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DEPARTMENT OF PARKS AND WILDLIFE

FISHERIES DEPARTMENT, WESTERN AUSTRALIAMONTHLY SERVICE BULLETIN

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STAFF NOTES

Inspector F.A.L. Connell, Fauna Warden, has submitted his resignation from the Department as from November 4 - the greener fields of private enterprise having lured him into the crayfishing industry. In addition to actively crayfishing at Lancelin Island, he will transport crays from the Abrolhos to Geraldton, using the T.M.V. Trimmerwheel. He is also negotiating for the lease of the Abrolhos and, if successful, intends to rebuild the tourist camp there.

Inspector G.C. Jeffery will succeed Inspector Connell as Fauna Warden, and Inspector A.V. Green will take over the Albany district. Assistant Inspector J.L. Gallop will be transferred to act as inspector temporarily in charge of the Bunbury district and Assistant Inspector V.J. Sinclair will replace him at Mandurah after the latter has completed his annual leave; Inspector A.K. Melsom will be stationed at Bunbury pending Assistant Inspector Gallop's transfer. Assistant Inspector G. Coombes will be transferred to Fremantle as assistant to Inspector Davidson, and Assistant Inspector B.A. Carmichael will be transferred to Geraldton, after completing annual leave, as assistant to Inspector S.W. Bowler.

Inspector J.C. Thair, on October 23 took over the Shark Bay district from Inspector R.J. Baird, who has been transferred to Fremantle in command of the P.V. "Garbo." The Supervising Inspector, Mr. J.E. Bramley, was at Shark Bay to supervise the handover. Assistant Inspector B.H. Boyd is located in Perth and

steps are being taken to appoint another inspector to fill the gap created by Inspector Connell's resignation.

Inspector N.E. McLaughlan will be in charge of the p.v. "Kooruldhoo" in the Cervantes - Jurien Bay area during the coming crayfishing season. Cadet Inspector D. Wright will assist as crew member.

The p.v. "Garbo", under the command of Inspector R.J. Baird, will patrol the Lancelin Island area after he has completed accrued leave.

Inspector A.J. Bateman will continue patrols from Fremantle on the p.v. "Silver Gull" with the accent on inspections in Rottnest Island waters and nearer crayfisheries. He will also pay some attention to the snapper grounds at Safety Bay.

Assistant Inspector B.H. Boyd and Cadet Inspector J.D. Milne will be shore based at Lancelin Island.

The Superintendent, Mr. A.J. Fraser, visited Geraldton and Dongara towards the end of October in connection with the closure of Denison Beach to net fishing.

Inspector G.C. Jeffery intends to commence his annual leave immediately after the Staff Conference.

Assistant Inspector V.J. Sinclair is scheduled to begin annual leave on November 15 and Assistant Inspector B.A. Carmichael on November 20.

Captain H.C.W. Piesse brought the research vessel Lancelin to Fremantle on October 14. Crew members R.M. Crawford and M.J. Simpson will take out their annual leave between the conference and the end of the year.

Technical Officer L.G. Smith, engaged on the current estuarine investigations, has recently taken length frequency recordings at Albany, Denmark, Mandurah and Bunbury. Technical Officer J.S. Simpson is delivering trout fingerlings to country districts.

Research officer J. Traynor operated in the Cockleshell Gully area, from where reports were received of ducks in large numbers, and was able to band 75 birds mostly black ducks.

DR. THOMPSON RETIRES

Dr. Harold Thompson has just retired from the position of Chief of the Division of Fisheries, C.S.I.R.O., in which capacity he had served for 17 years.

Dr. Thompson has had a distinguished career in the fisheries field in three continents. He was born at Aberdeen, Scotland, in 1890 and educated at the famous University there, gaining his D.Sc. In 1921, after service in World War 1 during which he attained the rank of Captain, he became Senior Biologist to the Fishery Board for Scotland and in 1931 went to Newfoundland to become Director of the Dominion Fishery Laboratory. When the Commonwealth Government decided to include fisheries investigations in the scope of the activities of the C.S.I.R. in 1937, Dr. Thompson was appointed to head the new section. His headquarters were at first in Melbourne, but the following year he transferred to the old fish Hatcheries at Port Hacking, N.S.W. In 1939 the new laboratory was constructed on the same site. In 1943 he became Controller of Fisheries in the Department of War Organisation of Industry, a post he held conjointly with his C.S.I.R.O. duties. He toured the whole of Australia in connection with the organisation of fisheries work, and visited Western Australia in 1940 and in 1946.

His scientific publications include many technical reports on the biology of haddock (on which species he was an acknowledged European authority), cod and salmon. He was also interested in the ascidians and published authoritative papers on this group in Scotland and Australia.

Dr. Thompson, accompanied by Mrs. Thompson, will leave Australia for Great Britain on November 26.

PERSONAL

Mr. F.N. Ratcliffe, Officer-in-Charge of the Wildlife Survey Section of C.S.I.R.O., is paying a visit to this State. During his stay he plans to inspect the research work being undertaken by his Section on Woodstock Station in the North-west.

STAFF CONFERENCE

The annual conference of inspectors will take place during the week commencing November 8. The Minister, Mr. Kelly, will formally declare the conference open at 10 a.m. on that day. All inspectors will attend.

FISHERMEN'S ADVISORY COMMITTEE

The statutory Fishermen's Advisory Committee met at the Court House, Fremantle, on October 14 and 15 primarily with a view to taking evidence on which to base a recommendation concerning the coming crayfish season in the Fremantle - Lancelin - Cervantes region. All members of the Committee, viz., Messrs A.J. Fraser (Chairman), J.C.J. Gregory, O.J. Benson and N.K. Swarbrick (professional fishermen's representatives) and Roland Smith (anglers' representative), were present. Also in attendance were Mr. H.B. Shugg (Secretary), and Inspector W. Davidson, as well as Dr. K. Sheard and Mr. R.W. George, of the Division of Fisheries, C.S.I.R.O., who were present in an advisory capacity. With the Committee's concurrence, Dr. J.S. Marian, secretary of the Fremantle Fishermen's Confederation, sat in to assist such of the fishermen as, by reason of language difficulties, were unable fully to explain themselves.

Altogether 27 witnesses were examined. Of these only three were non-fishermen.

Several subjects were discussed, including

the question of crayfishing at Rottnest Island and the Bar at Wilson's Inlet (Denmark). The more important dealt with the opening date for the next season, and the Knobby Head - Hill River closed area. A summary of the discussions which took place on these two subjects is given below for general information.

1. Opening Date of Season.

Last year we opened the season in waters south of the 30th parallel (excepting the Knobby Head - Hill River closed area which was not opened until January 1, 1954, and then for one season only) on December 1. In 1952 the opening date was a week earlier, viz., November 24; in 1951 it was November 15.

In the past years we have been pushing the opening date back later and later in order to give some measure of protection to the "white" crayfish, which "run" each year for a brief period of not more than three or four weeks. The white crayfish are believed by C.S.I.R.O. to be a maturing stage of the common "red" Westralian crayfish. They are believed to be the reservoir of fish upon which the fishermen will draw later, and for that reason the C.S.I.R.O. and the Department have long felt that it is undesirable to make too great inroads into the white crayfish stocks. It is well known that an early summer delays their appearance. Their presence in any area is dependent largely on the continuance of fine weather. Heavy weather results in their early disappearance.

The great majority of the fishermen who gave evidence believed that the white crayfish was a distinct species from the red crayfish. They declared that when a white was compared with a red crayfish of exactly the same carapace measurement, the white almost invariably had a larger tail than the red. C.S.I.R.O. officers produced figures and graphs which showed that the spread of tail-size as compared with carapace-size was almost identical in both cases.

The whole picture is made somewhat more complex by reason of the fact that although numerous red crayfish are taken of all sizes from a few centimetres upwards, no white crayfish seems ever to

have been seen by either fishermen or C.S.I.R.O. workers very much less than 2½" carapace length. At the same time big whites of up to 4" and 5" carapace length have been commonly taken.

White crayfish have been tail-marked in large numbers by or on behalf of C.S.I.R.O., and quite a few marked whites have been recovered within a week or two of liberation. Only two have ever been recovered as reds or "dark" whites. If there is a colour change - and the food of the fish must have some effect on colour, because there are "pale" as well as "dark" whites - it has never actually been proved scientifically. Crayfish moult quite frequently, and it can quite easily be understood that holes punched on any part of the shell before moulting become almost too indistinct to be of any value after the shell has been shed and the new one hardened. Marking by punching holes - and this seems to be the only way of marking - is therefore not wholly satisfactory.

Although the matter is not entirely free from doubt, the odds are definitely in favour of the C.S.I.R.O. theory that the whites and reds are the same fish, but in different phases of their life history. The whites therefore should receive protection, and while we are not sure of our facts, it is better to lock the door before the horse actually bolts.

2. Closed area Knobby Head - Hill River.

This area was opened to crayfishing on January 1, 1954, for the duration of the 1954 open season only.

It was originally closed in 1951 for a twofold purpose - (a) at the request of C.S.I.R.O. as a "control" area to enable them to study a crayfish population on an unfished area as against populations on fished areas, and (b) as a reserve area in the event of waters to the south having later to be closed to enable them to recuperate after intensive fishing or because of depletion.

The opening this year was made at the

suggestion of C.S.I.R.O. to permit the removal from the area of bigger, older fish which unduly compete for the available food with smaller, more desirable fish. Although approximately 1,000,000 lb. of fish was caught in the area in 1954, all fishermen who worked there said that the percentages of "jumbo" and "large" crayfish in the total take were not excessive, but were in line with those from other grounds. It would therefore appear that there is no great population of very big fish.

All witnesses before the Committee thought that portion at least of this closed area should be opened permanently, the principal reason being that if fishing were not permitted there the overcrowding in more southerly areas - already very serious - would become almost intolerable.

FREMANTLE CRAYFISHERY

Following the recent deliberations of the Fishermen's Advisory Committee, and after consideration of the Committee's recommendations, the Minister (Mr. Kelly) issued the following statement to the Press on October 25 -

"The Minister for Fisheries (Mr. Kelly) announced yesterday that he had approved a recommendation by the Fishermen's Advisory Committee, which had recently taken evidence from fishermen and others interested in the Fremantle crayfishery, that the open season would commence this year on November 20, and that all waters south of a line drawn west from North Head (Jurien Bay) would be open to fishing.

Mr. Kelly pointed out that last year the opening date was delayed until December 1 in order to give protection to the white crayfish, whose appearance in the Fremantle area was unusually late. However, it was anticipated that the annual "run" would commence somewhat earlier this year - possibly earlier than November 20 - but it was felt it was still necessary to afford some protection to these maturing fish, which

in effect comprised the reservoir of crayfish upon which later the fishermen would draw.

The area lying between Knobby Head and the Hill River, continued Mr. Kelly, was as a protective measure closed to crayfishing in 1951, but it was thrown open at the beginning of this year for the then current season only. This was done to enable the Fisheries Department and the C.S.I.R.O. to watch the effect of a commercial fishery. Having carefully studied the situation in the light of the current year's operations, both the Department and C.S.I.R.O. concurred with the Advisory Committee's finding that it would be in the interest of the industry if the southern portion of the closed area were opened. Hence the decision to excise all the waters south of North Head. The portion north of Jurien Bay would not be affected by the decision, and whether the lower portion would remain open permanently would to a large extent depend on the nature of the information gathered by the research team which was working on the crayfish problem."

NAVIGATION

(In this the second of a series of articles by the Supervising Inspector, J.E. Bramley, further causes of magnetic compass irregularities are dealt with.)

The Mariner's Compass is permanently affected by a medium termed VARIATION. This is the horizontal angle between the magnetic meridian and the true meridian, i.e., between magnetic north and true north. Variation is called easterly if the north end of the magnetic meridian is to the east of the true meridian, and west if it is to the west.

Due to the fact that the Earth's magnetic poles are constantly moving, the variation in any particular area is continually changing. The daily change is so small that it presents no problems to the navigator. Strict attention, however, should be

paid to the notation in the centre of the magnetic compass rose on Admiralty Charts which states the annual increase or decrease of variation in minutes.

We now come to one of the most elusive mediums with which navigators have to contend and towards which one's vigilance must never be relaxed. It is called DEVIATION, and is the angle between the compass needle and the magnetic meridian (or true magnetic north). It is caused by the combined effort of several magnetic forces embodied in the ship when it was under construction. These forces are due to the direction of the ship's head, its geographical position and the hammering and rivetting carried on while the ship was being built. The magnetism thus acquired becomes semi-permanent and is not lost unless very extensive repairs are undergone.

To counteract deviation, corrector boxes containing magnets are fitted to the compass. These magnets are inserted in such a way as to neutralise the magnetism built into the ship.

The magnetism embodied in mast, derricks, stanchions, bulkheads, etc., called vertical magnetism, or Force "R", has very little effect until the ship heels over. As the polarity of the vertical magnetism depends upon whether the ship was built in the Northern or Southern Hemisphere, a corrector that will change accordingly must be provided. This corrector, known as the "Flinders Bar", is simply a soft iron bar which is placed vertically and is subject to the influences of the earth's magnetism.

Temporary deviation is caused by the close proximity of metal objects such as knives, torches, etc. The placing of such objects close to the compass should therefore be avoided as far as possible.

It can be seen from the foregoing that magnetic compasses are always unreliable and require constant checking, and in a future article the different methods of determining compass errors and their corrections for plotting will be explained.

PEARL FISHERS' STRIKE

On September 16 a dispute arose between master pearlers, tenders and engineers over the lay of the latter. It appears that earlier this year tenders and engineers asked for a £1 increase in their lay over eleven tons and they claimed that this was agreed upon before they put to sea. The master pearlers declared that no such promise was made. When the men found that they were not getting the increase they went on strike.

By October 5, however, all but two vessels involving thirty men had recommenced work. Subsequently some of the men were taken to Court and convicted of a breach of their agreement. They were each sentenced to one week's gaol.

SCHOOLING SQUID

Inspector Jeffery has reported that the whale chaser of the Cheynes Beach Whaling Company Pty. Ltd., which unsuccessfully prospected for sperm whales during October, saw a very large school of squid swimming on the surface at a point approximately thirty miles south of Albany. This is the first occasion on which a report of this nature has reached the Department.

MARRON VERSUS TROUT

For quite a space of time correspondents have been airing their views in letters to the press on the alleged threat to the stocks of marron in the streams of the lower South-West. With quills aquiver protagonists of the marron paint the exotic trout as a voracious and dangerous fish which will quickly eliminate this particular freshwater crustacean from its age-old haunts.

Keen trout fishermen with other views point to waters which have been stocked with trout for many years and from which marron may still be taken, and often are, in large quantities.

Others declare that the worst and perhaps only dangerous enemy with which the marron has to contend is man who with little forethought takes immature marron for bait or other purposes and also shows no respect for future needs by catching and retaining spawners and females with berry.

While satisfied that the marron protagonists have made some exaggerated claims, the Department agrees that there is sufficient merit in their comments to warrant the position being carefully watched.

ELIMINATING "BLACKHEAD" IN COOKED PRAWNS.

Adherence to simple cooking rules worked out by C.S.I.R.O.'s Division of Food Preservation will ensure that cooked prawns reach the market free from the unsightly black discolouration which sometimes develops.

From time to time some of the iced prawns sent to the Sydney Fish Market from various fishing ports in New South Wales have been condemned on arrival because of an unsightly, black discolouration affecting the heads and other parts of the shell and legs of the prawns. This condition, known as "black-head", develops during a period of about a day and a half between cooking and arrival at the market.

The condition was thought to be due to spoilage by micro-organisms. Now, however, research by C.S.I.R.O. has shown that the discolouration is the result of chemical changes brought about by the action of naturally occurring tissue enzymes on one of the constituents of the blood of prawns.

A similar condition develops more rapidly and more intensely in all uncooked iced prawns.

Research has shown that "blackhead" can be avoided by making sure that the prawns reach cooking temperature rapidly and that they are then held sufficiently long at flesh temperatures of 190° and 200° F. The cooking procedure which prevents "blackhead" produces well-cooked prawns with no evidence of over cooking.

NORTH-WEST PRAWN INVESTIGATIONS, 1954

The prawn survey of the North-West coast was continued this year with the departure of p.v. "Lancelin" from Fremantle on May 25, manned by the following personnel -

Captain,	R.C.W. Piesse;
Mate,	R.M. Crawford;
Cadet Inspector,	M.J. Simpson;
Technical Officer,	K. Godfrey, Division of Fisheries, C.S.I.R.O.

"Lancelin" returned to Fremantle on October 14.

A limited amount of otter trawling was undertaken in Shark Bay on the way north. No quantity of prawns was taken in the Bay, but good catches of saucer scallops were trawled off the southern end of Dirk Hartog Island, as was the case in 1953.

Trawling commenced in Exmouth Gulf in early June and continued until the end of that month. This enabled a direct comparison of results against those of September, 1953, to be made.

Catches of tiger prawns (Penaeus esculentus) were made during this period over a wide area of the Gulf, up to 25 lb. per 60-minute haul being recorded. The tiger prawns generally were of a smaller size (15 - 18 to the lb.) and many were moulting. A few blue stripe prawns (Penaeus latisulcatus) of good commercial size up to 8 inches were caught, but there was no sign at this stage of the pink prawn (Penaeus merguensis) which had been taken in this area in

August - September, 1953. Included in the catches were large numbers of fish, mostly immature. These comprised quite a number of good size whiting, flounder and flathead, the females of which were in full roe. Good numbers of blue manna crabs (Lupa pelagica) were found, these being of good size and very "full."

The period July 1 - 22 was spent in the Dampier Archipelago area, where trawling was carried out in Hampton Harbour, off East and West Lewis Islands, and in Nicol Bay. This part of the programme was primarily to test which species of prawn was to be found north of Exmouth Gulf, and to ascertain whether suitable trawling grounds occurred.

Catches of tiger and blue stripe prawns were made in this area, but they were not located in any quantity. Although suitable for trawling in many places this area was very patchy. Much broken reef country restricted operations considerably. Twelve pounds of tiger prawns was the best single catch on this test, these being taken at night. Good catches of fish were again made, the overall picture being much the same as in Exmouth Gulf. The best results came from the Lewis Islands area, while Nicol Bay proved disappointing.

Following on this, work was continued in Exmouth Gulf from July 29 to August 16. During this period, the prawns appeared to have increased in size as compared with June. Measurements taken on celluloid strips confirmed this. The catching rate also improved considerably, up to 50 lb. of prawns being taken in a single haul. These were mainly tiger prawns with a sprinkling of blue stripe prawns, greasy-back prawns (Metapenaeus spp.) and a few specimens of pink prawns. The better catches were taken at night, as in the case of Dampier Archipelago.

The period August 21 - 31 was spent in a return visit to the Dampier Archipelago area. Here results were much the same as in July, prawns being very scarce. There was some evidence of pink prawns being present. In several places dead weed was

encountered. This somewhat hampered trawling operations. During this period Mr. R.W. George, Division of Fisheries, replaced Mr. Godfrey who had undergone an emergency operation for appendicitis.

The final test was made in Exmouth Gulf during the period September 12 - 29, Mr. Godfrey having by this time rejoined the vessel. In this test, an area on the west side of the Gulf was marked off and sampled intensively. Some sampling was also carried out on the east side. During part of this period two buoys were laid two miles apart in 9 fathoms of water 4 miles offshore on the west side of the Gulf. This buoyed area was consistently trawled at all times of the day and night and at different stages of the tide. These hauls produced quite encouraging results and gave valuable general information. Catches of all the types of prawns previously mentioned were made, and on one occasion 140 lb. was taken in four hours' fishing. During the whole cruise 130 hauls were made in depths ranging from 3 to 20 fathoms.

In addition to the prawn trawling, trolling lines were put out whenever the vessel was on passage. In all, seventeen species of fish were taken on trolls, a total of 311 fish being caught.

Surface and bottom temperatures were recorded at the site of each haul. Plankton tows with a high speed plankton net were made in all operational areas. The material secured included many species of plankton organisms previously unknown from the area.

Specimens of fish and prawns from all areas were preserved and forwarded to Perth for further study. Most of the prawn catches were sorted, weighed, sexed and measured. A detailed log was kept of fish schools observed and whale and bird occurrences.

It must be stressed that the catch quantities given are no real indication of what could possibly be taken if the areas were fished on a commercial basis. In this survey there was no concentrated effort to catch quantities, but instead to explore as large and as varied an area as possible within the time available and the prevailing weather conditions.

This survey completes the winter period of work in the north-west area. It is hoped during 1955-1956 to cover the summer period.

The following is a list of the fish taken by trolling -

Mackerel Tuna	- <u>Euthynnus alletteratus</u>
Northern Bluefin Tuna	- <u>Kishinoella tonggol</u>
Striped Tuna	- <u>Katsuwonus pelamis</u>
Leaping Bonito	- <u>Cybiosaida elegans</u>
Large Scale Tunny	- <u>Grammatorycnus bicarinatus</u>
Sampson Fish	- <u>Seriola hippos</u>
Kingfish (sea)	- <u>Sciaena antarctica antarctica</u>
Slimy Cod	- <u>Epinephelus taurina</u>
Spanish Mackerel (narrow-barred)	- <u>Cybiu commerson</u>
Japanese Spotted Mackerel	- <u>Cybiu queenslandicum</u>
Grey Mackerel	- <u>Indocybiu semifasciatum</u>
Wahoo	- <u>Aconthocybiu solandri</u>
Whitefish	- <u>Scomberoides sanctipetri</u>
Diamond Trevally	- <u>Alectus indica</u>
Turru	- <u>Turru emburyi</u>
Sea Pike	- <u>Sphyraena akerstromi</u>
Coral Cod	- <u>Epinephelus undulatostratus</u>

MAGPIES AND PUBLIC SAFETY

October of every year brings to light the fiercely protective instinct of our magpies. Usually the firm favourites of all sections of the community, in this month many of these birds become hated and as feared as any of Hitler's Stukas. They have a propensity for picking just the instant when one is off guard for swooping in on their "run".

This year they seem to have been more purposeful in their attacks, and we have received a greater number of complaints than ever before. Probably the publicity given to the subject by the press following an eye injury being inflicted on one unfortunate lad was the cause of the unprecedented number of calls for our assistance.

Over the years the Department has assumed responsibility for attending to reports of vicious birds received in the metropolitan area. While magpies are protected it is considered only reasonable that the welfare of the public should be our first concern, and each report is thoroughly investigated before any attempt is made to dispose of a bird. If it can be shown that a particular bird is dangerous and has actually caused an injury, or is like to do so, it is destroyed. Many of the complaints received on investigation were found to be unwarranted and no action was taken as a result.

There is no doubt that a large percentage of the attacking birds had become vicious because of the attentions they received from boys armed with shanghais and air rifles, and also from those misguided lads who attempt to rob nests. Unfortunately the magpies do not restrict their attacks to such guilty parties. Little children particularly were attacked, and many parents spoke with understandable alarm of the hysterical fear, shock and nightmares suffered by 2 and 3 year olds as a result. No reasonable person could uphold protection of a bird in such circumstances, no matter what had caused the bird's ill-humour.

This should bring home to those not previously concerned the need to respect the protection afforded our wildlife, or the consequences which have to be borne. This lesson will be stressed in protection publicity disseminated by this Department to school papers and other media. Parents should also be convinced that it's part of their responsibility to teach their children to refrain from robbing nests and otherwise pestering bird life.

OPEN SEASON FOR DUCKS

The early summer this year will be taken into account by the Fauna Protection Advisory Committee when deliberating on their recommendation to the Minister on a suitable period for the next open season. While some reports mention successful breeding in districts where permanent water abounds, it is considered that generally the year has been a poor one for our wildfowl.

The Committee has made arrangements to meet representatives of the Capel Gun Club and local residents at the Elgin Hall at 8 p.m. on the evening of November 2 to hear their views on the date and times of the opening of the season this year.

C.S.I.R.O. BIRD BANDING COMMENCES

Operators approved by the Chief Warden of Fauna have been appointed and equipped by the C.S.I.R.O. to mark wild birds, using numbered aluminium C.S.I.R.O. rings.

Among these operators is Mr. Ray Aitken, headmaster of the Nyabing State School, who is specialising at the moment on marking parrots and galahs, and despite the short time he has been operating he has had one recovery.

Mr. Aitken banded an adult smoker parrot at Nyabing on August 24 last. The bird was shot on September 1, i.e., 7 days later, at a farm 28 miles east of Kulin by Mr. R.G. Argent. This represents a travel, in a northerly direction, of some 70 miles.

It is expected that considerable information on the feeding movements and general dispersal of parrots will be accumulated as the result of these banding activities.

SEAGOING ALLOWANCES

The approval of the Public Service Commissioner has been given to the increase of the above allowances as from September 1, 1954. Rates now payable will be 12/-d a day for a married man and 7/-d a day for a single man.

OYSTER RESTRICTIONS AT WILSON'S INLET NOT RENEWED

In December, 1949, a proclamation was issued prohibiting the taking of oysters by any means whatsoever in the whole of the waters of Wilson's Inlet, Denmark, for a period of five years.

Supervising Inspector J.E. Bramley carried out an investigation of these waters last month, and has reported that the oyster population appears to be practically non-existent. It is understood that the oysters were first placed in the Inlet with the idea of supplying Kalgoorlie, but after several unsuccessful attempts to transport them the scheme was abandoned. Since then small lots of oysters have been transferred from Irwin's Inlet to Wilson's Inlet, but have not survived.

It has been decided not to renew the proclamation which will therefore lapse on December 14 next.

EXAMINATIONS FOR FISHERMEN

New regulations introduced by the Harbour and Lights Department will empower examinations of the qualifications of men in the fishing industry in this State. The Department already ensures by regular inspections that vessels are maintained in a seaworthy condition, and in future they will be able to ensure that only capable hands take the fishing fleets to sea.

Standards of seamanship and maritime knowledge required by skippers, coxswains and engineers are set down in the new regulations, which also provide that fishermen must understand English and be naturalised. Skippers are required to be able to read and write the language. Twelve months' grace has been granted before men will have to conform to the regulations, and there is also a provision that men with many years' experience at sea may qualify on the basis of experience.

OUTSIZE KINGFISH LANDED

At a metropolitan beach early in October a mulloway (river kingfish) measuring 4'9" in length with a girth of 31" was caught on a joined scrap nylon line. The weight of the fish was given as 64 lb.

NET RESTRICTIONS AT SHARK BAY

The recent enforcement of a regulation prohibiting the use of $1\frac{7}{8}$ " mesh whiting nets was suspended shortly after being enforced. A deputation of two Shark Bay professional fishermen, Messrs G.W. Fry and R.O. Hoult, was introduced by the Minister for the North-West, Mr. Strickland, to the Minister for Fisheries, Mr. Kelly. The Superintendent was also present. After listening to their case, Mr. Kelly decided that the suspension would stand pending a thorough investigation into the position.

DOLPHINS AT GUILDFORD

Another indication of a very early season was given by the appearance of six big dolphins near the confluence of the Swan and Helena Rivers on October 10. The big fish appeared to be feeding on

small mullet which were known to be plentiful in that part of the river. Due to the poor winter rains, there has been very little fresh water coming down, and consequently there is only a shallow layer of slightly fresh water on the top at Guildford. This is thought to be responsible for the unusually early appearance of the porpoises, as they are commonly termed.

NEW JETTY AT SHARK BAY

During a visit by the Minister for the North-West (Mr. Strickland) to Shark Bay last month, it was announced that the Government had approved of £14,000 being expended on a 1,700' jetty and slipway for the fishing fleet at Denham. The Treasury has indicated that provision could be made for this expenditure from the current financial year's funds. It is hoped that the work will be completed before June 30, 1955, but availability and transport of materials will be the deciding factor.

WHALING PRODUCTION FIGURES CORRECTED

Final figures have now been received from the Cheynes Beach Whaling Co. Pty. Ltd., concerning the take of oil for the 1954 season. The extra barrels of oil were recovered when the company was winding up operations for the season.

	<u>Previous figure:</u>	<u>Final figure</u>
Barrels of oil taken	: 6143	6286
Barrels of oil taken per whale:	51.2	52.4
Barrels of oil taken per foot whale :	1.27	1.30

NET-FISHING AT PORT DENISON

At the request of the Hon. David Brand M.L.A., the Minister recently agreed that the Superintendent attend a public meeting at the Irwin Road Board Hall, Dongara, to discuss the question of net-fishing on the beach at Port Denison. Mr. Fraser subsequently attended a meeting held on October 29. He was accompanied by Mr. S.W. Bowler, Inspector of Fisheries, Geraldton.

The position is that while the Department is strongly of opinion that from the overall State point of view, no benefit accrues to the fisheries generally by banning nets at this place, and that no harm would be done to the fisheries by allowing netting, a large number of visitors from the Midlands spend their summer holidays at Dongara. While some - probably not more than 10 or 15 all told - take nets with them, the remaining holiday makers are anglers, if they fish at all. Many complaints had been received to the effect that as soon as anglers had hooked a few fish, people with nets arrived on the scene and "cleaned up" what fish were then present. It was really to do the greatest good for the greatest number that we closed part of the beach to netting early this year.

At the meeting on October 29, which was presided over by the Chairman of the Irwin Road Board, there were representatives of the Road Board, of anglers and of professional fishermen - all told there were 19 persons present. The majority opposed the ban, although the anglers and one or two professional fishermen supported the Department's action. The meeting was marred by a great deal of acrimonious comment, the opposing factions being both evidently determined to have their point of view adopted. The Department was castigated for not having consulted the Road Board before taking action, but the Superintendent replied that this was a matter in respect of which the Board had no legal standing, and that on a previous occasion when the Board was approached it had intimated that it was not conversant with the needs of the situation and declined to comment.

A recommendation concerning the matter will go forward to the Minister in due course.

THE CLEARING HOUSE

Plankton and Fisheries

The word "plankton" comes from a Greek word meaning wandering, and the plankton in the sea is made up of all those plants and animals living in the water which can swim only weakly, if at all, and so drift with the currents. The plants are collectively known as the "phytoplankton". They are all tiny: the largest are only just visible to the naked eye while most of them are only visible through a good microscope. Each plant is a single cell: some live separately and others are joined together in chains which may have a hundred or more cells although more usual numbers are between four and twenty. Some examples of the plants of the phytoplankton are shown in fig. 1. Most of them belong to the group known as "diatoms", so called because their glass-like outer skeletons are made in two parts which fit together like the box and lid of a pill box. The simplest forms of diatoms are pill-box shaped, but even those which are drawn out into long tubes or squashed into flat discs or have long hair-like projections are basically of the same design. The plankton animals are known as "zooplankton" and they are even more diverse in size and shape than the plants. They are larger than the plants and most of them can be seen with an ordinary hand lens or with the naked eye: the largest are jelly fish up to a yard across. Fig. 2 shows some of the types of animals which are commonest in the plankton. The samples figured are from the North Sea but the main types are the same in most of the oceans and seas. For example the copepods are the commonest zooplankton type, met with everywhere, and the Euphausiids which look like shrimps are found in dense swarms in Arctic and Antarctic waters and are common in deep temperate and tropical waters.

On land all animal life depends for its existence ultimately on plants: so in the open sea the zooplankton, fish and whales depend on the phytoplankton. This is because only the green plants are able to build up organic compounds such as carbohydrates, proteins and fats directly from the simple

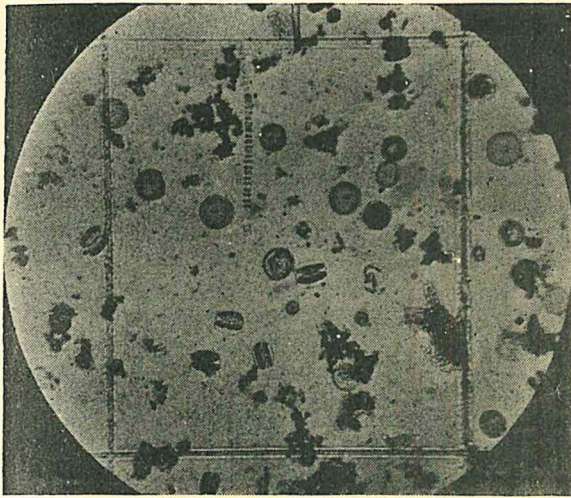


Fig. 1. Phytoplankton, including pill-box shaped diatom *Coscinodiscus* and a chain of the diatom *Lauderia*. Sides of the square are 2 mm.

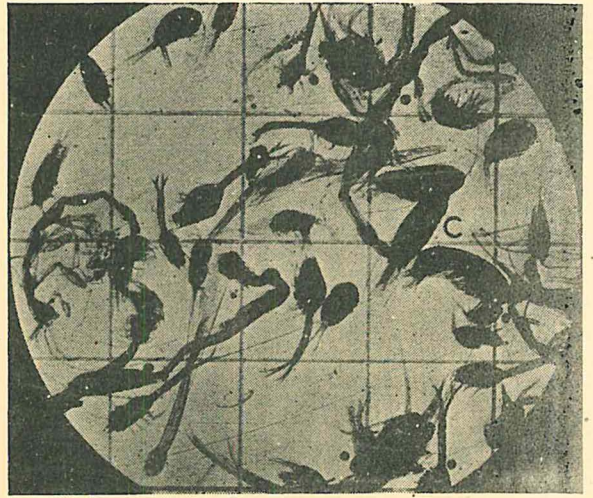


Fig. 2. Zooplankton, including the copepod *Calanus finmarchicus* to the left of the letter C. Sides of the square are 3 mm.

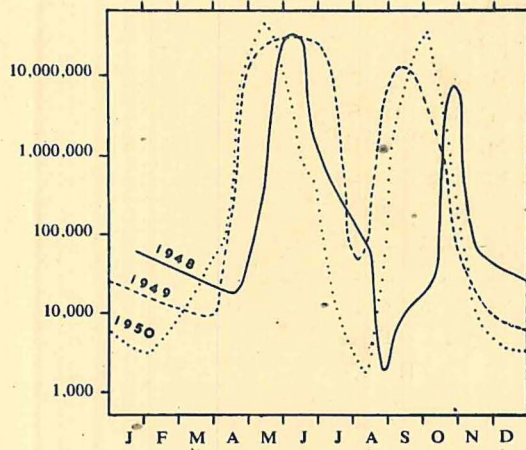
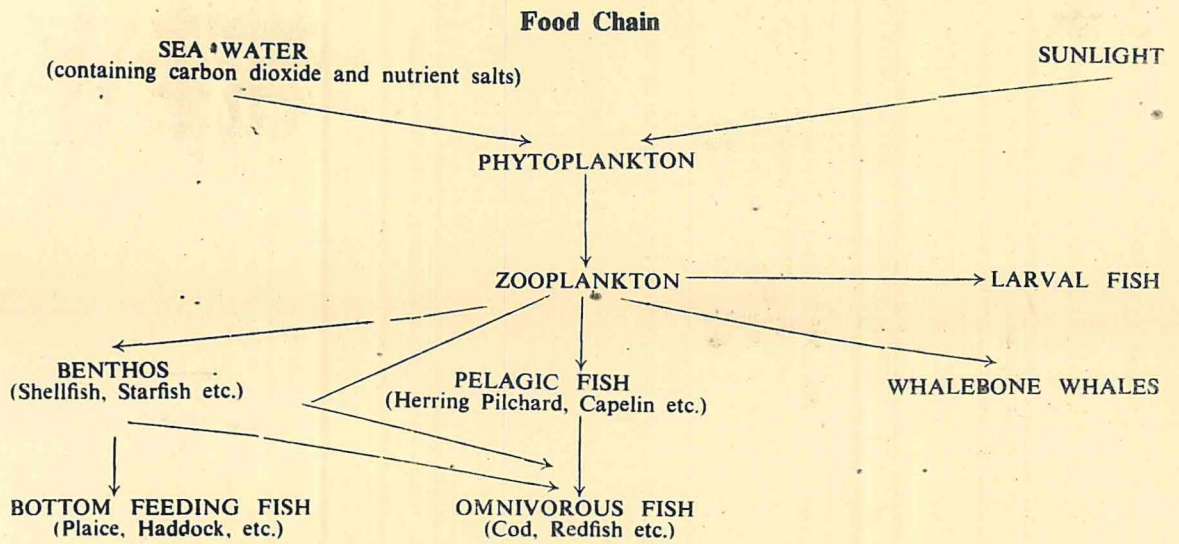


Fig. 3. Seasonal cycles of diatoms at Ocean Weather Ship station "I", 60° N 20° W. Numbers collected by a fine silk net 50 cm. in diameter, hauled from 50 metres



inorganic substances carbon dioxide and water with the addition of certain "nutrient salts". The most important of these nutrient salts are phosphates and nitrates, which are also the basis of many fertilizers on land. One reason why these two are specially important in the sea is that they are sometimes completely used up in some water layers and plant production has to stop. The energy needed for the synthesis comes from sunlight, so the process is known as "photosynthesis". The "food chain" reproduced on the plate shows the relationship between some of the main elements of marine life:-

As the phytoplankton depends for its growth and reproduction on sunlight, in higher latitudes production is greatest in spring, summer and autumn and at a minimum in winter. Fig. 3 shows the annual cycle of the diatoms, which form the main bulk of the phytoplankton, at a position in the North Atlantic 60° N, 20° W. This graph has been drawn after counting the diatoms in samples of plankton taken weekly from the British ocean weather ships on Station "I" by hauling a fine silk net vertically from a depth of 27 fathoms. It will be seen that the highest numbers are in the late spring, followed by a rapid decline in summer. This decline is due to two causes, the grazing by the zooplankton and the using up by the plants of all the nutrient salts in the upper layers of water into which sunlight can penetrate. In the autumn with its equinoctial gales more salts are brought up from deeper water so there can be a brief autumn outburst of phytoplankton. This sequence of events is typical of that occurring in temperate latitudes both in the open sea and in coastal waters. The maximum amount of zooplankton is usually found in summer, after the spring outburst of plants has provided food for the animals. The animals spawn in spring and the larvae feed and grow rapidly. Some of the smaller species pass through several generations in a year while others have only one generation, passing the winter as adults which die soon after spawning the following spring. The larger animals such as the Arctic Euphausiids may live for 2 or 3 years and become sexually mature only after 2 years.

Although plankton animals cannot swim far and so are carried by the currents, many of them are able to swim quite long distances vertically. Some animals make daily "vertical migrations": they live at depths of from 25 to 200 fathoms or more in the daytime and come up to the top 25 fathoms to feed on the plants at night. Other animals, such as some species of Euphausiids, live most of their lives in the deeper water and only come to the surface layers in spring to spawn. The adults in deep water feed on dead plants and the remains of animals which fall down from above, while the young larvae near the surface feed on the phytoplankton during the spring outburst. It has recently been shown by Norwegian scientists at their weather ship station "M" in the Norwegian Sea that the copepods which live in the upper layers in spring and summer spend the winter at depths of 500 to 1,000 fathoms.

As fish are dependent on plankton for their food either at first or second hand, the distribution, growth and behaviour of the plankton is very important for the fish. And a knowledge of the plankton is important for the fisheries biologist studying the habits of fish.

The plankton is of great importance to larval fish which may be said themselves to form part of the plankton temporarily. After a larval fish has used up the supply of food in its yolk it feeds on plankton. Some feed for a short time on phytoplankton but most feed on the smaller zooplankton, tiny copepods and the larvae of large copepods. It has recently been shown that larval plaice in the southern North Sea feed to some extent on a planktonic tunicate called Oikopleura. In temperate and Arctic waters there is usually most phytoplankton about in spring: most zooplankton animals spawn in spring, their larvae feeding on the phytoplankton: and most fish spawn in the winter or spring. If a fish larva cannot get a constant supply of the right kind of planktonic food it will soon starve to death. The presence of the right food at the right time may be critical for the survival of a brood of larvae in a particular year. This is possibly so for the larvae of the Arcto-Norwegian cod which spawn near the Lofoten

Islands and for Norwegian and Icelandic herring, but probably not for plaice in the southern North Sea. For these young plaice there seems to be usually enough food of one kind or another and survival of a brood probably depends more on the number of predators which eat the young fish.

Plankton and pelagic fish.

Herring feed on zooplankton and particularly in the North Sea on the copepod Calanus finmarchicus (see fig. 2). Between April and June there is a fishery for herring off North Shields and these herring are feeding on Calanus. In a series of cruises from early April to the middle of June 1949, the research vessel Sir Lancelot surveyed an area of about 100 miles radius from North Shields five times. In each cruise plankton samples were taken at stations throughout the area to find the abundance and distribution of Calanus: the echo-sounder was run continuously and the traces recorded gave an estimate of the distribution of the fish shoals. At the same time a separate estimate of the herring was given by plotting the catches of the drifters. Several distinct patches of Calanus were found in the area; and in May and June when the numbers of animals increased by rapid reproduction it was clear that the herring were concentrating on the Calanus patches. Some work on these lines was also done in the 1930's when several drifters towed "plankton indicators"; the silk discs when taken out of the indicator showed the abundance of Calanus.

A similar study of the relationships between pelagic fish and plankton is at present being made in the sardine fishery off the Californian coast; and one was made in the 1930's by Russian workers on the herring in the Barents Sea. Both these studies show a close relationship between shoals of feeding fish and the distribution and abundance of the plankton. But adult fish, unlike the larvae, can spend a part of their lives without food, and not all fisheries for pelagic fish are feeding fisheries. The East Anglian herring fishery is not, for example.

Research on Cod

The plaice is a true demersal fish, living

and feeding on the bottom. The haddock feeds on the bottom but is not particularly adapted to living on the bottom like the flat fish. The cod, however, feeds mainly on animals which are pelagic - plankton and fish - and takes them above the bottom, although it does feed sometimes on the benthos. Research on cod has been carried out in the North Sea, at Iceland, Greenland, Newfoundland and elsewhere and recently much work has been done from the research vessel Ernest Holt on cod in the Barents Sea, concentrating on the banks round Bear Island, Spitzbergen and Hope Island. The cod in this area feed mainly in summer and autumn. In an area between south and east of Bear Island as far as the "South-East Gulley" there are large swarms of a Euphausid known to scientists as Thysonaessa inermis. In June and July some cod feed heavily on these Euphausids and often a fishery develops on the feeding cod. To the fisherman these Euphausids are "pink shrimps", and when a catch is being gutted the deck in the pounds is red with them. Off southern Spitzbergen another crustacean known as Themisto libellula, a "large-eyed shrimp" is common in the cold water near the shore and the cod often feed on them when they swarm in the upper water layers in summer. Also in the cold water near Spitzbergen there is a small black snail in the plankton. This is Limacina helicina. In some years when they occur in large numbers the cod feed heavily on them. Cod which feed on them have a peculiar smell like iodine: such fish are known to the fishermen as "stinkers" and are disliked by the merchants. In July 1950 a lot of stinkers were being caught round Bear Island. A tow net survey by the Ernest Holt showed that Limacina helicina was abundant that year but that it was confined to an area of cold Arctic water stretching about 30 miles round the western side of the island. The cod caught in that area were feeding on Limacina.

"Ernest Holt" experiments

To the east of Bear Island and Hope Island during the late summer and autumn cod are found feeding heavily on capelin. The capelin, Mallotus villosus, is an Arctic fish similar in size and in habit to the herring: it is often called "a sand eel" by our fishermen although it is not really a sand eel at all.

Sometimes the cod are concentrated in large shoals feeding on capelin shoals and then they form the basis of a good but "patchy" fishery east of Hope Island in August and September. Occasionally a similar fishery develops further south earlier in the year. The capelin feed on zooplankton, mainly Calanus and young Euphausiids. The Ernest Holt has made several cruises in the area in recent summers and last year made a series of cruises from spring to autumn to study the relationship between the hydrography, the plankton, the capelin and the cod. The hypothesis being tested is that as the ice melts the area of sea uncovered becomes suitable for the rapid growth of phytoplankton; this would be followed by rapid growth and development of zooplankton feeding on the phytoplankton; the capelin in turn would feed on the zooplankton and then the cod on the capelin. Thus the ice edge, receding to the north east, would appear to be followed by "waves," first of phytoplankton and then zooplankton, and the capelin followed by the cod would actually move to the north east. The year's work supported this theory.

Non-feeding relationships

The last few paragraphs have described a few of the ways in which a study of the plankton is being used to increase our knowledge of the fisheries. The examples have been of feeding relationships, which are the most important, but all relationships between fish and plankton are not feeding ones. That between herring and "weedy water" in the southern North Sea is not. Sometimes in late summer and autumn large patches of phytoplankton develop in the North Sea: these are usually made up of a diatom Rhizosolenia styliformis or of a flagellate Phaeocystis, known to fishermen as "baccy juice" when it makes their nets slimy. It has been shown that the densest of the patches of Phaeocystis and probably also the densest patches of Rhizosolenia, and so the development and positions of the patches may affect the distribution of the shoals in the East Anglian fishery. The reason why herring avoid these patches is not clear, but it has been suggested that some substance given off by the plants or resulting from the breakdown of the cells at death is distasteful to the fish. A much more dramatic example of this sort of phenomena is seen in

the "red tides" which occur periodically off some tropical and semi-tropical coasts such as those of South-West Africa, Peru, southern California and Florida. When conditions are particularly favourable some species of phytoplankton of the type known as dinoflagellates, which are reddish in colour, increase very rapidly until the sea looks like red soup. When this happens fish in the area are often killed by the thousand: sometimes they float on the sea and sometimes they are washed ashore and cover the beaches. The cause of these "mass mortalities" is very probably a poison which is produced by the dinoflagellates, although some people think death may be due to asphyxiation from shortage of oxygen. It has been shown that this poison is also responsible for paralytic shellfish poisoning of man in southern California. Mussels feed on the dinoflagellates and accumulate the poison to which they are resistant, but people eating the mussels are seriously affected.

This short article has shown some of the ways in which plankton researches are important to the fisheries biologist. There are others in which the results are of less direct application and further research will extend their usefulness.

("World Fishing", London. July, 1954.)

World's Deadliest Organism

The deadliest animal in the world is a jellyfish found in the waters off the coast of northern Australia. Known as the "sea wasp," the Cubamedusa jellyfish is considered deadlier than the most poisonous snake, and has caused death in less than three minutes. The fish is about the size of a man's hand, has wispy tentacles between two and four feet long.

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

Incidentally, at the recent convention of the American National Fisheries' Institute, a delegate commented: "Old fishermen never die, they only smell that way."