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DEPARTMENT OF PARKS AND WILDLIFE

FISHERIES DEPARTMENT, WESTERN AUSTRALIA

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MONTHLY SERVICE BULLETIN

Vol. IV, No. 5.

May 1, 1955

STAFF NOTES

From April 13 to 16, the Superintendent (Mr. A.J. Fraser) and the Senior Clerk (Mr. H.B. Shugg) inspected the lakes in the wheatbelt from Lake Mears, out of Brookton, south to Dumbleyung, and south-west to Wardering Lake, west of Woodanilling.

Inspector J.L. Gallop will commence annual leave on May 2. During his absence Relieving Inspector A.K. Melsom will be in charge of the Bunbury district.

Technical Officer J. Traynor will commence long service leave on May 30. He has been granted 6 months' leave on half-pay and in company with Mrs. Traynor will holiday in England and on the Continent. All the staff joins in wishing them "bon voyage."

Our congratulations are extended to Mr. B.K. Bowen who, on May 21, will marry Miss Esme Irving. He will commence annual leave on May 23. Our best wishes and congratulations are extended to them both.

The Senior Clerk (Mr. H.B. Shugg) and Fauna Warden (Mr. G.C. Jeffery) visited Albany on April 21. After consultation with Inspector A.V. Green regarding the forthcoming whaling season, they travelled along the south coast via Wilson's and Walpole Inlets to Broke Inlet to investigate an application for the acquisition of Shannon Island in the middle of the latter Inlet.

Assistant Inspector B.H. Boyd resigned from the public service as from April 14. Mr. C.R.C. Haynes

was appointed as temporary assistant inspector on April 26 to fill the vacancy, and has been assigned to the research vessel "Lancelin."

Assistant Inspector G. Konow has been transferred from the "Lancelin" to assist Senior Inspector J.E. Munro in the metropolitan district.

Assistant Inspector T.B. Baines is now assisting Inspector Davidson in the Fremantle district.

Assistant Inspector V.J. Sinclair has resigned from the public service as from May 13 to accept a permanent appointment as Commonwealth Whaling Inspector.

Miss V.T. Hogan, who will return from annual leave on May 3, has announced her engagement to Mr. Richard Priest. Our best wishes are extended to the young couple.

OBITUARY

Mr. Philip Travia died at Geraldton on April 15. The late gentleman was well known and respected in the fishing industry in Geraldton, and for over 40 years was a prominent fisherman in that district.

Our condolences are extended to Mr. Tony Travia, his only son, and to the other bereaved.

ABROLHOS CRAYFISHERY

The following table compares the March crayfish catch at the Abrolhos Island for the years 1954 and 1955. It will be seen that this year's total catch exceeds that of 1954 by 58%, while the catch-per-man has shown good improvement. In fact this year's catch-per-man is nearly double the 1953 figure.

GROUP	MARCH 1954			MARCH 1955		
	Total	Catch per man	No. of men	Total	Catch per man	No. of men
	lb.	lb.		lb.	lb.	
Easter	156,468	3,259	48	204,917	4,269	48
Wallabi	120,382	2,799	43	168,872	4,222	40
Pelsart	72,230	2,778	26	182,384	4,241	43
North Is.	39,785	2,652	15	57,691	2,884	20
TOTALS	388,865		132	613,864		151

Apart from the increased number of men and boats operating, which no doubt contributed to the increase of the total catch, the fine weather in March, according to Inspector Bowler, allowed the boats to operate farther afield and in deeper waters. The catch-per-man, he says, owes its phenomenal increase to the extraordinary number of crayfish to be found on all grounds this season.

Another pleasing feature was the reduction in the total of "midget" and "small" tails packed for export. The following figures, which were supplied by Mr. F.W. Lemmon, Manager of the Geraldton Fishermen's Co-operative, indicate a remarkable increase in the percentage of "medium" crays handled, but they are no doubt somewhat influenced by the recent re-classification of grades. The re-allocation of weights within the "small" and "medium" grades (see March Bulletin) resulted in "smalls" being reduced to a 2 oz. range and "mediums" increased to a 4 oz. range. Nevertheless there is no doubt that the size of the general run of crayfish this year was larger than in previous years.

<u>Category</u>	<u>1954</u> %	<u>1955</u> %
Midget	27.27	27.62
Small	50.5	33.38
Medium	12.97	29.1
Large	7.29	7.36
Jumbo	1.97	2.54

While fishing in the Pelsart Group on March 25, the fishing boat "Silvery Wave", skippered by S. Lopresti, made a record catch of 42 bags in one day's pull. This is easily the largest catch ever made by one boat in one day's crayfishing in the Geraldton and Abrolhos Islands areas.

MISHAPS TO FISHING BOATS

On March 31, the crayfishing boat "Anchovee", owned and operated by Mr. L.G. Taylor, was lost in the vicinity of the Buller River about 15 miles north of Geraldton. This 15'6" auxiliary launch had one of its crayfish pots fast on the bottom, and while Mr. Taylor was endeavouring to free the pot, the boat was swamped by a breaker. On April 3 a salvage party managed to raise the hull of the boat and get it ashore. Valuable assistance was rendered by some local spear-fishermen who secured the boat with ropes, and the party dragged the craft ashore. The "Anchovee" was found to be very badly damaged and it was expected that a shipwright would visit the area to find out whether the hull could be repaired.

The 48' licensed fishing boat "Buongiorno" ran aground on a reef near Wreck Point on Long Island in the Pelsart Group of the Abrolhos on April 16. Two days later the four cruisers, "Cinderella", "Silvery Wave", "Hood" and "Lady Joyous", together with the carrier boat "Linda" from Geraldton, towed the "Buongiorno" off the reef and she was subsequently slipped at Geraldton. It was there revealed that the hull had been chafed, portion of the keel slightly splintered and the cement well cracked. It was anticipated that she would be back at the Pelsart Group early in May.

The 42' crayfish transport boat "Suda Bay" ran aground on a reef near the Point Moore Lighthouse at Geraldton at 6 a.m. on April 28. Efforts by the crew to reverse the boat into deeper water failed, and for three-quarters of an hour it remained fast on the reef with waves breaking over the stern. The carrier boat "Linda" went to the aid of the "Suda Bay", and after three hours' work managed to tow her clear and later into Geraldton Harbour. A hurried survey of the damaged vessel revealed that she had lost her rudder. Her propellor had also been damaged, and a leak had sprung in the stern.

STOP TO W.A. CRAY EXPORT

Air-freighting of W.A. crays to the Sydney market was halted in March due to unsatisfactory condition of the crays, says "Fish Trades Review" (Sydney, N.S.W., March, 1955).

Market manager H. Harris said he had wired the syndicate sending the crays across to stop shipments until they overcame a fault in cooking.

Heads of some of the fish were black on arrival and could not be sold, he said.

Mr. Harris went on to say that in order to pay the catchers, the W.A. crays should have brought 4/6d lb. at auctions. However, the best prices realised were 4/-d to 4/1d lb.

Mr. Boucaut, proprietor of Craypak Pty. Ltd., Fremantle, was in Sydney when the first of the black crays arrived.

He told Mr. Harris he thought the condition was caused by water. Although the men freighting the crays to Sydney were business rivals, Mr. Boucaut said he would pass on his opinion to them when he returned home.

C.S.I.R.O. scientists took samples of the black crays.

Information is now being obtained from the Division of Food Preservation and Transport, which secured the samples.

CRAYTAIL WEIGHT-RANGE CATEGORIES

It will be remembered that in our March Bulletin we published the old and the new size-range categories of crayfish tails for export. The new sizes were designed by the Commonwealth Department of Commerce and Agriculture to enhance the sales value of the packs.

Information has now been received that the South African Frozen Rock Lobster Packers (Pty.) Ltd. has brought its method of grading to the same basis as the Australian - that is by weight. Previously their grades had been determined by the number of tails per case. The South African Fishing Industry Research Institute will check exports to ensure that the percentage of tails falling outside the given weights for any grade does not exceed the tolerances allowed.

For the purposes of comparison the Australian and South African gradings are set out below. It will be seen that by not using a "midget" category, the South African packs will contain, grade for grade, smaller size tails than the Australian.

<u>AUSTRALIAN GRADE</u> <u>AND WEIGHT RANGE</u>	<u>SOUTH AFRICAN GRADE</u> <u>AND WEIGHT RANGE</u>
Midget : under 6 oz.	Small : $4\frac{1}{2}$ - $6\frac{1}{2}$ oz.
Small : 6 - 8 oz.	Medium : $6\frac{1}{2}$ - 9 oz.
Medium : 8 - 12 oz.	Large : 9 - 12 oz.
Large : 12 - 16 oz.	Extra Large : over 12 oz.
Jumbo : over 16 oz.	

YANCHEP BEACH CLOSED TO FISHING BOATS

Approximately 3 years ago (after a conference between this Department, the State Gardens Board, the Harbour and Light Department and fishermen) permission

was granted for four crews to camp on the Yanchep recreation reserve and to moor four boats in the anchorage. The fishermen agreed to keep the beach clear of offensive material.

Recently a number of complaints were received by the State Gardens Board, and the Minister for Lands (Mr. Hoar) visited the area. He was appalled by the condition of the beach, and found that the number of boats had increased to nine and the number of fishermen using the area had grown proportionately.

The Supervising Inspector (Mr. J.E. Bramley) also inspected the reserve and confirmed the report concerning the condition of the reserve and beach.

In view of all the circumstances, the Minister for Fisheries (Mr. Kelly) has decided not to take action, as requested by the fishermen, to ask the State Gardens Board to reconsider its decision to close the beach and offshore waters to all fishermen and their boats.

TOMMY RUFFS

The Senior Inspector (Mr. J.E. Munro) has reported that some nice hauls of ruffs have been taken from the Rockingham-Garden Island area recently, following the arrival of these fish in quantity in Cockburn Sound.

Very satisfactory hauls have also been secured at Bunbury. One crew using 2½" nets secured a particularly good run for which they received 6d per lb. The use of the larger size mesh paid off, as many fishermen using smaller mesh received only 3½d per lb.

ROTTNEST BIOLOGICAL STATION COMMITTEE

The Secretary of the above Committee, Mr. B.K. Bowen, has advised that members will be visiting the Station on May 7 and 8. A quarterly meeting of the Committee will be held on Sunday at 10 o'clock.

HOSPITAL MEDICAL FUND DEDUCTIONS

A circular from the Treasury Department advises that as from the first pay period in July, hospital and medical benefit fund subscriptions will be deducted from the salaries of officers who so desire.

The Societies for which deductions will be made will be restricted to :

- (a) Friendly Societies' Health Services;
- (b) Hospital Benefit Fund of W.A.;
- (c) W.A.G.R. Employees Hospital Medical Benefits Fund;
- (d) Goldfields Medical Fund.

The Friendly Societies of W.A. have nominated the Manchester Unity as the organisation to serve employees participating in this scheme, and this is the only lodge for which deductions will be made. Contributors to other lodges will be required to transfer their membership in respect of hospital benefit, if deductions from their pay are required. Any officer desiring to have deductions made from his salary instead of paying to his Society direct, should advise the Senior Clerk, Mr. H.B. Shugg :-

- (1) The name of the Society with which they are registered;
- (2) The amount of premiums they will require deducted each fortnight.

NETTING IN SAFETY AND SHOALWATER BAYS

A request was recently made that all the waters of these bays should be closed to net fishing. It was suggested that over-fishing had ruined the angling previously enjoyed by locals and visitors.

The position was reviewed and on the evidence submitted the Minister decided that no action

should be taken. The departmental view is that very little netting takes place there, and in any case it could not cause any serious depletion of stocks of migratory fish to be taken by anglers in such ocean waters.

RESTRICTIONS ON SPEAR-GUNS

The Minister for Police (Mr. Styants) has announced that legislation was at present being drafted for the control of spear-guns. It had been found that it would not be possible to provide sufficient protection for the public against injury, nor to properly control the use of spear-guns, by an amendment of the Firearms and Guns Act, and therefore special legislation was being prepared. It was hoped to submit a bill to Cabinet for consideration in time to allow its introduction into Parliament during the next session.

Mr. Styants said that he was surprised to learn that there were about 10,000 spear-guns in the State, some of them very dangerous, and many complaints had been received about the indiscriminate use of such weapons in crowded places.

Consideration is also being given departmentally to the question of prohibiting the taking of fish by means of spear-guns in certain areas, particularly on metropolitan and other popular beaches.

SNAPPER IN WILSON'S INLET

Reports received from Denmark reveal that in the newly-excavated channel excellent hauls of snapper weighing from 3 to 7 lb. have been taken by anglers. Some tailor and skipjack have also been landed. The snapper particularly are said to be in extremely good condition.

Since the recent publication in the daily press of a photograph taken at the new cut showing an excellent catch of snapper by anglers, the Department has been somewhat perturbed by reports which indicate that many people are catching far more fish than they and their neighbours can consume. Statements have also reached the Department that many dead and rotting fish have been found in the bush nearby. It has also been reported that some anglers are selling fish to local dealers, despite the fact that they are not licensed.

It seems a very great pity that amateurs generally never seem to know when to stop, even if they have caught sufficient for their own needs. They often keep on fishing for the sake of "sport", regardless of whether they can use the fish they catch or not. If this sort of thing continues, the Department will be compelled to consider the question of closing the area to all methods of fishing. Net-fishing is already prohibited.

DIVER'S NARROW ESCAPE

Pearling Inspector M. Goodlad reports that the head diver of a vessel out from Broome narrowly escaped disaster last month. While working five fathoms down, the ship's propellor cut his air hose. Immediately he closed the air valve on his helmet, but by the time he was brought to the surface, his face was so grossly swollen as to be practically unrecognisable.

After only two days in hospital he was discharged but is to have three weeks convalescence before returning to duty.

MARRON SEASON CLOSES

Officers are reminded that the taking of marron by nets or unattended traps is prohibited from May 1. The season will not open again until December 1. Incidentally, a report from Bridgetown in April spoke of an abundance of these delectable crustaceans in the waters of the Blackwood in spite of the February floods.

ABNORMAL FISH MORTALITY IN SWAN RIVER BASIN

During April three separate outbreaks of fish mortality in the upper reaches of the Swan River were reported. One occurred in the Canning River near its confluence with the Swan at Pt. Heathcote. The Hydrology Section of the Division of Fisheries, C.S.I.R.O., Perth, was requested to investigate and, if possible, determine the cause of these phenomena.

The results of the investigation yielded fairly strong support for the hypothesis that these fish died of oxygen deficiency due to their environment becoming contaminated with oxygen-deficient water. The cause of this deficiency almost certainly derives from the deeper parts of the basin by "upwelling", brought about most likely by tidal pressure.

Samples of fish taken from the affected parts of the river, comprising flathead, tailor, bream, flounder, gobbleguts and trumpeter whiting, were examined by a pathologist at the Animal Health and Nutrition Laboratory of the Department of Agriculture, but there was no discernible disease or harmful organism.

Mr. Athol Middleton, hydrologist of the Division of Fisheries, is going more deeply into the cause of the mortality, and it is hoped that a note on the occurrence will appear in next month's Bulletin.

ANTARCTIC WHALERS HAVE BAD SEASON

According to an official of the owners of the British refinery ship "Balaena", which discharged her cargo of oil at Liverpool, England, in April, the Antarctic whaling season (which ended on March 14) had been very poor and probably the worst since the war. The whales had been very thin with little blubber and the oil yield had been well below average.

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DISTRICT PRODUCTION FIGURES OF
WHOLE

Inspectorial District	Australian Salmon	Ruff	Mullet	Y. Eyed Mullet	Jewfish	Snapper
	lb.	lb.	lb.	lb.	lb.	lb.
Albany	5,038,980	284,013	21,284	91,237	2,808	14,624
Bunbury	1,066,241	109,458	36,931	57,764	85,677	9,523
Mandurah		173	118,449	138,453		
Fremantle	14,786	222,966	8,411	7,601	64,535	15,187
Perth		100	43,033	5,707		
Lancelin/ Cervantes		691			95,199	46,506
Geraldton		62	2,685		124,311	259,779
Shark Bay		980	161,273		1,227	665,151
North West *			3,300		37	295,611
TOTALS	6,120,007	618,443	395,366	300,762	373,794	1,306,381

* Includes all areas north of Carnarvon.

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PRINCIPAL COMMERCIAL SPECIES - 1954

WEIGHT

Shark	Sand Whiting	Cobbler	Other Species	Crayfish	Crabs	Prawns	Total
lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
62,612	915	4,694	171,130				5,701,685
135,192	13,365	7,158	78,651	2,518	220		1,602,698
	21,772	543,378	30,843		774	37,931	891,773
100,895	14,085	99	138,453	2,787,882	152		3,375,052
		4,251	5,625		15,341	26	74,083
2,893	25	45	9,690	4,323,283			4,478,332
1,098	188		12,779	3,165,848			3,566,750
4,863	262,072		119,435				1,215,001
114	508		7,058				306,628
307,667	312,930	569,013	573,664	10,279,531	16,487	37,957	21,212,002

CRAYFISH RESEARCH

It was announced last month that samples of Western Australian crayfish would be sent to the Scripps Institute of Oceanography, California, by the Fremantle Fishermen's Co-operative for the study of crayfish pigmentation.

Dr. K. Sheard, Officer-in-Charge of the W.A. Regional Laboratory of the Division of Fisheries, C.S.I.R.O., will examine the crayfish with other experts at the Institute.

Dr. Sheard will leave Perth about the end of August to spend about 4 months abroad, and while overseas will study current research in the United States and Canada on crayfish and plankton. Research workers at the Universities of Miami and Hawaii, and at the Pacific Biological Station in British Columbia, Canada, as well as at the Scripps Institute, have been collaborating with the staff of the Division of Fisheries in this State. Dr. Sheard's visit is designed to further this collaboration.

Population problems of crayfish and prawns will also be considered at the annual conference of the Gulf and Caribbean Fisheries Institute, and Dr. Sheard will present a paper to this Institute during his trip. He hopes that this conference will provide information to assist scientists here to a better understanding of the Western Australian crayfishery.

MARSUPIAL RESEARCH EXTENDED

It was announced last month that the Chairman of the C.S.I.R.O. (Sir Ian Clunies Ross) had made an offer of financial support for the W.A. University's marsupial research programme.

The programme, which was initiated and has been directed by Professor H. Waring, of Perth, has so far concentrated on local wallabies (quokkas). It will now be possible, however, to extend the work to the larger marsupials (kangaroos and euros) in an endeavour to learn how these animals feed, the amount of water

they require, and how quickly they re-produce.

This knowledge is of paramount importance to the agricultural and pastoral industry in this State, as from it methods of control of kangaroo populations might be evolved.

SOUTH WEST TUNA RESOURCES

Considerable public interest has been aroused in the tuna surveys initiated by this Department some time ago in the area lying between Fremantle and Cape Naturaliste. The survey is now being continued by Captain H.C.W. Piesse in waters off Fremantle with the departmental research vessel "Lancelin".

Several varieties of this fine food and sporting fish occur in Western Australian waters. The largest, the southern bluefin, is found principally along the south coast. Frequently in late summer very large specimens of the southern bluefin enter Princess Royal Harbour (Albany) and many fish up to 300 lb. in weight have been taken by local professional fishermen. This species is supposed to migrate to Western Australia annually from the eastern States and is thought to spawn in the area lying between Capes Leeuwin and Naturaliste. To the best of our knowledge, this is the only part of Australia where very small juvenile southern bluefin are found - some as small as 1 lb. having been captured here. This species is rarely encountered north of Busselton.

Another tuna, the northern bluefin, is quite common in northern latitudes, and during the winter months large concentrations of fish averaging slightly more than 20 lb. are met with at Shark Bay. This species has been caught as far south as Cape Naturaliste but only when conditions were favourable. Unfortunately, what constitutes favourable conditions is not at the moment clearly understood.

The yellowfin tuna, another northern species and probably the choicest of all the western tunas, occasionally migrates as far south as Busselton, and at times is quite common in waters around Rottnest.

The known range of this fish is from approximately the Aru Islands, in the Timor Sea, to Brisbane on the east coast and Fremantle on the west coast.

A fourth species, the oriental bonito, a small type of tuna, is in some years found in considerable abundance in Geographe Bay. This variety does not grow to any great size, 5 to 7 lb. being the largest.

On the recent "Lancelin" cruise bonito were taken in Geographe Bay in large numbers by means of trolled jigs. The catch of southern bluefin tuna was very satisfactory too, although the average size was not great - about 10 lb.

The behaviour of tuna on this side of the continent appears to fit in very well with the pattern observed in eastern Australia. In some years the fish are very abundant in a given area, whereas in the following year the concentration is in an entirely different area, very often far removed. This behaviour, for which no satisfactory reason has been advanced, makes it very difficult for fishermen to plan ahead, as it is not known where the fish will be found from year to year. At the same time there are some indications that the tuna occurrences in a given area follow some sort of cycle, and the work on which the Department is at present engaged is the collection of evidence to provide sufficient data to show whether there are cycles as supposed and if so whether they recur with any sort of predictable regularity.

DUCK SHOOTING SEASON ENDS EARLY

The Minister has announced that early nesting, the result of abnormal February rains, made it necessary to close the season for wild duck a month earlier this year. Normally the season closed at midnight on May 31, but departmental investigations showed that nesting was now well advanced.

Even early in March, many ducks shot were found to be full of eggs and in April, early clutches of grey teal and mountain duck had hatched. The season has been closed at midnight on April 30 therefore

to allow what promises to be an excellent breeding season to take its course.

The Department is anxious to secure completed scorecards from duck shooters and inspectors are requested to use their best endeavours to see that as many as possible are completed and forwarded.

BIRD BANDING

The C.S.I.R.O. Wildlife Survey Section in Canberra has organised an Australia-wide bird banding scheme based on centres at Canberra and Perth to study the habits and migrations of Australia's bird life. This is part of C.S.I.R.O.'s long-range programme for the study and assessment of Australia's wild-life, and is aimed to conserve those species which are beneficial to the nation's economy, and to restrict the depredations of those which are injurious to agriculture.

The Australian Bird Banding Scheme, as the C.S.I.R.O. activity is known, is quite separate from this Department's duck banding scheme, which has now been operating for almost three years. Our programme is being continued exactly as before and our bands, which are inscribed "Return to Fisheries Dept., Perth" should continue to be sent to this office. The C.S.I.R.O. bands are inscribed "Write Wildlife, C.S.I.R.O., Canberra, Australia", and anyone finding a dead bird with such a band should return the band with details of time and place of find. If a banded bird is captured alive, the band should not be removed, but details of band, bird and circumstances should be reported to the Wildlife Survey Section, C.S.I.R.O., P.O. Box 109, Canberra City, A.C.T., and the bird released.

The work of trapping and banding birds for the C.S.I.R.O. scheme is being done by interested persons approved by this Department and appointed by C.S.I.R.O. Under the Fauna Protection Act no person may mark fauna whatsoever in any manner except with the written authority of the Chief Warden of Fauna, and all C.S.I.R.O. operators in this State must first be approved by this Department. To date eleven

persons have been so approved, but in each case their permit to mark fauna has stipulated that no wild duck or other game birds are to be marked in any manner in order to safeguard our own duck research programme.

SALMON AND SNAPPER TAGS RECOVERED

The following internal tags, additional to those reported in this Bulletin last month, have been recovered recently :-

Salmon

Medium White	7017	Released at Ceduna, S.A. 10/1/52. Length unknown.	Recovered at Torbay, west of Albany, W.A., 1/4/55, by W. North. Length unknown.
Large White	4233	Released at American River, Kangaroo Is. S.A., 29/11/52. Length unknown.	Reocvered at Torbay, February, 1955. Length unknown.

Snapper

Small	3269	Released at Wilson's Inlet, 22/1/53. Length $7\frac{3}{4}$ ".	Recovered at Wilson's Inlet, 27/4/55. Length $15\frac{7}{8}$ ".
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Three tagged snapper were caught by Inspector N.E. McLaughlan at Shark Bay last month. These fish had been tagged by Technical Officer L.G. Smith at No. 1 Lease, Useless Inlet (Shark Bay), on July 16, 1954:-

10524	Length on release, $7\frac{3}{4}$ "	Length on capture, $11\frac{7}{8}$ "	Captured 14/4/55
10562	Length on release, 9"	Length on capture, $13\frac{1}{2}$ "	Captured 14/4/55
10437	Length on release, $10\frac{3}{4}$ "	Length on capture, $13\frac{7}{8}$ "	Captured 15/4/55

THE CLEARING HOUSE

Raising Rainbow Trout for Commercial Markets

Deep in the heart of southern Idaho, where the historic Snake River cuts deep into the plains shadowed by the Sawtooth Mountains, thousands upon thousands of brightly coloured Rainbow Trout are being raised for American dinner tables.

Here the Snake River Trout Company of Buhl, Idaho, the world's largest commercial trout hatchery, produces Rocky Mountain Rainbows from egg to table market size - and also grades, dresses, sharp freezes, glazes and packages the fish in six retail and six institutional sizes. The trout are shipped anywhere in the world where refrigeration systems are available.

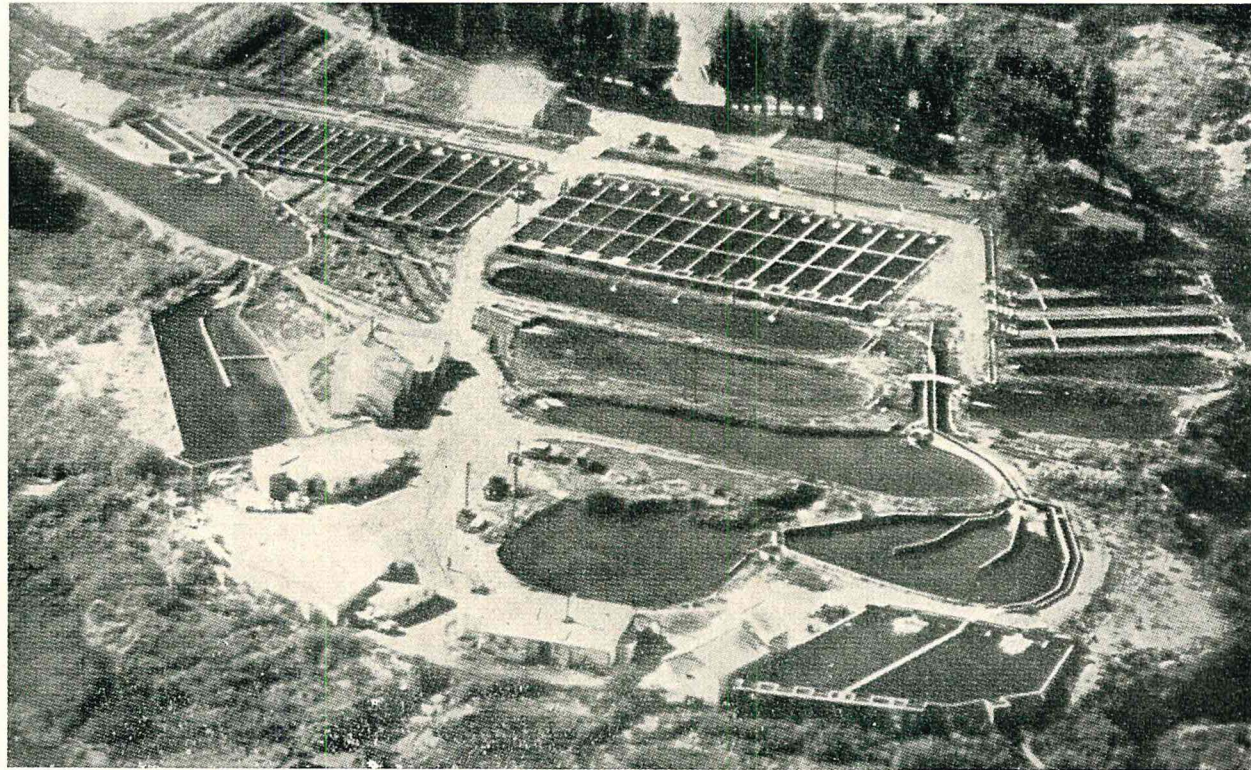
Through the summer months, tourists from the 48 states are drawn to the picturesque spot under the breaks of the deep canyon where 44 concrete rearing ponds ripple with the fins of the brilliant-hued fish.

Moving through the ponds at the rate of 40,000 gallons a minute, waters from one of the famous "1,000 Springs" keep the trout active and firm-fleshed until they are hand-graded for size, dressed, quick frozen and prepared for shipment.

Around the ten acres of hatchery ponds and buildings, tall trees and verdant vegetation stand as testimonials to the outpouring waters. Below the hatchery site, where the waters drain off to the Snake River in a series of slough-like ponds, fly fishermen often find big trout rising to their lures.

But here, where the late J.W. Tingey pioneered the domestic commercial trout industry in 1928, a score of employees under the energetic supervision of a slender Bob Erkins shepherd into existence 500,000 pounds of trout every year.

Erkins, a native of Florida, Notre Dame graduate, naval lieutenant, hotel manager and public relations man, in 1953 at the age of 29 was elected president of the company and immediately launched it on a programme of expansion and accomplishment.



THE SNAKE RIVER TROUT COMPANY'S CONCRETE REARING PONDS

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produce one pound of trout. At peak season, the company uses as much as 12,000 pounds of feed a day. In addition, 300,000 pounds of hard wheat are processed annually through the Company's hammer mill and blending machines, together with 40 tons of cottonseed meal, 40 tons of fish meal, 30 tons of whey, 15,000 pounds of brewer's yeast and the vitamin and antibiotic supplements already mentioned to provide a balanced diet.

("Fishing Gazette"

New York

December, 1954)

How the Otter Trawl Evolved

The evolution of the trawl, and otter trawl especially, is a controversial but interesting subject. It is almost certain that deep sea trawling originated in England - but the evolution has been gradual.

The ancient civilisations of Egypt, Phoenicia, Greece and Rome used a very varied range of apparatus. Mention is made of the use of drag nets. Oppian mentions fishing apparatus in his writings, referring to both seine and drag nets.

The seine net - the parent of the trawl net - was the main net used by the ancients and the English word "seine" is derived from the Greek and Roman spelling.

It is not difficult to perceive the transition from the seine to the trawl net. The latter is simply an extended use of the former, but used probably with greater speed of movement and with a funnel (i.e. cod end) in the centre of the net. Two boats first manoeuvred the apparatus, each dragging one wing of the net, which might be of considerable length.

When less cumbersome methods for keeping the pouch mouth open evolved, the "wing" method lapsed and the net became a trawl when dragged along the bottom. This method, however, was practical only in comparatively shallow waters.

The Romans Had an Oyster Trawl

Another prototype of the trawl net was the

oyster dredge, used by the Romans. Consisting of an iron frame about 14ft. wide, with an iron scraper replacing the ground rope, and 30 or 40ft. long with a long narrow pouch, it was still used by the French in the 18th century.

There was also the Wondyrchaun used in early times for sole fishing. Like the oyster dredge it had an iron frame. A graphic description of this net appears in 1376-7 prohibiting its use and leaving no doubt that it was a trawl, probably a development of the oyster dredge. The word is akin to the Dutch Wonderkuil meaning "The marvellous fishing trawl." This net, however, is towed between two boats, the mouth being kept open with corks above, and leads below.

Protective Measures Unpopular

The Middle Ages saw trawling confined to inshores and bays. From the 13th century our annals are well illustrated with the categorical efforts of the authorities to protect the "fry" of fish, and many were the detailed regulations laid down for fishing economy with the mention of mesh sizes, close seasons, undersized fish and a diversity of equipment.

The trawl nets were blamed entirely for absence or depletion of fish in areas of former abundance.

One clue to the development of trawling is given by the study of boat dues. In the reign of Edward I, Billingsgate received big consignments of sole which were cheap. The favourite method of taking them, was always by trawl, being easy and quick.

Laws were Ignored

In 1631 trawling was abolished as being detrimental to future yields and the outcry it produced among the fishing fraternity was proof of its popularity. Further proof was the almost complete disregard of the laws relating to it. Nothing could stop trawling, so with the downfall of the then regime and the institution of the Protectorate, trawling was allowed to continue.

The growing railway network and innovation of carrying ice on board in 1850 enabled vessels to fish further afield in the North Sea. By 1863 the ports from which trawling in the deeper seas was practicable were Scarborough, Hull, Grimsby, Yarmouth, Lowestoft and London. On the west coast Liverpool and Fleetwood were the most active in developing trawling.

Steam Comes In

The first week in November 1877 was the turning point in the history of trawling, as a steam ship was used successfully for the first time in hauling the trawl. Some were used to tow out the sailing smacks, which then cast their nets. The skipper of the Messenger, a paddle tug, thought he might just as well pull the trawl himself. It proved successful, so the modern trawler was born.

Many of these paddle tugs worked from Scarborough and experiments were made with otter boards instead of the beam. One tug so fitted was the 50 h.p. Triumph, built in 1867.

One authority places the official introduction of the otter trawl, as now understood, in 1894. It had long been known to yachtsmen and even used by some continental fisheries, but was not thought serviceable for commercial fishing.

Nevertheless, the otter trawl has been a most important factor in the development of modern trawling, especially in deep water where the beam trawl was ineffective.

It is impossible to definitely name any single individual as the proven inventor of the otter trawl. Like Topsy, it mainly "just grewed."

("The Fishing News" London January 28, 1955)

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A big shipment of frozen tuna from Australia to the U.S.A. may well be the forerunner of a new dollar-earning industry. Previously Australia had exported only canned tuna. This initial export of frozen tuna will be canned in San Francisco and distributed over North America, and it is wondered whether there will be any reaction from salmon-canners.

Unionists Submit Log of Claims
for Pearling Industry

The Darwin pearling industry would be revolutionised if a list of claims drawn up during the weekend for pearling crews received even partial approval of the Arbitration Court.

The claims were drawn up by a committee of members of the Seamen's Union from the Wangara, several Darwin unionists and a number of divers and other pearling crew members.

During a two-hour meeting on Sunday afternoon, a number of pearling crew members answered questions from the other men as to their conditions of work, hours, wages and other aspects of the industry.

The committee was then formed with the idea of drawing up a list of conditions for pearling crews, based to a large extent on the Seamen's Union award.

It is understood that a pearling-industry worker who is a member of the North Australian Workers' Union will introduce the claims to the general meeting of union members to be held tomorrow night.

The conditions which are claimed by the pearling crews are as follows :-

Working day of eight hours between 7 a.m. to 5 p.m. with one-hour breaks for breakfast and midday dinner and two quarter-hour smokos.

Overtime at $1\frac{1}{2}$ times to midnight and double time for Saturday and double time and a half for Sunday work.

No crew member to be paid less than the NT basic wage with skill allowances for divers, skippers, tenders and engineers. Hard laying money - suggested at £12 per month - to be paid to all crew members because of hard conditions.

Wages while ashore to be the same as while at sea, and overtime rates to be paid to all men taking part in the staging of a diver.

One day's holiday to be paid for each month of employment, with payment for 15 days holiday after one year's work. All public holidays to be paid for, and, if at sea, an extra day's pay for that day with $2\frac{1}{2}$ times for any work done on those days.

In Port

All wages and overtime to be fully paid up when a ship arrives in port. If in port or in shore quarters, payment to be made each Friday.

Basic wage to be paid during sickness or accident, with medical expenses to be met by the master pearler. In the event of death of pearling crew from outside Australia, the master pearler to arrange for the shipping of the body back home so that burial rites in accordance with the pearler's religion may be carried out.

All workmen to be covered by Worker's Compensation.

When living ashore, a cook to be provided with a properly-ventilated mess room, electric fans and complete kitchen and messing facilities and furniture. Bedrooms to be fitted with wardrobe, drawer, chair and bed for each man, two men to each bedroom, bed linen to be supplied and changed weekly. Electric light, electric stove and refrigerator to be installed.

On Shore

On shore quarters, proper lavatories and hot and cold showers, to union standards, to be installed and to be sewerred.

All luggers to conform to safety of life at sea, with proper Board of Trade requirements for lifeboat or Carley float, to be fitted with generators, small electric winch and derrick, kerosene refrigerator.

Guards to be fitted round propellers to prevent fouling of air lines, and a mother vessel to be in attendance with fresh food and medical equipment, which shall include a decompression chamber. This is to the benefit of the pearling industry in that more time would be available for fishing pearlshell.

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A watchman to be employed by the master pearler to look after shore quarters, protect crews' effects and keep quarters clean.

Charge for board and lodging not to exceed that of the Seamen's Union (£8/11/- per month) with a menu to be suggested. All food to be of first-class quality.

The sum of £60 to be paid to each crew member as compensation in the event of loss of effects at sea.

A union delegate to be appointed on each lugger and recognised by the master pearler; permission to be given for the holding of at least one stop-work meeting a month without loss of pay; the North Australian Workers' Union to take up the question of Australian citizenship for all crew members; any cases of victimisation to be met with the full strength of the NAWU and the trade union movement.

Effects of deceased pearlers to be sent to their families by the master pearler.

The Admiralty system of staging divers to be strictly adhered to at all times.

Lugger crews to be entitled to travel to anywhere they wish during their holidays at their own expense.

("The Northern News" Darwin April 19, 1955)

The Deep Sea Spawners

by "Peko"

We were talking about eels. "Half a million pounds worth", said my friend, "is what we import every year." "And the reason," he went on, "is that the London firms can never get enough of them at 2s. 6d. a lb."

Now this price, comparing well with that of plaice and prime, meant only one thing to a temporarily landbound fisherman - to see about catching some. My

mistaken idea that we exported eels was due probably to reading about the Severn elvers being sold to stock the continental rivers. This is a trade of long standing. But from the surprising amount imported it seems that we buy them back as adults.

Now there is something queer about eel catching. True it is fishing, but it is carried on mainly by landmen; by people as elusive almost as the eels themselves; in country crafts as old fashioned as thatching and ditching. It is a dark kind of trade, followed only part-time usually (and that generally at night) by rather reticent individuals.

Wherever there is an unpolluted river there are eels, and many and varied are the ways of catching them. Most important are the fixed traps or weirs, which are set to filter the down-running stream at suitable places. These are local and often family affairs, as are also some of the trap and basket fisheries.

Eel picking, or pitching is now a lost art. The fishing implement was a spear with four or more springy prongs to nip the fish when one is found by continual stabbing into the mud. The method is illegal now in some districts.

Until recently the movable traps were made of osier or cane. The Dutch type is a bottle-shaped basket with its base turned inwards to a small tapering opening making access to the bait easy and getting out difficult. The English kind has a more flaring "kype" or opening, and is now regarded by some as less efficient. Modern wire netting traps may be cylindrical or flat bottomed with openings at one or both ends, while some trappers make their own from laths on a wooden frame. Just as many and varied are the ways of rigging and baiting and laying the traps, each district having its own method. Babbing with worms, many-hooked lines, jigging and trawling are among the many other ways of catching the eel.

Eels may not be preferred by everyone; but they are the most nutritious of all the fishes. The jelly formed by cooking them comes from their exceedingly high fat content (fully three times that of herring), and once their taste is acquired jellied eels are

irresistible. We can put this down to their high food value, of 1,638 calories to the lb.

Journey of non-return

The eels of all European rivers belong to one species; Anguilla vulgaris, or common eel. They spawn once, in the deeps of the Sargasso Sea, and then die. American eels spawn there too, though they are a different species.

The story of the detection of the birthplace of the eel is like a modern whodunit. It proves a mysterious 4 to 6 thousand mile journey by every eel leaving every river, from Norway to the Mediterranean. This is the queer thing about eels. They can live in the shallowest water - on a wet flannel almost, and yet they need the deepest water of all to spawn in. This was a basic need in the older tropic species, which had, and still have, unlimited deep water quite close to their life rivers. And this same need, in the European eels, has produced an instinctive migration as staggering as any we know; not only in the finding of the deeps by the adults, but in the specially delayed development of the fry in their long journey to fresh water.

An explanation of this amazing migration may lie in the Wegener theory of continental drift - which assumes that the great land masses on either side of the Atlantic Ocean have slowly drifted apart (an assumption quite feasible judging by the opposing land shapes). If the eels spawned originally in the deep crack between the continents, a gradual lengthening of their journey would come in the course of ages. And the result would be just what we now have. An extended larval period precisely linked with the distance back to fresh water; of one year in the American eels, and three in the European A. vulgaris with their 4 to 5,000 mile drift.

Although male and female eels have long been distinguished, no one knew how or where they reproduced. And many queer beliefs of their origin were credited. Aristotle said they came from mud, and all sorts of local theories obtained of their production from worms, or even horse hairs, some of them even to the present. The mystery was natural because no spawn or very young fish were ever found.

Another thing made the solution long in coming. The larval stage of the eel was unknown as such. In fact the flat, leaflike creature was called by a different name. When it became known that the *Leptocephalus brevirostris* of the open sea was indeed the young of the fresh-water eel, a 20-year ocean search was still needed to solve the problem. In various expeditions many samples of surface water were taken all over the Atlantic Ocean. All catches of larval eels were recorded. The evidence led south and westwards where the individuals were found progressively smaller. Eventually in the Sargasso region the newly hatched larvae were found; and later tests confirmed the catching area as the deep water area between Bermuda and the West Indies.

Years of drifting life

Although it is hard to believe, the swarms of tiny elvers that invade our rivers - and those of the continent - have spent nearly 3 years adrift in the great ocean river of the Gulf Stream. A bare 3 inches long, they are true eels, having changed from flat to round at the end of their journey from the southwest Atlantic. Here is one of many a sea paradox; for their change is opposite to the plaice, which is born round to turn sideways later and become flat. The wonder is the perfect timing of the metamorphosis to coincide with their new fresh-water life.

To realise how this yearly elver run is maintained we must picture the next brood in mid-ocean, still in the flat larval shape; and the one after that even further away, as well as yet another year class of tiny embryos hatching above the Sargasso deeps. So the progression of eel life goes on, like the very steps in the march of time.

The American eel *A. rostrata* has a much shorter childhood. It takes to the fresh water of the east coast at 1 year old after a shorter journey. Leaving the ocean drift, it changes into an elver, and arrives in the same stage of development as its 2 years' older European cousin. Yet from the Sargasso northwards the two species are found together. How do they sort themselves out? The physical development of the species depends on the length of their journey. The instinctive wriggling of the *A. rostrata* elvers tend always to the

westward, while those of *A. Vulgaris* remain dormant for a further 2 years of passive drifting before awakening to their eastward urge.

It is hard to say which is more amazing, the long journey of these little threads of life, or the descent and departure of their parents to the far away deeps. Both are parts of a way of life built up in countless ages of evolution. We can no more explain them than say how the birds know which way to fly.

Yet it is strange that most people when told of the eel fry's travel simply refuse to believe it. Many quite reputable naturalists wrote emphatic denials when the results of research were published. But the facts are inescapable. Whoever may deny it, of all the elvers that swarm each spring into the rivers of Western Europe, none are younger than about 3 years old.

The main point is that the new born eel larvae cannot swim far. They must have been spawned in the area. The tiny transparent ribbons are ideally fitted for a floating life. Only after 2½ years or more do they become true eels.

Eels live in fresh water for about 10 years. The period may vary with individuals, but when maturity comes, with its irresistible call, the eels must depart on that mysterious journey of no return. The time or course they take no one knows. Here is a complete reversal of the salmon's way, whose spawning journey is fully known, but of whose life in the sea we know little or nothing.

The European and American eel are the only two species in the Atlantic. But there is more variety in the tropic seas of the Indian Ocean and Pacific, where some 18 different species are found.

It is one of the paradoxes of modern research that fishery scientists from Denmark have travelled across the world to Java and Sumatra simply to examine and study eels. As soon as they realised that some 20 or 30 eel species existed it became imperative to know and recognise them. Without complete knowledge of all, a life history of one was impossible. In fact the discoveries about the different tropical eels did much to explain the development and migration of the Atlantic species.

It is in countries like Sumatra and Borneo that the eel's strange affinity for the deep water is emphasised. Their eel population is one-sided, the fish occurring only on the coasts facing the great deeps. With 4 or 5 thousand fathom a few miles off-shore the adults' spawning movement must be practically straight downwards, and here the young are found in all stages of development, from the tiniest larvae to fully rounded elvers. No explanation is offered of the need for deep water. It may be that such a concentrated fish needs the pressure of greater depths for spawning.

Another thing essential to the spawning eels is water of high salinity. This is the salmon in reverse again, which lives in salt water and spawns in fresh. That the fresh water eel should need the saltiest water to breed in suggests it is descended from some older, entirely salt water dweller.

There are no figures of the U.K. catch of eels. It is probably quite considerable in spite of the smallness of the working units. The chief thing emerging from the knowledge of the fish's life history is that the catch in any one river has no effect upon its future stock. More adult eels could definitely be caught without reducing the supply of elvers.

Eels are too slippery for cultivation, but in some places they are actually cultivated. The world's largest eel farm is at Commachio in Italy. Its 15 great connected ponds cover 300 square miles, are ideally situated, shallow and rich in fish food. Output in a good year may be 1,000 tons of eels. The value of this fish farming industry is shown by its annual average catch of over 600 tons for the last hundred years. Yet no breeding or fertilising can be done. The stock and production is kept up by the natural run of elvers which each and every year are allowed free entry from the open Adriatic.

("World Fishing"

London

March, 1955)

Fishermen's Concern over Atomic Waste

An announcement in the press that drums of radio-active waste had been dumped 150 to 200 miles

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south-west of Land's End aroused considerable concern among Cornish fishermen. The Hon. Greville Howard, M.P. for St. Ives, took up the matter on their behalf and sought an assurance from the authorities that this atomic waste would not be a danger to fishermen or the fishing industry. The following statement was later issued by the United Kingdom Atomic Energy Authority.

The United Kingdom Atomic Energy Authority, continuing arrangements made in the first instance by the Ministry of Supply with the Ministry of Housing and Local Government and the Ministry of Agriculture and Fisheries, is disposing of quantities of radio-active waste by dumping in the deep waters of the Atlantic ocean and in the Hurd Deeps, a recognised dumping area in the English Channel. The disposal is carried out from ships provided by the Admiralty.

Material deposited in the Hurd Deeps, after authorisation by the Ministry of Agriculture and Fisheries and the Ministry of Housing and Local Government, consists of mildly radio-active waste - mainly sludge from the effluent treatment plant at Harwell and equipment used in laboratories. It is contained in 18-gauge mild steel drums which it is anticipated will have a short life in the sea. Their contents will then be quickly dispersed and diluted to an extent indistinguishable from the radio-activity normally present in sea water.

Material deposited in the Atlantic over the continental shelf is waste of higher radio-activity. It might include material which, if not placed in drums would float, or scrap materials such as metal which, if melted down and reused, could find its way into sensitive measuring instruments and interfere with their accurate working. This type of waste is contained in concrete blocks surrounded by a mild steel outer shell. They are designed to sink to the seabed where they will gradually disrupt over a period of many years, thus allowing the activity to be dispersed slowly. During this period the activity itself is dying out by the natural laws of radio-active decay. This disposal is carried out in water 2,000 fathoms deep, several hundred miles from any on the British coast; again in an area approved by