FISHERIES DEPARTMENT, WESTERN AUSTRALIA

MONTHLY SERVICE BULLETIN

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STAFF NOTES

The Superintendent (Mr. A.J. Fraser) visited Geraldton from May 23 to 26. In the company of the Minister for Fisheries (Mr. Kelly), he attended a meeting of the Northampton Road Board, called to discuss the Murchison River flora and fauna reserve. He was also present at a civic reception tendered to the Minister by the Geraldton Municipal Council, and visited crayfish processing works.

The Supervising Inspector (Mr. J.E. Bramley) will leave for Geraldton and Shark Bay on June 1. He will be accompanied by Inspector C.R.C. Haynes and Assistant Inspector S. LaRoche. Mr. LaRoche will replace Assistant Inspector T.B. Baines on the p.v. "Kooruldhoo", and Mr. Baines will return to duties in the Fremantle district.

Inspector A.J. Bateman flew to Onslow on May 12 and joined the crew of the research vessel "Lancelin" vice Inspector C.R.C. Haynes, who had been granted compassionate leave. Mr. Bateman will return to Fremantle and resume control of the p.v. "Silver Gull" when Mr. Haynes resumes duty on the "Lancelin".

The Senior Inspector (Mr. J.E. Munro) will visit the south coast during June to undertake patrols of Wilson's and Irwin Inlets.

Inspector R.M. Crawford, who was married to Miss Jean McBean on May 26, was at an informal function on May 25 the recipient of a crystal fruit set with the best wishes of the Superintendent and staff.

Inspector B.A. Carmichael has been appointed whaling inspector for the 1956 season at Carnarvon. It is understood that the Nor'-West Whaling Co. will commence operations at its new station about June 11. Mr. Carmichael will go there as soon as notification is received that whaling has commenced. Our congratulations are extended to Mr. Carmichael, whose engagement to Miss Rona Atley, of Geraldton, was announced last month.

Cadet Inspector R. McKay has been transferred to Pemberton to assist at the trout hatcheries for approximately three months from May 24.

Fauna Protection Officer H.B. Shugg and Technical Officer J. Traynor carried out a survey of sections of the 600,000-acre flora and fauna reserve north and east of Bremer Bay. A brief report of the survey is published elsewhere in this issue.

Inspector N.E. McLaughlan resumed duty after annual leave on May 15.

Technical Officer L.G. Smith will leave for Albany on June 1 to continue the estuarine research programme. The following week he will be at Mandurah and Bunbury, and towards the end of the month will visit Shark Bay to carry out a mullet tagging programme.

PERSONAL PARS

Dr. M. Blackburn, Principal Research Officer of the Division of Fisheries and Oceanography, C.S.I.R.O., Cronulla, N.S.W., who in the interregnum between the retirement of Dr. Thompson and the appointment of Dr. Humphrey acted as Chief of that Division, has now resigned to take up the appointment of Professor of Marine Biology at the University of Hawaii, Honolulu.

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Mr. C.G. Setter, Assistant Director of the Commonwealth Fisheries Office, Department of Primary Industry, Canberra, will visit Western Australia early in June for discussions with the whaling companies operating in the State.

OBITUARIES

Our sincere sympathy is extended to Inspectors A.J. Bateman and C.R.C. Haynes and their bereaved families.

Mr. Haynes' father died on May 17 following a serious illness. The Department was represented at the funeral by the Clerk-in-Charge (Mr. B.R. Saville) and the Supervising Inspector (Mr. J.E. Bramley).

Inspector A.J. Bateman, who was seconded to the research vessel "Lancelin" during Inspector Haynes' absence on compassionate leave, received notification by radiogram that his father-in-law had died suddenly.

MOVEMENTS OF DEPARTMENTAL VESSELS

The p.v. "Garbo" has been refitted and has had a complete engine overhaul and is now in excellent condition. She was used last month for trawling experiments and will remain in the Fremantle district for the time being. Her crew has not yet been allocated.

The research vessel "Lancelin" will arrive at Geraldton today after completing the Exmouth Gulf prawn work. After slipping she will sail for Fremantle, where her engine will undergo a major overhaul.

P.V. "Kooruldhoo" is still at the Abrolhos patrolling the crayfisheries there. She will not return to Fremantle until about August 31.

FISH STICKS SURVEY

Following on the greatly increased demand for fish sticks in the United States, the Fish and Wildlife Service of the Department of the Interior recently conducted a survey amongst homemakers to ascertain just how popular breaded shrimp and fish sticks were. Although the survey was made only in the United States, it is of interest to us as the demand for fish sticks in other countries, principally Britain, Canada and South Africa,

appears to be increasing and it seems probable that there would be a ready demand for them in this country.

The survey, in its 44 questions to the homemaker, endeavoured to find out what percentage of the population had tried fish sticks and breaded shrimp, and whether those that did not buy them were influenced by any particular reason.

From those who had tried the prepared products the survey asked whether they were to their liking as regards quality and size and how many times a month they were served at home or bought in restaurants, and so on.

Among the many interesting conclusions drawn from the summary were -

(1) only one homemaker in five bought breaded shrimp;

(2) fish sticks were used in less than 40% of all American households;

(3) 85% of those families which tried them were satisfied with them;

(4) consumers were indifferent about the variety of fish used in making fish sticks;

(5) neither breaded shrimp nor fish sticks replaced directly other fish products;

(6) the prospects for extending the market were favourable.

Another very interesting fact revealed by the survey was that the American public was not concerned by the price, that is, those who did not buy them were influenced by reasons other than the cost, although of all families with annual incomes of less than $2,000 only 20% were fish-stick purchasers.

In this State the price of the product would be more likely to affect sales than in the higher-level American economy.

The above information was issued as Fish and Wildlife Service Leaflet No. 424, and any inspector can borrow it on application to this Office, providing that he returns it reasonably promptly.

GOOD PRAWN HAUL

Advice received from Captain H.C.W. Piesse, of the research vessel "Lancelin", intimated that early in May approximately 1,000 lb. of banana prawns was landed in one haul. Captain Piesse said that it took 2½ hours to get the cod end aboard.

Although he did not give the locality where the good haul was made, it is understood that it was in Exmouth Gulf near Learmonth. The "Lancelin" was not able to remain long in the vicinity for further testing as she had to return to Onslow before proceeding to Fremantle for refitting.

PRAWNS IN W.A.

It will be remembered that earlier this year, Mr. W. Dall, of the Division of Fisheries and Oceanography, C.S.I.R.O., visited Western Australia from Cronulla to make a preliminary report on the prawn resources in this State.

Mr. Dall subsequently submitted his report, and the Department felt that the subject-matter was of sufficient interest to the staff generally to warrant the publication in the Bulletin of a condensation of it. The following, which has been condensed from the original report, has been approved for publication by Mr. Dall's chief (Dr. G.F. Humphrey).

It must be remembered that Mr. Dall was aboard "Lancelin" for just a few weeks, and his report covers observations made only during that short time. Any conclusions drawn are, of course, largely tentative, and may be subject to alteration when a final report is issued.

Preliminary Report on Western Australian Prawns

Introduction.

In 1952 the Fisheries Department Research Vessel "Lancelin", under the command of Captain H.C.W. Piesse, commenced a prawn survey from Fremantle to Broome. Mr. K. Godfrey, an officer of the Division of Fisheries (now Division of Fisheries and Oceanography), C.S.I.R.O., accompanied the vessel for this and subsequent surveys.

Although the survey was made during winter, the least favourable part of the year for a prawn survey, the results were promising. During the following winter (1953) the survey was concentrated in the Exmouth Gulf area. This region provided a certain amount of shelter as well as suitable trawling grounds necessary for the development and testing of fishing gear. The work was resumed, and extended, during the winter of 1954. It then became obvious that a summer survey was essential, and it was decided that the survey should cover the period September, 1955, to May, 1956. A refrigerated fishing vessel, D.S. Hunt's "Jon Jim", accompanied the "Lancelin" for the first few weeks of the cruise to examine the possibilities of catching and freezing prawns commercially. Results during the early part of the cruise were encouraging and it appeared that Exmouth Gulf might have a good commercial potential. Subsequently Mr. Dall, who had had previous prawn research experience, visited Western Australia and joined "Lancelin" in Exmouth Gulf. While in the State he also visited Peel Inlet to examine the commercial species there. This followed suggestions from local residents that the present methods of fishing were having a detrimental effect on the prawn stocks.

Physical Considerations.

Western Australia experiences a hot dry summer which has a considerable effect on coastal hydrological conditions. These in turn have an effect on prawn populations. In the lower North-West there are numerous sheltered inlets which terminate in salt pans, and in these inlets salinity sometimes becomes so high that most marine animals are excluded. On coasts with a high summer rainfall, similar sheltered inlets are

favoured by the juveniles of a number of prawn species. However, Western Australia is without such a rainfall and, therefore, although the topography of much of the north-west and west coast would appear favourable, the prawn population is more restricted than on the east coast of Australia.

The Peel Inlet estuarine system resembles many systems on the east coast. Towards the end of summer the salinity of the Inlet by evaporation rises above that of the sea water outside. At the same time the upper layers of the water in the Murray River have a salinity only about half that of sea water, but the salinity of the bottom layers is similar to that of sea water. The high salinity of Peel Inlet in late summer may be responsible for the paucity of prawns there, and possibly is the reason that they are confined to the Murray River, where most of the catch is made at this time of the year.

Biological Considerations.

(a) Peel Inlet

The principal species caught here is called locally the "school" prawn, Metapenaeus mastersii (Haswell), known in eastern Australia as the green-tail or greasy-back. There is some evidence that the western and eastern M. mastersii are distinct sub-species.

All the prawns taken for examination were caught in the Murray River in shallow water at night during January and early February. They were sexually mature, and a large proportion of the females was ripe and impregnated. This indicated that spawning occurred in the Murray River near Ravenswood. The spawning of this prawn so far up an estuarine system is most unusual, especially in a region with a low-salinity surface layer into which prawns move at night. However, post-larval prawns about half an inch long have been known to penetrate up a river into nearly fresh water, and and it is quite likely that the upper regions of the Murray River have a large juvenile population.

Large annual fluctuations are common in most prawn fisheries. The peculiar hydrographical nature of Peel Inlet and its rivers is likely to cause

even greater population fluctuations than occur elsewhere. The larger prawns have moved far up the system by the time winter flooding takes place and are likely to be subject to a greater mortality. At Peel Inlet it is alleged that full-size prawns are not obtained until well into summer. If this is correct it is likely that a population of only small juveniles survives winter and provides the late summer catches. A prolonged winter with flooding could have a marked effect on such a population.

It is of interest that the fishery is confined to the hours of darkness. In the Brisbane River (Queensland) this species is most often caught with small trawls during daylight. Some trawling at dusk and at night is also done, usually in the upper reaches of the river. It would be of interest to use a beam trawl (not more than eight feet across) in the Murray River during daylight.

(b) Exmouth Gulf

The species caught here are the tiger prawn, Penaeus esculentus (Haswell), the banana prawn, P. merguiensis de Man, and to a much lesser extent the king prawn, P. latisulcatus Kishinouye, and the brown or endeavour prawn, Metapenaeus endeavouri Schmitt. A few specimens of M. mastersii also appear sporadically. Two Trachypenaeus species and a Metapenaeopsis species are also common at night. However, these are too small to be of commercial interest.

Numerous trawls with a small frame trawl were made in shallow water in Exmouth Gulf and in Beadon Creek (Onslow) and Wapet Creek. The salinity of water sampled in these regions was very high and probably explains the paucity of post-larval stages. The younger stages seem generally to prefer sheltered water with plenty of algal cover, but as the salinity of all the numerous inlets of the Gulf is undoubtedly high, the bulk of the juvenile stages may be found outside. However, the Ashburton River, whose mouth is adjacent to Exmouth Gulf, is reputed to have an unusually large stream discharge compared with other north-western rivers. Moreover, it is common knowledge that small and medium size prawns can be caught in this river fairly readily. Unfortunately, it was not possible during Mr. Dall's visit to examine this river and adjacent waters,

and a large population of juvenile prawns may be present here. As these prawns approach sexual maturity, they could make their way down into the Gulf where spawning occurs. The high salinities would effectively bar the succeeding post-larval stages from moving to the southern part of the Gulf, and they would eventually move up the salinity gradient into the Ashburton River.

General Observations.

Present indications are that the tiger prawn will be the most regularly caught species in Exmouth Gulf, with the banana prawn comprising larger actual catches but extending over a much shorter season. Both these prawns, especially the latter, are excellent commercial species from all points of view. Unlike Peel Inlet, Exmouth Gulf should provide an extremely stable fishery. The average annual rainfall of the region is between 10 and 15 inches, and prolonged flooding of any of the "nursery grounds" is most unlikely.

However, as it is a spawning or pre-spawning population that would be fished, sudden short-term fluctuations should be expected. For example, in Moreton Bay (Queensland) prawns which have been abundant in an area for a few weeks suddenly disappear. They are then discovered in another locality nearby. The difficulty of tracing such movements may only be resolved by empirical methods. This would best be achieved by fishing vessels (preferably three or more) attempting to fish the area.

Mr. Dall considers it most unlikely that the existing method of fishing could appreciably deplete the prawn population of the Murray River. Several dozen small craft have been trawling for prawns in the Brisbane River (Queensland) for years without any apparent decrease in abundance.

As the prawns in Peel Inlet and Murray River are sexually mature at time of capture, and as all evidence suggests they do not survive a season's spawning, obviously there can have been no reduction in average size due to overfishing.

PAKISTAN'S PRAWN FISHERY

In the September, 1955, issue of "Commercial Fisheries Review", published by the U.S. Fish and Wildlife Service, was a report of the initial export of 5,000 lb. of shrimp (prawns) from Pakistan. It was stated that this was the culmination of two years of research, engineering and planning.

In view of the potential importance of the prawn fishery of this State (cf. "Prawns in W.A." elsewhere in this issue), the Superintendent wrote to the Director of the Central Fisheries Department in Karachi (Dr. M.R. Qureshi), whom he had met a few years earlier at a meeting of the Indo-Pacific Fisheries Council, seeking information in relation to this new industry.

Dr. Qureshi has now sent an informative reply, which is summarised here.

He says there is an unlimited demand from the U.S.A. for frozen shrimps, but that quite a long time must elapse before Pakistan can hope to cope with that demand. Firstly there is the difficulty with freezing. Dr. Qureshi points out that the present refrigeration setup in Karachi is the first of its kind in the country, and innumerable problems, principally technical, needed to be overcome before it functioned properly. There was the further difficulty of non-availability of the raw product, in either quantity or quality, a difficulty which will continue until mechanisation, or partial mechanisation, of the prawn industry is accomplished.

By reason of non-mechanisation, the fishermen are greatly restricted in their activities. At present they are able to work only in the creeks or shallow coastal waters with beach seines or cast nets. The fishery, it seems, is now limited to the winter months. Since the initial shipment of 5,000 lb. in June, 1955, shipments of 20,000 lb. each in February and March of the current year, have been made.

In reply to specific questions asked by the Superintendent, Dr. Qureshi has furnished the following facts -

(1) Ten different species of prawns have been observed in the commercial catches. The bulk of the take comprised Penaeus indicus, P. merguiensis (banana prawn, also taken by "Lancelin" in Exmouth Gulf), P. penicillatus, Metapenaeus monoceros and Parapeniopsis uncta.

(2) In the creeks the fishermen use beach seines and stake nets and in shallow coastal waters cast nets operated from a boat.

(3) Processing for export consists of removing the head and freezing the tails with shell on.

(4) The prawns are packed according to the number of headed prawns per lb. They start as small as 95-100 count per lb., and go up to 10-14 count per lb. The bulk of the export comprises three categories, viz. 30-35, 35-40 and 40-45 per lb.

(5) At the moment the alimentary canal is removed by hand. This is possible only if the prawns are beheaded soon after capture, in which case the canal is pulled out with the head.

(6) If the prawns are not cold, i.e., they have not been well iced before processing, freezing occupies up to 6 hours. If they have been chilled on ice freezing takes less time.

A further item of interest reported by Dr. Qureshi is the fact that a Karachi firm has commenced the canning of prawns. The product, he says, is very good, and exports have already been made to the United Kingdom. The prawns are packed in a salt solution in a 5-oz. (net weight) can.

DUCK BANDING

Due to the onset of winter rains with its consequent scattering of the wild duck population, and also to Mr. Traynor's being engaged on the Bremer Bay reserve survey, only 91 ducks were banded last month. These were all black duck banded at Queen's Gardens and Craig's Lake in the metropolitan area.

It is expected that very little further banding will be possible during the winter months and Mr. Traynor is engaged in completing new lightweight traps for use in the spring.

Recoveries : A further 9 bands were returned since the last issue of this Bulletin, 8 of them being black duck and one a grey teal.

The details are as follows -

Band No.	Date Banded	Place Where Banded	Date of Recovery	Place Where Recovered	Distance Travelled
			Black Duck		
1530	4.3.53	Queen's Gardens	Sep. '54	Rocky Lake, County Peak	80 miles
3283	3.2.55	Cape Riche	28.4.56	Cape Riche	---
3730	29.2.56	Queen's Gardens	27.4.56	Marrinup	35 "
3306	4.2.55	Cape Riche	26.4.56	Lot 1022, on a swamp near Narri-kup	61 "
3416	9.2.55	Cape Riche	10.5.56	Tudor Flats between Den-mark & Albany	77 "
3414	8.2.55	Cape Riche	5.5.56	Cape Riche	---
3278	3.2.55	Cape Riche	6.5.56	Cape Riche	---
			Grey Teal		
3809	23.3.56	Wardering Lake	28.4.56	Fitchets Swamp, 14 miles N. of Kojonup	10 "

SURVEY OF BREMER BAY RESERVE

Fauna Protection Officer H.B. Shugg and Technical Officer J. Traynor, accompanied by Mr. Ray Aitken, of Dumbleyung, last month carried out an inspection of sections of this reserve. The purpose of the survey was to ascertain whether there was on the reserve a sufficiently large mallee fowl population to make it unnecessary to reserve a further area for the protection of that somewhat rare species.

The party first travelled through the reserve down the No. 2 rabbit-proof fence which cuts the western end of the reserve. The country in the vicinity of the Fitzgerald River was inspected, first at the head of the estuary, and later at its junction with the Twertup River near Jonacoonak. Although extensive foot patrols were carried out in this latter region, it appeared that mallee fowl were not nearly as plentiful as had been reported. Six old nest-mounds were located, but no signs were seen of recent activity.

An attempt was made to enter the Twertup Creek area from a track off the Ravensthorpe Road, but after proceeding for some miles, the track disappeared in very rough and unpromising country and this traverse was abandoned.

Following local information, a visit was paid to the gorges and estuary of the Hamersley River, south-west of Ravensthorpe. In this wild and isolated country, which is said to have been at one time among the most picturesque in Australia, a few old mounds were located, but a great section of the best area had been burnt off. Mr. Aitken estimated that the habitat would not be restored to a condition suitable for mallee fowl for approximately 20 years. Other very large sections of the reserve had also been burnt - a lot of it, as at the Hamersley, since December of last year.

The party returned on the Ravensthorpe - Magenta - Pingrup track and passed through mallee and moort thickets which were considered to be ideal for the preservation of mallee fowl. Two old mounds and one live bird only were seen as no foot patrols were made due to lack of time and the fact that this area had

been surveyed by other parties in recent years. The absence of burnt areas was most noticeable, attributable to the fact that its geological character does not attract prospectors.

The opinion was formed that the Bremer Bay reserve is principally a flora reserve and although it harbours a wide variety of bird life, it does not, at least in its present condition, contain sufficient suitable areas to guarantee the conservation of mallee fowl.

The party was engaged on its survey for a period of one week, and travelled 378 miles in the reserve or adjacent country by land-rover and covered a lot of ground on foot.

ARTICLES OF INTEREST AVAILABLE

In previous issues of this Bulletin, in March and April, 1956, the titles of interesting articles and the name of the publication in which they appeared, have been notified so that inspectors could borrow them if they wish. So far, no inspector has availed himself of this service and unless more interest is shown, it will be discontinued.

The articles were selected for their general interest and especially for those officers who wish to keep abreast of news of fish, and fishing, overseas. They are too long to be reproduced and made available with these Bulletins.

The following further articles are now available :-

(12) "The Where and Why of Albacore" - "Pacific Fisherman", March, 1956.

(13) "Asdic in the Fishing Industry" - "World Fishing", March, 1956.

(14) "East Anglian Herring Failure" - "World Fishing", March, 1956.

(15) "Fiberglass Facts and Knocks" - "Field & Stream", March, 1956.

(16) "Whither Trawler Design" - "Fishing News", March 16, 1956.

(17) "Changing Trends in Trawler Design" - "Fishing News", March 23, 1956.

ABROLHOS CRAYFISHERY

The catch figures for the Abrolhos Islands for the months of March and April are set out in the accompanying table. Although the season opened on March 15 there was a week's delay in the commencement of operations due to the after effects of the March cyclone. This is reflected in the low overall catch and the low catch per man in March. However, the following month, April, a record catch, which retrieved the position considerably, was achieved. The percentage decrease for the two months combined was 8.1 whereas the decrease for March alone was 46 percent.

The overall catch for North Island was greater than for the same period last year, but this was due to the increased number of men fishing. At North Island the catch per man in March and April of this year was lower than the corresponding period last year. In the Wallabi and Easter Groups the overall catch was slightly less than last year, but both Groups were able to boast a greatly increased catch per man for the month of April. The Pelsart Group figures also show a decreased overall catch, but unlike the two previous groups there was not an increased catch during the month of April. However, the decrease is not as real as it may appear but is mainly due to the smaller number of men operating. As a matter of fact the catch per man in April of this year was greater than that of April, 1955.

ABROLHOS CRAYFISH CATCH, 1955 and 1956

GROUP	1955			1956			Increase or Decrease
	March*	April	Total	March*	April	Total	
	lb.	lb.	lb.	lb.	lb.	lb.	%
North Island	57,691	104,424	162,115	49,383	175,989	225,372	+38.9
Wallabi	168,872	251,762	420,634	84,905	293,483	378,388	-10.0
Easter	204,917	268,721	473,638	105,935	347,619	453,554	-2.1
Pelsart	182,384	228,087	410,471	91,882	199,737	291,619	-28.8
Totals ...	613,864	852,994	1466,858	332,105	1016,828	1348,933	-8.1

CATCH PER MAN, 1955 and 1956

GROUP	No. of Men				Catch per Man			
	1955		1956		1955		1956	
	March	April	March	April	March*	April	March*	April
North Island	20	20	31	36	2,884	5,221	1,593	4,888
Wallabi	40	41	40	38	4,222	6,140	2,123	7,723
Easter	48	48	38	41	4,269	5,600	2,788	8,478
Pelsart	43	49	33	38	4,241	4,654	2,784	5,255
Abrolhos	151	158	142	153	4,065	5,398	2,338	6,646

* Season opened March 15.

THE CLEARING HOUSE

What Antibiotics Promise-

Higher Fish Quality Over Longer Periods

Condensed from a paper by
Alex S. Malaspina

Foods spoil through a number of independent mechanisms such as oxidation, desiccation, enzymatic action, and, most important of all, microbial growth.

Methods devised to prevent spoilage usually change the flavour, consistency, and general character of the food. Freezing has been successful for preserving food in a nearly unchanged state. Refrigeration, the most common method of preservation, will keep a food product fresh but for a very limited period of time. However, prior to the discovery of antibiotics, no non-toxic chemical compound was available which, in very minute quantities, would extend the storage life of a food in the fresh state by effectively inhibiting bacterial growth.

The term antibiotic currently used designates a metabolic product of a microorganism that is detrimental or inimical to the life activities of other microorganisms.

Antibiotics such as oxytetracycline and chlortetracycline, which are active against a large number of bacteria, both anaerobic and aerobic, are said to have a broad antibacterial spectrum.

When added to foods at practical low levels, these antibiotics are not bactericidal but bacteriostatic. They effectively inhibit growth and development. Thus, they do not sterilize the food but depress the rate of bacterial spoilage, thereby prolonging the normal storage life of the product. For best results, they should be used in conjunction with refrigeration. Antibiotics are effective only when the food processor practises good sanitation and cleanliness. They can not be used to disguise spoilage

that has already occurred or to reclaim heavily contaminated food. It has been established that the low levels of antibiotics used in foods in no way effect the colour, texture, flavour or odor of the product.

Many very promising studies have been conducted on the use of antibiotics in fish.

While antibiotics may reduce spore counts of Clostridium botulinum, it is still an open question whether they can be relied upon to produce, with reduced retort heat-treatment, complete sterilisation in canned foods.

In fish antibiotics will play an important role. Of the three types of spoilage that occur in fish, bacterial, oxidative and enzymatic, the first one is by far the most important. The use of antibiotics will greatly assist in extending the freshness of fish and in eliminating important economic losses to the fishermen and fish industry. Not only will the fisherman be able to stay at sea longer and thus obtain a larger quantity of fish, but also the quality of the fish, when sold, will be considerably improved. The use of antibiotics will almost double the normal storage life of fish and will permit a longer interval between catch and consumption.

The antibiotic treatment should start immediately after the fish have been caught.

The method of storing fish on boats or on shore in refrigerated salt water has been applied to some extent. A quantity of about 1 ppm of a broad spectrum antibiotic, added to the salt water, will be inhibitory to the bacteria and the fish may remain fresh for extensive periods of time.

A second procedure for adding an antibiotic is to dip the fish very briefly in a 50 to 100 ppm solution of antibiotic just before icing to inhibit the surface bacteria.

The third and most practical method of employing an antibiotic is to incorporate it in the ice used for packing the fish. The quantity of the broad spectrum antibiotic in the ice should be about 5 ppm.

Finally, it seems probable that by combining the method of dipping the fish briefly in an antibiotic solution with that of storage under antibiotic-ice maximum bacterial inhibition may be accomplished.

Antibiotics are more effective against bacterial spoilage in eviscerated fish than in non-eviscerated whole fish since they cannot penetrate the flesh of round fish sufficiently to be able to combat the bacteria inside the viscera.

Fillets are usually dipped in a brine solution before the freezing operation. It may be very beneficial to add an antibiotic to the brine at about 5 ppm. No change in processing would be required. It may be of considerable advantage to add an antibiotic to the water used for thawing the fish to inhibit the rapid bacterial growth during and after thawing.

The addition of 1 to 2 ppm of an antibiotic to shell fish in the raw or cooked state may materially increase its quality, and may insure against pathogenic bacteria.

When a new process or chemical agent is found to have application in food processing, investigations as to its complete safety of use are mandatory. In general, the broad spectrum antibiotics are destroyed in cooking. It is believed that even if a few ppm or a fraction of a ppm of an antibiotic remain in the food, no harmful effects will result.

Sensitisation to the broad spectrum antibiotics is extremely rare as compared to other antibiotics.

When there is substantial evidence that in the antibiotic-treated food there is no residue remaining prior to consumption because of inactivation due to storage and/or cooking, then clearance can be obtained from the Federal authorities for the use of the antibiotic in that particular food.

It is believed that antibiotics will find extensive applications in the fish industry and will probably be used in combination with other methods of

preservation. Antibiotics should play an increasingly important role in preventing spoilage losses and thus will give the peoples of the world safer foods in greater variety and at lower costs.

(Dr. Malaspina is a member of the Technical Service Department of Chas. Pfizer & Co., who delivered the paper from which this article is condensed before a recent meeting of the New England Fisheries Technologists in Boston.)

("Pacific Fisherman" Portland, Oregon April, 1956)

Aureomycin Tuna Tests Conducted by Japanese

Experimental use of aureomycin for the protection of quality of tuna held in ice aboard the fishing vessel is being tried in Japan under the sponsorship of Lederle (Japan) Ltd., an affiliate of Lederle Laboratories and American Cyanamid Corporation.

The tests are being directed by Professor Toyama of Kyushu University, who asked Yamaguchi-ken Gyogyo Kosha, incorporated by the coastal fisheries co-operatives of Yamaguchi Prefecture, to perform the experiment aboard two of its newly-built tuna clippers. These are the vessels Bocho Maru Nos. 1 and 2.

The vessels are using ice made with 6 gr. of aureomycin per ton for packing tuna, and will compare the landed quality with that of fish from the same catches carried in untreated ice.

Another experiment carried-out on the same vessel involves injecting a solution of the antibiotic in water into the visceral cavity of the fish.

The tests are being made in the course of a fishing trip to the Indian Ocean.

Taiyo Gyogo's laboratory at Shimonoseki is also experimenting with the antibiotic.

("Pacific Fisherman" Portland, Oregon April, 1956)

Control of Units of Gear Prime Conservation Problem

> How to control the number of units of fishing gear, and thus the intensity of fishing, without doing violence to democratic processes and American concepts of law and equity?

Task of seeking the solution to this riddle was shouldered this spring by the interim fisheries committee of the Washington legislature, acting on the suggestion and at the insistence of J.F. Jurich, secretary, Local 3, Fisheries Division, I.L.W.U.

The proposal was warmly supported by Joe Burrows, president of the Puget Sound Gillnetters Association.

Determination to study ways and means by which gear limitation might be accomplished, and to start the research with a request for opinions and analysis by the Washington attorney-general, marked the Seattle hearing of the legislative interim committee at the end of February.

"Control of the number of units of active fishing gear is the heart of the present problem of fisheries conservation and rebuilding", Mr. Jurich told the legislative committee. He pointed out that regulations which seek to limit intensity of fishing by seasonal restriction may fail to provide the escapement sought, and be entirely ineffective as a means of biological rehabilitation; while limitation upon the size and type of gear units without control of their number encourages economic disaster.

Mr. Burrows contended that thorough study of the problem would produce constitutional means of control, perhaps along the line of the franchise method.

Possible development of a legal means by which intensity of fishing could be controlled through limitation on units of gear active was considered of wide potential importance, reaching far beyond the limits of the fishery of a single state. With the Washington interim fisheries committee addressing itself to the task, there appeared encouraging possibility that a formula

might be found; and the certainty that under the drive of Representative Chet King, chairman, the possibilities of solution would be thoroughly explored.

("Pacific Fisherman" Portland, Oregon April, 1956)

Sarah is Only a Little Tyke but She Could Save Your Life

Meet SARAH. She's not pretty, and she can't cook, but she could save your life someday.

She weighs less than three pounds, and at best is a strange looking creature, but her voice can be heard for many miles, and she certainly won't cost you much money.

SARAH is a tiny radio transmitting set invented recently in England, and soon to be used by the RCAF Rescue Service. It is an electronic marvel which sends out a strong, clear signal to special receiving sets in search planes or crash boats.

Her name is a letter-abbreviation of Search and Rescue and Homing, and she is essentially a small transmitter or "beacon" carried by the survivor which is capable of sending signals on a special frequency for 66 miles in all directions, to be picked up by "homing" equipment on search craft.

SARAH's use to fishermen is obvious. If a boat is wrecked on a remote section of the coast or sinks offshore, the little radio beacon will send out signals to all rescue planes or boats immediately. Wide searching over large areas will be unnecessary. Search craft will be able to pinpoint the survivor or wreck instantly as soon as the signal is received.

The equipment is being manufactured in Canada by Canadian Aviation Electronics Ltd., and is being distributed to the marine field in B.C. by Sounder Sales and Service, of Vancouver. RCAF units based in B.C. will be installing the new devices around the end of March. Seven receiving units will be installed in RCAF search planes, including three at Sea Island, one at Comox, and one at Pat Bay.

The part of the apparatus of interest to fishermen is the transmitter - a marvel of modern electronic engineering. In spite of its small size, it is unbelievably rugged. It is completely impervious to water, and a temperature range of 58° below zero to 158° above zero has no effect on it.

The beacon itself weighs just 7½ ounces complete with folded antenna. The power supply battery weighs only 29 ounces. The necessary connecting cable and the coding unit weigh 8 ounces. If you want a two-way radio-telephone communication unit, you can buy a 12-oz. speech modulator and receiver unit.

On fishing vessels, the radio could be stowed with the life-saving equipment, or attached to a boat or dinghy.

The entire unit is small enough to be carried in a pocket. The beacon will transmit for twenty hours continuously. Retail price in B.C. will be around $160.

("Western Fisheries" Vancouver B.C. March, 1956)

Rubber Gas Drum May Solve Fuel Problems

Those in the fishing industry who are faced with problems of transporting gas and oil in large quantities may find a solution in a recent innovation of the Goodyear Tire and Rubber Co.

It is a 250-gallon rubber tank shaped like a watermelon, which can be rolled over the ground, floated in water and dropped without bursting.

Called the Rolli-Tanker, the new drums are unconventionally-shaped tires of nylon cord and tread with fuel-proof inner lining. They can be built in a range of sizes, but to date the firm has only tested a 3½x5-foot tank that weighs 40 pounds deflated.

The rubber tanks can be rolled along the ground easily by one man, requiring only 30 pounds pull, and have excellent flotation characteristics because of extremely low ground-bearing pressure.

The natural buoyancy of the Rolli-Tankers allow them to be floated without trouble when properly filled. During recent tests, fully-loaded tanks were dropped 15 feet without bursting, giving preliminary indication that they may be suitable for parachute of free-fall droppable containers.

("Western Fisheries" Vancouver B.C. March, 1956)

Potential Industry from Lobster Shells

A potential million-dollar industry for the Maritimes by the utilisation of lobster shells for the manufacture of a rayon-like material is foreseen as a possibility by Dr. Henri Fougere of Halifax, director of the Atlantic Technological Station of the Fisheries Research Board.

Dr. Fougere's announcement was made as district protection and inspection officers gathered in Halifax for the general session of the annual Maritimes Area conference of the Federal Department of Fisheries.

From the lobster shell it is possible to extract a substance called "chitin" from which can be manufactured fibres which can be processed into a rayon-like material with water-repellent properties, Dr. Fougere told the meeting.

Other speakers at the meeting included J.J. Lamb of Ottawa, Director of the Department's administrative service; E. Blyth Young of Ottawa, assistant chief protection officer for the Department; and Dr. J.L. Hart, director of the Atlantic Biological Station at St. Andrews, N.B.

Chairman of the conference was Loran E. Baker, Chief Supervisor of the Department for the Maritimes Area.

("Fishing Gazette" New York March, 1956)

Rare Fish Caught at Great Depth in New Zealand Waters

Zoologists at Victoria University College, Wellington, report that they have hooked a white skate - the first of its kind ever seen - from a depth of 7,380 ft. in Cook Strait, between the two mainland islands of New Zealand.

The skate, 4½ft. long and 3ft. across, had needle-sharp teeth and large translucent eyes, but lacked the vicious spines which are the normal equipment of the skate family.

Another find was a five-inch long squid with a bulging eye, which has so far eluded classification.

The zoologists also hooked at the same spot a black whale fish, scientifically classed as one of the rarest groups of fish. Measuring just over 2in. in length, it was the 31st of the species every found and the first to be caught in the Pacific. It was equipped with rows of phosphorescent lights and comb-like rows of tiny teeth.

("The Fishing New" London April 20, 1956.)

Singapore Fisheries Have Been Revolutionised

Singapore fishing fleet has been revolutionised in the last five years.

Production of fish from offshore grounds has risen from nil in 1950 to 2,000 tons annually.

The establishment of a fisheries loans fund in 1951 provided suitable craft and gear with which to extend fishing operations into offshore grounds. The fleet is now mecahnised on a scale unapproached by other countries in the region.

("The Fishing News" London March 9, 1956.)

Whaling Quotas May be Further Reduced for Next Season

Fishing experts in many countries are inclining increasingly to the view that if whaling in the Antarctic is sustained at the present high tempo the time is approaching when it will become uneconomical. Although under the Moscow Convention the "ceiling" catch of baleen whales this season will be only 15,000 units (500 fewer than last season), more than 200 catchers from 19 fleets (representing seven countries) will hunt whales in the ice. Many of the fleets have increased their number of catchers.

According to Dr. J.M. Marchand, South African Director of Fisheries, who attended the Moscow Convention this year, scientists consider the quota is still too high. There is no fear that the whales will be exterminated in the Antarctic, because long before it reaches that stage whaling would be reduced to an uneconomical level. To avert this, it is proposed to reduce the quota by another 500 units for the 1956-7 season, but there is doubt that it will go through at the next convention.

The Netherlands objects to the proposal. If the Netherlands is not prepared to reduce its catch other nations will be forced - for competitive reasons - to turn down the proposal.

South Africa is strongly in favour of reducing the quota in the 1956-7 season. At the last convention the Netherlands and Panama (the Onassis fleet) voted against the present reduced quota, but they did not lodge an objection (which they were entitled to do within 90 days) when it was made law.

("The Fishing News" London April 27, 1956.)

Rich Tuna Fishing

Recent trips of Japanese longliners to the Indian Ocean are reported to have found exceptionally fine fishing, with catches running from 12 to 14 yellowfin per set of 100 hooks. This is far higher than the Japanese have ever reported from any other grounds, where they usually have found it profitable to fish at a catch rate of around 2 fish per 100 hooks.

("Pacific Fisherman" Portland, Oregon March, 1956)