

FISHERIES DEPARTMENT, WESTERN AUSTRALIA

MONTHLY SERVICE BULLETIN

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September, 1956

STAFF NOTES

The Superintendent (Mr. A.J. Fraser) left Perth on August 28 for a brief visit to the eastern States. He intended to call at Sydney and Cronulla and to return by air to Perth on Sunday, September 2.

The Supervising Inspector (Mr. J.E. Bramley) proceeded on annual leave on August 27 and will resume duty on September 10.

Captain H.C.W. Piesse also commenced annual and accrued leave on August 27, but will not resume duty until September 16.

Other officers commencing leave this month are: Inspector W. Davidson, on September 23; Inspector C.R.C. Haynes, on September 17; Cadet Inspector D. Wright and Assistant Inspector G.H. Lyon, on September 10.

Mr. I. Bartholomew, of Head Office, has received notification of his appointment as Clerk (Bridgetown), Classification C-II-1/2 in the Department of Agriculture. Mr. Bartholomew started in the Fisheries Department on November 9, 1951, his first appointment in the Service, and has been with us continually since. He has been acting as Statistics Officer since the appointment of Mr. B.K. Bowen as Research Officer on May 9. He will cease duty with this Department on September 4.

Inspector A.V. Green resumed duty after annual leave on August 26.

Cadet Inspector R.J. Murray was transferred to Geraldton on August 6 to assist in that district under the direction of Inspector R.M. Crawford.

Relieving Inspector A.K. Melsom will be stationed in Perth until September 23 when he will take over the Fremantle district during Mr. Davidson's absence on annual leave.

PERSONAL PARS

Dr. R.G. Chittleborough, Research Officer of the Division of Fisheries and Oceanography, C.S.I.R.O., returned to Perth by air on August 5 after having been absent from the State for five months. Dr. Chittleborough left Australia on March 7 and attended a meeting of the scientific sub-committee of the International Whaling Commission held in London later that month. He also attended meetings of the National Institute of Oceanography, in Surrey, and the International Congress on Animal Reproduction, in Cambridge, and was scientific advisor to Mr. F.F. Anderson, Director, Commonwealth Fisheries Office, who attended as the Australian delegate at the International Whaling Conference held in London last July. Dr. Chittleborough also visited whaling research centres in England and on the Continent and spent 6 weeks in Norway. Before returning to Perth, he represented Australia at the Limnology Conference held in Helsinki, Finland.

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The North-West is soon to lose one of its best known identities. Mr. A.H. Clark has retired after thirty-six years' service with the Harbour and Light Department at Port Hedland, where he occupied the position of Lightkeeper and carried out a multitude of duties for his own and other departments, including those of an inspector of fisheries and pearling inspector. It is understood that Mr. Clark will leave Port Hedland on September 6 to take up residence at Scarborough, where he has a new home. We wish him many, many years of good health in which to enjoy his well-earned leisure, and thank him most sincerely for his zeal in watching this Department's interests.

MOVEMENTS OF DEPARTMENTAL VESSELS

As reported last month, the research vessel "Lancelin" is undergoing a refit at Fremantle, the work being carried out by the staff of the Fremantle Harbour Trust.

Assistant Inspectors G.H. Lyon and S. La-Roche brought the p.v. "Kooruldhoo" to Fremantle on August 25 after a season in the Abrolhos area. The "Kooruldhoo" will undergo her annual refit in preparation for the commencement of the open season in the Fremantle-Lancelin-Cervantes crayfishery.

TROUT DISTRIBUTION

On September 1, 40,000 trout fry were transported from the Pemberton Hatchery by Technical Officers J.S. Simpson and J. Traynor and were distributed to waiting clients. All orders were fulfilled and a surplus of 12,000 fry were planted in Monger's Lake.

An innovation this year was the trial use of plastic bags as containers for the fry. A report on experiments in their use by the Research Officer, Mr. B.K. Bowen, appears elsewhere in this issue.

EXPLORATORY AND EXPERIMENTAL FISHING

We have, through the courtesy of Dr. G.L. Kesteven, Chief Fisheries Biologist, Fisheries Division, F.A.O., Rome, Italy, been able to secure a sufficient number of reprints of a paper under the foregoing title written by S.J. Holt, also of that Division, to enable one copy to be made available to each member of the staff. They have already been distributed. The paper originally appeared in Vol. IX, No. 1, of F.A.O. Fisheries Bulletin (January-March, 1956). We are most grateful to Dr. Kesteven for his co-operation, as we believe the paper will greatly assist the members of the Department to come to a clearer understanding of the need for a scientific approach to exploratory and experimental fishing.

WHITING SET NETS AT MANDURAH

In a proclamation in the "Government Gazette" of August 31, a new limitation was placed on the use of whiting set nets. It will be remembered that lawful nets of this nature are restricted in length to 300 yds, with meshes throughout of $1\frac{3}{4}$ " , and must be no more than 33 meshes in depth. By virtue of the recent proclamation, fishermen now may only set these nets in those waters of Peel Inlet and the Harvey Estuary which are not less than 6' in depth.

CLOSURE AT BROOKE'S INLET

A proclamation in the "Government Gazette" of August 10 amended the period during which fishing nets may lawfully be used in Brooke's or Broke Inlet. For a period of five years from 1956 to 1960 inclusive, the use of nets is prohibited from the seventh day after the Inlet opens to the sea, or from November 1, whichever is the earlier, until May 31 of the succeeding year.

CLOSURE AT WILSON INLET

By proclamation in the "Government Gazette" of August 10, the area of the waters closed to net fishing has been extended. The proclamation reads that "all the waters of Wilson Inlet situated between the low water mark of Ratcliffe Bay (Southern Ocean) and a line joining the southernmost extremity of reserve 12344 and the north-eastern corner of Plantagenet Location 1828, are closed to the taking of fish by nets."

EXPLOSIVES ON FISHING BOATS BANNED

A new regulation issued under the Fisheries Act and published in the "Government Gazette" of August 23, has made it illegal for any person to carry explosives on a licensed fishing boat unless he is in possession of a permit granted by a licensing officer. The new Regulation reads -

" 16A. (1) No person shall in any Western Australian waters carry in or on any boat registered or licensed under the provisions of the Fisheries Act, 1905-1951, as amended, any dynamite or explosive substance or anything which is noxious or poisonous to fish unless he is the holder of a valid permit issued under and subject to the provisions of subregulation (2) of this regulation.

(2)(a) A permit may be issued by an inspector or an officer appointed to issue licenses under the Act.

(b) An inspector or officer so appointed shall not issue a permit under this regulation to any person if the inspector or officer has reason to believe that the person intends to use the dynamite, substance or the noxious or poisonous thing in contravention of the provisions of the Act or these regulations. "

All officers are directed to take cognizance of this new regulation, which came into effect from the date of publication.

SNAPPER TAG RECOVERED

A recovery of some note was made by Mr. A. Horner, of Blackwood Lodge, Augusta, last month. Fishing at Flinders Bay on August 20, Mr. Horner hooked a 26" snapper, which he later found contained tag no. 7145. Records disclosed that Technical Officer L.G. Smith had tagged the fish at Wilson Inlet on August 21, 1953, and the recovery was of particular interest as it was the first tag returned to show any marked movement by snapper. The distance travelled by the fish from Wilson Inlet to Flinders Bay would have been not less than 140 miles.

ARTICLES OF INTEREST AVAILABLE

Further articles likely to be of interest to some inspectors are listed below.

- (25) "Fewer Mature Fish in Northern Waters" - "Fishing News" - May 25, 1956.
- (26) "There are No Deserts in the Sea" - "Fishing News" - June 1, 1956.
- (27) "Current Research on Fish Boxes" - "Fishing News" - June 8&15, 1956.
- (28) "Antibiotics for Fish Preservation" - "Fishing News" - June 15, 1956.
- (29) "Mount that Fish Trophy" - "Outdoors and Fishing" - July, 1956.
- (30) "Are Canned Foods Sterile" - "South African Shipping News" - May, 1956.
- (31) "How Underwater Explosions Affect Marine Life" - "Fishing News" - July 6, 1956.
- (32) "British Research in the Barents Sea" - "Fishing News" - July 13, 1956.
- (33) "Eastropic Expedition" - "Pacific Fisherman" - July, 1956.

WHALING

The Cheyne Beach Whaling Company completed its 1956 quota on August 21 when it secured a 44' bull only about 200 yards from the shore station. The Company reported a successful year, although the season was somewhat prolonged due to bad weather. During the last few weeks of the season particularly, the whales were said to have been in much better condition and the oil yield was expected to be considerably higher than previously.

During the week ending August 25, the Nor'-West Whaling Company secured a record catch of 86 whales,

bringing its total for the season to 670. During the previous week the Company had secured 81 whales and, if this rate were maintained, the Company should complete its quota by about the middle of this month.

The manager of the Nor'-West Whaling Company, Mr. H. Martin, stated recently that the whales taken had been in very good condition and that their size had been most satisfactory, the largest taken so far this season being 49 feet 7 inches.

As may be judged from the two successive record catches whales were plentiful. The usual predominance of males at this stage of the season was evident.

On his return to this State from overseas, Dr. R.G. Chittleborough, Research Officer of the Division of Fisheries and Oceanography, C.S.I.R.O., sounded a warning that the Antarctic whaling industry faces the danger of a collapse unless the catch of fin whales is reduced. He said that scientists at the International Whaling Conference held in London last July recommended that the fin whale quota should be reduced by 30%, but this was unacceptable to the nations concerned who agreed upon a reduction of 3½% only. Dr. Chittleborough pointed out, however, that Australian whaling stations would not be affected by any collapse of fin whale stocks as our stations concentrated on humpbacks.

According to a report published by the Commonwealth Fisheries Office, the whaling industry will be worth over £A2,000,000 this year.

IS W.A. GLUTTED WITH FISH?

Originating in remarks said to have been made at a fishermen's conference in the eastern States, a statement was recently broadcast over the national network to the effect that there was a glut of fish in Western Australia. Asked to comment, the Superintendent said that he was unaware any glut existed, particularly so far as fresh fish were concerned, although he admitted that local canners had had difficulty in quitting some canned lines. This applied particularly to ruffs, which despite the high quality of the pack did not seem to appeal to buyers.

The Superintendent's denial of a glut has brought down some criticism in the form of questions asked in Parliament, and it may perhaps be useful if we set out the position as we see it.

Among other things, it has been suggested that buyers have frequently turned down fish of good quality, such as whiting and snapper from Shark Bay, while supposedly inferior lines like cobblers, ruffs and yellow-eye mullet sold well.

On this point it can only be said that there is no standard by which the inherent quality of any kind of fish may be determined; it is so much a matter of individual personal opinion. In any case, demand is not created solely by quality, but rather because the public has taken a liking for a certain kind of fish, or because of its attractiveness to the housewife, or because of its cheapness. There is also a strong preference for fresh, i.e., unfrozen fish if fresh and frozen fish are displayed together. Cobblers always command a good price and ready sale to fried fish-shop proprietors in view of their popularity as a fried fish line. Whiting of good size always find a ready market, even if they are frozen, but small whiting, i.e., fish of from 9 to 10 inches, are unpopular whether fresh or frozen because of a lower percentage recovery of flesh when filleted. There is, moreover, a decided reluctance on the part of buyers to pay the rather high price asked for these small whiting. No doubt this reluctance is often explained away by alleging a glut. Snapper always sell well, excepting perhaps at the height of the "Shark Bay" season, when Perth buyers are frequently embarrassed by lack of cold storage. Big mullet which can be caught in such large quantities in Shark Bay are frozen before being brought to Perth. In this condition they have very little appeal to the public. On the other hand, the smaller run of mullet from the Swan River and Peel and Leschenault Inlets are always marketed in the fresh (unfrozen) state, and are snapped up quickly by buyers. Ruffs may be caught in very great quantities on south coastal beaches in autumn and in Geographe Bay and Cockburn Sound during early winter. The ruff season is a short, sharp one, and at its height the market tends to become glutted. Attempts have in the past been made to store ruffs, but when brought out frozen some months later, they are not at all popular as against other fresh lines then available. Large quantities of ruffs have been canned, but strangely enough there is only a limited demand for this very good product.

It has also been suggested that for some ulterior motive the price of imported frozen fish and local fish are "constantly maintained at similar prices."

It is not correct to say that these prices are kept at a similar level. Imported fish generally are cheaper, and though imported varieties are regarded as rather inferior in texture to the best local lines, they are packed attractively and are ready for cooking without further preparation. This, in the opinion of the busy housewife, more than offsets their slightly poorer quality, and the cheaper price adds to their attractiveness.

In general terms the Department subscribes to the view that greater production of fish in Western Australia is unlikely to increase the demand for the local product unless it is presented to the consumer in a form just as attractive as, and at a price competitive with imported lines. Nor is there any likelihood of any increase in the sale to the eastern States of fish from the West unless the appearance and general quality of our pack is improved. The solution of the problem really lies with the fishermen themselves.

PLASTIC BAGS FOR CONVEYANCE OF LIVE FISH

In recent years plastic bags have been used extensively overseas for the transport of live fish. Last year, when Technical Officer J. Traynor was in England; he had some discussion with hatchery operators who advised him of the use of such bags. Mr. B.K. Bowen, when he was in Java at the F.A.O. Fish Culture Training Centre towards the end of 1955, observed their use for the conveyance of fish for planting outside Java.

In Western Australia, trout for liberation in streams or farmers' dams have for some years been carried in a special tank mounted on a utility vehicle. Losses during transport have been singularly low, but the method has several drawbacks. The tank is very heavy in itself (its weight filled with water is approximately 2,000 lb.) and in addition two small motors as well as a pump need to be carried on the vehicle. This increases the weight to about 1 ton. Furthermore, because of the great distances to be travelled, the use of depart-

mental road transport is very costly, and the Department has for long been giving thought to the question of finding a cheaper, equally satisfactory method of distribution.

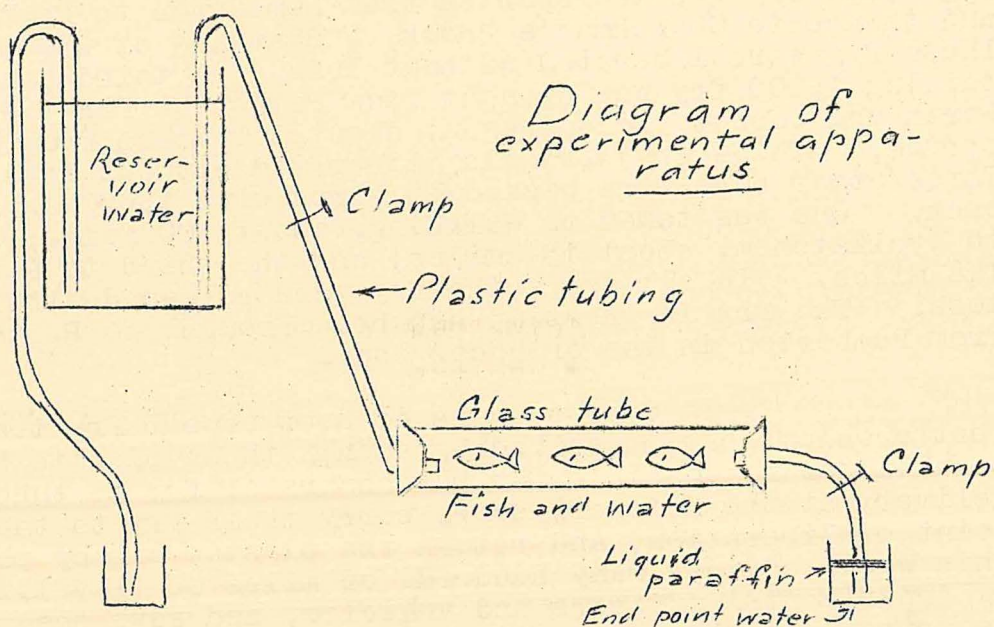
Soon after Mr. Bowen's return, he procured a plastic bag from Indonesia, and this was used as a pattern for a number which were made in Perth for experimental purposes. P.V.C. plastic was used in the construction of the bags, which are about the size of an ordinary pillow-case, but with a bottle-type neck. Each consists of an inner and an outer bag. The material from which the inner bag was made is 0.004 in. and that of the outer 0.008 in. in thickness. The seams were sealed electrically. Each bag holds approximately 7 gallons of water, but normally not much more than one-half of this quantity is used. Medical oxygen is then released into the bag to fill the remaining space. The bag is finally sealed by tightly tying the neck.

Before actually using the bags for transporting fish experimentally, it was decided first of all to carry out tests for the purpose of determining (1) the oxygen consumption per gram weight of rainbow trout fry (Salmo gairdnerii) per hour; and (2) the effect of holding such fry in bags containing water and medical oxygen. The tests were carried out by Mr. Bowen, assisted by Technical Officer J.S. Simpson.

The method used for determining the oxygen consumption will undoubtedly be of interest to the staff, and it is therefore briefly described below.

Twenty fry were used for these experiments of a mean length 3.21 cm. (approximately 1.3 in.). The water employed in the tests had a temperature ranging from 10.5°C. to 12.8°C. (approximately 51°F. - 55°F.) during the course of the experiments.

The quantity of oxygen consumed by the fry was arrived at by passing water through a tube containing fry. The oxygen content of the water in the reservoir, that is before being passed through the tube (see diagram), and the water at the end point after passing through the tube, was calculated. These calculations showed that 1,000 fry would consume 3.2 litres of oxygen in 50 hours. Theoretically, therefore, if 4 litres of oxygen were released into the bag, there should



be sufficient margin for 1,000 fry to remain alive in the bags for 48 hours, the greatest length of time ever likely to be necessary in this State.

One experiment was made by placing 280 fry in a bag containing $2\frac{1}{2}$ gallons of water and atmospheric air. The fry became distressed in 6 hours. In a further experiment with the same number of fry in the same quantity of water plus oxygen, the fry showed no signs of distress after $23\frac{1}{4}$ hours, and there did not appear to be any after-effects. A third experiment was carried out using 546 fry in 3 gallons of water plus oxygen. After 36 hours these fish were liberated into a drum of water where they were held for observation for 22 hours. During this time 41 deaths occurred. However during this period approximately 150 fish appeared to be distressed and close to death. A fourth experiment with a similar number of fish and the same quantity of water and oxygen, together with a small quantity of a "buffer", resulted in only 26 deaths over a period of 60 hours during which they were kept in the same drum.

Six experiments have since been made in regard to the transport of the fry in bags. The first was with a bag containing 1,000 fry, which was taken

from Pemberton to Keysbrook, 200 miles away. All the fry were liberated without loss. Another bag containing 1,200 fry was transported from Pemberton to Perth, and thence to Churchman's Brook, a distance of 230 miles. These fry were liberated without loss. A third containing 1,200 fry was brought from Pemberton first to Perth and then to Dandarragan, about 360 miles from Pemberton. These fry were also liberated without loss. Three other bags were packed at Perth with 1,000 fry each. One was taken to Walebing, about 100 miles; one to Wyalkatchem, about 131 miles; and the third to Pithara, 148 miles. In all cases the fry were released without loss. The fry in question had been brought to Perth from Pemberton in the orthodox tank.

It does seem as if most of our fry transport problems can be solved by using these plastic bags. It will now be possible for purchasers of fry to take delivery at the hatchery door, carry their fry to the point of liberation, and return the plastic bag by post. This would obviate many hundreds of miles of travelling by departmental officers and vehicles, and save the Department considerable sums each year.

No experiments have yet been carried out with fingerlings, advanced fingerlings or yearlings, but this will be done as fish become available.

PRAWN LENGTHS IN N.S.W.

In the March, 1956, number of this Bulletin reference was made to a suggestion that the minimum legal length of prawns be abolished in New South Wales.

The Department is now in receipt of a further communication from the Superintendent of Fisheries in that State (Mr. N.V. Harris) concerning the proposals. Mr. Harris says -

"(At the time I made my recommendation) the majority
"of (fishermen's) co-operative societies objected
"mainly on the ground that the market would be
"flooded with small prawns resulting in prices fall-
"ling. When making the recommendation, I had in
"mind that the fishermen would need to adopt similar
"practices to those followed in the American shrimp

"industry where prawns are sorted into a number of grades in order to obtain the best prices. Our fishermen, however, are not yet accustomed to this method of trading."

Mr. Harris wrote to America for prices of prawn-sorting machines, and it now appears that a co-operative which has agreed to export prawns to the United States is importing a sorting machine. Other societies desire to observe the working of the machine before deciding to follow suit.

In the meantime action to lift the existing size restrictions is being held over until mechanical sorting appliances have been generally installed. Mr. Harris cannot see how sorting may be done satisfactorily otherwise.

PROFITS IN WHALING

A report just released by Nor'-West Whaling Co., Ltd., for the year ended March 31, 1956, indicates that the company is still earning steady profits. Although the company's quota of whales was reduced by one hundred during the year in question, and despite £22,000 higher tax provision, net profit at £118,227 is almost £2,000 more than it was during the previous year. An unchanged 20% dividend is being paid.

At March 31 the company's paid capital was £270,000, and reserves stood at £304,000. From the 500 whales taken in the 1955 season there was a yield of 4,162 tons of oil worth £443,000. In the previous year, when the quota was 600 whales, the oil yield of 4,700 tons brought only £436,000.

The company, which until this year operated the Point Cloates station, recently purchased the Carnarvon station from the Commonwealth Government. The directors report that no further issue of capital related to the purchase of the Australian Whaling Commission's station is contemplated at present.

FREMANTLE-LANCELIN-CERVANTES-JURIEN BAY CRAYFISHERY

The accompanying table sets out the crayfish production figures for all areas south of the 30th parallel for 1952/53, 1953/54, 1954/55 and 1955/56 seasons. The most striking aspect of the table is the decrease in the average catch per man for the season just concluded. This is allied with a decrease in the total catch and an increase in the number of men fishing. It is, of course, fully realised that statistics alone can never give a complete picture because the final catch figures are always influenced by intangibles such as weather conditions, working efficiency of boats and fishermen, and so on. Also factors such as size and range of the crayfish must be considered before an accurate statement concerning the condition of the fishery can be made. However, such intangibles will not vary, to any marked degree, the number of men engaged in fishing. During the 1952/53 season 296 fishermen were working the open waters south of the 30th parallel, while during the last season there were 407. This represents a 38% increase over the last three seasons. The increase in the number of men did not have any deleterious effect on the catch per man in the 1953/54 and 1954/55 seasons, because of the opening of the Jurien Bay area to crayfishing, but the catch per man in the 1955/56 season decreased by 18% compared with the immediately preceding season. This was so, despite the fact that more waters, i.e., North Head to the 30th parallel, were opened to fishing for the first time. This means that each fisherman has, on the average, received £300 less than he received for last season's catch. Moreover, judging from the figures of the 1951/52 season, when 285 men caught 6.2 million lb. of crayfish, and subsequent seasons, it does not appear that the final production figure for the area is likely to rise greatly above that of the record season (1954/55, 7.3 million lb.) even though the fishing intensity may increase.

Turning to the individual areas, it will be seen that only Fremantle achieved a catch per

FREMANTLE-LANCELIN-CERVANTES-JURIEN BAY AREA

AREA	1952/53 Season (24.11.52 - 31.5.53)			1953/54 Season (20.11.53 - 31.5.54)			1954/55 Season (20.11.54 - 31.5.55)			1955/56 Season (20.11.55 - 31.5.56)		
	Total Catch	Average Catch per man	No. of Men	Total Catch	Average Catch per man	No. of Men	Total Catch	Average Catch per man	No. of men	Total Catch	Average Catch per man	No. of Men
	lb.	lb.		lb.	lb.		lb.	lb.		lb.	lb.	
Fremantle	2,354,509	16,465	143	2,301,532	15,656	147	2,570,729	18,362	140	3,006,893	18,223	165
Lancelin Is.	1,837,073	17,169	107	2,096,619	20,555	102	2,408,763	18,966	127	2,109,394	13,970	151
Green Islets	331,645	16,582	20	405,025	23,825	17	495,192	19,045	26	230,420	13,554	17
Cervantes Is.	572,995	22,039	26	416,708	18,941	22	1,054,183	19,167	55	633,384	17,118	37
Jurien Bay				919,667	15,587	59	748,167	18,704	40	590,653	15,964	37
TOTALS	5,096,222	17,217	296	6,139,551	17,952	347	7,277,034	18,734	388	6,570,744	15,776	407

man figure comparable with previous seasons. In the Lancelin area the catch per man dropped by 27% while the number of fishermen rose by 19 percent. In the remaining three areas the total catch decreased, as did the number of men operating.

In conclusion it can be said that the southern crayfishing season was not a good one from the point of view of either production or economics, but it must be recognised that the decline could have been due to fishing conditions and normal fluctuations rather than any actual reduction in the crayfish stocks.

No decision has yet been made in regard to the date of the commencement of the next open season, but it is expected that the Fishermen's Advisory Committee will hear evidence on the subject within the next month.

FISHERMEN'S ADVISORY COMMITTEE

Mr. B.R. Saville, deputy chairman of the above Committee, accompanied by members N.K. Swarbrick, R. Smith, F. Camarda and W. Matthei will leave for Geraldton on Sunday, September 16. The Committee will take evidence on the conservation of the Geraldton-Abrolhos crayfishery at a meeting in the Geraldton courthouse the following day.

The Committee will also meet at Fremantle to discuss the Fremantle - Lancelin - Cervantes - Jurien Bay crayfishery with interested parties. This meeting will take place on Thursday and Friday, September 20 and 21.

On October 1 the Committee will commence an inspection of the salmon beaches in the South-West and along the south coast. The Superintendent, Mr. A.J. Fraser, will lead the Committee on this occasion. The Secretary, Mr. H.B. Shugg, will be present throughout.

Mr. R.W. George, Research Officer of the Division of Fisheries & Oceanography, C.S.I.R.O. will attend the Geraldton and Fremantle meetings in an advisory capacity and the Department's Research Officer, Mr. B.K. Bowen, will accompany the Committee on its southern tour.

THE CLEARING HOUSE

How Crabs and Barnacles may Injure the World's Shore Fisheries.

by Eric Hardy, F.Z.S.

It was an Irish doctor who first showed, in the Irish Sea at Queenstown, that barnacles were strangely-altered shrimps which, after paddling about the sea as pinhead-larvae, come in on the tide to cement themselves down on their heads and live for the rest of their lives upside down, protected by white, calcified plates like a false "shell" around them. The number of these plates often distinguishes groups of barnacles, like six in the common acorn barnacle, seven in the stalked ship's barnacle, (which now inhabits driftwood). Though it lived formerly on wooden ships, its place on modern steel ships is mostly taken by acorn barnacles. There are eight plates on the Australian surf barnacle *Catrophagus*, and only four on the small immigrant Australian "smothering barnacle", *Elminius*.

New Pest for Oyster Beds

Favouring the muddy and rocky parts of our coast, the alien *Elminius modestus* is spreading so rapidly that it may soon oust *Balanus balanoides* as our commonest British barnacle. Limited only by possible cold winter, it has achieved in 10 years what took the American slipper limpet 50, and it may prove an even worse pest of oyster-beds and other shell-fish, where its competition reduces the spat, both in numbers and size. It has gone as far north as the Scottish coast from the Solway to Galloway, and it is rapidly colonising the Irish Sea.

Tropical barnacles frequently reach European waters on ships' hulls, but the cold winter prevents their breeding, and only a tenth of some 150 barnacles in the world live on ships. *Sacculina* lives on crabs, *Anelasma* roots into the dorsal fins of dogfish, coronet barnacles are brought on whales, the rock-boring barnacle *Lithotrya valentiana* is a notoriety of the Great Barrier Reef, and some acorn barnacles attach themselves even to penguins' toes.

Journey from Antipodes

Until discovered on a ship at Portsmouth in 1944, *Elminius modestus* was known only from South Australia and New Zealand, and only one other member of its genus was known from the northern hemisphere, at the Azores.

The close convoy system of wartime shipping aided concentrating settling habits of its gregarious larvae, and it must have been breeding on the south coast of England in 1943. It crossed the Channel to colonise France and Holland, it spread to the Thames and the east coast, and in 1946 it was noticed on a ship dry-docked at Liverpool after a trip from the Antipodes.

Dr. D.J. Crisp, director of Bangor University's Marine Biological Station at Menai Bridge, North Wales, is making a study of its distribution. He tells me it spread into the Liverpool Bay area, probably from Morecambe Bay area, in 1947-8, and advancing along the North Wales coast reached Anglesey about 1953 and has now spread around the island and along the Caernarvonshire coast.

First Manx Specimen

Dr. A.J. Southward discovered the first Manx specimen at Ramsey Pier in 1952 and brought the card index list of non-parasitic barnacles at the Port Erin Biological Station up to 13. It may have come from a Cumberland colony at Whitehaven, and it is now widespread around the Isle.

In the warmer waters of Sydney harbour, Dakin and Pope found it reached half-an-inch diameter, whereas in British waters it reaches only two-fifths. Growing to high levels between tide-marks, it may be vulnerable to hard frosts.

Young starfish feed voraciously on barnacles, but breeding all the year round, *Elminius* has a longer settling period than our native barnacles, and it competes for space with Essex oyster-spat. To illustrate the harm it does, "collectors" were sprayed with D.D.T. and they then gave twice the number of spat compared with unsprayed "collectors" near them. And the spat also averaged 40% larger.

Barnacles are of but little use. The huge parrot's beak barnacle of Chile is boiled and eaten cold by natives, and some large Chinese barnacles are eaten. Ordinary rock-barnacles will spread over a mussel bed and completely smother it; so will *Elminius* on both mussel and winkle beds.

Barnacles have migrated elsewhere by ships' aid, and in recent times one of our common British species, *Balanus improvisus*, has become established in Australian waters after conveyance on ships' bottoms.

B. eburneus previously known only in eastern North America, from Massachusetts to the Caribbean, appeared in the Mediterranean after the war - perhaps during it - and is now found on mussels taken at Marseilles for the Paris market.

Ballast Passengers

Ships are generally responsible for transplanting crabs around the fishing grounds of the world when the tiny larvae crab gets into their water-ballast tanks. The eastern American blue or Portunid crab, *Callinectes sapidus*, an edible species, has recently been discovered in the Mediterranean, inhabiting the Israel coast at Haifa Bay and elsewhere, after previously being found on the coasts of France in 1900, Holland (1934) and Denmark (1951). It is something British fishermen should look out for in river estuaries.

Such large numbers of breeding females have been taken in Israeli waters by Holthuis, Perlmutter, Gottlieb, and the Sea Fisheries Research Station at Haifa, in 1955, that it must have been established in the eastern Mediterranean for some time. Because of its strong swimming habits, some biologists think it might have reached Europe by the aid of the Gulf Stream, but it shows a preference for brackish water. It is marketed in America as the "soft-shelled crab" (moulted).

Crabs from China

Before the war, the Chinese woolly-clawed or mitten crab from the Yangtse reached the Elbe and other European estuaries in the water ballast tanks of ships and raised some alarm because it is the vector of

a human lung disease. Another undesirable crab that has gone around the world in the water ballast tanks of ships is our common uneatable green shore crab (*Carcinus maenas*) whose recent appearance on the Canadian Atlantic coast has alarmed the fisheries authorities and caused them to warn fishermen to watch for it, and destroy it. The evolution of this crab's career has taken it round Europe, North Africa, through the Suez Canal and the warm waters of the Red Sea to Ceylon, Australia and across the Pacific to Hawaiian beaches.

Until early this century the green crab was confined in the New World to the coast from Delaware to Cape Cod. More recently it reached the Bay of Fundy and now it is advancing along the Nova Scotian coast.

Wanders on Land

Even when adult, the green crab swims a little in the sea, but its propensity for living out of water is very vigorous, and on the sandy coast of Palestine at Jaffa and on the Anglesey coast I have seen it wander far from the beach to the road.

It is more pugnacious and aggressive than most of our British crabs, rendering considerable damage to shellfisheries, destroying the slow-growing mussels, clams and winkles by crushing their shells with its claws and picking out the bits of flesh food. Almost anything, living or carrion, is grist to the green crab's gastric mill before it dies, old and mottled with black, at some four years of age. One can sympathise with the Canadian Government regarding it as an undesirable alien.

Shell Aristocrats

Crabs are the aristocrats of the crustacean world, the stalk-eyed superiors of all shellfish, the armour-plated raiders of the rock-pool. The long-legged spider crabs are slow-moving experts in camouflage, concealing themselves with bits of seaweed which they attach to their backs.

More than 40 kinds of crab inhabit the Irish Sea. The orange-brown rock-crab of the crab-pot is a peaceful chap, who listens with his great pincers

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(his centre of hearing) and rolls into a ball when alarmed. The pugnacious green crab is alleged by every cartoonist to bite the bather's big toe. The American blue crab combines the utility of the former with the pugnacity and strength of the latter. It will attack even larger crabs. It usually lies buried with all but its stalk-eyes concealed, and waits for the unwary prey to approach within seizing distance.

("The Fishing News" London June 22, 1956.)

New Whale Industry for California

Whaling has begun again off the California coast. Two land stations at Point San Pablo, near San Francisco have started operations using whales taken by two catcher boats.

The operators expect to catch and process from one to four whales a day during the season. The first catch, made on May 9, was a 36-ton humpback. In addition to using the whales for meal and oil, it is believed that suitable parts of the whale meat will be frozen for mink or other animal food. This venture is the first attempt to catch and process whales in the U.S. since 1953.

Whales are plentiful in the offshore waters of California during the summer, and it is possible that another shore plant will be established at Morrow Bay in the southern section of the state.

Season for baleen whales (bluefin, humpback, sei, minke) is May 1 to October 31, and for sperm whales April 1 to November 30.

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

More Nations will Extend Territorial Waters

The vexed question of fishing limits in territorial waters is cropping up more and more in various areas.

In addition to Russia's recent insistence on a 12 mile limit in her northern waters (although varied in the case of a special agreement with Britain for three miles), Canada is now asking that her limits be 12 miles. For some time past she has banned trawling to her own nationals within that limit, but fishing vessels of other countries have been allowed to operate to the usual international three mile limit. This has naturally put her own nationals at a disadvantage and has made them very restive at the privileged position enjoyed by foreigners.

U.S.A. an Offender

To exercise pressure upon the United States, the chief offender in this respect, and secure agreement in regard to the conservation of stocks of salmon in particular on the West Coast, a demand is now being made that her territorial limit shall be extended to 12 miles so that foreigners may be excluded from their former advantage.

Under threat of this insistent demand, American interests have agreed to consultations which they formerly refused.

Mexico, in her turn, claims a nine mile territorial limit for the exclusion of foreign vessels in the Gulf of Mexico. This is designed to protect shrimp trawling interests which are very considerable in that area.

American vessels operate extensively there up to the customary three mile limit and Mexico has now secured some gunboats and is starting a campaign to maintain her claimed nine mile limit. As a start, she recently seized two U.S. fishing trawlers and charged them with illegal fishing in Mexican waters. They were found guilty and their cargoes of shrimps were seized and sold. In addition the boats were fined \$1,200 each.

This is the first seizure of such boats for a period of two years. Recently, when certain gunboats and planes were added to the Mexican coast for patrol purposes, the Minister in Charge, Senor Manuel Pavon issued a statement in which he protested against foreign boats equipped with the latest machinery, well

trained crews and carrying nets, larger and superior to those of Mexican fishermen, operating in those waters. According to one report he said some 600 boats were catching each a ton of shrimps daily, worth 100,000,000 pesas in total.

Some of these catches are landed at Mexican ports where the shrimps are processed and frozen before being shipped to the United States by freezer boats and cargo planes.

Mexico is establishing a train of radio stations along the coast to protect her interests against foreign craft.

This problem of international fishing limits has been before the International Law Commission at Geneva recently and their report with draft resolutions is being submitted to the United Nations Council in the near future. According to some observers, the hopes of a uniform agreement being reached and codifying international law has been wrecked by the propaganda methods and voting powers of some South American states.

It is understood that a draft clause has been approved giving coastal states unilateral powers to fix their own limits, subject to the right of compulsory arbitration on the part of others who may have interests which they think are infringed. If this is approved, a complicated situation is likely to arise.

("The Fishing News" London June 15, 1956.)

New Administration Setup For American Fisheries

A "new deal" for fisheries in the U.S. is promised by the passing of a bill in Congress last month which sets up a new body to be called the Bureau of Fisheries.

The new programme is the result of several months of intensive study within the Administration, and will be implemented in two steps.

First, Department of the Interior officials will undertake immediately the necessary preliminary steps for the creation within the Department of a Bureau of Fisheries, which will come into existence July 1, 1956, and will take over administration of all fishery responsibilities now vested in the Fish and Wildlife Service.

Secondly, the administration will request Congress to enact into law a comprehensive commercial fisheries programme which will provide a broad charter for the new agency. The administration bill, which in some respects is modelled after the so-called "Saltonstall-Kennedy Act" due to expire next year, would authorise the Secretary of the Interior to conduct needed investigations and research into all phases of fishing activities including oceanographic, biological, statistical and economic studies of the distribution, and abundance of fishery resources, the development of new and improved methods of fishing, and the development of improved handling methods and techniques. In addition, the bill would authorise research into the nutritive value of fish and fishery products, and many other activities designed to promote the flow of fishery commodities in domestic and foreign commerce.

The administration proposal includes the establishment of a special \$10,000,000 revolving fund to be used to make loans for the maintenance, repair and equipment of fishery vessels. Loans made from the fund will carry interest rates of not less than three per cent and could be made for periods of up to ten years.

,"Western Fisheries" Vancouver, B.C. June, 1956.)

German Scientist Makes Bread with Seaweed Flour

A German scientist has started producing bread containing a small percentage of seaweed.

Heinrich Lienau, of Flensburg, is producing a loaf called "Algenbrot", which contains varying amounts of seaweed flour up to 8 percent.

Lienau has been experimenting for decades with the utilisation of seaweeds as fodder, and he now

reports that he has been able to use certain kinds of seaweeds for human food. The experiments were started in Iceland before the war, and the German started to work with seaweed again in Germany after the war.

A special treatment is used to clean the seaweeds of parasites, shells, etc. He uses a type of weed with the scientific name "Phaeophyceen." To remove excessive salinity, the weeds are washed in fresh water, dried and coarse-ground. This product is packed in strong paper bags of 110 pounds and sent to Hamburg, where the coarse-ground seaweed is specially ground to prepare the product for mixing with common bread flour. Seaweed flour can be mixed with rye flour, wheat flour and any other type of flour.

Generally, 2 percent of the seaweed flour (soaked in milk or water until a gritlike paste is obtained) is kneaded into the bread dough. The percentage of seaweed flour may be increased according to taste and moisture content, but not more than 8 percent can be added, otherwise a peculiar flavour is imparted to the bread, according to Lienau.

It is reported that the nutritive value of the bread is improved by adding seaweed flour since it contains essential nutritive elements, vitamins, and trace elements missing in grain. The seaweed flour can absorb great quantities of moisture, and the bread is spongy. Bread with seaweed flour keeps longer than ordinary bread. Although a sea odour is observed when the bread is cooking, the odour disappears when it is cooled.

"Algenbrot" is also produced in Belgium, where sales are reported to be increasing daily. Production has also recently started in Austria.

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

What are Highlights of Seawater Chilling?

Highlights of early experience in the rapidly-developing practice of holding and transporting salmon in refrigerated seawater were emphasised before the 18th annual Salmon Cutting by J.S.M. Harrison,

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research engineer at the Pacific Fisheries Experimental Station, Vancouver, B.C., where the early research in this technological development had its origin.

"Most important of all" - so Mr. Harrison characterised the finding that salmon carried in a tank of refrigerated seawater did not settle and pack. They are in a condition of bare flotation, and suffer not at all from crushing.

Stability of the vessel need not be affected adversely; and may be improved.

Unloading by brailing from the tank is faster than in the case of iced fish; and Mr. Harrison said American firms, Whiz Fish Products Co., Libby, McNeill & Libby and Seldovia Bay Packing Co., had found unloading seawater-chilled fish by mechanical means entirely practicable.

Freshness of the fish is protected by seawater chilling for from 40 to 50% longer than in crushed ice.

Weight loss is much less than in ice - and here lies the greatest economic potential for seawater chilling."

Curd formation in salmon canned from seawater chilled fish is probably reduced.

Salt penetration in the case of salmon is very slight and not sufficient to be a problem, although this is not true in the case of some lean species of fish.

Fading of colour does not occur.

Antibiotic protection of freshness by a solution of aureomycin in seawater is much more effective than where the aureomycin is used in the ice in which the fish is packed.

"Combination of refrigerated seawater and aureomycin in solution appears ideal for protecting the quality of fish, although we know that the use of chilled seawater alone is a real technological advance", Mr. Harrison concluded.

("Pacific Fisherman" Portland, Ore. July, 1956.)