

MONTHLY SERVICE BULLETIN



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March, 1962

STAFF NOTES

The Director, Mr A.J. Fraser, and the Chief Clerk, Mr B.R. Saville, will attend a meeting of the Standing Committee on Fisheries to be held in Canberra on March 8-9. Mr Fraser left Perth by air on February 28 to have pre-conference discussions with the Director of Fisheries and Game, Adelaide, with whom he is co-operating in editing, under the aegis of the Council, a book on Australian fisheries. While in South Australia Mr Fraser will visit that State's wild duck banding centre on the Coorong and inspect tuna storages and canning equipment at Port Lincoln. He will later spend a day in Melbourne investigating allegations of the sale in that city of considerable quantities of cooked cray meat from Western Australia. Mr Saville will leave by air on March 6.

On February 26, Mr H.B. Shugg, of Head Office, with members of the Fishermen's Advisory Committee, left Perth for Geraldton. The members accompanying him were Mr Roland Smith, of Perth, Mr W. Matthei, of Yunderup, and Mr N. Wright, of Quindalup. On February 27, they left aboard p.v. "Dampier" (under command of Inspector A.T. Pearce, with Assistant Inspector L.R. Frizzell as crew member) to witness the opening of the Abrolhos crayfishing season. After visiting each island group, during which they will discuss its conservation problems with some of the fishermen, they will return to Geraldton on March 4. On the following day, Mr Smith will return to Perth but the remainder of the party will visit Port Gregory to take evidence in a dispute between local fishermen and the Shire of Northampton relating to the use of certain sections of

the beach. Mr Shugg will fly back to Perth on March 6, but Messrs Matthei and Wright will return via coastal roads and tracks. Relieving Inspector G.C. Jeffery will lead them through Dongara, Jurien Bay and Lancelin on an inspection of crayfishing sites and of the processing works recently established at various centres.

With Capt. H.C.W. Piesse in command, and her full crew - Mr E.A. Mackenzie, engineer, Mr D. Wright, mate, Mr J. O'Sullivan, cook, and Cadet Inspector John Kelly - and with Research Officer R.J. Slack-Smith and Technical Officer R.J. McKay on board, the research vessel "Peron" sailed from Fremantle for Shark Bay on February 26. The Chief Clerk, Mr Saville, and Research Officer B.K. Bowen were among those who saw the vessel off on its long cruise, which will be the first to be carried out under Mr Slack-Smith's direction. "Peron" and her crew will remain in Shark Bay waters until about May.

We welcome to the staff John Henry Jacoby, of 2136 Albany Highway, Gosnells, and Rodney Charles John Lenanton, of 34 Loch Street, Claremont, who have been appointed as cadet research officers consequent upon the approval recorded in the last issue of this Bulletin. Mr Jacoby was selected for the cadetship in wildlife management and Mr Lenanton in that of marine biology. We will not be seeing much of either of these young men for some time. They have been enrolled under the terms of their cadetships at the University, and will be employed on a full-time basis only during the long university vacations.

Officers to commence three weeks' annual leave next month include Assistant Inspector D.H. Smith and Cadet Inspector P.A. Smith, on April 16, and Senior Inspector A.K. Melsom, on April 26. On April 30, Mr B.R. Saville of Head Office, will commence one week's leave.

LONG BREAK IN APRIL

Just before going to press it was announced that the Tuesday after Easter will be a public service holiday. Those of us who will not be on duty will therefore be able to look forward to a 6-day break - April 20, Good Friday; April 23, Easter Monday; April 24, Easter Tuesday; and April 25, Anzac Day, all being gazetted holidays.

SMALL SALARY INCREASE

Officers who keep a close check on their salary credits may have noticed a slight increase in the last pay or two. Although the Arbitration Court at its last quarterly review determined that there would be no alteration in the basic wage, the half-yearly review of salary rates obtaining in other States resulted in increases being made to marginal allowances.

Advice to this effect was received last month in a circular from the Public Service Commissioner. Senior males will receive an increase of £8 a year, senior females £5 a year, while juniors will get pro rata increases commencing from £3 a year for 15 year old cadets - the equivalent of 2/4 a fortnight.

FAUNA PROTECTION IN KIMBERLEY

Law enforcement in this State has, in recent years, undergone some particularly noteworthy changes. Some of the more obvious have been the disappearance from the streets of the starting-price bookmaker, and the enforcement of hotel trading hours in such redoubts as Kalgoorlie, Boulder and Collie. Of lesser note, but nonetheless foreshadowing the shape of things to come, the conviction in Broome of a person for illegally taking a wild turkey (reported in the previous issue of this Bulletin) heralded the coming of fauna protection law to the Kimberley. Long held to ridicule by the northerner who claimed to devour fauna wardens without salt, fauna protection took another step forward in Broome last month when Mr Baird successfully prosecuted his second case. For shooting snipe in an area known as McDaniel's camp, Douglas Fong was fined £4 while his youthful companion, Victor D. Fong, was fined £2. In addition each had to pay 8/- costs. The laws of the State must be applied with equality to all citizens and Mr Baird is to be commended for his forthright approach to a very difficult problem.

CRAYFISH EXPORTS

The table hereunder shows a slight but continued decline in the weight of crayfish tails exported from Western Australia over the last three years. Additionally, last year there was also a decline in the weight of cooked whole crayfish exported, bringing the decline in the calculated total weight of craytails exported to a somewhat

significant 400,000 lb.

The figures in the final column, "Total Weight", are liable to error as they include the estimated weight of tails in the cooked whole crays. This was arrived at by taking 40% of the net weight in column (e). Furthermore, the 1961 column (f) figure includes 149 cases containing 9,398 lb. of processed crayfish meat. This was converted to tailweight by the arbitrary conversion factor 6:5, arrived at by estimating that the meat in a craytail is five-sixths of the tailweight.

YEAR	FROZEN TAILS		COOKED WHOLE		TOTAL WEIGHT*
	Cases	Net Weight	Cases	Net Weight	
(a)	(b)	(c)	(d)	(e)	(f)
		lb.		lb.	lb.
1958	217,826	4,565,735	11,852	453,368	4,747,082
1959	291,881	6,311,017	2,681	105,522	6,353,226
1960	261,015	6,263,191	20,537	846,190	6,601,667
1961	251,079	6,174,183	7,773	387,860	6,195,157+

*"Total Weight" includes 40% of column (e)

+ The 1961 total weight figure also includes 149 cases containing 9,398 lbs. of crayfish meat converted to tail weight.

BERNIER ISLAND TO BE RID OF GOATS

Arrangements have been finalised for the landing of a party on Bernier Island on March 5 to destroy the goat population there. The party, which will be led by Fauna Warden S.W. Bowler, will consist mainly of volunteers from the Carnarvon Rifle Club. It will be transported from Carnarvon aboard the research vessel "Peron".

A full report on the shoot will be published in the next issue.

A PAT ON THE BACK TO ALL

Hereunder is a copy of a letter received recently by Research Officer B.K. Bowen. He had corresponded

with the writers, an American company, in connection with the supply of darts to be used when crayfish marking is incorporated in his crayfish research programme -

"FLOY TAG & MANUFACTURING INC.

2909 N.E. Blakeley Street Lakeview 4-2310

SEATTLE 5, WASHINGTON, U.S.A.

February 21, 1962.

Mr B.K. Bowen,
Government of Western Australia,
Fisheries Department,
108 Adelaide Terrace, Perth,
Western Australia.

Your Ref.: BKB:MFC

Dear Mr Bowen:

Thank you for your January 4 letter which we received Monday, February 19.

Actually, the main reason for this letter is to thank you and the people of Perth for welcoming our astronaut as he flew over your city yesterday. Our newspapers, radio and television people made much of the fact that the people of Perth turned on their lights to welcome John Glenn. We felt very close to you and appreciate your thoughtfulness.

Sincerely yours,
FLOY TAG & MFG., INC.

(sgd) Paul Lyon."

CONFERENCE ON RESERVES

A further step towards better conservation of wildlife was taken last month when representatives of this Department and the Department of Lands and Surveys met to discuss the control of fauna sanctuaries.

Called at the behest of the Director, as Chief Warden of Fauna and chairman of the Fauna Protection Advisory Committee, the conference was held in the office of the Under Secretary for Lands on February 21. In addition to Mr Fraser, those attending were the Acting Under Secretary, Mr N.A. Young; the Surveyor General, Mr H. Camm; the Deputy Surveyor General, Mr T.A. Cleave; the Divisional Surveyor (Central) and representative on the recently constituted Wildflower Committee, Mr J.S. Morgan; the Clerk-

in-Charge, Roads and Reserves, Mr P.S. Smythe; and Mr H.B. Shugg, Secretary, Fauna Protection Advisory Committee.

Mr Fraser explained that the Advisory Committee had requested the meeting so that the importance of habitat preservation and its dependence on the proper control of fauna sanctuaries could be emphasised. He thought that a much better understanding of the problems facing the respective authorities could be reached at a round-table gathering. That this was not just a pious hope, was borne out by the amicable nature of the discussions which followed and in which the respective points of view were nonetheless forcibly put.

Points made by Mr Fraser and Mr Shugg were --

- // Large as well as small reserves are required;
- // reserves must not be restricted to poor soil types but must include representative sections of all types of habitat;
- // as a general principle, all fauna sanctuaries should be controlled by the committee owing to the need for a managerial understanding of the complex biological relationships between the flora and the fauna;
- // the expenditure of government and research funds on the management of reserves called for stability in their status which could best be achieved by vesting them in the committee;
- // as much public and scientific activity as practicable should be allowed on sanctuaries but such activity must be controlled so that there will be as little effect on the fauna as possible.
- // although over 100 reserves, totalling about 2,500,000 acres, had been set aside, many more would be required.

After difficulties connected with the creation and maintenance of reserves had been discussed, it was agreed that the Committee should list the reserves over which it wanted complete control so that the Lands Department could consider the matter further.

ILLEGAL FISHING IN ABROLHOS WATERS

Considerable publicity has been given to the

impounding of three freezer boats alleged to have been fishing for crayfish in the close waters of the Abrolhos Islands area. The boats concerned were Zora IV, Western Star and Blue Dolphin. They were apprehended by Inspector A.T. Pearce and Assistant Inspector L.R. Frizzell, who chartered the l.f.b. New Mexico and conducted a surprise raid in the close waters around Turtle Dove Shoal.

As it was considered that the boats were fishing in what are "Australian waters" or "proclaimed waters" under the Commonwealth Fisheries Act, papers relating to the matter have been forwarded to Canberra to be dealt with by the Fisheries Division of the Department of Primary Industry and the Commonwealth Crown Solicitor. On instructions received from the latter authority, the processed fish seized from the three ships has been returned but all seized gear is being held until the action is heard. Pending the hearing of the case, the boats have been released to continue fishing as it may be some time before the cases come to court.

BIG CRAYBOATS TREND NORTH

The table below sets out the disposition of boats licensed at Perth, Fremantle and Geraldton under the Commonwealth Fisheries Act. Not all these would have been cray-fishing, but most of them would have been, particularly in the Geraldton area. The table was compiled from a check of the conditions endorsed on the licenses. It demonstrates the well-known fact that many big boats have forsaken cray-fishing south of the 30th parallel to operate in the northern (commonly called Geraldton) division.

Division	Up to 25'	25' to 35'	35' to 55'	Over 55'	Total
Fremantle	86	125	94	13	318
Geraldton	65	52	39	27	183

The shift of large vessels northwards would be one of the reasons for the increase in the production of crayfish north of the parallel and the falling off in the Fremantle division.

This year, yet more big boats have switched from southern to northern grounds. As a proportion of these include processing vessels which have closed down their freezers to operate purely as catcher vessels in the Abrolhos area, a greater percentage of the catch should be processed at Geraldton. This will only occur, of course, if the Geraldton grounds can meet the extra fishing effort.

(24)

W.A. FISHERIES PRODUCTION 1960-61

	<u>Round Weight lb.</u>	<u>Price per lb.</u>	<u>Value £</u>
Crayfish	18,019,237	3/4d	3,003,201
Salmon	2,101,024	6d	52,525
Snapper	1,985,137	1/7d	157,156
Ruff (Sea Herring)	916,992	10d	38,208
Mullet	871,989	1/4d	58,133
Cobbler	659,114	1/6d	49,434
Mullet, Yellow-eye	503,269	7d	14,679
Shark	458,516	2/0d	45,854
Whiting, Sand or Silver	444,108	1/9d	38,859
Jewfish	340,108	3/6d	59,519
Spanish Mackerel	144,685	2/0d	14,468
Tailor	128,798	1/4d	8,586
Perth Herring	112,002	4d	1,866
Prawns	106,069	3/0d	15,910
Skipjack (Trevally)	104,657	1/10d	9,594
Garfish	79,174	1/9d	6,927
Whiting, King George	76,809	2/8d	10,241
Samson (Sea Kingfish)	75,202	1/7d	5,954
Oysters	73,576	7/8d	28,204
Bream, Yellow-fin	65,894	9d	2,471
Leatherjacket (Silver Flounder)	48,474	1/9d	4,241
Crabs	48,399	2/3d	5,444
Pilchard	46,080	9d	1,728
Bream, Buffalo	42,289	9d	1,586
Cuttlefish	34,468	1/3d	2,154
Mackerel, School, or "Mulie"	33,281	1/0d	1,664
Cod	29,247	9d	1,096
Tuna	25,544	10d	1,064
Pike	25,069	2/0d	2,507
Sardines	24,365	9d	914
Flathead	21,146	1/6d	1,586
Squid	19,499	2/0d	1,950
Groper	19,381	1/10d	1,777
Bream, Black	18,202	2/0d	1,820
Octopus	13,822	1/3d	863
Mulloway	8,740	2/0d	874
Skate	8,478	8d	283
Whitebait	8,388	9d	315
Bream, Silver	8,072	1/3d	505
Salmon, Threadfin	7,510	1/6d	563
Barramundi	7,253	3/0d	1,088
Whitefish	6,924	1/0d	346
Mullet, Red	5,925	1/0d	296
Sweep	5,857	1/3d	366
Other Scalefish	16,534	Various	885
Turtles (processed weight)	38,706	1/0d	1,935
TOTAL -	27,838,003		£3,659,636

CLEARING HOUSE

The salvation of the wild turkey

Many people are under the impression that Turkey (the bird) comes from the country of that name. The French are equally mistaken in calling it, according to sex, dinde or dindon, implying origin in India. The Turkey, however, is strictly an American bird, and the early colonists were responsible for introducing domesticated varieties to the rest of the world as food for festive occasions. Unfortunately, in the process they came near to driving the aboriginal species (Meleagris gallopavo) to extinction. In 1954, Frank C. Edminster, author of 'American Game Birds', reported that gallopavo "is one of the scarcest of our important game birds".

Since that date the wild bird has made a remarkable come-back. It is regarded today as one of the success stories of American conservation techniques. Turkeys are now seen on the runways of Appalachian airfields, and they are frequently appearing in places where they have not been known for a century or more.

In its full geographic range from the northeastern states to Mexico, M. gallopavo is found in six variations or sub-species. They are the Eastern (silvestris), Merriam's (merriami), the Florida (osceola), the Rio Grande (intermedia) and two in Mexico (gallopavo type species and onusta). The number of wild turkeys that once existed seems incredible today. Flocks of a hundred birds were commonplace, and two 17th century hunters reported seeing a thousand in one day in New England.

What brought about the birds' downfall was the classic peril of shortsighted land development. Turkeys need plenty of food (their crops hold about half a pint of mast*, fruits, grasses, seeds and insects): they also need protective forest cover, water, grit and a lot of room to prosper. The forester's axe and the plough deprived them of all these things.

What probably did more than anything else to save them was an eleven-state study of the birds' needs under Pittman-Robertson Projects. Many of the findings of this enquiry were subsequently implemented by wildlife management authorities, especially in respect of the provision of cover. The hunter was not held primarily responsible for the birds' decline. It was thoughtless land-management. When the Turkey was given a little living space it promptly

(*mast: fruit of oak, beech or other forest trees)

flourished and the forests and ranges around it prospered as well.

(New Scientist

London

December, 1961)

China's Fishing Industry is Developing Fast

China, with one quarter of the world's population, has coastal fishing grounds covering one quarter of the world's fisheries. In 1959, however, she still only caught 2,310,000 tons out of an estimated world total catch of 35,300,000 tons, or under 7 per cent. In addition to this, over 2,000,000 tons were caught or harvested inland on the rivers, lakes, and fish farms, which exist even in Inner Mongolia.

Leading country

Before the Japanese war, China was a leading fishing country. In 1936, a million tons of fish were landed in Chinese ports, and half a million tons of fish and edible aquatic plants, considered by the Chinese to be of considerable nutritional value, were produced inland.

In 1949, when China emerged from the chaos of the Civil War, only 300,000 tons were landed, and it was not until 1952 that the pre-war figure was surpassed. Since then the figure has gradually increased, by approximately 7 per cent per annum at sea and by 15 per cent inland, but now appears to be levelling off.

Changing picture

In 1949 China had only 60 wooden trawlers of 160 h.p. left by the Japanese, and countless thousands of fishing junks and sampans. This picture is changing slowly but relentlessly. In 1959, the fleet had grown to 131,000 small sailing junks at sea, 297,000 sampans on her rivers and lakes, 6,600 powered junks from 5 to 20 tons, and 6,300 junks over 20 tons. Her powered fleet consists of 414 inshore trawlers, 64 conventional trawlers, mainly pre-war Japanese, but including four 110 footers displacing 260 tons, carrying 65-90 tons of fish, and crewed by 19-23 men, 18 stern trawlers with 250 or 350 h.p. engines, eight seiners and three whale catchers. This high-seas and inshore fleet of about 500 vessels is based mainly on Port Arthur (229), Tsing-tao (117), Shanghai (70), and Hainan (47), and 90 per cent of China's sea fish is still caught by the small craft operated inside a 20 mile coastal strip

by the communes.

The interior fisheries have, due to amazing efforts on the part of the communes, been almost fully developed, at least for the time being, and the Government is turning towards the sea. Canton yards are now turning out very simple stern trawlers, and in 1960, a few transport ships of 1,900 h.p. for fleet work were launched.

Thousands of engines

Great importance is being given to mechanisation of the larger sailing junks owned by the coastal communes. By 1959 over 3,000 of these had been fitted out with 80 h.p. engines, and by 1964 more than 15,000 will be so equipped.

About 3,000 scientists are engaged on research in preparation for the next "great step forward", when circumstances permit. The first research vessel, the Kin Sing, of 1,500 tons, was launched in 1957, and 11 research institutes are in existence.

Primitive

The picture is therefore one of a still primitive fishing industry, hampered - almost crippled - by shortage of larger sea-going vessels, and by a lack of mechanisation. Fishing aids are almost unknown, radio still rare, and nets in extreme demand. Muscle still means far more than machines. Expansion seems to have slowed down for the moment, but once more vital priorities have been met, we can expect a rapid expansion in China's fishing fleet and industry, which she appears determined (or forced) to do on her own, without Russian help.

(World Fishing

London

December, 1961)

World's Record Catch Exceeds 37m Tons

Britain's share decreases but the freezers forge ahead

Statistics just published by the Food and Agriculture Organisation in Rome show that in 1960 the world's seas and inland waters yielded a record catch of 37 $\frac{3}{4}$ million metric tons of fish. This was almost twice as much as in 1948 when the comparable figure was 19.09 million metric tons.

In the years from 1955 to 1960 the United Kingdom's share of the catch grew steadily less, falling in that period from 1,100,400 metric tons to 923,800. Landings of round fish fell by 116,000 tons and herring, etc., by 63,000 tons.

Japan retained her place as the leading fishing nation by becoming the first country ever to land over 6.2 million tons in one year, so that one ton in every six was caught by Japanese fishermen.

Although figures are not yet available it is probable that Mainland China came second with something in excess of 5 million tons, with Peru ($3\frac{1}{2}$) in third place, Russia (3) fourth, U.S.A. ($2\frac{3}{4}$) fifth and Norway ($1\frac{1}{2}$) sixth.

N.E. Atlantic

The North East Atlantic, including the North Sea and the Baltic, continues to show a higher yield and in 1960 stood at 8.15 million tons compared with 7.34 in 1955.

The North West Pacific was, however, the most productive fishing area and in the same period increased from 7.35 million tons to 9.81, an improvement of nearly $2\frac{1}{2}$ million tons in five years.

Spectacular

The most spectacular progress has been recorded by Peru, whose fishing effort in 1960 produced $3\frac{1}{2}$ million tons, compared with $\frac{1}{4}$ million in 1955.

Here the increased catch was chiefly the anchoveta which supplies the country's huge fish meal industry, bringing a phenomenal rise from 20,100 tons to 2,200,000 from 1955-60.

There has been remarkably little change in the utilisation of fish over the past six years. The Yearbook shows that around 40 per cent is sold fresh; curing (salting, smoking, drying) and reduction accounts for a further 40 per cent, equally divided between them: and freezing and canning divide equally another 18 per cent.

These proportions are broadly similar to those in 1955, the main trend being away from curing - which accounts for 6 per cent - to reduction, up by 7 per cent.

Two per cent more of the catch was frozen in 1960,

representing a throughput of 3.4 million tons, nearly twice as much as in 1955. Here Britain's record is spectacular, especially with regard to frozen fillets, of which her increased production is higher than any other nation.

In spite of falling supplies of raw material, this country's output of frozen fillets now ranks third in the world - Canada, with 64,600 tons, being first, Iceland (58,800) second, and U.K. third with 44,300 tons - almost as much as Norway, Sweden and Denmark combined.

(Yearbook of Fishery Statistics 1960, Vol. XII.)

(Fishing News

London

January, 1962)

Leyland Marine Engine

A new 120 h.p. marine engine based on the Leyland Power-Plus 0.400 diesel engine has been introduced by Ajax Marine Engines Ltd., of Stockport. Named the Achilles it was exhibited on the Ajax stand at the International Boat Show, which opened in London on January 3.

This is the first marine propulsion unit to be based on a diesel from Leyland's Power-Plus range, which produce 33 per cent more power than previous engines of the same size and are 4 to 10 per cent more economical on fuel.

With their design, Leyland Engineers broke through the thermal efficiency barrier and raised it to over 40 per cent - the first time this has been achieved with a quantity-produced engine. At the same time these new engines retain the long length of life between overhauls of the previous Leyland diesels.

The Achilles has six cylinders of 4.22 in. bore and 4.75 in. stroke giving a total capacity of 6.54 litres. The output of the naturally aspirated direct-injection diesel is 90 to 120 b.h.p. at 2,000 to 2,200 r.p.m. Complete with a new Self-Changing Gears' gearbox which were shown with the engine, the Achilles weighs less than 15 cwt.

Based in principle on the oil operated S.C.G. gearboxes which have sold in large numbers all over the world, the marine gearbox is designated MRF.350. It has a multi-plate clutch for ahead and astern drive while a piston-operated brake pad operating on the running gear

ensures a stationary propeller when the neutral position is selected.

(Shipping News

South Africa

January, 1962)

Falling catches from a \$4 million fishery

Tilapia of Lake Victoria

The tilapia fisheries of Lake Victoria, East Africa, are threatened with depletion due to overfishing. These fisheries, particularly those concerned with Tilapia esculenta, are worth about \$4 million to the three East African Territories bordering the lake - Tanganyika, Kenya and Uganda - and in spite of declining yields have been completely derestricted regarding net regulations in Uganda and Tanganyika since 1957.

The immediate widespread use of nets smaller than 5in. mesh when the regulations were relaxed led to an immediate but temporary increase in the numbers of fish caught, but then the decline was rapid to a level of catches even lower than before.

How this happened and its effect on the lake fishermen is described in the report for 1960 of the East Africa High Commission.

The effects of such relaxation was forecast by Mr Beverton, of the Lowestoft Fisheries Laboratory, after a visit in 1957, and by the East African Freshwater Fishery Research Organisation a year later.

Complex Story

The story that emerges is a complex one because of the nature of the lake itself and the habits of the fish, the report says.

"Thus it is now known that in fact the total overall yield from the lake of all species of fish has not itself declined, since the decrease in catches in the more usually fished areas has been offset by increased exploitation of areas previously unfished.

"The fishermen have gone further afield in search of such areas which are located in the vicinity of the outer islands and reefs, and since these are too far away

to enable the fish caught to be landed as fresh fish on the mainland, more of these catches are being landed as dried fish which do not command as high a price.

"These outer areas carry a greater element of risk because the canoes are liable to encounter more rough weather, fishing takes longer, and is not so easy as a result. So as soon as the temporary respite afforded to the easy inshore areas has allowed a slight recovery of stocks, the fishermen return to these easy areas and skim off this slight increase very rapidly, being satisfied with only marginal profits."

It has also become known that the tilapia populations apparently form units confined to particular areas. If one area is depleted heavily it is not apparently re-inforced by immigration of fish from elsewhere, but depends on its own inherent viability to recover itself.

"One is therefore confronted with a situation in the form of a rotational fishery effort moving from area to area as yields decrease in one and build up in another. This would, of course, be an ideal form of fishery management, if it was not for one overriding factor which destroys its value in Lake Victoria - that of the actual number of fishermen engaged in this pursuit."

Because the smaller mesh nets led to an immediate increase in the numbers caught, at once more fishermen started fishing with more nets, and the total effort was more than double what it was before. This increase in effort has proved the most disturbing feature.

"Not only are fish being caught at a smaller size, but the fish stocks are now reduced to a level when they can no longer maintain themselves by normal recruitment, and there are too few fish left to breed rapidly enough to replace those caught. This is due to too heavy a mortality of adult fish caused by fishing itself."

(Fishing News

London

October, 1961)

Scientists Are to Discuss Growing Tuna Fishery

One of the impressive developments in world fishing during the past few years has been the increase of the catch of tunas and bonitos from about 500,000 tons in 1952 to more than 800,000 tons in 1959. But nobody yet knows

the extent of the stocks of this group of fish, and even their migratory and spawning habits largely remain wrapped in mystery, cloaked by the vast waters through which the fish roam for thousands of miles.

In the past the sea fishing industry has chiefly concentrated its activities on rich fishing grounds such as those found in the White Sea, off Iceland, off Newfoundland and in various areas of the Continental Shelf of Europe, the Americas, Africa and Asia, and it is only recently that fishermen have discovered that the tuna and related species roam in their hundreds of thousands, perhaps millions, over the temperate and tropical oceans of the world. So tuna fishing has become a major industry, nowhere more so than in Japan where the tuna fleets catch more than 500,000 metric tons of fish a year compared with little more than 200,000 tons in 1952. Even these figures do not reflect the full extent of Japanese enterprise in this booming industry as the Japanese tuna fishing boats are now operating in all the great oceans.

Problems

With the rapid development of the tuna fishing industry have come questions and problems of concern to all the nations engaged in the industry, many of them problems which can best be solved through international co-operation. In this connection the Food and Agriculture Organization has taken the lead and is convening a World Scientific Meeting of the Biology of Tunas and Related Species, which will be held at the invitation of the United States Government, in La Jolla, California, July 2 to 14, 1962.

At FAO headquarters last month, the Technical Secretary of the Congress, Mr Horacio Rosa, who is Chief of the Marine Resources Section of Fisheries Division, FAO, said:

"While it is true that tuna and related species have been fished by man from immemorial times - the tuna fishery in the Mediterranean, for example, is one of the oldest fisheries in the world - it is mainly since the last World War that fishermen have realized the extend the commercial importance of this group of fish. For example, French, American, Japanese and other fishermen have, in recent years, opened up a profitable tuna fishery off the coast of West Africa, while Norwegian and German fishermen have found they can catch tuna in the North Sea and in areas off the Norwegian coast. But the Japanese have been the great leaders in this fishery and they are operating

in all the oceans of the world.

Main Types

"With this vast expansion of the tuna fishery there have come many problems," he continued. "Commercially, the main types of tuna and related species are the bluefin, the yellowfin, the bigeye, the albacore, the skipjack, the little tuna and the bonito. There is no agreement so far among biologists as to how many species of tuna there are. Two of the main types, the bluefin, which is found mostly in the North Atlantic, Mediterranean and North Pacific waters, and the yellowfin, which is found mostly in the South Atlantic, the Pacific and Indian Oceans, are among the most important commercially. Albacore, skipjack, bonitos and little tuna are found in most of the oceans and seas. The question of identification of these various types will be a major item on the agenda of the meeting."

It is expected that a good deal of discussion will centre around the need for reliable and standard statistics on catch and effort.

"At present, for instance, only a few of the increasing number of countries engaged in tuna fishing keep statistics of catch and effort but with no agreed, uniform method so that the statistics are not comparable and much of their potential value is lost," Mr Rosa pointed out. "What is needed is an agreement among tuna fishing countries to standardize their methods of collection of statistics, which would be a big step towards assessing the magnitude of the world effort now going into tuna fishing and its effect on stocks."

Another big problem which concerns both biologists and fishermen is the migratory habits of this large and roaming species of fish, Mr Rosa said. Nobody knows for certain, for example, whether the tuna which swim into the Mediterranean, presumably to spawn in the Aegean and Black Seas, form part of the vast tuna schools that migrate into the South Atlantic, down the west coast of Africa, and then across the ocean to the east coast of South and North America, or swim northwards up the coast of Europe around the British Isles and over to North America.

Migrations

"In fact," said Mr Rosa, "we know very little about where tuna go in any of their seasonal movements. Attempts have been, and are being, made to track these mi-

grations and there is some evidence to suggest from the catch of tagged fish that the bluefin tuna of the North Atlantic, for example, pass through the Mediterranean to spawn in the Aegean and Black Seas and then resume their thousands of miles of migration through the North and South Atlantic. But this is little more than hypothesis at present, supported only by the occasional catch of a tagged fish.

"For instance, two tuna which were tagged in 1954 by biologists of the Woods Hole Oceanographic Institute, Massachusetts, U.S.A., were caught five years later, in October, 1959, by French tuna boats operating from the South of France. Similarly, tuna that had been tagged by biologists of the Inter-American Tropical Tuna Commission in California have been captured off the coast of Japan."

In view of the growing importance of the tuna fisheries, Mr Rosa said, it is essential to know the full life story of tuna, the environment in which they live, the catch and effort of the fishing industry and an understanding of the dynamics of the population, if the stocks are to be exploited without depleting them.

"The problems I have briefly mentioned, and many others, will be discussed by the World Congress," Mr Rosa stated. "We hope that at this international meeting of fisheries scientists ways and means will be found to bring about effective international co-operation in investigating the riddle of the tunas so that ultimately we come to have sound knowledge of the magnitude of the resource and the effect that fisheries exert upon it.

"Such knowledge is necessary if scientists are ever to be able to predict the volume which can be caught without impairing stocks," he concluded. "But that is looking far into the future and will, in any case, be a subject for discussion at the 1962 Congress."

A prospectus of the meeting is now being distributed in which the organization, scope and objectives are explained.

(Shipping News South Africa November, 1961)

Millions of fish eggs but survival is chancy

In a Scottish Home Service broadcast recently, Dr J.H. Fraser, a scientist from the Marine Laboratory at

Aberdeen told how millions of eggs are laid by fish at every spawning but that only a few of these generally survived.

Female cod, he said each lay about a million eggs, haddock half a million, plaice a quarter of a million and herring about 50,000, and they did so for several years in succession.

Dr Fraser asked the question: How then is it that there is sometimes a shortage of young fish?

He went on to explain that fish eggs contained a small supply of yolk which nourished the developing larva before hatching with a little left over to feed the tiny fish after hatching. That was important because their mouths did not open for a day or two.

Once the yolk was absorbed, the $\frac{1}{4}$ in. fish must fend for itself and the right kind of food must be present in the water, organisms of the correct kind and size - smaller animals of the plankton only about $\frac{1}{100}$ in. to $\frac{1}{50}$ th inch.

And these must be sufficiently abundant, too, because such small fish cannot swim far looking for them.

Growing up

During the growing up stage the young of bottom living fish as well as those of herring, live in the upper layers of the sea where their food is, and in turn become excellent food for the carnivorous animals in the plankton such as jelly fish, comb-jellies and slightly bigger fish, and many thousands are eaten.

Living in the plankton themselves they are drifted about by water movements and if these take them to places not suitable for their later life they again suffer casualties.

"Small wonder," said Dr Fraser, "that at every stage of this precarious existence thousands of young fish are lost. Many are eaten as eggs or as tiny fish, others starved because of absence of the right kind of food at the right time, or they are carried away to wrong places for later growth."

Daily losses

Even under good conditions it was reckoned that

about a tenth were lost every day so that after a month only about 40 remained alive out of a thousand. In a bad year losses were much higher and there were hardly any left at all.

"Recruitment is a very chancy business and one year's brood may be two hundred times as successful as another, even though there was no appreciable difference in the number of eggs to start with. It's not really a matter of how many eggs there are so much as what happens to them afterwards."

Repercussions

Marketable fish in the sea were those that had survived these hazards and a good brood one year would dominate the fishery for several years in succession; three year olds one year, four year olds the next and so on. Two or three good broods running would yield excellent catches, but a series of bad broods could have serious repercussions in the trade.

(Fishing News

London

January, 1962)

Eskimos go into business

Eskimos are rapidly developing the Arctic char which has appeared on menus at Ottawa state dinners. The fish compares favourably in price with Japanese trout on the Vancouver market.

Arctic char are shipped from Cambridge Bay, in Canada's northernmost commercial fisheries, where an Eskimo co-operative has been established. First season's production is expected to be around eight tons, half of which has already been shipped to Edmonton (Alberta). Arctic char is regarded in Canada as one of the country's choicest fish and can be cooked like salmon or trout, but it has a flavour all its own.

(Fishing News

London

December, 1961)