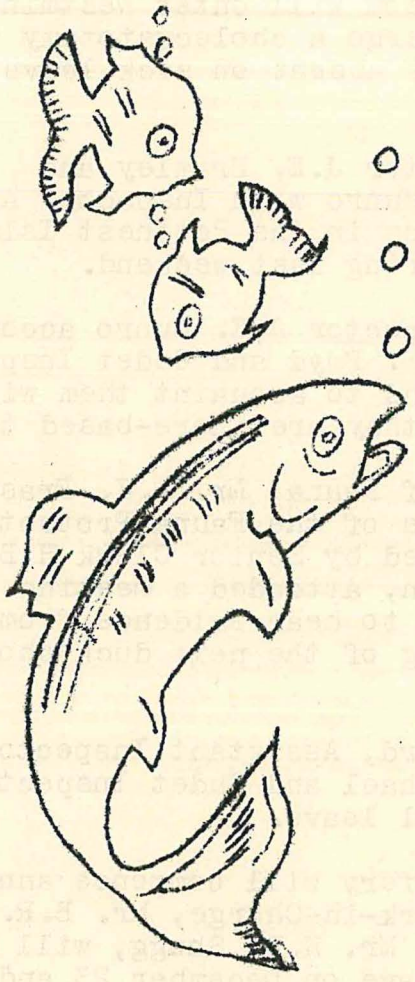
PARTMENT, WESTERN AUSTRALIA

MONTHLY SERVICE BULLETIN

Vol. III, No. 12. December 1, 1954



To every member
of
the Staff
I convey
very best wishes
for
Christmas and the New Year

Superintendent.

STAFF NOTES

The Superintendent, Mr. A.J. Fraser, the Clerk-in-Charge, Mr. B.R. Saville and Technical Officer J.S. Simpson, attended the quarterly meeting of the Trout Acclimatisation Council of W.A. at Pemberton on Sunday, November 28. Representatives of Trout Acclimatisation Societies presented their reports to the Council.

Congratulations are extended to Assistant Inspector J.L. Gallop whose wife presented him with a son on Sunday, November 14. Mr. Gallop left Mandurah on November 29 to spend some time in Head Office before taking over the Bunbury district.

Inspector A.K. Melsom will enter Westminister Hospital on December 5 to undergo a cholecystotomy and appendicectomy and will be absent on sick leave for some weeks.

Supervising Inspector J.E. Bramley and Metropolitan Inspector J.E. Munro with Inspector A.J. Bateman carried out inspections in the Rottnest Island waters on the p.v. "Garbo" during last weekend.

On November 29 Inspector J.E. Munro accompanied Assistant Inspector B.H. Boyd and Cadet Inspector J. Milne to Lancelin Island to acquaint them with their duties during the time they are shore-based there.

The Chief Warden of Fauna, Mr. A.J. Fraser, and Dr. D.L. Serventy, members of the Fauna Protection Advisory Committee, accompanied by Senior Clerk H.B. Shugg and Inspector A.V. Green, attended a meeting at the Elgin Hall on November 2, to hear evidence from local residents on the opening of the next duck shooting season.

Inspector R.J. Baird, Assistant Inspectors V.J. Sinclair and B.A. Carmichael and Cadet Inspector M.J. Simpson are all on annual leave.

Inspector G.C. Jeffery will commence annual leave on December 1. The Clerk-in-Charge, Mr. B.R. Saville and the Senior Clerk, Mr. H.B. Shugg, will each commence one week's annual leave on December 23 and 31 respectively.

PERSONAL PARS

Dr. H. Thompson, late Chief of the Division of Fisheries, C.S.I.R.O., will in company with his wife be passing through Fremantle on the "Straithaird" on December 7 on a visit to the old country. They will be tendered a luncheon organised by the staff of the C.S.I.R.O. Some officers of this Department will also be present.

Mr. John K. Howard, of the University of Miami, a world authority on Istiophorids (sailfish and marlin) last month called on the Superintendent. He was accompanied by the U.S. Consul Mr. S. Winship. Mr. Howard will return to Perth on his way by plane to South Africa on December 28.

Dr. E. Lundelius of the University of Chicago and his wife visited the Superintendent during the month. They were introduced by Mr. A.R. Main of the Department of Zoology, University of W.A. Dr. Lundelius is a paleozoologist and his wife a geologist and together they will accompany Mr. John Calaby of the Wildlife Survey Section of C.S.I.R.O. to the Hill River area to study cave fossils.

Dr. D.L. Serventy, Officer-in-Charge of the Wildlife Survey Section, C.S.I.R.O. is at present at Flinders Island, Bass Strait, having left Perth on November 16. It is understood he will return to Perth on December 17.

Mr. R.W. George, Research Officer of the Fisheries Division of C.S.I.R.O., will be married to Miss Marjorie Gould of Geraldton, on Saturday, December 4, at Geraldton. Our congratulations and best wishes are extended to the young couple.

EXPORT ESTABLISHMENTS

Advice has been received from the Chief Veterinary Officer of the Commonwealth Department of Commerce and Agriculture that the following establishments have been licensed under the Exports (Fish) Regulations for the period July 1, 1954, to June 30, 1955 :-

WESTERN AUSTRALIA

Registered premises under the Export (Fish) Regulations 1954/5.

Reg. No.	Operator and Business Address	Location of Establishment
830	Anchorage Butchers, Pty. Ltd., 188 St George's Terrace, Perth	Coogee, South Fremantle.
846	Annear & Wheeler Bros, 184 Hope Road, Applecross.	M.V. "Eckero"
856	Balgarnie, W., 43 Victoria Avenue, Claremont.	M.V. "Pacific Pride"
843	Bluefin Fishing Co. Pty. Ltd., Elder Bldgs., Cliff St, F'tle	M.V. "Bluefin"
852	Brown & Dureau Ltd., 5 Henry Street, Fremantle.	Robbs Jetty Works (leased portion)
842	Carmela Syndicate (Tropical Traders & Patersons Ltd.,) 863 Wellington Street, Perth.	M.V. "Carmela"
866	Craypak Pty. Ltd., Elder Bldgs, Cliff Street, Fremantle.	M.V. "Shelley Boy"
858	Craypak Pty. Ltd., Elder Bldgs, Cliff Street, Fremantle.	M.V. "Batavia Road"
Ø 833	Dept. of Agriculture, W.A. Government	Robbs Jetty Works
Ø 828	Fremantle Cold Storage Co. Pty. Ltd., 48-56 Beach St, F'tle.	48-56 Beach Street, Fremantle.
869	Fremantle Fishermen's Co-op, Scty. Ltd., Fish Markets, Fremantle.	Fish Markets, Fremantle.
836	Genex Pty. Ltd., Elder Bldgs, Cliff Street, Fremantle.	Robbs Jetty Works (leased portion)

WESTERN AUSTRALIA

Registered premises under the Export (Fish) Regulations 1954/5.

Reg. No.	Operator and Business Address	Location of Establishment
851	Geraldton Fishermen Co-op Ltd.,	Ocean Street, Geraldton.
832	Golden Gleam Fish Processing Co. Pty. Ltd., Augustus Street, Geraldton.	Augustus Street, Geraldton.
850	Groper Fisheries Pty. Ltd., 117 Barrack Street, Perth.	M.V. "Sonoma"
837	Hunts Canning Co. Pty. Ltd., 32 Adelaide Terrace, Perth.	Albany.
870	do.	M.V. "Jon Jim"
845	Kingfishing Trawling Co. Pty. Ltd., 168 St George's Tce, Perth	M.V. "Kingfisher"
853	do.	M.V. "Nord Star"
838	Lancelin Products Ltd., Elder Bldgs, Cliff Street, Fremantle	Lancelin.
839	Ocean Canning Pty. Ltd., Box 177, Fremantle.	Sydenham Street, Sth Belmont.
841	do.	Dorset Street, Busselton.
844	Saunier & Kidson, Chapman Road, Cannington.	M.V. "Eureka"
863	South Seas Syndicate, 18 Martha Street, Beaconsfield.	M.V. "South Seas"
865	Tropical Traders & Patersons Ltd., 863 Wellington St, Perth.	16 Evan Street, Geraldton.

WESTERN AUSTRALIA

Registered premises under the Exports (Fish) Regulations 1954/5.

Reg. No.	Operator and Business Address	Location of Establishment
835	Tropical Traders & Patersons Ltd., 863 Wellington St, Perth.	Robbs Jetty Works (leased portion)
848	do.	Lancelin
829	do.	Marine Terrace, Geraldton.
840	Vigilant Trading Co., Pty. Ltd., Elder Bldgs. Cliff Street, Fremantle.	M.V. "Villaret"
847	W.A. Proton Fisheries Co., 45 Market Street, F'tle.	M.V. "Proton"

Ø Appointed place only.

LIGHTING OF FISHING VESSELS

The ramming of the p.v. "Kooruldhoo" by the fishing boat "Linda" while the former was at anchor in the Geraldton Harbour brought to notice the fact that our vessels have not been carrying the necessary warning light prescribed by article 11 of the International Regulations for the Prevention of Collision at Sea. This Regulation states :-

"A vessel under 150 ft. in length when at anchor shall carry forward - where it can best be seen, but at a height of not more than 20 ft. above the hull, a white light in a lantern so constructed as to show a clear, uniform and unbroken light visible all round the horizon at a distance of at least one mile."

This regulation is applicable to all vessels anchored in either inland waters or harbours, unless there is a port direction or regulation framed by a local governing body such as the Harbour and Light Department to the contrary. There is no such direction or regulation made in this State.

Officers in charge of departmental patrol vessels are hereby directed to ensure that in future the requirements of the regulations are carried out to the letter.

CRAYFISHING

The vagaries of the weather this season are expected to influence the white crayfish run all along the coast. Reports coming in indicate that while the early take has been good and the fish are of excellent size, the run of whites is breaking up and the season for them will be short, particularly in the northern areas.

Inspector S.W. Bowler has advised that the season at Geraldton to date has been excellent, considering the small number of boats operating. The number of crayfish coming forward there are less than the appropriate figures for last year, but the average size is very good.

All down the coast white crays were taken on the first day of the season, although from the Lancelin-Cervantes area a later start was reported with indications suggesting an early move.

At Fremantle the season so far has been equal to, if not better than, the pro rata figures for last year.

SOUTH AUSTRALIAN FISH PRODUCTION, 1953/54

Although whiting were relatively scarce in South Australian waters during 1953/54 the known production of fish during that period amounted to

7,350,000 lb. which was an increase of 100,000 lb. on the previous year. Part of the increase was due to the greater quantity of salmon taken for canning. Some fishermen refrained from catching tuna and ruffs as they considered the price offered here did not justify the heavy outlay in gear and although blue-fin tuna were plentiful, only 12,146 lb. was marketed which was less than one fifth of the previous year's production. Medium and large crayfish made up a bigger percentage of the catch than in former years and the known production of crayfish at 3,850,000 lb. was 350,000 lb. more than last year.

KANGAROOS AND MARRON - EXPIRY OF SEASONS

(a) The attention of all officers is directed to the closing on November 30 of the open season for grey kangaroos in certain road districts in the lower South-West. As from December 1, therefore, kangaroos are protected in the whole of the grey kangaroo reserve and may only be taken under the authority of a license, except in the Wagin, Dumbleyung, Moora, Lake Grace, Wongan-Ballidu, Mingenew, Mt Marshall and Kondinin vermin districts, where they have been declared vermin.

(b) Officers are also reminded that on November 30 the close season for marron expired and these fish now may be taken by any person (and by any means other than by unattended traps) providing that the legal minimum length of 3", measured from the tip of the rostrum to the posterior margin of the carapace, is observed.

OPEN SEASON FOR WILD DUCKS

On November 2 the Chief Warden of Fauna, Mr. A.J. Fraser, and Dr. D.L. Serventy, members of the Fauna Protection Advisory Committee, accompanied by the Secretary, Mr. H.B. Shugg, and Inspector A.V. Green, of Bunbury, attended a meeting at the Elgin Hall to hear the case put by seventy two local residents for an evening opening.

The Chairman of the Capel Road Board, Mr. N.R. Payne, (who presided) and the Board's Secretary, Mr. D. Wright, also attended.

The main point made by the meeting was that the opening of the duck season was traditionally used to usher in Christmas festivities. The opportunity was taken to have an outdoor evening, in which the shooters' families participated.

Other arguments included the declaration that the local ducks did not "fly" in the morning, as once they were disturbed they disappeared either out to sea or to the broad stretches of the Estuaries where they could rest and could not be approached unobserved.

In the evening, it was said, they came in to feed and though disturbed would fly about and come back again to the feeding grounds.

A motion by the Gun Club urging the Department to open the season at 6 p.m. on December 22 in this and every year was carried unanimously.

On November 25 representatives of the Perth Gun Club and the President of the W.A. Sporting Shooters Association waited on the Committee and offered their views on the merits of what would be the best time and date to open. Each favoured the morning opening on the grounds that it is safer for the shooters, more humane towards the ducks while also allowing a more reasonable bag to be secured. These things, they averred, could only be achieved by a morning opening and were imperilled by evening openings.

The Committee also had to consider views offered by Honorary Wardens and other members of the public, both shooters and bird lovers.

After careful consideration of all the aspects a recommendation was finally made by the Committee to the Minister along the lines of the statement released to the press. The Committee considered that although in many parts of the State the duck population may have decreased and the breeding season been unsuccessful, the reverse applied in as many other

districts. It decided that the case prepared by the Capel shooters warranted the refusal of the plea for a State-wide morning opening made by city shooters. The Committee decided to accept two further recommendations in respect to areas that should be omitted from the open season.

A copy of the statement issued by the Minister is enclosed in this Bulletin.

ANNUAL INSPECTORS' CONFERENCE

On November 15, 1954, the Minister for Fisheries (Mr. L.F. Kelly) opened the 12th annual conference of inspectors of the Fisheries Department.

In his opening address the Minister said :-

"It is very pleasing to have again the opportunity of meeting you all, and to realise that once more you are able to deliberate on the affairs that have come under your jurisdiction during the past few months. There has been quite an appreciable amount of progress made during that period. There have been very many new angles that have come up and, in all, the last twelve months have been some of the most interesting for quite a number of years. Mr. Fraser has already made some comment in regard to our departmental association and I would like to emphasise very strongly that that association is a very cordial, friendly and co-operative one.

I think this conference is a great opportunity for the departmental officers to get together, for the older men to exchange ideas and for the younger men to glean knowledge from the experience of the older men. It gives all officers the opportunity of realising some of the happenings in other parts of the State which, in all probability, they will find at a great variance from those to which they are accustomed. The Department also must profit by being able to record the observations and opinions of the inspectors, who are, to all intents and purposes, the eyes and ears of the Department.

OPEN SEASON FOR WILD DUCKS

The Minister administering the Fauna Protection Act (Mr. Kelly) announced yesterday that the open season for wild ducks will commence as follows :-

(a) at 6 p.m. on the evening of Saturday December 18, in the Harvey, Bunbury, Capel, Dardanup, Collie, Preston, Busselton, Augusta-Margaret River, Nannup, Balingup, Greenbushes, Bridgetown and Manjimup Road Districts;

(b) at 5 a.m. on the morning of Sunday December 19, in all the rest of the State.

The open season would not apply in any of the following areas which have been set aside as sanctuaries :-

(a) The whole of the area within a radius of twenty miles of the General Post Office, Perth.

(b) All municipalities and townsites in the South-West Land Division.

(c) The whole of the Rockingham Road District.

(d) The whole of the waters of Lake Leschenaultia, Yealering and Seppings, and Bambun, Wagin, Nambung, Mungala, Nannerup and Wardering Lakes, and all land within twenty chains of their shores.

(e) The whole of the waters of Leschenault, Vasse and Wonnerup Estuaries and all land within twenty chains of their shores.

(f) The whole of the waters of the Vasse, King and Kalgan Rivers, and all land within twenty chains of their shores.

(g) All that portion of the Capel River between the Capel and Stirling Bridges and all land within twenty chains of the river bank.

(h) The whole of the waters of Oyster Harbour and Princess Royal Harbour and all land within a radius of twenty chains of their shores.

(i) The whole of the area of the Yanchep Caves Reserve.

(j) The whole of the Harvey Catchment area.

(k) The whole of the area within a radius of two miles of the Mandurah Post Office.

(l) All that portion of the Avon River from Dumbarton Bridge to the Railway Bridge, north of Toodyay and all land within twenty chains of the river banks.

(m) All that portion of the Serpentine River from Road 8629 at the southern end of Goegrup (Willies) Lake to Peel Inlet near the Old Mill and all that land within twenty chains of the river banks.

(n) All State Forests, Timber Reserves and Flora and Fauna Reserves.

"The Department is very concerned at reports which have been received regarding the shooting of wild ducks during the close season," said Mr. Kelly, "and all Wardens of Fauna have been instructed to take immediate action against offenders. Duck shooters enjoy a much longer open season in this State than in any other part of the Commonwealth, but unless the shooting public is prepared to co-operate during the close season, it may be necessary to reduce the period of the open season in future years."

"There is a bag limit of 15 ducks a day" continued the Minister. "It is illegal for any person to use traps or decoys for the capture of wild ducks and spotlights as a duck shooting aid are prohibited.

The Department's duck research programme is being continued and members of the shooting public can assist by sending in immediately to the Department any bands recovered and also by each completing a duck shooters scorecard which will be available from Gun Clubs and Fauna Wardens before the season opens."

"In spite of the poor conditions this year," Mr. Kelly added, "it has not been considered necessary to make any alteration to the duration of the season which will close as usual at midnight on May 31, next."

It is very important to have the opportunity to review policy in regard to some of the experiments which are being carried out by the Department, particularly in some of its field centres. The benefits that will accrue from this review of the work of the Department and the advances made on the technical side cannot help but have a good financial result for the industry and the State.

It is therefore with great pleasure that I declare this conference open."

A full report of the discussions at the conference will be published at a later date.

CLAIMS FOR TRAVELLING AND REIMBURSEMENT

The following information has been prepared for the guidance of officers in the submission of claims.

(a) Travelling and milage:

Under the Consolidated Allowances Agreement the daily travelling rate is divided into four equal parts - breakfast, lunch, tea and a bed - and the appropriate time limits are 8 a.m., 1 p.m., 6 p.m. and 11 p.m. The daily travelling rate is at present 31/-d per day, if the officer is absent from his headquarters overnight. If an officer leaves his headquarters and returns in the same day he is entitled to claim an allowance of 7/6d for each meal that he actually purchased providing that he makes the following endorsement on his claim :-

"I hereby certify that the meals were purchased by me. _____"
signature

Milage, overnight travelling and sea-going subsistence claims need no certification and the only entries in respect of these that need be made on the face of the claim form (P.S.C. 10.) are :-

"Milage as per back hereof ..... miles @ ..... "

"Travelling allowance as per back hereof

..... days @ ...."

" .... days Subsistence @ (12/-d for a married man)
(7/-d for a single man)

..... "

(b) Reimbursement:

Claims in respect of petty expenditure (such as telegrams, telephone calls and small sundry items) incurred on behalf of the Department will only be met if they bear the following endorsement :-

"I hereby certify that the sum of ..... was expended by me on public service.

_____ "
signature

A receipt must accompany the claim for each amount exceeding 5/-d.

Special attention to these requirements will save considerable delay in the payment of your claims.

LARGE MULLET IN THE SWAN

Two mullet, one weighing 5 lb. and the other 4½ lb. were caught last week in the Swan River by Mr. L. Armstrong.

One was sold, and the other which was cleaned by Mr. Armstrong had roe, well advanced.

From their colour - a very dark hue - it seems that these fish came from the upper waters of a river.

Statistics indicate that most accidents happen in the kitchen and the men have to eat them.

THE CLEARING HOUSE

Commercial Bluefin Tuna Fishing Off New England

Bluefin tuna fishing on a commercial scale is scheduled to be carried out in waters off New England this summer. Based on results of tuna explorations conducted by the Service over the past three years in that area, experimental fishing by a California purse seiner will commence about the end of July in the Gulf of Maine and nearby waters. Considerable industry interest has been shown in this undertaking, as it will be the first commercial seining for North Atlantic tuna since an attempt was made by industry to establish such a fishery in 1938-40.

Captain Nick Mezin has been en route from San Pedro, California with his purse seiner Western Pride and an experienced West Coast crew for the past month. Latest word indicated that they were due to arrive in the Cape Cod area July 28. Mechanical difficulties caused a later start than was planned, but the vessel will purse seine for bluefin tuna in New England waters until the end of September or until it is apparent that the run of tuna is over for the season.

The Service's bluefin tuna exploratory program, which began in 1951, successfully showed that North Atlantic tuna could be taken by the purse-seine method in commercial quantities within a hundred-mile radius of New England fishing ports. The catch that year was 180,000 pounds of prime tuna of a size ideal for canning. In 1952 and 1953 explorations, the Service used long-line gear. Although catches were smaller with this type of gear than with the purse seine, the project in both years continued to demonstrate that good canning-size bluefin tuna could be caught over a wide area in the Gulf of Maine and adjacent waters during the summer months. Considerable information on the habits and movements of the tuna was obtained. However, additional exploration of offshore

waters, in and beyond the Gulf Stream, is necessary before any extensive evaluation of the potential fishery can be made.

("Fishing Gazette" New York. August, 1954)

Sea Food Potential

The world catch of fish, now estimated at 26 million tons a year, could be doubled without harming the resources which now contribute only ten per cent of the world's protein food supply, declared Dr. P.V. Cardon, director-general of the Food and Agricultural Organisation, speaking on "The opening up of the New Frontiers" at a meeting of the British Association last week.

"But fish are not the only harvest from waters. The world growth of seaweeds, already a source of food materials, is very great. We can count the plankton as a resource still virtually uncommanded. In some Asian countries plankton is already being made into pastes and edible fishery products."

("The Fishing News" London. September 10, 1954)

Hong Kong Was Venue for Fish Marketing School

One of the most well-developed and efficient fish marketing organisations in the Far East was the focal point for an International Training Center on Fish Marketing which the F.A.O. conducted in co-operation with the governments of the United Kingdom and Hong Kong from 12 July to 21 August 1954.

The sixteen Member-Governments of the Indo-Pacific Fisheries Council were invited to send participants to the Center where lectures were given on fish as a commodity, the fish industry, fish supplies, the economics and technology of fish marketing, business management, organisational forms, special functions of marketing organisations, and general economics and the economics of marketing. The participants also took part in seminars on their countries'

fish marketing problems and observed the operations of Hong Kong's Fish Marketing Organisation.

F.A.O. regards the fish marketing problem as one of the most important links in the chain of problems which is holding back increased consumption of fish in a great number of the underdeveloped countries of the world. In most of these countries livestock production is low, so wherever possible fish must provide the bulk of the animal protein needs of the populations.

F.A.O. is helping to raise fish production in many countries, but solution of the technical problem of catching more fish cannot automatically increase the quantities of fish reaching the consumer. In many countries fish catches are landed on isolated parts of the coast, where they are sold to dealers who virtually fix their own prices.

There are no facilities for handling large catches quickly enough to avoid spoilage or to hold over supplies by means of storage and processing. Distribution arrangements are often so cumbersome in relation to the quantities handled, that retail prices rise to a level which only a small number of consumers can afford.

The Hong Kong Fish Marketing Organisation, which is generally considered a model, was set up by the Government of the Colony after the end of World War II. Under a number of orders passed by the Government of Hong Kong all marine fish must be sold through the Marketing Organisation.

The Organisation picks up the fishermen's catches at eight collecting depots spaced through the Colony and transports them to four wholesale markets. There they are sorted, divided into lots, and auctioned. From the market the fish is transported free of charge to buyers' businesses in urban areas. Total charges levied by the Organisation are 6 per cent. on the proceeds of the auctions. The fishermen can either collect their money directly after the auction, or it will be posted to them by the Organisation.

The Hong Kong fish marketing scheme

providing, as it does, an assured market for the whole catch at good prices, has been a great success. Between 1946 and 1953 the quantities of fish submitted for auction more than doubled. In 1946, 243,557 piculs (14,730 metric tons) of salted and fresh fish were auctioned for a total return of about £1,350,000. In 1953, 528,184 piculs (31,945 metric tons) of fish were auctioned for about £2,605,000.

The Organisation has repaid the money advanced by the Government for its establishment and is now running at a small profit after paying all its expenses out of the 6 per cent. commission. In 1953, for instance, its financial surplus at the end of the year was about £5,625.

It is the intention of the Government of Hong Kong gradually to relinquish control of the Fish Marketing Organisation to fishermen's co-operatives which will eventually be formed.

("The South African Shipping News and Fishing Industry Review." Cape Town. September, 1954)

California Studies Tags

A recent stud by Robert D. Collyer, California biologist shows the importance of using a tag which is suitable for the species under study. Using a variety of different fish tags, a series of tests were made on yellow-tail to determine the relative merits of the tags. Four types of experiments were conducted to obtain the desired results. Tags were tested by double-tagging yellowtail; by observing tagged yellowtail in an aquarium; by testing tagged fish in a water tunnel; and by testing the physical effects on tags by placing them for prolonged periods on the bottom of a research vessel.

Five types of tags were tested and considerable difference was noted on their ability to remain on the fish. A number of the tags were conclusively shown to be shed rather easily by the yellowtail. Although Collyer's work was on pelagic marine species capable of obtaining relatively high speeds, his work

could well be applied to other marine and fresh water fish. Most fisheries investigators have recognised the importance of selecting a reliable tag; however, they have often chosen to ignore it when the problem confronts them. A number of conclusions have been made by biologists concerning the migration, populations, and fishing rates on fish stocks without a proper understanding of the inadequacies of the tags used. Yellowtail is taken by commercial and sports-fishermen in California. The results of the tests by Collyer demonstrated several acceptable tags which will be used in future studies on the yellowtail.

("Pacific Fisherman". Portland. September, 1954)

Fluctuating Fishery Stocks

By Dr. L.A. Walford,
Chief of Fishery Biology,
U.S. Fish & Wildlife Service.

An address delivered to the Fishery Products Conference of the National Canners Association, slighty condensed.

Many of you are concerned about the condition of your fishery stocks, several of which seem to have receded to a low ebb of abundance in recent years. You are asking what has happened to Pink salmon, to Alaska herring, to Maine sardines, to the Pacific sardine, to the Gulf of Mexico shrimp. Are there fewer of them in the sea? Or have they perhaps retreated to distant, more obscure areas and become less accessible to fishermen? Whatever the nature of the condition may be, is it permanent? It is not only Americans who are concerned with these questions. So are people in other parts of the earth, for comparable conditions have occurred elsewhere, not only in California, Maine and Alaska, but also in such distant and widely separated places as Japan, India, Spain, North Africa. Is this all the result of mere coincidence? Could any important part of this effect have sprung from some common cause impelled by such a cosmic influence as weather, for example, which might

affect these diverse species in a similar way? Are all these recent and current seemingly peculiar conditions within the range of normal variation? That last question is most important, because the seriousness of present conditions can be judged only in comparison with some standard; and that standard, which we call the Normal cannot be simply defined.

In the language of our everyday conversation, the word "normal" tends to have the rather fuzzy meaning of Things-as-they-should-be. Lucky is the "perfectly normal man" - there is nothing wrong with him. It will be a fine thing when "the country gets back to normal again," when our domestic and international problems have become resolved. When enough food is produced to feed the millions of hungry people of the world, they can enjoy "normal lives." - Those are conceptions we hear on every side. In its popular connotation, Normal is the good state of affairs, the good life. In the language of the statician, it is something quite different - not nearly so cheerful a word, but very much exact. It is simply the average, the sum of all the items divided by the number of items - the lean years and the fact, the good and the bad, the tall and the short - whatever it may be that we are talking about.

We are talking about fishes and invertebrate animals that happen to be commercially useful for canning. Exact information about the history of these species is limited to relatively few recent years when they have lived under the pressures of intense fisheries. We know nothing about their fortunes under virgin conditions. In those days did they go through alternating periods of great abundance interspersed with periods of contrasting scarcity? What was their normal life then? We cannot tell. A great part of what we can learn now we must deduce from the catches of fishermen. Thus, in searching for normal patterns about the complex lives of fishes in order to understand the significance of events in a single year like the last, we must take into account patterns in the complex affairs of men. The behaviour of fishermen fluctuates in response to economic conditions; and for that reason as well as others the intensity of fishing rarely remains constant long. Fishing techniques improve; fishing fleets increase in size; markets change, etc. And because recorded history about these aspects of fisheries is

usually exasperatingly fragmentary, it is difficult to draw absolutely certain conclusions about normal conditions of fish or of fisheries. This much, however, seems clear: conditions have rarely been "normal."

Fishery harvests are characteristically unstable, subject to irregular oscillations. This is illustrated in records of 150 years of Atlantic mackerel fishing, 50 years of American cod fishing, and 37 years of Pacific sardine fishing.

In 300 years of Japanese fishing for tuna, skipjack, herring, squid and saury, periods of abundance alternate with periods of scarcity. Data are not statistically good enough to demonstrate any periodicity in these waves; nevertheless some Japanese scientists interpret that waves of maximal abundance have occurred about as follows:

Tuna 60 years apart.
Skipjack 80 years apart.
Sardine 100 years apart.
Hokkaido herring 50 years apart.

Part of the fluctuations shown in these records reflects economic conditions, part reflects the degree of accessability of the fish on fishing grounds, and part - surely a very important part reflects fluctuating abundance of the fish. Fishery biologists work continually to resolve these influences and have made much progress in that effort. They have long been in general agreement that fluctuations in environmental conditions cause fluctuations in abundance of the fish; but what elements of the environment are critical and by what mechanisms they affect the survival of fish are problems that remain largely unsolved. As long as that is true, fishing must continue to be the uncertain occupation that it is. Agricultural Science is far ahead of fishing science in understanding the biology of the environment and making use of that understanding. But then, of course, the problems of Agriculture, difficult though they may be, are very much simpler than those of fisheries. For the farmer has the enormous advantages over the fishery man of being able to perceive his produce as

it develops; and there are various things he can do to protect it when a period of unfavourable weather hits, such as a cold spell or a drought. Because the farmer can follow the viccissitudes of his produce with his eyes, he is constantly aware of what is happening on his land. He knows the limits of his piece of the environment and he can put a fence around it which will contain his crops and his animals; and therein they will stay until he is ready to harvest them.

The fishery man enjoys none of these advantages. The environment in which he is most interested - the body of water in which dwell the fishery stocks that give him his living, is continually moving, changing direction, position, levels. Now it is close to the shore; now far ar sea; now at the surface; now deep in the depths. It expands and contracts, like a living thing; and as far as we can tell, the fishery stocks which it contains tend always to fill it to its capacity and to remain in it wherever it goes. But its capacity evidently also changes constantly. All the evidence which has accumulated about the natural history of aquatic animals indicates that their environments have limits beyond which they cannot stray very far. How can we define these limits? How can we distinguish a body of water which contains all the materials that attract mackerel from a body of water that repels them?

One of the most obvious boundaries of the territory in which an aquatic animal can live is temperature. Fish are exceedingly sensitive to temperature.

Sea fishes react purposefully to changes in temperature of only 0.03° C., and in salinity of 0.2 parts per thousand. These results indicate the extreme care with which field oceanographic studies must be designed, and the precision with which observations must be made at sea - the figures are close to the limits of accuracy of hydrographic instruments - in order to determine relations between oceanographic conditions and biological effects. They also suggest how some striking changes in marine climate that have been observed in recent years can affect the fish

directly. The distribution of marine animals is sharply limited by temperature barriers.

The distribution of sardines of the world shows sardines are somewhat less closely bound to land masses than are other members of the same family with which we are familiar, namely herring, menhaden and shad. Shad must ascend rivers to spawn; menhaden spawn about estuaries; herring in the intertidal areas; sardines may spawn as far as 200 to 300 miles at sea. Their young come close in, the first months of life along shore. The temperature range of sardines (about 12° to 20° C.) is intermediate between that of the menhaden and that of the herring.

Menhaden and similar fishes in general, require warmer water than pilchard can tolerate and they occur only in regions with extensive estuarine areas. They spawn in or near estuaries, and their young move into salt water sloughs and marshes and even up into fresh water during their early growing period. Thus the growth and survival of menhaden are more affected by local conditions than is true of many other marine fishes. Inshore conditions of the environment are less stable than are those offshore, hence these fishes are more subject to violent fluctuations.

The herring is a cold water fish occuring only in the Northern Hemisphere, north of the range of pilchard.

The Pacific salmon can exist only where there is a peculiar combination of stream conditions and of oceanic conditions, as proved by the fact that although their eggs have been transplanted to many parts of the world, Pacific salmon have taken hold only where environmental conditions approximate those of the North Pacific, i.e., New Zealand, Chile, Maine, New Brunswick. In streams, the optimal temperature conditions for the incubation period are somewhere between 4° and 11° C. Eggs suffer severe mortalities if subjected to excessive periods outside those limits. After hatching, the optimal temperature range which controls the growth and survival of the young lies between 13° and 17° C. Prolonged periods beyond these limits cause excessive mortalities among the young.

In the ocean, salmon seem to be limited during their spawning and seasonal migrations to a temperature zone at the surface of about 0° to about 20° C.

The cod family, which furnishes about 19% of the world's harvest of sea fish is widely distributed on continental shelves in temperate latitudes.

I have shown you that various groups of fishes are confined to certain types of environments and in particular to certain temperature zones. Is there any evidence that there could have been important changes in the location of the boundaries of these zones in recent years that might account for changes in accessability or abundance of the fishes? In places, yes.

There are various ways by which climatic changes might affect food fishes. Most directly and simply, they could change the location of the environment having the physical characteristics to which these fishes are physiologically adapted.

If a fish feels uncomfortable because it is too hot, it will move into a cooler zone. This is probably true not only of fishes but of all other classes of animals. Warming encourages invasion by predatory species from warmer zones, and these drive out the former dominating residents. This sort of action may go on all the way along the food chain.

Another effect of changing climate is to stimulate diseases to burst into epidemic proportions. There is mounting evidence that fungi and viruses, which are very sensitive to temperature changes, sometimes severely decimate populations of marine animals and plants.

Striking examples of changing distributions are given by the spread of the mussel parasite and the green crab in the North Atlantic; the Northward spread of the cod into the arctic; the return of menhaden to the Gulf of Maine; the shift in composition of the species of shrimps of the Gulf of Mexico, and of shads off the coast of India.

Biologists have been rather slow to become aroused to the possible significance of these changes. Those in countries bordering the Atlantic were first to become interested, perhaps because the effects are more striking in the North Atlantic. Gradually this interest is spreading to other parts of the world, and scientists are beginning to consider the possibility that we are dealing with a world-wide phenomenon.

("Pacific Fisherman", Portland. September, 1954)

U.S. Tests use of Salt Water Ice for Preserving Fish

Experiments using ice frozen from salt water to preserve fish in boats at sea were carried out last year by a Florida Fishing company and a New York ice company.

Flaked salt water ice was taken from the refrigerated bin in the shore plant, in which it had been stored for as long as 5 weeks, and placed in the boxes on the vessel. Despite its long storage, the ice was easily handled and the flakes showed no tendency to stick together. Only those flakes in contact with the warm sides of the ice boxes were found to fuse together.

Fish were divided into lots immediately after landing. Some lots were iced with flaked salt water ice and others were iced with ordinary crushed fresh water ice. In each case the fish iced with the salt water ice were said to be superior in appearance, color, brightness of eyes, firmness of flesh, and to have substantially no slime.

Crushed fresh water ice was found to melt at approximately 32 degrees, while the temperature of the iced fish varied from 36 to 40 degrees. Salt water ice flakes, prepared from a 3% solution of salt water, showed no tendency to cake but remained quite slippery. Its melting temperature was 28 degrees, and the temperature of the fish was approximately 31 degrees.

("Western Fisheries", Vancouver. September, 1954)

Watch for this New Fabric in Ropes, Twines, Netting

Canadian Industries Ltd., are beginning production of a new wonder fabric which will likely make big inroads in the fields of ropes, twine and netting.

Called "Terylene", the fabric has been successfully tested in the field of garments and fashion, and exhaustive investigations of its properties under extreme marine conditions are nearly finished.

It has been found to have an unusual strength, either wet or dry, it does not stretch when wet, and is completely resistant to sunlight and rot.

The fabric is being tested in fishing nets and ropes, but research is still going on, even as the first commercial production of the material comes out of the plant. It will not be available to manufacturers for some time.

("Western Fisheries", Vancouver. September 1954)

How New Fillet Machine Works

Commercial production of a fish filleting machine capable of handling both flat and round fish at an average speed of about 100 per minute is being manufactured in San Francisco and will be introduced commercially this year, according to Kenneth W. Howell, president of Associated Machine Designers, developers of the machine.

He says that the machine adjusts itself automatically to fish of varying shape and size up to 18" wide and 5" thick. Tests indicate a higher yield than the average of hand filleting, with added saving at the nape.

The fish are fed tail first and emerge from the discharge end filleted both sides. During operation the machine is self-cleaned by water jets and special nylon brushes. It is easily opened for sterilization upon shutdown, while water lubrication of all internal moving parts eliminates the possibility of contamination from oil or grease.

("Pacific Fisherman" Portland. August, 1954.)