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REPORT ON THE FISHERIES OF NORFOLK ISLAND

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Nouméa
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REPORT ON THE FISHERIES OF NORFOLK ISLAND

by H. van Pel

Introduction

At the request of his Honour, Mr. R.S. Leydin, Administrator of Norfolk Island, and with the approval of the Island Council, I carried out a general survey of the fishing industry in Norfolk Island and adjacent waters, from 17th January to 14th February, 1959.

The most generous co-operation was extended by the Administrator and his staff, the Island Council, local fishermen, the staff of the Norfolk Whaling Company, and a number of private citizens.

No report of earlier investigations was available, although I was able to consult some letters dealing with the fishing industry which were of great value to me.

This report has been written for non-scientists since the greatest problem in Norfolk Island at the moment is in connection with the economic side of the fishing industry. Some of the data collected in this report will, however, be of interest for fishery biologists and others, as the present knowledge of Norfolk Island waters is very sketchy and my report would not have been complete without these details.

NORFOLK ISLAND

General

Norfolk Island, discovered by Captain Cook in 1774, is situated in latitude 29 degrees, 3 minutes, 45 seconds south, and longitude 167 degrees, 56 minutes, 29 seconds east. Its total area is 8,528 acres, the island being approximately 5 miles long and 3 miles wide. The coast line is about 17 miles in length. The distances separating this island from the nearest main ports are as follows:

Sydney, Australia	-	930 miles
Auckland, New Zealand	-	660 miles
Suva, Fiji	-	1,016 miles
Nouméa, New Caledonia	-	420 miles

Norfolk is of volcanic origin and its average elevation is in the vicinity of 350 feet with two peaks rising to 1,023 and 1,039 feet. Two uninhabited islands, Nepean Island and Phillip Island, lie close south of Norfolk Island. Nepean, which is a small island of limestone formation, is about $\frac{2}{5}$ ths of a mile from Norfolk. Phillip Island, which is made of decomposed basalt and rises to a height of 930 feet, is about $3 \frac{1}{5}$ miles distant. Both islands are practically bare and serve as breeding grounds for a number of sea birds.

These three islands are outcrops of a submerged shelf approximately 55 miles long and 20 miles wide. Rising from depths of 500 fathoms and more, this shelf lies under 44 fathoms of water at its deepest part. Over this area, the bottom is mostly rocky with a growth of small coral and brown algae.

Neither Norfolk Island nor the two smaller islands have any harbour. Norfolk has some streams, a few of which are permanent, but no river in which small boats can berth.

There are reasonably good roads, suitable for motor cars.

Most of the coast of Norfolk is steep and high, the only place where the terrain is gently sloping or level being at Kingston in the south of the island.

In Kingston are found the Government buildings, as well as ruins dating back to the time of convict settlement. Norfolk Island has been inhabited by convicts on two different occasions, and after being vacated, was finally settled by Pitcairn Islanders in 1856. Norfolk Island is under Australian Administration.

Demography

Norfolk Island is populated by descendants of Pitcairn Islanders, usually called "Islanders", and by "Mainlanders" from Australia and New Zealand. Of course inter-marriage has occurred so that it is increasingly difficult to find direct descendants of the original Pitcairn Islanders. The population varies every year in number since many young people go to Australia and New Zealand where they find employment for more or less protracted periods. Tourists also come and go and a certain number of Australians and New Zealanders settle in the island.

At the time of my visit, the total population was estimated at about 1,027, classified as follows:

Employers	22
Self employed	85
Employees	240
Helpers (not paid)	5
Not at work	10
Not stated	15
Domestic Duties (married women etc)	360
Children	190
Indigent, aged persons etc.	100
<u>TOTAL :</u>	<u>1,027</u>

Climate

Norfolk Island has a very healthy climate. It lies outside the cyclone belt, although it is often swept by strong winds. Mist occurs sometimes. The following tables obtained from the Meteorological Office of the local aerodrome will provide further data.

DATA FROM METEOROLOGICAL OFFICE AERODROME NORFOLK ISLAND

1956

<u>Month</u>	<u>Sunshine</u> <u>hours</u>	<u>Rainfall</u>	<u>Maxim.</u> <u>temp.</u>	<u>Minim.</u> <u>temp.</u>	<u>Rel.</u> <u>hum.</u>	<u>Prevailing</u> <u>winds</u>	<u>Strongest Gust</u> <u>(in knots)</u>
January	223.7	358	79.9	58.0	87%	NE/SE	ESE/38
February	108.5	717	79.1	63.0	86%	ENE/SE	S/57
March	208.4	57	79.8	62.8	80%	ENE/SE	ESE/33
April	233.2	202	77.8	60.2	84%	NW/SW	ESE/30
May	164.7	1213	74.7	55.8	89%	NNW/W	NNW/42
June	149.9	625	71.0	55.2	79%	NW/SW	NE/39
July	199.4	536	67.0	50.3	76%	NW/SW	SW/51
August	213.7	399	66.3	49.2	82%	NW/SW	WNW/46
September	187.7	505	69.2	52.1	85%	NE/SE	ESE/45
October	208.6	591	73.2	54.0	81%	NW/SW	W/44
November	239.6	170	74.2	52.1	83%	NW/SW	SW/30
December	215.5	123	79.0	58.2	87%	NE/SE	NNW/33

1957

January	257.9	168	78.9	60.7	77%	NE/SE	ESE/33
February	213.6	307	80.6	63.1	80%	NE/SE	ESE/56
March	221.1	427	76.9	59.8	75%	E/SE	ESE/44
April	237.9	290	77.0	56.8	79%	E/SE	NW/36
May	199.1	570	75.0	52.9	74%	WNW/SW	N/47
June	175.9	457	66.8	50.8	82%	W/WSW	SW/35
July	139.6	759	67.9	48.0	81%	W/WSW	N/47
August	181.3	754	68.0	50.2	84%	NW/SW	W/46
September	263.1	144	68.7	49.6	77%	NW/SW	WSW/38
October	240.4	71	71.7	50.2	77%	NW/SW	NNW/53
November	262.3	186	76.4	55.4	76%	NNW/WSW	NNW/35
December	289.7	111	78.4	58.2	70%	ESE/S	SSW/35

1958

January	167.9	861	80.4	61.2	80%	NE/SE	NNE/30
February	195.7	358	80.6	62.2	84%	NE/SE	SW/37
March	182.7	452	80.4	61.1	84%	NE/SE	E/39
April	223.3	67	75.6	54.6	71%	E/SSE	SW/30
May	85.7	116	73.9	55.4	75%	NW/SW	SSE/35
June	92.9	1081	71.4	56.3	86%	E/SE	WSW/51
July	190.8	549	68.9	49.0	79%	NW/SW	WNW/57
August	190.1	562	68.3	51.4	80%	NE/SE	NNW/38
September	229.9	815	69.6	50.4	83%	WNW/SW	NNW/40
October	250.0	505	72.8	51.6	80%	NW/SW	NW/33
November	277.0	156	73.1	54.0	80%	E/SE	S/32
December	267.7	258	78.6	58.0	79%	NW/WSW	N/32

Produce and Industries

In general the agricultural, grazing and forest lands are reasonably good. The main agricultural crops are tropical and temperate zone fruits and vegetables and maize. The only agricultural export is seed beans, the rest of the agricultural production being absorbed locally. The most important forestry product is timber from the Norfolk pines. This is used in house and boat-building etc.

Cattle and sheep are grazed on this island, and the meat is consumed locally. In one year, (1957-58), a total of 675 beasts were slaughtered on licensed premises for local consumption, comprising: 572 cattle, 79 sheep, 24 pigs. Pork and mutton are still imported.

Some milch cows are also kept. Large numbers of horses can be seen on the grazing lands and some of them are used as riding or pack horses.

The tourist industry is important. One hotel and a few guest houses are found in the island but it seems that with the present recreation facilities this industry has reached its peak.

A small whaling industry provides an important income for the population. 120 whales are caught every year and the resulting products are exported to Australia.

There are rich fishing grounds around Norfolk Island and the catch is, for a small part, consumed locally, while a large proportion is exported, mainly to Sydney, Australia.

Further income for both Islanders and Mainlanders is provided through employment by the Administration, Aerodrome and Cable Station.

Some Islanders and Mainlanders also derive income from old-age pensions and war pensions.

Public Finance

The main sources of revenue of the territory are postal revenue, (including the sale of stamps), custom duties, liquor tax, rents payable under leases of crown land and motor registration fees. There is no income tax and no duty is levied on the products of the whaling station.

The Australian Government provides an annual subsidy of about £40,000.

Imports and Exports

The imports, (£225,037) for the budget year 1957-58, exceeded the exports, (£176,231), by £48,806. The main commodities produced for the export market were whale products, bean seeds, and frozen fish.

FISHERIES

Problems

Two serious problems were encountered in the field of fisheries:

1. With the present quota of 120 whales a season, the Norfolk Whaling Company makes little profit.

2. The Norfolk Whaling Company, acting as exporter of frozen fish, suffered losses on this commodity and the reduced price offered was not remunerative for the fishermen.

Before attempting to find a solution for these problems, the present situation will be reviewed.

Whaling Industry

Numbers of hump-back whales migrate from the Antarctic to the tropics and back, between Australia and Tonga. Many of these whales pass through Norfolk Island waters both during their northward and their southward migration.

This migration is evident in the vicinity of Norfolk Island during the period from June to October. In the past the whales were chased with open boats but Norfolk Islanders have now abandoned this method.

In 1949-50, the South East Whaling and Sharking Company Ltd. commenced operations at the whaling station at Ball Bay on the East coast of Norfolk. Three whales only were caught and treated, the oil from which realised £520. Further activities were prevented by the loss of a launch and damage to the chaser. A further setback was experienced by the Company when their premises and repaired chaser at Ball Bay were destroyed by fire on the night of 27th October, 1950. In 1956, the Holding Co. Norfolk Island & Byron Bay Whaling Co. Ltd. opened a whaling station in Cascade on the north side of Norfolk Island. There is no harbour so that all whales have to be pulled through the surf and over rocks to the station. In this station the whales are processed into oil and whalemeal.

The Company has one whale chaser and one tanker. Both these ships are stationed in Australia after their season is finished at Norfolk. Whales are chased within 25 miles off shore. The whales caught at the beginning of the season are fatter than at the end. All whales are measured and inspected by the Whaling Inspector. The minimum legal size for a hump-back whale is 35' and the largest specimen caught so far measured 49'7".

Only two embryos were found, one in 1957 and one in 1958, both during the southward migration. For further detail on the humpback whale, please refer to R.G. Chittelborough, "The Australian Journal of Marine and Freshwater Research", Nos. 1 and 3, 1955.

The chaser brings the whale to a buoy anchored near the shore. A wire cable runs from the shore to the buoy, through a ring and back to shore again. The whales are towed to shore by means of this wire and a steam winch. In bad weather it is very difficult for the chaser to come so near the coast; fishing must stop for several days and the chaser anchors on the leeward side of the island. In spite of all these difficulties, more than the allotted quota of 120 whales could be caught.

During the whaling season, many Islanders work at the station. They seem to have become quite skilled at their work and some are even hired to work

at another station owned by the same Company, in Australia.

The tanker has a capacity of about 200 tons of whale oil. Fuel oil for the whaling station is brought by the tanker from Australia. Both the fuel oil and the whale oil are pumped out of, or in to, the tanker through underwater pipes. There is a small pier in Cascade for loading or unloading equipment and whale meal with the help of open boats in calm weather. These operations can also be carried out in Kingston where another pier exists but here again calm weather is necessary.

In 1957, 120 whales were caught which gave: 6,606 barrels of oil, 265.4 tons whalemeal, 20,000 lbs. whalemeat. (82 whales from the north migration and 38 from the south migration). In 1958, 120 whales were caught which gave 6,120 barrels of oil, 255.1 tons whalemeal, 5,000 lbs. whalemeat. (30 whales from the north migration and 90 from the south migration).

The oil price in 1957 was £A118.10.0 per ton and in 1958 was £A90.0.0 per ton.

I was kindly allowed confidential access to the books of the Norfolk Whaling Company and noted from the balance sheets for the years 1957 and 1958, that profits had fallen drastically in the second year. This was due to the drop in oil prices, the smaller production of oil, and the higher cost of repairs on the tanker. In 1958 only 5,000 lbs. of whalemeat were sold locally, as shipments to Australia had shown no profit the previous year.

In view of the lower prices now paid for the whale oil, I cannot envisage a favourable future for the Norfolk Whaling Company.

The exploitation costs of a remote whaling station are so high that a quota of 120 whales will never provide satisfactory results.

Another point is that no revenue is paid to Norfolk Island. During the 1957 season, the Company employed 46 local residents at a total wage bill, including bonuses, of £23,594. During the 1958 season £16,000 were paid in 71 days to about 40 local residents. In addition there is a permanent staff of 9 living in Norfolk Island.

According to my personal calculations, a minimum quota of 150 whales per season would put the Company on a sound operating basis; in other words, the Company would be able to expect reasonable profits and a 3% export duty could be paid to the Norfolk Administration.

I must appeal to the Central authorities at Canberra to consider with great attention this industry which is very important for Norfolk Island.

I am aware of the fact that an additional quota of 30 whales may be quite difficult to obtain and that it may have to be taken out of the quotas allotted to other stations in Australia. However, it seems strange that Norfolk Island is restricted to a quota of 120 whales while whaling stations in New Zealand have no quota at all to respect. Both places presumably deal with the same group of whales.

It is my opinion that, economically speaking, Norfolk Island depends more closely on whaling than most other countries in the world. It seems, therefore, that obtaining a reasonable quota for this isolated island is an urgent matter.

Out of the total expenditure of the Norfolk Whaling Company in any one year, a small proportion only goes to Norfolk Island, mostly in wages; this small proportion, however, is already important to the islanders, and could be increased if employment was provided for them not only at the station but also on the chaser and tanker. Some are already working on the latter ship and the manager of the Company was satisfied with their services. The station labour, often working overtime, also gives full satisfaction.

FISHING INDUSTRY

Past Endeavours

There have been several endeavours to establish a fishing industry in this territory. As has been the case with other efforts to establish various local industries, they were short lived.

In 1920, an attempt was made by a Company, who erected a factory at "Cockpit", Cascade. Because of the lack of supplies the Company had to close its factory and freezing works, which were later totally destroyed by fire.

In 1937, Burns Philp (South Sea) Co. Ltd. established freezing works at Kingston for the storage of fish. During the years 1937 and 1938, 3,660 lbs. and 13,120 lbs. of frozen fish, respectively, were exported. However, during the latter part of the year 1938, the plant was disposed of to a local resident for use in connection with a butchery business. Weather conditions, causing uncertainty of supplies, was a main factor in bringing about the end of this endeavour.

The third endeavour to establish the industry was made by the Norfolk Island Industries Ltd., a company registered in Norfolk Island in the beginning of 1945. The total declared value of fish exported by that Company during its operations amounted to £2,842.

Norfolk Island Industries Ltd. employed 2 trawlers, brought to Norfolk Island from Australia, and erected a factory and freezing works at Burnt Pine. Both trawlers were lost at Norfolk Island; one being wrecked on the shore at Cascade Bay in 1946, and the other destroyed by fire off Headstone in February, 1947.

When the second trawler was destroyed the company discontinued operations. A launch owned by the Company was lost in April, 1948, while attempting to enter Emily Bay through an opening in the reef.

The Burnt Pine Investment Co. Ltd. erected a fish freezing plant with a storage capacity of 20 tons opposite the Norfolk Whaling Company buildings and this was later taken over by the Company.

Present Situation

Nine open motor boats, from 13' to 22' long, operate in the waters surrounding Norfolk Island. They do not go more than twelve miles off shore.

The bulk of the fish is caught by handlines.

The fish is brought ashore in the round. It is then scaled and filleted by people working for the Norfolk Whaling Company which operates a fish freezing and cold storage plant of 20 ton capacity.

The frozen fish fillets are packed in cardboard boxes and shipped as refrigerated cargo on a freighter belonging to Burns Philp (South Sea) Co. Ltd. The ship calls every seven to seven and a half weeks and, as mentioned before, the fish is sold in Sydney to a wholesale dealer. However, the freighter's route goes through the New Hebrides and the British Solomon Islands so that the fish fillets are kept for about five weeks in the refrigerated hold.

In addition to the quantities sold in Sydney, the population of Norfolk Island buy fish from the boats. Some fish caught from the rocky shore with pole and line is consumed locally.

While the prices paid for fish in the round are too high to enable the freezing plant to operate profitably, any reduction in this price would not be acceptable to the fishermen.

Fishing is possible only in good weather as the boats are too small. There is no harbour and the boats must be launched and lifted out of the water by a crane set on a pier. These operations are difficult even in a breeze or at night.

The fishing grounds in the vicinity of Norfolk Island are good.

Fishing Boats

Five of the nine fishing boats are operated commercially, but the others also sell fish on occasion. The following table indicates the boats existing, at the time of my visit, in Norfolk Island.

Number	Length	Power and Type of Engine
1	13'6"	5 H.P. Seagull Outboard Engine
1	16'	4 H.P. Seagull Outboard Engine
1	16'	2½ to 3 H.P. Chapman Inboard Engine
1	18'	4½ H.P. Chapman Inboard Engine
1	20'	5 H.P. Simplex Inboard Engine
1	22'	5 H.P. Invincible Inboard Engine
1	20'	5 to 7 H.P. Chapman Inboard Engine
1	18'	5 to 7 H.P. Chapman Inboard Engine
1	16'	4½ H.P. Chapman Inboard Engine

All the above mentioned engines use petrol. These boats reach a speed of 7 knots and are not rigged for sail. They are mostly of local construction.

The fishermen

From two to four fishermen, sometimes five, operate from each boat. They are part-time line fishermen rather than professionals. Their other occupations include farming, seasonal labour for the Whaling Company and boat lighterage.

These fishermen are quite skilled in boat handling and hand-lining. The conditions prevailing in Norfolk Island explain why they were not able to develop their fisheries.

Fishing gear

No nets, traps or other elaborate types of gear are used. All fishing is by hook and line and four different types of rig can be distinguished, of which the first two are used for commercial purposes. The other two are employed when fishing for recreation, although reasonable quantities of fish may at times be obtained in this way for local consumption. These four rigs will be briefly described here.

1. Bottom Handline (Drift Fishing)

A cotton line $1/6''$ to $1/8''$ in diameter, 30 to 40 fathoms in length. At the end of this is attached a swivel, then a fore-runner made of a 3' piece of the same line and terminating in a 1' loop. The loop is passed through a hole pierced at one end of an elongated 2 lb. lead sinker, and the free end is passed once over and around the standing end of the loop. Two 8" leaders are attached at the end of the loop and two more one foot above the sinker. The hooks used are long-shanked ($3''$ to $3\frac{1}{2}''$), reversed, No. 0/6 to 0/8. The hooks are baited with raw fish. This rig catches all kinds of bottom fish. Whenever a hook or a leader breaks, a whole fore-runner, prepared in advance, is substituted, in order to save time.

2. Floating Handline

This is a $1/24''$ nylon line with a No. 2 or 4 hook. No floats or sinkers are used. The fish, mainly kingfish and trevally, are chummed up with small pieces of fish or bread, and the hook, baited with a small piece of fish is let down a few fathoms.

3. Pole and Line

Bamboo poles 12' to 15' long are used, with 12' lines of thin nylon. The hooks used are small and are often baited with meat. Crushed meat is used to chum up the fish near the rocky shore. Trevally and kingfish are often caught in this way.

4. Cast Handline

This is a nylon line, $1/24''$ in diameter, with a sinker at the end, equipped with two or more droppers and hooks. This is cast by hand from the rocky shore to a distance of about 100'. The hooks are baited with meat, fish or crab. All kinds of bottom fish are caught with this rig.

MAIN FISH SPECIES OF NORFOLK ISLAND

Local Name	English Name	Identification
Trumpeter	Sweetlip Emperor	<u>Lethrinus chrysostomus</u>
Snapper	Red Bream	<u>Chrysophrys guttulatus</u>
Kingfish	Yellowtail Kingfish	<u>Regificola grandis</u>
Hapoeka	Grouper	<u>Promicrops lanceolatus</u>
Ophie	Silver Trevally	<u>Carangidae</u>
Ophie	Yellow-lined Trevally	<u>Carangidae</u>
Home Ophie	Trevally	<u>Carangidae</u>
Horse Mackerel	Bonito	<u>Sarda chiliensis australis</u>
Bucket	Stonefish	<u>Scorpaena cardinalis</u>
Red Cod	Red Rock Cod	<u>Serranidae</u>
Unknown to author	Barred Reef Cod	<u>Serranidae</u>
Parrotfish	Parrotfish	<u>Scaridae</u>
Dreamfish	Drummer	<u>Kyphosidae</u>
Garfish	Garfish	<u>Hemirhamphidae</u>
Long Tom	Long Tom	<u>Belonidae</u>
Shark	Shark	no determination
no name	Yellowfin Tuna	<u>Neothunnus macropterus</u>
Flying Fish	Flying Fish	<u>Exocoetidae</u>

The bulk of the catch is generally made up of the following fish: trumpeter, snapper, kingfish, hapoeka, ophie, Home ophie, and red cod.

Squids and octopus are present, but no crayfish or shrimps were seen and no crabs except small crabs living at the edge of the water, among the rocks.

One fish deserves special mention here, the "dreamfish" or drummer. Eating adult specimens of this species causes nightmares. Apart from this, there are no toxic fish around Norfolk, though the sting of the stonefish, whose spines are equipped with poison glands, is dangerous.

There are not as many species here as there are in tropical waters, but each species is present in large numbers and finds ample food supplies.

Large flocks of seabirds such as sterns, mutton birds, and gannets can be seen preying on small fish chased by pelagic fish. Large schools of kingfish were spotted, and were invariably followed by such flocks of birds. Some seabirds were found to be full of $4\frac{1}{2}$ " squids.

Fishing Tests and Related Notes and Statistics

For fishing tests and other observations at sea, the Government launch was put at my disposal. This is a boat with a small foredeck, a roof over the engine and an open cockpit. Its overall length is 26' and its beam 8'. It was equipped with a 40/50 H.P. diesel engine. This boat was built locally of Norfolk Pine and its cost, complete, was £2,400. Total weight with the crew aboard was about 3 tons.

At the time of my visit, a cyclone passed through New Caledonia and considerably affected the weather as far south as Norfolk. Four trips only could be made with the Government launch in the four weeks of my stay. On the first of these trips, on 26th January, we had to turn back a few moments after setting out, as the weather was deteriorating.

The trips made with the launch were designed to obtain first-hand knowledge of fishing operations as they are normally carried out in Norfolk.

Further observations were made on two occasions from ships anchored $1/8$ and $1/4$ mile south of the Kingston pier.

In order to provide a fairly complete picture of fishing in Norfolk, I have described here the launching operations and each of the four trips to sea, in some detail.

Launching

The launch, normally standing on shore, is brought to the Kingston pier by a 5 ton mobile motor crane. This crane is owned and operated by the Government, the fee for launching and hauling out a boat being £A1.10.0.

The engine is started as soon as the boat is in the water, as there is a swell running along the pier and there is danger of damaging the hull. Rollers break at the end of the pier and the boat crews have to watch for a quiet spell during which they can go through at full speed.

On the north coast of the island, there is another small pier, equipped with a loading boom. The use of this is free, but the fishermen have to use their cars to haul out their boats with the help of block and tackle.

First Trip - January 26

We were only half a mile from shore, heading south, when the breeze freshened and the two fishermen who were with us cautioned us against the weather. Fortunately, the crane operator was still at the pier and we were able to have the launch hauled out immediately. This operation would have been much more difficult if we had insisted on going out, as the wind blew from the ESE that day, force 5 to 6.

Second Trip - February 3

For the first time since my arrival the weather was reasonably calm. We left the Kingston pier at 09.00 hrs. with an east wind, force 3. The crew included two professional fishermen, one engineer, one helmsman and myself. One of the fishermen, aged 85, was highly skilled in hook and line fishing and knew all the good fishing grounds.

Fifteen minutes after setting out, the wind increased to force 4 and we had to seek the lee of the island. On the way to the fishing grounds we observed large numbers of seabirds, two schools of kingfish and some flying fish. The salinity of the water, at the surface, was 34-35 per thousand

with a water temperature of 77°F. and an air temperature of 78°F. at 12.00 hrs.

Fishing started at 10.00 hrs. near Point Vincent, in the NW of the island in depths of 12 to 20 fathoms. The transparency of the water, measured with a 12" Secchi disc, was 30 feet. After two hours of good fishing, during which we often hauled up as many fish at a time as we had hooks on our lines, we had drifted 4 miles off-shore and had to look for shelter, as the wind had again increased to force 5. We made for Headstone and spent another two hours fishing between Headstone and Anson Bay, on the west side of the island, in depths of 12 to 22 fathoms. About 60% of the fish were caught west and north/west of Point Vincent and the rest between Headstone and Anson Bay.

The detail of the catch made with four lines in four hours actual fishing was as follows:

Number	Species	Size	Weight
125	Trumpeter	12" to 22"	500 lbs.
1	Snapper	16"	3 lbs.
1	Kingfish	24.5"	7 lbs.
3	Red Rock Cod	12"	3 lbs.
3	Shark	30"	20 lbs.
9	Stonefish	8" to 13"	4 lbs.
142			537 lbs.

The shark and stonefish were used as bait. In actual fact, we had five lines out, but three only were rigged normally, with 4 hooks each, while the other two only had two hooks each.

Fishing was not really good, as the boat was drifting too fast, and the lines went out at an angle of 45° from the vertical.

The trumpeter caught did not contain any roe. According to the fishermen, the spawning season is September/November.

The largest trumpeter caught this day was 22" long and weighed 6½ lbs; the smallest was 12" long and weighed 2 lbs. All trumpeter smaller than 12" were released.

The bottom in the two areas fished was rocky and covered with short brown seaweeds and small corals. The hooks snagged on the bottom on a few occasions, but were generally freed by a strong pull, as the surface of the rock is rather soft.

Some sharks were seen around the boat and one fish was bitten off the hook, the head only being left on.

The maximum speed of the current was 1 knot. At new moon and full moon, currents up to 2 knots are observed and in one place, between Phillip Island and Nepean Island, 3 knots.

During this trip, which lasted from 09.00 hrs. to 16.00 hrs., four hours were spent in actual fishing, one hour sailing out to Point Vincent,

one hour moving from Point Vincent to Headstone, and one hour sailing back to Kingston.

As an appointment had been arranged with the crane operator, the launch was hauled out immediately upon our arrival.

At the time we landed, most of the fish were in good condition. However, in those caught before 11.00 hrs. the belly was getting soft. None of the fish were gutted.

Third Trip - February 8

We left Kingston pier at 08.30 hrs. and again had to seek shelter on the leeward side of the island. On the way to the fishing grounds, a trolling line was put out for one hour. This was a cotton line 4/6" in diameter, 30 yards long, with a 3' steel trace and a double hook with feather jig. Four bonito, 18" to 19" were caught. All had ripe eggs. Trolling was tested again in the afternoon on the way back to Kingston and another 4 bonito of the same size were caught, two males and two females.

On this trip, the drift fishing test with bottom handlines gave quite good results. From 09.45 hrs. to 13.00 hrs. we fished at a distance of from 1 to 3 miles NW and NNW from Point Vincent, in depths of 14 to 20 fathoms. About 11.00 hrs. the wind, which had been blowing force 4 to 5, dropped to force 3.

In 2 $\frac{3}{4}$ hours of actual fishing with five handlines, rigged with four hooks each, over 1,000 lbs. of fish were caught; two sharks, ten stonefish three bonito and one octopus were used as bait.

Such good results can be attributed to the fact that from 11.00 hrs. on, we were in a current moving to the east and wind blowing from the east, so that our drift was slowed considerably. The number of trumpeter on the bottom must be phenomenal. Three or four fish were often hooked within a few seconds after the bait had reached the bottom.

As we were beginning to lack space, with five men in the boat and a large catch, including two grouper 4'10" and 3'10" respectively, we decided to move to Nepean Island and test another type of fishing.

Upon arriving at the fishing grounds, we spotted a number of trevally. These fish were chummed up to the boat with breadcrumbs and pieces of fish. Two floating handlines were used and 21 trevally and one kingfish were caught in about 30 minutes.

We then proceeded to Kingston pier, where the boat was hauled out at 16.00 hrs.

The total catch for this day weighed 1,215 lbs. and the break-down of this figure showed the following results:

Method	No. of Lines	Actual Fishing Time	No. & Species of Fish	Size	Weight in Lbs.
Trolling	1	2 hours	8 bonito	18"-19"	24 <hr/> 24
Drift Fishing with Bottom Lines	5 (4 hooks ea.)	2 hrs. 45 mins.	224 trumpeter 2 grouper 2 kingfish 8 red rock cod 16 stonefish 2 shark 1 octopus	12"-22" 4'10"-3'10" 25" 12" 8"-13" 40"-60" 28"	896 150 16 8 8 16 4 <hr/> 1,098
Floating Line	2 (1 hook ea.)	30 mins.	21 trevally 1 kingfish	14"-16" 26"	84 9 <hr/> 93
TOTAL :			314 fish & 1 octopus		1,215

Fourth Trip - February 11

We left Kingston pier at 08.30 hrs. intending to go south of Phillip Island, but the wind, which was blowing force 3 increased to force 4 at 09.00 hrs. and veered from SSE to ESE. On our way to a point two miles west of Phillip Island we trolled two lines and caught two bonito in 30 minutes.

Drift fishing with bottom line was tried from a point two miles west of Phillip Island to a point two miles north west of the same island, in depths from 25 to 23 fathoms. Five handlines were used, but the drift was rather fast and the line stood at an angle of 45° from the vertical.

Shark and stonefish were numerous in this area, but we also caught trumpeter and one large snapper.

At 11.00 hrs., we were forced to seek shelter near Phillip Island. On the way, twenty minutes trolling with two lines produced one 28" yellowfin tuna.

One hour was spent drift fishing with bottom lines near the south shore of the island. In spite of the easterly wind, the current was so strong that we drifted east.

Concentrations of fish were more scattered here, and shark and stonefish were numerous.

At 13.00 hrs. the weather was threatening to become worse and I decided to stop fishing. We proceeded north at reduced speed as the seas were rather high.

In the lee of Nepean Island, we tried fishing for trevally. Although the fish were there, the wind and current were too strong and only one parrotfish was caught.

At 15.30 hrs., we were back at the Kingston pier. The wind was then blowing at force 6.

Details of the catch for this day are :

Method	No. of Lines	Actual Fishing Time	No. & Species of Fish	Size	Weight in Lbs.
Trolling	2	50 mins.	2 bonito 1 tuna	18"-19" 28"	6 6 <hr/> 12
Drift Fishing with Bottom Lines	5 (4 hooks ea.)	2 h. 30 m.	122 trumpeter 1 snapper 1 kingfish 1 trevally 5 red rock cod 25 stonefish 12 shark	12"-22" 25" 26" 12" 12" 8"-13" 40"-60"	488 8 9 2 5 13 96 <hr/> 621
Floating Line	2	10 mins.	1 parrotfish	13"	2 <hr/> 2
TOTAL :			171 fish.		635

All the sharks were killed and what was not used for bait was thrown away. Although shark and stonefish have excellent white flesh, they are not popular as food on Norfolk Island. However, they provide very good bait.

Observations made from anchored ships

From the observations made on board the Damadora del Mar, anchored in shallow water about 1/8 of a mile south of Kingston pier, it seems that trumpeter will not bite in depths of less than 3 fathoms on a clear day.

On the other hand, the crew of the Tulagi, anchored in 10-11 fathoms of water, 1/4 of a mile south of the pier, and fishing at night, caught numbers of trumpeter, snapper, trevally, red rock cod, kingfish, stonefish and shark. At another anchorage, 1/4 of a mile north of Cascade pier, in about 15 fathoms of water, quantities of trumpeter were also caught.

These fish are also taken from shore in smaller quantities.

Other fishing grounds

According to the older fishermen, the old time sailing whalers used to catch large quantities of trumpeter far south of Phillip Island. These fish were salted and dried aboard ship.

The knowledge of fishing grounds is limited to a radius of about 12 miles from the island. One of the best fishing grounds is called "No Trouble" and seems to be situated 10 to 12 miles NNE from Cascade pier; another, "Shallow Water" appears to be nearer, in the NE of Norfolk. I was unfortunately unable to visit these rich fishing grounds which are said to cover quite a large area. I was informed that the trumpeter from "No Trouble" were not as tasty as those taken nearer Norfolk Island.

Generally speaking, I had the impression that both bottom fish and pelagic fish were very abundant.

Sample Statistics of Landings - (Trumpeter)

The Freezing Plant of the Norfolk Whaling Company buys only trumpeter from the fishermen, as they incur heavy losses on other species of fish. It is therefore interesting to evaluate catches of trumpeter over a period, to compare this with the number of actual fishing days and to see what shares were paid to the crew members and the boat.

The fishing unit chosen as example is Mr. E. Snell's boat, 20' long, open, 5-7 H.P. Chapman petrol engine, launched March 14, 1958.

LANDING - STATISTICS OF MR. E. SNELL'S FISHING BOAT IN
5 MONTHS OF 1958

14th March, 1958	..... 354-lbs. @ 6d. per lb...	£ 8.17. 0
G. Allen	.. £ 2. 4. 3	
T. Quintal	.. 2. 4. 3	
E. Snell	.. 2. 4. 3	
Boat	.. <u>2. 4. 3</u>	
15th March, 1958	..... 514-lbs. @ 6d. per lb...	£ 12.17. 0
G. Allen	.. £ 3. 4. 3	
E. Quintal	.. 3. 4. 3	
E. Snell	.. 3. 4. 3	
Boat	.. <u>3. 4. 3</u>	
24th March, 1958	..... 536-lbs. @ 6d. per lb...	£ 13. 8. 0
G. Allen	.. £ 2.13. 7	
E. Quintal	.. 2.13. 7	
T. Quintal	.. 2.13. 7	
E. Snell	.. 2.13. 7	
Boat	.. <u>2.13. 7</u>	
25th March, 1958	..... 550-lbs. @ 6d. per lb...	£ 13.15. 0
G. Allen	.. £ 2.15. 0	
E. Quintal	.. 2.15. 0	
T. Quintal	.. 2.15. 0	
E. Snell	.. 2.15. 0	
Boat	.. <u>2.15. 0</u>	
28th March, 1958	..... 1000-lbs. @ 6d. per lb...	£ 25. 0. 0
G. Allen	.. £ 5. 0. 0	
E. Quintal	.. 5. 0. 0	
T. Quintal	.. 5. 0. 0	
E. Snell	.. 5. 0. 0	
Boat	.. <u>5. 0. 0</u>	
29th March, 1958	..... 765-lbs. @ 6d. per lb...	£ 19. 2. 6
G. Allen	.. £ 3.16. 6	
E. Quintal	.. 3.16. 6	
A. Bathie	.. 3.16. 6	
E. Snell	.. 3.16. 6	
Boat	.. <u>3.16. 6</u>	

TOTAL FOR MARCH, 1958 ...

Boat allowance .. £19.13. 7
 Total Payments .. 92.19. 6
 Total poundage of fish .. 3719-lbs.
 6 fishing days.

9th April, 1958 567-lbs. @ 6d. per lb... £ 14. 3. 6

G. Allen .. £ 2. 7. 3
 E. Quintal .. 2. 7. 3
 T. Quintal .. 2. 7. 3
 A. Bathie .. 2. 7. 3
 E. Snell .. 2. 7. 3
 Boat .. 2. 7. 3

10th April, 1958 1039-lbs. @ 6d. per lb... £ 25.19. 6

E. Quintal.. £ 5. 3.10
 T. Quintal.. 5. 3.10
 A. Bathie .. 5. 3.10
 E. Snell .. 5. 3.10
 Boat .. 5. 3.10

22nd April, 1958 938-lbs. @ 6d. per lb... £ 23. 9. 0

G. Allen .. £ 3.18. 2
 E. Quintal.. 3.18. 2
 T. Quintal.. 3.18. 2
 A. Bathie .. 3.18. 2
 E. Snell .. 3.18. 2
 Boat .. 3.18. 2

28th April, 1958 1039-lbs. @ 6d. per lb... £ 25.19. 6

G. Allen .. £ 4. 6. 7
 E. Quintal.. 4. 6. 7
 T. Quintal.. 4. 6. 7
 A. Bathie .. 4. 6. 7
 E. Snell .. 4. 6. 7
 Boat .. 4. 6. 7

29th April, 1958 926-lbs. @ 6d. per lb... £ 23. 3. 0

G. Allen .. £ 3.17. 2
 E. Quintal.. 3.17. 2
 T. Quintal.. 3.17. 2
 A. Bathie .. 3.17. 2
 E. Snell .. 3.17. 2
 Boat .. 3.17. 2

TOTAL FOR APRIL, 1958 ...

Boat allowance .. £ 19.13. 0
 Total payments .. 112.14. 6
 Total poundage of fish .. 4509-lbs.
 5 fishing days.

2nd May, 1958	.....	970-lbs. @ 6d. per lb.	£ 24. 5. 0
G. Allen	..	£ 4. 0.10	
E. Quintal	..	4. 0.10	
T. Quintal	..	4. 0.10	
A. Bathie	..	4. 0.10	
E. Snell	..	4. 0.10	
Boat	..	<u>4. 0.10</u>	
3rd May, 1958	.....	882-lbs. @ 6d. per lb.	£ 22. 1. 0
G. Allen	..	£ 4. 8. 2	
E. Quintal	..	4. 8. 2	
T. Quintal	..	4. 8. 2	
A. Bathie	..	4. 8. 2	
Boat	..	<u>4. 8. 2</u>	
5th May, 1958	.....	875-lbs. @ 6d. per lb.	£ 21.17. 6
G. Allen	..	£ 4. 7. 6	
E. Quintal	..	4. 7. 6	
T. Quintal	..	4. 7. 6	
A. Bathie	..	4. 7. 6	
Boat	..	<u>4. 7. 6</u>	
6th May, 1958	.....	794-lbs. @ 6d. per lb.	£ 19.17. 0
G. Allen	..	£ 3.19. 5	
E. Quintal	..	3.19. 5	
T. Quintal	..	3.19. 5	
A. Bathie	..	3.19. 5	
Boat	..	<u>3.19. 5</u>	
9th May, 1958	.....	868-lbs. @ 6d. per lb.	£ 21.14. 0
G. Allen	..	£ 4. 6. 9	
E. Quintal	..	4. 6. 9	
T. Quintal	..	4. 6. 9	
A. Bathie	..	4. 6. 9	
Boat	..	<u>4. 6. 9</u>	
10th May, 1958	.....	92-lbs. @ 6d. per lb.	£ 2. 6. 0
G. Allen	..	£ 0.11. 6	
E. Quintal	..	0.11. 6	
A. Bathie	..	0.11. 6	
Boat	..	<u>0.11. 6</u>	
14th May, 1958	.....	932-lbs. @ 6d. per lb.	£ 23. 6. 0
G. Allen	..	£ 4.13. 2	
E. Quintal	..	4.13. 2	
T. Quintal	..	4.13. 2	
A. Bathie	..	4.13. 2	
Boat	..	<u>4.13. 2</u>	
19th May, 1958	.....	215-lbs. @ 6d. per lb.	£ 5. 7. 6
G. Allen	..	£ 1. 1. 6	
E. Quintal	..	1. 1. 6	
T. Quintal	..	1. 1. 6	
A. Bathie	..	1. 1. 6	
Boat	..	<u>1. 1. 6</u>	

20th May, 1958	.....	472-lbs. @ 6d. per lb.	£ 11.16. 0
G. Allen	..	£ 2.19. 0	
E. Quintal	..	2.19. 0	
A. Bathie	..	2.19. 0	
Boat	..	<u>2.19. 0</u>	
21st May, 1958	.....	898-lbs. @ 6d. per lb.	£ 22. 9. 0
G. Allen	..	£ 5.12. 3	
E. Quintal	..	5.12. 3	
A. Bathie	..	5.12. 3	
Boat	..	<u>5.12. 3</u>	
22nd May, 1958	.....	655-lbs. @ 6d. per lb.	£ 16. 7. 6
G. Allen	..	£ 4. 1.10	
E. Quintal	..	4. 1.10	
A. Bathie	..	4. 1.10	
Boat	..	<u>4. 1.10</u>	
24th May, 1958	.....	639-lbs. @ 6d. per lb.	£ 15.19. 6
G. Allen	..	£ 3.19.10 $\frac{1}{2}$	
E. Quintal	..	3.19.10 $\frac{1}{2}$	
A. Bathie	..	3.19.10 $\frac{1}{2}$	
Boat	..	<u>3.19.10$\frac{1}{2}$</u>	
26th May, 1958	.....	201-lbs. @ 6d. per lb.	£ 5. 0. 6
G. Allen	..	£ 1. 5. 1 $\frac{1}{2}$	
E. Quintal	..	1. 5. 1 $\frac{1}{2}$	
A. Bathie	..	1. 5. 1 $\frac{1}{2}$	
Boat	..	<u>1. 5. 1$\frac{1}{2}$</u>	
28th May, 1958	.....	607-lbs. @ 6d. per lb.	£ 15. 3. 6
E. Quintal	..	£ 3.15.10 $\frac{1}{2}$	
A. Bathie	..	3.15.10 $\frac{1}{2}$	
D. Evans	..	3.15.10 $\frac{1}{2}$	
Boat	..	<u>3.15.10$\frac{1}{2}$</u>	
29th May, 1958	.....	567-lbs. @ 6d. per lb.	£ 14. 3. 6
E. Quintal	..	£ 3.10.10 $\frac{1}{2}$	
A. Bathie	..	3.10.10 $\frac{1}{2}$	
D. Evans	..	3.10.10 $\frac{1}{2}$	
Boat	..	<u>3.10.10$\frac{1}{2}$</u>	
30th May, 1958	.....	1134 -lbs. @ 6d. per lb.	£ 28. 7. 0
G. Allen	..	£ 5.13. 4 $\frac{1}{2}$	
E. Quintal	..	5.13. 4 $\frac{1}{2}$	
A. Bathie	..	5.13. 4 $\frac{1}{2}$	
D. Evans	..	5.13. 4 $\frac{1}{2}$	
Boat	..	<u>5.13. 4$\frac{1}{2}$</u>	
31st May, 1958	.....	1192-lbs. @ 6d. per lb.	£ 29.16. 0
G. Allen	..	£ 5.19. 2	
E. Quintal	..	5.19. 2	
A. Bathie	..	5.19. 2	
D. Evans	..	5.19. 2	
Boat	..	<u>5.19. 2</u>	

TOTAL FOR MAY, 1958 ...

Boat allowance .. £ 94.14.4 $\frac{1}{2}$
 Total payments .. 299.16. 6
 Total poundage of fish ... 11,993-lbs.
 17 fishing days.

2nd June, 1958 61-lbs. @ 6d. per lb. £ 1.10. 6

Boat, paid £1.10. 6
 1 fishing day.

14th July, 1958 245-lbs. @ 6d. per lb. £ 6. 2. 6

G. Allen .. £ 1.10. 7 $\frac{1}{2}$
 A. Bathie .. 1.10. 7 $\frac{1}{2}$
 E. Snell .. 1.10. 7 $\frac{1}{2}$
 Boat .. 1.10. 7 $\frac{1}{2}$

15th July, 1958 312-lbs. @ 6d. per lb. £ 7.16. 0

G. Allen .. £ 1.19. 0
 A. Bathie .. 1.19. 0
 E. Snell .. 1.19. 0
 Boat .. 1.19. 0

TOTAL FOR JULY, 1958 ...

Boat allowance .. £3. 9. 7 $\frac{1}{2}$
 Total Payments .. 13.18. 6
 Total poundage of fish .. 557-lbs.
 2 fishing days.

Total of fish .. 20,839 lbs.

Total payments .. £ 520.19. 6

Boat allowance .. £ 139. 1. 1

An average of 3.7 Fishermen £ 381.18. 5 in 31 fishing days

An average income per fisherman of £ 3. 6. 0 per day.

The following tables show total sales of fish, (mainly trumpeter) to the Freezing Plant, including the catches made by a small boat belonging to the Whaling Company (949 lbs.)

FISH SOLD TO NORFOLK WHALING CO. LTD. - CASCADE

Date	Buffett C. & J.	Adams Pat	Hemus & Hirst	Christian E.	Friend, Prentice & Francis	Evans C. & A.	N.W.C.
22. 6.57	53		150	293			
27. 6.57	531½	129½					22
28. 6.57	609½	302	720½				
29. 6.57				1150½	644	341	42
4. 7.57							128½
6. 7.57							21
17. 7.57							170
21. 7.57							28
22. 7.57							30
24. 7.57							140
25. 7.57							105
26. 7.57							29
27. 7.57		104		300			
29. 7.57							21
31. 7.57							108
6. 8.57			198				18
7. 8.57		20					16
8. 8.57							31
8. 9.57	46						
6. 9.57							40
10. 9.57			459				
12. 9.57			460				
13. 9.57		131					
16. 9.57	108	259	179				
20. 9.57		38					
26. 9.57	96		221				
29. 9.57	732		389			449	
1.10.57		192	336				
7.10.57	133		631				
15.10.57			304				
19.10.57			21				
27.10.57			220				
28.10.57		1095	656				
Fwd.	2309	2270	4944	1543	644	790	949

Date	Buffett C. & J.	Adams Pat	Honus & Hirst	Douran R.	Christian E.	Evans C.&A.	Prontice & Francis	Christian H.	N.W.C.
b/fwd.	2309	2270	4944	-	1543	790	644	-	949
29.10.57	699	502	75						
30.10.57		494	672	836	690				
31.10.57	574	578	55						
1.11.57		772		633					
2.11.57	652	482							
3.11.57						420	97		
5.11.57		663					785		
7.11.57							74		
8.11.57			118				455		
15.11.57			67						
16.11.57	663	290	294						
17.11.57	249		175			137			
18.11.57	773	954				378			
22.11.57		550	62			232			
23.11.57	705	910	138						
24.11.57		767	456			443			
29.11.57		633				569			
1.12.57			97						
2.12.57	354	1295	537	1376		558			
3.12.57	827	318	382	992		256			
8.12.57		973	605						
9.12.57				1236		631		859	
10.12.57	935	429		850		370		624	
11.12.57		462							
12.12.57		731	432						
13.12.57	705	1084						683	
14.12.57	1044	714	666	1371				728	
20.12.57	506	436	374			404			
21.12.57	481	366	130	304				730	
26.12.57		467						527	
27.12.57		459						765	
28.12.57			416					240	
30.12.57			713						
Fwd.	11476	17599	11408	7598	2233	5138	2055	5156	949

Date	Buffett C. & J.	Adams Pat & Bathie	Honus & Hirst	Douran R.	Christian E.	Evans C.&A.	Prentice & Francis	Christian H.	Snell E. E.	N.W.C.
B/fwd.	11476	17599	11408	7598	2233	5138	2055	5156		949
2. 1.58						180				
3. 1.58		300				60				
6. 1.58		508								
16. 1.58			130							
1. 2.58							114			
2. 2.58							170			
3. 2.58							112			
7. 2.58				121			230			
8. 2.58							202			
9. 2.58							281			
10. 2.58				143			714			
17. 2.58							602			
18. 2.58							333			
22. 2.58			96							
26. 2.58		225	242				32			
27. 2.58		140								
12. 3.58							165			
13. 3.58				117						
14. 3.58							60		354	
15. 3.58			530						514	
24. 3.58									536	
25. 3.58	296		376	482			148		550	
26. 3.58	136	109					54	60		
27. 3.58	251	564		650			234	283		
28. 3.58	822	689	544	606			463	727	1000	
29. 3.58			338						765	
30. 3.58	582	662	446				524			
9. 4.58									567	
10. 4.58							60		1039	
22. 4.58	91			328					938	
28. 4.58									1039	
29. 4.58	484			174			142		926	
Fwd.	14138	20796	14110	10219	2233	5378	6695	6226	8228	949

Date	Buffet C. & J.	Adams Pat & Bathic	Hemus & Hirst	Douran R.	Christian E.	Evans C.&A.	Prentice & Francis	Christian H.	Snell E. E.	N.W.C.
b/fwd.	14138	20796	14110	10219	2233	5378	6695	6226	8228	949
2. 5.58									970	
3. 5.58	286			271			471		882	
5. 5.58	310			634					875	
6. 5.58	630			200			578		794	
9. 5.58							75		868	
10. 5.58									92	
14. 5.58									932	
19. 5.58									215	
20. 5.58									472	
21. 5.58									898	
22. 5.58									655	
24. 5.58									639	
26. 5.58									201	
28. 5.58									607	
29. 5.58									567	
31. 5.58									1192	
30. 5.58									1134	
2. 6.58									61	
14. 7.58									245	
15. 7.58									312	
TOTAL :	15364	20796	14110	11324	2233	5378	7759	6226	20839	949

Total sold to the Norfolk Whaling Company Freezing Plant, Cascade :

From 22.6.57 to 30.12.57 :

In 66 days actual fishing : 63,612 lbs.

From 2.1.58 to 15.7.58 :

In 52 days actual fishing : 41,366 lbs.

or,

In 118 days of actual fishing spread over a period of about 13 months :

104,978 lbs. of fish in the round, mainly trumpeter.

Purchase, Freezing, Transport and Marketing of Fish :

The fish is brought by the fishermen to the Freezing Plant, in Cascade.

The plant includes three sections :

- engine room,
- fish cutting room with snap freezer,
- cold storage (capacity : 20 tons).

The fish is weighed in the round and purchased from the fishermen at 6d. per lb. Payments are made once a week.

The freezing plant crew scale and fillet the fish. The offal is not used. Fillet weight is about 33.5% of the weight in the round, for trumpeter. Previously, when all fish were processed, a higher ratio (41.3%) was obtained.

The fillets are snap frozen in trays of 5 lbs., then wrapped in cellophane. These packages are then boxed seven to a carton. The interior of the cartons used is treated with paraffin wax and each box is tied with string. For a net weight of 35 lbs., the packaged unit weighs 37 lbs. 3 ozs. These cartons are then placed in cold storage to await shipment.

When the Tulagi, of the Burns Philp (South Sea) Co. Ltd., calls, the cartons of frozen fish are brought to the ship's side in lighters, then stored into the refrigerated hold. The Tulagi proceeds to the New Hebrides, the British Solomon Islands, and occasionally other islands.

The frozen fish is delivered in Sydney four to five weeks after leaving Norfolk. It is purchased there by a dealer who specializes in ship provisioning.

Present Operating Costs and Possibilities of Reducing Them

At the present time, the Norfolk Whaling Co. state that they cannot operate the freezing plant profitably if they have to buy fish at more than 4d. per pound. On the other hand, the local fishermen maintain that they cannot supply fish profitably at less than 6d. per pound.

The following calculations may throw some light on the matter.

From 22.6.57 to 3.6.58, the freezing plant purchased 104,421 lbs. of fish. Since one of the boats did not start fishing until late in this period, it is a reasonable surmise that the present fleet can land 126,000 lbs. per year. If the whole of the catch were purchased, processed and sold in Sydney as previously, with the only difference that an 18 H.P. diesel be now used to work the freezing plant, instead of a 40 H.P. engine, the costs would be as follows :

	<u>£. s. d.</u>
126,000 lbs. fish @ 6d.	3,150. 0. 0
Cleaning & filleting 42,000 lbs. @ 3d.	525. 0. 0
1,200 carton boxes @ 4/-	240. 0. 0
Cellophane paper (1,200 boxes x 7 sheets ea.) @ 2½d.	78.10. 0
Packing - 1,200 packages @ 8d.	40. 0. 0
Diesel fuel	1,003.10. 0
Lubricating Oil etc.	294. 0. 0
Depreciation of plant over ten years	500. 0. 0
Boat transport, (1,200 cartons fillets x 37.5 lbs. ea.) @ 4½d. per lb.	844. 0. 0
Lighterage - 20 tons @ £1.11.0 per ton	31. 0. 0
Miscellaneous, staff and administrative costs :	231. 0. 0
Interest on Working Capital 1%	63. 0. 0
<u>TOTAL :</u>	<u>7,000. 0. 0</u>

With a production of 126,000 lbs. of fish in the round, purchased at 6d. a lb., the cost of fish fillets is 3/4d. a lb. If the production were doubled, fillets would cost 2/10.2d. a lb., and if it were trebled, the cost would drop to 2/8.2d. a lb.

These calculations are based on a purchase rate of 6d. a lb. at the freezing plant. The Company, on the other hand, state that with a purchase rate of 4d. a lb. and a production of 126,000 lbs. of fish, the cost of the fillets, landed in Sydney would be £A5,950 or 2/10d. a lb. on the basis of 42,000 lbs. of fillets.

With trumpeter purchased in Norfolk at 4d. a lb. (whole) and sold at about 3/- lb. (filleted) in Sydney, a profit of about 7% would be left.

Small Scale Freezing Plant

Mr. Sanders, a local butcher, is building a small freezing plant. The construction work was almost finished at the time of my visit, and the complete plant was to be set up as soon as a loan was obtained from the Commonwealth Trading Bank.

The cold storage room of this installation has a capacity of 234 cubic feet, so that it will not take more than 275 cartons of fillets, of 35 lbs. each. The deep freeze compartment will be 6' high, 6' wide and 2'4" deep, and will communicate with the cold storage room.

With the present shipping connections between Norfolk and Sydney, every 7 to 8 weeks, the maximum yearly production of this freezer will be 960 cartons, or 33,600 lbs. of fillets.

The complete installation is estimated to cost £A600 for the building, and £A1,000 for the refrigerating equipment, including installation and spares.

Theoretically, the exploitation of this installation would work out as follows :

	<u>£. s. d.</u>
100,800 lbs. of whole fish @ 6d.	2,520. 0. 0
Cleaning and filleting 33,600 lbs. @ 3d.	420. 0. 0
960 cartons @ 4/-	192. 0. 0
Cellophane paper (960 boxes x 7 sheets ea.) @ 2½d.	63. 0. 0
Packing - 960 cartons @ 8d.	32. 0. 0
Electricity (300 x 15 hr. days) @ 1/1¼d.	258.10. 0
Depreciation of plant over ten years	160. 0. 0
Boat freight (960 cartons fillets x 37.5 lbs. ea.) @ 4½d. per lb.	637.10. 0
Lighterage - 16.1 tons @ £1.11.0 per ton	8.17. 0
Interest on Working Capital 1%	43. 3. 0
6% Interest on bank loan (£A1,000)	60. 0. 0
Administrative Costs	18. 0. 0
<u>TOTAL :</u>	<u>4,413. 0. 0</u>

On these premises, the fillets would cost 2/7½d. a lb. landed in Sydney. The gross profit over a year would therefore be £A627. Assuming a five year loan to be reimbursed in 5 equal annuities, the net profit to Mr. Sanders would be £A427 in the first year.

Exploitation of Fishing Boats

By checking the statistics over a period of twelve months, from 17 July, 1957, to 15 July, 1958, one observes that fish were sold to the freezing plant on 112 different days. Not a single fishing boat, however, has been out 112 days in this period. The two leading boats landed 14,170 and 20,365 lbs. of fish in 29 and 41 fishing days respectively.

The irregularity of fishing activities can be ascribed to the fact that they only represent a part-time occupation. The fishermen in Norfolk are not professionals; they farm, do lighterage work or work for the Whaling Company. Again, a boat may be in Cascade when the weather does not permit launching there, while conditions are favourable in Kingston, or vice versa. In such a case, the owner of the boat does not always want to bring his boat overland to the launching point.

When the weather seems doubtful, the boats in Kingston stay ashore, to avoid wasting the launching and landing fee of £1.10.0. These fees are not exaggeratedly high, and certainly not comparable to the exploitation costs of the Government crane, which include the operator's salary.

As an illustration, I have set out below the exploitation costs of one new 20 ft. boat equipped with a 5-7 H.P. Chapman petrol engine. The value of this boat when launched was £A670.0.0 including £500.0.0 for the hull, and £170.0.0 for the engine (including installation). This boat had been out 31 days in 4 months and the owner averred that he could easily go out twice as many days in one year, under existing conditions.

The following annual costs have been established on this basis :

	<u>£. s. d.</u>	<u>£. s. d.</u>
Depreciation over ten years	67. 0. 0	
Fuel - 62 fishing days	53.10. 0	
Oil - 62 fishing days	8. 0. 0	
Maintenance and Miscellaneous costs	21.10. 0	
<u>Total Exploitation Costs :</u>	<u>150. 0. 0</u>	
Total landings in 12 months - (on the basis of actual landings in 31 days (20,389 lbs.) x 2) - 41,678 lbs. @ 6d. per lb.	1,041.18. 0	
<u>Less : Crew shares -</u> (Owner being crew member)	<u>820. 0. 0</u>	
<u>Total boat share :</u>		<u>221.18. 0</u>
<u>Less : Exploitation Costs</u>		<u>150. 0. 0</u>
<u>Total Net Profit :</u>		<u>71.18. 0</u>

This is the best fishing boat in Norfolk, which can show a profit of 10% of the capital invested at the present price of 6d. per pound of fish. At a price of 5d., the profit would drop to 5% of the capital.

Since no insurance company will take a risk on these boats, a profit of 10% is reasonable and the fishermen are justified in asking 6d. per pound for their fish.

In the case above, each crew member had to supply his own fishing gear. The owner was included in the crew. This boat was based at Cascade and no launching and landing fees were paid, use being made instead of the loading boom mentioned earlier.

Fish Preservation

The fishermen only go out for one day at a time and do not preserve the fish on board. The only two methods of preservation used in Norfolk are freezing and smoking.

Although in wintertime the catch can be delivered in reasonable condition at the freezing plant, in summer the fish caught in the morning are beginning to soften in the afternoon when landed.

Freezing

See pages 25 and 26 for details.

Smoking

Some fish is smoked in Norfolk Island. Most of it is prepared for familial consumption, but some is sold locally.

I was able to visit a smoke kiln, about 6'6" high, 3'3" wide and 2'4" deep, built of corrugated iron. The fire box was placed three yards away from the kiln and 2' lower. A pipe led the smoke up into the kiln. The fuel used was maize husks and oak leaves.

At the time of my visit, the owner of the kiln was smoking trevally. The fish were split and headed, then lightly brined before smoking. The retail price of this cured fish in a local grocery was 3/6d. per lb. This was an unusually good price caused by a scarcity of fish over the preceding few weeks.

The smoked fish prepared in this kiln is comparable to the products sold in Australia or New Zealand. It will keep for long periods at or around freezing point.

Local Fish Consumption

Local fishermen give away quantities of fish to relations and to friends. Some frozen fish from the plant is sold locally. Altogether, 200 lbs. of fish may be sold each week in Norfolk.

In addition to these amounts, local shops sell imported tinned fish, at the following prices:

White bait	.. ..	7 ozs.	-	4s. 9d.
Australian tuna	.. ..	7 ozs.	-	3s. 9d.
Australian salmon	.. ..	8 ozs.	-	3s. 7d.
Canadian Salmon	.. ..	7 $\frac{3}{4}$ ozs.	-	6s. 6d.

THE FUTURE OF FISHERIES IN NORFOLK ISLAND

The following problems and advantages become apparent from an examination of the present situation.

Problems

1. The only substantial market is in Sydney, 930 miles away.
2. The price of fish in Sydney is too low to cover present costs of filleting and freezing at the Whaling Company's plant, whose capacity is too large for the present supply of fish.
3. Although New Zealand is nearer, no market will be found there for several reasons - prices there are no higher than in Australia; there is no shipping between Norfolk and New Zealand; finally, it is doubtful whether imports would be permitted.
4. Air freight rates to Sydney are too expensive for this method of transport to be used.
5. The lack of harbours and safe anchorages makes it impossible to use any except very small fishing boats which can be lifted on shore.

6. Launching and landing operations are dangerous in a breeze.
This limits the activity to daytime fishing in calm weather.
7. The size of the boats allows only for simple fishing techniques.
8. Fishing does not provide sufficient returns, so that the young men prefer to find work in Australia and New Zealand.

Advantages

1. The Norfolk shelf could produce annually, without danger of over-fishing, 120 tons of trumpeter, 30 tons of other bottom fish, and 200 tons pelagic fish.
2. The transparency of the water is favourable for both hook and line and net fishing.
3. Large quantities of tuna and other pelagic species are found off the edges of the shelf. This is not of great significance for the near future, but would become important if a harbour were built and foreign fishermen brought in.
4. The Australian market can absorb much larger quantities of fish.
5. Boats can be built locally.

CONCLUSION AND RECOMMENDATIONS

Although the freezing plant operated by the Norfolk Whaling Company has exchanged its 40 H.P. diesel engine for an 18 H.P. diesel, this is still disproportionate with the capacity of the plant and contributes to make the operation expensive. If the plant had been designed on modern lines, half the power would be sufficient. One glance at the high cost of diesel oil and lubricating oil is enough to understand the difference. It also seems that the price of 4/- for a carton measuring 13.5" x 13.5" x 6.5" is too high.

There has not been enough attention paid to the prices which could be obtained for headed, cleaned trumpeter. On the basis of this year's supply, this product could have been delivered to Sydney at 25d. per lb.

Fish which are not at present accepted at the Plant, such as trevally, and Kingfish, could be bought at 4d. a lb. and sold in Sydney, headed, gutted and frozen. Cost price landed in Sydney would be 16d. a lb. This fish would come as a supplementary product and therefore no costs should be taken into account for fuel, oil, depreciation etc., as these are already covered by the trumpeter production. Assuming a supply of 126,000 lbs. of such fish, which would give 84,000 lbs. of headed and gutted fish, the profit, at a sales price of 2/- a lb. would be £2,800.

Taking into account the loss of 42,000 x 4d. (see exploitation costs of freezing plant, page 26) and the new profit of 84,000 x 8d., the net profit would still be £2,100.0.0.

These figures are theoretical, of course, but they at least show that with an increased production of trumpeter, alone, or trumpeter plus trevally and kingfish, it becomes possible to make a profit even with an uneconomical plant.

I understand that kingfish and trevally were also purchased previously, but I suspect they were filleted. These species should be tried in headed and gutted form. They should be purchased from the fishermen at 4d. a lb.

In order to put an end to the present state of dissatisfaction, I would advise the local Government to subsidize purchases of fish for export only at the rate of 2d. per lb. of trumpeter and snapper, and 1d. per lb. for other fish. This subsidy would make it possible for the plant to pay the fishermen 6d. and 4d. respectively for these two categories of fish. If these measures are not taken early, I am convinced that commercial fishing will stop.

Improvement of Fishing Craft

The boats used in Norfolk are all too small for commercial operations. This is explained by the lack of harbours. Two of these craft are 20' and one 22' overall length. The rest are smaller and suitable only in the finest of weather. Their size leaves little room for anchoring gear and many simply do without a rope and anchor. If engine trouble develops the crew rows back, an alternative which can only be considered in good weather.

The smallest boat which could be considered for commercial fishing would be 25' long, with a beam of 9'. This would also represent the maximum which could be handled with the new crane (probably arrived in Norfolk by now).

Such a boat has been designed and blueprints will be forwarded to Canberra as soon as they become available.

As mentioned before, the first fish caught in the morning are beginning to deteriorate in the late afternoon, in summer. To avoid this, the above-mentioned 25' boat has a built-in live-well which can hold about 600 lbs. of fish alive. On top of the live-well there is storage space for 700 lbs. of dead fish.

This boat is also rigged for sail, so that the crew need not depend on the motor to get back to port.

A small foc'sle will help to keep food and clothes dry. This boat could be used for night fishing. In short, it is more seaworthy than any of the present boats, it can produce better catches and the quality of the fish landed would be improved. In addition, this craft could be used, later on, for fishing methods other than hand-lining.

In the case of such a boat, equipped with a 12 H.P. diesel engine, fishing 100 days a year, with an average motor run of 6 hours per fishing day, the exploitation costs would be :

	<u>£. s. d.</u>
Depreciation over 10 years (initial cost - £2,500)	250. 0. 0
Interest on Capital	150. 0. 0
Fuel, 350 gals. @ 4/9d. per gal.	83. 0. 0
Lubricating oil - 22 gals.	17. 0. 0
Repairs & maintenance	60. 0. 0
Boat supplies	60. 0. 0
<u>Total over 1 year :</u>	<u>620. 0. 0</u>

Assuming an annual catch of 25 tons of fish at 6d. a lb. and 10 tons at 4d. a lb., the profits over a year should be as follows :

	<u>£. s. d.</u>
25 tons (1 ton = 2,240 lbs.) @ 6d. a lb.:	1,400. 0. 0
10 tons (1 ton = 2,240 lbs.) @ 4d. a lb.:	373. 0. 0
<u>Total sold :</u>	<u>1,773. 0. 0</u>
<u>Less : Exploitation costs</u>	<u>620. 0. 0</u>
<u>Total Profit :</u>	<u>1,153. 0. 0</u>

With a crew of four, each fisherman would therefore get £288.5.0 for 100 days fishing. The sharing system would probably have to be slightly different from that used at present, the boat being rather more costly to buy and maintain than present craft. In any case, the figures shown above are definitely on the safe side.

I recommend that two 25' motor fishing boats of the type referred to above be made available to reliable fishermen on a hire-purchase basis. The initial capital might be provided by a Bank under Government guarantee. Alternatively, these boats might be made available to a Co-operative formed amongst Norfolk Island fishermen, and the initial cost could be advanced either by the Fisheries Development Trust Account or by the Rural Credit Development Fund of the Commonwealth Bank of Australia.

Preservation and Marketing of Fish

Only incomplete surveys have been carried out in these fields, and in a rather haphazard fashion. Finding out which is the most profitable product for Norfolk Island is an important point. There is a wide choice: frozen fillets; fish - split, headed, smoked and cold stored; salt and sun-dried fish; various types of canned fish.

The product is not all; a market must be found for it in Australia, the New Hebrides or the British Solomon Islands.

During my stay, I had the opportunity to examine a good grade of smoked fish prepared for local consumption. I personally salted some trumpeter, snapper, kingfish and trevally in saturated brine (1 part salt

to 4 parts water) overnight. This fish was then sun-dried for 3 days and the final product was of good quality. The fish were headed, gutted and boned. If flies or rainy weather make sun-drying impossible, this product can be dried under shelter, over a slow fire.

On the basis of 60% dry weight, i.e. 60 lbs. of dried fish for every 100 lbs. of dressed fresh fish, this product could be bought in the New Hebrides, the Solomon Islands, or Sydney at a cost of 1/10d., including freight.

A one year survey by a fish preservation technologist is recommended in order to find the most profitable product which can be made in Norfolk. In addition to the local survey, samples of processed fish would have to be sent to the various prospective markets for acceptance tests.

It would be necessary that the two boats mentioned earlier be in operation, to give such a survey its full value. Co-operation with the freezing plant, and with any Fisheries Co-operatives which may be created, would also be essential.

Harbour

Once the two fishing boats have proved their value and a suitable export product has been evolved by the technologist, a harbour becomes essential to the development of a fishing industry. Let us mention in passing that such an industry would be a powerful inducement for many young Norfolk Islanders to stay home and that it might go a considerable way towards balancing the island's budget.

A number of factors militate in favour of such a harbour; a fishing industry cannot flourish where fishermen are at the mercy of the slightest wind; under present conditions, nets cannot be used, but a harbour would make it possible to introduce them; insurance companies will not take risks under the prevailing system, but might be induced to insure boats using a safe harbour.

Besides these considerations, strictly connected with the fishing industry, a harbour would be beneficial in other ways. The small tourist industry already in existence could be expanded by offering, for instance, big game fishing in addition to the scenery and mild climate which constitute the island's only attractions at the moment. Bonito, tuna, kingfish and trevally were observed during my visit and marlin and large tuna can be found west and east of the island, at a distance of 12 miles. Such sport fishing would require two charter cruisers and these in turn require a harbour.

Large tourist ships on round-the-world cruises would call if their passengers could be landed in safety. Visits of yachts and warships would increase the number of visitors.

Outside the tourist industry, the loading and unloading of commercial ships would be made cheaper and safer. The particular situation of

the airfield makes it necessary to have a fast boat standing by whenever an aircraft is landing or taking off, and this would also be easier and safer in a harbour.

All these factors would add to the local income.

Investigations have already been made in Norfolk as to the possibility of building a harbour. However, they all failed to produce results, as large and too expensive installations were envisaged.

My personal opinions on the sites considered are:

1. Cascade : Unsuitable for a small harbour, being deep and unprotected. In addition, no open space is available on land near the shore.
2. Ball Bay : This is situated on the windward side of the island. It is deep and the shore is steep and rocky.
3. Breakwater : (From Point Hunter to Nepean Island). Expensive and only suitable to provide an anchorage to leeward.
4. Emily Bay : The channel through the reef is dangerous. If breakwaters were built, the strong current between Point Hunter and Nepean Island would form breakers in front of these breakwaters in shallow water.

All but one of these places would be suitable, only if long breakwaters were built. The exception is Emily Bay, but this is the only safe swimming place at present and the establishment of a fishing harbour there would attract sharks.

After conducting a personal survey over a number of days, during which I was favoured with the best conditions, such as bad weather, spring and neap tides, I came to the conclusion that the best site for a small harbour would be near the Kingston pier. The presence of the pier is in itself an indication that the site was chosen as being protected, free of currents, and also because the breakers are not as bad here as elsewhere.

It is regrettable that the pier was not made 150' longer, on a true bearing of 265° from the end of the present pier to the edge of the nigger head. This would already be an improvement. (Ref. Appendix II - Project I).

However, two 900' breakwaters would be needed here to provide a safe harbour, as illustrated in Appendix II, Project 3, with the harbour axis on a true bearing of 205° from the end of the Kingston pier. There would be 18' of water in the harbour entrance at low water, springtide.

A smaller harbour could be made by combining Project I (150' extension of existing pier) with the construction of a 280' breakwater as shown in Appendix II, project 2. This would provide a depth at the entrance of about 4' at low water, springtide.

It should be mentioned here that differences in level between high and low water are 5'5" at springtide and 2'1" at neap tide. There would be no danger of the harbour entrance silting up.

The three projects will now be examined, in order to show their respective advantages.

Project 1

The 150' extension would make loading and unloading operations safer. Boats could be launched and lifted out with a southerly wind of force 3 to 4.

Project 2

The 280' breakwater and the extension mentioned under Project 1, plus a 4' basin (low water springtide) would again improve the safety during loading and unloading. Fishing boats could anchor in the harbour channel with southerly wind up to force 5. Some blasting would be required and the blasted rock would have to be taken away.

Project 3

The two 900' breakwaters would provide safe anchorage in the outer harbour at low water springtide for boats drawing up to 5'. Loading and unloading of shallow draught boats would be safe at all times in the inner harbour. In the event that a fishing industry develops, both the level site east of Kingston pier and the shallow foreshore in the inner harbour can be used for the necessary buildings.

Projects 1 and 2 could be implemented with local labour under the supervision of the Government Surveyor. It is possible that Project 3 could be carried out with the same personnel.

All breakwaters, as well as the extension of the existing pier, would be built of loose rocks. This material is plentiful at Cascade, and a 3 ton truck can cover the distance in 15 minutes.

The illustrations appended are not to scale. They will serve, however, to convey my ideas more clearly.

SUMMARY OF RECOMMENDATIONS

1. Whaling Quota

A quota of 150 Hump-back whales per season is recommended for the Norfolk Whaling Company.

2. Subsidy for Fish Exports:

A Government subsidy of 2d. per lb. for trumpeter and snapper; 1d. per pound for trevally, kingfish and grouper is recommended to end the present unsatisfactory situation. This subsidy is to be paid only for fish purchased for export. It should be established for a period of two years, after which it is hoped that the development of fisheries will bring a solution to the problem.

3. Fishing Boats

It is recommended that two 25' fishing boats equipped with 12 H.P. diesel engines, sails, and live-wells, be built or imported in Norfolk Island.

4. Fish Preservation

It is recommended that the services of a fish preservation technologist be obtained for a period of one year during which he should determine the most profitable product which can be prepared in Norfolk and also test various markets with sample shipments of this product.

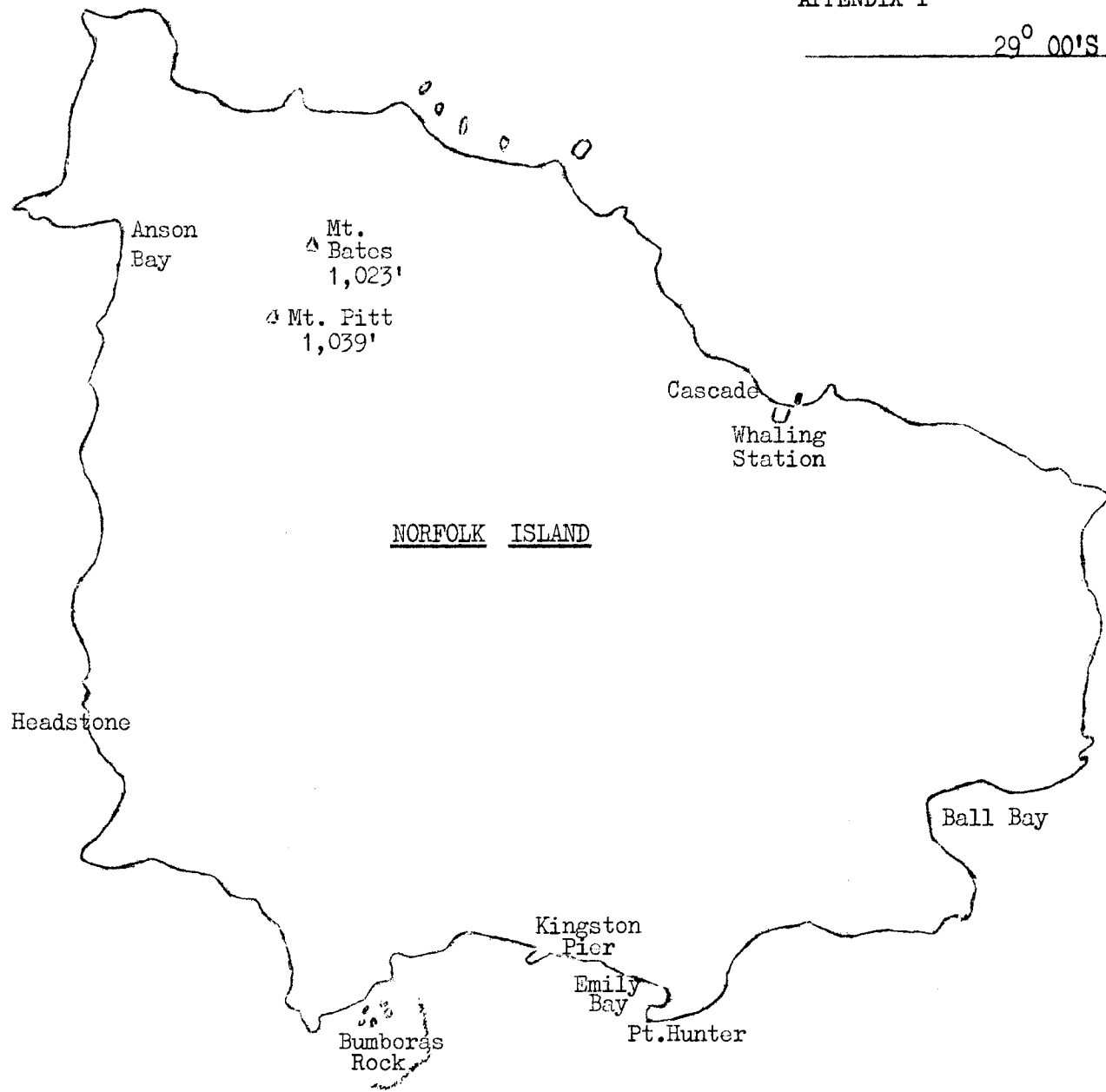
5. Harbour

Once the above recommendations, 3 and 4, have been carried out with satisfactory results, it is recommended that a harbour should be built near Kingston pier.

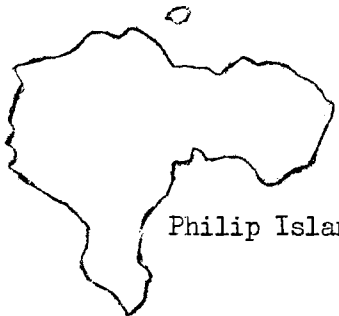
Pt. Vincent

APPENDIX I

29° 00'S



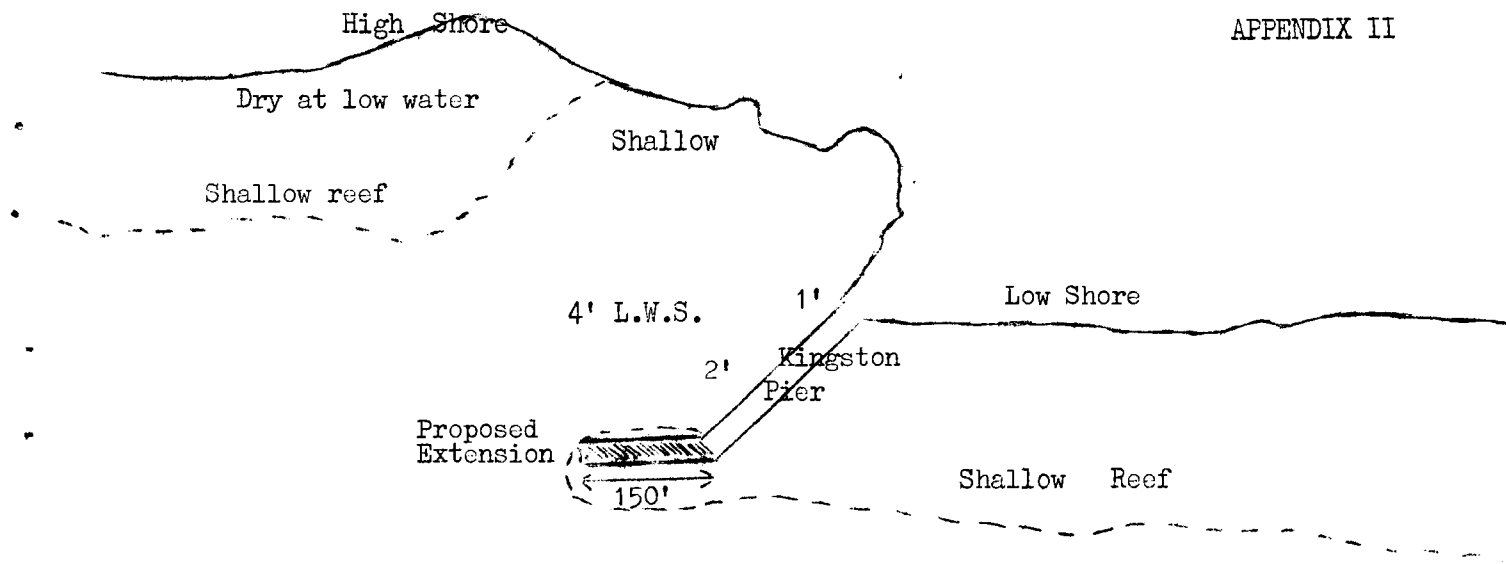
Nepean Island



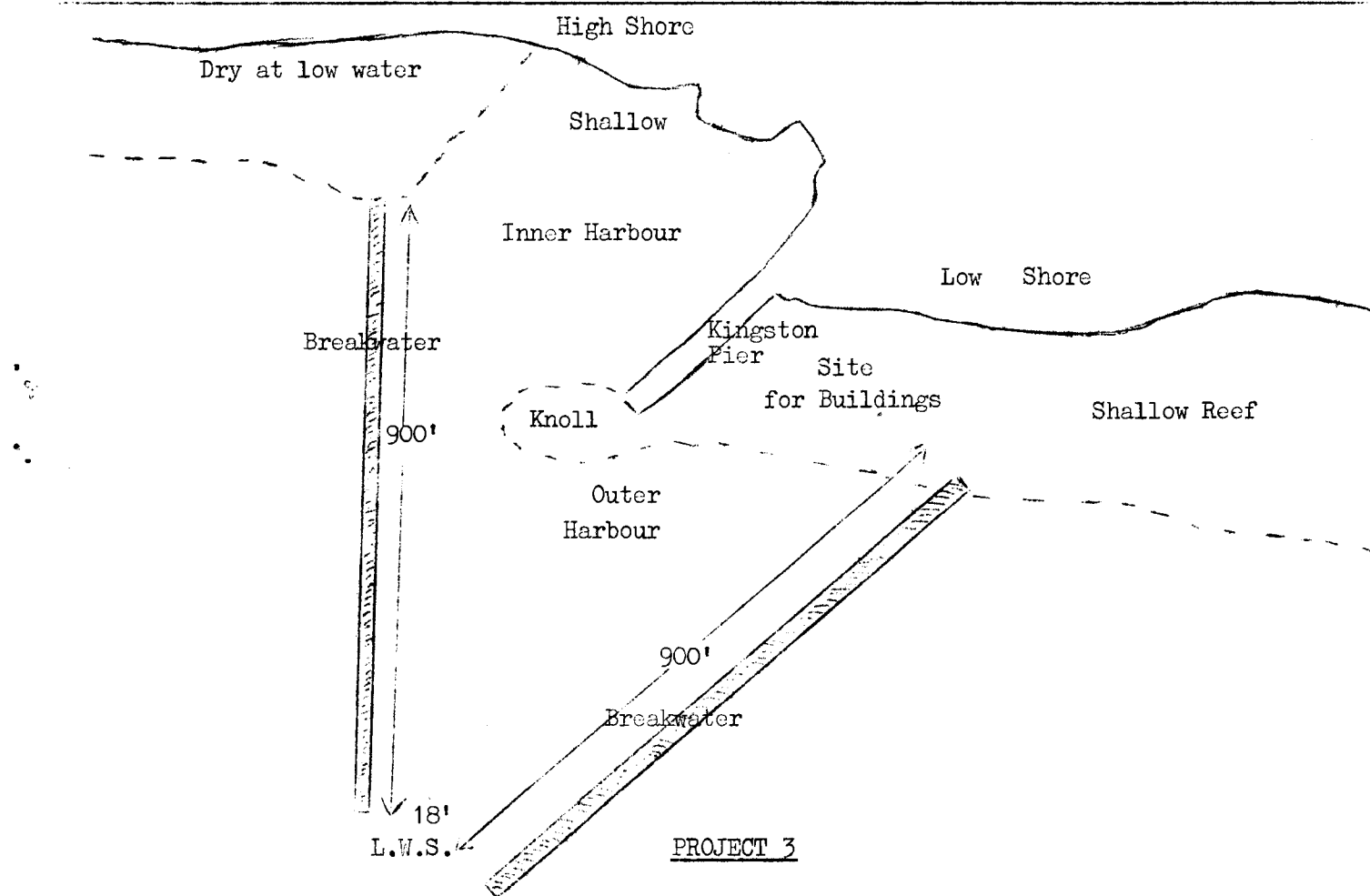
167° 55'E

Philip Island

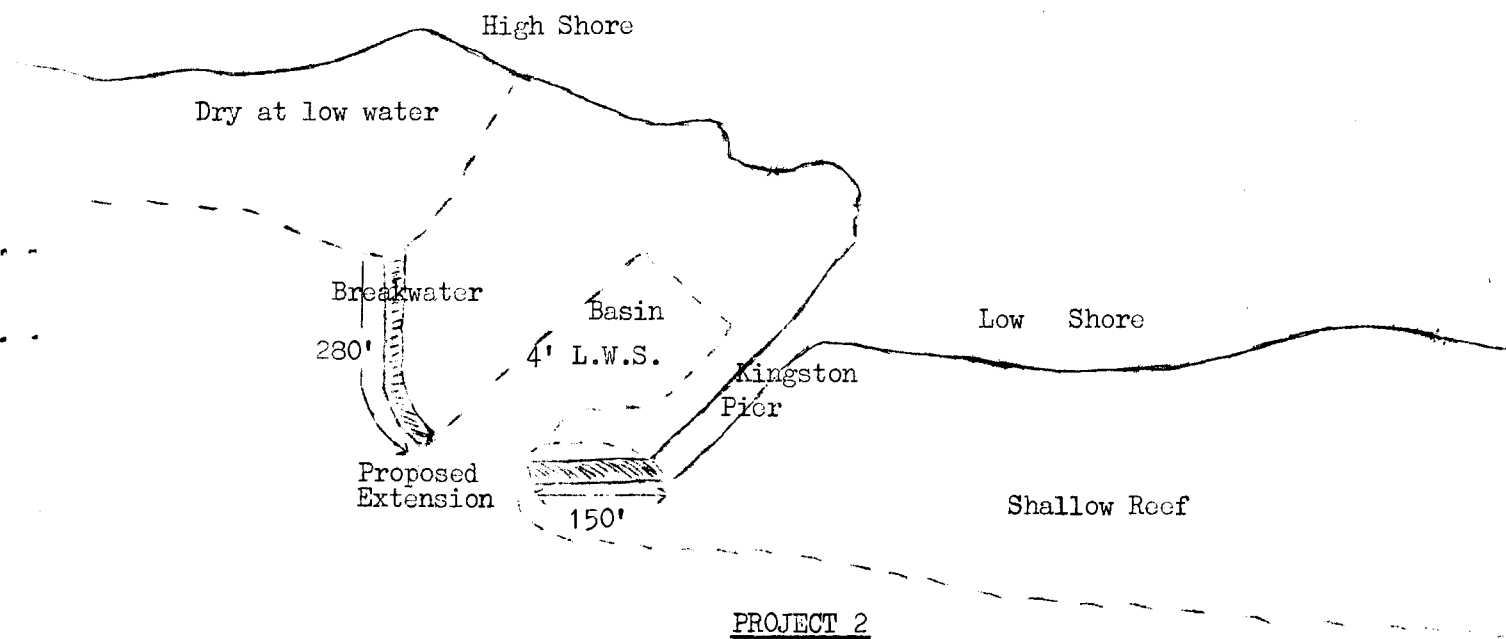
167° 59'E



PROJECT 1



PROJECT 3



PROJECT 2

APPENDIX III

COST OF VARIOUS COMMODITIES AND SERVICES

	<u>£. s. d.</u>
Petrol - per gallon	5. 9
Lubricating Oil - per gallon	16. 0
Diesel Oil - per gallon	4. 9
Kerosene per 4 gal. drum	19. 6
Long shank reversed hooks per 100	1. 4. 0
Freight : Sydney - Norfolk Island per ton	12. 0. 0
Freight : Refrigerated cargo - Sydney - Norfolk Is. per lb.	4 ¹ / ₂
Lighterage per ton	1.11. 0
Weekly wages : unskilled labour	9.17. 1
skilled labour	10.17. 1
tradesmen	11. 7. 1
Electricity KWH	11
Salt per lb.	6
Frozen Meat - Beef - New Zealand per lb.	6. 0
Mutton - New Zealand (airfreight)	3. Od. to 3. 3
Mutton - Australian (surface freight)	2. Od. to 2. 6
Beef - Local	2. Od. to 2. 6

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