

Reclassification appeals lodged by Supervising Inspector J.E. Bramley, Senior Inspector J.E. Munro and Inspectors A.V. Green, A.T. Pearce and F.J. Campbell were heard by the Public Service Appeal Board last month.

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The r.v. "Lancelin" left Fremantle for the Pelsart group of the Abrolhos on February 23, in an endeavour to recapture some of the crayfish which were tagged and released in that area last October, and to punch mark further crayfish as part of the growth study programme. The work will be extended to the Easter Group prior to the official Abrolhos open season on March 15.

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We regret to advise that Assistant Inspector K.P. Enright (p.v. "Dampier") was admitted to Royal Perth Hospital on February 17 to undergo an operation. He will be absent on sick leave for some four weeks.

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Officers to commence annual leave this month include Relieving Inspector R.M. Crawford, on March 2, Inspector R. Smith (Jurien Bay), on March 8, Inspector D.H. Smith (Dongara), on March 22, and Inspector C.W. Ostle (Mobile Patrol) on March 29. Inspector R.G. Emery (Fremantle) will relieve Inspector Smith at Dongara and Inspector D.E. Blackman (Perth District) will relieve Inspector Ostle on the Mobile Patrol.

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Mr. P.A. Smith, who was appointed last November in a temporary capacity to assist in the crayfish measuring and monitoring programme, resigned from the Department on February 26.

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We welcome back to duty Technical Officer J.S. Simpson who returned to work on February 22 after a long illness.

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Cadet Inspector P.M. Lambert will go to Albany on March 4 where he will be tutored in salmon measuring and sampling techniques by Mr. O. Augustine, Technical Assistant, Division of Fisheries and Oceanography, C.S.I.R.O., Cronulla. Mr. Augustine is already at Albany and will remain in W.A. for the duration of the salmon season. After being tutored, Mr. Lambert will go to Busselton to measure and sample salmon caught in the west coast fishery.

PERSONAL PARS

A visitor to Perth last month, en route to Adelaide to join the Harold Hall scientific expedition through northern South Australia and central Western Australia, was General Sir Gerald Lathbury, of the United Kingdom. Sir Gerald is a member of The British Museum (Natural History) which is launching the Harold Hall Australian Expedition.

Sir Gerald is also a keen conservationist and Vice President of the Wild Fowl Trust and Treasurer of the Council of Nature. Accompanied by local ornithologists, Sir Gerald visited some waterfowl swamps in the metropolitan area and at Coolup, followed by a tour through the South-West as far as Two People Bay. He was also shown over some islands adjacent to Safety Bay which have been reserved as bird sanctuaries.

During his stay in Perth Sir Gerald was a guest of the Governor at Government House.

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Mr. W.D. Hughes, Department of Primary Industry, Canberra, and Mr. C. Brown, Division of Fisheries and Oceanography, C.S.I.R.O., Cronulla, will arrive in Perth on March 1. Mr. Hughes will collaborate with crayfish research teams in this State to study and assess the success of the current crayfish measuring and monitoring programme. Mr. Brown will go to Dongara to assist with the research programme.

WESTERN FISHERIES RESEARCH COMMITTEE TO MEET

The annual meeting of this Committee will be held in Perth from March 22 to 24. In addition to salmon, two of the more important items to be considered by the Committee will be the results of crayfish research which has been carried out over the past twelve months, and the results of current prawn research. The crayfish and prawn research programmes will also be discussed and future research plans could well be formulated.

REGULATION TO CONTROL ENTRY INTO A
PROCLAIMED FISHING ZONE

Following amendments to the Fisheries Act made last Session, a new regulation has been made to control the entry of persons into recognised salmon fishing beaches and adjacent waters during the salmon fishing season.

Under the new regulation all persons, other than professional fishermen, seeking entry into a proclaimed fishing zone must first obtain a written authority from the local Inspector of Fisheries. So far applications have been received by the Department to have Peaceful Bay, John and James Coves (Bremer Bay) and Cheyne Beach declared proclaimed fishing zones under the Act.

The Chief Inspector of Fisheries, or any inspector to whom he may delegate his powers under new section 12B of the Act, may, inter alia, regulate and control by such means as he may think fit the use of the proclaimed zone and the behaviour, conduct and activities of any person whom he may authorize to be in that zone. He also has power to prohibit the entry into such zone of all persons (other than professional fishermen) vehicles, boats, motors and engines, etc.

It must be stressed, particularly to members of the field staff, that no person other than the Chief Inspector or his lawful delegate may exercise these powers. A professional fishermen operating in a proclaimed zone does not have the legal right to order people out or in any way interfere with their free use of the area included in the proclaimed zone - this power is limited to the Chief Inspector or his delegate. It is to be clearly understood that the powers reserved in the Act must be exercised with the utmost prudence so as not to interfere unduly with the general public. For example, if no fish have been sighted in the vicinity the public are to be allowed complete freedom of movement. But if a school of fish has been observed approaching the fishing area, and a professional fisherman desires to catch them such action as deemed necessary to allow the fisherman unimpeded access to the fish should be taken by the inspector.

GEAR RESEARCH COMMITTEE TO MEET

The initial meeting of the Gear Research Committee will take place in Perth on March 25, 1965.

The Committee was established by a resolution of the 1964 (Melbourne) meeting of Commonwealth and State Fisheries Ministers, and was directed to prepare a report for submission to the 1965 conference of Ministers on -

- (a) the need for gear research in Australia;
- (b) the problems, including those of finance, associated with implementing gear research programmes; and

- (c) courses of action which might be adopted to deal with the problems identified by the Committee.

The Committee comprises Mr. C.G. Setter, Assistant Secretary (Fisheries), Department of Primary Industry, Dr. G.L. Kesteven, Division of Fisheries and Oceanography, C.S.I.R.O., and Mr. A.J. Fraser, Director of Fisheries and Fauna (W.A.), representing the State Fisheries Departments. Mr. G.R. Williams, Division of Fisheries and Oceanography, C.S.I.R.O., Cronulla, is Secretary to the Committee.

RECOVERY OF DUCK BANDS

The following information has been compiled from Departmental files and concerns records of duck bands which had been recovered and sent into the Department since the opening of the duck shooting season on December 19 last.

An interesting point is the recovery of bands from Mountain Duck which were banded during January last at Rottnest Island by Wildlife Research Officer T.L. Riggert. The six recoveries from Mountain Duck were all made within 65 miles of the place of banding and generally in a southerly direction from Rottnest Island. The longest known time lapse between ringing and recovery of these was 39 days. It certainly appears as though the surplus population of Mountain Duck which breeds on Rottnest Island migrates to other wetlands in the South-Western areas. The greatest distance recorded between ringing and recovery localities was 335 miles. This was a Maned Goose (Wood Duck) banded at Wardering Lake, west of Woodanilling on March 9, 1964, and recovered at Reedy's Swamp, about 18 miles north-east of Kalgoorlie, on December 20, 1964.

Banding Operations - Recovery of Rings December 19, 1964 to February 28, 1965

No.	Date Ringed	Place Where Ringed	Date of Recovery	Place where recovered and distance from ringing locality	By Whom Recovered	Time Lapse in Day
<u>BLACK DUCK</u>						
10608	11.3.64	Monger's Lake (Perth)	7.12.64	Monger's Lake Nil	A.G. Mathews	272
10674	10.3.64	Hyde Park (Perth)	19.12.64	Capel Lakes 110 miles	M.W. Gross	285

10027	7.4.62	Wardering Lake	19.12.64	Augusta 130 miles	H. Horner	986
10440	10.3.64	Queen's Gardens (Perth)	26.12.64	Wannamal Lake 60 miles	E. Collett	293
10437	10.3.64	"	20.12.64	Higgins Lake 115 miles	G.E. Smith	296
8158	2.3.61	Wardering Lake	9.1.65	Wilgarup River 80 miles	L.D. Robins	1408
11006	12.3.64	"	*	Bokal 20 miles	P.S. Wright	-
10567	11.3.64	Monger's Lake	26.1.65	Aitkin's Swamp 10 miles	D. Vanbeem	322
8257	9.3.64	Wardering Lake	31.1.65	Murdalmurrin Lake 15 miles	R. Eldridge	329
8273	9.3.64	"	30.1.65	Kulikup 40 miles	F. Hall	328
10628	11.3.64	Queen's Gardens	2.2.65	Queen's Gardens Nil	J. Harris	329
10316	9.3.64	Wardering Lake	30.1.65	Gundaring Lake 20 miles	R.F. Bodkin	328
11132	13.3.64	"	3rd week in Jan. 1965	Lake Muir 70 miles	F.L. Muir	About 315
9251	4.3.61	"	*	Wagin 10 miles	G.C. Kennett	

* Recovery date unknown.

MOUNTAIN DUCK

1514058	13.1.65	Rottnest Is.	26.1.65	Willie's Lake 40 miles	N. Cox	14
1514043	14.1.65	"	24.1.65	Lake Clifton 52 miles	F. Backshall	11
10904	10.3.64	Wardering Lake	28.1.65	Gairdner River 130 miles	J. Morris	323
10375	9.3.63	"	22.1.65	Mortijimup Lake 250 miles	J. Wills	318
1514088	14.1.65	Rottnest Is.	21.2.65	Peel Inlet 37 Miles	N. Harding	39
1514118	30.1.65	"	20.2.65	Lake Preston 65 miles	F.W. Reading	21

1514038	12.1.65	Rottnest Is.	*	Mandurah Estuary 40 miles	R.S. Atkins	
1515079	14.1.65	"	*	Speck's Lake 35 miles	V.R. Fraser	

* Recovery date unknown

GREY TEAL

5892	13.3.64	Wardering Lake	27.12.64	Gundaring Lake 25 miles	Mr. Lorenzi	290
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MANED GOOSE (WOOD DUCK)

10367	9.3.64	Wardering Lake	20.12.64	Reedy's Swamp 335 miles	L.E. Neve	286
10869	10.3.64	"	10.1.65	Kojonup 55 miles	R.J. Long	306

APPOINTMENT OF RESEARCH CADETS

The Public Service Commissioner has approved of the appointment, as from March 8, of second-year University students, John Joseph Mott and James William Penn, to professional university cadetships in Wildlife Management and Fisheries Research respectively. In anticipation we congratulate Mr. Mott and Mr. Penn on their appointments.

DEPARTMENT IN THE NEWS

A newsbrief appearing in the January 22 edition of "The Fishing News", London, concerns recently-amended regulation 14A. The paragraph reads as follows -

"New regulations, designed to end the traffic in under-size crayfish, became effective in Western Australia on December 16 only hours after they had been approved. The regulations, enforced immediately by Fisheries Department inspectors, carry a maximum £A100 penalty."

The amended regulation 14A which, amongst other things, was promulgated to curtail the processing of crayfish by other than registered export establishments, is as follows:-

- 14A (1) No person shall remove the crayfish tail from any crayfish, or cut up or otherwise process any crayfish except in an export establishment registered in pursuance of the Exports (Fish) Regulations (Statutory Rules, 1949, No.54 and amendments thereto) made under the provisions of the Customs Act, 1901, and its amendments and the Commerce (Trade Descriptions) Act, 1905, and its amendments, of the Parliament of the Commonwealth.
- (2) No person shall bring ashore from any boat any crayfish tail or any severed portion of any crayfish unless that boat is an export establishment registered as mentioned in subregulation (1) of this regulation and such tail was removed from the carapace of the crayfish, or the crayfish was cut up or otherwise processed in that boat.
- (3) (a) No person shall bring into Western Australian waters, or on to land, any portion of any crayfish that has been taken in the Abrolhos Islands area.
- (b) For the purposes of this subregulation the term "Abrolhos Islands area" means all that area bounded by lines starting at the intersection of 27 degrees 30 minutes south latitude and 113 degrees 37 minutes east longitude and extending south-easterly to the intersection of 29 degrees 30 minutes south latitude and 114 degrees 30 minutes east longitude; thence west to 113 degrees east longitude; thence north to 27 degrees 30 minutes south latitude aforesaid; and thence east to the starting point.
- (4) No person in charge of an export establishment registered as mentioned in subregulation (1) of this regulation shall receive any crayfish tail or any severed portion of any crayfish.
- (5) No person shall in any vehicle or boat or otherwise carry any crayfish tail or any severed portion of any crayfish unless such tail was removed from the carapace of the crayfish, or the crayfish was cut up or otherwise processed, in an export establishment registered as mentioned in subregulation (1) of this regulation.
- (6) Any person who contravenes any of the provisions of this regulation commits an offence against these regulations and is liable upon conviction to a penalty not exceeding one hundred pounds, and all crayfish tails or severed portions of crayfish received or carried in breach of this regulation shall be forfeited to the use of Her Majesty and any inspector may seize the same.

- (7) For the purposes of section 24A of the Act, the weight of a crayfish tail shall be not less than five ounces.

E.M.S. AND PLANET PART COMPANY

The Department has received advice that following the formation of Planet Fisheries (1963) Pty., Ltd., as a wholly owned subsidiary of William Angliss (Aust.) Pty., Ltd., the firm of Engineer and Marine Services Pty., Ltd., has lost control of the old Planet Fisheries of Shark Bay. Mr. Frank Pensabene has been appointed managing director of Planet, while Mr. George Powell continues his association with E.M.S. The latter will in future restrict its activities to the provision of engineering services.

William Angliss is the Australian member of the Union International Group, which also controls the U.S. crayfish buying firm of Tupman Thurlow Inc. Tupman Thurlow have established an office in Fremantle in the same premises as those occupied by Planet Fisheries.

EXMOUTH GULF OFFICE SITE

To provide for the Department's future needs with the expansion and development of the fishing industry in Western Australia, particularly in northern waters, the Lands Department has set aside a block of land within the Exmouth Townsite for the purpose of a Fisheries Office.

WHY NOT TRY GRUNTING FOR WORMS?

An article appearing in the December, 1964, edition of the Wildlife Review, a journal published by the Fish and Game Branch, Department of Recreation and Conservation, British Columbia, Canada, concerns a unique method of catching bloodworms, and because of its unusual interest, the article is reproduced hereunder.

AN ODD PASTIME known as "Grunting for Worms" came to the attention of Forest Protection Officer Larry Requa of the Yukon when in Florida recently. Larry was down there to give a paper on lighting fires in the Yukon. At the same time he was studying the Florida program of reducing forest fire hazards by controlled burning of the forest floor.

Here is how Larry Requa describes the worm grunting caper.

"Other benefits of the burned areas are marketable patches of blueberries, and the business of grunting for worms. This grunting for worms is carried on in open stands of long leaf pine about four months after a burn. The grunting noise is made by rubbing an old car spring leaf over the top end of a 1 x 4 wooden stake two feet long driven about 18" into the ground.

"The top of the stake is rubbed with the car spring and vibrates in such a manner as to make the grunting sound, and the resulting vibrations cause the worms to emerge from the ground.

"The demonstration I saw resulted in about 3000 worms coming to the surface within a 50-foot radius. The worms bring the grunter 60 cents a hundred and are packed 500 to a tin. The grunter I saw in operation had his wife and two children to help him and they picked 60 cans full from daylight until 10 a.m. Not bad at all for a morning's work.

"The worms are shipped all over the U.S.A. and used by fishermen for bait.

"I thought that I might try a little grunting when I got back to the Yukon, but am a little doubtful about what might crawl out from under the rocks!"

EXOTIC TORTOISES

A tortoise recently handed into the South Perth Zoological Gardens has been identified by zoologists of the University of Western Australia as a Mediterranean animal of the genus Clemmys and possibly of the genus leprosa. This species ranges through Spain, Morocco and Algeria. A similar species occurs on Crete and a further similar species occurs in Asia Minor. They are all members of the genus Clemmys.

The tortoise was handed in to the Zoo authorities anonymously by a man who said he had found it on a road. Unfortunately, even the district in which it was found is unknown and in the absence of information it is difficult to say how the animal was brought into the country, although more than likely it was landed from an overseas ship. These animals are sometimes kept by ship's crews as pets.

The tortoise recently found at Bedford Park and which was featured in a local newspaper has been identified as Elseya dentata. This species occurs in Northern Australia and possibly in the Kimberley Division of Western Australia.

CLEARING HOUSE

ARE INFECTED FISH HARMFUL?

By E.S. Iversen

Everyone takes for granted the fact that fish are unsafe for human consumption when they have been spoiled by lengthy or improper storage. But we really do not have to be told that. Spoiled fish generally broadcasts its own olfactory warning, unmistakable even to the neophyte. But sometimes a freshly caught fish will have an unappetizing appearance due to the presence of parasites, although it has no other unpleasant characteristics. Is such a fish safe to eat?

The salt water angler has reason to be concerned about parasites in his fish. The appearance of the flesh and even flavour may be marred, or in some cases the person eating the fish may become infected with the parasite. From the tiniest one-celled animals to the giant whales, nearly every animal species plays host to parasites of one kind or another. In some animals parasites of different kinds can be found inhabiting almost every organ or surface area. Some are even small enough to live within the animal's cells. The Pacific sockeye salmon is host to more than fifty different parasites.

Fortunately for the fishes (and for the fisherman's peace of mind) many parasites that attach to the outside of reef fishes are removed and eaten by smaller fishes and shrimp. These parasite-cleaning creatures provide a most interesting example of cooperation between animals of different species. They remove parasites from the skin, gills, fins and mouths of other fishes. Fishes bothered by parasites go to definite areas or "cleaning stations" on reefs and even wait in line to be serviced by the parasite-pickers. Some small parasite-pickers even swim inside the mouths of larger barracudas to perform their labors. (Sea Frontiers, Vol. 8, No. 1). There is some indication that these parasite-pickers are important to the health of reef fishes. After parasite-pickers were removed from a Bahama reef by a scientist, many of the larger fishes left the reef and those that remained developed large sores on their skins. At a nearby reef, still populated with parasite-pickers, fishes appeared healthy.

Parasites Seen and Unseen

The angler may not see many of the parasites in his catch because they are often located in such parts as entrails

and gills, which are discarded. Since very heavily infected fish become weakened and may fall prey to larger fishes, birds, or mammals, they are not often caught by anglers.

The parasites that fishermen are most likely to find are in the flesh (endoparasites) or on the skin (ectoparasites). "Anchor worms" (*Pennella*) (not worms at all but copepods, relatives of barnacles and lobsters) are easily seen. These creatures bury their heads in the flesh of the host fish and leave their rear ends protruding. Other close relatives of copepods called "fish lice" (*Argulus*) also occur on the skin of fishes. Occasionally leeches, or "blood suckers", a seagoing relative of the earthworm, attach to the skin of fishes and are found by fishermen. They are attached so loosely that they sometimes let go of the host when it is caught. Because anchor worms, fish lice, and blood suckers can be easily removed by the angler when the fish is skinned or scaled, they present little problem.

Parasites located in the flesh of food-fishes are of greater concern to the angler. These are generally of three kinds: protozoans (single-celled animals), roundworms, and flatworms.

Protozoans occur as small cysts scattered through the body muscles of fishes. These cysts, resembling tapioca, are spherical and contain numerous protozoans. There is no intermediate host involved in the transmission of this parasite. For the protozoan to infect another fish it must be eaten by another fish either of the same or a related species. Spanish mackerel harbor a species of protozoan in the flesh but in this case, as in many others, the parasites are harmless to man.

Roundworms may also be found encysted in the flesh of some southern marine fishes, including the red drum and the wahoo. Usually only a few roundworms occur in each fish but many members of any particular species of fish may be infected. When these infected fish are eaten by birds, or by mammals such as seals or porpoises, the young worms grow to adults and reproduce. The life cycle cannot be completed unless this intermediate host eats an infected fish. These worms will not infect man, so the fisherman need not fear them.

In the body muscles of some fishes anglers may notice "grubs." These are the young (larval) stages of flatworms. The life cycles of some of these flatworm

parasites are extremely complicated. Each species has a number of stages during which it must live in certain organs of two or more host species in order to complete the life cycle. For example, the young stages may occur in certain snails or other shellfish, and the adult stages may occur in fishes. In seatrout, the angler may find these grubs entwined in the muscles. At certain times of the year, usually during summer, half of the seatrout catch may be infected. Some of the larger trout may have more than 100 of these worms, some of which may be over 6 inches long.

A Matter of Taste

Since flatworms in fresh-water fishes are known to be harmful to man (Sea Frontiers Vol. 6, No. 1), and flatworms in brackish-water mullet in the Philippines, Japan and China are a known public health menace, these parasites require special attention.

There is good evidence from the Philippines that the flatworm which infects the mullet can do serious damage to humans. The young stages of this flatworm have not been found in Florida mullet, however, nor have the adult stages ever been found in man or other animals which might serve as hosts in Florida. There was one doubtful case in which a worm was suspected of causing a death in Florida but this parasite was probably not to blame.

What guide lines can the angler use to decide on whether or not to eat his fish? Generally, if a parasite is so abundant in a fish that it is difficult to remove from the flesh, a disagreeable flavor will result. In any case the flesh will not be very appetizing. But effects on flavor and appearance may be very important to one person while not to another; it is a matter of individual taste. The average person has many prejudices about food but some gourmets ignore them, and intentionally eat some of the worms found in fresh-water fish, just as other gourmets eat ants and grasshoppers. Years ago in Naples, Italy, a local fish known as Lasca was eaten widely although it contained many flatworms. The dish was called "Lasco with Macaroni". Gourmets in Italy and southern France also eat other fresh-water fish worms and consider them delightful. The important consideration is the possible danger of infection to man.

Man is Immune - Sometimes

There is a widely-held notion that truly pelagic

fish are safe to eat raw. Raw skipjack tuna is an important item in the diets of many Asians. They suffer no ill effects from the worms occasionally encysted in the flesh. In Hawaii the skipjack, little tuna, and a species of mackerel are popular in raw form. Fresh fish are cut into thin slices which are dipped into soy sauce mixed with grated ginger or mustard. People not accustomed to the strong sauce often argue that it would kill any worm on contact, but that is merely conjecture. In another popular raw-fish dish called lomilomi (Hawaiian for "massage") the fish flesh is mashed with the fingers, and relish, onions or peppers are added to taste.

Based on past records, the notion that pelagic fishes are safe to eat raw seems to be true. Some species of fresh-water fish parasites are known to infect man, but the vast majority of pelagic fish parasites have never been known to do this. Perhaps this is because fish parasites from the open sea are not adapted to develop into adults using man as a host.

Worms are Hardy

Many people besides Asians like raw fish; but to be on the safe side it's best to cook it. Although cooking kills most of the parasites, it does not guarantee destruction of all encysted worms. A series of experiments sponsored by the U.S. Public Health Service showed the the hot smoking procedure in which fish are cooked from 2 to 4 hours at temperatures of 110° to 250° F will apparently kill all encysted worms. Unfortunately, most smoked fish is prepared by a cold-smoking method and no data were collected on the effect of this process on encysted worms. In this method, cooler temperatures (generally under 100° F and usually about 75° F) are used, and the fish are hung a considerable distance from the fire. The smoke cools before it reaches the fish and although the fish fillets are exposed to the smoke for an extended time, the temperatures in the flesh where the worms are encysted may be too low to kill them. Even stronger preservation methods may not harm these worms. In the same series of experiments, larval worms in fish frozen for five days died but those in a strong brine solution remained alive for a month.

Thoroughly cooking any fish, whether caught in fresh water, brackish water or salt water, will eliminate all danger from parasites. But to be doubly safe, it is wise to cut from the flesh any worms or other obviously foreign organisms. If you miss some, however, the chances are that you will never know the difference and they will not bother you.

MEN OF IDEAS NOT WANTED!

Mr. Tony Cangemi, of Fremantle, who received world-wide publicity last year when he announced his intention to start a crayfish farm, has abandoned the idea. He claims that the W.A. Fisheries Department let him down. Mr. Cangemi had asked the department to get him 10 acres of land near the sea; to give him protection for 10 years and to issue him with a crayboat license so he could catch undersized crays to stock his farm.

Not On His Own

Mr. Cangemi should not worry about the little setback he received over his cray farm. During World War II a gent named Slater tried to induce the N.S.W. Fisheries Department to off-load the 7th Division and to use the troopships Queen Mary and Queen Elizabeth as trawlers. Sydney was desperately short of fish at the time, and he wanted the big boats to steam up the coast "just once" in parallel, dragging big trawl nets between them. They would, so he claimed, have caught enough fish to see Sydney through till the end of the war. The Fisheries people turned the idea down flat.

These two examples, occurring at random just 20 years apart, show there is no room in Australia for men of ideas. If someone suggested crossing a prawn with a grasshopper to save the cost of nets, we'd bet the Fisheries boys would knock it back.

(Fish Trades Review

Sydney

January, 1965)

KUWAIT PLANS FISHING INDUSTRY TO REPLACE OIL

Richest oil state in the Middle East, Kuwait owns about half the world's petroleum reserves. But the government believes that this wealth will be exhausted in the next 40 years and is building up industries to take its place.

Established only five years ago, Kuwait now possesses, in the Gulf Fishing Company, the largest and most modern fishery organisation in the Middle East. It is owned by Sheikh Sabeh el Ahmed El Sabbah, Minister of Foreign Affairs, and Abdel Aziz Al Rashid, a leading merchant, and is managed by Dr. Khalal Osman, A Sudanese expert, trained in Egypt and the Sudan.

From three vessels in 1959, the company's fleet has grown to 18, fully equipped with the most up-to-date catching gear and electronic navigational and fish-finding aids. Principally, the company is engaged in freezing and exporting shrimp to the U.S.A., Lebanon and Europe, besides many varieties of fish which abound in the Gulf. Ten more vessels are due to join the fleet before the end of the year.

Cold stores are planned on a large scale as well as a canning factory. The company employs perhaps the most cosmopolitan pay-roll in the Middle East, for the fishermen are drawn from 34 nationalities, including the U.K, Japan, the United States and Norway.

The company enjoys an almost complete monopoly of the fishery industry in the state although there is no law forbidding other companies to compete.

(Fishing News International London Oct-Dec., 1964)

SALMON - AT 10s. AN OUNCE!

The highest price ever paid for a salmon on the Dublin Fish market - nearly 10s. an ounce - was given for the first fish of the season. It was a 17 pounder landed from the Liffey by Mr. Thomas Keegan of Inchicore, who received £134.6s.

There was ten minutes of fast bidding between several retailers for the salmon before it was knocked down to Mr. Thomas Mulloy, fish retailer, of Baggot Street, Dublin. He bought it for Trainors Ltd., of the Goat Grill, Dublin.

Bidding started at 70s. a pound, and went up quickly by 2s. a pound. Four other bidders were Dunnes of D'Olier Street; Byrnes of Dorset Street; Moloneys, of Dun Laoghaire, and Sayers, of Chatham Street, Dublin.

The price reached on January 2 last year for the first salmon was £5.15s. a pound.

It was on the menu at the Goat Grill at between 15s. and 20s. a steak.

(Fishing News London January 15, 1965)

SOVIET OCEANOGRAPHY

By Yevgeni Suzyumov

Scientists who attended the 13th General Assembly of the International Geodetic and Geophysical Union at Berkeley, California, in September, 1963, may remember the name Gleb Udintsev. The Soviet geomorphologist presented a paper on his studies of the topography of the Pacific Ocean bed which he illustrated with a chart, the result of a fourteen-year investigation of the Pacific sea floor conducted by Soviet scientists aboard the research vessel "Vityaz" and other ships.

Soviet geologists and geomorphologists have studied the topography and structure of the Pacific Ocean floor, sampled sediments and bedrock in various deeps and discovered a new deep - which was charted and named after Vityaz.

The author had the good fortune to be aboard "Vityaz" late in 1961 when this discovery was made. The ship was making her thirty-fourth voyage, sailing from Fiji Islands to Japan. During a dark tropical night in the eastern part of Melanesia we were passing over an area in which the echo-sounding equipment detected great hitherto-uncharted depths. Gleb Udintsev was on watch in the echo-sounding laboratory that night. He was keenly watching the oscillographic recorder when suddenly the line of the echogram declined sharply. Udintsev turned to me and exclaimed with joy, "I was right in my assumption about a deep here. Here it is!"

For half the next day "Vityaz" zig-zagged to chart the depths, the dimensions and direction of the deep which was found to descend to 20,184 feet. It is situated along an underwater range crowned with the islands of Anuda, Mitre, Duff, Tycopea and Rotumah.

It was Udintsev who, during the expedition of "Vityza," recorded the maximum depth so far discovered anywhere in the world: 36,174 feet in the Marianas Deep and 35,715 feet in the Tonga Deep. Newly discovered underwater chains, mountains, plains and depressions appeared on the chart of the Pacific. There was a particularly large number of underwater volcanoes.

Discovery of New Animals

The Soviet geologists collected extensive material on clastic (sedimentary rock) deposits and suspended mineral

materials in the water. They have ascertained the mechanism of deposition and have made charts of clastic deposits.

Soviet marine biologists have discovered some 400 new species of bottom dwellers in the Pacific. From the deeps of the Marianas, Tonga and New Hebrides, "Vityaz" has captured some ultra-abyssal bottom dwellers. The living organisms discovered at these extreme depths reveal that there is a constant and adequate supply of oxygen in the near-bottom water layers of the deeps. This has been confirmed by the studies of the hydrological conditions of the deeps. Soviet scientists have concluded that the vertical exchange of ocean water reaches the very bottom, hence their protest against disposal of radioactive wastes in the ocean deeps.

Professor Lev Zenkevich and his pupils, Nina Vinogradova, Georgi Belyayev and a few others have worked out a new scheme of distribution of deep-sea fauna in the World Ocean. Only recently the ocean depths were regarded as a "realm of homogeneity," suggesting that life in the deeps is much the same in all parts of the ocean. The Soviet scientists, however, has proposed the division of the abyssal zone into three biological regions, six sub-regions and eight zoo-geographical provinces.

In 1961, Soviet oceanographers on "Mikhail Lomonosov" discovered two large underwater currents in the deep layer of the Atlantic. These currents flow in the opposite direction to surface currents above them. One of the newly-discovered deep-sea currents crosses the ocean from west to east at a depth of up to 656 feet. It carries immense masses of water at speeds up to 4 feet per second. This current is under the South Equatorial Current. Georgi Ponomarenko, chief of the expedition that made the discovery, suggested that it be named the "Lomonosov Deep-Sea Equatorial Counter-Current".

There is another deep-sea current flowing at a depth of up to 3,200 feet under the Brazil Current. Its direction is counter to that of the Brazil Current and it carries relatively colder masses of water at approximately 14 inches per second. It was named the "Brazil Deep-Sea Counter-Current of Zubov" in memory of a prominent Soviet oceanographer who died recently.

Professor Vsevolod Zenkovich and his team have developed a theory of the evolution of seashores. Zenkovich's theoretical propositions have helped develop methods of forecasting shore evolution. Application of these methods ensures sound selection of sites for constructing seaports and provides means of combating erosion. Only recently the port of Sochi on the Black Sea was threatened by sand wash and gravel congestion. However, thanks to the investigations conducted by Zenkovich and his team, methods for combating these processes were evolved. As a result, the port of Sochi has been saved.

Floating Ice Stations

Soviet oceanographers have developed methods for investigating the Arctic Ocean directly from stations on drifting ice. Several Arctic drift stations are currently maintained. We are well-advanced in our studies of the laws of drifting ice and water dynamics in the Arctic Ocean as well as the exchange of water between the Arctic Ocean and the Atlantic and Pacific Oceans. The underwater Lomonosov and Mendelejev mountain chains have been discovered in the Arctic basin. They affect hydrological conditions there considerably. A large magnetic anomaly has also been discovered in the same region.

In 1955 Soviet oceanographers began to study the Antarctic Ocean. Investigations carried out by Ob and other expeditions since then have produced much information on the dynamics of this region. Researchers have established the dependence of the current speeds on the winds and have established the steady character of the eastern drift. They have estimated the masses of water involved in the exchange between the Antarctic Ocean and the three adjacent oceans.

A team of marine geologists has discovered a deep which lies parallel to the Eastern Coast of Antarctica from the Davis Sea to the Ross Sea. Apparently it marks the breaking zone formed by the tremendous static pressure exerted by the Antarctic ice-cap on the ocean bed.

Fish Without Red Blood

Biological investigations have revealed a rich flora and fauna in Antarctic waters close to shore. There are about 100 species of seaweed. Rare fish of the Chaenactid genus known for the absence of haemoglobin in their blood

have been discovered. The studies have revealed that at depths exceeding 13,000 feet up to 72 per cent of the animals remain highly localized, hence Soviet scientists have designated the Antarctic deep-sea region a separate zoo-geographical zone.

The scientists of the Institute of Oceanology are carrying on their studies of the Pacific and Indian oceans on the 5,500 ton "Vityaz" - one of the first Soviet oceanographic vessels. The ship made her first voyage in 1949 when she sailed from the Black Sea to Vladivostok. For several years she plied the waters of the Sea of Okhotsk, the Bering Sea and the Sea of Japan. Later she took part in studies connected with the International Geophysical Year. Many discoveries are connected with the name of this ship, and a whole school of Soviet oceanographers were trained aboard her. "Vityaz" has made thirty-six voyages of from four to six months each. Her complement is seventy officers and men. In addition to these, she usually carries about sixty scientists during an expedition.

The other research vessels of the Institute of Oceanology is "Academician Valvilov". She is much smaller than "Vityaz", displacing only 450 tons. Her complement is twenty officers and men and ten scientists. This ship is used for studies of the Black Sea and the Mediterranean.

The Sea Hydrophysical Institute also has its own vessel, "Mikhail Lomonosov". She was built for research in the Atlantic as part of the program of the International Geophysical Year. The ship was commissioned in 1957. In the past six years "Mikhail Lomonosov" has made fourteen voyages in the Atlantic. The first few expeditions investigated the northern part of the ocean with particular emphasis on the Gulf Stream and the North Atlantic Current. In 1960 she began work in the tropical zone of the ocean. "Mikhail Lomonosov" is larger than "Vityaz" by 450 tons. She has sixteen laboratories, normally staffed with sixty-five scientists.

Historic Sevastopol and Marine Biology

One of the oldest marine research institutions of the U.S.S.R. is the Sevastopol Biological Station. Last year the Station marked two outstanding events: its centenary and reorganization into the Institute of Biology of the South Seas. The Institute has its own research vessel, "Academician Kovaleski". For many years the Institute

concentrated on the study of organisms of the Black Sea and their environment. However, with the launching of the International Geophysical Year the scientists of the Institute made several voyages into the Mediterranean, the Red Sea and the Gulf of Aden. Scientific research conducted by the Institute has been supervised for many years by Professor Vladimir Vodyanitsky, an authority of fauna of the southern seas.

Two International Geophysical Year expedition vessels, "Pyotr Lebedev" and "Sergei Vasiliev", belonging to the Institute of Acoustics, have a displacement of 4,600 tons each. As a rule these ships sail together to conduct acoustic investigations of the ocean and seismic investigations of the ocean floor.

Locating New Fishing Grounds

In addition to her major ships, the Soviet Union has dozens of other expedition vessels for more specific work. The research vessels of the fishing industry are primarily devoted to locating new fishing grounds. The vessels of the Weather Service do weather duty at sea and collect information on the interaction between the atmosphere and the ocean. Hydrographic ships' data is used for charts and pilot handbooks. Aboard "Bataisk" and other training ships future oceanographers take their practical training at sea.

Professor Zenkevich maintains that in the next few years the Soviet oceanographers should concentrate their efforts on twelve main problems. The first problem is the study of the waters of the World Ocean and the physical processes occurring in it. The next two problems are closely connected with the first; the chemical structure of the masses of ocean water and the interaction between the ocean and the atmosphere. According to Professor Zenkevich the remaining problems are the biological structure of the ocean and its organic resources, geological structure of the ocean bed, structure of the earth's crust beneath the ocean bed, interaction between the ocean and the lithosphere, history of the world ocean, the ocean's mineral resources, the ocean's power resources, distribution of natural resources, preservation of the ocean's resources and transformation of the nature of the world ocean.

Soviet scientists were active in contributing to the Program of the International Geophysical Year. The foundation

for international scientific cooperation, laid during the last International Geophysical Year is being strengthened. "Vityaz" has been participating for three years in the International Expedition for the study of the Indian Ocean. "Mikhail Lomonosov" and some of the other Soviet research vessels participated twice in last year's "Equalant", an international expedition for the study of the tropical zone of the Atlantic. "Mikhail Lomonosov" took part in the First International Oceanographic Congress in New York in 1959 and "Vityaz" participated in the Tenth Pacific Scientific Congress in Honolulu in 1961.

The oceanographers of China, Rumania, India, Indonesia, the United Arab Republic and Australia and their practical training aboard "Vityaz", and the scientists of the German Democratic Republic, Poland, Brazil and Uruguay on "Mikhail Lomonosov". Some of these scientists were attached to these vessels as UNESCO trainees.

This year the oceanographers of the U.S.S.R. Academy of Sciences will continue their work on the study of the World Ocean. This year "Vityaz" will renew her investigations in the Indian Ocean as a member of another International Expedition. The medium-sized research vessels will be working in the Mediterranean. However, one medium-sized ship will study biological productivity in the waters surrounding the island of Cuba.

The laboratories of the U.S.S.R. will process the material collected by the sea expeditions and draw conclusions. They will also continue their work on theoretical problems of oceanography. The information thus derived will be transferred to the International Depository Centres for safekeeping of IGY material where it will be readily available to the scientists of the world.

(Sea Frontiers

Miami

December, 1964)

ARCTIC PLANKTON

Biologists studying the distribution of plankton have always been interested in the relationship between Atlantic and Pacific forms. Obviously, somewhere under the great Arctic icecap, some of the Atlantic and Pacific plankters intermingle. Where this intermingling takes place, a boundary of sorts must exist. This under-ice plankton has now been sampled by a unique method. The atomic submarine Seadragon was equipped with continuously-operating plankton samples, and on a cruise beneath the icecap 204 large samples of plankton were collected.

(Sea Secrets

Miami

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