



FISHERIES DEPARTMENT, WESTERN AUSTRALIA

MONTHLY SERVICE BULLETIN

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STAFF NOTES

The Superintendent (Mr. A.J. Fraser) and the Clerk-in-Charge (Mr. B.R. Saville) left for an inspection of the Bunbury and Busselton areas on August 29. They had a discussion with the President of the South West Fishermen's Association at Busselton and at Bunbury met some of the local fishermen. They afterwards inspected a fish farming project on land between the Collie River and Leschenault Inlet. The following day they left for Pemberton to attend the Annual General Meetings of the Pemberton-Warren Trout Acclimatisation Society and the Trout Acclimatisation Council of W.A. These meetings were also attended by the Research Officer (Mr. B.K. Bowen).

The Supervising Inspector (Mr. J.E. Bramley) visited Shark Bay and the new Dirk Hartog crayfish grounds last month. He was accompanied by Technical Officer J. Traynor, who investigated possible duck banding sites in areas adjacent.

The Superintendent will commence annual leave on September 9.

Other officers proceeding on annual leave this month include Inspector N.E. McLaughlan on September 2; Technical Officer J. Traynor and Inspector H.J. Murray on September 9, and Inspector A.V. Green on September 23.

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Inspector A.K. Melsom commenced leave last month and will resume duty on September 16.

Inspector R.M. Crawford, of Geraldton, plans to start his annual leave on October 21 and Research Officer B.K. Bowen will commence his about nine days later.

Technical Officer L.G. Smith will carry out tagging and sampling of black bream in the Bunbury district this month as part of the research programme aimed at establishing distribution, growth-rates, maturity data and spawning areas of this species.

Assistant Inspector S. LaRoche was transferred to the Mandurah district on August 27.

Inspector J.L. Gallop has forfeited his office in the Service.

OBITUARY

On August 15, Mr. G. Saville, father of Mr. B.R. Saville, passed away. To all the bereaved we extend our sincere sympathy.

PERSONAL PARS

On August 10, Dr. G.F. Humphrey, Chief of the Division of Fisheries and Oceanography, C.S.I.R.O., left for duties overseas. He is not expected to return to Australia until November 7, and during his absence Mr. J.M. Thomson will be Acting Chief of the Division.

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Mr. A. Uyama, Counsellor of the Embassy of Japan, Canberra, called at Head Office on August 6. The following day he left for Onslow and Broome, to investigate conditions appertaining to his nationals engaged in the pearling industry. While in Broome he

met the Superintendent (Mr. A.J. Fraser), who had just completed an inspection of pearl culture operations in the Kimberleys.

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Mr. R.S. Spencer, B.Sc., a hydrologist on the staff of the Division of Fisheries and Oceanography, C.S.I.R.O., Cronulla, N.S.W., who spent some years in this State and is well known to the majority of our staff, has resigned from the Organisation to accept an appointment with the Institute of Agriculture at the University of W.A. He is expected to take up his new post during the first week of September.

ABROLHOS CRAYFISH PRODUCTION

The table on page 126 reveals that the progressive catch at the Abrolhos up to the end of July this season has already exceeded the previous record total catch for the area. The July production this year of over 300,000 lb. is also a record for that month, the previous highest total being in 1954 when 263,292 lb. was taken. It is expected that the total production this year from the greater Abrolhos area will be almost 3,000,000 lb.

The weather in July was quite good, as it obviously must have been to allow the very satisfactory catch per man at most groups. It will be seen that the production at the Southern Group increased only slightly compared with the number of men, thus causing a decline in the average catch per man for the month, but this was the only group where the average was less than last year.

While the number of men working in July was only one more than in the previous year, the average for the season would be much greater and our records show that the number of pots in use this year was considerably greater than in 1956, the respective figures being 3,633 in 1957 and 3,252 in 1956. This is indicative of the higher level of fishing intensity throughout the industry which is causing concern in informed circles, that the saturation point may have been reached, or even passed, and the economic future of the industry endangered.

ABROLHOS CRAYFISHERY

AREA	JULY, 1956			JULY, 1957		
	No. of Men	Total Catch	Catch per Man	No. of Men	Total Catch	Catch per Man
		lb.	lb.		lb.	lb.
North Island	27	29,713	1,101	17	22,674	1,334
Wallabi Is.	41	65,926	1,608	31	67,795	2,187
Easter Group	38	36,548	962	55	136,832	2,488
Southern Group	35	75,757	2,170	39	79,375	2,035
TOTAL	141	207,944	1,474	142	306,676	2,159

TOTAL FOR FIVE MONTHS 1956 .. 2,327,232

TOTAL FOR FIVE MONTHS 1957 .. 2,828,212

FREMANTLE CRAYFISHING AREAS CLOSE

When crayfishing in the Fremantle-Lancelin-Cervantes-Jurien Bay districts closed on August 31, returns from all fishermen were not to hand, but it was anticipated, from information already received, that the 1956/57 season production would be shown to have exceeded that of the previous season by 500,000 lb., approximately.

The record catch of 7,250,000 lb., taken in 1954/55, will not be surpassed by the catch this year, which is estimated at 7,000,000 lb. While a poor season had been experienced at Lancelin, the catch in the Green Head and Green Island areas has been excellent and elsewhere was slightly over 1955/56.

DIRK HARTOG CRAYFISHERY

As inspectors will remember, a promising new crayfishery in the vicinity of Dirk Hartog Island has been developed this year. The number of vessels operating there during the winter varied from 9 to 12, and one vessel operated all last summer.

It has been suggested that this newly worked ground, which is populated mainly by larger-size crayfish, is responsible for re-populating grounds farther south and that measures aimed at protecting spawning females should be introduced.

The opinions of fishermen on this matter will be sought by the Advisory Committee before any recommendation is made to restrict fishing operations.

FISHERMEN'S ADVISORY COMMITTEE

On September 5 a meeting will be held at Fremantle to gather evidence and to discuss measures which should be taken to conserve the Fremantle-Lancelin-Cervantes-Jurien Bay crayfishery.

On October 16 the Committee will hold its annual meeting in Geraldton to obtain views on the conservation of the Geraldton-Abrolhos crayfishery.

TRAWLING IN THE BIGHT

As reported in a previous issue of this Bulletin, the Commonwealth Government has decided to equip a modern vessel to carry out an investigational programme which could lead to the establishment of a big trawling industry in the Great Australian Bight. The Commonwealth's decision to base operations at Port Adelaide has not been well received in this State. There seems to be a general feeling here that the part played by the Western Australian Government in pioneering trawling operations in the Bight, and the suitability of Albany as a base, possessing as it does a fish processing works capable of rapid expansion, had been overlooked in a manner all too familiar to Western Australians.

It was pointed out that this State was the only one which had carried out any serious research projects aimed at establishing new fisheries and developing offshore resources, but it looked very much as if other States, which had done little to develop their fisheries, would gain at the expense of W.A. This would be a bitter pill to swallow, when it was remembered that the moneys for this Fund were obtained solely from the sale of the Western Australian-based whaling station.

CRAYFISHERMEN LOSE THEIR ACCESS WAY

The Supreme Court of Western Australia recently, on the motion of a pastoral company, granted an injunction against crayfishermen crossing the company's property near Yanchep. The track, which was said to be the only access available, was previously used by fishermen operating at Two Rocks.

The company claimed that the fishermen were ruining a sand track and continually left gates open, thus interfering with its pastoral activities.

PROGRESS IN PEARL CULTURE EXPERIMENTS

After his recent visit to the areas north of Derby leased to Pearls Pty. Ltd., the Superintendent reported that the Company's operations appeared to be promising and that the programme was running just about on schedule. Mr. Fraser, who was accompanied by Inspector R.J. Baird, of Broome, and the W.A. Manager of Brown and Dureau Ltd., agents for Pearls Pty. Ltd., was conveyed to the grounds on the Company's chartered vessel, the "Otama Maru".

The Station is situated at the head of a small bay known locally as "Kure Bay". It is almost entirely surrounded by sheer cliffs and jungle-like timbered country, through which one or two freshwater creeks emptied into Brecknock Harbour.

The shell when treated is laid out on wire trays suspended from rafts made from W.A. pine saplings mounted on 44-gallon oil drums. The rafts are secured by a number of conventional anchors.

The scientist in charge of the Station, Dr. Iwake, told the Superintendent that the quality of the locally cultured pearls gave every indication of being superior to those produced in a different type of oyster in Japanese waters. Dr. Iwake was hopeful that it would be possible to build up the industry in this State to one approximating that of Mikimoto in Japan which, he said, had exported \$115,000,000 worth of culture pearls to the U.S.A. in the 50 years that it had been operating. Pearls Pty. Ltd. has extended an invitation to the Minister and to the Superintendent to visit the Station next winter.

CRAYBAIT PROBLEMS

With unhappy memories of last season's craybait shortages much in their minds, buyers are already casting about for supplies to meet the expected demands of the coming season.

A dearth of salmon heads, due to a run of smaller-size salmon during the autumn-winter of this year, may greatly aggravate the situation which might become serious if nothing were done to meet it.

One South-West family of fishermen, ever on the alert to gain an extra penny or two, is capitalising on the present state of affairs. Their contribution to the welfare of the crayfish industry is cobbler heads. Thousands of these are clipped of their stings, boxed and sent on to cold storage at Fremantle.

Sevenpence a lb. is being paid, and already over £200 has been netted by these wide-awake and industrious people.

It's hard, messy work, preparing the heads, but the reward more than compensates for the labour expended.

INTERSTATE FAUNA CONFERENCE

Advice has been received that the above Conference which was to be held on the week commencing September 23, has been postponed until November, due to the ill health of Mr. F.J. Griffiths, Chief Guardian of Fauna, Sydney.

MAINLAND QUOKKAS

In May this year, the first specimens of quokkas secured on the mainland in the last 22 years were obtained in the Gleneagle Forest area, near Byford. Although reports had been received from time to time that these animals still existed in the region between Byford and the Traveller's Arms Hotel, there were many who doubted them and believed they resulted from incorrect observations and confusion with other genera.

The publication earlier in the year of an article in the daily press that the quokka was extinct on the mainland invoked criticism from Mr. H. Atkinson, of Bibra Lake, who agreed to accompany a

party comprising Dr. D.L. Serventy, of the Wildlife Survey Section, C.S.I.R.O., Dr. A.R. Main, of the Department of Zoology, University of W.A., and Hon. Warden Julian Ford to the Gleneagle Forest. There he pointed out swamps where he believed that the quokka still existed. That Mr. Atkinson's belief was soundly based was proved beyond all doubt in subsequent weeks by personnel of the University, who succeeded in trapping three specimens.

Great concern was felt when one of the areas in which the quokka had been found proved later to be on private land, which the owner had bulldozed preparatory to agricultural development. A party was organised by this Department last month to try to establish whether the range of the quokkas was limited only to the swamps and creek beds in which they had already been found. An invitation was extended to Mr. R. Aitken, of Dumbleyung, to accompany the party as he had been the first person, at least in recent years, to report the occurrence of quokka in this area to the Department. Other members of the party included the Fauna Protection Officer (Mr. H.B. Shugg), Technical Officer J. Traynor and Fauna Warden S.W. Bowler, of this Department; Mr. A.J. Milesi, Fire Control Superintendent, Forestry Department, and Mr. C. Kinsella, Forester in charge of the Gleneagle Forest; Mr. Shelley Barker and Mr. R. Sadlier, of the Zoology Department of the University of W.A., and Mr. N. Stewart, of the Wildlife Survey Section, C.S.I.R.O.

Fine weather was encountered the first day, but the onset of storm conditions in the afternoon of the second day caused the early termination of the survey. However, led by Mr. Kinsella, whose intimate local knowledge was of inestimable value, strong evidence was found which suggested that the range of the quokkas was more extensive than had been thought. In the time available, it was not possible to ascertain the limits of the range, but it appeared that it extended some distance north and east of the Albany Highway and could be expected to extend a considerable distance south. In fact, it appeared probable that the animals would be found wherever the habitat was favourable. On the eastern margin of the range a permanent swamp was located which appeared to be temporarily disused by the marsupials. The suggestion was made that the area was almost

too wet in the winter months, but might be used each summer when surrounding seasonal wet-lands dried up.

In co-operation with the Zoology Department and C.S.I.R.O., it is intended to carry out a minor trapping programme and night surveys in the summer months to establish concrete proof of the quokka's occurrence over the extended range, and possibly to attempt some population studies.

PRAWN NETTING TO CONTINUE IN THE SERPENTINE

A request by members of the Furnissdale-Barraghup Progress Association for the prohibition of prawn net fishing in the channel system between the lakes and the estuary of the Serpentine River has been refused by the Minister.

Members of a deputation which waited on Mr. Kelly alleged that although camping was prohibited in the area, many prawning parties congregated there and caused a nuisance to residents.

After careful consideration, however, the Minister decided that no action should be taken under the Fisheries Act. The 12' prawn net allowed in the Serpentine River was the type almost universally used in Western Australian estuarine and river waters, and could not be banned on conservation grounds. It was considered that the offended parties should avail themselves of their rights under other laws governing public behaviour.

DUCK BAND RECOVERIES

As the season in this State has closed, the number of bands coming in is extremely limited, as may be seen by the table overpage. The number of bands returned has now reached 297, of which 186 were from black ducks and 97 from grey teal. As 4319 ducks have been banded, the recovery rate is 6.88%.

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WHALING

Reporting from Albany, Inspector B.A. Carmichael advised that the Cheyne Beach Whaling Company took its hundredth humpback for the season on August 28. It was a 44' female. The weather during July was most unfavourable and hampered the operations of the chasers considerably. It has been unkind during most of the season so far and has caused this year's catch figures to lag behind last year's despite the additional chaser operated by the Company. At the end of August the total of humpbacks taken had reached 102, whereas last year the quota of 120 was taken on August 21. Towards the end of the month, Inspector Carmichael reported, the Company decided to concentrate on sperm whales and four of this species were taken during the week ended August 24 and a further three in the following week, bringing the total for the season to 10.

It is understood that a lot of bad weather has been experienced at Carnarvon also, although the number of whales taken there to the end of August, (789), is an improvement on last year (741). The river has been running on three occasions this season which no doubt has caused some local alteration in water conditions and might have affected the movement of stocks to some extent. The average length of whales taken by the Nor-West Whaling Company this year seems to be a little down on last year but it may pick up before the season ends. With the usual predominately male run being experienced it is anticipated by the Company that it will reach its quota on or about September 20.

LATE NEWS

The p.v. "Kooruldhoo" left Geraldton on August 27 and is expected to arrive in Fremantle on September 3. The inspector in charge of the vessel (Mr. G.H. Lyon) will start his annual leave in the following week and the crew member (Assistant Inspector M.J. Simpson) at a date to be fixed.

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Mr. K. Godfrey, Whaling Officer, Division of Fisheries and Oceanography, C.S.I.R.O., has joined the research vessel "Lancelin" which is engaged on a whale-marking programme in Carnarvon waters.

THE CLEARING HOUSE

Amateurs Earn £20 Week from Mackerel

Genuine fishermen suffer - but what can they do?

Week-end amateurs - mostly dockyard men and others on a five-day week - are killing the mackerel trade and interfering with the livelihood of bona-fide fishermen by fishing off the South Devon coast and hawking their catches on Sunday evenings.

"For 17 or 18 years I have been the first to go mackerel fishing from Plymouth", said Mr. George Edwards, who has been a Barbican fisherman all his working life, "but it has got to such a pitch that I really dread a fine week-end."

Mr. Edwards was referring to complaints made to the Devon Sea Fisheries Committee at Newton Abbot that fishermen from Plymouth, Torquay and Brixham are really up against it because of competition from men in good weekday jobs who flood the market with their week-end catches.

"As soon as it is fine and calm, motor-boats, rowing boats and almost anything capable of floating converge on the fishing grounds," said Mr. Edwards. "Once outside Plymouth Sound there are boats for miles around. My heart goes up in my mouth every time I see them because I know what the market is going to be like next day...."

"Good fresh mackerel should now be fetching about 10s. or 11s. a stone, but the price is nearer 6s. or 7s. and fish are always being left unsold. Even if some of their catches are small, the amateurs still send children around the neighbourhood to sell them or give them to friends. The result is that many people have no need to go to market for their fish and it hits the regular fishermen badly."

Dockyard Men

Lieutenant Commander W.H. Batten, the fishery officer, said most of the amateurs at Plymouth

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were dockyard workmen who have spare time from Friday night to Monday morning.

"Barrow boys also complain that they cannot sell mackerel on Mondays because the amateurs have gone around the streets on Sundays," he added. "I have heard of men earning up to £20 a week in this way".

The Ministry of Agriculture, Fisheries and Food advised that fishing in territorial waters was part of the common rights of the public. There was nothing the committee could do about persons engaging in casual or part-time fishing.

Mr.S.A. Giles said it was a matter for trades unions to investigate.

("The Fishing News" London June 21, 1957)

Seals Not Important Salmon Killers, Say Scientists

Fishermen who have landed seal-mauled salmon, some with large bites taken out of their bodies, will be happy to hear that their fears that seals are depleting B.C. salmon stocks are completely unfounded.

According to discussion in the House of Commons in April, seals are not a serious predator of salmon. Fisheries Research Board chairman John L. Kask, who was called "one of the most brilliant fisheries scientists in the world", gave evidence in a committee meeting that there is no proof that fur seals are responsible for the destruction of commercial fish particularly salmon.

Former Fisheries Minister Sinclair explained the scientists' findings. "In 1952", he said, "Canada, the U.S. and Japan joined in a scientific study and we killed 3,000 seals on their migration north. We examined their stomachs and found that over 50 percent of them had no fish in their stomachs and less than 3 percent had any trace of salmon. The principal

food in their stomachs was squid, which of course are not used commercially in Canada though they are used in Japan. We also found lance fish, which we do not use, some smelts and some herring, or in other words, smaller schooling fish."

The scientists have been given provision for a six-year study under the new fur seal treaty to kill seals at sea to find out definitely the damage done to the commercial fisheries by the seal herd.

("Western Fisheries" Vancouver, B.C. June, 1957)

Can we "Fertilise" Sea to Grow More Fish?

In various parts of the world attempts to increase the fish yield in the sea have led to the application of chemical fertilisers. These have been used both experimentally and commercially.

Under natural conditions, the sea can only support a limited population of marine animals. The food chain in the sea is very complex, small animals feeding on small plants, larger animals feeding on the small animals, and in turn being fed upon by fish.

Theoretically if the abundance of any link in the chain could be increased, the fish would also increase in quantity. In most marine situations, it does not appear to be feasible to introduce a sufficient number of living organisms to have a significant effect on the food chain. The method which has been used is that of applying chemicals or organic waste to the water to increase the abundance of the lowest living link in the food chain, the tiny plants. If this were done in the open sea, an enormous wastage would occur since the ocean currents would disperse the fertiliser and perhaps also the organisms feeding on it. Thus it seems that this experiment could only be successful if conducted in an enclosed body of water. Some water exchange may be necessary to maintain the oxygen supply.

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An experiment of this type was carried out in an inlet on the west coast of Scotland. This technique has also been used in pond-culture work in Japan and elsewhere. While an increase in the yield of fish can be obtained using such methods, the gain is not usually in proportion to the amount of fertiliser applied. Some of the fertiliser may be wasted if it sinks to the bottom and becomes unavailable to living organisms.

Some of the fertiliser will be taken up by organisms which do not enter into the food chain of the fish whose yield the experiment is intended to increase. Such organisms may prey upon the organisms in the food chain or on the fish themselves. Hence it is possible, under special circumstances, to increase the yield of marine animals, but "sea farming" will pay only rarely, if at all.

("Western Fisheries" Vancouver, B.C. July, 1957)

6080 Feet per Hour:
Knots to You

"Knot" is a unit of velocity equal to one nautical mile (about 6,080 feet) an hour. The term dates back to the days before Kenyon when a knotted line and old-fashioned sand glass were the equipment used to estimate the speed of a vessel.

The sand glasses used were similar to those sometimes used now for timing the boiling of an egg. The proper time for cooking is measured by the time taken for sand to run down from one end of a two-bulbed glass to the other.

A common sand glass used at sea had sufficient sand to require 28 seconds to run down.

The line had a zero mark and at intervals of about 47 feet was knotted with pieces of string or rags. One end of the line, with a chip of wood attached, was thrown overboard. As the zero mark

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passed the rail the glass was inverted and the number of knots that ran out were counted during the time taken for the sand to run down. Since the distance between knots was the same proportion to a nautical mile as 28 seconds to an hour, the number of knots was equal to the speed of the ship in nautical miles per hour. Thus the number of nautical miles an hour is designated as the number of knots. The sure mark of a landlubber is the term "knots per hour".

("Western Fisheries" Vancouver, B.C. July, 1957)

Tuna is Abundant - If you Want to go Out 700 Miles

An American exploratory fishing vessel has discovered abundant schools of albacore tuna about 700 miles off the coasts of Washington and Oregon.

The Fish and Wildlife Service vessel "John R. Manning" caught 195 albacore weighing between 12 and 20 pounds between June 19 and 23. The best day yielded 97 fish. The tuna were taken by gillnetting and trolling.

The "John R. Manning" was conducting a general reconnaissance preliminary to the North-eastern Pacific Albacore Survey, which got underway July 22.

During the survey nine chartered commercial fishing vessels will search for albacore tuna along predetermined tracks from the coast to 350 miles offshore.

The objective of the survey is to define precisely the distribution of albacore off the coast in midsummer, and even more important, to learn conditions in the ocean that govern their distribution. This knowledge will be a long step towards placing the Pacific coast albacore fishery on a rational basis, instead of the hit-or-miss situation prevailing now.

Scientists say that albacore fisheries fluctuate chiefly because conditions in the ocean that

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control their distribution change. Thus a good year might result when the ocean brings albacore close to shore, where they are easily found. A poor year might simply mean that ocean conditions hold the fish three or four hundred miles offshore - too far to be discovered by chance.

Once the situation is understood scientists think there is a good chance of predicting when and where albacore can be found, thus eliminating disappointment and waste through fruitless scouting.

("Western Fisheries" Vancouver, B.C. July, 1957)

Colour of Sea Varies from Blue to Red

The sea is not always blue. It may vary from an indigo, or deep blue to an intense green, or in certain circumstances brown or brown-red.

Blue waters are typical of the open oceans, particularly in the middle or lower latitudes, whereas green water is more common in coastal areas, and the brown or "red" waters are usually observed in coastal regions only.

The blue colour can be explained as a result of the scattering of light against the water molecules themselves, or against the suspended minute particles smaller than the shortest visible wave lengths. The blue colour of the water is therefore comparable to the blue colour of the sky.

It can be noticed that on cloudy days, the water appears gray, reflecting the colour of the clouds.

The transition from blue to green colour, however, can not be explained as a result of this scattering, and it has been pointed out that a "yellow substance" which seems to be a metabolic product of plant plankton and which occurs in greatest abundance in coast area, in combination with the "natural"

blue of the water, leads to a variety of shades of the green colours which are observed at sea.

When water is full of silt or other suspended large particles, the sea will take on the colour of the particles. Discolouration can be observed when large quantities of suspended mineral particles are carried into the sea after a heavy rainfall. This also may occur when very large populations of certain kinds of microscopic algae or dinoflagellates, such as those found in Florida's "red tide" are present very near the surface. Thus the "red water", which is actually more often brown than red, which is observed in many areas and after which the Red Sea and the Vermillion Sea in the Gulf of California have been named, is due to the abundance of certain algae or dinoflagellates.

("Western Fisheries" Vancouver, B.C. July, 1957)

Production and Distribution of
CANNED SALMON

When salmon enter a cannery, they are subjected to as much close scrutiny as a bug under a microscope. When the product is finally in the can, only about 50 percent of the catch is graded "Fancy", and the rest must be sold as "B" quality or less. This article is based on a lecture to the Fishermen's Short Course at UBS, and outlines in detail the process of producing and distributing canned salmon from the time it arrives at the cannery until it lands in the consumer's market basket.

When salmon arrives on the cannery floor, the first thing that is done is to inspect each fish for any faults which may exclude it from being selected as number one quality.

Workers inspect the fish for bruises, softness, late run skins, or any indications that the

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fish were carried too long in the boat, or were subjected to "boat contamination", or were injured by pugh marks. These faulty fish, of course, are canned separately from the prime fish because the presence of any of these faults degrades the parcel from "Fancy".

Pale fish are separated because this also degrades them from being marked "Fancy".

It may be surprising to readers to know that about 50% of the salmon delivered to any cannery will never be produced as prime canned fish. This percentage differs of course from year to year. In a short run year, for example, we find that quality suffers, and the percentage of "B" quality goes up.

After the canning process the finished product is stored in separate lots, each one identified by species, sizes and quality.

All canned salmon, in a sense, is impounded by the Government until after it has passed inspection by the Inspection Laboratory. When the particular lot of salmon has reached its spot in a warehouse, we submit full details to the Inspection Lab on a form supplied by them. The Lab then arranges to draw samples of the lot, the number of tins depending on the number of packing days and cartons represented by the lot.

They take these samples to their Lab, and put them under a fairly comprehensive inspection. First they weigh the cans, to make sure that the weight does not fall below that generally shown on our labels. If it does, a hold order is put on the lot until it is labelled to show the correct weight.

They then test the vacuum, and measure the oil or liquid content. They drain off the liquid into a tube and then measure the oil content in c.c.'s.

Firmness of the fish is tested by a penetrometer with needles. If needles penetrate fish beyond a set point the fish is considered to be soft. Softness is a contributing factor to the parcel being graded "A" or "B".

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To test for odour, the contents of the tin are turned out and smelled by the inspectors. If there is a suspicion that decomposition to an advanced degree has set in, then a chemical process is used to see how far this has gone. If it has gone too far, the parcel will be graded "B" and if it is too far, it may be graded below "B" - which means it is confiscated and destroyed. This has happened.

The Inspection Lab measures colour by using a machine which records the units of blue, red and yellow, but this finding is for record purposes only and does not effect the Grade rating of the parcel.

Assuming the parcel has received a Grade A rating, it is then ready for marketing. If required the Department of Fisheries will issue a certificate to the effect that the goods are Firm, Fresh and Well Packed.

However, if it is graded "B" a hold order is placed on the lot until it is so marked. This is done by gluing a metal disc over the Canada end of the tin, and this disc reads in fairly large letters "GRADE B". This is not only a very expensive procedure, but it also advertises the salmon for what it is, and automatically it becomes a price proposition. This price will drop 25% or more from what it would have earned had it been rated as "A" or "Fancy".

After Government Inspection we undertake our own private inspection, looking not only for what the government lab does but for many other things which might degrade the parcel from being first class.

We check the weight, vacuum, oil, top appearance, filling, colour, cleaning, late run skin, flush, softness, odour, bruise marks and pugh marks.

If the parcel reaches our requirements we judge it suitable for our best label, and we can expect to get top price for it. If it misses out on any of these points it drops down in quality and its earning power drops accordingly. It does not mean to say it must be really top notch in all of these classifications, but if it fails in several of them, or to a marked degree in any of them - it just isn't Fancy Quality.

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Now we have reached the point where the processes of distribution and marketing enter the picture.

I will first deal with distribution and give you some idea of how our product reaches the market.

Canned salmon is produced in British Columbia and has to be shipped from here to the various markets. In Canada, the railways carry the largest percentage, although trucks are used to some extent. In the old days it was common to ship by steamer from Vancouver around to the east coast for distribution from there. There is very little difficulty shipping in Canada. You simply select the species, sizes and labels required, load them into a railway box car, or truck, make out bills of lading and send them on their way. Sometimes it goes directly to a buyer, but in many cases it goes to a warehouse in one of the main cities of Canada for distribution from there to the buyers as they require stocks. There are a few little problems such as extreme cold weather when we have to use insulated cars or trucks.

About half our pack goes to export markets, and here we face conditions and problems quite different to those in Canada.

After we receive our order from overseas, the fish is labelled and at the same time the carton is marked. This mark usually consists of some identification for the buyer - perhaps his initials or order number. It will also likely include the name of the port where the shipment is to be discharged.

Sometimes the cases are bound with wire, or flat iron straps. This is for the purpose of preventing the cartons from breaking open - or being deliberately broken open.

Our Traffic Department ascertains from the order where the shipment is to go, books the space on a steamer or arranges a rail car, and then issues a delivery order to have the shipment moved to where it is to be loaded.

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We must take out insurance for all our shipments to protect the salmon from any damage except that caused by inherent vice, which is something that was wrong with the goods before shipment.

We ship all over the world - to most of the countries in free Europe and to Africa, India and Ceylon, Malaya, Indonesia, Hong Kong, Australia, Fiji Islands, New Zealand, South Sea Islands, South and Central America, West Indies and United States.

We suspect some of our merchandise reaches countries behind the Iron Curtain.

We must keep a sharp eye on all these countries. We keep abreast of freight rate changes, and availability of steamer service, licensing regulations, exchange controls, customs rulings, consular requirements, labelling, marking, and so on.

When we sell to these countries it is most common to quote them on a CIF basis. This stands for "cost or cargo-insurance-freight". These costs are then included in the quotation and we prepare what we call a "costing" for each country. This is done by taking the base price at Vancouver and adding it to such expenses as wiring, wharf charges, freight, insurance, financing costs, miscellaneous charges such as foreign agents' commissions, etc.

Sometimes the price has to be converted from Canadian dollars into U.S. Dollars, Pounds Sterling, Francs, Pesos, or some other currency.

That covers briefly the production and distribution phases of the canned salmon business, but I would like to put in a few words on one of the most important factors in our industry. This is the matter of quality.

Many people are inclined to find out the highest price at which we sell our products and presume that is our return. They could not be more wrong. As I have told you, a large part of our pack is degraded and sold at lower prices. Some of the reasons for degrading can't be helped - such as late

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run fish and pale fish. These are hazards of the business. But many of the down grading factors can be eliminated by care. Bruises and pugh marks on fish are merely signs of carelessness. Fish carried too long and not kept separate from sound fish can, I am sure, be avoided. Downgrading is just as much an expense as is carrying the goods from the time they are packed until we can get them sold and delivered.

In most countries our best canned salmon is a luxury article. The consumer pays for, and is entitled to the best quality we can produce.

by
Cyril Ashdown, Export Sales
Manager, Canadian Fishing Co. Ltd.

("Western Fisheries" Vancouver, B.C. May, 1957.)

Why Does a Fish Have Scales

The scales of skin on the fish exude an oily secretion which materially lessens friction with the surrounding water and facilitates the motion of the fish. The scales of the average fish are generally overlapping, like shingles laid on a roof. Fish without scales have an excellent substitute in the form of a strong and oily outer skin very difficult to rupture.

("Western Fisheries" Vancouver, B.C. July, 1957)

Riddles of the Universe

Our body consists merely of carbon, hydrogen, oxygen, nitrogen, calcium, phosphorus, potassium, sulphur, sodium, chlorine, magnesium, with the odd pinch of iodine, fluorine, zinc, bromine, aluminium, silicon, copper, lithium, and arsenic, worth about \$1 at current prices. Science has all the elements, yet never made a man.

("Western Fisheries" Vancouver, B.C. July, 1957)

Arabian Sea Catastrophe

Russians Report Dead Fish by the Million
Over Substantial Area

Many millions of tons of dead fish were floating last month in the Arabian Sea between 60/70°E. and 10/12°N., according to a report sent to the Food and Agriculture Organisation (FAO), Rome, by Prof. P. Moiseev of the State Institute of Oceanology and Marine Fisheries, Moscow. The data available were insufficient for making an accurate estimate of the quantity of fish that have been killed, but it was clear that this was a large-scale catastrophe.

"According to the information from Moscow, based on reports from a Russian ship sailing through the Arabian Sea, there were about ten dead fish to the square metre," explained Mr. Taivo Laevastu, oceanographer of Fisheries Division, FAO. "The area of mortality as reported covers about 200,000 square kilometres. The fish are reported to be 20 to 25 centimetres in length, and fish of this size generally weigh at least 100 grams.

20,000,000 Tons?

"If we could assume only one-tenth of the area reported is covered with the dead fish at a density of ten to the square metre, the total is 20,000,000 tons, which is almost equal to the world's yearly commercial catch of marine fish.

"The trouble is that we do not know how well this figure of ten per square metre holds for the entire area. Assumption that the entire area was covered like this would mean mortality of 200 million tons of fish. This seems unlikely, although, to tell the truth, we cannot reject the possibility. But even if the figure of ten to the square metre were true for only one hundredth of the area, the resultant 2 million tons would represent a great catastrophe.

Fish Killed by Lack of Oxygen.

Mass death of fish occurs from time to time in many parts of the world, such as California, Florida, Peru, Mexico, Japan and Africa (Dakar and Walvis Bay areas).

"The present catastrophe", said Mr. Laevastu, "may have been caused by a layer of water known as the 'tropical subsurface oxygen minimum'.. Sometimes this layer lies no more than 50 to 75 metres below the surface. The upwellings which take place along the divergence lines of currents, following the changes in the monsoon in April, May and November, often lead to the growth of rich crops of phytoplankton. Sardines, mackerel, tuna and other fish tend to migrate from, presumably, the Indian Ocean to graze on the phytoplankton. Then conditions may favour particularly strong upwellings which bring the tropical subsurface oxygen minimum layer to the top and the fish are killed through lack of oxygen."

The Sea Suddenly "Boiled" with Fish

This phenomenon has often been reported. A graphic account of such a happening in April, 1956, was given in The Marine Observer (Vol. 27, No. 176, April, 1957) as follows: "Place: Arabian Sea, underway from Bandar Mashur to Kwinana, 14th April, 1956. At 17.15 G.M.T. the ship was over a depth of about 2,000 fathoms. The sea was dead calm and the sky was cloudless with stars shining and no moon. The ship's wake was slightly phosphorescent, but the rest of the sea was dark. Ordinary Seaman A. Korvo was on lookout duty on the bridge and Mrs. Stromberg was near him. They saw the water begin to "boil" by the sudden appearance of many thousands of fish, of about the size of mackerel.

"The master and the 1st and 2nd Officers were called from the chartroom to see this phenomenon, which is referred to in Rachel L. Carson's book: The Sea Around Us. After the observers had been watching for 2 or 3 minutes another phenomenon appeared. About 10/20° forward of the starboard beam, at a distance of about 300-400 yards, phosphorescence bubbled up from below the surface in the form of a cone of light which spread at the surface into a circular luminous area, having a diameter of between 100 and 150 yards. This was repeated three more times at intervals of between 2 and 4 minutes, but each time in a different place."

The same number of The Marine Observer reports two discolouration of waters in the Arabian

Sea (71°E . 14°N . and 75°E . 10°N). Three more upwellings in this area are reported in the same periodical Vol. 26, No. 176, July, 1956, pp. 136-137 ($7^{\circ}45'\text{N}$., $72^{\circ}37'\text{E}$.; $5^{\circ}19'\text{N}$., $58^{\circ}40'\text{E}$.; $5^{\circ}55'\text{N}$., $81^{\circ}00'\text{E}$.).

Discolouration of water is often reported from this area, and is assumed to be due to a high standing crop of phytoplankton in the upwelling zone on a current divergence.

Another observation on dead fish on the area ($10^{\circ}12'\text{N}$., $61^{\circ}54'\text{E}$.) was reported by Captain F.C. Brooks on m.v. Worcestershire, 7th June, 1955, 0600 to 0800 G.M.T.: "Numerous dead fish were observed. They were approximately 3 to 6 in. long and red in colour. It was noted at the time that the flying fish were not affected."

Intense Interest

Whatever information can be gathered about the present disaster will be studied with intense interest by fishery biologists and by all those concerned with the fisheries of the area and of the Indian Ocean.

"One important aspect of the present report is that the undoubted magnitude of the catastrophe provides evidence to support the view that the Arabian Sea and the Indian Ocean are rich in fish resources," pointed out Mr. Laevastu. "It seems unquestionable that for part at least of this area of the Arabian Sea there were fish in density exceeding one kilogram per square metre. Concentrations of pilchards in the North Sea as high as one kilogram to the square metre have been observed, but only occasionally, and not covering the vast area reported in this case in the Arabian Sea.

"The report is of interest from another point of view. If the fish are, as seems possible, Indian mackerel, the observation of this mortality may be evidence of the migratory path of this species from the fisheries off the coast of West Pakistan and India," continued Mr. Laevastu. "If this should prove to be true, we may find that this evidence on mortality and migrations will contribute valuably to analysing the

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fluctuations that are a feature of these fisheries. In any case, mortality on the scale reported must severely deplete the stock and it could easily be that it will take several years for the stock to recover its abundance. This fact may perhaps be established by the catches made by Indian and Pakistani fishermen during the next two years."

("The South African Shipping News and Fishing Industry Review" South Africa July, 1957.)

Better Fish Cookery Methods Help Fishing Industry

Frying is the most common way of cooking fish. About three out of four housewives prepare fish in this way, a West Coast survey revealed. Yet a leading reason for not serving fish more often or not using it at all was the housewife's objection to the odours caused largely by the frying method.

Asked about reasons why they don't buy more fish, twice as many housewives complained about fish-cooking odours than about fish prices, according to the Pacific Coast survey recently conducted by Oregon State College with Saltonstall-Kennedy funds for the United States Fish and Wildlife Service.

Industry groups, magazines, newspapers, and food editors, as well as others have put out numerous fish cookery recipes using broiling, baking, and poaching methods. The survey recommends the much wider distribution of good simple recipes using these methods rather than frying as a means of promoting fish consumption.

The survey also recommends that the budgets for advertising fresh and frozen fishery products be increased because it was found that the present budgets were well below one percent of sales - a low figure compared with other food industries. A stepped-up educational campaign directed toward better fish cookery would pay off well in terms of improved sales.

("Fishing Gazette" New York July, 1957)