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FISHERIES DEPARTMENT WESTERN AUSTRALIA

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STAFF NOTES

The Superintendent (Mr. A.J. Fraser) will attend the quarterly meeting of the Trout Acclimatisation Council of W.A. at Mornington Mill on Sunday, December 1. The Research Officer (Mr. B.K. Bowen) will also attend.

Technical Officer J. Traynor was admitted to the Mt. Hawthorn Hospital on November 27 for surgical treatment. He does not expect to return to duty much before the end of the year.

Mr. G.C. Ferguson, of Head Office, and Inspector B.A. Carmichael, of Albany, will each commence leave on December 16. Inspector H.J. Murray will be in charge of the Albany district during Mr. Carmichael's absence.

The Clerk-in-Charge (Mr. B.R. Saville) will commence annual leave just before the Christmas break.

The Fauna Protection Officer (Mr. H.B. Shugg) and Fauna Warden S.W. Bowler will each go on annual leave on December 30. Assistant Inspector S. LaRoche, of Mandurah, whose leave was postponed from November, and Assistant Inspector D. Wright, of Geraldton, will also commence leave this month.

The Statistics Officer (Mr. A.J. Buchanan) will pay a brief visit to the Lancelin area on December 2 and 3.

OBITUARY

On November 6, 1957, at Royal Perth Hospital, Herbert Sydney Clarke, of Broke (Brooke's) Inlet, passed away, at the age of 77 years. Mr. Clarke had been a professional fisherman for a great number of years.

PERSONAL PAR

We are delighted to learn that Mr. W. Bruce Malcolm, of the Division of Fisheries and Oceanography, C.S.I.R.O., has been awarded a Ph. D. of the University of Western Australia for his work on the Australian salmon. Dr. Malcolm, who is also a graduate in science of the University of Sydney, spent two or three years in this State in the course of his salmon and ruff investigations. He is at present in Canada doing post-graduate work at the University of British Columbia, having just completed several months of study at the laboratories of the Fisheries Research Board of Canada at Nanaimo.

To Dr. Malcolm we extend our heartiest congratulations on his well-merited honour, and our cordial good wishes for his future success.

RESEARCH NOTES

The Research Officer (Mr. B.K. Bowen), accompanied by Technical Officer L.G. Smith, visited the Boolardy Pastoral Company's property "Cranmore Park" at Walebing during the month, and obtained water samples for oxygen determination and collected plankton in continuance of the experiments being conducted on two dams on the property, one of which has been fertilised and the other left as a control.

Technical Officer L.G. Smith reported that, in carrying out routine tagging of black bream at Bunbury, he had noticed that these fish had moved from the Inlet into the Collie River during October. In September and early in October, he said, they had been in the Inlet and were then in full roe, but moved into the River during October, presumably to spawn. When the usual 100-bream sample was taken for tagging last month, it was found they were all spent.

PLAINLY SPEAKING

The Ninth Annual Report of C.S.I.R.O., covering the 12 months ended June 30, 1957, has been tabled in the Federal Parliament. A copy has just reached Perth.

Two of the components of C.S.I.R.O. - the Division of Fisheries and Oceanography and the Wildlife Survey Section - have in the past been particularly active in Western Australia and contributed in no small way to the solution of fishery and fauna conservation problems. Because of the interest these instrumentalities have hitherto created among our staff, the portions of the report dealing with their work are summarised elsewhere in this issue.

Unfortunately the report, in the absence of any mention of renewed activity in this State by the Division of Fisheries and Oceanography, cannot act as a stimulus to our interest, but rather arouse a feeling of the keenest disappointment, and perhaps resentment, because of our own very ready co-operation in the research programmes. The number of new projects indicated is strictly limited, and even these are planned for waters adjacent to the south-eastern seaboard. In any case, the new projects will be confined almost entirely to long-term fundamental studies which will add very little to our present knowledge of Australia's commercial fishes. With one or two exceptions they are a sealed book.

The recall of a number of the Division's research personnel to its Cronulla headquarters (not mentioned in the report) is significant. It suggests the dawn of a new policy - a policy which means the eventual closing down of work in the more remote States so as to facilitate research in an area close to where most of Australia's population lives.

The following is an extract from C.S.I.R.'s Digest of Current Affairs published not so very many years ago - in 1946, to be exact -

"The experience which has been gained by the Division "of Fisheries during the last few years indicates that "fisheries research in Australia differs in many aspects "from fisheries research overseas. In Europe, the "fisheries industries have developed over many centuries "and research is concerned mainly with the conservation "of fisheries resources. In Australia, on the other "hand, the fishing industry is relatively primitive and "undeveloped and it is evident that in the first instance "the most useful contribution from the research side will "be associated with the exploration of the seas around "the Australian coast, with the objects of discovering "the types of fish that occur, their seasonal variations, "and other factors of this nature. Some work of this "type has already been carried out by the Division and it "has built up a reasonably complete picture of the fish "occurrences in the areas around the south-east corner "of the continent. Very little systematic work has been "done along the remainder of the coast, and if the infor- "mation which is necessary for the successful development "of the fisheries industry is to be obtained this explora- "tory work must be extended to the areas round the Aus- "tralian Bight, and the coasts of western and northern "Australia.

"It is proposed, therefore, to bring into being in "the Division a special Section devoted to exploratory "work. This Section will also be responsible for the "investigation of methods for catching pelagic fish in "large quantities. In order that the work should be "adequately organised, the proposal envisages the appoint- "ment of an Officer-in-Charge to whom the Chief may dele- "gate the full responsibility for exploitation and bulk- "catching investigations. The Section will have a "small staff of trained men and be equipped with the "necessary facilities, such as boats and fishing gear, "to enable it to carry out this work successfully."

What a different tale today!

It is perhaps symptomatic of the changing policy that a number of trained officers whose names appeared in the list of research and technical staff at June 30 have since accepted positions elsewhere. What is the reason for their defection?

The gradual closing down of fisheries research in Western Australia may to some extent be attributed to the paring of C.S.I.R.O.'s estimates by the Treasury. That this cannot be wholly true, though, is quite evident because of its so closely following the pattern set by the Federal Government in relation to fisheries development in this State. Some 18 months ago, it will be remembered, the Commonwealth sold the Carnarvon Whaling Station to private interests for some £900,000. Special legislation was passed to provide that from this sum about £¾ million, representing largely the profits of the venture during the period of Government management, was from time to time, as instalments were received from the purchasers, to be paid into a special account at the Treasury known as the Fisheries Development Account. The moneys thus made available were to be spent on the development of Australia's fisheries.

Despite the fact that these funds were derived from the exploitation of a Western Australian resource, and that in any case this State is an integral part of the Commonwealth, the Federal Government has turned a deaf ear to most of the recommendations made by our Government designed to assist development in Western Australia. In fact, two of the major projects which have so far been approved as a charge on the fund are in respect of areas outside Western Australia. They are an investigation of the prawn resources of Queensland and a pilchard (sardine) survey of the waters off the New South Wales coast.

It has been decided also to spend a very substantial part (£250,000 or thereabouts) on the purchase and equipment of a trawler to exploit the bottom-fish resources of the Great Australian Bight, and at first sight this might appear to assist Western Australian development. Strange to relate, however, the Commonwealth Fisheries Office plans to land the whole of the trawler's catches at Port Adelaide, for sale in the "fish hungry" eastern States. Yet it was a Western Australian Government which only comparatively recently spent large sums of this State's own money in proving the trawl-fish potential of the western Bight. It had the expectation that our State would ultimately

benefit, not only by supplying fish to our own fish-hungry outback and reducing the already large volume of imports (about 3,200,000 lb. valued at £320,000 annually), but also by bringing a new industry to a State which badly needs new industries. It does seem, if the Commonwealth Fisheries Office is allowed to have its way, that we shall just be sitting back idly watching the Commonwealth trawler cashing in on the results of our work and at the same time giving the eastern States all the benefits. There are adequate processing facilities at Albany, which possesses one of the finest harbours in Australia and is no farther from the proven grounds than is Port Adelaide, but even if that were not so Western Australians could be forgiven for regarding this proposal of the Commonwealth Fisheries administration as totally unconscionable and grossly unfair.

Western Australia's record of fisheries development is second to none in the Commonwealth. Today's annual production - excluding that of the whale and pearl fisheries - is almost seven times what it was towards the end of the war.* No other State can boast of such progress. But in contradistinction to the old adage "God helps those who help themselves", there seems little doubt that the Commonwealth Government's policy for fisheries is to help only those who don't help themselves.

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* 1944 : 3.2 million lb.; 1956 : 20.6 million lb.
= 544% increase.

Cf. Australia -
1944-5 : 61.7 million lb.; 1955-6 : 88.1 million lb.
= 43% increase.

In 1944 W.A.'s production was 5% of that of the Commonwealth - in 1956 it had reached 23%.

PATTERNS OF FISHERIES DEVELOPMENT

The following is the script of a talk given by the Superintendent (Mr. Fraser) over Station 6WN on November 24. It is reproduced with the concurrence of the Australian Broadcasting Commission.

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Perhaps it is not so simple as it may seem to forecast with accuracy the lines future development of the fisheries of Western Australia will follow.

Firstly, we have a vast coastline - some 3,000 miles all told. There are many species of fish, but relatively small numbers of individuals of each species, which means, because of their varied habits, that many, and in some cases costly, techniques must be used to catch the different kinds.

Secondly, population is sparse in the North-West, where the best scope for development appears to exist. Consequently, a pool of cheap labour is just not available. In towns like Geraldton and Albany, for example, the greatest possible use is made of part-time female helpers in the fish processing plants. This ensures economical working.

Development since the war has really been phonomenal. During this year the total production of the fisheries, aside from whaling and pearling, is seven times what it was during the war years. This has largely been due to the demand for crayfish "tails" on the United States market, and the canning of salmon in Albany and Perth.

So far as crayfish are concerned, some doubt is at present felt regarding the future of the industry. Actually, total annual production has during the past few years been stabilised at around 12 million pounds. At the same time, the catch in some areas, notably the once highly productive Lancelin

Island region, has fallen away. To counterbalance this drop new crayfisheries have been opened up in the deeper waters surrounding the Abrolhos Islands, near Geraldton, and off Dirk Hartog Island, Shark Bay. One somewhat alarming feature is the increase in the number of men entering the industry and the big fall in the catch-per-man. So far the reduction in the catch-per-man has been offset by the higher and higher prices obtained in the American market, but this upward price spiral cannot last indefinitely.

Crayfish we know exist along the south coast. These are of a different variety from those we are now fishing for. They are nevertheless of high quality - in fact they are identical with those caught in South Australia and Victoria. The State Government has asked the Commonwealth Government to apply some of the money received from the sale of the Carnarvon Whaling Station to investigating the south coast cray resources, but so far without avail.

It does not seem as if any great increase in salmon production may be expected. During the years since the war the annual catch has fluctuated most violently, due to what appear to be fluctuations in the behaviour of the fish themselves. Some years they move close inshore during the course of their westward spawning migration and also close inshore on their return eastwards after spawning. In those years the catches are high, but in other years the fish move farther out at sea, and the catches are greatly reduced.

Some of you will remember, no doubt, that for a couple of years a few years ago we had two trawlers operating from Albany and fishing the waters at the western end of the Great Australian Bight. This venture failed - not because of scarcity of fish, but solely because of the unsuitability of the two cast-off vessels which were imported from England. There is a big trawling potential in this area, and the Commonwealth Government has decided to spend a very substantial part of the Carnarvon proceeds in putting a modern trawler to work there. It is possible that Western Australia will not benefit greatly from the

venture, because it is proposed that the whole of the trawler's catches be landed at Port Adelaide for sale in the eastern States. The Western Australian Government rightly feels that as it spent quite large sums in proving this fishery, and that as in any case the whaling moneys were derived solely from sources in this State, we should at least share equally in the fish caught by the trawler. Adequate processing facilities are already available at Albany to treat the catches.

One species of which we hear a great deal when fisheries potential is discussed is the tuna, or tunny - the American "chicken of the sea." It would probably be worthwhile for me to dwell a little on this fish.

We had better look at the tuna resources in relation to two distinct geographical areas : the first the southern section from about Shark Bay southwards, and the second the area to the north of that.

In the southern section the species which occur in sufficient numbers to be of possible commercial importance are the southern bluefin tuna, the northern bluefin tuna and the oriental bonito. The striped tuna and the albacore also occur, but they appear to be in such small numbers as to suggest that they are of little value commercially. The area has been surveyed by both aircraft and ship, but only in relatively close proximity to the coast. So far no really great concentrations of tuna comparable with those in south-eastern Australia or in South Australia have been located. It is known, however, that very large and sexually mature southern bluefin weighing up to several hundred pounds occur off the south coast during winter. These do not take a hook, but quite a number of specimens have been caught by nets in Albany harbour.

Otherwise only very small southern bluefin tuna are found along the Western Australian coast. These are present in two size-groups. The

smaller averages about 3½ lb., and the larger about 10½ lb. One year (1951) rather larger fish (averaging 13 lb.) also occurred with these smaller groups in the Albany area. These small fish may be caught by trolling, but it does not seem that the occurrences even of the smaller ones are comparable with those of the eastern States.

Our oriental bonito is similar to that of eastern Australia, but slightly larger. Specimens vary from 2½ lb. to 14 lb. and more; about half the specimens caught by trolling are fish between 5 and 6 lb. in weight. This species is found between Busselton and Doubtful Island (about 45 miles east of Albany) and in certain sections of their range are quite plentiful.

The northern bluefin tuna is found on the west coast to as far south as Cape Naturaliste, near Busselton. It can be caught by trolling, but this method is rather uncertain for large catches, as the fish often refuse to take the hook. Netting either along the beaches with beach seines or in deeper water with purse seines might be more certain, but neither method has been tried here. The northern bluefin in the south average about 25 lb.

In northern areas from Shark Bay northwards large schools of tuna have been observed by trained investigators. These appear to be chiefly northern bluefin and mackerel tuna. When the whaling factory ship "Frango" was operating in Shark Bay in 1938, many tons of tuna, reputedly northern bluefin, were caught from the anchored ship. On some days hundreds were brought aboard. A fair daily average over the whole period was 12, of an average weight of 35-40 lb. All were taken by handline. The fish had apparently been attracted to the factory ship by the vast quantities of offal discharged from the digestors.

So far, yellowfin and striped tuna have not been met with in abundance in the northern area, although they are known to occur there. In some parts of this area mackerel tuna and northern bluefin are

actually observed swimming along piers and jetties and around anchored ships. A great many have been caught by anglers.

We might say, then, that prima facie the northern section, and perhaps also the southern section, possesses major economic possibilities as far as the exploitation of tuna is concerned. The only commercial fishery on our coast at the moment is a very small one at Fremantle where one or two men troll a few tons of northern bluefin annually. A small quantity is canned and sold locally.

To exploit tuna properly, particularly in the northern area which is so remote from the metropolitan area and, indeed, from any large centre of population, large expensive vessels are needed. Furthermore, some difficulty has already been experienced in disposing of tuna canned in the eastern States. As the canned form is the only one which offers any possibility of finding a ready market, a proper survey of marketing prospects, both inside Australia and overseas, must be put in hand before any attempt is made to exploit this resource.

Two likely developments have recently been receiving the close attention of the Fisheries Department. These follow the discovery by the State research vessel "Lancelin" of extensive prawn resources in Exmouth Gulf and Shark Bay, and of what appear to be large occurrences of scallops in Shark Bay.

The prawns consist of three main kinds, the banana prawn, the king prawn and the tiger prawn, although the bananas have not yet been located in Shark Bay. They are of a very large size, up to 9 inches in length, and of excellent quality. Big catches can be made with trawl nets. It is believed that as soon as proper processing techniques can be evolved it will be possible to export the major portion of the catch to the United States, as is being done by New South Wales and Queensland at the present time.

Most encouraging catches of scallops have been made in Shark Bay. These are almost identical

with the scallops of North Queensland, but different from the famed Tasmanian kind. In fact many gourmets believe that the Western Australian variety is of finer texture, and superior flavour, to its Tasmanian counterpart. There is no doubt that the development of a scallop fishery will mean more dollars from a waiting United States market.

In conclusion one can only say that as population grows and world demand for foodstuffs increases, there is no doubt at all that our fishery resources will be developed. But on past experience it is evident that any real development will be in the hands of the fishing boat owner-skipper, who in the final analysis is the backbone of the fishing industry, rather than to large companies with boards of directors and lists of shareholders who are so very impersonal and so very remote that the will to win is just not found among the operatives. The owner-skipper, however, has a real stake in the industry, and developments in the past have clearly shown that he is the man on whom we must rely in the future.

C.S.I.R.O. ANNUAL REPORT

The following brief summary of the activities of the Division of Fisheries and Oceanography and the Wildlife Survey Section, abstracted from the 9th Annual Report of C.S.I.R.O., is published for the information of departmental officers.

Division of Fisheries and Oceanography

A brief, perhaps over-simplified, statement of the functions of the Division is given in these words at the commencement of the report -

> "The Division of Fisheries and Oceanography is "concerned with a study of the aquatic resources of "Australia, including whales, the more important "commercial fish, crustacea and shellfish, to ensure "their economic use and, where necessary, their

"management to prevent depletion of stocks. Funda-
"mental to this study is an examination of the
"environment to ascertain the variations in oceano-
"graphic conditions which affect organic produc-
"tivity and are to a large extent responsible for
"fluctuations in fish occurrences."

Investigations at Lake Macquarie for the N.S.W. Fisheries Department were brought to an end during the year. Victorian flathead investigations also ceased. An analysis of statistical data on the Westralian crayfish was being carried out. Some field work was done to confirm previous opinions that the "white" crayfish were the same species as the reds.

Routine sampling of trout in Tasmania continued, and a study of the tench as a suitable subject for cultivation in farm dams in Tasmania was brought to completion. Some work was also done in the same State on the southern crayfish.

One thousand pearl oysters were tagged and measured at Groote Eylandt, in the Gulf of Carpentaria. Attempts to secure the spat of the pearl oyster Pinctada maxima were unsuccessful. Several half pearls and some graft pearls were produced experimentally.

Field work was carried out on oysters and scallops, and an analysis was being made of material collected in estuaries and inlets in the south-west of Western Australia.* A programme to determine the cause of fluctuations in the availability of barracouta in Bass Strait was to be re-planned because of the inadequacy of the existing facilities.

Field work in relation to whaling investigations was continued, as was the sampling of trawled tiger flathead in the Sydney fish market. Two long-lining cruises were made to sample tuna, and some work was done on the school shark.

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* Vide note in November, 1957, issue, of this Bulletin.

A resume is given of the work on the virus myxomatosis, to which was widely attributed the decimation of the rabbit population two or three years ago. The studies in train comprised intensive investigations of disease activity, rabbit populations and the production of insect vectors. Research on virus variation and immunity from and resistance to myxomatosis was proceeding at the Australian National University.* The statement is made that evidence is accumulating that climatic conditions not favourable to successful breeding have contributed to the continuing general low level of rabbit infestation.

Work on the euro, or hill kangaroo, was continued at Woodstock Station, situated between Port Hedland and Marble Bar in the Pilbara district of this State. A regional survey showed that only in a few very small areas were euros in such abundance as to make them serious competitors with sheep for pasture. An interesting fact evolving from the kangaroo investigations was that at the height of the dry season, 60% of the euro stock drank only once or twice in each 14 days, with a few drinking more often and some not drinking at all in that period. Studies of the euro's physiological adaptations (presumably in relation to its toleration of intense dehydration) were being planned. It is believed they will lead to a true understanding of the euro's relation to sheep and to the red (or plain) kangaroo as competitors within their environment.

Investigations to determine the status of the marsupials in N.S.W. were completed. Species new to N.S.W. were found during the course of this work. A study was also commenced near Canberra of the role of dispersal in population regulation of the brush-tailed possum. It would seem either that there was a heavy death-rate among young possums or that they dispersed very rapidly. Although neither of these concepts had been proved, there was some evidence to support the latter.

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* The Agriculture Protection Board of Western Australia is inclined to believe that rabbits are definitely developing immunity from, or at least resistance to, myxomatosis.

A handbook of Australian fishes was being published serially in the "Fisheries Newsletter", and the preparation of a check-list of the fishes of New Guinea and an illustrated handbook of New Guinea fishes was well in hand.

New projects were few. In the field of physical oceanography, the routine calculation of surface currents and volume transport in the vicinity of Sydney was commenced. Surface currents were also being measured directly by electrical means. Some oceanic and coastal hydrography was undertaken.

The aquarium building at Cronulla was extended to permit the installation of an illuminated constant-temperature room for rearing organisms used in marine fouling research.

A new group of scientists was organised to "enable the productive areas in Australian waters to be recognised and the factors involved in production to be determined ..... it is hoped that this knowledge will be used to allow human intervention to bring present unproductive areas into production."

Wildlife Survey Section

The preamble to this report reads as follows -

> "In every country of the world animals and birds, "both native and introduced, affect primary produc- "tion and other human activities in a variety of "ways. In Australia, what may conveniently be "termed wildlife problems range from that of the "rabbit, the country's most serious pest, to the "mutton bird, on which a small but valuable "industry depends. Kangaroos, possums and wild ducks "and geese of various species, may be pests at "various times and in parts of their range, while "calling for conservation elsewhere because of their "economic value or their importance as game. To "deal with wildlife problems that called urgently "for solution or merited scientific study for other "reasons, the Organisation established its Wildlife "Survey Section in 1949."

The magpie goose, from its inroads in rice-growing areas in the Northern Territory, was the subject of special study. The work so far seemed to indicate that the most profitable approach to protection of the rice crops would be based on the manipulation of the breeding habitat of the birds.

Australia's most important game bird, the wild duck, seems to be responsible to some degree for the spread of Murray River encephalitis, says the report. Ducks banded in the Griffith area in New South Wales were recovered from such widely separated and distant centres as Perth, Western Australia, and Roma, Queensland.

Investigations designed to provide conservational measures for the mutton bird of the Tasmanian Islands in eastern Bass Strait were continued. During the year 2,200 birds were banded (some in Nuyt's Archipelago, off Ceduna, S.A.). This brings the total bandings to 20,321 since the studies were initiated.

Other projects of the Wildlife Survey Section comprised studies on the mallee hen ("gnow" in Western Australia), the magpie in the Australian Capital Territory, the raven (the common "crow", in respect of which attempts to eradicate breeding birds from an area of 5 square miles by shooting and trapping, merely proved the existence of an "immediate reservoir of replacements"), and the white-tailed black cockatoo and the twenty-eight parrot of Western Australia, where they were becoming forest and agricultural pests.

TROUT DELIVERIES

Technical Officer L.G. Smith, assisted by Assistant Inspector K. Brooks, delivered 66 bags of advanced trout fry last month. Twelve bags were taken to Harvey, Bridgetown and Bibra Lake, ten to Beverley and twenty to Jarrahdale. All the bags carried very well. They were all transported during the night, except on the short run from Pemberton to Bridgetown, and Mr. Smith reported that the recipients were delighted by the good condition of the fish. Several small lots were also brought to Perth, as only a few fish are left in the holding pond at Craig's Lake, Kewdale.

WILD DUCKS

(a) Open Season in Outlying Areas :

After giving consideration to information made available from duck banding programmes throughout Australia, the Fauna Protection Advisory Committee recently recommended that an extended open season be proclaimed in the Kimberley, Eastern and North-West Land Divisions.

The recommendation, which has been accepted by the Minister, will mean that the season will open in these outback areas on the 22nd of this month, and will not close until 1962.

In making their recommendation, the Committee was mindful of the different breeding seasons of ducks, both geographically and between species. In the Kimberleys, on information received from a competent naturalist and Honorary Warden, Mr. P. Slater, all species except black duck and freckled duck nest during the "wet", i.e., from November to March. Black and freckled duck usually nest later on when the Kimberleys are comparatively dry. Banding programmes have shown that grey teal, the species most commonly shot in light rainfall areas, are opportune nesters and set about breeding wherever and whenever conditions are to their liking. It will be seen that to protect the different species during their breeding seasons would call for a number of close seasons and cause a good deal of confusion. In recent years the same open season has been declared throughout the State, but it is well known that in all outlying areas, where supervision is difficult, shooters take little notice of the close season. Banding results have shown that this has had a negligible effect on the total duck population, so that the prolonged open season will legalise the shooting habits of outback shooters and remove an unnecessary restriction.

(b) Duck Banding :

For the first three weeks in November, Technical Officer J. Traynor was engaged on duck banding

in the Dowerin district. Mr. Traynor advises that although there was a great number of birds about, they did not enter the traps readily. Before returning to Perth for medical attention, he was able to band a total of 183 birds, of which 166 were grey teal, the remainder being pink-eared, black, wood and mountain duck in about equal proportions.

MANDURAH FISHPOT

An unusual but most attractive competition has been designed by Mandurah business men to "sell" their town and district to the holidaymaking public. Named "The Mandurah Annual Fishpot", the competition will commence on December 13. It is already exciting considerable interest, and we are indebted to Assistant Inspector S. LaRoche for having supplied details of the scheme.

In the first place a committee was set up to find something that would boost the town - something that was simple, original and attractive, and in keeping with the character of Mandurah. Fishing and Mandurah being synonymous, the committee bent its thoughts on an angling competition and decided to wed it to the current jackpot craze. Thus the basis of the scheme was born. Business men rushed to support it and guaranteed a weekly prize of goods to the value of £50 which will "fishpot" if not won.

The whole scheme, and the rules, were kept simple. Briefly they are --

(a) The competition is open to all comers and there is no entry fee or form.

(b) The fish entered must be caught from waters within the boundaries of the Mandurah Road District by a handline or rod and line.

(c) The fish must be taken to the recording office at No. 2 Pinjarra Road, Mandurah,

within 18 hours of being caught. They must not be refrigerated.

(d) The entrant must complete a statutory declaration that entrance conditions have been observed.

(e) The decision of the judges shall be final.

The competition will proceed along these lines - the species and sizes of the fish, and the prizes, will be publicised by press and radio on the Friday evening preceding each weekly competition. The heaviest fish of the prescribed species caught in accordance with the rules will be adjudged the winning entry except that, if no fish of the minimum standard set by the committee is caught within the set time, the prizes will "fishpot" to the following week's competition.

Assistant Inspector LaRoche, who will be on annual leave, has been appointed as one of the official judges and will check the weights and measurements of all fish entered. Inspector A.V. Green, who is in charge of the district, will also assist in the running of the competition in whatever time he has available. Notices drawing attention to departmental fishing restrictions have been posted at suitable places and the activities of anglers will be policed.

NATURAL v. SYNTHETIC FIBRES FOR NETS

The cost of making nets of synthetic fibres (e.g., nylon) is much higher than that of vegetable fibres (e.g., cotton). The raw material is dearer and its manufacture into twine and netting takes longer, adding still more to the cost. Stretching and knot slippage need to be overcome during manufacture, again adding more to the cost. So asserts one of the principal net-making firms in England. It contends that nylon is subject to as great, or greater, damage from snags, rocks, etc., as vegetable fibre. It says that nets of natural fibres are every bit as good as they always were, and a lot cheaper. If properly cared for and kept clean they should have a perfectly satisfactory economic life.

THE CLEARING HOUSE

The Case Against World-wide Uniformity for the MARGINAL SEA

Should every nation be forced to observe a 3-mile limit, or 12-mile limit, or any other strict rule regarding territorial waters? Here is an argument for regional differences in the width of the marginal sea by one of the most prominent marine legal authorities in the U.S., and a former member of the International Pacific Salmon Fisheries Commission. The meeting on the Law of the Sea has been called by the United Nations for next March and this timely statement of opinion may have an important bearing on the discussions.

by Edward W. Allen,
Seattle, Washington.

The forthcoming meeting of the Law of the Sea called by the United Nations for next March may well be the most important meeting ever held concerning that subject. One of the most vital and probably the most controversial phases of the subject is that relating to ocean fisheries.

Much has been said concerning the width of the marginal sea (often referred to as territorial waters) and the respective rights of local and roving fishermen. Some of the discussions have been legally objective; some so much so as to be largely theoretical, placing more emphasis upon legalistic ideas than upon the fishermen themselves; some have been patently nationalistic, viewing the problems solely from the standpoint of local interest.

Instead of starting from a legalistic viewpoint, would it not be more in the interest of humanity to consider first what will promote the interests of the general public?

At the Rome meeting in 1955 called by the United Nations there was at least vocal acclaim for fishery conservation, with much effort to define the term. Simply stated, the objective of law bearing upon ocean fisheries should be "maximum permanent utilisation" with emphasis upon "permanent." Taking up the three terms in reverse order, "utilisation" means putting the enormous food resources of the sea to beneficial human use. "Permanent" implies that this use should be so ordered that it will continue from generation unto generation forever. "Maximum" is the term giving greatest difficulty in application because, although it implies the direct opposite to the unsound old concept that conservation of a natural resource means to deprive the present generation of its use, it must at the same time be strictly held down by the limiting factor of "permanent" utilisation - take so much now, but so much only as will permit sufficient survival to secure the greatest utilisation year after year.

How can law best serve this concept of "maximum permanent utilisation"? First, by recognising the physical attributes of fisheries and, second, by recognising human attributes of fishermen and their countrymen.

An immediate answer is that neither fishes nor humans are identical the world over and no amount of communal effort to make them automatons in the sea or out of it is ever likely to succeed. This being so, the question arises whether it is essential that all fisheries and all people be placed in a universal straight-jacket, or is it both permissable and desirable that differences be recognised?

Every previous effort to deal with the law of the sea as to fisheries has foundered because of the refusal to recognise differentiations. It remained for the Court of International Justice to disclose vision by its holding that universal unanimity of rules is not essential even in these days of a United Nations. If the forthcoming United Nations meeting will commence with an acceptance of this basic principle of its own highest court it may stand a chance to fare better than its predecessor, the League of Nations, did in 1931.

Consider now the marginal sea. It constitutes the area of water along a nation's coast which the nation owns. There is no question now but that fishery rights within this area belong to the coastal nation. The fish, however, know nothing about this fact. Some live wholly within the area (whatever width it may have); some live primarily within the area and the adjacent waters; some (anadromous fish) make the streams flowing into it their domicile, but do some visiting abroad; some rovers occassionally pass in and out; some never come within it.

The two theories upon which the current marginal sea came into being were that the coastal nation should possess the area it could defend from the shore and that ocean fisheries were inexhaustible and hence need no protection. Both theories are, of course, obsolete. However, domestic convenience, sedentary fisheries, pollution and other things still make a marginal sea of some width desirable, but there is no logical connection between three miles (or nine, for that matter) and migratory fish. Ordinarily, effective conservation practices in order to secure maximum permanent utilisation must deal with specific stocks of fish rather than areas.

Stocks of fish vary so greatly in their attributes that the same conservation practices may not apply to all. A few sketchy examples will illustrate. Whales and tuna, generally speaking, are world rovers. They have no domicile. Halibut, on the other hand, though they swim inshore and out and up and down a coast to some extent, limit themselves to definite ocean banks. On the northwest coast of North America, for instance, they are mostly found within twenty-five miles of shore and almost never beyond one hundred miles - an insignificant distance compared to the width of the Pacific Ocean. Salmon are wholly different. They are spawned in rivers and lakes to which they specifically return to spawn and die. In the interim they have gone to various feeding grounds at sea where they have mingled with salmon from other streams.

Forgetting for the time existing theories of law, and considering only practical solutions, whales

and tuna should be conservation regulated, if at all, by general agreement between large groups of nations and available to anyone. Halibut, being localised, should most properly be fished and regulated by the nations to which their banks are adjacent. Salmon, because of their peculiar habits, can only be regulated effectively stream by stream, hence until they segregate themselves inshore to return to their respective streams, they should not be caught on the high seas at all.

Anyone really acquainted with fishermen knows that few of them give serious thought to actual conservation. They are after the fish whenever and wherever they can catch them. In a few areas, such as the northwest coast of North America, where several decades of successful international joint management between Canada and the United States has afforded striking demonstrations of how the fishermen themselves benefit by regulation based upon sound scientific research, there is a different attitude. So it may be taken for granted that except where there has been such education it may be many years, perhaps generations, before there will be adequate public support for effective regulation. The difficulties in connection with the whaling convention are revealing though not widely publicised. The foregoing is mentioned to bring out the differences in humans as well as fish. Should those few nations and areas where sound conservation has taken root be brought down to the common low level of world fishery practices, or should they be permitted to continue leadership and give inspiration by their successful example?

To be sure the Rome meeting and the International Law Commission proposals which followed gave lip-service to the idea of regional management. They then proceeded to hedge it with expressions of universal rights of interference under the apparent misconception that the term "freedom of the seas" made such hedging imperative. "Freedom of the seas", reasonably applied, has its usefulness, but it would be well to forget it as a slogan and be practical and reasonable in its application.

The proposals of the International Law Commission do not purport to be a codification of existing law, but to be a code of what the Commission

considers the law should be. If this is so, why not wipe out the obsolete and incorporate realistic concepts? The principle, not new, though bearing the new name of "abstention", recognises historic rights and at the same time encourages practical and effective conservation. The fact that comparatively few nations have arrived at the point where the principle is applicable, should not prejudice their rights. Conservation of fisheries should be considered from the stand-points of stocks and human historic background as well as areas.

("Western Fisheries" Vancouver, B.C. September,1957)

Japanese Claim Merit for Knotless Nets

A knotless net, made of rot-proof synthetic fibres, has become popular among Japanese fishermen, according to a paper by the Nippon Seimo Company, of Tokyo, read to the International Fishing Gear Congress in Hamburg.

The firm, which invented the nets in 1922, claims remarkable merits for them, and says they may eventually replace ordinary nets in Japan.

Pointing out that an ordinary net cannot be made without knots, the paper describes the making of the knotless net by a doubling process in which several single yarns are doubled together without twist by a machine.

An S Twist

Two or more of these doubled yarns are then again doubled and twisted into a strand in "Z" direction. This strand is then wound on the bobbin of the netting machine.

Twine in the knotless net has an "S" twist of two-ply strands.

Special features of the knotless net include lighter weight and less bulk since as much as 50 per cent of raw material can be saved; higher

strength; less resistance to currents; easier to handle and no friction; less labour and smaller tackles; no damage to the fish; mesh size almost 100 per cent exact; easier and more complete dyeing; and less adherence of dirt and microbes.

By a heat-setting process, the "S" twist in the twine is fixed in position and the twine becomes stronger by about 15 per cent. Also, hard fibres become soft and soft fibres can be given suitable hardness.

Nets of nylon and similar yarns are dyed with commercial dyes, pigment colours or coal-tar.

("The Fishing News" London October 11, 1957.)

Bucketed Scientists Peek at Tuna in Their Feeding

Feeding behaviour of tuna is studied under water by scientists of Pacific Oceanic Fishery Investigations, working in the safety of a submerged "bucket" with an underwater breathing device.

This equipment, currently being used in studies from the research vessel C.H. Gilbert, appears to offer great promise as a research tool in studying the feeding behaviour of tuna and their reactions to various baits and lures.

POFI scientists designed an observation "bucket" which is suspended about 8' below the surface of the sea near the stern of the vessel. A scientist climbs into the bucket, using an underwater breathing device, and sits in safety, if not comfort, while tuna are being chummed to the vessel. The present apparatus permits the investigator to remain underwater in the observation post at speeds up to about six knots. Underwater vision is good. In clear offshore water the observer can see for about 180' on a vertical and horizontal plane.

Numerous tuna schools were observed during preliminary trials with the apparatus, and the

men were able to make comparative observations on the behaviour of tuna tagged by POFI dart tags and the type G tags developed at California. Almost invariably tuna tagged with the dart tag return to the school and in most instances recommence feeding on the chum thrown from the vessel. In contrast to this, Skipjack tagged with "spaghetti" tags usually appear somewhat distressed and have not been seen to rejoin the parent school. Very likely this is related to the additional handling required and to the somewhat more severe wound caused by the spaghetti tag.

Observations have dispelled one of the hoariest myths in the Hawaiian tuna fishery, that the local anchovy is a successful tuna bait because when thrown in the water it returns to the stern of the vessel, drawing the Skipjack within fishing range. Quite the contrary, the Hawaiian anchovy or "neuh", leave the vessel with all possible haste. This behaviour pattern is followed when there are no Skipjack in view and when there are Skipjack actively feeding on them.

("Pacific Fisherman" Portland, Ore. October, 1957)

Helicopters Will Help Six Japanese Whaling Fleets

The largest Japanese whaling expedition since the war has been ordered to prepare for the 1958 whaling season beginning in December.

The expedition consists of six fleets totalling 129 ships which hope to catch 5,000 whales during the two month season. Each fleet's mother-ship has been equipped with a helicopter. Radar and echo-sounding equipment has been installed in each of the 68 catcher vessels. The fleet also includes six oil tankers and 49 refrigeration and transport vessels.

Norway will be represented by nine fleets, Britain three, and the Netherlands and the Soviet Union one fleet each.

Record Expected

Argentina will probably have the biggest catch in her history as one company is to employ 12 catchers this season compared with seven previously - a direct consequence of the Argentine Government's decision to grant free exchange for whale oil sales and the company's ability to charter four Norwegian catchers because of the closing of a Norwegian factory at Husvik Harbour, South Georgia.

Average price obtained for Norwegian whale oil this year was around £85 a ton. Out of 150,000 tons produced, 130,000 tons were sold some time ago, initial lots fetching £90 and later shipments £85. The remaining 20,000 tons did not find a market so easily, but most of this amount has now been sold to Unilever at £75 a ton, while Swedish buyers have taken the rest. - Reuter.

Dispute Delay

The Norwegian fleet has been held up by a dispute over a claim for higher wages by officers and crew. All official attempts to find a solution have failed. - Reuter.

("The Fishing News" London October 18, 1957)

Russian Whaler

It is reported that the Russians have under construction a whale-factory ship which will replace the Slava built in 1929; it will be accompanied by 20 other whalers.

The new craft will be 679 ft. 2 in. long, 84 ft. 6 in. wide and will have a displacement of 43,800 tons. Propulsion machinery will consist of two Burmeister & Wain engines of 7,500 h.p. each, giving a speed of 16 knots. Four oil-fired boilers will produce steam for the factory installation and two others will feed the turbo alternator. The ship will have special equipment for hauling in the whales and her tanks will hold 18,000 tons of oil.

("World Fishing" London October, 1957.)