The Papua and New Guinea

Agricultural Journal

Vol. 10 October, 1955 No. 2

SURVEY OF FISHING POTENTIALITIES OF THE CORAL SEA AND SOUTHERN AND EASTERN PAPUA IN 1955

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I.—*Introduction.*

SMALL motor boats and two vessels 60 feet in length, including Administration ships and a chartered boat from Australia, were used over a period of seven months to assess the fishing potentialities of the Coral Sea and Southern and Eastern Papua. As fishing at sea is seriously handicapped during the south-east season, sometimes for many days at a time, shore based tests from Port Moresby were carried out over a period of six weeks at Bootless Inlet in an attempt to replace part of the fishing effort at sea with work concentrated on shore which could be carried on independently of the weather.

II.—*Summary of Fishing Voyages.*

A period of six days was occupied fishing for bait about Port Moresby from Vabukori to Tatana and 500 lb. of bait sprats and anchovies were obtained; the following ten fishing voyages were made during the period February to August, 1955 :—

1.—1st-4th February—Fisherman's Island, beach netting and long line testing.

2.—15th-19th February—Hula Village, beach netting and long line tests.

3.—23rd-28th March—Port Moresby-Caution Bay and Idiha Island.

4.—31st March-12th April—Port Moresby via Gulf to Fly River Mouth returning via Bramble Cay and Portlock Reefs.

5.—18th-27th April—Port Moresby, Eastern Fields Reef and Daru returning via Fly River and off Yule Island.

6.—2nd-8th May—Port Moresby coastwise to Samarai.

7.—10th-18th May—Samarai, Milne Bay, Conflict Group, Kosmann and Uluma Reefs returning via Wari Island and Siriki Shoals.

8.—21st-26th May—Samarai, Wari Island, Shellard Ridge, Siriki Shoals, returning via Bremmer Island coastwise to Port Moresby.

9.—26th July - 2nd August — Off Kapa Kapa, tuna fishing tests 16 foot diesel motor boat.

10.—9th-12th August—Off Kapa Kapa and Gaile tuna fishing tests with 18 foot petrol driven vessel.

III.—*Trolling Results.*

The length of coast-line travelled, excluding off-shore reefs, is approximately 500 miles. Port Moresby lies slightly to the west of the mid point. In the following discussions of abundance the area is divided into five parts according to the different

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types of fishing water and principal areas are :—

1.—Port Moresby from Keppel Point to Yule Island.

2.—Gulf.

3.—Reefs of the Coral Sea.

4.—Central South Coast, and

5.—East of Samarai.

1.—*Port Moresby Area—Keppel Point to Yule Island*—

No spectacular catches of fish were made trolling in this area, although special efforts were made to catch inshore shoals of mackerel tuna, which with yellowfin and trevallies come inshore during the south-east season. Off Kapa Kapa a 16 foot diesel motor boat was not very effective, an 18 foot petrol-engined vessel was only slightly better on the figures given in Appendix I. However, partly because of poor weather conditions, over a three day period the catch from the petrol-engined vessel was less by 22 lb. than the smaller diesel-engined boat. These tests were carried out to determine the type of vessel most suitable for trolling from a larger vessel and for comparison with fishing by Kapa Kapa people who catch from three to nineteen fish per day per canoe, using small anchovies and bait chumming for tuna and trevallies. The average catch per canoe of about eight fish weighing 60 lb. compares favourably with the results from the two motor boats. Off Tupuselei to Pyramid Point also there are, at certain times, small shoals of fish, but the main run does not usually travel far west of Kapa Kapa or Gaile.

Off Yule Island.—Near the 100-fathom line best catches in this general area were made on a passage from the Gulf and if the area was systematically fished good results could be expected. Similarly off Idiha Island and the shoals to the west and north, there were indications that small schools of fish are to be found at the correct season.

Off the five general areas fished, the region from Keppel Point to Yule Island gave consistently the poorest results by all methods of fishing tested. This is at least partly because the Barrier Reef ends a few miles north of Idiha Island and the influence of the Gulf water bearing a different stock of fish has some effect.

2.—*Gulf Area*—

Trolling from Jokea to the Fly River Mouth from 1 to 20 miles off shore on the ship's course, produced for over 20 hours of trolling, 12 lb. of fish.

3.—*Reefs of the Coral Sea—Bramble Cay to East Cay*—

At *Bramble Cay*, a convenient anchorage in the south-western Gulf region, excellent catches of Spanish mackerel were made in February, 1948, and March, 1950, and Queensland fishing vessels have had good fishing there on numerous occasions; since then Bramble Cay yielded no fish at all on two visits in April, 1955, and only several fish were taken on the passage from Laxton Reef to Bramble Cay. Best results in the Coral Sea were obtained at Anchor Cay where 313 lb. of fish were taken in two hours, and at East Cay, although a greater quantity of fish was taken, the rate of catching was slower, 553 lb. of fish were taken in four hours.

Anchor Cay is a fair anchorage in south-east weather having on the north side an extensive shoal. At low tide there is a small area of reef exposed forming a crescent in which there is an extensive shoal area of sandy mud about 4 fathoms deep covered with eel grass with an area of sand only 30-40 yards in diameter which would be awash at high tide.

East Cay would be a satisfactory anchorage only in calm weather. There was no exposed sand cay seen at East Cay although extensive areas of reef were exposed, traversed by a shallow channel.

Portlock Reef.—Trolling over the reefs could not be satisfactorily accomplished as conditions were not favourable for cruising over uncharted reef, to the north-east of the most western reef, however, *en route* to Port Moresby, a few fish were taken. Results in Appendix I include trolling approaching from the west on the edge of the reefs; to the east sharks were a serious problem near the edge of the reef. Portlock Reef is an extensive area in which there are numerous shallow reefs. It is reported to have fair anchorages, although the western and north-western parts were trolled no satisfactory anchorage was found on the visits in April, 1955. The reefs are rather widely separated and some are sufficiently deep to be sailed

over without sighting except in good weather conditions. On the crossing estimated at the middle of the reef an unbroken chain of reef was seen to the south and small reefs were found at irregular intervals inside this area which formed a relatively calm area of sea. Fish were not taken except near the reefs and best results were obtained near the north-western boundary of the reef. An extensive lagoon without any visible entrance lies to the northern extremity of the reef area. Tides at the time were strong and sharks caused some damage, and gear was lost through strikes by big fish.

Eastern Fields.—The three reefs, East Cay, Portlock Reefs and Eastern Fields, form a series in which there is a change from small but compact reef over which there are depths of 3-5 fathoms to Portlock Reefs where there is an area of more scattered reef with shallow parts at the edges while a shallow lagoon in at least one case, had extremely precipitate margins in which the outer wall was almost perpendicular to a depth of 50 fathoms. No fish were taken approaching Eastern Fields reef in late evening, one shark was taken with a handline in 50 fathoms. However, crossing about the centre of the reef area two very large fish broke lines. It is considered that the greatest supply of fish nearest to Port Moresby is at Eastern Fields Reefs with Portlock Reef as the next best area. Although relatively small catches were made the fish are of greater size and with a well equipped ship good results would be obtained.

The fishing grounds of the Coral Sea could be worked for four to six months a year and to make regular fishing voyages would require a vessel of about 200 tons.

4.—*Central South Coast of Papua*—

Grange Island.—Inside the sunken barrier between Port Moresby and Samarai, European vessels have seldom taken many fish yet Native canoes, fishing in conditions which deter small coastal ships, are able to take fair quantities of troll fish. The reason appears to be that fish do not take lines readily under conditions in which vessels can steam close to the reef, whereas canoes in a fresh breeze can be managed better and with their shallow draft can, with greater safety, be navigated close to reefs. There are fair stocks of fish near the sunken barrier in a number of places but in six cruises from 1949 to 1955 only a few fish have been taken. Off Grange Island three Spanish mackerel were taken in 3 minutes, but no further strikes were obtained over a period of 40 minutes trolling about the reefs to the west and around the Island.

Off Mogubu comparable results were obtained and in a period of more than two hours only at infrequent intervals was a small mackerel obtained and in the passage from Mogubu to Fyfe Bay under fair weather conditions only slightly better results were obtained .

5.—*East of Samarai*—

A number of good fishing reefs lie within a few hours steam of Samarai. Most important of these tested in 1949 and 1950 were fished again and results were again found to be good. Greatest quantity of fish was taken over Emerald Shoal and Reef which is an extension of this shoal and not different in character or depth of water. Fish on this shoal were found only in patches with different schools of fish on various parts of the shoal. Small motor boats in fair weather should make good hauls on this reef which is quite extensive and fish were found over an area about 15 miles north and south and 20 miles east and west. On the Western Boundary there are isolated reefs separated by deep water from the main shoal, but generally the depth over the shoal is from 5-7 fathoms with extensive patches of white sand (where few fish are caught) lying between dark areas of reef on which the fish can hide.

On Kosmann Reef the fastest trolling rate of catch in the area was made in poor weather and although some losses were experienced through sharks, these were not serious. This reef is not so extensive as Emerald Reef and is estimated to extend approximately 9 miles to the north-west of Kosmann Island and about 6 miles wide near the island. Although there are shallow parts, it is generally deeper than Emerald Reef and there are depths of over 10 fathoms.

Principal reefs to the south-east of Samarai lie between Kosmann Island and Uluma Reef where on the inside of the sunken Barrier good catches may be made in isolated parts. On the passage to Uluma Reef, 30 lb. of fish per hour were taken. Although this was exceeded in the passage off Yule

Island, conditions were different and the isolated reefs east of Samarai are most productive and would, for short periods, yield results comparable to those obtained at Emerald Reefs.

Other important reefs were found in the vicinity of Wari Island, where, although there is a considerable Native fishing population, some good catches were made to the south near a large lagoon reef, and to the north at Ikalka and Bell Rock.

The most extensive reef bearing good stocks of fish is the Siriki Shoals which, while deeper and more crossed by channels than Emerald Reef, is similar to it in many respects and bears similar species of fish. Trolling with small motor boats over this area, which like Kosmann and Emerald Reefs, receives much protection from southerly weather by the Barrier Reef would be practicable for a large proportion of each year.

Bremer Island has not produced good results although it was previously reported to be a good fishing ground. Tests on three occasions yielded only about 60 lb. of fish for four hours trolling over reefs.

Principal trolling results show conclusively that there are few extensive relatively rich grounds with great lengths of coast-line bearing, at least inshore, quite small stocks which are caught only by special methods or under favourable weather conditions, viz., cloudy sky and a moderate sea. At the following places more than 100 lb. of fish were taken per hour :—

Anchor Cay	180 lb.
East Cay	138 lb.
Eastern Fields	112 lb.
Emerald Reef	114 lb.
Kosmann Reef	129 lb.

Of the areas where satisfactory trolling may be found the nearest produced 125 lb. of Spanish mackerel and yellowfin tuna in 1½ hours; concentrated fishing in the area may improve on this result. As this ground is only 60 miles from Port Moresby this class of fishing may be an economic possibility. Of the grounds mentioned above, the next nearest to Port Moresby is Eastern Fields Reef, 100 miles distant.

The only method by which the reefs east of Samarai could be economically fished would be for the catch to be loaded to refrigerated vessels trading to the Territory, for shipment to centres where supplies are needed.

Although trolling and chumming off Kapa Kapa produced few fish the shoals which come in to feed on the post-larval anchovy offer one of the greatest potential fisheries in southern Papua, and if further trolling methods do not produce better results, netting with mesh or beach nets may prove more satisfactory.

IV.—*Line Fishing.*

Handlines.—Testing of an area for handline fishing presents difficulties as commercial fishing grounds are usually developed in connection with economic needs. It was found most practicable during the survey to anchor at night wherever possible on a reef that might prove productive. In the Port Moresby area most satisfactory results were obtained in Idiha Island shoal, a sand and coral bank to the west of Idiha Island. Under rather unfavourable tide conditions, but using patu bait, 40 lb. of fish were taken during 2½ hours. Comparable reefs with similar species of fish are found off Tupuselei, the principal species being *Lutganus coatesi* (local name Siaro).

At Eastern Fields it was not possible to fish inside the lagoons, and at a depth of 50 fathoms, within a few yards of the reef, only one black-tip shark was taken. At Conflict Reef near Panassea 90 lb. mixed fish, including *Epinepelus, Lutjanus coatesi, L. ornatus* and *Lethrinus* were taken from motor boats and vessel in two hours.

Best results in Papua, in this and a previous survey, were made off Kosmann Reef where with handlines 210 lb. of fish were taken in 4 hours with three lines. Conditions were favourable, there being a small tide, and the bottom was relatively clear. The rise and fall in tide estimated for Port Moresby when this catch was made showed only 3 inches difference between high and low water.

Long lines.—Horizontal lines were tested in lengths up to 2 miles off Port Moresby, Hula Village, Jokea and Milne Bay. Sharks were taken to a depth of 15 fathoms. None, however at 35 fathoms, although at 15 fathoms in the same place, off Port Moresby, two sharks were caught. Results are given in Appendix II.

Horizontal long line fishing cannot be considered an economic possibility until the grounds are further prospected and a supply of first-class bait is available.

Two sets were made with vertical lines off Fisherman's Island and off Jokea; only one shark was taken. Milne Bay is an extensive area of relatively sheltered water. It undoubtedly has good stocks of fish but as in 1951, attacks by sharks damaged much long line used horizontally and made fishing quite unprofitable. In May, 1955, fifty hooks used on a line anchored in 80 fathoms, set diagonally and buoyed at the surface produced parts of the heads of two sharks estimated at 8 feet in length. Four hooks were lost and a cod 8 lb. in weight was taken. This is the only locality where fish other than sharks were taken on set lines.

In Milne Bay fish are not caught by the Native people for a considerable part of the south-east season, April to October, although parts of the bay are of sheltered water. Vertical lines in 80 to 100 fathoms may make a substantial contribution to their needs.

V.—*Fish Trap and Mesh Nets—Bootless Inlet.*

The need for a continuous supply of fish is frequently most obvious in otherwise prosperous communities where gluts of fish alternate with periods of scarcity. This is most marked in Port Moresby where Native fishing in the south-east season may practically cease for a week or ten days because of the weather conditions.

After preliminary fishing tests with nets and lines in Bootless Inlet in 1954 and 1955, a wire mesh fish trap was installed to the east of Dogura Village. One arm of the trap 150 yards long, was built to take the run-off from Bomana Creek where good quantities of mullet and small sharks are often taken. During the first nine days the trap was operated, catches were poor, but 280 lb. were taken on the tenth day in mesh nets used in association with the trap. Severe south-east winds broke part of the trap which was moved about 200 yards west to a more suitable site, with respect to the weather. An estuary rather wider than the Bomana River opens into the north-west corner of the Inlet (no fresh water runs in the watercourses entering Bootless Inlet in the south-east season).

Further catches in the mesh net, however, showed that they were superior to the wire mesh trap and in an operating period of fifteen days the daily catch of traps and mesh net amounted to 63 lb. bony fish and 10 lb. sharks and rays.

Principal difficulties were watching the trap and fishing every tide over a seven day period and keeping the small quantity of fish in good order. Lightly salting proved satisfactory over a 36-hour period but transport by motor truck proved too costly for the amount of fish produced.

A group of three Tupuselei Natives fished the traps and mesh nets for two weeks getting the fish to Port Moresby as best they were able. Value per man was stated to be approximately £3 per week. The fishing finally stopped because of other necessary seasonal work in the village and the trap was removed.

The information from the trap in Bootless Inlet suggests that in this region a trap is not sufficiently productive to be a success. Three inch mesh nets at this season take impressive quantities of fish and the method will be further tested. Most abundant species were the Hairback Herring *Nematalosa nasus*, Wolf Herring, *Chirocentrus dorab*, Leatherskins *Chirocentrus* and Mullet *Mugil*.

Netting.—Mesh netting, although profitable in the vicinity of Port Moresby, was not entirely successful in two other places tested; to the east and west of Red Scar Head small Spanish mackerel were taken; off Dedele Point a small variety of fish was taken. This class and size of net is more suitable for enclosed waters and beach seine nets are more satisfactory for exposed waters.

VI.—*Bait Fishing.*

For trolling, salt gar *Hemirhamphus* was used and best supplies nearest Port Moresby were obtained at Hula Village. Both *Hemirhamphus far.* the barred gar and *H. dussumieri* the striped gar were taken, the latter being most satisfactory for bait. Small quantities were also obtained at Fisherman's Island where there is a small sandy bay on the north-eastern corner.

In Port Moresby from Vabukori to Tatana, sprats *Dactylolepis* (Motu-patu)

come inshore during the south-east season and although they tend to jump over the cork line of the hauling net it was found that 1 inch mesh 9-ply used as a beach net effectively catches a large part of the shoal as the fish become meshed. A lift net has been successfully used to catch quantities in excess of 400 lb. in an hour. Anchovy *Engraulis* (Motu-herre) of a similar size are also caught in this way and are an excellent bait.

At Kapa Kapa "whitebait" also came close inshore, they may be caught in mosquito net or woven net of Native material. These fish which are advanced post larval anchovies *Engraulis* are too large to use as whitebait, European style. They vary in size from 2.1 to 2.7 inches in total length. The large head and the advanced post larval development showing a broad silvery band on each side of the body seriously detract from their appearance as whitebait for food. They are excellent bait for chumming but rather small for use on a hook.

Best results in bait fishing for 4-6 inch size fish have been found with a lift net in the shape of a truncated triangle using a small beach seine to drive the shoal over the broad side of the lift net.

VII.—*Canoes Versus Motor Boats.*

Three tests of Native canoes versus motor boats were observed. Two tests off Kapa Kapa to Gaile with a 16 foot motor boat powered with a 7-9 horse-power diesel proved about equal under fair weather conditions. A low-powered petrol engine in an 18 foot motor boat gave comparable results to the diesel-engined vessel. Some Natives with much experience on canoes experience difficulty in judging the weather conditions for small motor boats and it is significant that the larger canoes can be more effective fishing vessels than quite large motorized craft. On one part of the coast while motor vessels were sheltering from the weather some of the larger Native canoes were taken out fishing and made excellent catches. Shallow draft, manoeuvrability and fine sailing qualities, however, do not completely recompense for the loss of comfort of the crew, and such fishing even for Natives is limited to relatively short expeditions in the vicinity of villages.

In a further test with an outboard motor and dinghy it was found that for trolling, inboard engines are superior. During the south-east season it would not be desirable to use outboard motors even inside the reef on the south coast of Papua except for short periods of favourable weather. In the north-west season, however, there are considerable periods when outboards would prove of great assistance in developing fisheries and they will be of particular use in estuaries in enclosed waters.

VIII.—*Marketing of Fish.*

At the Koki Market prices of fish vary to some extent according to species, generally, however, small fish of average quality cost 2s. 6d. per lb. and larger from 1s. 6d. to 2s. per lb. This makes the cost on a basis of skinned fillets approximately 3s. 6d. a pound, a price comparable to that of imported fish. It is difficult to determine how much fish is sold in the Port Moresby Native Market where in the late afternoon, fish are on sale strung on poles. The number of poles varies with the weather and in bad conditions only two or three poles bearing twenty to forty pounds of small fish each may be displayed, whereas on days when fishing is good as many as eighteen to twenty poles may be displayed and the weight may vary from 80 lb. to 100 lb. per pole, most of the fish being more than 5 lb. in weight.

These supplies give only the quantity of fish on display at one time. An average daily turnover during the south-east season could be based on seven poles bearing 400 to 500 pounds of fish and this probably represents about half the daily sales of fish including smoked fish at the Koki Market. It is reported that during a particularly good run of fish off Tupuselei in August, 1955, that 400 mackerel tuna were taken in one day and all were smoked and delivered to the Koki Market. The weight of these fish was estimated at 3,600 lb.

In July, 1954, a group of Tatana Natives organized commercial fishing to supply some Administration messes at Port Moresby. This effort produced, in a period of four months, until November, 6,242 pounds of fish and 870 dozen oysters. The fish was not all of good quality and the contract terminated

when it became known that the fish would be better used in the villages. The largest quantity delivered in one day was 680 lb. The price of the whole fish was approximately 1s. 6d. per lb.

The fish caught by the Division was disposed of as shown in Table 2, which includes mesh net caught fish and some bait fish. Some of the catch was unloaded at Samarai, transferred from the shore freezer and transported by refrigerated ship to Port Moresby, and after eight weeks in cool store reported to be in fair condition, being superior to imported fish. This test shows fairly conclusively that fish caught in the Territory and prepared by Natives under European supervision has a fair market. A small sample of this was sent to the Highlands where, however, thawing and re-freezing caused a considerable loss in quality.

Some tuna species which were kept for three months in a freezer were found to be in good condition but had suffered slight freezer-burn. Several samples of tuna, including yellowfin and dogtooth, were canned in association with a Native Co-operative Society. One sample of yellowfin in coconut cream proved to be quite a superior article being better than tuna in oil. Canned dogtooth tuna were inferior to yellowfin.

For a marketing test through Native Co-operatives, 60 lb. of fresh fish sold in about 30 minutes at a price of 1s. per lb. Shark and skate at 8d. per lb. sold last.

A small sample of tuna smoked hard Native style was sent from Kapa Kapa. This was cooked but not dried and had a safe keeping time of approximately 36 hours in Port Moresby conditions. The demand for this type of product, which is suitable for Native rations for labour lines and hospitals, exceeds the supply in the Native Market.

Smoking European style may have some advantages in eliminating slight losses. It is unlikely, however, that the demand from Native peoples would be appreciably improved. Salted fish for use in coastal areas, it is considered, would have only a limited sale. A test with salt and pyroligneous acid (liquid smoke) indicated that for the labour involved smoking over a fire would be preferable unless conditions were such as to necessitate transport before fired smoking could be completed.

Development of Fisheries.

Building of Japanese vessels was subsidized by the Japanese Government after the war for the development of fishing fleets. These have now reached considerable size and about 1,200 vessels exceeding 100 tons fish the eastern and southern Pacific as far as New Caledonia. These ships now have available to them information on the distribution of different species in the Pacific and Indian Oceans, and as a consequence, vessels of 100 tons capacity can be filled on these grounds in 25-30 days and sometimes less. The journey to and from the more distant fishing grounds, however, requires ten to twelve weeks and sometimes longer.

Vessels based in New Guinea employing Papuan or New Guinea Natives as crews under proper technical guidance should compete after a few years with these Japanese vessels. They have the advantage of port facilities and shore bases much closer to their fishing grounds and do not need to carry such large supplies of fuel and provisions. Fishing vessels based on Australia could not compete until a very high catch per day was achieved.

Native and European Industries.

European capital for development of edible fish industry as opposed to shell industry, will not be attracted until marketing and distribution in the Territory have been proved. Native organizations have an advantage in this respect that the vessels used by them could operate nearer Native villages than it would be advisable to allow European vessels to do. Off shore, at distances of 20 to 100 miles from main ports, there are extensive reefs which cannot be fished by Natives except under particularly favourable conditions and on some of these areas fish are abundant. It is considered, however, that a vessel of two hundred tons capacity would be required to work these reefs with any regularity and in any degree of comfort and safety; until crews can be trained using smaller vessels inshore ½-20 miles off the coast in the methods to be followed, fishing, except in a few uninhabited sheltered areas, will be the right of the Natives.

A large part of the south-east coast of Papua is not a rich fishing ground and it is probable that the Gulf fishing or reefs of

the Coral Sea will prove economic and more satisfactory than inside the Barrier Reef extending south-east and north-west from Port Moresby.

Except in the principal towns where there is a considerable European population and concentration of Native labour, large scale fishing is not likely to succeed unless the Administration and business firms are prepared to give assistance to the fishing industry by using locally caught fish for their Native staff. Natives in villages or in the towns have not the money to purchase very much fish based on European prices and Europeans even in the larger towns aften show a preference for imported fish. In Port Moresby alone, the European requirements for fresh fish may be stated at between 2,000 and 2,500 pounds per week. Native requirements, in addition to present Native supplies may exceed a further 5,000 lb. weekly. In a small town where there is a considerable demand for fish, a local retail store, supplied through the Native Co-operatives, sold (at a price approximately half that of the imported article) ten pounds of locally caught fish in two weeks. The balance of the fish supplied was used for Native labour.

To establish a fishing industry the most effective aims are to supply—

(*a*) the larger towns for European consumption;

(*b*) to the large companies and to the Administration for Native staff;

(*c*) Native Co-operatives which are able to sell small quantities in the larger towns where Native staffs are employed by Europeans.

As much knowledge of local conditions is necessary for successful fishing, the most satisfactory way in which an industry may be established would be for Native Co-operatives or European firms established in the Territory to organize vessels to fish the most highly productive areas and to establish pilot plants so that supplies of fish in excess of those which can be used fresh, may be smoked or canned. At least one fishing venture in New Guinea failed because of lack of attention to disposal of catch which was surplus to the local needs of fresh fish.

TABLE 1

RESUME OF FISH LANDED—FISHERY SURVEY, PAPUA
23rd March—16th May, 1955 (gutted weights)

Date	Locality	Sharks (lb.)	Tuna, Spanish Mackerel, etc. (lb.)
1. 4th-18th February, 23rd-29th March	Bootless Bay to Idia Island (long line) .... Red Scar Bay—Idia Island	450 260	 100
2. 31st March-10th April	Across Gulf to Bramble Cay and Portlock Reefs	....	260
3. 18th-27th April	Eastern Fields, Portlock Reefs to Daru, Fly River Mouth	....	840
4. 2nd-8th May	Port Moresby, east to Samarai	....	320
5. 10th-18th May	Milne Bay, Conflict and Emerald Reef and Siriki Shoals	....	2,041
6. 20th-26th May	Bell Rock, Shellard Ridge, Dumolins, return to Port Moresby	....	456
		710	4,017

TABLE 2

DISTRIBUTION OF FISH (excluding Sharks)
February to July 1955

—	Natives and Native Labour	Native Hospitals	European Hospital and Messes	Experimental
Port Moresby	610	750	1,560	200
Samarai	630	480	....	460
Rigo	260	....	....	....
Conflict Group	80	....	....	....
Daru	40	....	....	....
	1,620	1,230	1,560	660

APPENDIX I

TROLLING AND CHUMMING RECORD

Station	Date	Locality	Depth fathoms	Bottom	TIME			Tide	Catch—species and number of fish and weight in pounds	Remarks
					Shot	Finish	Total Time			
							H. M.			
1	24.3.55	Caution Bay to Idia Island	....	..	11.0 a.m.	12.20 p.m.	1 20	½ E.	1 yellowfin tuna (18)	Caught inside passage west of Island. Many surface shoals of fish.
	25.3.55		....	....	8.30 a.m.	4.30 p.m.	8 0	....	4 trevally (24), 1 pike (30), 1 trout (8)	
2	1.4.55	Off Yule Island	....	....	11 a.m.	1 p.m.	2 0	L.W.	2 mackerel (24), 1 pike (28), 1 turrum (20)	Near Island steaming to Cape Possession.
	27.4.55	Off Yule Island	....	....	10.30 a.m.	noon	1 30	½ F.	3 mackerel (47), 3 yellowfin tuna (74), 1 pike (4)	Off Island near 100 fathom line.
3	2.4.55 to 6.4.55	Cape Possession to Jokea to Panaroa to Fly River	....	....	....	....	18 40	....	1 golden trevally (6), 1 mackerel (3)	Close inshore about 7 fathom line all daylight steaming. Water usually showing evidence of fresh water from rivers.
4	22.4.55	Anchor Cay to East Cay	....	....	10.40 a.m.	12.35 p.m.	1 55	½ E.	25 mackerel (313)	Mackerel taken in small area off Anchor Cay. Fish taken over wide area includes 2 sharks 290 lb.
	8.4.55 to 9.4.55						4 0		5 mackerel (105), 9 turrum (92), 6 others (356)	
5	9.4.55	Portlock Reef	....	....	10.45 a.m.	3 p.m.	4 15	½ E.	3 mackerel (51), 3 turrum (59), others (65)	Some gear broken with sharks and large yellowfin tuna. Trolling over big area. Fish not taken where previous catches made.
	21.4.55	Portlock Reef	....	....	10.30 a.m.	11.20 a.m.	- 40	½ E.	1 tuna (18), 1 pike (18)	
6	20.4.55	Eastern Fields	....	....	6.30 a.m.	9.15 a.m.	2 45	H.W.	5 tuna (265), others (45)	Crossing reef fish taken only near shoal areas. Lost two lines with big fish.
7	5.5.55	Off Grange Island	....	....	11.5 a.m.	12.20 p.m.	1 15	¼ E.	3 mackerel (48)	3 fish taken in 3 minutes. None others taken in 1¼ hours. Trolling about Island.
8	6.5.55	Off Mogubu to Fyfe Bay	....	....	8.20 a.m.	10.40 a.m.	2 20	¼ E.	4 mackerel (21), pike (9)	Water calm, clear and fish jumping.
	7.5.55		....	....	7.35 a.m.	12.10 p.m.	4 35	½ E.	5 mackerel (40), 2 jobfish (17), trevallies (36)	Weather cloudy.
9	13.5.55	Emerald Reef	....	....	1.40 p.m.	5.10 p.m.	3 30	H.W.	1 mackerel (18), coral trout (20), 2 jobfish (13), 6 trevallies (82), tuna (7)	Fish take line on this reef mainly before 9.30 a.m. and after 5.30 p.m.
	14.5.55	Emerald Reef	....	....	7.45 a.m.	10.15 a.m.	2 30	½ E.	4 mackerel (34), 7 tuna (171), 3 red bass (19), 1 coral trout (16), 1 trevally (10), 2 pike (8)	

10	15.5.55	Emerald Reef	....	....	6.40 a.m.	12.20 p.m.	5	40	E.	4 tuna (63), 10 mackerel (124), 3 pike (24), 16 jobfish (117), 3 red bass (18), 3 trevally (22)	Although the reef is extensive fish are taken on only a limited area.
11	15.5.55	Kosmann Reef	....	....	2.45 p.m.	5.10 p.m.	2	25	H.W.	2 mackerel (24), 1 tuna (12), 1 pike (6)	Sky cloudy and heavy. Fish not taking lures.
	16.5.55				8 a.m.	9.20 a.m.	1	20	½ E.	3 mackerel (45), 3 red bass (19), tuna (13), 2 jobfish (17), coral trout (12), others (66)	Serious trouble with sharks, which took 2 fish and broke gear.
12		Kosmann Reef to Uluma Reef	....	....	12.30 p.m.	4.30 p.m.	4	0	H.W.	5 mackerel (77), 1 jobfish (11), 7 others (45)	Sky clear, sea calm. Fish not biting although passage steamed very close to reefs.
13	17.5.55	Siriki Shoals	....	....	7 a.m.	9.30 a.m.	2	30	½ E.	13 mackerel (168), 4 jobfish (27), 1 tuna (8)	On two days fishing in rough weather 23rd and 24th May over parts of this area no fish were taken.
		Wari Island									
		Ika Ika	....	....	9.30 a.m.	12.30 p.m.	3	0	¾ E.	3 mackerel (59), 12 jobfish (110), 1 pike (21)	
		Bell Rock									
14	23.3.55	Port Moresby to Caution Bay	....	....	2.45	4.30 p.m.	1	45	¾ F.	1 spotted trevally (7)	Steamed on ship passage.
	31.3.55	to Keppel Point	....	....	8.30 a.m.	1.30 p.m.	5	0	¼ E.	1 blue trevally (7), coral trout (8)	
	26.5.55		....	....	9 a.m.	6 p.m.	9	0	....	1 wahoo (59), pike (8), dolphin (18)	Steamed straight course off Tupuselei.
15	27.7.55 to 29.7.55	Kapa Kapa	....	....	....	....	8	0	....	2 northern bluefin (18), 1 mackerel tuna (5), 1 yellowfin (8), 1 mackerel (1)	Duck feather lures and plastic jigs. Tuna feeding on anchovy, many surfacing but few took troll lines.
16	27.7.55	Kapa Kapa	....	....	7 a.m.	9.30 a.m.	7	30	½ E.	3 northern bluefin (25)	Chumming with anchovies and with anchovies on 3 and 5/0 hooks with 8 inch wire trace and nylon line. Calm morning, choppy sea in afternoon.
					noon	5 p.m.			½ F.	3 mackerel tuna (18) 1 turrum (5)	
17	28.7.55	Kapa Kapa	....	....	noon	2.30 p.m.	2	30	L.W.	3 nothern bluefin (24) 3 mackeral tuna (12), 1 morwong (*Plectorhynchus*) (4)	Chumming anchovy bait as 27.7.55. Large sharks took some fish. Choppy sea.
18	29.7.55	Kapa Kapa	....	....	11 a.m.	5 p.m.	6	0	L.W. to H.W.	1 northern bluefin (9), 3 mackerel tuna (20)	40 lb. anchovy used in chumming in 6 hours, lost many fish with sharks.
19	10.8.55	Kapa Kapa	....	....	5.45 a.m.	9.30 a.m.	3	45	L.W.	3 mackerel tuna (26), 6 northern bluefin (51), 1 mackerel (3)	Period of 1 hour chumming omitted no catch. Fish taken on troll lines.
20	12.8.55	Gaile	....	....	8 a.m.	11 a.m.	3	0	¾ E.	3 northern bluefin (24), 1 mackerel tuna (10), 2 mackerel (8), 1 trevally (5)	Includes 1 hour chumming for 18 lb. fish.

APPENDIX II

LINE FISHING RECORD HORIZONTAL LINES

Station	Date	Locality	Depth of Line fathoms	Bottom depth fathoms	TIME Shot	TIME Finish	TIME Total Time H. M.	Tide	Catch	Remarks
1	3.2.55	5 miles off Fisherman's Is.	15	400	11.20 a.m.	11.30 a.m.	2 10	½ F.	2 sharks for 8 hooks, 200 and 60 lb.	Line drifted strongly, travelled about 3 miles although tide not at spring rising 2 feet 6 inches.
2	17.2.55	1 mile off reef Hula Village Hood Point	15	200	9.30 a.m.	10.30 a.m.	1 0	½ E.	1 shark for 15 hooks, 400 lb.	Fresh south-east wind so lines hauled early.
3	24.3.55	8 miles off Idia Island	35	800	4.10 p.m.				No catch for 100 hooks	Miscellaneous bait, including 8 hooks with salted garfish. Remainder fresh gar and other fish.
4	28.3.55	½ mile south of north end Fisherman's Island	15	150 hard bottom	2.30 p.m.	6.15 p.m.	3 45	½ E.	2 sharks for 40 hooks and 1 swimmer mangrove crab. Sharks total 260 lb.	Line drifted strongly and travelled about 3 miles. Tide rise 2 feet 4 inches. Sharks easily handled by long line.
5	2.4.55	3 miles off Jokea Gulf of Papua	15	80 soft mud	11.15 a.m.	4.30 p.m.	5 15	H.W. to ½ E.	4 sharks, black-tip and similar species. 47 lb. 40 hooks	Bait mainly *Trachinocephalus* (Grinner). Line drifted at right angles to set in very soft mud. Only a few baits taken.
6	10.5.55 to 11.5.55	Head of Milne Bay	80 to surface	80 mud	5.5 p.m.	11 a.m.	17 55		1 Epinephalus 8 lb. 2 shark remains, 1 jaw bone and part of head	Bait *Selar crumenophthalmus*. Line left overnight not satisfactory. Epinephalus had not been on line very long. A considerable tangle of line on bottom section which had possibly caught severel Epinephalus all taken by sharks.
7	12.5.55	Head of Milne Bay	35	80 mud	8.30 a.m.	9.12 a.m.	42		20 hooks set. 1 bait and hook taken	Bait *Selar crumenophthalmus*. Results suggest that anchored vertical lines in Milne Bay with 20 to 50 hooks would be best for trials.
						VERTICAL LINES				
8	28.3.55	½ mile south of Fisherman's Is. Port Moresby	150	hard	1.45 p.m.	4 p.m.	2 15	½ E.	Nil. No baits taken	Baits possibly not satisfactory. 2 sharks were taken at 40 fathoms with horizontal line.
9	2.4.55	Off Jokea, Gulf of Papua	17	mud	12.15 p.m.	4 p.m.	3 45	H.W. to ½ E.	1 shark 3 lb. All baits taken from 2 lines with 12 hooks	Bait not satisfactory. Natives fish here with handlines evidently on the mud.