OF FISHERIES AND FAUNA
TERN AUSTRALIA

MONTHLY SERVICE BULLETIN

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STAFF NOTES

Congratulations are overdue to Mr. H. B. Shugg on his completion of the requirements for the Diploma of Public Administration. This is a five year part-time course made up of sixteen units in which Mr. Shugg obtained nine distinctions. At the annual presentation night of the Public Administration Association he was the graduate chosen to propose the toast to the Technical Education Division and here again he acquitted himself with distinction in his own refreshing style.

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Our congratulations also go to Inspector B.A. Carmichael on his promotion to the position of Senior Inspector (Perth) G-II-3. Inspector Carmichael is at present relieving at Geraldton which position he will continue to fill until such time as a permanent appointment is made at Geraldton.

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Two members of the inspection staff have added to their responsibilities by becoming parents. Inspector I.L. Cardon has announced the arrival of a daughter and Inspector W.M. Mahoney the arrival of a son. We extend to them and their wives our felicitations for their future family life.

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Inspector C.W. Ostle recently celebrated his marriage and we wish both him and his bride the very best for their future hapiness. Inspector Ostle proceeded on annual leave on April 26.

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Inspector G. Clifford has been on annual leave from March 28 to May 5. During this period p.v. "Dampier" has been undergoing a refit.

Cadet Fauna Warden K.D. Morrison commenced annual leave on April 13. He has since received notice of his call-up for two years National Service Training and will be required to commence early in the next financial year.

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Assistant Inspector G.D. Noble commenced annual leave on May 2. He is being relieved at Cervantes by Assistant Inspector W.M. Mahoney.

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Inspector A.V. Green commenced annual leave on April 26. He is being relieved at Mandurah by Relieving Inspector R.M. Crawford.

AERIAL INSPECTION OF COASTAL WATERS

A snap patrol of the one-mile closure between Rottnest and the 30th parallel was made in a twin-engine aircraft on April 20. The flight also covered the Abrolhos Islands and Geraldton waters. On board the aircraft were Inspector A.T. Pearce, Technical Officer N. McLaughlan, and Clerk-in-Charge, A.J. Mearns.

Four fishing boats were seen working lines of pots and more than 200 set pots were counted inside closed waters. The names or license numbers of the boats were noted and photographs taken. The boats used bags to cover identification numbers and one boat manoeuvred so that it was stern onto the aircraft as it passed overhead. After two runs had been made over another boat the crew were seen to lift the engine cover, giving the appearance of having suffered a breakdown.

Photographs were also taken of the crayfish research area in the Abrolhos Islands and of the r.v. "Lancelin" working gear in that area.

PROTECTION OF PORPOISES (DOLPHINS)

Recent press publicity has been given to a porpoise which has established friendly relations with residents of Monkey Mia, Shark Bay who feed it from the jetty. Some fears were expressed regarding the possibility that a tourist stranger may harm the porpoise.

This animal is totally protected under the Fauna Protection Act and any offenders would be liable to a considerable penalty.

CONVICTIONS

JANUARY - MARCH, 1966

Date	Defendent	Court	Charge	Result
		FISHERIES ACT		
24.1.66	WARNER, Lee	Fremantle	U/S Crayfish & Closed Season.	$ 44.80
"	MYERS, Raymond Leslie	"	" "	44.80
"	CARTER, Douglas Herbert	"	" "	44.80
17.3.66	PIPPAN, Guido	"	U/S Crayfish	64.80
"	MONDI, Antonio	"	Illegal Processing	66.00
"	" "	"	U/S Crayfish	100.00
"	MINERVINI, Damiano	"	U/S Crayfish	97.20
"	ANDRICH, Alan	"	U/S Crayfish	69.60
"	WATERS, Joseph Brian	"	U/S Crayfish	164.50
23.3.66	SABENZA, Jose	"	Illegal Processing	100.00
10.2.66	PASKOV, John	"	Condition of License.	60.00
"	NEWBOLD, William Thomas	Geraldton	U/S Crayfish	35.40
"	SHIELDS, John	"	U/S Crayfish	61.80
2.2.66	McCORMICK, Mary (Mrs.)	"	U/S Crayfish & Illegal Processing	74.50
16.3.66	DODDS, R.C.	"	U/S Crayfish	34.80
"	NISBET, James	"	" "	65.00
"	CHRISTIE, E.W.J.	"	" "	93.50
"	FINDLAY, Alexander	"	" "	33.40
"	RIGBY, Michael	"	" "	31.60
"	MASIELLO, Gesualdo	"	" "	69.00
"	CROOKS, Ronald B.	"	" "	63.00
"	JENNINGS, Robert	"	" "	63.50
"	NIELSEN, Karl Eric	"	" "	32.20
"	WILSON, William John	"	" "	63.00
21.3.66	THOMSON, Ronald I.	"	" "	63.00
"	MARTIN, William Harold	"	" "	33.20
"	DOUST, John Arthur	"	" "	122.00
"	KANNIROSKI, Lavri	"	" "	34.40
"	HANCOCK, Colin Thomas	"	" "	34.60
"	GUDMUNDSEN, Eric Joachim	"	" "	31.40
27.1.66	TOWTEN, Lawrence Jack	Pinjarra	Unlicensed Illegal Net.	21.60
"	McCARTHY, Brian Francis	"	" "	21.60
12.1.66	HOLDEN, Norman	Perth	U/S Crayfish	26.00
4.3.66	McCORMICK, H.W.	"	" "	75.00

Convictions Continued..

Date	Defendent	Court	Charge	Result
23.3.66	CAMPOREALE, Luigi	Perth	U/S Crayfish	$103.00
"	" "	"	" "	297.00
"	DELL-OLIO, Donato	"	" "	21.50
"	LANTZK, Quintin William	"	" "	26.20
"	LAWRENCE, Roy Steven	"	" "	20.70
"	HOY, Joseph Henry	"	" "	51.00
	FAUNA PROTECTION ACT			
12.1.66	BARISEVIC, Ivica		Keeping Fauna w/out a license.	4.00
19.1.66	BARTELL, Harry and Victor		Taking Protected Fauna.	10.00
4.2.66	HUTCHINSON, Harold		Failure to supply returns.	6.00

CANADIAN FISHERIES RECONNAISSANCE MISSION TO NEW ZEALAND AND AUSTRALIA

The Canadian Fisheries Reconnaissance Mission, an all-fisheries trade mission which has been visiting Australia spent a short period in Western Australia during March.

The threefold purpose of their visit was to:-

(a) Investigate the kinds and varieties of fisheries products sold in Australia by other countries.

(b) Examine possible outlets in Australia for Canadian fisheries products, especially on a long-term basis.

(c) Investigate fisheries developments and methods of production and marketing in Australia.

Australia depends on imports for more than half the fish it consumes, with a total import value of more than $28 million last year. Canada is one of the world's leading suppliers of fisheries products - exporting 70 percent of its catch to 90 countries.

The Mission included officers of leading Canadian fisheries companies, their associations and co-operatives, and of Canadian federal and provincial fisheries departments. Those that visited Western Australia were:-

Joseph E. Antonelli	-	General Sales Manager, Fresh and Frozen Fish Division, Fishermen's Co-operative Federation, Vancouver, British Columbia.
Kenneth M. Campbell	-	Secretary-Manager, Fisheries Association of British Columbia, Vancouver, British Columbia.
Maurice A. Foley	-	Chief, Engineering Section, Industrial Development Service, Department of Fisheries, Ottawa, Ontario.
Leonce Chenard	-	Deputy Minister, Department of Fisheries, Fredericton, New Brunswick.
William E. Simpson	-	Divisional Manager, 40-Fathom Division, National Sea Products Limited, Halifax, Nova Scotia.
T. R. Kinsella	-	Assistant Director (Fisheries), Agriculture and Fisheries Branch, Department of Trade and Commerce, Ottawa, Ontario.

They were accompanied by Mr. H. A. Gilbert, Commercial Counsellor for Canada, of South Melbourne, Victoria, and were joined in Perth by Mr. G. Williams, the local honorary commercial agent for Canada.

The Director of Fisheries and Fauna was absent from the State at the time of the Mission's visit but met them at a reception in Melbourne tendered by Mr. Gilbert.

The mission, which concluded its overseas programme in Perth, arrived here by air on Tuesday March 15. They were met at the terminal by the Administrative Officer (Mr. Saville) and the Fauna Officer (Mr. Shugg). After press and television interviews they were taken to their hotel and later to Head Office where they had round-table discussions with Mr. Saville and Senior

Research Officer, Mr. B.K. Bowen. Members of the mission later intimated that these discussions were some of the most informative and down-to-earth of their entire trip. In the evening they attended a ministerial reception tendered them by the Minister for Fisheries and Fauna (Mr. G.C. MacKinnon) and to which representatives of our fishing industry, together with senior officers, were invited.

The next morning they were invited by the Minister to morning tea at Parliament House where they were joined by the Minister for Industrial Development (Mr. C.W. Court) and the Hon. L.C. Diver, M.L.C. Members were given a comprehensive outline of past and proposed developments in this State. In the afternoon and evening they were taken by Messrs. Saville and Shugg to inspect the fishing boat harbour and other facilities at Fremantle. The Fremantle Fishermen's Co-operative entertained them at afternoon tea and they later visited the processing works of Ross Fisheries at West Perth.

On the following morning members prepared their reports while Dr. Chenard flew home. Mr. Gilbert accompanied Mr. William on a tour of the South-West while other members stayed over until Friday and saw something of Perth's beaches and suburbs. Messrs. Kinsella and Foley left by Qantas to return to Canada via Europe while the other members returned via Sydney.

Letters expressing warm appreciation for the information supplied and hospitality extended to the Mission have been received. They confidently forecast that mutually beneficial results would flow from their Mission's visit.

NEW RESEARCH VESSEL

Plans for a new 60 ft. research vessel to replace the Department's r.v. "Lancelin" have now reached the drawing board stage. Mr. L.A. Randell, who has designed many of the boats comprising the Western Australian fishing fleet, has been commissioned to design the new vessel, and he has submitted sketch plans to the Department. These have been examined by departmental officers and discussed with Mr. J. O. Traung, Chief of the Fishing Boat Section of the United Nations Food and Agriculture Organisation. Except for a few minor modifications, the sketch plans have been accepted and Mr. Randell has been asked to proceed with final plans and specifications.

The vessel will be engaged mainly on crayfish research and for this purpose, will be fitted with two 100 gallon holding tanks with continuous running sea water. She will also have

trawling gear for prawn and bottom fish research, and it will be possible to install live-bait tanks if she is required for tuna work. A hookah unit, capable of supplying air to four divers, will also be built into the vessel.

Electrical installation will include an echo sounder and fishlupe, a radio direction finder, an automatic pilot, and a continuous sea water temperature recorder. Allowance is also being made for future installation of a radar set and a closed unit television set for underwater observations. Accomodation for seven men will be situated in the forward section of the vessel. The wheelhouse will be amidships, leaving approximately 25 feet of after deck for working space.

When the new vessel is commissioned next year, r.v. "Lancelin" will be transferred to the inspection section and used to patrol the crayfishing areas.

APEX MOVE ON CONSERVATION

Hereunder is the text of a letter recently sent to the secretary of each and every Apex club in Western Australia and Malaysia. As indicated in the text, it originated from a proposal by a New South Wales club that the Apex movement adopt the preservation of flora and fauna as a "service scheme" for 1966-67. The proposal met with the enthusiastic support of our Minister who had, coincidentally, only a little while previously, addressed the Bunbury Apex Club on this theme. The letter was also sent to clubs in Malaysia at the specific request of the Macksville Club as Malaysia is in the same division of Apex as is this State.

The letter read as follows -

"As you are no doubt aware, the Apex Club of Macksville, New South Wales, has proposed that the preservation of flora and fauna be made a service scheme for 1966-67. The Hon. Minister for Fisheries and Fauna (Mr. G.C. MacKinnon) has welcomed this proposal and I am pleased to put before you the following comments and to seek your club's support.

In Western Australia the preservation of flora and fauna has been an accepted responsibility of Government for many years. The Native Flora Protection Act was first passed in 1935 while the Fauna Protection Act came into force in 1950 (replacing the Game Act which had become outmoded). Despite the legal protection afforded most species, however, much of our wildlife is threatened with ultimate extinction, or at least to relegation to a few,

isolated reserves. It is, therefore, timely for us to review the situation and see if it cannot be improved.

Responsibility for the conservation of flora and fauna is divided. By the Native Flora Protection Act, Parliament has imposed on the Conservator of Forests the duty of protecting the native flora. Under the Fauna Protection Act, the duty of protecting and conserving the fauna is reposed in the Department of Fisheries and Fauna.

The first point I must make is that a government department can never hope to achieve the aims of conservation and protection without the goodwill, informed knowledge and active co-operation of the public at large. The natural wonders of our "bush" are often taken for granted and are frequently under-rated because people do not realize their values. We tend, too, to think of the wildlife as being assured of refuge in the "vast interior", forgetting the giant steps being taken to eradicate the "bush" in the great developmental programmes now underway. A point to remember is that in the past four years in Western Australia we have cleared far more land than has been reserved for fauna conservation during the entire 136 years since settlemer

The second point I wish to stress is that protection alone cannot achieve the results we seek, nor can the reservation of a few national parks and nature reserves. We must have both - and then much more. The wildlife and the people cannot be separated into neat little boxes. We want more fauna on farms and between farms. Wildlife conservation needs to be fitted into the community and must go hand-in-hand with the proper conservation of the other renewable natural resources - the seas and inland lakes, rivers and streams, the soil and even the atmosphere. To do these things we need to know a lot more about the world in which we and the wildlife live - of our inter-action with the environment and what things are critical to the survival of ourselves and our fauna. The native flora and fauna represent a great latent asset - a source of knowledge, of material, a synthesis of Nature's experiences over millions of years in the art of survival. It is huge, but it is precious; it is precious but it is vulnerable. We know so little about it - we do not even know for certain what yet remains.

We are doing something. We do have the basis of a good reserves system - provided the basis is built on in time. We do have a concept of protection - but we have only 3 full-time wardens to cover 1,000,000 square miles. We have, too, the foundation of a research unit but, dedicated as those workers are, they are doing no more than scratch the surface, so to speak. We must have more honorary assistants prepared to help in the establishment and protection of reserves, to encourage the

maintenance of bush lots in private land and where that is not possible, the adaptation of farming techniques for the mutual benefit of the farmers and of the harmless and beneficial species such as dunnarts, ibis, wild turkeys, water-fowl and various lizards, to name but a few. The over-sentimental attitude against native predators and scavengers which are of such indirect benefit, too, must be broken down and a more objective outlook encouraged.

In all these things and many more, the Apex movement could assist and in doing so could help to make Australia a better place to live in; to help preserve some at least of the heritage we were given by our forebears. It is well to reflect that if we lose this heritage the majority of Australian wild-life will have been lost in our lifetime. Posterity will not blame our forefathers, who have had no opportunity to realize the dangers, and they will not blame our children if they have been left nothing to save. The blame will sit squarely on us and we will be remembered in history for our failure. This outlook does not appeal to me, does it to you?"

TECHNICAL MEETING ON FISHING BOATS

Under the auspices of the Commonwealth-States Fisheries Conference, a Technical Meeting on Fishing Boats was held at Broadbeach, Queensland from March 14 to March 18.

Western Australia was represented by the Director (Mr. Fraser), Mr. L.H. Randell, Naval Architect, who presented two papers, and Mr. A.F. McKimmie, Engineer and Ship Surveyor, Harbour and Light Department. Twenty-five persons in all were present including representatives from all States, the Northern Territory, New Zealand and Fiji.

This meeting was designed to take place during the second visit of Mr. Jan Olof Traung, Chief of the Fishing Boat Section, Fisheries Department, F.A.O. Mr. Traung visited Australia in March, 1964, at the invitation of the Commonwealth Government to advise on problems relating to the design and construction of fishing vessels. Because, Mr. Traung did not have the time available to complete his investigations and report in one visit, two visits were arranged. Mr. Traung acted as Chairman of the meeting.

The aims of the meeting were to :-

(a) Assist naval architects to gain a greater appreciation of the problems in fishing vessel design.

(b) Assist in designing more efficient and more seaworthy vessels.
(c) Bring to the notice of fishermen the advantages of a well designed vessel and the need for a naval architect's service to achieve this.
(d) Demonstrate the necessity for full and careful calculations of hull designs.
(e) Introduce some measure of uniformity in design.

The following nine papers were presented during the meeting:-

Paper 1 : "What boat builders must be given from Naval Architects in the way of plans and specifications for the most economical construction of fishing vessels".
(Presented by Mr. J. Doherty)

Paper 2 : "Proposals regarding measurements of Australian fishing vessels".
(Presented by Mr. C. Boden).

Paper 3 : "Scantlings and construction proposals for Australian timbers having in mind Australian fishing conditions".
(Presented by Mr. A. Swinfield).

Paper 4 : "Design study on lines necessary for a 50' prawn trawler suited to bar work".
(Presented by Mr. W. Hood).

Paper 5 : "Stability of Tuna vessels".
(Presented by Mr. C. Boden).

Paper 6 : "When can fishing boats be made planing".
(Presented by Mr. L. Randell).

Paper 7 : "Small steel fishing boat design incorporating sea water tanks for fish storage".
(Presented by Mr. J. Doherty).

Paper 8 : "Methods for holding crayfish at sea".
(Presented by Mr. L. Randell).

Paper 9 : "A study of winches, deck gear and layout for fishing vessels and in particular prawn trawlers".
(Presented by Mr. R. Wright).

Commenting on his return, Mr. Fraser said he believed this was a most important occasion. Not only because of the free interchange of views possible during discussions following presentation of the papers, but because the meeting enabled many of the naval architects present to meet one another for the first time.

Not only during the formal sessions, but also in extra-curricular dissertations, the participants were enabled to talk over and in some cases settle mutual problems with officials of both the fisheries and marine administrations.

After the meeting, Mr. Traung paid short visits to Port Lincoln, S.A., and Perth, leaving with his wife for Singapore and other parts on Good Friday. It was most unfortunate that on the day before his departure Mr. Traung fell in his room and fractured a small bone in his right arm.

LICENSING OF BOATS FOR CRAYFISHING

Following the crayfish production peak of a little more than 21 million lbs. in 1962 there was a rapid drop in annual production to 16½ million lbs. Conservation measures were introduced in an attempt to halt this decline and one of these was a restriction on the lengths at which existing vessels may be replaced.

The Minister issued a directive, under powers conferred on him by section 17 of the Fisheries Act 1905-1965, that any boat exceeding 25 feet in length may be replaced by a boat of only the same length, and that (in the interests of safety) a boat of not more than 25 feet may be replaced by one of up to 25 feet.

This restriction is of a "blanket" nature, and was imposed fully appreciating that while its purpose was to conserve the crayfishery, it would perhaps in a few individual cases impose personal hardship. A similar situation existed in regard to controls exercised during the last war. These also had a blanket effect, and some individuals were hurt. However, when acting on the basis that the greatest good must be done for the greatest number, it is not always possible to consider individual desires.

If any fisherman was allowed to replace his vessel with a larger one, even if the number of pots he could lawfully use was not increased, there would be a great increase in fishing efficiency. Obviously, the boat would have greater power and speed resulting in pots being pulled more frequently and an increase in the tempo of fishing. There would also be the temptation, to which admittedly all fishermen would not succumb, to use a greater number of pots than that prescribed.

It should be explained that this restriction was introduced for the benefit of the industry as a whole. It should be remembered that by reason of conservation restrictions crayfishermen are working in what is in effect a closed, a protected industry. It does seem reasonable that crayfishermen should be prepared to accept small hardships in return for the privelege they enjoy of having no more competitors allowed into the crayfisheries.

When the effect of conservation restrictions have been properly studied and analysed and the Department can be sure that production has been stabilised, the restrictions will be reviewed and some of the existing controls may be lifted. This could occur at any time within the next 18 months or two years.

TAKING OF CRABS IN LESCHENAULT INLET

The following is the context of a letter recently sent by the Minister. It conveys a general statement of policy equally applicable to other areas experiencing problems in relation to the taking of crabs.

"I have had this matter very thoroughly investigated. On-the-spot enquiries were made by Mr. J.E. Munro, Acting Supervising Inspector of the Departmenr of Fisheries and Fauna, who is a native of Bunbury and whose knowledge of Leschenault Inlet, and of the fish and crabs that occur there, goes back sixty years. In your absence he discussed the matter with Mr. Davenport, acting chairman of the Tourist Bureau; he attended a meeting of the Australind Progress Association -- which had also raised the matter -- and he spoke with a number of other Bunbury people, both professional and amateur fishermen.

As a result of his enquiries, and by reason of his long experience of the Bunbury area, Mr. Munro is satisfied that no undue damage has been suffered by the crab population by reason of the high commercial catches made this season. It must be borne in mind that it is not only the professional fishermen, i.e., those largely dependent on fishing for their livelihood, that are commercialising the resource. Many local residents, as well as visitors, catch and sell crabs. In fact, the Department estimates that there are probably more crabs taken from the Inlet by these quasi-amateurs than by the true professionals.

Be that as it may, the 1966 crab season has been the best for some years, but despite greatly increased catches there

does not seem to have been any diminution of the crab population. During the months of January, February and March, when most of the crabs taken by professional fishermen are caught, the taking of females is prohibited. Furthermore, the professionals are bound to keep only crabs which are not less than the minimum legal size of 5 inches, and they are allowed to fish for crabs only during daylight hours. Amateurs, quite understandably perhaps are not so scrupulous, and if the Department were to take action against amateurs offending against the minimum size law it would greatly restrict amateur activity without in any way improving the population of crabs in the Leschenault Inlet.

There is one other thing. All of us have observed that many amateur fishermen take far more crabs than what they can use for the consumption of their immediate families. It is human nature, perhaps, to keep on fishing while catches are good, without thought of what can be done with them. But it results in much waste, and it would perhaps be a better step in the direction of conservation to discourage tourists and amateurs from overdoing things than to worry about possible depletion stemming from professional activity. It is the Department's experience that in the main professionals are sufficiently alive to the needs of the morrow to ensure that as far as possible no undersize crabs or gravid females are taken -- or if taken that they are returned to the water -- and that no wastage occurs.

The following figures relating to the catch of crabs by professional fishermen in Leschenault Inlet for the past five years are forwarded for your information, viz.,

1961	...	11,680 lb.
1962	...	7,121 lb.
1963	...	6,675 lb.
1964	...	11,325 lb.
1965	...	8,290 lb.

STOP PRESS REPORT

Two fishing boats Alba Marina F.119 and Silvery Wave F.17 owned by Riccardi Bros. purse seining for crayfish bait between mainland and Rottnest Island in one shot landed 28,000 lbs. of Australian Pilchard commonly called the mulie. Another estimated 7,000 lbs. were released as no room was available on deck.

HELPFUL HINT

A good way to dry out your fishing boots quickly instead of cooking them by the fire is to shove your wife's vacuum cleaner hose in each boot and run it full blast for a few minutes.

CLEARING HOUSE

ARTIFICIAL SEAWEED

Beaches, unlike rocky shores, are unstable, constantly shifting in uneasy equilibrium. Undulating tides and restless winds continually alter coastlines, shifting the shore by the loss or gain of sand. Nature, undisturbed, sends up slim fingers in the form of beach grass, sea-oats and other plants to tether mobile dunes to the shore. But man, in his wanton way, dredges, clears and drills, upsetting the delicate balance which nature provides, and precious beaches wash into the sea.

Along the coast of New Jersey, coastal engineers are experimenting with a new aid to nature to hold sandy ocean bottoms together and prevent excessive erosion. Last August at Island Beach State Park, 800 feet from shore, a grid of artificial seaweed was planted in 15 feet of water. The experiment, the first of its kind in the U.S., is being conducted under carefully supervised conditions by the New Jersey State Department of Conservation and Economic Development and Avisun Corporation, a plastics manufacturer, "If this experiment proves successful," says Francis B. Cogan, assistant chief engineer of the New Jersey State Bureau of Navigation, "it will constitute a major breakthrough in beach protection".

The artificial seaweed is made of polypropylene, the lightest of all plastic materials, and two forms are being tested - hairlike monofilament and slit film strands.

The planting took three weeks. At Barnegat Light an anchored barge served as operations base. Working only the few hours each day when the water was extremely calm the seaweed was transferred from a large skiff to a smaller buoy tender and hand-fed over the side into the water at predetermined points. It was fastened to a grid, 90 x 900 feet, in clusters or "fronds" at 3-foot intervals. The vacillating clusters extend upward 6 feet from the ocean floor, allowing 9 feet of clearance for passing boats. Twelve tons of weights prevent the grid from floating away.

The first report of the two-year study will be issued in February 1966, when initial soundings and samplings have been evaluated. A log of the weather in the area is being kept and every three months additional tests will be conducted.

Denmark was the first country to make tests of artificial seaweed. The idea was born when it was observed

that fishermen took refuge during storms in kelp beds, which seemed to dissipate the effect of violent seas. The idea that artificial seaweed might produce the same effect as natural seaweed in reducing wave energy was tested there on a limited scale almost two years ago. A 40-square-meter grid was planted in the Thyboren Channel. It was found that sand accumulated on the channel floor behind and in the grid, within an area of approximately 500 feet from the planting. More extensive testing showed a build-up of sand amounting to about a yard in eighteen months.

After noting the Danish tests, England began conducting trials at Bournemouth in hopes of trapping sand from offshore to build up beaches there. Synthetic seaweed, they feel, should be more advantageous than the long wooden groins which run out into the sea and trap only sand that is carried along the coasts by currents, thereby robbing beaches farther long.

As a means of preserving the shoreline, the role of plastic seaweed can be evaluated only when the results of the tests are known. Beach erosion is normal, but strands of polypropylene may be a fragile, but effective, force to temper the powerful, encroaching sea.

(Sea Frontiers Washington January-February 1966)

THE WATER CYCLE AND POLLUTION

Nearly everyone knows about the water cycle - how moisture falls from the clouds, pursues many useful paths on earth, is purified by plant transpiration and natural evaporation to rise again and be precipitated once more. It is a continuous process arousing attention only when too much water or too little - flood or drought - occurs.

Familiarity with this everyday miracle and its minor deviations from the norm through the centuries has imbedded the misleading belief that water, like matter in general, is indestructible regardless of what is done to it; and that practically speaking, it has only one characteristic to be considered: Quantity (how much or how little) at a specific place.

In a sense nothing could be further from the truth. When you destroy the usefulness of anything, you have, for all practical purposes, destroyed the thing itself. In this sense, water can be destroyed; and it can be destroyed

because of its other important characteristic: Quality.

When pollution impairs the quality of water to the point of unfitness for human use we have, in effect, destroyed that water. We shall never again recapture that particular amount of water for our use. It has been lost, for one round of the water cycle, forever.

But why be concerned about losing some water? Isn't it nearly everywhere, like the air, and free?

That, too, is a general misconception. We are short of water in many, many places, especially in heavily populated areas where demand is greatest.

The demand for water (and its total cost) increases as population and industry expands - only more so. Our population has doubled since 1900, but total water use has increased six times.

Furthermore, water is not free. Treatment of water to make it suitable for use costs money. The present national water bill runs to hundreds of millions yearly not including the cost of capital investment in buildings and equipment.

The more polluted our waters become, the more costly their treatment for the various uses they must meet.

Polluting our rivers, lakes and bays and then trying to "purify" that water to usable condition is like locking the barn door after the horse is stolen.

What is wanted is prevention rather than cure. We must attack the pollution problem at the point where the wastes are discharged rather than where the water is used.

No water except that in the laboratory, of course, is 100 per cent pure. The quality of water begins to deteriorate even before it reaches earth - falling raindrops pick up atmospheric dust on their way. However, even after it has fallen, and is flowing seaward, the quality of water is high enough for nearly any human use: "Pure enough to drink", as the saying goes.

But when water comes into contact with human activities, quality or "purity" degenerates fast.

We say that water is polluted when it contains

substances that make it unclean or unfit for our use. There are two main forms of pollution in our waterways.

The first is silt - the soil that makes our rivers brown and muddy and fills up the reservoirs behind our dams. Bad farming, over-grazing or deforesting multiply immensely the soil particles normally carried by flowing water as a result of natural erosion. Raindrops striking the earth are like miniature bombs that blast soil particles loose and incorporate them with the water - and the quality of water is impaired. This silt would be a priceless asset if it were allowed to stay on the land.

The second form of pollution consists of our unwanted wastes. These wastes are of two general types: sanitary sewage, and industrial wastes.

Sanitary sewage includes everything that goes down the drains of a city and into its sewer system - the used water from toilets, bathtubs and sinks, washings from restaurants and laundries, hospitals and hotels, etc.

Industrial wastes are the acids, chemicals, oils, greases, and animal and vegetable matter discharged by our factories.

The water that Nature gave us is now an unnatural concoction of man and an offence to society.

Silt is chiefly a problem for farmers, foresters and soil conservationists. It is basically a land problem, and it will be solved in rural areas.

But the problem of sewage and wastes is a water problem. It must be solved by the communities and factories which cause it.

(Wildlife Review Canada December 1965)

FISHERMEN MAY NEVER GET THEIR FEET WET

This is the intriguing title of an article in the "Canadian Fishermen" of August, 1965. It is described as being "in the world of tomorrow", and the editor of that journal asked the advice of an expert on the article, and was told that it should be published, as "it was time that fisheries entered the science fiction field". Anyway, some science fiction seems to have come true - maybe this will.

The author is David Gunston.

- Editor -

All through History deep-sea fishermen have followed their calling against the elemental odds of nature, dredging food from the ocean in a more or less unchanged way for centuries.

Before long, however, fishing fleets may operate in a vastly different manner, their methods strikingly improved by modern science.

To begin with, instead of seeking shoals of fish to catch, they may soon be able to draw the fish to them.

It has already been found that large schools of fish may be herded together in selected areas of the sea by luring them with trails that attract them through the sense of smell. Fish can detect very small quantities of attractive-smelling substances in the water, and may be coaxed to swim where they are needed by trails of olfactory pellets dropped into the sea by helicopters or ordinary aircraft.

These pellets would attract the fish shoals by reproducing the odours of their own natural prey. Schools of herring, mackerel, tuna and other fish will be herded about the oceans in this way.

Fish also have very keen hearing, and work has been going on with some hope of success to see if large numbers can be driven towards the fishing fleets by electrically or sonically produced underwater sounds that reproduce the normal noises of their food creatures, or even of their natural enemies.

Having moved food fish to water areas where they are easy to catch, the next step is to make sure they stay there until they are required. This will be done in the future by laying air-hoses on the seabed, each length fitted with thousands of minute holes. Compressed air pumped from shore or fishing factoryship would form a rising curtain of bubbles through which fish hesitate to swim. Such undersea 'fences' might be made even more effective by charging the continuously-forming bubbles with certain chemicals known to dispel fish. Thus, inside their confines, the fish would be captured with ease to suit the demands of the market.

This may be done in the usual way, but with nets vastly improved by modern plastics and man-made fibres. Or deep-sea trawling may be taken over wholly or partly by remotely-controlled submersibles, small submarines that can guide, open and close large purse-nets either by radio control from ships, or independently reacting to the underwater conditions, numbers and kinds of fish and their movements.

Another way to concentrate numbers of fish just where they are wanted, with extreme ease of capture by nets, will undoubtedly be to build nuclear reactors on chosen spots on the deep sea-bed. These underwater sources of heat will cause an upwelling of warm, nutrient-rich water to the sunlit surface where plants can utilize the nutrients. In these enriched food areas would congregate huge populations of fish of all kinds, ripe for scooping up into ready-spread nets powered by small units that would set them automatically at the required depth.

Another likely scheme for bringing in easy and good catches of some of the larger fish, like tuna and barracuda, that swim close to the surface would be to provide them with artificial mooring "logs". These species seem to prefer to congregate near drifting logs and other flotsam, so that concentrations of them could be achieved by floating off numbers of artificial logs, of lightweight plastic and easily retrievable, with built-in electronic detention and communications systems.

Thus, not only should such "logs" attract the fish, they would automatically report concentrations of fish (possibly identifying the species by smell or sonar) to nearby fishing vessels and make catches more certain as well as saving much time at sea.

One of the age-old headaches of deep-sea fishermen has always been the number of fish that escape from trawls and nets after capture. This will soon be a thing of the past when electric current carrying cables are used on the nets, giving a weak but effective shock to any fish trying to wriggle or break through. In addition, electronic monitoring systems will tell fishing crews exactly what catches have been made in bottom and mid-water trawls, the rate of capture each day, and when best to haul in.

Aerial searching for fish using radar has already been tried but without much success. In the future, infra-red techniques will be the thing. The use of infra-red rays to detect the turbulence caused by large numbers of fish swimming

near the surface, as well as noting the boundaries of water masses in the oceans like tidal streams, warm currents, plankton drifts, will enable existing fishing fleets to be used more effectively and economically. Little will be left to chance in the fisheries of tomorrow. And with the use of the powerful new light beam, the laser, it may be possible to reconnoitre the sea to a much greater depth, even in rough weather.

Underwater searching for fish is another avenue that will be explored to the full. Not only will the direction and speed of fish shoals be detected acoustically or by dopler sonar: there will be positive identification by remotely-controlled submerged units of the actual species of fish involved. It seems likely that such identification will be based on our growing knowledge of both the characteristic swimming techniques and the actual voices of different kinds of fish.

Indeed, there may come a time, certainly within the next 20 or 30 years, when fishing fleets may look decidedly old-fashioned. At a central control office on shore (already named "Hydro-central"), information about weather conditions, fish movements and wave patterns would come in continuously, via interrogating communications satellites circling the earth from unmanned moored buoys dotted about the oceans. When likely schools of fish are reported at sea, the nearest buoy would be instructed by radio to identify the species, possibly by analyzing its odours, perhaps even by marine television.

Then, with all the data collected, the chairborne fishermen at "Hydro-central" would direct the net towing submarine craft to move in for the controlled catch. The oldtime romance of fishing will have been lost, but the human gain in time, efficiency, even lives, will be immeasurable to a world that, even then, will doubtless still be far from free from hunger.

(Fur, Feathers and Fins Victoria March 1966)

'MULTI-PACKET' CARGO SHIPS WOULD SHARE MACHINERY

A revolution in the economics of cargo shipping is the aim of an unorthodox vessel which can be broken up into sections while still afloat. While the cargo section is in dock being unloaded, the propulsion section, which also carries the crew, can be away on its next voyage, attached to

a second cargo unit. Details of the project have been released by the British National Research Development Corporation.

The vessel, the Multipacket, has been designed by Hay and Smart (Projects) Ltd. of Liverpool to share the cost of development on a joint venture basis if an industrial partner can be found.

The principle of this new concept of cargo ships is similar to that of the load-carrying road transport trailer and motorised "iron horse" towing unit. The vessel is built so that the aft section containing the propulsion, navigating and accommodation units, can be rapidly disconnected from the cargo sections, while freshly-loaded hull sections can be linked in for movement to the next port. The design is intended to make greater use of the capital invested in shipping.

In a modern cargo vessel, the propulsion machinery, accommodation and control equipment is concentrated in the aft portion of the ship and accounts for approximately two-thirds of the total cost of the vessel. Because a cargo ship can be expected to spend at least 50 per cent of its life in port, the most costly part of it, the aft section, is never used to full advantage.

Used on a shuttle service, the Multipacket can be operated so that one propulsive unit (the aft end) works in conjunction with three cargo units, one of which is at each end of the shipping run being loaded or unloaded, while the third is in transit.

In this way one propulsive unit and three cargo sections could do the work of up to three conventional vessels, depending on the length of route and turn-round time. The capital cost, however, would be only one-and-two-thirds that of a single conventional vessel.

Though the Multipacket principle entails an unconventional method of construction in which the sections would be "hinged" at deck-level only, ship-tank tests have shown that it would behave like a normal ship, even in the worst weather.

The initial idea was to cut through a conventional coaster just forward of the engine room and introduce a new bulkhead to seal off the hold spaces of the forward section.

Linked at deck level :

In a two-part ship of this kind, the normal stresses afloat would in fact help to hold it together, though physically linked only at deck-level.

Most modern ships are in a "hogged" condition for much of their life. The deck members are in tension and the bottom members are in compression so that the bulkheads of the "divided" ship would be constantly pressed together. There would be additional holding pressure from the resistance of the hull to forward movement and the thrust of the propeller.

Problems of trim and stability of the individual sections when separated and the whole vessel when linked up have been taken into account and apparently solved satisfactorily.

Taking the vessel apart and putting it together could be basically mechanical, controlled from the bridge of the propulsion unit. The operation could be accomplished, the designers estimate, in a matter of minutes.

The initial problem of aligning the sections longitudinally is overcome by two winch-controlled wires which can draw the sections close enough together to allow hydraulic rams to complete the task of positioning the two bulkheads accurately. These rams would be controlled to correct any transverse misalignment which could be caused, for instance, if one unit had a slight list.

When the deck edges have been drawn flush, hinged steel flaps are placed in position across the joint and secured. The duty of these straps is to provide continuity of strength along the deck girder members, resisting tensile and sheer stresses.

The two-part ship is the simplest form of the Multi-packet idea. The intention, however, is that the principle can be applied to more elaborate systems, with several separate sections, up to the design length of the vessel. This would allow general cargo, liquid cargo or refrigeration units to be assembled as needed.

Following extensive tank tests on the Multipacket, the British Ministry of Transport, with the advice of the National Physical Laboratory of the Ministry of Technology, has stated that a vessel to this design would be approved for an International Load Line Certificate.

The National Physical Laboratory agreed that the model tests would adequately simulate the performance of the Multipacket under sea conditions. They included storms equal to the worst that could be met in the Bay of Biscay, but the behaviour of the ship model was no different from that to be expected from a conventional integrated ship.

For the purposes of the test, the model, representing a 205 ft. coaster, was divided into five parts - a propulsive aft section, three cargo units and a bow.

(The South African Shipping News Cape Town February 1966)

THE EFFECT OF SEA TEMPERATURE AND CLIMATE ON THE CATCH

A sudden drop in 1965 by some 10 per cent of Peru's enormous anchovy-catch, which has seen an explosive rise in post-war years to bring that country ahead of Japan with the world's biggest fisheries yield in 1963, is a most interesting illustration of the influence of sea temperatures on fish populations, an influence long stressed by Dr. Le Danois, the French authority.

The cause is attributed to the abnormally high water temperatures of the Humboldt Current, or Humboldt's Current as it was originally named. It is one of the three great currents. Starting from the South Pole, it brings its cold water along the coasts of Chile and Peru, meeting warmer currents from the north and encouraging a thriving plankton on which the anchoveta feed. They in turn form a link in the food-chain for predatory fishes and also the vast colonies of sea-birds.

Over eighty species

Between 80 and 100 anchovy species are known in the world, and the anchoveta of Peru is Engraulis rigens. It is the same which Chile has been fishing in recent years.

Most of the anchovies are tropical or sub-tropical, but the British anchovy, Engraulis encrasicholus, ranges from Norway through the Mediterranean to the Turkish fishery. However, "Norwegian anchovy paste" does not necessarily contain anchovy: usually it is sprat.

Anchovies are small, soft fish around six inches long, and usually migratory, coming inshore to spawn.

In 1964 Peru landed 8,700,000 metric tons, most of which was turned into meal and fishbody-oil. This year's decline in the Peruvian catch has greatly improved prices for fish meal and has extended markets for the South and South West African pilchard and anchovy catch, which is also converted mainly into oil and meal.

Temperature and climate have a wide influence on fishes. Sea-lamprey eggs can develop successfully only within the limited temperature range of about 60 to 70°F, and as these blood-sucking fish are serious pests to some commercial species, especially in the Great Lakes of Canada, this is a vital factor in controlling their distribution.

The South African pilchard catch can be roughly estimated from sea-temperatures of the upper 50 metres in the previous year. The size of one autumn's pilchard catch is related to the temperature of this layer the previous autumn. Biologists have, however, suggested caution in accepting the theory that the warming of the North Atlantic may have affected the pattern of stock changes and yield in the Greenland and other northern fisheries in modern times.

Lobster Affected

Mackerel catches show a relation to air temperature fluctuations over long periods of 130 years. The warming of inshore waters was believed to cause the decrease of lobster and American "whiting" or hake south of Cape Cod since 1900, though one would have expected lobsters to become more active and more likely to enter traps. North of Cape Cod, however, the warming-up has greatly increased the catch of both species since 1940, and in the autumn-winter catches of American "whiting" or silver hake. The warming waters of the North Atlantic results in new northern records of southern species like garfish from the Shetlands and on the Canadian coast frigate mackerel, bonito pilot-fish and file-fish, without any extension of the range of northern species southwards.

Off Japan a warm current, known as the Black Stream, brings fish. Two years ago when this current fell back more than 60 miles from its usual northern extremity, water-temperatures around Japan fell sharply and there was a drastic decline in catches by Japanese fishermen. Dead fish unable to adapt themselves to the change floated around the fishing banks.

Cod are predominantly cold water fish, living usually

between 34 and 40°F, dying when it rises above 66° or drops below 23°.

Limited by cold

Haddock are less adaptable, being limited to roughly 32° to 50°F and most numerous between 30° and 45°.

The cold edge of the Arctic current limits their northern range. Hake prefer even warmer water than either of the previous fish. The Pacific salmon is limited to a surface ocean summer temperature below 59°F rather than by near freezing.

The significance off Peru is that on the west coast of South America cold waters from the polar south intrude into sub-tropical seas and are encountered as far north as latitude 5 deg. S, hence the vastly different fishery compared with Liberia on the West coast of Africa, which is in the same latitude.

For maximum productivity, the surface waters of tropical and sub-tropical ocean regions require a certain amount of cold water mixture, either brought by currents from the cold polar regions, like the Labrador Current meeting the Gulf Stream off the Great Banks of Newfoundland, or by upwelling from cold, deep sub-Antarctic or Arctic waters.

(The Fishing News London March 1966)

APPROACHES TO CONSERVATION

by E.C.F. Bird
School of General Studies,
Australian National University.

In response to the interest in conservation expressed by a number of resolutions submitted to the preceding ANZAAS meeting in Canberra, the organizing committee for the Hobart congress decided to make conservation a major feature of its program. An all-day symposium was held in the Hobart Town Hall as a joint meeting of eight of the sixteen sections (C, D, F, H, K, L, M, and P), and later in the week Professor J.S. Turner (University of Melbourne) lectured on conservation at an evening meeting open to the public. Section programs also included lectures and symposia dealing with problems relevant to the conservation theme.

Conservation is a very broad subject. Professor Turner defined it as "the wisest possible use, over a long term, of all our natural resources, applied for the benefit of man". At the symposium, eight contributors illustrated some of the problems that arise in attempting to practise this, in fields ranging from architecture to zoology. Mr. Dirk Bolt, a Canberra architect, outlined the proposals made by Unesco in 1962 for the maintenance of scenic values in natural rural and urban areas throughout the world, and considered these in terms of the Australian environment. Australians, he said, care little for the visual impact of their landscapes, accepting man-made ugliness as inevitable, if it is noticed at all; they tolerate such evils as pollution of rivers and lakes, dumping of rubbish in the countryside, and wanton destruction of natural vegetation and wildlife. The Unesco proposals call not only for the preservation of scenery in National Parks, but also for a program of public education and legislation to ensure the conservation of landscape and amenity throughout the countryside, and if possible to repair some of the damage that has already been done. Outside the Australian Capital Territory (where these matters are the responsibility of the National Capital Development Commission) adequate steps have not yet been taken to ensure the conservation of Australia's varied landscapes.

In terms of biological resources, which are self-renewing if properly treated, conservation is something more than preservation. This point was developed by Dr. J.M. Gilbert, of the Tasmanian Forestry Commission, who described methods of forest management in relation to the conservation of wildlife and scenery. Management procedures include the strategic use of fire, which is often the only effective way of ensuring regeneration of Tasmanian eucalypt forests, as well as being a means of reducing the risk of widespread devastation by accidental bushfires. Modern forestry practices seek to create a mosaic of forest types at various stages of maturity in order to provide a sustained yield of timber; the result is a landscape that can remain varied and interesting, with a wide range of wildlife habitats.

In recent years it has been recognized that wetlands (shallow inland water areas, including lakes, rivers and swamps) are of considerable economic, as well as ecological significance. They produce fish and fowl, they harbour a flora and fauna of scientific and educational interest and they provide opportunities for a variety of recreational activities, such as sailing, duck shooting and angling. In western Europe the International Union for the Conservation of Nature has recently completed Project MAR, an inventory

of wetland resources, as a basis for a conservation program for these areas. Dr. A.H. Weatherley, of the Australian National University, discussed wetlands in Australia, and outlined some of the biological consequences of human interference - the draining of swamps, the damming of streams, and the pollution of rivers and lakes. It is possible that losses and modifications of natural wetlands are made good by the creation of artificial lakes and farm dams, particularly if these are managed in such a way as to maintain the values of natural ecosystems, but at present we know little of Australia's wetland resources and a comprehensive survey is necessary as a basis for a national policy of wetland conservation. Some of the physiographic and ecological problems posed by this kind of area were discussed by Dr. G.R. Cochrane and Dr. G. Robinson, of the University of Melbourne, in a paper on the Hattah Lakes National Park in Victoria, an area where ecological conditions are determined by recurrent natural flooding from the River Murray.

Conservation of wildlife seeks to maintain a balance of plant and animal species in a community without impoverishing their habitat; it aims to avoid the risk of species extinction on the one hand and multiplication to pest proportions on the other. Dr. H.J. Frith, of the C.S.I.R.O. Division of Wildlife, took up this theme in relation to the conservation of kangaroos in mainland Australia. Recent surveys of kangaroos in various habitats suggest that their numbers are being generally maintained, and in some areas where the kangaroo population has become excessive and apparently in direct conflict with agricultural interests, the need for control has led to harvesting of kangaroos for meat and hides. Dr. Frith presented preliminary results on the extent to which sheep and kangaroos are really in competition, and suggested that the adverse effects of kangaroo grazing on production from sheep have been exaggerated. Controlled management and harvesting in rural areas, coupled with protection in wildlife reserves, can ensure the survival of kangaroo species, most of which are still abundant. There is evidence, however, of a decline in the population of the red kangaroo, and there should now be some restraint on the harvesting of this species.

The difficulties of preventing species extinction were illustrated by Mr. K.H. Miers, of the New Zealand Wildlife Branch, with reference to several "threatened species" of birds, some of which survive only in very small numbers on an island off the New Zealand coast. Repeated surveys are necessary to ensure that these do not die out, particularly in islands invaded by predators, notably rats. The Wildlife

Branch has transferred rare birds to rat-free islands which have been acquired as reserves, and attempts are also being made to perpetuate rare species by breeding them in captivity.

Dr. A. Mitchell, of the Soil Conservation Authority of Victoria, dealt with the management of grazing country as an example of the effort to secure a sustained yield from natural resources. Grazing potential is determined largely by the inherent capacity of land: overgrazing impoverishes pastures and initiates soil erosion, whereas undergrazing allows scrub and forest vegetation to invade pastureland. An ecological approach aims to adjust grazing to the pattern of ecosystems in a particular area; the land may be divided into natural sites, with assessed grazing potential and erosion hazard, and grazing can be managed in terms of these rather than abritrary paddock divisions.

Finally, Dr. J.G. Mosley, of the University of Newcastle, gave an account of the Tasmanian National Park System. Tasmania has a number of large National Parks, representative of most of the natural landscape types, and so far little modified by man, largely because of difficulties of access. It is likely that, as visitor numbers increase, demands will be made for the extension of tourist roads and the provision of recreational facilities in National Parks, and development of hydro-electric projects and timber exploitation will also be advocated. Dr. Mosley doubted if the existing administration will be equal to the task of maintaining the National Park system in the face of such pressures, without improved legislation to protect these areas, and a professional National Park service to administer them. Careful planning will be necessary to ensure that development does not destroy the existing character of the National Parks, and that adequate attention is given to designating wilderness areas, managed wildlife reserves, and natural scenic areas, as well as providing facilities for public use.

The symposium showed that conservation has many facets. The underlying theme was the desire to maintain, and if possible enrich, the quality, productivity and cultural and scientific interest of man's environment. Soil conservation, water conservation, the conservation of mineral resources biological conservation, landscape conservation, and conservation applied in forestry and agriculture were all seen to be aspects of the broad problem of achieving a balanced, long-term utilization of natural resources. In Australia, progress is being made in terms of soil and water conservation, and efforts have been made towards the conservation of wildlife

and scenery, but misuse and exploitation are still rampant, notably in the semi-arid interior of the continent. We are still without an adequate and representative series of Australian National Parks and Wildlife Reserves; and those we have are not yet properly staffed and managed. We have still to learn how to implement conservation, in its various forms, in the Australian landscape generally, and especially around our coasts. We need to develop a more positive approach to the problems posed by the growing demand for facilities for outdoor recreation. Some of these themes are likely to be taken up by the newly-established Australian Conservation Foundation, which hopes to stimulate and encourage the surveys, research projects, management programs, and educational effort needed if conservation is to become widely understood in Australia, and practised as the only rational approach to the utilization of our natural resources.

(The Australian Journal of Science Sydney March 1966)

IS THE WEATHER CHANGING ALONG WESTERN AUSTRALIAN COAST?

Strange things are happening along the West Australian coast, reports our correspondent. Scientists believe the State's weather is changing.

In the past 50 years or so, the north has been getting drier and the south wetter. This in itself may have little to do with ocean fish. But the pattern of sea life seems to be changing too.

Fish and other ocean creatures once regarded as strict inhabitants of the tropical waters north of Capricorn are coming south and thriving. Tailor and snapper, also southern species, venture as far north as Shark Bay, Dirk Hartog, Bernier and Dorre Islands and even to Carnarvon. But they move no further north and the north-west snapper and queenfish become their northern counterparts.

About three years ago something very strange happened. Mangrove crabs suddenly appeared in the Murchison River. These heavy backed brown crabs, with claws like small boxing gloves, were named for their love of the squelchy mangrove tidal mud flats of the north. But the Murchison River has a peak tide range of only a couple of feet and its only mud is deposited on river banks on its way down from inland rains. The rest of the year the river and the beaches surrounding its mouth are a combination of emerald blue water, white sand and brick red rocks.

Stranger still, baby north west groper have begun appearing in the Murchison River. In the north it is common to catch baby groper in freshwater tidal creeks miles inland. But in the Murchison it was definitely odd. These baby groper ranged in colour from yellowish with brown spots to brown with black spots. This colouring sometimes leads baby groper to be called spotted cod.

In 1965 yet another stranger visited the Murchison River. This one is called the javelin fish previously seldom caught south of Carnarvon. The javelin is essentially a river fish. In appearance it vaguely resembles the spangled perch or yellowtail of southern rivers. It has similar speckles and spots. But it is not a perch - which is characterised by a smallish head and humped shoulders. The javelin fish looks more related to the big snout faced northern snapper, sweetlips, bream and emperors.

What is causing all this unusual movement of fish? One theory is that it has been caused by a shift in a significant warm current.

Once, according to oceanographers, a warm ocean current used to sweep in on the coast around Dongara and move northwards. Now this warm current is believed to be hitting the coast nearer to Cape Naturaliste.

(Fishing News International London February 1966)

FISHING LIMITS AND THE ROAMING FISHERMEN

It would be hard to think of two fishing areas more widely separated than those of the west coast of North America and of the south west coast of Africa. Their fishermen are as different as a halibut and a hake; they use different methods and boats to catch different species of fish. But the global spread of the fishing effort of several nations has given each fishery a problem common to the other and shared by fishermen all over the world.

In an age when the screeching jet and the howling ether have made a nonsense of distance, it was inevitable that some fishing areas would lose the protection their remoteness once gave them. The ocean hunt for fish is on andonly the exhaustion of stocks is likely to stop it. The question anxiously asked from Vancouver to Cape Town and from Buenos Aires to Reykjavik is: How far away is exhaustion?

For some fisheries the signs are already ominous. "Every year," wrote Mr. Roy Matthews, chairman of the British White Fish Authority in an article in The Times, "larger fleets range more widely and declining yields in one traditional ground after another tell their own story of over-fishing." Mr. Matthews was adding his plea to that of many other far-sighted fishing men for "effective international agreement for productive management of the world's fisheries".

Inevitably men, industries and nations will find ways of managing the resources of the oceans. But events over the past year show that such co-operation will be slow in coming and that some cherished concepts of commercial fishing may have to be discarded in the process. One of these is the illusion of 'our fish' and 'our grounds'.

There is a limit to what can be claimed as the exclusive fishing preserve of any one nation and this is generally recognised today as 12 miles from the shore. In some fortunate areas this protects valuable stocks; in others the best fish are being found well outside the limit.

Off the west coast of Canada a particularly rich trawling area lies in the tumultous Hecate Strait between the mainland and Queen Charlotte Island. As Canadian base lines are drawn, the Strait is open fishing water outside 12 miles. But just south of Queen Charlotte is Vancouver Island and it is being contended that the base line should be drawn between the two islands enclosing the Strait in territorial waters. Urgency has been added to this contention by the appearance over the Hecate trawling grounds of a large Russian fleet complete with factory ships and modern stern trawlers. In law this Soviet fleet is working in the open sea as are smaller American trawlers who have fished the Hecate Strait as a traditional ground. To oust these ships by drawing fresh base lines will create a delicate international situation. But Canadian fishermen are calling on their government to do something to protect these production grounds before other wide-ranging fleets come in.

Across the other side of the world what has been described as a "fishing free for all" has surged beyond control of any one nation.

Less than five years ago fishermen of South Africa and South West Africa were working a rich, remote backwater.

From Cape Town a fleet of about 70 local trawlers brought in about 100,000 tons of hake and other bottom fish a year. This catch has now soared beyond 200,000 tons but

the entire increase is coming up in the nets of vessels from seven or eight countries.

The hurried extension of the local fishing limit from three to 12 miles has had no effect on trawlers working 20 or more miles off the coast. When it was introduced in 1963 there were about a dozen ships from Spain and Japan operating off the Cape coast; last year they were joined by vessels from Israel, Holland, Italy and Germany. The fleet - including ships of the Soviet Union, East Germany, Poland, Bulgaria and Ghana operating to the north - now exceeds 100 vessels and the local industry is becoming more and more anxious for the future of its stocks.

One positive result of this anxiety is a suggestion that all or most of the nations with ships fishing off Southern Africa should work together in an investigation of the little-known resources of demersal fish. Encouragement for this has come from the owner of the first West German trawler to arrive in Cape Town who believes an international agreement could be reached for the conservation of Southern African stocks. Further support is implied in the interest being shown in the area by the White Fish Authority. The views of the Japanese are not known, but the largest of the Spanish companies with ships based on Cape Town has a 40 per cent stake in a South African fishing company and it could well take a leading part in negotiations for a joint research/ conservation project.

While these are still the early, turbulent days of long range fishing, they are already showing that reluctant 'hosts' will get nowhere by standing on the cliff tops and shouting at the factory ships and freezer trawlers on the horizon. Restrictions, shut-outs and other, perhaps more ingenious, measures may temporarily restrain them, but they are not likely to stop nations and industries who have spent millions on this new ocean-wide pursuit of fish.

(Fishing News International London February 1966)

INDIAN OCEAN'S FOOD POTENTIAL

The Indian Ocean contains some of the relatively few remaining world fishery resources capable of large scale development and these are sufficiently close to the areas of chronic food shortage to make highly organised fishing activity an economic undertaking, though return on capital might be low during the initial years. There has, of course,

been substantial growth of short-range and inshore fishing but some major resources remain under-used. The International Indian Ocean Expedition gave more detailed recognition to what had long been known. There are several areas rich in plankton - and therefore fish - due to the upwelling of deep water rich in nutrient salts, to replace water driven away from the shores for part of the year by monsoon winds.

Favourable conditions

The Arabian Sea and Bay of Bengal are therefore very fertile, as is the sea between North West Australia and Indonesia. Furthermore, the South Easterlies blowing offshore from Western Australia have a similar enriching influence there, and give rise to westward moving currents which, due to the rotation of the earth and their interaction with the current system to the north, lead to upwelling along a belt in equatorial latitudes.

These upwellings give rise essentially to pelagic fish, particularly small but densely-schooled clupoids. These are caughtby purseseines and similar types of net, but mid-water trawls might prove suitable in offshore areas. These schools are preyed on by larger pelagic fish, notably the tuna group, which lends itself well in these seas to catching by floating long-lines.

Fertility from upwelling counterbalances the fact that the Indian Ocean, because of its geological history, has generally narrow continental shelves, so that demersal fish are not capable of the same expansion of output as pelagic fish. There is still scope for much increased catches of ground fish, however, if suitable gear can be devised to meet the often difficult bottom conditions, such as coral reefs. The mid-oceanic shelves, such as that around the Seychelles, have also been reported as having considerable resources.

The most likely belt capable of rapid development appears to be the arc stretching from Somalia to the Gulf of Oman, including the Gulf of Aden and South Arabia. This expansion could include both more intensive use of short-range resources, and the development of longer-range vessels. As local population density is small, the bulk of the expanded catches would go for export. It may well be that this belt may undergo growth in the coming decades comparable to that recently attained in the upwelling belt off South and South-West Africa, while according to some reports it could rival that of Peru.

It is obviously too early to attempt any quantitative forecasts. It might, however, be useful to define desirable objectives.

Fish meal

There is a large latent resource fairly close to the most under-nourished population in the world. Is it therefore socially, or even ultimately economically desirable that the bulk of its production should go, as in Peru and South-West Africa, into fish meal for the benefit of meat production in already well-fed countries? We are frequently told that advanced Western nations wish to help densely populated underdeveloped countries with their food problems, at least until their population growth rate levels out due to acceptance of family planning. Large sums are therefore spent on various forms of aid, both as direct grants of food surpluses as from the U.S.A., and indirect aid in technical assistance

It would therefore be a contradiction in terms if a large ocean resource in the area of underfed countries were to become exploited to provide exports outside the region. An essential element here is the cost of processing fish for the optimum, not the maximum, time of keeping for human consumption; that is, it should be palatable and safe beyond the period in which it will be consumed in the area for which it is destined.

Fish consumption

Despite the relatively slow but generally upward trend of the Indian catch, almost entirely from the inshore and short-range fisheries, it is now over a million tons a year, rather more than the British catch. This still leaves the average annual consumption of fish (after gutting and processing) at about one kilogram per head, about a tenth of the British figure. The total yearly food intake of the average Indian is about 250 kgs. compared with about 700 kgs. for the average Englishman. Pakistan consumes about 2 kgs. per head per year of fish, still a very small amount.

Clearly there is an enormous potential market for sea fish and its products on the sub-continent, with its population of some five hundred million. To open up the market, adequate attention must be paid to keeping costs down, to providing palatable material which can be incorporated in traditional dishes.

Here fish flour, or less sophisticated but hygienically produced versions, may play an important part. The main nutrition deficiency is in protein, and many nutrition authorities now feel that vegetable protein is not a full substitute for animal protein.

Again fish does not normally have the religious objections by various groups towards meat. Increase of meat production in the sub-continent would, in any case, be slow because of competing demands for land by basic crops.

This is not to say that fisheries development is the complete answer to the problem of malnutrition around the Indian Ocean. What it can do, however, is to produce an acceptable food which helps to meet the main need; protein deficiency. Given adequate finance, fisheries in underused areas can be expanded much more rapidly than can under-used or ill-used agriculture, and at what usually proves to be cheaper per unit of nutrition than for comparable land products.

As it is the British Government's policy to maintain the British naval presence in the Indian Ocean, and as the major populations afflicted by food shortage are members of the Commonwealth, it would appear that Britain should give the lead in the development of its marine resources. This call for finance on a substantial scale, and quick returns should not be expected. Nevertheless, the balance of payments need not be adversely affected, as the bulk of the payment for vessels, engines, gear and processing plant could be spent in the U.K. This, of course, does not mean in any way competing with FAO or local Government agencies which are already doing such excellent work in the area.

At this stage one can only ask questions, but the right questions are necessary and produce the right answers.

The questions are these:

(1) As the Indian Ocean is unique in having large under-exploited sea resources in proximity to large underfed populations, can it not be treated as a special case in fisheries development?

(2) What is the case for setting up an Indian Ocean Development Authority, with representatives from the various interested Governments, and adequate legal power? It would concern itself initially with such problems as where to site new bases for landing and transhipment, what types of vessel

would be required, and the possibility of standardising on a limited number of types. Above all, it should first analyse the markets, to find the best type of product suitable for each, while bearing in mind the need for acceptance of hitherto unfamiliar types.

There are other problems, such as relative financial contributions, manning and training, which cannot be discussed in a short space. Nevertheless, it would appear that here is an opportunity for planned and co-ordinated action which might pay off in both humanitarian and economic terms.

(World Fishing London March 1966)

THE DOLPHIN

What is a dolphin?

The dolphin and porpoise belong to a group of animals known as cetaceans, which include the whales. They constitute the largest and most important group of mammals that has turned, or returned, (there are schools of thought on both) to an aquatic life and that best adapted to an existence in the water. They have become so completely divorced from their former land life that they are helpless if stranded on a beach. Only in their need to breathe air do they show any marked reminiscence to their previous terrestial existence.

Porpoise and dolphin brains appear to be of an advance type. Psychological study of cetaceans is difficult, but there is evidence that the dolphin, at least, rates very high among non-human mammals in mental ability.

The term "poipose" is generally applied to the smaller members of the family which are short-snouted. The Atlantic porpoise never exceeds six feet in length and there are a number of other species of similar size. The term "dolphin" (not to be confused with the dolphin or dorado which is a true fish) properly belongs to the larger forms, with pronounced noses. Along the Atlantic and Gulf coasts of North America, the animal called a "porpoise" is actually the common bottle-nosed dolphin, a larger animal (up to twelve feet in length). The dolphin of the ancients is a type with world-wide distribution, but is especially abundant in the Mediterranean. Its length averages eight feet or so as an adult and it has a pronounced nose or beak. Included in the dolphin family are the "white whale" or beluga, the black

fish or pilot whale, and the white spotted terror - the killer whale. These members are referred to as whales, but are not true whales.

In the past several years the popularity of the porpoise or dolphin as a study object or plaything has been greatly intensified. Through the media of popular magazines and televised programs, facts about these curious animals are being publicized. The possession of a dolphin in the swimming pool has become a status symbol to those who can afford to buy and maintain them. Accordingly, a lucrative market for the dolphin hunter and trainer has developed.

The dolphin has long been the subject of intensive study by many fields of science. The Naval Electronics Laboratory has been carrying out extensive studies on the sounds produced by the dolphin. It is thought that the animal possesses a vocabulary of some 60 or more sounds. Researches are studying their physiology and means of locomotion. Experiments have been carried out by placing a coating like the dolphin skin on submarines to reduce friction and increase underwater speed. There have even been suggestions that dolphins be trained as underwater military scouts, so that they would report to the surface sightings of objects or men. They also might be used as underwater guides through mine fields or other dangerous areas.

Recently the Bureau of Commercial Fisheries of the United States Fish and Wildlife Service published the following about the porpoise and dolphin.

"The porpoise and his larger cousin the dolphin, are often thought of as man's best friend in the sea. Fond of humans, remarkably intelligent, incurable show-offs, both of these mammals are popularly painted as playful princes of the deep. This view is not shared by the fishermen of the Mediterranean. From Barcelona to Beirut, from Trieste to Tripoli, porpoise and dolphin alike are detested as pests, robbers and natural enemies of all who make their living from the sea."

A study of the General Fisheries Council of the Mediterranean (GFCM) written by C. Ravel of France and published recently through the Food and Agriculture Organization, give the reasons for the fishermen's hostility.

Porpoise and dolphin annually destroy or seriously damage thousands upon thousands of fishing nets - not only nets used near shore, but trawls working over the continental shelf

at depths up to 70 fathoms. Year after year these animals chase away schools of tuna the fishermen have sometime tracked for days. Porpoise and dolphins feed on diminishing stocks of sardine, anchovy, sole and other fish that make up the bulk of the Mediterranean catch.

Italian fishermen report that porpoise alone cost them about $500,000 a year in destroyed or damaged nets. The French estimate damage to gear at $400 per boat for the Mediterranean fishing fleet. The Spaniards say the porpoise damage or destroy up to 20,000 items of gear a year. Dolphin are a major threat to the prize bluefin tuna fisheries off Morocco's north coast. Yugoslavia with an average of 3,000 nets ruined and 6,000 damages, reckons its yearly losses due to those animals is about $270,000.

What is doubly galling to the fishermen is that the porpoise and dolphin have public sympathy on their side. Any Mediterranean-wide campaign against them would probably set off a chain of protests. Admiration for the porpoise and dolphin goes back to ancient times. Greeks and Romans saw them as a noble, even divine creature. Homer called the dolphin "King of Fishes and Lord of the Sea". He also said that to hunt a dolphin was sinful and displeasing to the Gods. Pliny cited the dolphin as a saviour of drowning men and a fierce fighter of crocodiles in the Nile.

Despite the porpoise-dolphin's established public image, the fishermen do what they can in their own defense. They use a variety of attacks.

Porpoise and dolphin are shot with rifles - without much real effect on their numbers. Underwater detonations and grenades scare them away but seldom kill them. Poisons are poured in the sea where they are thought to collect - usually without impressive results. Ultrasonic wave emitters frighten them away from the fishing boats - temporarily. Once the echo sounders are turned off, the "divine creatures" come swarming back. Other devices are tried - with indifferent success.

The GFMC study offers one solution: eat them. Ravel's study says that "porpoise hunting might perhaps be intensified if porpoise meat could be marketed in an ordinary way."

He points out that although little porpoise meat is eaten in his country (its bright red color is considered shocking), there is no reason why the meat could not achieve popularity.

"It tastes very good, rather like venison. Certain cuts - fillets, tongue, brains, liver and kidney - are special delicacies. In other countries, such as Italy and England, porpoise meat is highly esteemed and eaten quite normally".

"In Canada", the study continues, "canned dolphin meat is an enormous success, so that its poor reputation elsewhere is quite undeserved and ought to be changed. Porpoise meat should find the place it used to enjoy on the market and this would be the best way of keeping down the numbers of those animals".

A good way of combatting the Tursiops species of dolphin, (bottle nosed, etc.) Ravel recommends, is to "harpoon them on sight". Thus Mediterranean fishing boats, especially those engaged in tuna and sardine fishing, would do well to keep harpoons aboard "so as to deal with the Tursiops when they start prowling around the boat".

In Turkey the animals are specifically hunted with high powered rifles from high speed boats. The meat is desirable to the Turks and is marketed.

Ravel's final recommendation is the use of underwater acoustic signals. As porpoise and dolphin are known to communicate with one another by such signals, he thinks that it may soon be possible to keep them at bay by transmitting their alarm or distress signals.

"In other circumstances", his study concludes, "different signals may be used to attract those creatures to specific points, so that they might be caught and killed by appropriate means".

Many of the troubles of the Mediterranean fishermen, concerning dolphin, are experienced by our Louisana fishermen. Dolphin are known to tear into shrimp trawls to get at fish and shrimp caught inside. This action results in loss of part or all of the catch and costly, time consuming repairs.

This article is not meant to be anti-dolphin: so "Flipper" fans, "At Ease!" Several methods mentioned in the study are highly argumentative and could not be more detrimental than beneficial i.e., pouring poison into the water. However, it was felt that both sides of the story of these unique animals should be presented giving some international attituded about it. Friend or foe - what about the dolphin?

(Louisiana Conservationist New Orleans July-August 1965)

POISON PLANTS IN THE GARDEN

Some 18 commonly grown garden plants are known to be toxic and many local home gardens have five or six of them. Several other species can cause skin ailments.

To be grown so commonly, these plants must have a useful purpose and it is not suggested that they should not be grown.

But it is important that their dangers are known and that children are warned. Stock-owners should be aware of the hazards of allowing stock to browse in gardens and of disposing of toxic garden clippings where stock may reach them.

Poison plants have been known to man since very early times. The ancient Greeks and Romans were acquainted with them, and so were the Hindus, as evidenced by Sanskrit texts written as early as 900 B.C.

Many of the primitive peoples of the world possess a knowledge of poison plants which they make use of in arrow poisons, fish poisons, hallucigenic drugs used in sacrificial and spiritual rites, love potions, abortifacients, and in a host of medicinal preparations. Many of these plants when taken in excess may cause poisoning and death.

Through the ages, poison plants, for one reason or another have been cultivated as garden subjects the world over. These plants present a great hazard to very young children, who have not learnt of the dangers of chewing at plants. Cases of plant poisoning in our modern society are most prevalent among children. Children have to be protected by keen vigilance to see that they do not chew at plants. They must be told of the dangers of garden plants.

Certain plants, by virtue of their contained latex (milky sap), gum, resin, or sap, act corrosively, or as an irritant, or by the setting up of an allergic reaction in the skin. They may cause blistering, dermatitis, rash and even temporary blindness on contact with the cornea. People susceptible to skin ailments are strongly advised to wear gloves and to cover themselves when handling plants. The danger of touching the eyes after handling plants must always be borne in mind.

Plants that are poisonous when eaten may affect the patient in a variety of ways, depending upon the species of

plant eaten and upon the toxic principle or principles contained in the plant. Some plants affect the heart, others the alimentary system, the nervous system or the respiratory system. When seeking Medical treatment, the person affected would be advised to take a specimen of the offending plant to the attending medical practitioner. Knowing the cause could be useful in deciding treatment to be given.

If and when an ingested plant causes sickness or distress, do not hesitate to seek medical treatment. The sooner the treatment, the less serious the result.

In this article no attempt has been made to include plants, the sawdust of which is known to produce dematitis in sawmill workers. Nor have those plants whose pollen or spores are known to cause respiratory allergy been listed. Only the more important or better known plants found under cultivation in Western Australian gardens, are included.

Plants Capable of Causing Skin Ailments.

Capsicum annuum, Chilli. The fruits can cause local skin irritation and burning of the eyes. When ingested it can cause, by its irritant action, enteritis with consequent diarrhoea.

Echium plantagineum, Paterson's Curse, Viper's bugloss. Originally introduced as a cultivated subject and now more common as a weed, this plant by abrasive action of its stiff hairs and possible allergic reaction, is capable of causing rash when handled by susceptible persons.

Euphorbia spp. Several Euphorbia species including E. pulcherrima, Poinsettia, E. tirucalli, Naked lady, E. milii, Crown-of-thorns, and E. marginata, Snow-on-the-Mountain, found as garden subjects are corrosive in action when handled. The latex is irritant, causing temporary blindness on contact with the eye, and blistering to tender portions of the skin. When eaten the plants induce vomiting and purging and delirium preceding death.

Hedera helix, Ivy. This plant has caused skin rash, blistering and inflammation when handled. The berries are said to be poisonous to children who have eaten them.

Narcissus pseudo-narcissus, Daffodil. The sap from the cut stems of this plant has caused dermatitis. The plant is poisonous when eaten, causing inflammation of the digestive tract and convulsions, sometimes with fatal results. The

Jonquil, N. jonquilla, is also poisonous, as are some of the other members of the Amaryllidaceae, the family to which these plants belong. Amaryllis belladonna, Crinum spp., and Nerine spp. are examples.

Rhus spp. Species of Rhus are capable of causing skin irritation. The most severe form is caused by R. toxicodendron, Poison Ivy, with severe irritation and blistering of the skin, while an intense swelling of the face, which may spread to other parts of the body, is characteristic.

Schinus terebinthifolius, Japanese Pepper. A susceptible person who deliberately drew a branch of this plant across an arm, came up with severe dermatitis on the portion touched. The fruit of this plant and the related S. molle, Pepper tree, are toxic when ingested in quantity, producing irritation in the throat, vomiting and diarrhoea.

Plants Poisonous When Eaten.

Acokanthera spectabilis, Winter Sweet. The whole plant is highly poisonous, and the eating of the fruit by children has resulted in deaths. The symptons of poisoning by this plant are severe, gastriontestinal irritation with digitalis-like cardiac effects.

Caesalpinia gilliesii, Bird of Paradise. The pods and seeds are said to be poisonous to children. The symptons of poisoning are vomiting and diarrhoea.

Conium maculatum, Hemlock. Poisonings by this plant have been recorded in humans, more especially in children who may mistake the leaves of hemlock for parsley, or may chew the seeds or make whistles or pea-shooters from the stem. Hemlock is a narcotic plant, the symptoms of poisoning being a general and gradual weakening of muscular power. Loss of sight may occur, and death results from gradual paralysis.

Cotoneaster spp., Cotoneaster. The fruit of these plants yield hydrocyanic acid, particularly after heavy frost. Children who have eaten the fruit in this condition have become violently sick.

Datura arborea, Angel's trumpet. The fruit and seeds of this plant are poisonous, and have been the cause of human fatalities. The contained toxic principles are alkaloids. The symptoms of poisoning are dryness of throat and increasing thirst in the early stage, disturbance of vision, followed quickly by giddiness, flushing of the face, and sometimes

headache, restlessness, and a kind of inebriation on attempting to walk. The restlessness increases and the patient ultimately becomes widly delirious and incoherent. The pupils of the eyes are widely dilated, the heart rate quickened, The violent delirium changes dramatically to a low muttering type of exhaustion, which ushers in coma and finally death.

Dieffenbachia sequine, Dumb-Cane. This plant was formerly used for torturing slaves in the West Indies. Persons chewing on the stem are rendered speechless. The plant contains needles of oxalates and an unknown toxin which produces a tingling pain to the lips and mouth, and causes vomiting if swallowed.

Duranta repens, Duranta. The fruits are said to cause illness and death in children, with symptoms of sleepiness, high temperature, rapid pulse and convulsions.

Ipomoea spp., Morning Glory. The fruit and especially the seeds of these plants can contain hallucigenic compounds, poisonous to humans. The contained lysergic acid derivatives have been used in modern medicine.

Laburnum vulgare, Laburnum. The leaves and seeds of this plant are poisonous. The seeds, which are the most toxic part, have been eaten by children who have been poisoned by doing so. The alkaloid cytisine is said to be the toxic principle. The symptoms of poisoning are vomiting, purging, tetanic spasms and convulsions.

Lantana camara, Lantana. The fruit is said to be poisonous, and children have frequently been made ill through eating them.

Ligustrum vulgare, Privet. The berries have been recorded as being lethal to children. The signs and symptoms of poisoning are vomiting, diarrhoea, weak pulse, subnormal temperature and coldness of body, muscular twitchings and convulsions.

Melia azedarach, Cape lilac, White cedar. The fruits of this plant are poisonous and have caused death of children eating them. The symptoms include nausea, vomiting, diarrhoea, laboured breathing and palpitation.

Nerium oleander, Oleander. Almost since the dawn of medical history of this plant has been known to be poisonous. All parts of the plant are poisonous, and provide a source of danger to young children. Children have been fatally

poisoned through eating one flower. Poisoning has followed the eating of meat cooked on skewers made from the wood, and from the eating of porridge stirred with oleander twigs. Inhaling smoke from burning oleander stems can produce symptoms of poisoning. Two toxic gluco-sides have been isolated from the plant. These are said to have a digitalis-like action, the chief effect being to slow the heart. The symptoms of poisoning in humans are nausea, vomiting, colic, dizziness, staggering gait, dilation of the pupil, sanguineous diarrhoea, cardiac weakness and death preceded by coma.

Prunus spp. The kernels of apricot and plum may contain sufficient hydrocyanic acid to cause poisoning of humans, and have caused the death of at least one child. The symptoms of poisoning are vertigo, mental dimness, headache and palpitation, followed by dyspnoea (often marked) and finally unconsciousness with convulsions. Ultimately the respiration stops after a period of difficulty.

Ricinus communis, Castor-oil plant. The seeds of this plant are poisonous, causing purging with nausea and vomiting. Two to three seeds can constitute a fatal dose to an adult human. Sometimes a choleraic condition is produced, the signs and symptoms of which are restlessness, pinched features, cold clammy skin, marked thirst, small rapid pulse and cramps in the muscles of the calf and abdominal wall. The stools are not of the cholera type. The sufferer may become drowsy and even stuporose, but in many cases consciousness is retained, although the patient may be in a state of collapse.

Robinia pseudo-accacia, False Acacia. The bark, leaves and flowers are said to be toxic. Children have been poisoned from chewing the bark which is said to be sweet like licorice. The symptoms of poisoning are repeated vomiting, sleepiness, dilation of the pupil and convulsions.

Sambucus spp., Elder. There are records of this plant being poisonous when eaten by humans, with severe purging, sometimes followed by paralysis and death.

Solanum spp. The fruits of several cultivated species of Solanum have been reported as poisonous, and have caused illness in children.

Thevetia peruviana, Yellow Oleander. The eating of the fruit of this plant by children has resulted in death. All parts of the plant are very poisonous, especially the kernel of the fruit. Symptoms of poisoning are similar to Oleander.

Zantedeschia aethiopica, Arum Lily. All parts of the plant contain sharp crystals of oxalate and an unknown toxin. When eaten the plant causes dermatitis, swelling of the tongue and throat and severe illness. Children who are poisoned by this plant are attracted by and usually eat the white spathe or the yellow spadix.

(Journal of Agriculture Western Australia January 1966)

SHRIMP BREEDING

The Soviet Institute of Marine Fishing and Oceanography is studying the possibility of cultivating shrimps in the water reservoirs of peat-fired power stations. After previous attempts to breed sweet-water Far East shrimps in other reservoirs failed, the problem was solved when several shrimps accidentally got into the water reservoir of a power station together with fish fry let in to clear it of plants. The even temperature of 35 deg. C., and the soft peat water provided an excellent medium in which the shrimps could breed. In a few years the number of shrimps has reached several hundred thousand in one reservoir.

(World Fishing London February 1966)

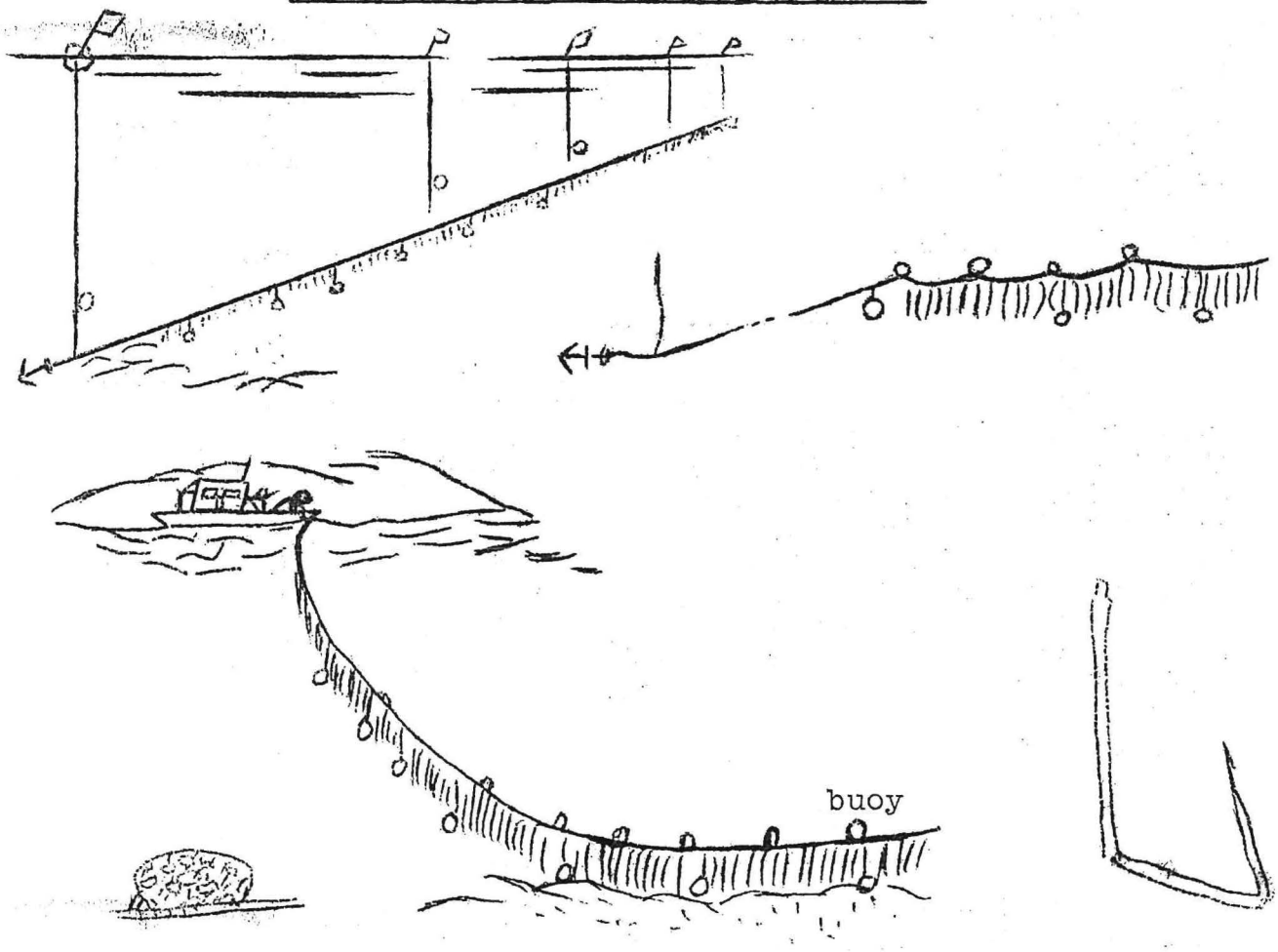
SUBMERSIBLE DISCOVERIES

The 16-foot research submarine Asherah has produced a number of interesting discoveries while in use by scientists of the U.S. Bureau of Commercial Fisheries Biological Laboratory in Honolulu. While working at a depth of 600 feet off the island of Oahu, scientists spotted schools of commercially-valuable skipjack tuna, which had not been previously known to dive so deep. In some areas plankton were observed in tremendous concentrations - an estimated 50 to 100 times as plentiful as some scientists formerly belived. Large lobsters of a type considered rare in Hawaii were seen under crevices in great numbers. At one spot, at depths between 290 and 360 feet, observers were startled to see a school of fish swimming upside down. The reason for this peculiar behaviour is unknown.

(Sea Secrets Miami January 1966)

JAPANESE METHODS OF FISHING FOR OCTOPUS

Tako Karatsuri - Octopus Long Line



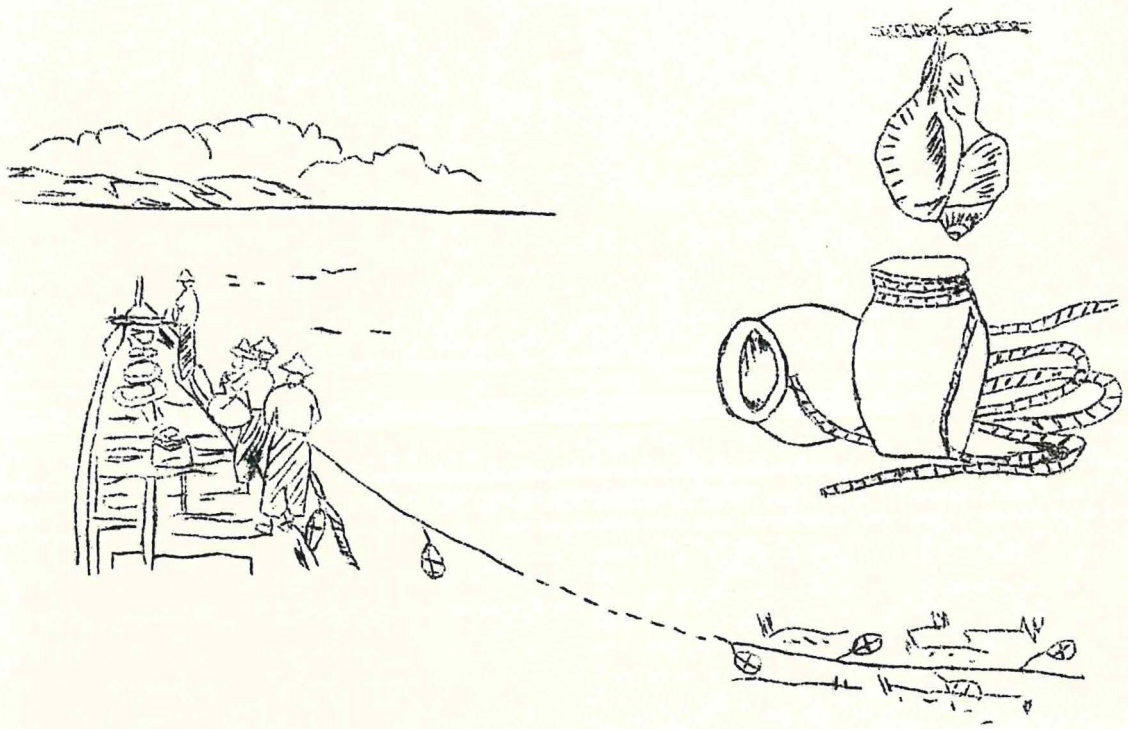
Construction: The main line is made of Manila twine and measures 43.2 m. The branch line made of cotton yarn No.10 measures 80.3 cm. and is fastened to the main line 36.4 cm. apart from each other. Ninety-eight branch lines are kept in a basket. The hook is of galvanized iron. The glass float is 9.9 cm. in diameter. Six stone sinkers, each weighing 337.5 gr., are used for a unit (basket). In addition, glass-ball buoy, "se" line, "sute" rope anchor are used.

Operation: The gear in 30-80 units are set one after the other and are left unremoved for 4-5 days in succession. In each haulin the catch of the units is removed from the hook. The lowering of long line is operated down current from land to sea-ward, and the hauling is operated landward.

Species: Octopus or "mizudako" (polypus dofleini)

JAPANESE METHODS OF FISHING FOR OCTOPUS

Takotsubo - Octopus Pot



Construction: This pot of reddish orange in colour is shaped like a flower vase and made of terra cotta, measuring usually some 10 cm. across the opening and 24 cm. high.

The main rope, connecting the traps with straw ranch lines, is also made of straw and is weighted with stone sinkers. The rope, in the case of Seto Island Sea, measures 00 m. long and carries some 10 dozens of the traps. The pots re sometimes substituted by shells of sea snails, such as oyster rill and others.

peration: Three to four fishermen on a boat set the gear at everal places, and in each place 2 or 3 sets of traps are placed onnected with each other.

In one or two days they return to the place, pick p the rope by using "Sumari" or hookshaped anchor and pull up he pots by hand or the aid of power-driven drum. The pots after ne fish removed are again returned into the water. The animal s pulled out from each pot by hand.

ishing Season: Throughout a year.

pecies: Octopus (Polypus vulgaris, and P. fangsiao).