the surface of the fat being disturbed, the released steam ejected a portion of the heated fat through the open door over the unfortunate workman. Circular instructions were issued to Inspectors stating that the circumstances of this accident and the danger of removing doors during the process of cooking were to be brought under the notice of managers and attendants of digestive plants.

Of the 42 non-fatal accidents reported, 6 were connected with machinery not inspected by the Department. Twelve of the remaining accidents occurred at woodworking machines, 7 were at circular saws, 3 at butchers' mincing-machines, 4 at presses, and 4 at lifts. Four accidents were connected with farm machinery, which is now exempt from annual inspection. One-half of the non-fatal accidents reported were with machinery fully protected and for which no additional safeguards could be provided. These accidents were due to carelessness of the workers, and in some cases the guards had been removed from the machines. A careful investigation was made into the causes of all accidents and where it was practicable and reasonable to do so additional safeguards were fitted. During the year circular instructions were issued having reference to the guarding of gear-wheels, biscuit-stamping machines, chaff-cutters, oil-engines, mincing-machines, grooving-presses, and printing-press rollers.

Examinations of Land Engineers, Engine-drivers, and Electric-tram Drivers.

These examinations were held at the various offices of the Inspectors of Machinery throughout the Dominion at the regular intervals provided for in the regulations—namely, in the months of May, August, November, and February. In addition, a few special examinations were granted, but the holding of special examinations is not encouraged, as it is considered that the regular examinations are of sufficient frequency, and, except in very exceptional circumstances, candidates are expected to make arrangements to attend the scheduled examinations.

The full list of places where the examinations were held is shown in an appended return, as also is the number of candidates examined at each place. The classes of certificates for which examinations were held were: First-class engine-driver, second-class engine-driver, steam winding-engine driver, electric winding-engine driver, locomotive-engine driver, traction-engine driver, locomotive and traction-engine driver, and electric-tram driver.

The total number of candidates examined was 380; of this number 292 were successful and 88 failed in their examinations. 335 certificates were issued, which includes 292 to successful candidates for examinations. The remainder were issued under the provisions of sections 53, 59, and 62.

The regulations relating to the granting of engineers' and engine-drivers' certificates were consolidated and amended slightly during the year.

Prosecutions.

During the year legal proceedings for offences under the various statutes administered by the Department were instituted in 49 cases. Prosecutions under each Act were as follows: Fisheries, 38; harbours, 1; Shipping and Seamen Act, 3; inspection of machinery, 7.

Fisheries.

The report of the Chief Inspector of Fisheries, which is appended hereto, deals exhaustively with the operations of this Division during the year.

The sale of rock-oysters last season resulted in a net profit of £839 6s. 10d. after taking all charges into consideration. This was £553 less than the net profit obtained during the previous season when sales were a good deal higher. Oysters, being more or less of a luxury line, are affected to a large extent by the restricted purchasing-power of the public at the present time. The following statement showing the number of sacks picked from the beds since 1911 and the gross proceeds from sales each year, is of interest:—

Year.	Number of Sacks.	Gross Sales.	Year.	Number of Sacks.	Gross Sales.
		£ s. d.			£ s. d.
1911	4,782	3,013 6 8	1922	7,323	7,702 10 0
1912	7,728	5,212 0 0	1923	6,800	7,355 17 6
1913	9,069	6,157 14 0	1924	6,841	8,395 9 3
1914	8,361	5,770 3 0	1925	8,297	10,205 5 0
1915	9,634	6,714 18 6	1926	6,771	8,344 10 0
1916	8,172	5,692 11 6	1927	6,021	7,314 11 0
1917	10,357	6,890 3 0	1928	5,547	6,931 4 6
1918	10,422	7,516 13 6	1929	6,219	7,698 0 9
1919	7,256	5,363 8 3	1930	5,216	6,431 13 8
1920	6,979	6,296 8 6	1931	4,360	5,430 8 5
1921	7,219	7,763 7 4			

Whaling.

As anticipated in the annual report for last year, the surplus stocks of whale-oil produced from previous intensive exploitation of the whaling-grounds were such that no whaling operations were last season carried out in the Dependency. It is, however, apparent that operations will be resumed during the coming season, as one of the largest whale-factories is coming south and it is probable that there will be others.

The International Whaling Convention was signed at Geneva on the 24th September, 1931, on behalf of twenty-six countries, New Zealand being one of the signatories. The convention provides that it shall come into operation on the ninetieth day following the receipt by the Secretary-General of the League of Nations of ratifications or accessions on behalf of not less than eight members or non-member States, including the Kingdom of Norway and the United Kingdom of Great Britain and Northern Ireland. A number of instruments of ratification or accession have been deposited, but I have not so far received advice that there have been sufficient deposited to enable the convention to come into operation on the appointed day.

In the meantime, however, the pleasing advice has been received that an agreement has been reached by practically all the companies operating in the Antarctic to restrict whaling operations there during the forthcoming season. The restriction is to be effected by fixing in respect of each company a quota corresponding to the mean between its production in 1930–31 and the loading-capacity of its floating factory or the productive capacity of its land station less 38 per cent. Whaling is not to commence before the 20th October. In order to encourage the fullest possible utilization of carcasses, quotas have been calculated on the basis of both barrels and whales, each blue whale being estimated to yield 110 barrels of oil.

The catch of the companies which have entered into this agreement is to be restricted to 1,931,734 barrels; and it is estimated that, including the catch of one company which, from latest advices, had not so entered, the total yield of oil will not exceed 2,000,000 barrels, or about 50 per cent. of present capacity. Any oil caught by a company in excess of its quota will be sold for the benefit of all the parties to the agreement, which also provides that until the 1st May, 1933, no company shall sell or rent out, for the purpose of whaling, land stations, floating factories, or catchers to non-signatories, unless the latter accept the restrictions imposed.

It can be readily seen that these restrictions will be all to the good in that, while assisting the industry, they will go a long way towards conserving the species; and when the convention is brought into force it should go a long way towards remedying the damage which has been inflicted in the past.

As a result of the economic depression and the fall in the market price of oil, the two whaling firms operating in New Zealand have not been able to quit all of their last season's production, and their operations this season are being very much restricted.

B. W. Millier, Acting-Secretary.

REPORT ON FISHERIES FOR THE YEAR ENDED 31ST MARCH, 1932.

SIR,—

I have the honour to submit the following report on fisheries for the past year :—

With regard to statistics, the most important subject to be dealt with in an annual fisheries report, an attempt has been made to improve upon the records previously published by showing in the summary table (p. 32) the quantities of different kinds of fish landed at different ports. The returns sent in have not permitted more than a partial classification in Table IIA, and about half the total quantity of fish landed is included under the heading of "mixed" and "kind not specified."

Means are still unfortunately lacking for obtaining records of the landings of individual vessels from which statistics could be compiled showing the quantities of the chief kinds of fish caught by the different methods of fishing.

The total quantity of wet fish landed during the year was 318,956 cwt., valued at £311,199.

Compared with the figures for the previous years, this shows a reduction in quantity of 14 per cent., a reduction entirely explicable by the reduced purchasing-power of the public which restricted market requirements, and in very many cases resulted in catches being voluntarily limited by the fishermen themselves. The decline in value from £406,675 for 1930–31 to £311,199 in 1931–32, a diminution of 23·5 per cent., is a more significant feature than the reduction in quantity.

While the prevalence of unemployment and straitened finances diminished the demand and brought down the price of fish in the established channels of trade, it led to increased numbers of people taking up fishing in a casual semi-professional way. The catches made by such fishermen, generally speaking, were not taken into account in the returns from which the figures for this report are compiled, but they would not alter the total very appreciably, though such operations to some extent added to the difficulties of the established members of the industry. Cases have been reported where fishermen found the expenses of their operations too heavy for the returns obtained and had to abandon fishing and take to relief work.

An estimate of the total production of the Dominion fisheries for the year is given in the following summary :—

	Quantity.	Value. £
Wet fish	318,956 cwt.	311,199
Whitebait	2,941 cwt.	32,715
Dredge oysters	36,538 sacks	22,836
Rock-oysters	4,360 sacks	5,014
Mussels	4,242 sacks	1,294
Crayfish	2,083 cwt.	2,650
Toheroas (canned products)	257 cwt.	2,400
Whale products—		
Oil	530 tons	6,000 (estimated)
Fertilizer	74 tons	
Quinnat salmon (netted fish only)	15,337 lb.	760
Total value		£385,868

The corresponding total value of fishery products for the preceding year was £471,176.

Auckland, the most important fishing centre in the Dominion, shows a decline of 19·5 per cent. in the quantity and 22·4 per cent. in the value of fish landed compared with last year. Though all fishing interests have suffered a serious setback, trawling, on account of its higher working-expenses, was the branch of the local fishing industry most affected by the economic depression. Whereas in the 1930–31 year four trawlers were working continuously and one trawler operated for part of the year, during the twelve months under review three trawlers were engaged in the first five months; the number was reduced to two in September, and for January and February all were laid up except one. Their fishing operations were carried on mainly in the Bay of Plenty and in the outer portion of the Hauraki Gulf, this method of fishing being prohibited on the nearer grounds of the Gulf. Trawled fish thus constituted a smaller proportion of the Auckland supplies than usual. So far as snapper and flounder were concerned, except when they were held up by bad weather, the Danish-seiners' catches were more than adequate to make up for the deficiency arising from the curtailed trawling operations. It is to be regretted that I cannot here give a more detailed study of the effects of this change in relation to the fish stocks on the one hand and the economic factors on the other hand. The latter, being of more immediate human concern, naturally controlled the situation. From the point of view of fishery administration, however, the effect of fishing operations on the stock and on the prospects of future supplies is of most essential importance. It is difficult to gauge the condition of the fishing-grounds as regards productivity from the quantities landed, for the reason that for the greater part of the year all the boats were "put on a limit" by the fish-distributing agencies, and certainly did not bring in so much fish as they would have done if there had been a demand for all they could get. The flounder and dab fishing, prosecuted by Danish-seiners off the entrance to the Thames Firth, off the north coast of Waiheke, and off the western shore, was particularly good; and it would appear that the quantities of these flatfish have recently increased. Snapper supplies, though usually more than sufficient to meet the market demand, do not appear in such promising light since for the best catches it was necessary to exploit grounds further afield.

Largely due to the increased supplies of dabs and flounders, especially in the spring season, the Thames fleet had a fairly successful year so far as catches were concerned, though the prices were

much depreciated. The Danish-seiners, working on the "Dab Patch" grounds, were responsible for the greater part of the catches. This class of fishing, carried on by the larger vessels capable of working at greater distance from port, has now definitely taken precedence of the older method of set-net fishing which was formerly used by all the Thames fishermen. A large proportion of line-caught fish, principally snapper, is still brought by road to Thames distributors from Mercury Bay.

In Hawke's Bay, as in the Hauraki Gulf, there has been an unusual abundance of flat fish, though round fish have been scarce. The trawlers did not work full time owing to the limited demand. The discovery of a new hapuku ground, from which some good catches were made, has been reported.

With regard to the industry in Otago, groper (hapuku) catches have been below the average of former years, but better fishing for red cod and kingfish has been experienced. The blue-cod fisheries off Stewart Island and the Chathams have suffered seriously from the diminished demand for exports to Australia, and it would appear that considerable efforts for the improvement of the quality by better refrigeration methods and for a more satisfactory selling organization will be necessary for the rehabilitation of these fisheries.

The statistics of the exports and the imports of the fish and shellfish are given in Table V. As might be expected, a fairly substantial decrease is shown compared with last year's figures which were themselves much below those of the previous year. Exports of fresh oysters have declined from 140,289 dozen, valued at £1,500, to 45,681 dozen, valued at £543. Frozen blue cod have gone down from 9,504 cwt., valued at £27,213, to 7,329 cwt., valued at £17,866; frozen snapper from 1,624 cwt., value £2,274, to 871 cwt., value £1,051; frozen flounder show practically no decline in quantity (1,894 cwt., compared with last year's 1,897 cwt.), but a considerable drop in value from £5,774 to £4,617; other kinds exported frozen dropped from 4,653 cwt., value £11,786, to 4,004 cwt., value £6,861. The value of the total exports of frozen fish fell from £47,047 to £30,395. Although canned toheroa shows a decline from £3,353 to £992, the exports of canned oysters show a promising increase from 15,079 lb. to 69,497 lb., though the increase in value (£1,207 to £2,490) is not commensurate. Canned whitebait exports have also increased from 39,066 lb., value £4,908, to 66,386 lb., value £7,459, and other kinds of canned products have increased from 2,347 lb., value £411, to 36,028 lb., value £2,243.

Rock-oysters.

Oyster-picking was commenced on the 22nd June, and finished on the 19th September, forty-three pickers being employed. The number of sacks taken from the different areas was as follows: Bay of Islands, 1,780 sacks; Whangarei Harbour, 144 sacks; Kaipara Harbour, 467 sacks; Hauraki Gulf (Takatu–Gull Point, 35; Rakino, 157; Rangitoto, 168; Motutapu, 167; Waiheke, 624; Ponui, 131) 1,282 sacks; Coromandel, 377 sacks; Great Barrier Islands, 310 sacks: total, 4,360 sacks.

As might have been expected, the demand was not so brisk as usual, and with our system of a uniform price per sack for all rock-oysters, some difficulty was experienced at the Auckland depot in getting dealers to take anything but the best-quality oysters. Unfortunately, the beds which yield the finest oysters are, generally speaking, the most sparsely stocked, and considerable judgment and restraint are always necessary to avoid a tendency to deplete the best areas to the jeopardy of future supplies.

Oyster-cultivation.

With limited funds available the work was confined to the most obviously necessary and profitable undertakings. The following statement gives a summary of operations and expenses:—

Rock-oyster-cultivation Work.

Area.	High-water Oyster-rock removed.	Other Work.	Costs.
	Sq. yds.		£ s. d.
I. Bay of Islands ..	1,368	250 square yards of rock cleaned from "grape weed"	80 14 4*
III. Kaipara Harbour ..	3,647	7,800 square yards of oyster-bearing stones turned on the Ruawai Stop-bank; six new trays erected	99 1 6
VI. Coromandel ..	..	Twenty-four new trays erected ..	45 2 0
Totals	5,015	..	224 17 10

* Includes an accident compensation claim of £6 1s. 4d.

Note.—In addition to the above operations the following work was done by the permanent staff in the course of their ordinary duties, no extra labour-costs being entailed: 1,606,100 "borers" destroyed; 185 yards of "capstones" turned: 280 square yards of rock cleaned from dead shell, and 10 square yards from "grape weed"; 2,001 "pupu" destroyed.

Toheroa.

The year under review was exceptionally difficult for the canned toheroa trade, owing principally to the reduced demand for this luxury in Australia. One cannery suspended operations and the other packed a somewhat smaller quantity than in the previous year. During the last three or four years

there has been a noteworthy improvement in the abundance of toheroa (locally called *tohemunga*) on the beaches in the neighbourhood of Levin, Otaki, and Waikanae, on the west coast of the Wellington Province. These beds have previously been regarded as not containing sufficient stock to warrant being leased or otherwise made available for commercial exploitation. However, if the improvement continues, it seems reasonable to entertain hopes of their becoming a commercial asset as well as a source of food for the natives of the district. It is desirable that these and other toheroa-beds should be made the object of a systematic survey and more thorough investigation made of their biology, and especially of the conditions which determine their distribution and abundance. Over all the North Island beds, so far as can be ascertained, the present stock of full-grown toheroa is well up to average abundance, except where exploitation has been excessive. The Southland beds, on the other hand, appear to have deteriorated. On the Ninety-mile Beach a considerable mortality of toheroas from some unknown natural cause took place in February, 1932. The beds were very heavily stocked. The scavenging operations of sea-birds and the effects of high spring tides quickly disposed of the danger of pollution to the beach which it was feared might be a serious matter, and it is understood that no very considerable harm has been done to the beds, although the losses were reported to be very heavy.

To obviate the depletion which of recent years has been increasing in the more accessible toheroa-beds, owing both to commercial exploitation and unrestricted picking by motor-car parties, the regulations foreshadowed in my report of last year were gazetted on the 10th September, 1931. By these regulations a size limit of 3 in. has been prescribed, and a "bag" limit of fifty toheroas per person per day: the use of spades and shovels has been prohibited, and the months of October and November (during which most of the spawning takes place) have been declared a close season. The taking of toheroa for sale is forbidden except under license, and is confined to certain prescribed areas with a limit of not more than 3 bushels per day. Several honorary Inspectors have been appointed to see that the regulations are observed. No commercial licenses have been taken out, doubtless owing to the unpromising prospects for this sort of trade under the prevailing conditions, and also possibly because the beds open to commercial picking are limited to restricted portions of the North Kaipara Beach. The well-stocked condition of some of the other beaches would appear to warrant their being opened for licensed diggers, but while our knowledge of the absolute abundance of these bivalves and of their reproductive capacity is incomplete, and our powers of surveillance so limited, a policy of conservation, rather than exploitation, seems to be preferable.

Mussels.

No mussels were canned during this year's season and, with the general decline in retail trade also, the landings dropped to 4,242 sacks, valued at £1,294, compared with last year's total of 6,224 sacks, valued at £2,039. However, the new dehydrated products industry, which uses these molluscs for the manufacture of soup-powder, has made promising progress; 76 cwt. of soup-powder, consisting partly of dehydrated mussels, were produced in Auckland during the year. Representations have been made to the Department with the object of getting definite mussel-bearing areas, which extend from between tide-marks to depths of 10 fathoms or more, set aside for exploitation by lease-holders only. There is statutory provision for the establishment of such a system, but both practical and administrative difficulties stand in the way of its adoption at least so long as the stocks of mussels on the open-sea grounds are as well maintained as they appear to be at present.

Quinnat Salmon.

The usual rack used for the trapping of salmon in the Hakataramea River for hatchery operations was completed on 6th April and the first salmon taken on the 18th of that month. The first run was helped by a rise of 3½ in. in the river-level, which provided a satisfactory stream into a side channel of the main river. As the Hakataramea went down, a groyne was built to conduct all the tributary water into the Waitaki in one channel. By the 14th May, 184 males and 237 females had been trapped, and over 1,102,000 eggs laid down in the hatchery. This was sufficient for the stocking programme to be undertaken. The rack was left in position for the capture of trout, and later running salmon were lifted over the rack to pursue their journey up the Hakataramea and spawn naturally. The number so lifted over was 334, making a total of 755 salmon, of which 758 were taken in the month of May. The rack was taken out on the 24th June, but a pound-net was still kept in the river for trout till the 13th July. The last salmon came into it on the 6th July.

Six hundred thousand eyed ova were sent to the Maori Creek Hatchery for the continuation of stocking the Wairau River with this species, and 200,000 were sent to Hokitika; 302,000 were hatched out at Hakataramea, and of the resultant fry 294,000 were liberated in the local river, and 8,000 kept for pond rearing to be marked and liberated as yearlings, and to supply material for scale investigations.

The fishing season immediately preceding the spawning season, as was mentioned in last year's report, was spoilt by the prevalence of floods, and it was not possible to judge the abundance of fish from the numbers taken by angling. So far as could be judged by the run of spawners into the Hakataramea, the 1931 season was better than average, both in point of numbers, and also as regards the size and condition of the salmon. The majority of the fish ranged between 14 lb. and 24 lb. It is reported that considerably more fish were seen in the other tributary streams of the Waitaki in the 1931 winter than in the previous year, but the big run was rather later than usual. Similarly in the Rangitata River the bulk of the fish came up late in the 1931 fishing season, and though the anglers got little satisfaction out of them, the spawning-grounds were generally well attended.

The 1932 fishing season, of which the earlier and greater part falls into the last three months of the year under review, has been characterized by fair runs of fish, though water conditions rarely afforded the most favourable circumstances for successful angling. It is impossible to make an estimate of the number of fish caught by the numerous anglers who are allowed to take quinnat salmon (not for sale) by virtue of being holders of trout licenses. The returns made by holders of anglers' quinnat-selling licenses are summarized below.

——	Males.	Females.	Sex not given.	Totals.
Waiau-uha River, 1/3/32 to 30/3/32 (one rod)—				
Number of fish caught	4	8	..	12
Weight of fish in pounds	76	147	..	223
Average weight, in pounds	19·0	18·4	..	18·6
Hurunui River, 17/2/32 to 1/4/32 (one rod)—				
Number of fish caught	10	7	..	17
Weight of fish, in pounds	215	118	..	333
Average weight, in pounds	21·5	16·9	..	19·6
Waimakariri River, 7/2/32 to 10/4/32 (five rods)—				
Number of fish caught	37	41	..	78
Weight of fish, in pounds	586	672	..	1,258
Average weight, in pounds	15·8	16·4	..	16·1
Rakaia River, 12/2/32 to 7/5/32 (eight rods)—				
Number of fish caught	72	100	9	181
Weight of fish, in pounds	1,187	1,760	180	3,127
Average weight, in pounds	17·6	16·5	20	17·3
Rangitata River, 6/2/32 to 28/2/32 (nineteen rods)—				
Number of fish caught	99	92	79	270
Weight of fish, in pounds	1,953	1,833	1,573	5,359
Average weight, in pounds	19·7	19·9	19·9	19·8
Waitaki River, 21/3/32 to 29/4/32 (four rods)—				
Number of fish caught	20	21	8	49
Weight of fish, in pounds	496	417	192	1,105
Average weight, in pounds	24·8	19·9	24·0	23·6
Combined rivers, 6/2/32 to 29/4/32 (thirty-three rods, five of which fished two of the above rivers)—				
Number of fish caught	242	279	96	607
Weight of fish, in pounds	4,513	4,947	1,945	11,405
Average weight, in pounds	18·6	17·7	20·3	18·8

The dates given above for the first and last catches made in each river afford an idea of the period covered by the principal runs. The earliest quinnat catch reported was made on the Rangitata River on the 9th January, but the first appreciable "run" did not take place till the 9th February. More than half the total fish caught were taken in the month of March, and fairly good fishing was obtained in April, more especially in the first half of the month. In the Waitaki River, although the run was apparently the biggest that had ever entered that river, the high and turbid water made angling success almost impossible in the main river, and most of the 200-odd fish taken with rod and line were caught in the later half of the season in the higher reaches and tributaries. The season was most notable in this as in all other rivers for the extraordinary large size of the fish. This will be seen by comparing the average weights of the fish in the summary given above with those of former years, though the 1931 average sizes were also much higher than usual. The biggest quinnat so far landed by an angler in New Zealand was caught in the Waitaki; weight, 52 lb. Several 40 lb. fish were taken, and catches of 30 lb. were comparatively common. There was also a remarkable absence of scarred fish, which indicates an absence of their usual marine enemies, probably barracouta judging by the nature and position of the cut which quinnat salmon frequently show, sometimes as a healed scar, and sometimes raw and recent.

One other noteworthy fact may be recorded here—namely, the capture of a quinnat smolt, 5½ in. long, in the Wanganui River, sixteen miles below Taumarunui. This was taken on a trout fly by Mr. Alex Saddler from a pool which contained a number of similar small fish apparently on their way down the river, and was sent to the Department for identification. The presence of this fish indicates that adult quinnat had entered the Wanganui River and had spawned successfully, apparently during the winter of 1931. This evidence of the invasion by quinnat of a west coast North Island river which had failed to show any sign of results from a fairly intensive stocking with Atlantic salmon between 1923 and 1929, is perhaps surpassed by the discovery, made on a visit to Whakatane, that in the previous season (March, 1931) a quinnat had been taken by an angler (Mr. Dockray, of Whakatane) in the Tarawera River, which empties into the Bay of Plenty. This fish had been preserved by a taxidermist and was examined by the writer. Any inference as to the migratory range of the species is vitiated in this case by the fact not hitherto revealed, that about fourteen young fish which had been kept in an ornamental pool at Rotorua were liberated in the Tarawera River in 1916. A similar number were put out in the neighbouring Rangitaiki River at the

same time. Whether Mr. Dockray's Tarawera quinnat, which was 36 in. long and weighed 15¾ lb., was descended from a pair of the few young fish casually cast into the Tarawera in 1916, or whether it was a wanderer from the south is a question which must remain unanswered. This much, however, is certain, that the Bay of Plenty, although almost sub-tropical in character, and the habitat of sub-tropical species of fish such as the snapper, mullet, mako-shark, and marlin, is not unsuitable for the quinnat salmon; nor is the Tarawera River uncongenial as a spawning resort. The conditions in the sea which influence the movements of migratory fish are not constant from year to year, and it may be that both this occurrence and the entry of the quinnat into the Wanganui River, which is the furthest north to which the species has been known to penetrate on the west coast, are abnormal cases, and do not indicate that these localities would afford suitable conditions for the permanent establishment of the species.

Quinnat-salmon Netting.

As in the previous season, four salmon licenses were issued for netting the lower tidal waters of the Waimakariri River, the fishing this year being restricted to four days in each week. The first fish was netted on the 10th February and the last on the 12th April. Of the total of 1,157 salmon landed, 132 were caught in February, 979 in March, and 45 in April. The following statement summarizes the results:—

—	Males.	Females.	Sex not given.	Totals.
Number of fish caught	474	383	300	1,157
Weight of fish, in pounds ..	5,917	5,308	4,112	15,337
Average weight, in pounds ..	12·5	13·9	13·7	13·3

Some of these fish were gutted before weighing.

Atlantic Salmon.

Trapping operations for the supply of ova to the Te Anau Hatchery were commenced in March. A pound-net was put into the Upokororo River on the 24th March, and the rack fixed at the usual place was completed on the 6th April. A slight rise took place in the river while the rack was being erected, which presumably enabled the earlier running fish to get up the river. The probability of this is indicated by the fact that the first salmon trapped in the pound-net consisted of two males and four females, whereas a marked predominance of males is always characteristic of the earliest run of spawners. Five different floods came over the rack during the season, one of them flowing 2 ft. over the running-board above the top of the rack. These floods caused some damage, and accounted for the escape of an unknown number of fish. Between the 29th July and the 10th August, only five salmon were trapped, and on the latter date the rack was taken out. In all, 227 salmon were captured, of which 82 were males and 145 females. This was a reversal of the proportion of the sexes taken the previous year, when the males numbered 169, and the females 86. Of the total eggs taken the number that were hatched out or sent away at the "eyed" stage amounted to 330,500. With the assistance of officers of the Southland Acclimatization Society the upper waters and tributary streams of the Upokororo River were stocked with 92,000 fry, and the Eglinton system with 190,000 fry, while 42,000 eyed ova were sent to the North Canterbury Society for a further stocking of Lake Coleridge, which has produced from the liberation of 40,000 Atlantic salmon fry in 1928 the interesting results recorded in my report for last year. In addition to the above liberations the Southland Acclimatization Society hatched out 67,000 ova from salmon taken in their trap in the Eglinton River, from which 31,000 fry were liberated in the Upokororo, 29,300 fry in the Eglinton River, and 6,700 fry were introduced in Lake Wakatipu tributaries.

With regard to the 1931-32 angling season the total number of salmon taken, according to the estimate made by the Southland Acclimatization Society's observers, was between 300 and 400, about the same number as in the previous season. A few were taken in the lower Waiau near the sea. These were all "small fish," and it may be that they were not ascending from but dropping down to tidal waters. Scale samples from such fish would be of considerable interest as the character of the scale would throw some light on this question.

Whitebait.

There are difficulties in the way of presenting a satisfactory and comprehensive report on the whitebait fishery, just as there are in the way of its satisfactory administration and regulation. They arise from the fact that, although the total annual value of the industry amounts to several thousands of pounds, the people engaged in the fishery are scattered units operating in out-of-the-way places. A few professional long-shore fishermen take to whitebait-fishing in the season. Many become professional fishermen for the whitebait season only. Most whitebaiters may be classed as semi-professionals or amateurs, and they comprise a large proportion of the population, juvenile and adult, of both sexes living in the neighbourhood of the hundreds of rivers and streams into which whitebait run. The most important whitebait fisheries at the present time are in Westland, Grey, and Buller Counties, and along the lower course of the Waikato below Tuakau, where the local Maoris apparently depend upon the fishery for a considerable portion of their income.

From returns submitted by local Inspectors of Fisheries the statement given below has been prepared.

Whitebait Fishery.

Inspector's Centre.	Rivers fished.	Method of Fishing.	Fishing began	Best Month.	Number of Fishermen.		Total Quantity caught.
					Whole Time.	Part Time.	
			1931.				Cwt.
Auckland ..	Lower Waikato ..	Hand-net ..	28th June	September ..	120	50	1,181
Napier ..	Tukutuki, Ngaruroro, Wairoa	Set-nets ..	July ..	November ..	50	30	58
New Plymouth	Mokau, Waitara, Mohokatina, Tongaporutu	Hand and set nets	September	Mid September to mid October	(?)	(?)	68
Foxton ..	Manawatu ..	Set-nets ..	July ..	October ..	..	70	86
Blenheim ..	Wairau, Opawa, Omaka, Tuamarina Stream, Spring Creek	(?)	Early in October	September ..	(?)	(?)	17 (approx.)
Greymouth ..	Grey River, Teremakau	Hand-nets ..	Mid August	Mid October to mid November	20	200	246
Hokitika ..	Hokitika, Teremakau, Mahinapua, Totara, Arahura, Waitaha, Three-mile, Mikinui	Set and hand nets (trenches)	September	October and first part of November	216	250	360
Matainui, South Westland	Big Wanganui, Poerua, Wataroa, Okuru, Haast, Maori, Jacobs River	Set and hand nets	September	End of October and early November	32	6	446
Christchurch..	Styx, Ashley, Avon, Waimakariri	Hand and set nets	August	November ..	300	(?)	73
Dunedin ..	Taieri, Clutha, Waikouaiti, Shag	Hand-nets ..	September	October ..	(?)	(?)	355
Invercargill ..	Mataura, Oreti, Makarewa, Aparima, Waihopu	Hand-nets ..	September	October to November	..	100	51
Totals ..	..	..	..	..	..	..	2,941 cwt. (approx.)

It will be understood from the foregoing remarks that these returns do not constitute a complete record of the produce of this fishery, nor is it possible to give its approximate total value. The 2,941 cwt. of whitebait given as the total yield of the principal whitebaiting rivers would have an average wholesale value of, say, two shillings per pound, or about £11 per cwt., so that the total value would be not less than £32,000. During the year 66,386 lb. of canned whitebait was exported, valued for Customs purposes at £7,459.

The productiveness of whitebait-fishing is much affected by the weather, and it may be said with truth that the heavy rains of spring and the resultant flooded rivers have done more than anything to conserve our whitebait stocks. In the 1931 season the fishery on the west coast of the South Island was considerably hampered by floods and the catches were below average. A report from Marlborough, on the other hand, states that the catches were much below normal, perhaps owing to very dry weather. The Manawatu River is said to have had the best season for many years. The Tutaekuri and Esk Rivers in Hawke's Bay have been affected (probably through loss of spawning-grounds) by the raising of their beds by the great earthquake of 1931. The whitebait runs in the season following showed a great reduction below normal. It is stated that they were also probably affected by more than usual snow-water.

The whitebait fisheries as a whole, though varying considerably from year to year owing to natural causes, have undoubtedly shown a general decline in every succeeding decade since the earlier years of settlement. Overfishing, drainage, cultivation, and stocking of lands and the predations of such introduced fish as trout have each in some degree contributed to this reduction, and there is urgent need, before it is too late, to throw light on the extent and significance of each of these factors. The discovery of the peculiar circumstances connected with spawning of the species has already provided a solution to one problem of first importance. This knowledge should be acted upon and measures taken not only for the protection of known spawning-grounds, but also for the restoration or creation of other grounds where conditions are naturally suitable. It is very much to be regretted that the state of the Department's finances has not permitted the extension of the work of locating spawning-places to all the more important whitebait waters of the Dominion, nor to carry into practice the recommendations previously made for the protection of those spawning-places which are now known.

Up to about two years ago the Department possessed no knowledge at all as to the natural propagation of whitebait, and a somewhat vague and sketchy understanding of the exploitation of this fishery. While our understanding of the natural history of the species has taken a considerable step forward, our surveillance of the human operations, which involve not increase but decrease of the whitebait supplies, remains very imperfect and unsatisfactory. It is the job of the Fisheries Department to control and regulate the fisheries. It must first acquire the necessary knowledge or

else the control may be exercised the wrong way. That is the basis of my advocacy for a licensing system for whitebait fishing—in order that we may get into closer touch with its operatives, and also that we may acquire funds to provide for investigational work besides doing more to ensure that every whitebaiter fishes fairly in competition with other fishermen. The question of the better regulation of these fisheries has for some time been a matter of concern to fishermen, to local Inspectors and rangers, and to the Department, and it is hoped that by the time the next fishing season arrives there will be in operation a revised set of regulations that will be clearer, as well as more comprehensive, than the regulations issued at intervals over the past quarter of a century. Ideal regulations will never be possible, because the fishing conditions vary so much not only for each different river but from place to place in the same river.

Scientific Investigations.

Not only the hoped-for extension of investigational work, which is quite necessary for the rational control and prudent development of our fisheries, but also the modest undertakings we had in hand have suffered a set-back owing to the necessity to effect considerable reduction in expenditure.

Oysters.

The Marine Biologist, Mr. M. W. Young, has devoted most of his attention to rock-oysters, continuing his work on various methods of experimental oyster-culture and systematic observation of the condition of the natural oysters and their environment. Owing to the fact that the growth of the rock-oysters to marketable size requires at least four years, it is not possible to arrive at definite results in any shorter time. Periodical inspections have been made of the experimental trays, stakes, and concrete slabs mentioned in previous reports. New tray experiments have also been started in the Kaipara and in Manaia (Coromandel) to test various materials with regard to their resistance to erosion. A careful record is being kept of the cost of the various methods and materials used in these cultivation experiments. Some hundred stakes on which young oysters have been collected in Bon Accord and Mahurangi waters, which are consistently favourable to abundant reproduction of oysters, but are not very satisfactory for growth and fattening, were transplanted to Manaia, an environment which has been found to be very satisfactory for fattening but not for natural propagation, to see if the results would justify the transference of poor oysters in bulk so that they would attain marketable size and condition within a reasonable period. Having been informed by "practical" oyster-pickers that it was fatal to remove rock-oysters from their natural location between high- and low-water marks to a position below the low-tide level, the experiment of putting such oysters in wire cages and keeping them permanently below water was tried. After six months (December to June) of submergence no appreciable mortality had been noticed, and the oysters were in excellent condition.

Continuing preliminary attempts made by Mr. Young, the possibility of artificially impregnating the ova of rock-oysters, which are unisexual, has been demonstrated by Captain Daniel, Inspector of Fisheries, Auckland, who found that a water temperature of 19·8° C. (67½° F.) was favourable for this operation. Free-swimming larvæ were obtained, but the "fixed spat" stage was not achieved in the small vessels in which these larvæ were confined, possibly through lack of suitable food. Such observations as these are made by Captain Daniel as a side-line to his normal duties. If a trained biologist, suitably equipped, could be enabled to concentrate on this work and follow up these experiments, there is no doubt but that results not only of scientific interest but also of value to the improvement of oyster-cultural methods would be obtained.

An oyster-washing machine, designed by Mr. Young, has been made use of in the Kaipara with very satisfactory results. The muddy condition of many of the Kaipara oysters had previously been a serious drawback in marketing them.

Marine Fishes.

In addition to making continuous notes on the operations of the Auckland fishing-fleet and on the market conditions, Captain Daniel has made a special observation upon the propagation of snapper, dabs, and flounder by means of frequent examination of the sexual condition of the fish and by tow-netting for the pelagic eggs of these species, identifying the same by comparison with artificially fertilized ova taken from ripe parent fish. With regard to snapper, large quantities of eggs were taken in a tow-net two or three miles north of Tiri, and smaller quantities to the south-south-east, on the 3rd December, 1931. Pelagic eggs were also found in abundance on the 28th of that month and on the 28th January, 1932. Indications pointed to a long and intensive spawning of snapper in the Gulf. A contemporary scarcity of snapper off Mercury Bay and Tauranga was noted as possibly indicating a spawning migration from this part of the Bay of Plenty to the Hauraki Gulf. Tagging experiments would doubtless throw light on this point.

Considerable quantities of anchovy eggs were again found in the same area and at the same time as snapper eggs.

Observations were again made on the incidence of spawning of flounders and dabs. Dabs appeared to precede flounders in their spawning. During August and early in September both species were spawning in the middle of the Gulf between Ponui and Coromandel and also off the western shore. Spent individuals of both species were taken on the 3rd September off Big Bay and by the end of October the spawning appeared to be over, and only spent dabs and flounders were seen in the catches examined.

Further examinations of the stomach contents of snapper have been made and otoliths of dabs and flounders have been collected as the opportunity occurred and sent to the Marine Biologist for examination with a view to age determination.

Statistics.

The tabulation of returns of the Auckland fish landings and the Foveaux Strait oyster-catches has been continued and a commencement made with similar records relating to Wellington fishery operations. Further extensions of the collection of fishery statistics on a uniform plan is impeded by lack of the necessary assistance.

Whitebait Investigations.

Captain Hayes continued his observations on this species, making a visit to Westland and Canterbury in April, where spawning-grounds were discovered on the following rivers and streams: Hokitika River and Mahinapua Creek, Grey River (Punt Lagoon), Arahura River, Ashley River (Saltwater Creek and Taranaki Creek), Rakaia River.

Lack of funds prevented further tours to distant parts of the Dominion. In May spawning-places were located on the Makara Stream, near Wellington. Periodical visits were paid to the Manawatu where a continuous record of observations of spawning occurrences and attendant circumstances was kept by Mr. Harry McGregor, Mr. A. McGregor, and Mr. A. Taylor. An interesting case of the desertion of an area formerly used for spawning was noted, the cause being the diversion of a drain from its original course. More effective drainage provision involved loss of provision for whitebait propagation, and doubtless such cases have occurred very frequently in the course of land-settlement and agricultural development in many parts of the Dominion. A further case of how potential whitebait supplies may be unwittingly destroyed was exemplified by the discovery that the eggs on a whole spawning-ground had been killed by pollution caused by the use of a chemical weed-killer in drain-cleaning operations.

Spawning-grounds additional to those mentioned in last year's statement were discovered as follows: Mahinapua Creek (Hokitika), a fourth and fifth area (Mr. T. Spoor); Porangahau River (Hawke's Bay), a second area (by Mrs. Ropiha, per Mr. H. McGregor); Rakaia River (Canterbury), a third area (Mr. E. H. Knight); Rangiuru Stream (Otaki), (Mr. P. Phillips); Avon River, two areas (Mr. E. H. Knight); Mongone River (Waikanae), (Captain L. Hayes).

Evidence has been obtained showing that the species has a much more extended spawning period than was at first suspected. Spawn has been observed in October (Ashley River), November (Ashley River and Manawatu), December (Ashley River and Manawatu), January (Waimea Creek, Waikanae, and Ashley River), and February (Ashley River). The species may thus spawn in any month from October to May inclusive.

With a view primarily to ascertaining the rate of growth and the age at first maturity a number of whitebait caught in the Manawatu were introduced into an artificial pond at Foxton in October, 1931. Samples were taken out at monthly intervals, measured and weighed, and their stomach contents examined. Growth and development were found to take place very rapidly. From an average length of $2\frac{1}{8}$ in. at the whitebait stage the inanga averaged $3\frac{1}{2}$ in. after three months, and the male fish were found to be sexually mature after four months at a size of 3·6 in. At the same age the females had fully developed ovaries, though it was found that in the pond the ova did not ripen so as to be capable of impregnation.

Examination of stomach contents showed that the food was very varied, consisting principally of ostracoda, cladocera, and copepoda (minute crustaceans called "water-fleas").

Fresh-water Research.

The work of the Freshwater Research Committee of the New Zealand Acclimatization Societies' Association has made steady progress during the year. Its biologist, Mr. A. W. Parrott, working at Canterbury College, Christchurch, under the direction of Professor E. Percival, has continued his study of the scales of brown trout from various rivers and lakes in both Islands, and has also extended his attention to both Atlantic and quinnat salmon, and to the rainbow trout of Lake Taupo. His first paper on "The Age and Growth of Trout in New Zealand" has been published by the Marine Department as Fisheries Bulletin No. 4. Professor Percival has embodied the results of his faunistic studies in various rivers and his analysis of an angler's record of catches made through forty-three successive years on the same portion of the Oreti River in a report published by the Marine Department as Fisheries Bulletin No. 5, "On the Depreciation of Trout-fishing in the Oreti (or New River), Southland; with Remarks on Conditions in other Parts of New Zealand."

I have, &c.,

Marine Department, 27th August, 1932. A. E. Hefford,
Chief Inspector of Fisheries.

MARINE FISHERIES INVESTIGATION STATION.

Sir,—

I have the honour to forward herewith the Report of the Portobello Marine Fisheries Investigation Station for the year ended 31st March, 1932.

From various causes the work carried out has not been as satisfactory as the Board had hoped; yet good results have been attained in several departments.

At the time of drawing up the last annual report, Mr. Graham, the biologist, had re-entered hospital to undergo a further operation on his injured knee. This proved a serious and prolonged matter, and he was not able to resume work till the 6th August. Owing to the uncertainty as to his permanent recovery, and the pressure of the Department to reduce expenditure, the Board decided

to terminate Mr. Graham's engagement, and gave him notice to that effect, fixing the 20th December as its closing date. This arrangement was conditional on the position of its finances at that date. At the close of the financial year no finality had been reached, and the Board renewed his engagement till the 20th April.

During the early portion of the past financial year correspondence from your Department, on the suggestion of the Treasury, made it a condition of the continuance of the annual grant to the Station that the Board should impose an admission charge to visitors. In the chairman's reply of the 20th June to the Secretary's letter, it was pointed out that such a scheme was not workable. The charge could not be collected. It was pointed out, *inter alia*, that most of the visitors from Dunedin come by way of Port Chalmers and it costs them 2s. or 2s. 6d. a trip, of which 1s. 3d. or 1s. 9d. goes to the Railways Department, and the balance to the Ferry Service. Students and school pupils simply could not come to the station if a charge were made, and the great educational value of the place would be lost, thus at a time when the chairman and others are striving to get more natural science taught in our schools.

The following suggestions were made :—

(1) That the biologist give demonstrations or talks on Saturdays and public holidays and make a charge of 1s. on these occasions. The collection of such fees would always be a matter of difficulty, as the station is open to every passing boat on the one side, and to every one who walks over the hill from the land side. (This proposition has not been given a trial so far, but it is hoped to carry it out in some modified form in the future).

(2) That a definite charge be made for all biological material supplied to museums and to the biological departments of University colleges for teaching purposes. A list of such material has been drawn up by Dr. Benham, with the assistance of Professors Kirk (Victoria College) and Percival (Canterbury College), and has been issued. A copy of this list, which covers forty items, is appended herewith.

(3) A proposal made by members of the Board has also been given effect to. A collection-box, with a notification that contributions from visitors will be welcomed, has been placed in the aquarium, and has already received a certain measure of support.

Biological Work.

Owing to Mr. Graham's prolonged absence, no attempt could be made to ascertain the conditions under which the groper (hapuka) and red cod spawn, which is the first stage in their life-histories. Their ova ripen about July, when the fish mostly cease to take bait, and probably move into deep water. Apparently the only way to solve these interesting problems would be to go out with the steam trawlers during the spawning season. Males of both species have been taken with milt flowing from them, but females with ripe ova have very seldom been met with by fishermen, and then only at depths of 40 fathoms or more. This information has been obtained from several fishermen of Otago Harbour. Mr. Howes has made an interesting suggestion which may prove of value in future investigations. In European seas it has been stated that at the spawning season the female cod (*Gadus morrhua*) are only found in very deep water, while the male fish occur at a much higher level in the sea. If this is really the case then the ova liberated at these considerable depths float up and are fertilized at the higher levels, and the fertilized eggs float to the surface where with the brighter light and increased oxygen-supply the larvæ are hatched out. We have no records of the egg-production of the red cod. But female groper are known to produce two or three million eggs or more, and if these fish congregate in certain areas about spawning-time, as is probably the case, the first question is to discover these areas and then endeavour to arrive at some knowledge of their spawning-condition.

Rearing of Native Species of Fish.

Green-bone or Kelp-fish (Coridodax pullus).—Continuous attempts were made by Mr. Graham to obtain fertilized eggs of this species, but so far without success. On the 9th November numerous nearly mature females were secured, but no males appeared ripe enough to produce milt. Similarly fish brought to the station by local fishermen were in the same immature condition. On 3rd, 12th, 15th, and 24th December female fish with mature eggs were secured, but no ripe males. "Ripe eggs were placed in the glass tanks and ponds with male fish in the hope that they might be fertilized, but with negative results. While the nets were set we used the launch for tow-netting in the hope of obtaining fertile eggs." One ripe female specimen had about 70,000 eggs. "Ripe eggs that were stripped from the female fish were brought in, males were opened and the milt taken out and macerated in water, and placed in the jar with the eggs, but fertilization did not take place. Measurements and drawings were made of the eggs."

Garfish (Hemiramphus intermedius).—The first garfish were taken on the 19th November, the females being almost ripe, but the males not nearly so. On the 23rd another haul was made, when large numbers were netted, containing many almost ripe females. Bad weather prevented a further catch till the 8th December, when numerous ripe fish, both males and females, were secured. The fertilized eggs were placed in containers and supplied with water through the iron pipes, but all died within eight days. On the 11th and the 18th December further nettings were carried out, but neither the males nor females which were obtained were mature. On the 22nd "a splendid haul was made of ripe males and females. The eggs were quite ripe and males fully ripe enabled us to secure quantities of fertilized eggs. These were placed in glass containers under iron pipes, also in glass jars and hatching-boxes with water direct from the main tank, eliminating the iron pipes. Those placed under the iron-pipe water all became covered with rust and died. In the hatching-boxes the eggs twined about each other with the long filaments and formed balls which had to be shaken to remove as much

extraneous matter as possible." [These eggs are about 2·5 mm. diameter, and are characterized by possession of a great many small oil-globules dispersed throughout the superficial layer.—G. M. T.] "It appears that the eggs require some strong current to keep them clean, as those kept in glass jars with the water running quickly enough to keep the eggs moving remained quite clean, and fewer deaths resulted. On the 29th January, forty-four days from securing the eggs, they began to hatch and continued for several days. Almost from the beginning the young garfish began to disappear between midnight and 6 a.m. On speaking to Mr. Adams he thought the overflow of the boxes was too high. This was remedied and new cloth placed on the bottoms, but still they disappeared. My intention was to preserve one larval garfish each day to show the development of the lower beak, but I did not have sufficient specimens for such work. One night five disappeared, and the last disappeared when nearly three weeks old." But several stages of growth have been preserved, and drawings made showing slight increase in the lower jaw.

Kokopuru or Cockabulli (Tripterygion varium).—Specimens of this species were found on the 21st October to have spawned in empty mollusc shells, "the males exhibiting parental care of the eggs, remaining inside the shell and aerating them during the three weeks hatching. Close observations were taken and recorded, drawings were made of the larval fish and photographs taken of the male protecting the eggs."

Sucker-fish (Diplocrepis puniceus).—These fish were found spawning at Harrington Point on the 8th October. Eggs were brought to the station and photographs and drawings were made. Although a great number of ripe fish of both sexes were brought to the station, only on two occasions did they spawn in captivity."

Mr. Graham reports that of *Notothenia purpuriceps* (new to New Zealand), of which one specimen was met with last year, five more were caught in the channel near the station, and one at Moeraki. Fishermen have sent in specimens of the following rare fish to the station, viz.: Ribbon-fish (*Trachypterus trachypterus*), *Pseudopentaceros Richardsoni*, *Notothenia microlepidota*, *Paratrichthys Trailii*, and *Emerocoetes Waiteii*. "*Auchenoceros punctatus*, a fish I recorded new to Otago as being found in the stomach of red cod, is now plentiful in the harbour and in Blueskin Bay. A ray of unusual shape, which according to the drawings and description appeared to be an Australian form, was sent to the station during my absence in hospital, but was not kept to be examined." Stomach contents of both mature and juvenile fish have been recorded throughout the year. Notes on the habits and life-histories of ten species of mollusca, six species of decapod crustaceans, and other forms were made.

European Lobsters.—The stock of lobsters in the ponds on the 31st March consisted of fourteen males and eleven females. These, which were imported in 1928, are now presumably about fourteen or fifteen years old. The females were examined early in November: six were found to be carrying full batches of eggs; three varied from three-fourths to half batches. Mr. Adams estimates that the total number of larvæ liberated from the ponds in December and January was about 105,000, probably a very conservative estimate. In his annual report to the chairman, Mr. Adams states, "As Mr. Graham decided to make another attempt to rear a number of young lobsters, two females with eggs more advanced than the others were placed in the wharf pond. Some three weeks later both were removed to an observation tank, and on the 14th December the first larvæ commenced to hatch out. These were placed in the boxes in the aquarium, and the water-supply was brought direct from the reservoir through a rubber hose so that it was impossible for any rust to foul the bottom screens." Mr. Graham reports that "over 100 larvæ were kept in specially prepared boxes with water flowing in direct from the main concrete tank. These were kept till they were a month old and were living on the floor. Seventy-nine fairly active specimens were liberated at Quarry Point in a secluded spot where there were plenty of crevices to remain in and thus escape the larger enemies. Six weeks later on examining the spot, two were found under a rock close by and made frantic efforts to find cover."

The attempt to introduce the European lobster into New Zealand waters has, up to the present, met with no success. A brief summary of the history of the movement shows that the first attempt was made in 1864 by Mr. A. M. Johnson, of Opawa, Christchurch, who was noted for his work in endeavouring under most adverse conditions to introduce many sorts of fish into the Dominion. In shipping them from London he put all his twenty-six lobsters into one tank, with the result that they fought like Kilkenny cats till only one was left alive, and this was sold to a passenger who no doubt had it for dinner.

In 1885 a dozen lobsters were shipped in London by Mr. C. S. Farr for the Canterbury Acclimatization Society, but all died in the tropics. In 1892 Mr. Clifford, of Dunedin, shipped a lot for the Otago Acclimatization Society, but these met with the same fate.

In 1891 Mr. Purves, Chief Engineer of the "Ionic," attempted on his own account to bring out lobsters, but was unsuccessful. He renewed the attempt in the following year, again without success. But on his third voyage he landed nine (out of twelve shipped) at Dunedin. These were the first lobsters landed alive in this country. They were placed on the mole at the entrance of Otago Harbour, a most unsuitable locality, and were never heard of again.

In 1906 the Board of the Portobello Fish Hatchery, the parent of the present Board, renewed the attempt. Twenty-five lobsters were shipped by the "Karamea," but the apparatus for cooling the water was very defective, and only two were landed at Port Chalmers. In 1907 and 1908 further shipments of twenty-five each time were made, and on each voyage seven were landed alive. In 1909 better success was achieved, and seventeen males and fourteen females were landed. In 1912 Mr. Anderton, curator of the station, went Home to bring out herring ova for the Government, and advantage was taken to bring out more lobsters. On the 1st March, 1913, forty-one lobsters (out of forty-three shipped), were landed at the station. The surviving lobsters of the old stock were liberated at Harrington Point, just inside Otago Heads. In 1928 the last lot of thirty-nine was landed at the station, and as reported above there are still twenty-five in the ponds.

It is difficult to say why this experiment, carried on for so many years, should have failed, but the sea is very vast, and even if many of the larvæ survived on the coast and grew to maturity, the chances of males and females coming together are but small. It is possible, but not very probable, that mature lobsters may yet be met with.

History of the New Zealand Crustacea.

The Chairman of the Board has himself been engaged for the past two or three years in drawing up a natural history of the Crustacea of these southern seas. The work was undertaken by him after the death of the late Dr. Charles Chilton, who had done so much to add to the existing knowledge of this group of animals. An attempt was made to collect and edit a number of his papers on the subject, which he had hoped to complete and publish, but it was found impossible to do this in a satisfactory manner. The larger task of drawing up a descriptive catalogue of all recorded New Zealand Crustacea was therefore undertaken. In this list, as far as possible, every species will be illustrated by one or more line drawings. The valuable collection of pamphlets in the station library has proved of immense assistance. The only previously existing catalogue of New Zealand species was that prepared by E. J. Miers of the British Museum in 1876. In this 139 species, many of them of very doubtful authenticity, were described. All of these were of the larger forms, crabs, crayfish, prawns, isopods, and amphipods. Since then collectors and systematists have added greatly to the knowledge of the group, so that up to the present time about 750 species have been recorded. But these records and descriptions are scattered over numerous publications in various parts of the world, and are therefore inaccessible to most workers. The publication of an illustrated catalogue should therefore prove a boon to all zoology students. The number of species already known is evidently small compared with those which have not yet been met with or worked out. The study of this group of organisms, especially the Copepoda and the larval forms of nearly all Crustacea, their life-histories and their distribution, has an enormous and an increasing value in connection with the scientific development of New Zealand fisheries.

Hydrographic Work.

Records of the temperature of the air, the ponds, and the harbour were taken daily throughout the year, those of the ocean outside Otago Heads on every possible occasion. Water-samples for salinity testing were taken on every trip of the launch made by Mr. Adams outside the Heads. These, together with the samples received from Mr. Schofield, light-keeper at Puysegur Point, are sent direct to the Government Analyst's Office in Dunedin, and the results are duly recorded. Throughout the year Mr. Schofield has sent these water-samples and records of surface temperatures from Puysegur Point. Mr. Schofield has now been transferred to Stephens Island. Unless arrangements can be made with his successor no further samples for salinity tests will be received from Puysegur Point. In response to a request from Dr. Speight, of the Canterbury Museum, a copy of the water-sample records taken at Puysegur was sent to him. He desired to obtain these figures to incorporate them in a paper on the West Coast Sounds which he is preparing for the Pan-Pacific Congress. A copy of the surface temperatures and of the ocean-current records was sent to Mr. A. W. Parrott, Biologist, Canterbury College, in connection with his researches on salmon in New Zealand. Mr. Adams has been asked to furnish to the Fishery Department a full report of the hydrographic work carried out by him. It is hoped to forward this in the course of a few days.

Mr. Adams in his annual report states that "during April small-sized pilchards were inside the harbour in very large quantities. The sprat-nets were set, but the meshes were too large to allow these small fish to be caught. A number taken in hand-nets were preserved. Throughout the winter months pilchards were found in the stomachs of barracouta and red cod taken outside the harbour."

The outside ponds, not being used for lobsters, were stocked with kelp-fish by Mr. Graham. With the exception of cleaning the walls by scraping, no other removal of marine growth was done. The green slimy weed that accumulated on the bottom does not appeal as a food to the kelp-fish. Quantities of large kelp, placed in the ponds, though quickly devoured by these fish, appear not to satisfy them. Chopped-up fish was given to them every other day and they are now keen on this food, though in their natural haunts it is not possible to hook kelp-fish when using a fish bait. Although the set-net was in use more frequently than during past seasons, the catches of kelp-fish and moki were the poorest on record. "Whale-feed" were again late in making their appearance in the harbour, and it was not till early in January that they were seen on the surface in quantity. The scarcity of this important fish-food early in the year, and the continued spell of unsettled weather right through the summer months, were doubtless the main causes of the small number of fish taken in the set-nets. During January and February whale-feed were more abundant in the harbour than for the past four years. They are still (March) to be seen, but only in scattered numbers.

A fairly mild winter was experienced to the end of May. The temperature of the harbour water on the 4th June was 7·6° C. Two days later the heater was started, the temperature being down to 5·5° C. During the month very low temperatures prevailed. On the 30th June that of the ponds fell to 2·8° C. The blue cod in the ponds were placed in the observation tanks, which were kept above 6° C., blue cod in the open die when the temperature falls to 5° C. On the other hand, red cod and pigfish, which are required for feeding the lobsters and tank-fish, do not seem in any way affected by the very cold water. July was an extremely cold month, and owing to the large quantity of water used in the aquarium, it was seldom possible to keep the temperature above 6° C. The lowest figure recorded for the outside pond water was 1·4° C.

The buildings, boats, and gear have been kept in excellent order throughout the year. All the rooms in Mr. Broadley's cottage were repapered, and the inside woodwork painted. A small porch was built over the front door, and several piles supporting the house were renewed.

Mr. Broadley paid his usual visits of inspection to the fishery ports in the Otago District twice during the year.

A monthly weather report was sent to the Director of the Meteorology Department.

The educational value of the work has been steadily kept in view, and Mr. Graham, when able to be on duty, popularized the station by showing parties of students, school pupils, and other visitors round the aquarium, and explaining the contents of the tanks and ponds. He has also contributed many articles on fishery matters to the press. The students of the Training College in large numbers have visited the station along with Mr. McCaskill, their enthusiastic instructor. Parties of pupils from the High Schools, Technical School, McGlashan and St. Hilda's collegiate schools, and from several of the primary schools in the Dunedin District have visited the station, and received elementary instruction in marine zoology. The total number of visitors has been between two thousand and three thousand.

The following have received material for research work during the year: Professor Benham (Annelids); Dr. M. Watt (diatoms and Foraminifera); Mr. E. W. Bennett, of the University of West Australia (Brachyura); Dr. Uttley, of Southland Boys' High School (Bryozoa); Miss Fyfe, of University Museum (Hydroids); Mr. Laws, Training College (Mollusca); and Mr. Rawson (diatomaceous material).

Biological material has also been provided to Victoria College, Canterbury College, and Otago University.

I am, &c.,
GEO. M. THOMSON,
Chairman of Board.

The Hon. the Minister of Marine, Wellington.

REVISED PRICE-LIST FOR ANIMALS SUPPLIED BY THE MARINE FISHERIES INVESTIGATION STATION AT PORTOBELLO.

A reduction will be made for quantities exceeding one dozen of the larger species. Specimens properly preserved.

	Per Dozen. s.	d.
Sycon	12	0
Other sponges	6	0
Obelia or other Hydrids, per group	12	0
Anemones	6	0
Leptoplana	12	0
Nemertine	6	0
Nereis, small	4	0
Nereis, large species	12	0
Eulalia	6	0
Nephthys or Glycera	12	0
Sabellid, in tube	12	0
Serpulid, in tube	12	0
Terebellid, in tube	12	0
Polyzoa, per group	12	0
Lamp-shell	12	0
Amphipods, mixed	4	0
Orchestia	6	0
Idotea	6	0
Isopods, mixed	4	0
Barnacles (rock)	4	0
Barnacles (ship)	4	0
Shore crab (Halicarcinus)	6	0
Spider crab (Paramithrax)	12	0
Petrolisthes	4	0
Hermit-crab in shell	12	0
Shrimps or prawns	6	0
Limpet	6	0
Gastropods, small	6	0
Large species	12	0
Deep-water species	24	0
Doris (when available)	24	0
Haliotis (when available)	24	0
Scutum (when available)	24	0
Aplysia (when available)	24	0
Squid (Ommastrephes), large	4	0
Squid, small	3	6
Octopus, large	4	0
Octopus, small	3	6
Bivalves (pipi, cockle, &c.)	4	0
Dolichoglossus	10	0

Fishes at prices according to species.

NOTE.—This increased price has been found necessary to cover the cost of preserving and packing. Postage charged at cost.

TABLE SHOWING THE NUMBER OF SEAMEN ENGAGED AND DISCHARGED IN NEW ZEALAND, AND THE FEES RECEIVED, FOR THE YEAR ENDED 31ST MARCH, 1932.

Port.	Engagements and Discharges, Foreign and Intercolonial Trade.				Engagements and Discharges, Home Trade.				Total Engagements.		Total Discharges.		Grand Totals.	
	Engagements.		Discharges.		Engagements.		Discharges.							
	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.
		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.		£ s. d.
Auckland	2,268	212 19 0	2,060	199 17 0	1,247	106 17 0	1,303	114 10 0	3,515	319 16 0	3,363	314 7 0	6,878	634 3 0
Dunedin	451	44 18 0	446	44 4 0	432	40 1 0	368	33 1 0	883	84 19 0	814	77 5 0	1,697	162 4 0
Gisborne	3	0 4 0	3	0 4 0	136	11 16 0	134	12 11 0	139	12 0 0	137	12 15 0	276	24 15 0
Greymouth	12	1 4 0	14	1 6 0	15	1 2 0	19	1 10 0	27	2 6 0	33	2 16 0	60	5 2 0
Hokitika	..	..	..	..	19	0 18 0	14	0 18 0	19	0 18 0	14	0 18 0	33	1 16 0
Invercargill	27	1 14 0	43	3 6 0	..	..	..	..	27	1 14 0	43	3 6 0	70	5 0 0
Kaipara	3	0 6 0	1	0 2 0	..	..	..	..	3	0 6 0	1	0 2 0	4	0 8 0
Lyttelton	230	21 12 0	242	23 9 0	886	72 5 0	864	71 5 0	1,116	93 17 0	1,106	94 14 0	2,222	188 11 0
Napier	9	0 18 0	3	0 6 0	81	7 0 0	84	7 15 0	90	7 18 0	87	8 1 0	177	15 19 0
Nelson	6	0 12 0	3	0 6 0	503	38 12 0	500	37 6 0	509	39 4 0	503	37 12 0	1,012	76 16 0
New Plymouth	11	1 2 0	18	1 16 0	7	0 14 0	7	0 14 0	18	1 16 0	25	2 10 0	43	4 6 0
Oamaru	..	..	..	..	18	1 14 0	17	1 12 0	18	1 14 0	17	1 12 0	35	3 6 0
Onehunga	..	..	..	..	224	18 13 0	218	19 5 0	224	18 13 0	218	19 5 0	442	37 18 0
Patea	..	..	..	..	46	2 0 0	46	2 0 0	46	2 0 0	46	2 0 0	92	4 0 0
Picton	1	0 2 0	..	..	8	0 8 0	10	0 12 0	9	0 10 0	10	0 12 0	19	1 2 0
Tauranga	1	0 2 0	1	0 2 0	..	..	..	..	1	0 2 0	1	0 2 0	2	0 4 0
Timaru	4	0 8 0	4	0 8 0	17	1 14 0	18	1 16 0	21	2 2 0	22	2 4 0	43	4 6 0
Wairau	..	..	..	..	26	0 17 0	36	1 7 0	26	0 17 0	36	1 7 0	62	2 4 0
Wanganui	3	0 4 0	3	0 4 0	74	5 5 0	47	2 13 0	77	5 9 0	50	2 17 0	127	8 6 0
Wellington	2,653	261 16 0	2,711	253 2 0	1,451	128 6 0	1,560	138 13 0	4,104	390 2 0	4,271	391 15 0	8,375	781 17 0
Westport	4	0 8 0	5	0 10 0	89	8 5 0	91	8 9 0	93	8 13 0	96	8 19 0	189	17 12 0
Whangarei	4	0 8 0	2	0 4 0	..	..	..	..	4	0 8 0	2	0 4 0	6	0 12 0
Foxton P.O.	..	..	..	..	16	0 14 0	16	0 14 0	16	0 14 0	16	0 14 0	32	1 8 0
	5,690	548 17 0	5,559	529 6 0	5,295	447 1 0	5,352	456 11 0	10,985	995 18 0	10,911	985 17 0	21,896	1,981 15 0

TABLE SHOWING TOTAL COST OF MAINTENANCE (EXCLUDING INTEREST ON CAPITAL AND DEPRECIATION) OF NEW ZEALAND COASTAL LIGHTHOUSES FOR THE YEAR ENDED 31ST MARCH, 1932.

Name of Lighthouse.	Salaries and Wages.	Oil consumed.		Stores and Maintenance.	Totals.
		Gallons.	Value.		
	£ s. d.		£ s. d.	£ s. d.	£ s. d.
Akaroa Head	419 18 3	765	52 0 2	171 19 4	643 17 9
Brothers	908 16 0	1,013	68 16 5	749 18 3	1,727 10 8
Cape Brett	588 14 9	708	48 2 9	153 17 5	790 14 11
Cape Campbell	457 18 7	650	44 4 2	152 12 2	654 14 11
Cape Maria van Dieman ..	634 19 6	844	57 6 10	249 11 5	941 17 9
Cape Palliser	443 19 0	653	44 8 4	82 13 6	571 0 10
Cape Saunders	422 4 7	775	52 13 6	193 7 6	668 5 7
Castlepoint	448 17 6	638	43 7 1	124 18 0	617 2 7
Centre Island	641 1 6	717	48 14 2	197 7 11	887 3 7
Cuvier Island	632 19 4	731	49 13 1	250 14 5	933 6 10
Dog Island	497 16 9	736	50 0 3	175 14 2	723 11 2
East Cape	463 13 2	713	48 9 10	192 7 2	704 10 2
Farewell Spit	657 11 3	909	61 15 9	285 6 0	1,004 13 0
French Pass	203 13 0	116	7 18 2	49 19 0	261 10 2
Godley Head	482 15 0	861	58 10 0	224 6 10	765 11 10
Kaipara Heads	647 11 9	785	53 7 2	206 13 3	907 12 2
Moeraki	428 7 0	773	52 10 11	102 1 0	582 18 11
Moko Hinou	633 2 6	585	39 15 10	223 1 8	896 0 0
Nugget Point	429 12 0	863	58 13 7	214 0 2	702 5 9
Pencarrow Head	478 7 6	706	48 0 1	124 8 7	650 16 2
Portland Island	662 0 4	848	57 12 8	264 6 0	983 19 0
Puysegur Point	668 18 5	812	55 3 2	315 16 7	1,039 18 2
Stephens Island	738 4 0	706	47 19 1	321 1 3	1,107 4 4
Waipapapa Point	453 2 6	646	43 17 8	182 11 0	679 11 2
Automatic lights	703 2 6	..	..	944 10 8	1,647 13 2
Fog-signals	..	..	..	150 17 9	150 17 9
	13,747 6 8	17,553	1,193 0 8	6,304 1 0	21,244 8 4

RETURN OF ESTATES OF DECEASED SEAMEN RECEIVED AND ADMINISTERED IN PURSUANCE OF THE PROVISIONS OF THE SHIPPING AND SEAMEN ACT, 1908, DURING THE YEAR ENDED 31ST MARCH, 1932.

Name of Seaman.	Balance to Credit of the Estate on 31st March, 1931.	Amount received.	Amount paid.	Balance to Credit of the Estate on 31st March, 1932.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Bannen, T.	8 4 10	..	8 4 10	..
Brown, W. C.	..	6 13 3	6 13 3	..
Campbell, U.	..	16 4 10	16 4 10	..
Catchpole, W. W.	..	2 9 11	2 9 11	..
Duncan, A. W.	0 1 7	..	0 1 7	..
Finch, W.	..	16 2 2	16 2 2	..
King, C.	8 5 2	..	8 5 2	..
Lancaster, J. H.	50 1 11	3 5 5	..	53 7 4
Lawton, F.	..	35 6 10	35 6 10	..
Peterson, F.	34 10 1	..	34 10 1	..
Samuelson, M.	..	1 16 9	1 16 9	..
Sankey, G. S.	..	1 5 10	1 5 10	..
Simpson, T. M.	..	4 8 11	4 8 11	..
Stevens, F. G.	..	4 5 9	..	4 5 9
Strain, J. V.	..	17 6 1	17 6 1	..
Wareline, F.	..	0 1 2	..	0 1 2
Williams, E. C.	2 18 9	1 9 0	4 7 9	..
Winton, W. T.	..	19 8 10	19 8 10	..
	104 2 4	130 4 9	176 12 10	57 14 3

RETURN SHOWING AMOUNTS RECEIVED PRIOR TO THE 1ST APRIL, 1931, STANDING TO CREDIT OF ESTATES OF DECEASED SEAMEN, AND FOR WHICH CLAIMS HAVE NOT BEEN PROVED.

Name of Seaman.	Balance to Credit of the Estate on 31st March, 1932.
	£ s. d.
Evans, W., late cook, m.v. "Opawa."	8 10 4
McMahon, S. G., late seaman, s.s. "Apanui"	13 2 2
Welsh, T. B., late second cook, s.s. "Marama"	8 7 0
	£29 19 6

Summary of Examinations for Certificates of Competency as Masters and Mates for the Year ended 31st March, 1932.

Class of Certificate.	Auckland.				Wellington.				Lyttelton.				Totals.				Total Examinations.
	Pass.	Partial Pass.	Failed.	Partial Failure.	Pass.	Partial Pass.	Failed.	Partial Failure.	Pass.	Partial Pass.	Failed.	Partial Failure.	Pass.	Partial Pass.	Failed.	Partial Failure.	
Foreign-going, masters and mates	3	3	1	5	6	..	3	..	..	..	..	..	9	3	4	5	21
Home-trade, masters and mates	4	3	..	..	2	..	4	..	1	..	1	..	7	3	5	..	15
Masters of river-steamers	2	..	3	..	3	1	..	..	..	..	1	..	5	1	4	..	10
Masters of sailing-vessels plying in harbours and rivers	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1
Certificates of efficiency for members of the New Zealand Division, R.N.V.R.	..	..	..	..	1	..	1	..	..	..	..	..	1	..	1	..	2
Yacht-masters in New Zealand waters	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	2
Voluntary examination in compass deviation	..	..	1	..	1	..	1	..	..	..	..	..	1	..	2	..	3
Signals only	4	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	4
Totals	16	6	5	5	13	1	9	..	1	..	2	..	30	7	16	5	58

Summary of Casualties to Shipping reported to the Marine Department during the Financial Year ended 31st March, 1932.

Nature of Casualty.	On or near the Coasts of the Dominion.			Outside the Dominion.			Total Number of Casualties reported.		
	Number of Vessels.	Tonnage.	Number of Lives Lost.	Number of Vessels.	Tonnage.	Number of Lives Lost.	Number of Vessels.	Tonnage.	Number of Lives Lost.
Strandings—									
Total loss	1	181	4	..	..	..	1	181	4
Slight damage	22	25,970	..	..	..	..	22	25,970	..
No damage	3	870	..	..	..	..	3	870	..
Total strandings	26	27,021	4	..	..	..	26	27,021	4
Fires—									
Total loss	2	87	..	..	..	..	2	87	..
Slight damage	7	13,815	..	..	..	..	7	13,815	..
No damage	..	..	..	..	..	..	..	..	..
Total fires	9	13,902	..	..	..	..	9	13,902	..
Collisions—									
Total loss	..	..	..	..	..	..	..	..	..
Slight damage	14	9,804	..	1	5,459	..	15	15,263	..
No damage	8	1,659	..	..	..	..	8	1,659	..
Total collisions	22	11,463	..	1	5,459	..	23	16,922	..
Miscellaneous, including damage by heavy seas to hull and cargo, breakdown of machinery, and one foundering	27	31,517	7	10	33,807	..	37	65,324	7
Total number of casualties reported	84	83,903	11	11	39,266	..	95	123,169	11

Return of Land Boilers and Machinery inspected during the Year ended 31st March, 1932.

Class.	Not exceeding 5 Horse-power.	Exceeding 5 but not exceeding 10 Horse-power.	Exceeding 10 Horse-power.	Total.
Boilers—				
Stationary, portable, and traction	1,099	1,262	2,367	4,728
Digesters, jacketed pans, sterilizers, vulcanizers, and other steam-receivers	..	..	..	2,531
Air-receivers	..	..	..	655
Total boilers	..	..	..	7,914
Machinery—				
Electric motors	16,085	3,383	3,961	23,429
Internal-combustion engines ..	7,179	755	1,223	9,157
Water-power engines.. ..	162	101	194	457
Lifts	..	..	..	2,988
Cranes	..	..	..	310
Hoists	..	..	..	1,351
Total machinery ..	..	..	..	37,692
Grand total	..	..	..	45,606

Return of New Boilers inspected during the Year ended 31st March, 1932.

Class.	Made in Dominion.		Imported.		Total.	
	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.
Stationary, portable, and traction	64	575	37	1,601	101	2,176
Digesters, jacketed pans, sterilizers, vulcanizers, and other steam-receivers	60	..	66	..	126	..
Air-receivers	35	..	107	..	142	..
Totals	159	575	210	1,601	369	2,176

Return of the Number of Certificates issued to Land Engine-drivers and Electric-tram Drivers during the Year ended 31st March, 1932.

Class.	Number.	Class.	Number.
Service—		Competency—*continued.*	
First-class engine-driver	1	Electric-winding-engine driver ..	1
Second-class engine-driver	1	Locomotive- and traction-engine driver	38
Competency—		Locomotive-engine driver	9
First-class engine-driver	15	Traction-engine driver	20
Second-class engine-driver	190	Electric-tram driver	57
Steam-winding-engine driver	3		335

Return of Land Engineers', Engine-drivers', and Electric-tram Drivers' Examinations held throughout New Zealand during the Year ended 31st March, 1932, showing the Number of Successful and Unsuccessful Candidates.

Place.	First Class.		Second Class.		Locomotive and Traction.		Loco-motive.		Traction.		Winding.				Electric-tram Driver.		Total.		Grand Total.
											Steam.		Electric.						
	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	P.	F.	
Auckland	2	..	18	..	..	..	1	..	..	..	..	..	..	..	25	..	46	..	46
Christchurch ..	..	4	6	4	4	..	..	..	6	1	..	..	..	..	12	1	28	10	38
Dunedin	..	..	13	10	1	..	..	1	4	..	..	..	..	..	..	..	18	11	29
Gisborne	..	..	3	2	..	..	..	..	..	..	..	..	..	..	..	..	3	2	5
Greymouth	1	..	4	1	..	..	3	1	..	..	2	..	..	..	..	..	10	2	12
Hamilton	..	1	21	10	1	1	1	1	1	..	1	..	..	..	..	..	25	13	38
Invercargill	..	1	14	5	1	..	..	..	..	1	..	..	..	..	..	..	15	7	22
Napier	2	2	9	2	1	..	..	..	..	..	..	..	..	..	..	..	12	4	16
Nelson	..	..	10	3	1	1	..	..	1	..	..	..	1	..	..	..	13	4	17
New Plymouth ..	3	..	43	16	3	..	..	..	..	..	..	..	..	..	2	..	51	16	67
Palmerston North ..	2	3	8	3	..	..	1	..	2	2	..	..	..	..	..	..	13	8	21
Parnassus	..	..	5	..	1	..	2	1	..	..	..	..	..	..	..	..	8	1	9
Timaru	..	..	2	..	..	..	..	..	3	..	..	..	..	..	..	..	5	..	5
Wanganui	1	..	8	..	..	..	..	..	..	..	..	..	..	..	2	..	11	..	11
Wellington	1	1	13	1	1	..	1	..	1	..	..	..	..	..	16	2	33	4	37
Whangarei	..	..	1	6	..	..	..	..	..	..	..	..	..	..	..	..	1	6	7
Totals	12	12	178	63	14	2	9	4	18	4	3	..	1	..	57	3	292	88	380

FISHERIES TABLE I.—SHOWING THE NUMBER OF FISHING-VESSELS AND THE NUMBER OF FISHERMEN AND OTHER PERSONS ENGAGED IN THE FISHING INDUSTRY AT EACH PORT FOR THE YEAR ENDED 31ST MARCH, 1932.

Name of Port.	Vessels engaged in Fishing for Wet Fish.														Vessels engaged in Shell-fishery.						Number of Persons employed.					
	Steamers Trawling.		Motor Trawlers.		Steamers Danish-seining.		Motor-vessels Danish-seining.		Motor-vessels, Set-net and Line Fishing.		Sailing-boats.		Rowing-boats.		Oyster-dredging Vessels.		Mussel-dredging Vessels.		Crayfishing Vessels.		Fishermen.		Others.		Total.	
	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.	Whole Time.	Part Time.
Russell	..	..	..	..	..	..	..	..	6	11	..	..	4	12	..	..	..	..	1	1	50	40	4	..	54	40
Kaipara	..	..	..	..	..	..	..	..	25	..	..	..	3	..	..	..	..	..	..	..	34	..	..	..	34	..
Whangarei	..	..	..	..	..	..	2	..	6	..	..	..	1	..	..	..	..	..	..	..	18	..	..	8	18	8
Auckland	1	3	..	..	..	..	26	6	70	28	1	1	19	21	..	..	1	1	..	5	250	133	90	..	340	133
Thames	..	..	..	..	..	..	9	5	22	4	..	..	3	2	..	..	1	1	..	..	90	18	25	..	115	18
Mercury Bay	..	..	..	..	..	..	..	..	18	..	..	..	2	..	..	..	..	..	3	..	35	..	4	..	39	..
Tauranga	..	..	..	..	..	..	2	..	28	..	2	..	6	..	..	..	..	..	..	..	72	..	6	..	78	..
Opotiki	..	..	..	..	..	..	..	..	2	..	..	..	..	5	..	..	..	1	..	3	9	..	..	..	9	..
Gisborne	1	..	..	..	..	..	..	..	13	2	..	1	3	7	..	..	..	..	..	27	39	18	3	..	42	18
Napier	..	14	..	1	..	..	..	..	..	29	..	..	..	68	..	..	..	..	..	10	..	160	20	8	20	168
New Plymouth	..	..	..	..	..	..	..	..	15	6	..	..	2	17	..	..	..	..	..	12	26	60	..	8	26	68
Wanganui	..	..	..	..	..	..	..	..	..	23	..	..	..	..	..	..	..	..	..	..	..	28	..	..	..	28
Foxton	..	..	..	..	..	..	..	..	..	3	..	..	..	24	..	..	..	..	..	..	4	30	..	..	4	30
Wellington	2	..	..	..	..	..	..	..	60	10	..	..	15	22	..	..	..	..	6	31	220	116	20	3	240	119
Picton	..	1	..	..	..	..	..	..	16	20	..	..	..	7	..	..	..	..	..	..	36	45	..	..	36	45
Blenheim (Wairau)	..	..	3	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	6	7	..	..	6	7
Nelson	2	..	..	..	2	..	5	..	10	7	..	1	..	4	..	1	..	..	..	1	28	21	9	..	37	21
Greymouth	..	2	..	3	..	1	..	..	..	7	..	1	..	5	..	..	..	..	..	..	..	30	..	..	..	30
Kaikoura	..	..	3	..	..	..	..	..	17	..	..	..	1	..	..	..	..	..	1	..	38	..	1	..	39	..
Akaroa	..	..	3	7	..	..	..	4	12	16	..	..	4	6	..	..	..	..	..	6	13	30	1	..	14	30
Lyttelton	2	..	11	..	..	..	..	2	48*	7	9	4	41	72	..	..	..	..	..	8	172	105	60	30	232	135
Lake Ellesmere	..	..	..	..	..	..	..	..	6	..	..	20	..	..	..	..	..	..	..	..	8	20	..	3	8	23
Timaru	..	..	..	23	..	..	..	5	..	..	..	..	..	1	..	..	..	..	..	..	32	3	3	..	35	3
Oamaru and Moeraki	..	..	..	..	..	..	..	..	39	2	..	..	..	2	..	..	..	..	..	1	56	5	5	1	61	6
Dunedin and Otago district	3	1	..	13	..	..	..	1	66	..	..	..	33	..	..	..	..	..	..	9	185	..	19	..	204	..
Invercargill	..	..	..	..	..	..	..	..	..	50	..	..	..	10	..	..	..	..	..	..	..	150	..	..	..	150
Bluff	..	..	..	..	..	..	..	..	44	..	..	..	..	..	6	2	..	..	..	..	145	..	22	..	167	..
Stewart Island (Half-moon Bay)	..	..	..	..	..	..	..	..	36	..	..	..	..	..	..	..	..	..	..	..	88	..	9	..	97	..
Chatham Islands	..	..	..	..	..	..	..	..	9	1	..	..	..	..	..	..	..	..	..	..	25	3	9	5	34	8
	11	21	20	51	2	1	44	23	568	226	12	28	137	285	6	3	2	3	11	115	1,679	1,022	310	66	1,989	1,088

* Includes one steamer.

Fisheries Table II.—Showing the various Kinds of Fish caught and approximately the Total Quantities of Fish* and Shell-fish landed at the Chief Fishing-ports for the Year ended 31st March, 1932.

Name of Port.	Principal Kinds of Fish caught.	Quantity landed.	Total Value (Fish).	Shell Fishery (excluding Toheroa).							Grand Total Value.
				Oysters.	Value.	Mussels.	Value.	Crayfish.	Value.	Total Value (Shell-fish)	
		Cwt.	£	Sacks.	£	Sacks.	£	Cwt.	£	£	£
Russell	Snapper, mullet, flounder, hapuku, crayfish, piper, kingfish, tarakihi, gurnard, kahawai	1,460	1,818	..	..	..	..	..	..	..	1,818
Kaipara	Flounder, snapper, mullet	5,439	5,720	..	..	..	..	..	..	..	5,720
Whangarei	Snapper, flounder, hapuku, mullet, blue cod	3,770	5,719	..	..	..	..	..	..	..	5,719
Auckland (including Manakau and Coromandel)	Snapper, flounder, tarakihi, hapuku, gurnard, dogfish, dory, mullet, crayfish, blue cod, kingfish, trevally, frost-fish, barracouta, piper, herring, oysters (rock), mussels, sardines	83,753	69,046	4,360	5,014	4,242	1,294	1,453	2,102	8,410	75,354
Thames	Snapper, flounder, dab, mullet, gurnard, dogfish, dory, herring, pioke	21,302	21,116	..	..	..	..	..	..	..	21,116
Mercury Bay	Snapper, tarakihi, groper, gurnard, blue cod, flounder, kingfish	7,431	5,053	..	..	..	..	..	..	..	7,155
Tauranga	Snapper, hapuku, tarakihi, gurnard, trevally, dogfish, mullet, blue cod	8,818	7,750	..	..	..	..	..	..	..	7,750
Opotiki	Snapper, flounder, groper, gurnard, tarakihi	123	495	..	..	..	..	..	..	..	495
Gisborne	Tarakihi, snapper, hapuku, gurnard, sole, flounder, kahawai, crayfish	2,937	3,993	..	..	..	..	..	..	..	3,993
Napier	Tarakihi, gurnard, sole, flounder, snapper, hapuku, barracouta, john-dory, moki, trevally, kingfish, kahawai, whitebait, brill, mullet, warehou	11,100	19,320	..	..	..	..	228	225	225	19,545
New Plymouth	Snapper, hapuku, cod, crayfish, tarakihi, gurnard, herring, kingfish, kahawai	2,111	2,367	..	..	..	..	120	168	168	2,535
Wanganui	Snapper, hapuku, blue cod, flounder	40	96	..	..	..	..	..	..	..	96
Foxton	Flounder, kahawai, snapper, mullet, gurnard	200	550	..	..	..	..	..	..	..	550
Wellington	Tarakihi, hapuku, hake, ling, bass, crayfish, warehou, moki, flounder, sole, butterfish, kahawai, blue cod, trevally, snapper, gurnard, bream, kingfish, skate, whitebait, garfish, red cod, conger, kelpfish	63,421	66,248	..	..	..	..	..	..	..	66,248
Picton	Flounder, butterfish, garfish, moki, blue cod, herring (bait), hapuku, crayfish	1,780	2,942	..	..	..	..	..	..	..	2,942
Blenheim (Wairau)	Sole, flounder, tarakihi, gurnard, butterfish, snapper, moki, red cod, hapuku, crayfish	2,830	2,530	..	..	..	..	60	60	60	2,590
Nelson	Snapper, flat fish, gurnard, blue cod, bream, hapuku, crayfish	3,443	4,856	..	..	..	..	9	12	12	4,868
Greymouth	Sole, groper, snapper, turbot, flounder, herring, red cod, ling	1,720	2,275	..	..	..	..	..	..	..	2,275
Kaikoura	Groper, trumpeter, hake, ling, tarakihi, bass, blue cod, and crayfish	2,912	4,077	..	..	..	..	..	..	..	4,077
Akaroa	Groper, flounder, sole, brill, blue cod, red cod, barracouta, moki, butterfish, kingfish, conger-eel	4,055	6,254	..	..	..	..	160	60	60	6,314
Lyttelton	Flat fish, groper, tarakihi, ling, elephant-fish	14,282	16,424	..	..	..	..	..	..	..	16,424
Lake Ellesmere	Flounder and herring (yellow-eyed mullet)	1,500	1,750	..	..	..	..	..	..	..	1,750
Timaru	Flounder, sole, groper, red cod, ling, occasional kingfish, elephant-fish, barracouta, brill, and gurnard	8,030	12,045	..	..	..	..	..	..	..	12,045
Oamaru	Groper, blue cod, red cod, ling, barracouta, moki, warehou, sole, crayfish	1,999	1,980	..	..	..	..	..	..	..	1,980
Moeraki	Groper, blue cod, red cod, ling, barracouta, moki, warehou, sole, crayfish	3,100	3,138	..	..	..	..	53	23	23	3,161
Dunedin and Otago Districts	Groper, kingfish, blue cod, flounder, sole, brill, bream, trevally, garfish, red-cod, tarakihi, barracouta, moki, trumpeter, ling, mullet, red perch, kelpfish, elephant-fish, kahawai, skate	41,134	20,560	..	..	..	..	..	..	..	20,560
Invercargill and district	Blue cod, groper, flounder, green-bone, trevally, ling, kingfish, crayfish	4,398	4,911	..	..	..	..	..	..	..	4,911
Bluff	Blue cod, groper, flounder, green-bone, trevally, ling, kingfish, crayfish	5,065	9,389	36,538	22,836	..	..	..	..	22,836	32,225
Stewart Island	Blue cod, groper, trumpeter, green-bone, moki	7,866	8,406	..	..	..	..	..	..	..	8,406
Chatham Islands	Blue cod, hapuku	2,937	1,371	..	..	..	..	..	..	..	1,371
	Totals	318,956	311,199	40,898	27,850	4,242	1,294	2,083	2,650	31,794	343,993

* Not including whitebait.

FISHERIES TABLE IIA.—SHOWING APPROXIMATELY THE QUANTITIES OF DIFFERENT KINDS OF FISH AND THE TOTAL VALUE OF FISH LANDED AT EACH OF THE MORE IMPORTANT PORTS DURING THE YEAR ENDED 31ST MARCH, 1932.

—	Russell.	Kaipara.	Whangarei.	Auckland, with Coromandel and Manukau.	Thames.	Mercury Bay.	Tauranga.	Opotiki.	Gisborne.	Napier.	New Plymouth.	Wanganui.	Foxton.	Wellington and District.	Picton.	Blenheim (Waitau).	Nelson.	Greymouth.	Kaikoura.	Akaroa.	Lyttelton.	Lake Ellesmere.	Timaru.	Oamaru.	Moeraki.	Dunedin and Otago District.	Invercargill and District.	Bluff.	Stewart Island.	Chatham Islands.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Barracouta ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	81	4	..	..	..	..	..
Blue cod ..	..	..	215	113	..	182	67	..	..	..	72	6	..	..	..	..	72	..	..	..	..	..	..	225	969	..	2,858	4,512	6,672	2,906
Butterfish ..	..	..	..	..	..	19	..	..	..	..	..	..	..	..	..	60	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Flounders, dabs, and soles	90	3,334	190	4,201	7,228	42	..	20	..	5,700	..	8	..	..	..	2,200	2,144	1,080	..	2,740	..	1,000	..	..	..	..	279	77	..	..
Groper (hapuku) ..	..	..	290	1,961	..	566	1,556	10	..	..	414	5	..	..	..	20	9	240	..	1,275	..	..	..	1,307	1,807	..	954	339	954	31
Gurnard ..	..	..	..	101	1,004	183	..	8	..	..	59	1	..	..	..	200	133	..	..	..	..	..	..	..	..	..	..	..	..	..
John-dory ..	..	..	..	1,221	152	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kahawai ..	..	..	..	9	2	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kingfish (northern)	..	..	35	47	5	24	77	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	111	140	..	..	..	..	..
Ling	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	70	..	..	..	..	..	..	..	87	4	..	..	..	..	..
Moki	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mullet	400	873	310	645	48	8	252	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pioke	..	..	..	105	448	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Red cod ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	120	..	..	..	..	..	..	..	128	176	..	..	..	..	..
Sardines ..	..	..	..	90	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Snapper ..	890	1,232	2,540	43,102	10,257	5,891	5,441	80	..	..	1,512	14	..	..	..	80	1,085	200	..	..	..	..	..	..	..	..	..	..	..	..
Tarakihi ..	..	..	160	23,652	..	495	656	5	..	..	54	..	..	..	..	80	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Trevally ..	..	..	..	52	..	..	140	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	60	..	..	..	..	..	..
Warehou ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mixed, or kind not specified	80	..	30	8,454	2,158	21	629	..	2,937	5,400	..	..	200	63,421	1,780	..	..	200	2,912	40	14,282	500	8,030	..	..	41,134	307	137	240	..
Totals ..	1,460	5,439	3,770	83,753	21,302	7,431	8,818	123	2,937	11,100	2,111	40	200	63,421	1,780	2,830	3,443	1,720	2,912	4,055	14,282	1,500	8,030	1,999	3,100	41,134	4,398	5,065	7,866	2,937
Total value	£ 1,818	£ 5,720	£ 5,719	£ 69,046	£ 21,116	£ 5,053	£ 7,750	£ 495	£ 3,993	£ 19,320	£ 2,367	£ 96	£ 550	£ 66,248	£ 2,942	£ 2,530	£ 4,856	£ 2,275	£ 4,077	£ 6,254	£ 16,424	£ 1,750	£ 12,045	£ 1,980	£ 3,138	£ 20,560	£ 4,911	£ 9,389	£ 8,406	£ 1,371

FISHERIES TABLE III.—SHOWING THE NUMBER OF SACKS AND VALUE OF THE OYSTERS OBTAINED IN THE DOMINION DURING THE YEAR ENDED 31ST DECEMBER, 1931.

Locality.	Quantity.	Value (Wholesale).
DREDGE OYSTERS.		
	Sacks.	£ s. d.
Foveaux Strait	36,538	22,836 5 0
ROCK OYSTERS.		
Bay of Islands	1,780	5,014 0 0
Whangarei	144	
Kaipara Harbour	467	
Hauraki Gulf*	1,282	
Coromandel	377	
Great Barrier Island	310	
Total	4,360	
Grand total	40,898	27,850 5 0

* Takatu to Gull Point, 35; Rakino, 157; Rangitoto, 168; Motutapu, 167; Waiheke, 624; Ponui, 131.

FISHERIES TABLE IV.—SHOWING THE NUMBER AND SPECIES OF WHALES TAKEN OFF THE NEW ZEALAND COAST, WITH QUANTITY OF PRODUCTS FOR THE YEAR ENDED 31ST MARCH, 1932.

Whaling-station.	Number of Whales taken.	Species.	Yield of Oil	Quantity of Bonedust and Fertilizer.
			Tons.	Tons.
Whangamumu (Russell)	48	Humpback ..	240	44
Marlborough Sounds (Picton)	62	,, ..	290	30
Totals	110	..	530	74

FISHERIES TABLE V.—SHOWING THE TOTAL QUANTITY AND VALUE OF FISH AND SHELL-FISH IMPORTED INTO AND EXPORTED FROM NEW ZEALAND DURING THE YEAR ENDED 31ST MARCH, 1932.

Fish and Shell-fish imported.

Description of Fish.	Quantity.	Value.
		£
Oysters	Nil	..
Anchovies, salted, in containers of 28 lb. or over	26 cwt.	66
Other fish—		
Frozen, smoked, pickled, dried, or salted	874 cwt.	2,696
Potted and preserved in tins	1,955,437 lb.	68,164
Total value of imports	..	70,926

Fish and Shell-fish exported.

Description of Fish.	Exporting Ports.	Quantity.	Value.
			£
Produce of New Zealand.			
Oysters, fresh	Auckland	1,205 doz.	23
	Wellington	5,516 doz.	119
	Invercargill (Bluff) ..	38,960 doz.	401
	Total ..	45,681 doz.	543
Blue cod, frozen	Auckland	3 cwt.	18
	Wellington	1,976 cwt.	5,754
	Lyttelton	236 cwt.	603
	Dunedin	68 cwt.	161
	Invercargill (Bluff) ..	5,046 cwt.	11,330
	Total ..	7,329 cwt.	17,866
Snapper, frozen	Auckland	839 cwt.	973
	Wellington	32 cwt.	78
	Total ..	871 cwt.	1,051
Flounder, frozen	Auckland	1,276 cwt.	3,028
	Wellington	60 cwt.	129
	Lyttelton	342 cwt.	796
	Dunedin	68 cwt.	235
	Invercargill (Bluff) ..	148 cwt.	429
	Total ..	1,894 cwt.	4,617
Other kinds, frozen	Auckland	2,162 cwt.	3,444
	Wellington	721 cwt.	1,452
	Greymouth ..	..	..
	Lyttelton	993 cwt.	1,600
	Dunedin	68 cwt.	255
	Invercargill (Bluff) ..	60 cwt.	110
	Total ..	4,004 cwt.	6,861
Total exports of frozen fish from Dominion	..	14,098 cwt.	30,395
Smoked, dried, pickled, or salted ..	..	638 cwt.	1,851
Preserved in tins—			
Oysters	..	69,497 lb.	2,490
*Toheroas	..	9,724 lb.	992
*Whitebait	..	66,386 lb.	7,459
Other kinds	..	36,028 lb.	2,243
Value of total exports of New Zealand fish and shell-fish	..	..	45,973
Re-exports.			
Potted and preserved in tins	..	18,004 lb.	638

*Exporting Ports.	Toheroas.		Whitebait.	
	Quantity.	Value.	Quantity.	Value.
	lb.	£	lb.	£
Auckland	8,200	856	33,829	3,934
Wellington	1,524	136	3,974	305
Lyttelton	..	..	3,636	415
Dunedin	..	..	24,947	2,805
Totals	9,724	992	66,386	7,459

NOTE.—Exports from New Zealand are credited to the port at which they are shipped on board the exporting vessel.

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