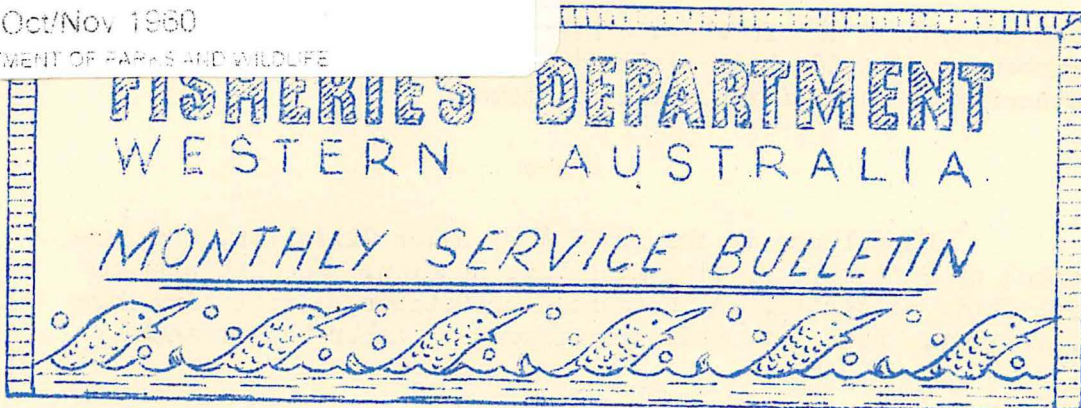


[MONTHLY SERVICE BULLETIN
(WESTERN AUSTRALIA FISHERIES

9(10) Oct/Nov 1960

DEPARTMENT OF PARKS AND WILDLIFE

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October-November, 1960.

STAFF NOTES

The Director, Mr. A.J. Fraser, returned to Perth by air on September 22 after attending conferences of State and Commonwealth Fauna and Fisheries Authorities at Brisbane and Canberra, respectively. Accompanied by the Chief Clerk (Mr. B.R. Saville) and the Research Officer (Mr. B.K. Bowen) he visited Pemberton during the week-end of October 1/2 and presided at a meeting of the Trout Acclimatisation Council of W.A. On October 20 he visited Gnowangerup to discuss fishing restrictions and access to the salmon beaches in the vicinity of the Beaufort and Wellstead Estuaries with fishermen and representatives of the Gnowangerup Road Board.

* * *

The Research Officer, who also attended the Commonwealth-State Fisheries Conference at Canberra and a subsequent conference of officers of the Division of Fisheries and Oceanography, C.S.I.R.O., at Cronulla, N.S.W., returned to Perth on September 28. Mr. Bowen had earlier attended meetings of the Australian Waterfowl Committee in Melbourne and Brisbane.

* * *

The Supervising Inspector, Mr. J.E. Branley, resumed duty on September 26 after nine weeks' sick leave.

* * *

The Fauna Protection Officer, Mr. H.B. Shugg, returned to duty on October 19 after annual leave. Mr. Shugg had previously

been present at the Interstate Fauna Authorities Conference in Brisbane, and paid short visits to the office of the fauna authority in each of the mainland States.

* * *

We welcome to the staff Miss Helen Gilfellow, who commenced on September 2, vice Miss V.L. Lothian. We also welcome Miss Marie McDonnell, who commenced on October 3, replacing Miss D.A. Broun. Both have been transferred to other Departments.

* * *

Inspector B.A. Carmichael, of Albany, who was on annual leave until October 31, commences long service leave on November 1. His district will be taken over by Inspector J. Traynor from November 7 on that officer's return to duty after annual leave.

* * *

Cadet Inspectors P.K. Enright and J.T. Kelly will resume duty on November 7 after annual leave.

* * *

Mr. A.J. Buchanan, of Head Office, and Inspector R.M. Crawford, of Geraldton, will both commence annual leave in November, Mr. Buchanan on the 7th and Mr. Crawford on the 28th.

* * *

The Broome Pearling Inspector, Mr. R.J. Baird, will commence biennial leave, followed by long service leave, very early in the New Year. The Relieving Inspector, Mr. G.C. Jeffery, will, it is expected, be stationed in Broome during Mr. Baird's absence.

* * *

Senior Inspector J.E. Munro will leave Perth on November 2 to take a new dinghy to Geraldton for the P.V. "Kooruldhoo". Mr. Munro will carry out coastal inspections from Dongara to the Moore River on his way back.

Personal Pars.

Mr. K. Godfrey, of the Division of Fisheries and Oceanography, and Mrs. Godfrey, are receiving congratulations on the birth of their first child, a son. All members of the staff join in offering their felicitations.

Mr. Godfrey, who has recently returned to Perth after a cruise in the Great Australian Bight in the Commonwealth-sponsored Southern Trawling Company's "Southern Endeavour", will leave shortly to join the Japanese Oceanographic Training Vessel, "Umitaka Maru". "Umitaka" will sail from Darwin on November 21 to test the tuna fisheries in the Indian Ocean, and will at the same time investigate the trawl-fish resources in much the same area in the North-West as Japanese ships explored in the immediate pre-war years. "Umitaka Maru" is expected to reach Fremantle a week or two before Christmas.

While Mr. Godfrey was aboard "Southern Endeavour" she penetrated into Western Australia, as far west as 126°E, approximately due south of Twilight Cove. In all 68 species of fish were trawled.

* * *

Mr. J. Donovan Ellis, a top American buyer of W.A. crayfish, visited Perth early in October to renew contacts with local suppliers. During the course of an interview Mr. Ellis expressed the view that Spanish mackerel, of which Western Australia has extensive resources, could become a big dollar earner. He said that if mackerel steaks could measure up to the Japanese swordfish in flavour and public appeal, a big and lucrative trade could be established.

Mr. Ellis said that the United States could still absorb what crayfish Australia had to offer. Cuban exports to the States had fallen away to almost nothing and Mexico had ended its crayfish season without any carryover of stocks. A strong demand had therefore been created on the west coast of U.S.A., which meant pressure on Australia to supply both fresh and cooked tails in big quantity. At the same time he warned that the market could become increasingly competitive with Brazil, northern Africa and certain central American States coming in.

* * *

Another visitor from the United States during October

was Mr. F. Goldstein, of the Liberty Fish Company, of Philadelphia, Pennsylvania. Mr. Goldstein's firm operates a fleet of prawn trawlers out of Brownsville, Texas. He was in the State to investigate the possibility of engaging in trawling for prawns, scallops, etc., off the Western Australian coast. He hopes when he returns to America to be able to arrange for 10 trawlers and a mother-ship to come to Western Australia in time to move into Carnarvon early in March, 1961. At present a decision from Canberra is awaited as to whether approval can be given to bringing the vessels into the Commonwealth.

Fisheries Act Amendments

As he announced at the annual Inspectors' Conference, a Government-sponsored Bill to amend the Fisheries Act was introduced into Parliament by the Minister for Fisheries, Mr. Hutchinson, on October 25. The Bill seeks, in the main, to simplify the enforcement of existing crayfish conservation measures and to discourage the commission of offences by increasing the penalties which may be awarded upon conviction. The principal provisions of the Bill towards these ends are :-

1. Defining for legal purposes the term "crayfish tail" and empowering the introduction of pertinent regulations in respect to them.
2. Requiring and enforcing the compulsory labelling of all consignments of fish and crayfish tails.
3. Strengthening the provisions relating to the possession of undersize fish and crayfish tails taken, consigned, transported or held in contravention of the provisions of the Act.
4. Fixing irreducible minimum penalties and increasing other penalties generally.
5. Imposing in addition to the prescribed minimum fine a further fine in respect of each undersize fish or crayfish tail.
6. Requiring the court to suspend the license of any person guilty of dealing in berried female crayfish, or removing eggs therefrom.
7. Authorising the confiscation of the entire contents if the percentage of undersize fish in any receptacle exceeds 5% of the total, and the forfeiture of all

fish consigned or transported in unlabelled containers.

8. Defining more exactly the method of measuring crayfish.

In his second-reading speech the Minister traced the history of crayfishing from the time towards the end of World War II when the industry got its first break consequent on the demand of canned crayfish for troops in forward areas. Pre-war, he said, small crayfisheries existed close to Fremantle and Geraldton. The fishing craft in those days - mostly under sail - were just not capable of exploiting the resource, and in any case the people in the West would not have been able to absorb any greater quantity than the relatively small catches then made.

Immediately after the war canning ceased, but demands for frozen "tails", an entirely new product as far as Western Australia was concerned, were made by buyers from the United States. From 1947 the annual catch of crays had increased tenfold and the number of crayfishermen quadrupled.

Mr. Hutchinson mentioned the stringency of the regulations introduced to manage this new fishery. He admitted it was not possible under the existing legislation to control adequately the operations of the "no-hopers" who existed on the undersize cray market, and it was for this reason, and generally to tighten the law, that the Bill had been introduced.

The measure was commended by Government and Opposition members alike, including the former Minister for Fisheries (Mr. Kelly) and the members for Fremantle, Gascoyne, Geraldton and Toodyay.

Measuring of Crayfish

Facing page 114 is an illustration of the uniform gauge and a description of the official method to be used for measuring crayfish.

It will be remembered that the introduction of the gauge was announced recently by the Minister for Fisheries, Mr. Hutchinson. It is to be hoped that both the measure and the method of measuring will prove satisfactory to all concerned, for they conform to what has been so often requested by fishermen in the past. They are expected to remove the difficulty previously experienced by crayfishermen, many of whom complained that the old method was almost impossible when measuring had to be carried out at sea in a heavy swell.

A limited number of uniform gauges, complying with the requirements of and stamped by the Weights and Measures Branch of the Police Department, have been ordered for sale to fishermen. All inspectors will, of course, be issued with one.

Fishermen's Advisory Committee

Members of the above Committee will leave Perth on November 23, preparatory to holding meetings at Geraldton, Denham (Shark Bay) and Carnarvon. The Committee will take evidence on all matters affecting the conservation and development of the fisheries of those waters and of the State generally. Perhaps the most important item on which the Committee will require evidence will be the conservation of the Abrolhos crayfishery.

Members of the committee are Mr. A.J. Fraser, Director (Chairman); Mr. G. Travia, of Geraldton, representing crayfishermen; Mr. Noel Wright, of Quindalup, representing deep-sea fishermen other than crayfishermen; Mr. W. Matthei, of Yunderup, representing beach and estuarine fishermen; and Mr. Roland Smith, of Perth, representing persons not commercially engaged in the fishing industry.

Mr. H.B. Shugg, of Head Office, who is secretary to the Committee, will be present during the tour.

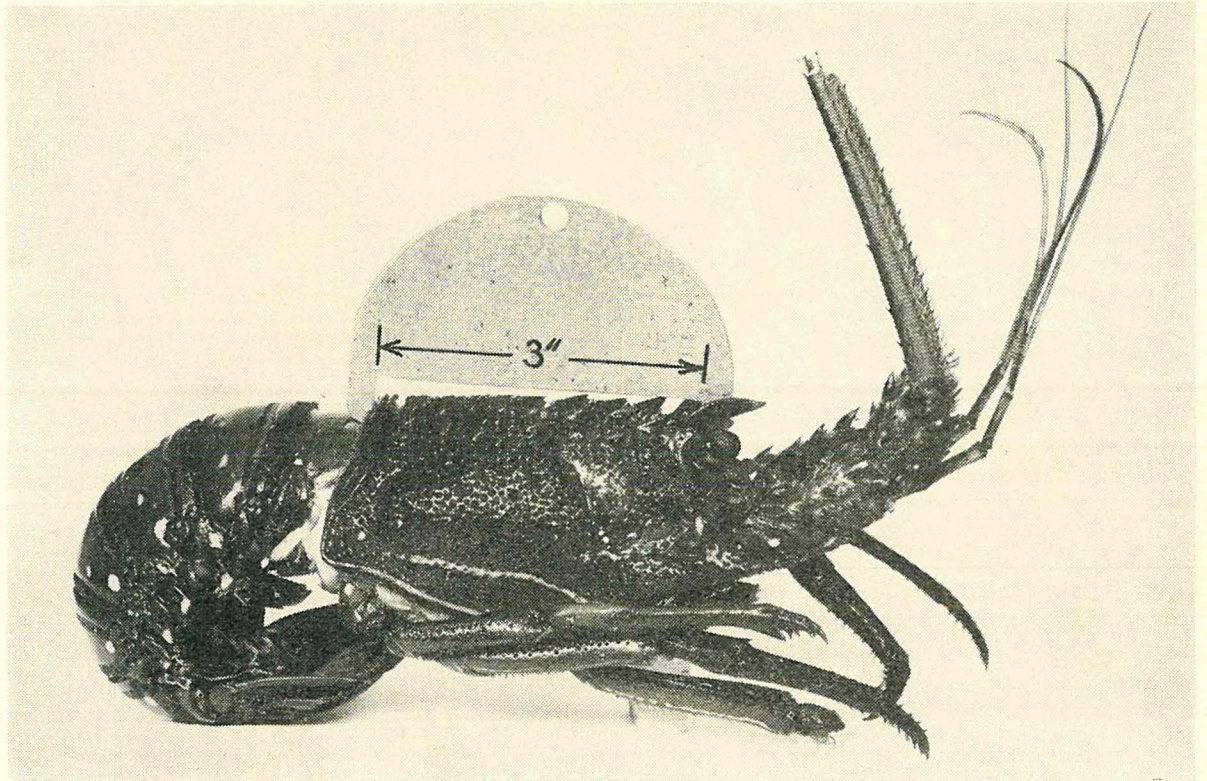
Tragic Loss

On Thursday night, October 21, the 72 ft. crayfish carrier "Linda" crashed unchecked into a reef near the mouth of the Moore River. The only survivor from the three-man crew was Mr. L. Sommerfeld, who had been at the wheel at the time the vessel foundered. The skipper, Mr. J. Roberts, and the other member of the crew, Mr. P. Hind, were presumed to have drowned.

The "Linda" had been at Fremantle to have a new screw and shaft fitted, and sailed in fine weather at 5.15 on the afternoon of the tragedy. The vessel was owned by Geraldton businessmen S.J. Davey and W. Horwood. She was valued by the owners at between £15,000 and £20,000, but it is understood she was insured for only £11,000.

A considerable number of other fishing vessels have been lost this year, the actual number being uncertain. Only 14 have been officially reported to the Harbour and Light Department, but it is known that at least 15 have been lost in the Geraldton area alone.

UNIFORM CRAYFISH MEASURE



Method of Measurement:

Crayfish are measured along the mid-dorsal line from the anterior edge of the pronounced ridge which joins the front edges of the rostral horns immediately posterior to the eyestalks, to the posterior margin of the carapace.

Fremantle-Jurien Bay Crayfish Season

The Minister for Fisheries has approved all areas south of 30°S being opened to crayfishing on November 15, the same date as in previous years. Fishermen will be allowed to set unbaited pots on the grounds not earlier than one week prior to the opening date. This concession is granted in recognition of the restricted facilities of the Fremantle fishing boat harbour which makes it quite impossible for all boats to load their pots on the one day.

As a preliminary to the new season, the bait organisation has been working at top pressure. Hundreds of tons of fish heads have been brought in from Britain, the U.S.A., Canada, Hong Kong and Japan to supplement the supplies available from local sources, and many thousands of bullock hocks are coming in from New South Wales, Queensland, South Australia and Tasmania. The hocks come by both sea and road. Mr. A. Cicerello, of East Fremantle, who is the largest purveyor of crayfish bait in the State, says that the amount of bait needed has increased tenfold in the past three or four years. The cause for this is twofold - the increased number of boats operating and the greater number of pots per boat. He says the industry owes a deep debt of gratitude to the Minister (Mr. Hutchinson) and the Department, through whose efforts the 1d. a lb. duty on fish heads for bait was removed by the Minister for Customs and Excise earlier this year.

It is expected that 400 cray boats will be working south of 30° this year. Sixty new boats have been commissioned, some of these replacements for old boats. More new vessels are likely to be completed before the season ends.

A warning to shipping has recently been issued by the responsible Commonwealth Department in regard to the fouling of craypots, floats and ropes. Masters of all ships have been enjoined to keep a sharp watch along the coast. The areas in which crayboats operate have been listed, following reports of a number of ships running into pot markers last season in recognised shipping lanes.

A new land-based processing plant at Jurien Bay will be in operation when the season opens. This will be serviced by a new 260-ft. jetty and an air strip. Charter DC3 aircraft will fly the processed crays to Perth.

Commonwealth-State Fisheries Conference, 1960.

The Annual Commonwealth-State Fisheries Conference, which it was originally intended to hold in Perth last July and postponed, took place in Canberra from September 20 to 23. The following were present representing the respective States and Commonwealth Departments :-

<u>N.S.W.</u>	Mr. N.V. Harris, Superintendent of Fisheries.
<u>Victoria</u>	Mr. A.D. Butcher, Director of Fisheries and Wildlife; Mr. D.J. Lynch, Superintendent of Marine Fisheries Management.
<u>Queensland</u>	Mr. E.J. Coulter, Chief Inspector of Fisheries.
<u>S.A.</u>	Mr. A.C. Bogg, Director of Fisheries and Game.
<u>W.A.</u>	Mr. A.J. Fraser, Director of Fisheries; Mr. B.K. Bowen, Research Officer.
<u>Tasmania</u>	Mr. F.W. Hicks, Director of Agriculture; Mr. L.A. St. Leger, Secretary, Fisheries Division; Mr. R. Andrews, Chief Inspector of Fisheries.
<u>Territory of Papua and New Guinea</u>	Dr. A.M. Rapson.

Department of Primary Industry:

Mr. F. Grogan, Assistant Secretary (Agriculture and Fisheries);
Mr. C.G. Setter, Director, Fisheries Division; Mr. A. Bollin, Assistant Director, Fisheries Division; Mr. D.J. Gates, Senior Research Officer, Fisheries Division; Mr. G. Young, Chief Clerk, Fisheries Division; Mr. I. MacInnes, Editor, "Fisheries Newsletter".

C.S.I.R.O. (Division of Fisheries and Oceanography)

Dr. G.L. Kosteven, Assistant Chief; Dr. A.G. Nicholls, Principal Research Officer; Mr. D. Vaux, Principal Research Officer; Mr. A.M. Olson, Senior Research Officer; Mr. G.R. Williams, Divisional Administrative Officer; Mrs. L.M. Willings, Divisional Editor.

Mr. Grogan acted as Chairman, but during certain periods while departmental business took him from the meeting, Mr. Setter assumed the chair.

The Secretary of the Department of Primary Industry (Mr. J.V. Moroney) attended and delivered the opening address, in the course of which he welcomed the delegates from the various States and from the C.S.I.R.O.

A drafting Committee, consisting of Messrs. Butcher, Fraser and Bollin, was appointed to draft resolutions arising from the debates.

The following were the items on the agenda :-

- (a) Commonwealth Licensing (publicity; gear; registration; patrol of Commonwealth waters; coverage of licensing; expiry date of licenses).
- (b) Fishing vessels (identification from the air; certificates of seaworthiness).
- (c) Fisheries management (minimum mesh size of nets; craypot limits; restriction of gear and/or boats to avoid depletion of stocks; crayfish generally; close season for male crayfish in Victoria).
- (d) Fisheries development (introduction of trout into New Guinea; training course in fisheries administration, biology and management for fisheries inspectors and interested fishermen; edible shark fishery; pelagic fisheries in southern Australian waters and possibilities of future development; fisheries resources map of Australia; economic studies of the Australian fishing industry).
- (e) Marketing of fishery products (grading of crayfish tails and minimum export weight; branded wrappers for crayfish tails).
- (f) Nomenclature of fish.
- (g) Quarantine arrangements for imported live fish, including aquarium varieties.
- (h) Extension services. (Fisheries Newsletter and information services).

- (i) Fisheries Statistics.
- (j) Transshipment of foreign-caught fish at Australian ports.
- (k) Formation of Australian Fisheries Council.
- (l) Direction by responsible authority of Asian students studying Australian fisheries.

The following is a brief resume of the highlights of the more important debates -

Fisheries Education in Australia.

The report brought in by a working committee appointed by conference, drew attention to the fact that expansion of the Australian economy had manifested itself in the fishing industry so that more and more fisheries appeared to be approaching their maximum yield. It showed that this was happening at a time when fishermen were themselves seeking to increase their productivity and expecting to participate in the general rise in living standards. At the same time, more and more fishermen were requiring better craft and modern aids to navigation, fish-finding and fishing itself. It was evident that in the existing fisheries there was a steadily growing need for rational management of fishing operations in the interest of efficiency, including the preservation of the stocks in a condition to give sustained yields. This, continued the report, was not the entire story; development of certain unit fisheries which were capable of expansion would require the employment of still better craft, equipment and techniques. Thus both the present condition of the fisheries, and their future prospects, demanded a better understanding among fishermen of the principles according to which fishing operations could be managed.

At present there were no special arrangements to provide education in fishery matters at any level, the report stressed. In the existing situation, this condition could not be permitted to continue, and it was deemed desirable that consideration be given to steps which might and should be taken to remedy the situation. The problem of the present situation was summarised by the committee under the following three heads :-

- (a) There is need among fishermen for improved appreciation of the objectives, methods and benefits of fisheries management; for greater technical competence so that new craft and equipment might be brought into more

effective use in the industry; and for improvement in the handling of their business affairs.

- (b) Fishery field officers, the principal channel of contact between the administration and the operatives in the industry, should have a better understanding of the objectives, methods and results of fisheries science; they should be better acquainted with fisheries technology, more skilled in the techniques of administration and better trained in public relations methods.
- (c) There is need to train a group of fishery extension officers able to communicate to fishermen the latest advances in technology and management.

Whilst the committee recognised that great development of the industry might eventually mean that consideration would have to be given to a much more comprehensive programme of fisheries education, (comprising technical college and university elements) directed largely to new recruits to the industry, it came to the conclusion that at the present juncture efforts should be directed towards raising the technical education of men already engaged in or with the industry, and that a programme be laid down that would begin with fisheries inspectors or field officers who, after training in the sense indicated, could undertake work directed at the first of the needs listed in the immediately preceding paragraph.

The committee outlined a preliminary scheme for a short course of training of fisheries field officers and at the same time sketched the steps which it thought would meet the first of the needs listed and, concurrently, supplement the measures proposed for training field officers.

In brief, the working committee proposed the conduct of a short training course at which, through lectures, demonstrations and practical work, and by the use of films and other audio-visual aids, those officers might be shown the more important techniques employed in fisheries research and given some understanding of their theoretical basis. It suggested that the course be open to one or two officers from each State, chosen for their aptitude and readiness to assist in development of the programme. It considered that the C.S.I.R.O. Laboratory at Cronulla, near Sydney, was the logical place to choose as venue for the course, and that the co-operation of the C.S.I.R.O., the Division of Fisheries of the Department of Primary Industry, and the various State Departments should be sought for the provision of suitable personnel to

give lectures, demonstrations and the like. It was also recommended that the costs of the course (including travel, subsistence and demonstration materials) be made a charge on the Fisheries Development Trust Account.

The Committee also drew attention to the fact that the Food and Agriculture Organisation of the United Nations (FAO) had now had considerable experience in conducting training centres for fisheries workers, and had also evinced great interest in all educational projects related to the fishing industry. It recommended that FAO be informed of these plans, that advice and assistance be sought from Rome, and that an approach be made for the loan of films, documents, etc., suitable for use in the course.

Finally, the committee considered that a recommendation should go forward to both Commonwealth and State authorities for the conduct of similar courses for fishermen based on the material of the field officers' course and relying on the graduates (i.e. the fisheries officers who have taken the course) to give a large part of the instruction.

The following is a brief outline of the curriculum proposed for the course, it being expected that C.S.I.R.O. and the other agencies concerned would arrange final details :-

A. Fisheries Science.

- (a) Study of Fish. (Identification; scale counting; fin-ray counting; distribution, including collection of fish eggs and larvae; life history, including reproduction and fecundity studies and location of spawning grounds; larval development; state of growth and nutrition, including age determination; fish-measuring; stomach contents; behaviour, including tagging and laboratory experiments).
- (b) Population studies. (Market measurement and statistical operations).
- (c) Exploitation studies. (Classification and description of craft and gear; measurement of fishing power and selectivity of gear; records of fishing operations and catch; calculation of yield equations; and choice of management measures).
- (d) Food Technology. (Hygiene and handling from point of view of production efficiency).

- (c) Economics and Statistics. (Collection and compilation of fishery statistics; production cost analysis).

B. Administration.

- (a) Management (development and conservation)
- (b) Relations with industry.
- (c) Relations with public.

After very careful consideration of the committee's report, and general discussion on all the points raised, it was finally resolved that Conference strongly support the proposals set out in the report. A working committee consisting of Mr. Setter and Dr. Kesteven (with power to co-opt) was appointed to examine the practical implications of all aspects of the report. It was recommended for the sympathetic consideration of the Minister for Primary Industry that sufficient sums be made available annually from the Fisheries Development Trust Account to cover the cost of appropriate courses of instruction.

Formation of Australian Fisheries Council.

For a number of years, at successive Commonwealth-State Conferences, the question of the establishment of an Australian Fisheries Council, to follow very closely the organisation of the Australian Agricultural Council,* has been discussed. At the 1958 conference, the Secretary of the Department of Primary Industry (Mr. Moroney) put forward very strongly the suggestion that the question of the creation of a Council be very carefully considered. After lengthy discussion, however, the State delegates felt that the time was not then ripe, and suggested that the matter be placed on the agenda of the next conference. It was further shelved at the 1959 meeting, but brought to a head at the present conference following an approach to each of the Ministers by the Minister controlling fisheries in South Australia.

* The latter comprises the Commonwealth Minister for Primary Industry and the Minister for Agriculture of each State. It is charged with the determination of high policy concerning agricultural matters affecting the Commonwealth as a whole. A standing committee consisting of the permanent heads of the appropriate Commonwealth and State departments also operates to consider and process for the Council itself matters referred by the States.

After full discussion it was finally resolved -

"That this Conference is of the opinion

- (a) That the expansion of the fishing industry in Australia has reached the stage where greater co-operation between Commonwealth and State agencies in relation to the solution of developmental and management problems is of the highest priority; and
- (b) that many of the problems confronting these agencies are of such a nature as to be resolved only at the highest level;

and recommends

- (a) that the Minister for Primary Industry invite the appropriate State ministers to attend an early ad hoc meeting to consider the desirability of creating a Council of Ministers patterned as nearly as possible on the Australian Agricultural Council; and
- (b) that one of the matters to be placed before such meeting be a suggestion by Conference that there be set up a permanent standing committee of the chief fisheries officers of the Commonwealth, the States and interested Territories, and a representative of the Division of Fisheries and Oceanography of C.S.I.R.O., as a clearing house for matters to be presented to the Australian Fisheries Council if established."

Pelagic Fisheries in South-eastern Australia and Possibilities of Future Development.

An exceedingly comprehensive and well documented paper, prepared by Dr. Kesteven, was presented to Conference. In his submission Dr. Kesteven pointed out that although extensive research had been done on the waters and fishery resources of the Tasman Sea and Bass Strait, and a considerable array of data had been accumulated, it was a fact, unfortunate in the present situation, that no reliable account could yet be given of the characteristics of the stocks of pelagic fishes in these waters. There was a fairly sound idea of the composition of the ichthyofauna of the area but, while certain species were regarded as being of present or potential value, it could not be said that others regarded as of minor importance, or still again of others

of which there was scarcely any knowledge or awareness, might also prove to be of high commercial value. Of the species of recognised value (tuna, barracouta, etc.) there was as yet no reliable account of distribution nor of the factors that determine variations in distribution; there was as yet no analysis of the structure of those populations, no assessment of their magnitude and no determination of their dynamics. As Dr. Kesteven said, "We are even further from being able to predict any of these characteristics."

In order that industry might be furnished with information of the nature mentioned, Dr. Kesteven continued, was the principal aim of fishery science as applied to the study of resources, and therefore the application of techniques to obtain such information was the normal task of fishery scientists. Field, market, laboratory and office workers all made their contribution to data which yielded, after systematic analysis, information by which fishing operations might be guided and managed so as to make the best use of resources, and to ensure the most efficient employment of equipment and manpower. If there were no urgency, the required data might be collected over many years and be ready for use at some time when urgency, because of the problems of depletion or pressure resulting from expanding trends in industry, made such information indispensable.

Dr. Kesteven pointed out that it was probably correct to say that hitherto there had been no great urgency or pressure to produce a detailed account of the pelagic fish resources of the areas in question, and that it was because of this that research had been progressing at a rather leisurely pace; without the degree of organisation necessary under more urgent conditions. However, urgency was now a feature of the situation. Industry desperately needed more comprehensive information concerning tuna stocks than was now available. Before long, it would be demanding similar information concerning stocks of other species. C.S.I.R.O. believed that the research staff and facilities at its disposal would not be able, unaided, to secure the required information sufficiently speedily, no matter how well the activities of the staff might be organised and no matter how great might be the scientific value of their work. It believed, therefore, that it was appropriate to inform interested State and Commonwealth authorities of the situation, to describe to them its plans for intensification of work in these areas, and to seek from them certain measures of collaboration and their views on arrangements that might be made to continue the work as a co-operative enterprise.

Following considerable discussion, the following resolution was carried -

"That this Conference having discussed the proposal with regard to investigation of the stocks of pelagic fishes of south-eastern Australian waters and recognising the potential contribution to the Australian fisheries represented by these stocks, is of the opinion that a standing committee comprising the Chief Fisheries Officers of the States of New South Wales, Victoria, Tasmania and South Australia as well as a representative of the Department of Primary Industry and of the Division of Fisheries and Oceanography of C.S.I.R.O. should be established to plan and co-ordinate Australian research on these stocks. Meetings are to be convened by C.S.I.R.O. The permanent nature of the recommended committee should be further examined when the future of the Commonwealth State Fisheries Conference is determined.

Statistics.

A working group, which included Mr. Bowen of this Department, was set up to report back to conference with suggestions for improvements in the collection and collation of fisheries statistics.

The group spent much time analysing both the immediate and long-term purposes of statistics as applied to the fishing industry, the methods currently in use in the various States, the types of fishery in respect of which statistics were most needed, and the possibility of mechanising the processing and tabulation of the statistics collected.

In view of the relatively short time available to the working group, its report, which set out what it considered were the fundamentals of a good statistical system, recommended the appointment of a continuing committee to develop a system acceptable to all State and Commonwealth Departments. It stressed particularly the need for greater uniformity in the collection of statistics in the various States.

In adopting the report in principle, Conference approved the appointment of a committee as recommended, to consist of three Commonwealth officials and an officer of the Victorian Fisheries and Wildlife Department to represent all States.*

* Advice has subsequently been received that the Commonwealth nominees are Messrs. A.G. Bollin, of the Commonwealth Fisheries Office, R. Lakin, of the Bureau of Census and Statistics, and G.R. Williams, of the Division of Fisheries and Oceanography, C.S.I.R.O. The State representative has not yet been chosen.

Venue of next meeting.

It was decided that the next meeting be held in Western Australia to commence on Monday, May 29, 1961.

Whaling

Assistant Inspector D.H. Smith, who acted as Whaling Inspector at Carnarvon this year, reported that the Nor'West Whaling Company ceased activities for the season on September 30. The last whale, which was taken on that date, brought the station's tally to 440, of which 209 were males and 231 females. This was a mere 58% of the quota allotted to the company for 1960.

At Albany the Choynes Beach Whaling Company ceased humpback whaling on August 5, by which time 107 whales had been taken. This Company is continuing its sperm whaling activities, however, and to October 15 had taken 210 for the season.

Complete production tables will be published in the December issue.

Although this was the worst of a recent series of poor seasons encountered by the Nor'West Whaling Company, an improvement in future years is confidently looked for. It will be remembered that the International Whaling Commission, at its annual meeting in London in June, agreed to prohibit humpback whaling in Antarctica Zone 4 for a period of three years. The humpbacks on which Western Australian companies operate belong to the Zone 4 stock.

Basic Wage Increases.

Following the recent quarterly declaration of the Court of Arbitration, new basic rates have been struck to apply on and from October 24. Adult officers in the metropolitan area will receive an increase of £6 a year; in other parts of the South-West Land Division the increase will be £8 a year. In all other districts there will be an increase of £3 a year. Junior officers will receive pro rata increases. Payment will be made at an early date.

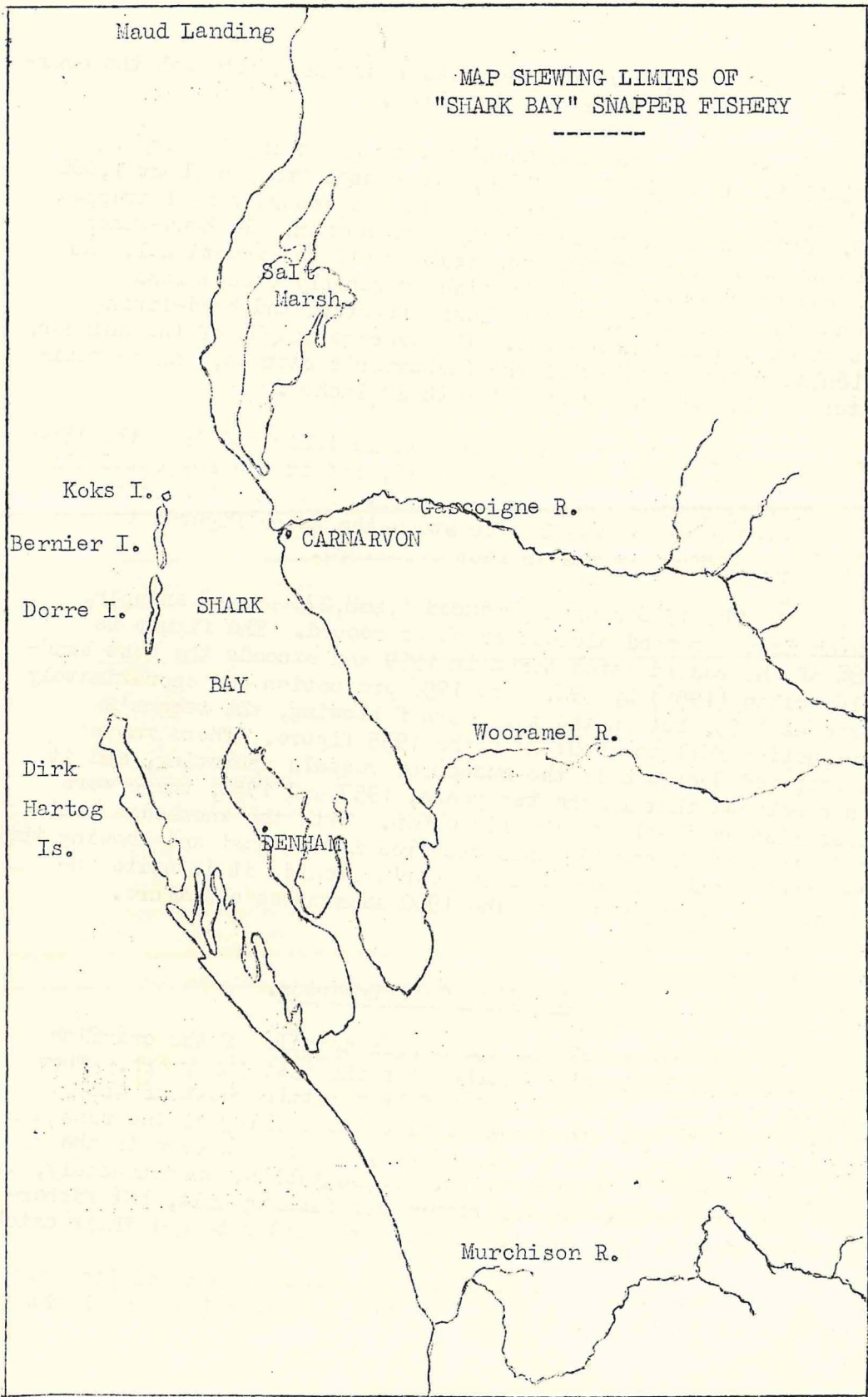
Shark Bay Snapper Fishery

The snapper fishery is one of the most important in Western Australia. Last year, the production was two million pounds and salmon was the only "scale" fish fishery to top this figure. Although snapper, scientifically known as Chrysophrys unicolor, are caught along the south-west coast, the major fishing grounds are in the Shark Bay area. This seasonal fishery is, therefore, commonly called the Shark Bay snapper fishery, although it actually extends broadly from the Murchison River northwards to Maud Landing (see map on page 127).

Relatively few snapper are caught in Shark Bay proper but to the west of the islands (Dirk Hartog, Dorre and Bernier) bounding it. The fishery extends from South Passage at the southern extremity of Dirk Hartog Island to Koks Island lying just north of Bernier Island. Within this range, the two most important areas are at Cape Inscription at the northernmost tip of Dirk Hartog, and Koks Island. The fishery operates on a schooling stock and commences during the first weeks of June. The duration of the season depends upon the availability of fish, but it usually finishes towards the end of August. About 30 vessels fish the area, the majority of these being freezer-boats from Fremantle. In the season just concluded, for instance, there were 19 Fremantle and 2 Geraldton freezer-boats, 2 ice-boats and 8 catcher-boats. It is obvious that the freezer-boats constitute the fishing pressure and in the 1960 season they were responsible for 84% of the total catch.

Prior to 1959, hand-line fishing was the sole method employed. However, last year, and again this year, a snapper trap was used with great success. The trap is circular in shape and measures about 4 feet in diameter and 18 inches in height. The frame is of mild steel and this is covered by wire netting or loose link mesh netting. The photo opposite page 128 shows a trap being pulled aboard the fishing boat "Lady of Fatima." She is skippered by Sam Sousa.

Each vessel usually works six traps which are baited with crayfish heads. The traps are dropped on a snapper patch and pulled at short intervals, from 15 to 30 minutes. The fish are bled immediately they reach the deck. They are then gutted, washed and placed in the freezing chamber. This routine is followed daily until a vessel has her chambers full. She then returns to either Fremantle or Geraldton to off-load her catch.



During the season, a vessel may make four trips, although the average for 1960 was between two and three.

When snapper are abundant, trap fishing is very efficient. In early June, 1960, one vessel trapped about 1,000 fish in one day and on another occasion a second vessel trapped 700. Catches of over 300 per day were common. If hand-lines were used, a catch of this magnitude would be exceptional. As the season progressed and the fish presumably became less abundant, trap fishing became less effective and hand-lining was often equally successful. The average weight of the snapper, calculated from samples of the fishermen's catches, was approximately 9 lb. and the average length 27 inches.

Last July, a newspaper article indicated that the 1960 season was one of the worst on record, and it was suggested that trap fishing during 1959 was the cause. Now that the season has concluded it is possible to study the catch figures to determine whether it was in fact a failure.

The 1960 season produced 1,468,275 lb. of snapper, which is the second highest catch on record. The figure is 88% of the record catch taken in 1959 and exceeds the best hand-line catch (1955) by 39%. The 1956 production was approximately the same as 1955, but in the two years following, the season's production fell to about half the 1955 figure. There was no correlated decrease in the number of vessels operating, and it is concluded that in the two years, 1957 and 1958, there were less fish available to the fishermen. With the knowledge that this type of fluctuation has occurred in the past and knowing that the 1960 catch was 88% of last year's record, it is quite unreasonable to suggest that the 1960 season was a failure.

Abrolhos Crayfisheries.

On pages 129 and 130 appear details of the crayfish production at Houtman's Abrolhos for the past ten years. They reveal that the 1960 production fell a little short of the 1959 record total. This was despite the opening of the season a fortnight earlier than usual seasons, and an increase in the overall number of men operating. These tables, unfortunately, do not give any details of the return per fishing unit, but fishermen report that they are having to work harder to get their catch.

Over the ten years the catch-per-man reached its peak in 1954 at 18,756 lb. and has declined steadily (with a slight



L.F.B. "Lady of Fatima" hauling Snapper trap
at Shark Bay

(photo courtesy "Daily News")

recovery in 1957 and 1958) until this year, when it fell to a figure of only 13,679 lb.

Abrolhos Crayfish Production

(1)

Year	Number of Men				Total
	North Island	Wallabi Group	Easter Group	Pelsart Group	
1951	7	29	24	34	94
1952	8	20	32	24	84
1953	7	26	40	17	90
1954	15	36	41	21	113
1955	18	39	47	45	149
1956	31	42	38	40	151
1957	26	45	60	46	177
1958	30	58	64	40	192
1959	43	70	67	51	231
1960	62	71	81	45	259

(2)

Year	Total Catch				Total
	North Island	Wallabi Group	Easter Group	Pelsart Group	
	lb.	lb.	lb.	lb.	lb.
1951	116,206	483,834	545,565	502,219	1,647,824
1952	132,437	441,684	579,773	395,556	1,549,450
1953	123,243	573,081	647,967	294,020	1,638,311
1954	208,972	679,783	814,848	415,797	2,119,400
1955	278,681	717,699	802,879	672,885	2,472,144
1956	395,831	713,153	774,172	561,512	2,444,668
1957	433,185	774,926	1,042,910	653,685	2,904,705
1958	512,126	1,026,150	1,153,189	580,667	3,276,132
1959	659,180	980,053	1,151,347	760,542	3,551,122
1960	776,798	937,587	1,165,603	662,773	3,542,761

Abrolhos Crayfish Production (cont.)

(3)

Year	Catch per man				
	North Island	Wallabi Group	Easter Group	Pelsart Group	All Groups
	lb.	lb.	lb.	lb.	lb.
1951	16,601	16,684	22,732	14,771	17,530
1952	16,555	22,084	18,118	16,481	18,446
1953	17,606	22,041	16,199	17,294	18,203
1954	13,931	18,883	19,784	19,800	18,756
1955	15,482	18,402	17,082	14,952	16,592
1956	12,769	16,979	20,373	14,038	16,189
1957	16,661	17,221	17,382	14,211	16,411
1958	17,204	17,692	18,018	14,516	17,063
1959	15,329	14,001	17,184	14,912	15,373
1960	12,529	13,205	14,391	14,728	13,679

Biennial Conference of Australian Fauna Authorities.

Last September delegates from all States and from the Australian Capital and Northern Territories, with representatives of Commonwealth Departments, met at Brisbane to discuss problems and policies associated with fauna conservation and protection. It was the first time that Queensland had been the host State and only the second of these at which all States had been represented.

Items discussed included reports on current research programmes and the co-ordination and planning of research. These comprised waterfowl in general, vermin control measures and their effect on fauna, and other management problems. Not the least of these were those resulting from the commercial exploitation of kangaroos.

A feature of the conference was the early appointment of a committee whose job it was, progressively, to draft and prepare resolutions arising from the discussions for later consideration by the conference. The compact and smoothly-functioning

committee, which comprised the conference's convening officer, Mr. J.A. Weddell, of Queensland; the Director of Fisheries and Wildlife, Victoria (Mr. A.D. Butcher); and our own Director, Mr. Fraser, was able to crystallise various decisions into readily acceptable terms. The net result was that the most important function of the conference, the circulation of its resolutions, was accomplished before the record of proceedings reached draft form.

The resolutions passed by the conference read as follows :-

Resolution No. 1 - Pesticides.

That this Conference, having given consideration to the increasing use of pesticides for the control of pest fauna and weeds, and appreciating the need for adequate control, believes that little cognizance has been taken of their adverse effect on native fauna and recommends to the Governments of the respective States and Territories that, before undertaking poisoning on Crown lands, or on reserves, sanctuaries or other areas set aside for the conservation of native fauna, the opinion of the fauna conservation authority be obtained as to the possible effect of such poisoning on the native fauna occurring therein.

Resolution No. 2 - Wedge-tailed Eagle.

That this Conference, having regard to the diverse opinions of pastoralists and agriculturists in regard to the depredations of the wedge-tailed eagle, and being anxious to avoid unnecessary destruction of native fauna, recommends to the Wildlife Survey Section of C.S.I.R.O. that it undertake a biological study of the species for the purpose of arriving at an authoritative assessment of its destructiveness or otherwise.

Resolution No. 3 - Basic Research.

Conference is of the opinion that, in attempting to seek the solution of short-term fauna problems, the role of basic research in providing the solution to problems is frequently neglected. As one step towards achieving an acceptance of the need for basic research the State fauna authorities should consider inviting co-operation of groups of interested persons and providing them with information which would foster their interest. This in turn could lead to a greater public awareness. One of the present difficulties in organising biological investigations is that of obtaining assistants with adequate biological training.

Conference recommends that the respective State authorities give consideration to possible ways and means of meeting this problem.

Resolution No. 4 - Waterfowl Breeding Areas.

That this Conference, having consideration to the very great importance of certain areas of duck breeding habitat within the Murray-Darling basin, wishes to bring to the attention of the N.S.W. Water Conservation and Irrigation Commission the urgent need for the provision of protective measures for duck breeding habitat during planning stages of water conservation schemes.

Resolution No. 5 - Waterfowl Drought Refuge.

That this Conference, having regard to the very great importance of the area known as BAMEROO-GJAGA, Goose Camp, in the Northern Territory, as a refuge for waterfowl during times of extreme drought, recommends to the Northern Territory Administration that steps be taken to ensure the future preservation of this area under the appropriate form of reservation.

Resolution No. 6 - Banding Records

Conference agrees to the necessity for uniformity of waterfowl banding records and recommends that the respective State and Federal authorities carrying out banding should retain an additional record for delivery to a Central Depository when such has been established. For this purpose the Australian Waterfowl Advisory Committee should define the form of record to be kept.

Resolution No. 7 - Wildlife Reserves.

Conference places on record its recognition of the value of the very real progress made over the past few years in respect to sanctuaries and related wildlife reserves as reported by the several States and takes cognizance of the need for a greater public awareness of these developments. Conference also wishes to acknowledge the assistance being given by the Australian Academy of Science to the national parks concept in this country.

Conference strongly recommends to the several State and Federal authorities that this activity in the field of wildlife habitat be intensified.

(S.A. abstained from voting).

Resolution No. 8 - Private Zoos

Conference places on record its opposition to private zoos or collections of fauna, but in so doing accepts that such opposition may be qualified in those States which do not possess major zoological gardens. Conference excludes bona fide avicultural collections from the terms of this resolution.

Resolution No. 9 - Overseas Export

Conference expresses its disapproval of the unilateral action by the Commonwealth on the question of the export of fauna and stresses the necessity for Commonwealth and State consultation before action affecting State fauna administration is initiated.

(C.S.I.R.O., Department of the Interior, and Department of Customs and Excise abstained from voting)

Resolution No. 10 - Control of Exotics in Aviaries.

Western Australia expressed concern at the possible spread of exotic aviary birds and instanced the case of the Java sparrow and the potential risk to the rice industry. Conference therefore recommends that each State and Territory and the C.S.I.R.O. Wildlife Survey Section examine the exotic aviary bird position with a view to submitting to the Conference Secretariate lists of those species considered to present a potential threat to primary industry or native fauna, together with a statement as to the specific potential problem, and that this item be included in the next Conference agenda.

Resolution No. 11. - Check-Lists of Birds and Mammals.

That this Conference, recognising the need for up to date check lists of both birds and mammals in Australia, seeks the co-operation of the Wildlife Survey Section, C.S.I.R.O., the Royal Australasian Ornithologists' Union and the Australian Mammal Society in the preparation of these lists.

Annual Departmental Conference.

The seventeenth annual conference of the field, research and administrative staffs of the Department was officially opened by the Minister for Fisheries (Mr. Ross Hutchinson) on the morning of October 24.

The Director (Mr. Fraser), in introducing the Minister, referred to the rapid strides now being made in relation to the development of the fishery potential of Western Australia. He said that instead of occupying the lowest position of all States as far as production was concerned, which was the case at the end of World War II, the State had now reached the stage when it was knocking at the door of New South Wales, which had always held pride of place. This was to a very large extent due to the willingness of all Governments to make funds available in furtherance of the Department's developmental and management programmes. Mr. Fraser said that the Department was fortunate in having Mr. Hutchinson as its ministerial head. He had always shown a most lively interest in every phase of the Department's activities, and was at all times prepared to lend a sympathetic ear to projects placed before him.

Mr. Hutchinson said it gave him considerable pleasure to be present during the opening stages. The manifold ramifications of the Department, and the far-flung nature of the State, added greatly to the responsibilities of the staff. The job was not easy, but he knew the Department was well served by its field staff, and for the fishing industry to flourish it was necessary that this be so. He believed that in the fisheries field Western Australia was on the springboard of very big things. He thanked the staff for the work performed for the State in the past.

Before concluding the Minister mentioned the decision to introduce a uniform standard gauge to measure the length of crayfish. One thousand of the new gauges, which would measure 3 inches, were being made on the Department's order, and would be made available to fishermen at a fraction over cost. He also mentioned that Cabinet had now approved legislation to tighten the law regarding undersize and berried crayfish, and their consignment to market, and to increase penalties to a more realistic figure. He hoped the necessary Bill would be introduced to Parliament within a few days. He then formally declared the conference open for business.

A vote of thanks to the Minister, moved by Mr. J.E. Bramley, Supervising Inspector, was carried most heartily.

(Notes on the discussions will be published next month).

Departmental Prosecutions

July 1 to September 30, 1960.

Date	Defendant	Court	Charge	Result
			<u>Fisheries Act.</u>	
29.7.60	Fremantle Fish Supply	Bunbury	U/s fish	Fined £15
11.7.60	Lo Presti, S.	Fremantle	U/s crayfish	" £10
"	W.A. Fish Filleting Pty. Ltd.	"	"	" £3
"	Castrovinci, S.	"	"	" £5
"	Dray, L.E.	"	"	" £3
"	Moreno, D.	"	"	" £3
1.8.60	Frideaux, L.	"	"	" £3
"	do.	"	"	" £3
"	Larner, J.	"	"	" £5
"	Sweeney, N.E.	"	"	" £3
"	Paparone, F.	"	"	" £3
22.8.60	Anderson, G.	"	"	" £5
"	Bateman, C.	"	"	" £2
"	do.	"	"	" £2
"	Anato, C.	"	"	" £5
"	Ianello, C.	"	"	" £15
"	Jansen, G.	"	"	" £5
"	Moreck, H.	"	"	" £2
"	Moreck, H.) Hubbard, J.)	"	"	" £2
"	Tropical Traders Ltd.	"	"	" £2
"	do.	"	"	" £2
"	Yama Pty. Ltd.	"	"	" £2
"	W.A. Fish Filleting Pty. Ltd.	"	"	" £2
"	do.	"	"	" £2
"	Mazzio, F.	"	"	" £5
12.9.60	De Mario, C.	"	"	" £2

Date	Defendant	Court	Charge	Result
12.9.60	Hellewell, A.	Fremantle	U/s Crayfish	Fined £5
30.8.60	Cannon, H.	Geraldton	"	" £5
"	Lang, J.L.	"	"	" £5
"	Garton, P.	"	"	" £5
"	Cuthbert, R.	"	"	" £5
"	Wilton, T.	"	"	" £5
"	Davis, E.	"	"	" £5
"	Hope, G.	"	"	" £5
"	Lockwood, N.	"	"	" £5
"	Mott, L.	"	"	" £5
30.6.60	Campbell, T.D.	Perth	"	" £5
19.7.60	Katnic, F.	"	"	" £10
18.8.60	International Fisheries	"	"	" £10
1.9.60	Barnden, R.G.	"	"	" £4
15.9.60	Abbott, F.K.	"	"	" £3
"	do.	"	Spawning crays	" £5

Fauna Protection Act

14.7.60	Harrison, Robert	Perth	Illegal trapping of ducks	" £10
15.8.60	Kappler, L.J.	" (Chil- ren's)	Illegal shooting	cautioned
18.8.60	Pearce, R.D.	Perth	" "	"
"	Begley, J.M.	"	" "	"

CLEARING HOUSE.

The Fishing Boat of 1975.

By Jan-Olof Traung, Chief, Fishing Boat Section, FAO, Rome.

In the future there will be more and more specialized types of fishing vessels, and they will all be safer, more seakindly, and more comfortable, according to this prophecy by the editor of the monumental second volume of Fishing Boats of the World, published in London last month.

Two FAO Boat Congresses and one Gear Congress have aroused much greater interest in the industry than fisheries meetings usually do. The papers and discussions published in the two Boat books and the Gear book have painted a many-contoured picture of the world's fishing industry, but this picture is rough and still unbalanced.

The reasons for this are many. One is that people are both progressive and indifferent. The progressive people have participated in these Congresses, therefore the resulting picture may be too bright and optimistic.

Details of small fishing boats of under 70-ft. in length are scanty. Such boats are mostly owned by remote fishing populations in many of the developed countries. They are still built by the rule of the thumb method by almost illiterate builders who have seldom studied a boat from another area and who can scarcely read blue-prints, and they are owned by fishermen who are not likely to be interested in comparing their own boats with those from other areas.

These small boats have one feature in common: they are all regarded by their builders and owners as "the best in the world". This complacency is one very strong reason why the design and construction of such boats have stagnated. In agriculture, farmers are informed of technical developments by their organisations and the extension services of the Government, but there is no such advice and help for the fisherman. One cause for this state of affairs is the low economic level of a large part of the industry. There is no money available for establishing an "extension service" to remote fishermen. The result of such lack of communication is reflected in many ways. For instance, it has been impossible to attract owners and builders from the remote areas to international gatherings such as these Congresses.

If, therefore, the FAO Congresses have painted a somewhat too bright and optimistic picture of the technical level and interest of the industry in further development, at least they have produced a picture and have made it possible to see the progressive aspects of the industry. That being so, perhaps we might peer into the future to see if we can get a glimpse of the fishing boat of 1975.

To make such an extrapolation, it might be helpful to assess the industry about fifteen years ago - say in 1945, just after, or in 1938, just before, the war. The table gives some figures of the past, present and estimated future world population and the total fish catch for selected years.

Year	World Population (millions)	Total Fish catch (million ton)	Per capita (lb.)
1938	2,194	20.31	20.4
1948	2,423	19.09	17.4
1957	2,795	29.96	23.6
1975	3,830 *	60 ?	34.5?
2000	6,280 *	100 ?	

* U.N. estimate.

The 1957 catch may be regarded as a representative figure for today although, of course, there is a wide gap between the good fisherman with modern equipment who catches up to 100 tons a year and the fisherman in one of the under-developed countries who catches half a ton a year.

In 1945 few in the fishing industry knew anything of, and still fewer used, echo-sounders, asdic, decca, mechanised purse seining, synthetic net fibres, welding, diesels, freezing equipment or technical journals. The largest trawlers in the U.K. were about 160-ft. long; today they are about 200-ft. Factory ships were not used. Few fishing boats in sub-tropical or tropical areas had an engine; today there are about 10,000 engines in use, and it is known that there are hundreds of thousands of small boats in need of mechanisation. Echo-sounders are now in use in the boats of developed countries and asdic is coming, but few boats in sub-tropical or tropical areas possess fish-finding equipment.

It has been estimated that the sea could yield some 60,000,000 tons of fish per annum, and if this total is to be reached by 1975 the catch per capita must be increased by some 50 per cent, or to about 35 lb. (16 kg.) per capita. Despite so much technical development, partly war-inspired, during the past fifteen years, the catch per capita has risen only from 20 to 24 lb., or by 20 per cent. It is evident therefore that technical progress will have to be outstanding if the catch is to be increased by another 50 per cent in the next fifteen years.

There are many technical developments which have been successfully applied on a laboratory or pilot scale, but which are not in common use by the industry. Here are a few :

- Echo-ranging (asdic)
- Fish attraction (light, electricity, vibration)
- Fish collection (pumps)
- Net design (using synthetic fibres and engineering principles)
- Underwater television (for record of gear behaviour and of fish entering the gear)
- Mechanised handling of trawl gear (by stern trawling or winding the gear directly on the winch)
- Extension of storage time (chilled seawater, antibiotics and radiation)
- Transfer of crews and cargoes by airplane.
- Fishing under ice (submarine)
- Artificial upwellings (by nuclear heating)
- New materials (plastic, aluminium, rubber)
- New power plants (gas turbines, nuclear, Wankel principle)

The fishing boat designer must keep such possibilities in mind, and he must also follow the development of his own profession, and in this he cannot avoid seeing how new boat types are being developed and how knowledge of theoretical naval architecture is being acquired at an accelerated pace.

The hydrofoil principle, for example, is no longer a doubtful proposition. It has been used in sea-going craft which now regularly transport a considerable number of passengers, and some of the designs now in use are definitely more seakindly than conventional designs. Such craft will perhaps be used in 1975 for carrying men to a fishing unit or in transporting expensive fish products. The Hovercraft, which has already crossed the English Channel both ways, has revealed possibilities, and such craft might one day be used as beach landing fishing boats, or, perhaps, to transfer catches from a commercial boat off the breakers straight to the coastal fish market.

Two-hulled craft, also called catamarans, have lately gained popularity in yachting circles because of their speed and comparatively large deck area in relation to construction and maintenance cost. They have also been adapted commercially as oil drill platforms and fire floats, and work is now in progress to investigate whether this type of design could be used for a fisheries research vessel, which naturally needs a large deck space. As commercial fishing vessels also need a large deck space for handling fishing gear and accommodating fish processing machinery, there may be possible uses for this type of design in commercial fishing.

Aircraft have long been used in the fishing industry for spotting, although their importance has decreased with the development of echo-sounding and echo-ranging. But they might offer other possibilities in the future. For example, helicopters might be used to transfer crews and catches at sea from catching vessels to the mother ships. They might also be used for echo-location of fish. Then there is the possibility of using hydroplanes to carry light surrounding nets, so that when a fish school is discovered it can be immediately imprisoned and kept there until boats arrive to take care of the catch.

Submarines have passed under the Polar ice cap and if there is so much fish in these cold water regions as is normally believed, there is a case for submarine fishing. The U.S.S.R. has already put a submarine oceanographic research vessel into use, and other countries are planning similar vessels. Submarines could be very useful in studying the behaviour of pelagic fish, say in tropical waters. They could also be used in detecting fish under the ice caps, and for experimenting to find out whether there is a future for submarine fishing.

The success of the U.S. nuclear powered submarines has initiated research into the possibilities of using submarines for the transport of cargoes. It is felt that such cargo ships could be made

much more hydrodynamically efficient than surface craft. They would also be more independent of weather and could, perhaps, be built of lighter scantlings. While it might take years before commercial cargo submarines are in operation, their development should be watched because they might be helpful in evolving the design of a submarine fishing vessel.

Other developments in general shipbuilding may influence the design of the fishing boat of 1975. Container traffic, for example, is being developed more and more, and one could easily visualize that large fishing boats might have their holds arranged for containers, so that the fish could be loaded directly into them for immediate transport to individual retailers, thus avoiding unnecessary handling and exposure to air in the fishing harbours.

Since ships have been built they have had to fight against the elements, but it is only recently that the study of their seakeeping qualities has begun. This is now gaining considerable attention, and this Congress has shown how seakeeping research is now being devoted to fishing vessels. In the next fifteen years there will undoubtedly be confirmation of some of today's hypotheses on good seakeeping qualities. There will also be much more information available on the subject of damping ship movements, such as rolling and pitching, and practical rules have recently been developed which will be used in the design of anti-rolling tanks for oceanographic research vessels. Such tanks might also have their importance for fishing vessels.

The discussion about the prismatic coefficient reveals how little we know about the practical design of sea-kindly ships, but it seems likely that such a discussion would be unthinkable in 1975.

Much is expected from the use of nuclear power for the propulsion of small ships. If small nuclear power plants are developed for aircraft, they could probably also be used in large fishing vessels. But it seems that the heavy shielding at present necessary for reactors and the increasing difficulty in disposing of waste might make the application of nuclear power to fishing boats too difficult to accomplish in the next fifteen years.

There is a tendency today to reduce the size of components without eliminating any of their potentialities. The use of transistors in place of tubes is a typical example, which has made possible modern electronic computers and very small radios. Perhaps the power developed by nuclear reactors could be harnessed and accumulated without taking up too much space, or weighing too much, and that such new type

accumulators could be used for fishing craft. If radios can be made so much smaller through the use of transistors, why should we have to put up with heavy batteries?

The interest of European fishery technicians seems to be centred around trawling, as though they are fascinated by this fishing method. But when considering the many different methods of fishing described at the Congress one feels that, while trawling is a very active method, the boat towing the trawl along the bottom is very passive during fishing. If it should be possible to reduce the time for handling the catch on board, the large crew of a trawler would have very little to do between hauling and shooting the trawl, and thus one begins to wonder whether it would not be possible to use several trawl nets from the same ship at the one time.

Could one not imagine self-propelled trawl doors towing several trawls in various directions, automatically controlled, so that they would return with their catch at suitable time intervals? Such self-propelled trawl doors might sound rather fantastic, but if it is possible to direct satellites in the universe and to switch their radio apparatus on and off, it should not be too difficult to develop torpedo-type bodies to tow the trawl and bring it with its catch to the vessel.

The capacity of mother ships is limited by the number of catcher vessels that can be stored on board. But what about inflatable rubber catcher boats which could easily be stored and inflated when needed? Rubber rafts and small rubber working boats up to 30 ft. (9 m.) are already produced commercially, so there should not be much difficulty in manufacturing rubber boats of 50 to 60 ft. in length.

It is necessary to reduce the time for handling the catch. Chilling fish, either by ice or chilled seawater, in the tropics is more efficient than in cold climates because most of the fish spoiling bacteria in tropical and warm waters are of the mesophilic type which are inactivated by temperatures below about 50°F. (+ 10°C). In warm waters, normal chilling temperatures of 31° to 39°F (-0.5° to +4°C) are sufficiently below the critical temperature to hamper bacterial activity. In cold waters, psychrophilic bacteria play the main part. They can be active in temperatures as low as about 28° to 19°F (-2° to 7°C), and the normal chilling temperatures will only retard the growth of the bacteria for a limited number of days.

Sea water chilling of fish has the advantage that it also decreases the need for labour in packing and unloading. However,

it must be admitted that engineering experience of chilled seawater tanks is limited and, perhaps, far more extensive and effective use of sea water chilling will be made in some of the fishing boats of 1975.

The present tendency to fish further and further afield will no doubt continue. The reaction of fish to various bacteria in cold and warm waters might play an important role in the design of the 1975 fishing boats, those operating in warm areas might be using chilled sea water while those in cold areas will have to freeze the catch. A chilled sea water type of boat would resemble a tanker and the unloading might be facilitated if some brine were pumped into the fish tanks after arrival at port. Because of the density of the brine, the fish would float up and could easily be sucked ashore by pumps. Work is in progress for the development of this type of unloading technique which requires very little labour. The cost of using brine would be moderate if it were used over and over again.

It is not only through introducing new ideas and new techniques that the fishing boats of 1975 might be considerably different from those in use today, but through a general improvement in technical practices. Controllable-pitch propellers, for instance, were almost unknown outside Scandinavia fifteen years ago. They are beginning to be used elsewhere today. So perhaps, in fifteen years from now the majority of fishing boats will use controllable-pitch propellers. They are no more expensive than the present arrangements with reverse gears, but they improve the handling and manoeuvrability of a boat and lead to more economic operation.

(Western Fisheries

Vancouver

July, 1960)

British to Use Carriers as Fishery Factoryships.

Two aircraft carriers are to be used as factoryships to service the British deep-sea trawling fleet. The carriers have been purchased, along with an old repair ship, by a British company formed in the city of London.

Behind the venture is a firm of shipbrokers and managers, which has been working on the project for nearly a year.

The aircraft carriers are the "Ocean" and the "Thosseus", both 13,000 tons, and the repair ship "Ranpura" (16,000 tons). Equipment from the latter will be used in the conversion of the carriers

and thereafter she will be scrapped.

Helicopters will be used to transfer catches from trawlers to the motherships, each of which will make four 90-day round trips in a year. On board the motherships the fish will be quick frozen. Products will be sold to distributors on a contract basis.

Capital amounting to more than £A3.1 million (U.S.\$7 million) is behind the plan.

The firm estimates that 50 trawlers will be required to service each carrier. Trawler owners seem to realize that the plan is an excellent one and that it would allow their vessels to spend more time on the fishing grounds.

In addition to acting as factoryships, the carriers, each with a complement of 425, will act as servicing ships supplying the catching vessels with fuel, ice, and other requirements. They will have what are described as "shore amenities" for the trawlermen.

The trawlermen's trade union has been consulted on matters affecting pay and conditions.

(Fishing Gazette

New York

August, 1960)

How will increased seining affect Yellowfin Tuna stocks?

By Dr. M.B. Schaefer, director of the Inter-American Tropical Tuna Commission, the principal authority on the condition of the tropical tuna stocks in the eastern Pacific Ocean.

Most readers of 'Pacific Fisherman' know that the Inter-American Tropical Tuna Commission through its research work has reached some rather definite conclusions on the effects of fishing on the populations of Skipjack and Yellowfin in the Eastern Pacific.

As far as Skipjack is concerned, the population off the West Coast of America is so large that the Commission's scientists so far can see no effect whatever of commercial fishing on the total Skipjack population, as measured by the catch-per-unit-of-fishing-effort.

The Commission's statistics show that the catch-per-day's-fishing, which measures the abundance of Skipjack as the fisherman

sees it, fluctuates a good deal from year to year. This is partly because the fish are more or less abundant at various times, also partly because the fish are more available to the fisherman at some times than at other times.

But the important point is that although the fishing effort has increased, and the total catch has increased, the average level of abundance of Skipjack has not decreased. That is, although fishermen have been fishing harder, and catching more fish, there is still just as much Skipjack to be caught as there ever has been, within the errors of estimation. From this it seems that the Skipjack population can support much greater catches than have ever been made up to this time.

What About Yellowfin ?

On the other hand, speaking of Yellowfin, the Commission data indicate that the fishing effort, and the total catch, are having a definite effect on the population. It can be seen that as the fishing effort goes up, the population abundance goes down, at all levels of fishing effort. However, the average total catch increases up to about 35,000 units of effort, which yield, on the average, about 195,000,000 lbs., and then decreases.

On the basis of the statistics the Commission has gathered, and the mathematical computations made by its scientists, we predict that the average maximum catch is somewhere between about 175,000,000 and 220,000,000 lbs. - most probably 198,000,000 lbs. Up to 1958, the fishing effort has remained somewhat below the level corresponding to the maximum average catch.

The Shift to Purse Seine Fishing.

Until two years ago, the big factor in the tuna fishery was the bait boats. In 1958 the shift toward purse seining began, with a number of clippers converting to that type of gear. Now, as most readers know, there is a rush to convert to net fishing.

What effect will this have on the tuna stocks?

Seiners have always caught a greater proportion of Yellowfin in relation to Skipjack, than clippers. This is largely because seiners have fished in areas and at times when Yellowfin dominate the catch, although it may also partly be because the seine gear itself is more effectively for Yellowfin than for Skipjack. In any case, it

is evident that the conversion to seiners will increase the effects on the Yellowfin population.

For example, the California landings of Yellowfin through mid-May 1960 have been over 40,000 tons, three-quarters of which have been landed by seiners - the highest figure for the past five years. This is in spite of the fact that about a score of vessels are not fishing, being in the yards undergoing conversion to seiners.

For this same period, Skipjack landings are only 8,500 tons, less than half the average for this period during the past five years. Practically all of the 1960 landings have been made by bait boats.

It seems that the present rate of catching Yellowfin is not excessive. But what will happen when the vessels now being converted are out fishing, plus yet other conversions? There is very good likelihood that the fishing intensity on Yellowfin may go well beyond the level corresponding to the maximum sustainable catch.

In other words, the Yellowfin population of the Eastern Pacific may not be big enough to support all the seiners that will be fishing in the future. It will be necessary to divert much of this effort to Skipjack, which can still stand a big increase in rate of harvesting.

This diversion might be effected by imposing fishing regulations. But whether you have regulations or not, diversion will be forced by economic necessity, because after you get beyond the point of maximum yield you will, on the average, catch less fish the harder you fish for them.

Problems of Measurement

The Tuna Commission scientists are finding it difficult to monitor the changes in fish populations during this present period of rapid changes in fishing methods. In the past, we have used the records of bait boat operations to measure population abundance. We have of course also computed the seiners' catch-per-unit-of-effort, but these figures are not closely correlated with the clipper statistics, because seiners have up to this time fished within a narrow range of time and area.

But the new big seiners work the year round, and cover

all the fishing areas; and they are replacing the bait boats so rapidly that it is hard to calibrate their efficiency as compared with the bait boats. The Commission scientists are now wrestling with this problem.

Another problem which looms on the horizon is finding out just how much Yellowfin is being caught in the Eastern Pacific.

Until recently, we have been able to compile quite complete and accurate statistics with the fine co-operation of all members of the industry, and of the Governments of the Eastern Pacific countries. But during the last two years Japanese-flag vessels have been fishing in the area, and they take their catches back to Japan. Unfortunately, the Japanese Fishery Agency has been completely and totally unco-operative in collecting and releasing the necessary catch statistics.

Unless this can be corrected, it may result in frustrating all our efforts to conserve the Yellowfin stocks in the Eastern Pacific.

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Interior Announced Rules for Fishing Vessel
Construction Aid.

The proposed rules for the payment of direct aid in the construction of fishing vessels have been approved and will appear in the Federal Register in the near future, Secretary of the Interior Fred A. Seaton said. A 30-day period is provided during which interested persons may submit comments, suggestions and criticisms of the proposals to the Bureau of Commercial Fisheries, Fish and Wildlife Service, Washington, D.C.

An act to provide a programme of assistance in the construction of fishing vessels to correct the inequities of the construction costs between domestic and foreign vessels recently passed Congress, and was signed by the President.

The cost of building such vessels in foreign countries is subsequently less than it is in the United States but Federal law prevents United States fishermen from taking advantage of the less expensive foreign construction. The new aid programme applies only to fishing vessels which are part of a fishery being injured or threatened by increased imports. The payments cannot exceed one-third of the construction cost. There is an annual authorization of \$2,500,000, but no funds have yet been appropriated.

Under the law an applicant must show that he possesses the necessary ability, experience and resources to operate and maintain the vessel. He must also show that the vessel will aid in the development of the fisheries of the U.S.

The vessel must be of United States registry, land all of its catches in ports of the United States except under "force majeure," and employ as its crew only American citizens or aliens legally domiciled in the United States. It must be suitable for speedy and economical conversion to a vessel capable of aiding in national defence or other national emergency. It must be constructed in the United States under the supervision of the Maritime Administrator.

(Fishing Gazette

New York

August, 1960.)

New Drug Keeps Trout Alive Without Water.

How 49 lake trout were kept alive for almost five hours without water and with the aid of a new drug is told by two Canadian scientists quoted by Canadian Fishermen.

The fish were sent by air instead of a distance of 425 miles by road, from the lake where they had been reared to a hatchery for breeding experiments. Only five died during the trip.

It was decided to reduce the transfer time by using air transport and an anaesthetisation-icing technique, and a new drug, never before used in this type of work, was tried - MS-222 (tricaine methanesulfonate).

The fish were then packed in successive layers of chipped ice and sphagnum moss in metal tanks on trays, which were wrapped with a tarpaulin to retain coolness and moisture.

An hour elapsed before the fish were loaded on the aircraft, which took 3 hours and 35 min. for the 285 mile trip.

Of the five that died, three were in poor condition at the time of packing.

(Fishing News

London

August 12, 1960).