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DEPARTMENT OF PARKS AND WILDLIFE

19 FEB 1970

DEPARTMENT OF
FISHERIES AND FAUNA
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STAFF

BULLETIN

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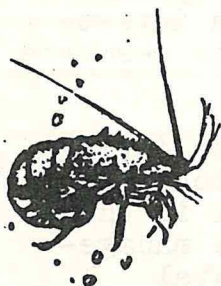
DEPARTMENT OF FISHERIES AND FAUNA
108 Adelaide Terrace, Perth, Western Australia

THE DIRECTOR LOOKS INTO THE 1970s

The Director of Fisheries and Fauna, Mr. B.K. Bowen, B.Sc., in a talk on A.B.C. Radio on January 13, spoke of the challenge the 1970s will provide to the Department and its officers.

Mr. Bowen said:

"This is the first talk for 1970 in this series by officers of the Department of Fisheries and Fauna. It is, therefore, the first talk in this new decade, and it is, perhaps, appropriate to look at the past decade and give some pointers to the developments which are likely to occur within the Department during the 1970s.



Management of the rock lobster industry has been the dominating factor during the past years. This industry is now tightly regulated and our principal aim is to ensure that the fishery persists and continues to provide a satisfactory living for those engaged in it. It follows then, that in this fishery, management research will continue and be expanded in the 1970s. We need more precise information on the year by year recruitment of young rock lobsters, and the factors which cause variations in recruitment. We have an urgent need for an oceanographic vessel in the rock lobster research programme so that data may be gathered on the pattern of water movements along our west coast, and the distributions of the rock lobster larvae in this water mass. I foresee then, in the 1970s, an expansion in the rock lobster research programme to a size which will give both administration and industry a far better understanding of the dynamics of this most valuable fishery. In talking about what we will be doing in rock lobster research in the 1970s, I am referring to the research team which includes both officers of the Department of Fisheries and Fauna, and the Division of Fisheries and Oceanography, C.S.I.R.O. which work as an integrated group.

If the Western Australian fishing industry is to develop, we need to recognise that the rock lobster industry is now fully exploited and further development will be as a result of exploiting other species. Prawns look the most promising, and in this sphere I visualise a development in the technique of locating the



stocks of banana prawns which occur in our northern waters. It seems to me that technological advances in fish-finding equipment are the key to future successes. This applies not only to industry in relation to catching fish, but also to those entrusted with the difficult problem of managing the exploited stocks.

After prawns - scallops, tuna and bottom trawl fisheries are likely to be developed further, and in that order. The scallop fishery is a certainty; the major problems being one of handling the product, including treatment of a parasitic worm, and one of managing the resource to ensure rational exploitation.

The question of fish meal often arises in discussions of future development. I place this well down on my list of possibilities for the 1970s because of the high investment capital cost involved and the magnitude of the resource required.

Turning now to the functions of the Department involved in fauna conservation, I see three major developments during the next decade. These are greater control in the taking of kangaroos, increased activity in reserve management and the establishment of a unit of environmental studies.

The community at large has, quite rightly, shown concern about the kangaroo populations. Over the past few years there has been increased activity on the part of professional kangaroo shooters to provide a product for the pet food industry. In the Eastern States, especially New South Wales, a combination of the drought years and high exploitation has reduced the populations to a marked degree. Western Australia is now starting to feel the same effects from professional shooting. Accepting always that there are some areas where kangaroos are a problem to farmers and number control is required, the Department will in the 1970s become much more involved in kangaroo regulation. (See talk on A.B.C. Radio by Research Officer R.I.T. Prince elsewhere in this Bulletin - Editor).

A system of reserves throughout Western Australia is in the process of being established. The next five years are probably critical in this sphere and there will be considerable activity by those of the fauna research group engaged in reserve surveys and acquisition. Australia has a unique assemblage of fauna and we in Western Australia have a responsibility to ensure that areas of land are set

aside which enable representative populations of that fauna to persist. Moreover, some of the reserves because of their smallness of size require manipulation to provide an adequate environment in which to live. During the 1970s research on reserve manipulation will be expanded and will assume increasing importance.

Lastly, I refer to the subject of environmental studies, a very broad subject which sets out to understand the changes which will flow from the alterations to the environment being effected by man. I see the establishment of an environmental study unit as one of the most exciting possibilities during the next decade."

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Staff Notes

A number of officers have joined the Department since the commencement of the new year, and to these we extend a warm welcome. They are Miss P.D. Goerke, Typist; Mr. K.J. Davey, Trainee Graduate Assistant; Mr. C.R. Wilson, Clerk; and Messrs. C. Lewis-Driver, R.W. Kendrick, L.R. Baird and S.C. McWhirter, all appointed as Ministerial Cadet Inspectors.

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During the busy seasonal licensing period, Mr. M.D. Loney assisted at the Fremantle Office and Mr. J. Uusiojo at the Geraldton Office.

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The Public Service Commissioner has created three new items; these are Inspector (Special Investigations) classified G.II.4; Inspector Grade I, (Geraldton) classified G.II.2 and Publicity Assistant, classified C.II.2.

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The Senior Warden Mr. S.W. Bowler is to visit Fauna Patrol District No. 4 (Carnarvon) during the period January 27 to February 5.

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PLEASE NOTE

The Director's attention has been drawn to the fact that some officers have given verbal advice on fisheries and fauna matters to private companies and Government Departments. It is appreciated that discussions will take place in answering questions raised by members of the public and Government instrumentalities. However, officers should at all times ensure that such discussions are never taken to represent the official view of the Department. This is especially so when the opinion given leads to the expenditure of money by the public or a decision of some standing by a Government instrumentality. Officers should note that the only official view of the Department is that given in writing from the office of the Director.

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STAFF NOTE

Subsequent to the retirement of Mr. B.R. Saville, a number of officers are relieving in higher positions. Mr. H.B. Shugg is acting as Administrative Officer, Mr. A.J. Mearns is acting as Assistant Administrative Officer, Mr. D. Arnold is acting as Clerk in Charge, Mr. B. Phillips is relieving at Head Office and Mr. P. Smith is relieving at Waterman.

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QUAIL SEASON



The Western Australian Wild Life Authority reviewed the basis of an open season for Stubble Quail (Coturnix pectoralis) and Brown Quail (Synoicus ypsilophorus). It concluded that both these species have an abundant population and that there was no immediate threat to them as successful quail shooting required the services of a good gun dog and these were rare. It also considered that an opening to the season on January 1 rather than December 1 will ensure that young quail have attained the flight stage.

The Hon. Minister for Fisheries and Fauna, Mr. G.C. MacKinnon, has accepted the Authority's recommendation that there be one open season for Stubble Quail and Brown Quail and that it extend from January 1 to June 30 in each year. In 1970 this open season will apply from the date of the publication of the proclamation in the Government Gazette and end on June 30. The date of this publication was January 23, 1970.

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TECHNICAL EDUCATION PASSES

Technical Officers E.H. Barker, P. Yewers and D. Wright all passed "Animal Care II" and Technical Assistant R. Emiliani passed "Animal Care I", in the 1969 examinations conducted by the Technical Education Division. Mr. Barker gained a Distinction in his subject.

Another officer who was successful in the 1969 Annual Examinations was Mr. Peter Smith. Mr. Smith passed the following units in his study for the Diploma in Public Administration - Government II, Psychology I, Economics I and Accountancy I.

Congratulations are extended to these officers on their success.

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Life is not to be alive, but to be well.

- Martial

STATE PUBLIC SERVICE V COMMONWEALTH PUBLIC SERVICE
ANNUAL BOWLING MATCH, 1970

The Bowling Match between State and Commonwealth officers is to be held at the MELVILLE BOWLING CLUB on Friday, 20th February, 1970 commencing at 7.30 p.m.

It may be necessary to limit the teams to 56 players, however, if a larger nomination is received, the Commonwealth will be able to match the increase, so all interested bowlers are requested to submit their names. Catering arrangements for players and visitors are to be organised by the Melville Ladies' Bowling Club.

In order to meet incidental costs and make a donation for the use of the greens, a charge of \$1.00 per player and 50c per visitor will be made.

Intending players should submit their names in writing, not later than Friday, 6th February, 1970, and state Department, Pennant Club, the division and normal position in which he plays. To assist the ladies it is requested that each player indicate whether he will be accompanied by any non players.

PLEASE ADDRESS YOUR REPLIES TO : -

K.T. CADEE,
PUBLIC SERVICE COMMISSIONER'S OFFICE
184 ST. GEORGE'S TERRACE,
PERTH, W.A. 6000

* * * * *

DIRECTOR AT GERALDTON

The Director of Fisheries and Fauna, Mr. B.K. Bowen, visited Geraldton on Thursday, January 22, to address members of processing establishments. During his overnight stay Mr. Bowen also took the opportunity and addressed Geraldton rock lobster fishermen.

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In every volume of poems something good may be found.

- Johnson

KANGAROO - THE MANAGEMENT OF A RESOURCE

Mr. R.I.T. Prince, B.Sc. Hons., the Research Officer in charge of marsupial research, gave the following talk on A.B.C. Radio on December 9, 1969:

"The fish, fauna, and many other features of the natural environment of this State are the common property of the people of Western Australia, both present, and in the future, and the Department of Fisheries and Fauna, and the Minister, are the custodians of much of this property. The primary activity of the Department in this respect involves different aspects of the conservation of renewable resources, which may or may not be exploited for direct commercial gain, and includes the preservation of diversity in the environment by way of creation and management of reserve areas, and by protection, and management where necessary, of elements of the fauna at large.

There is little doubt that most people agree with the basic aim of conservation of such renewable resources, especially where these are amenable to direct commercial exploitation, and agree with the principle of preserving diversity in their environment, but there is even less doubt that almost everyone has a different idea of what is necessary to achieve such goals. The over-riding consideration in this regard in any management situation is however, that the procedure adopted must be biologically viable, otherwise the final outcome will be the loss of the particular species involved. Our Department is at present attempting to come to grips with a problem of this nature, that of the conservation and management of kangaroos.

The fact that the kangaroos are worthy of conservation is not seriously disputed. What is at issue is that there is a pressing need to arrive at a biologically sound management programme for these animals. At the same time there is a need to cater for the interests of the different sectors of the community, and to resolve some of the conflicts between the animals and some forms of human activities. We must also recognize the fact that some of the so called solutions advocated will result in completely unacceptable biological situations in practice, while others fail to take account of the legitimate interests of other parties concerned with the welfare of these animals. It must be accepted that the only sure way of avoiding some sorts of objections would be the complete elimination of all the animals. This is generally unacceptable, and would

not be a real solution to the problem at all. This also means that there will have to be acceptance of some situations as they are, even though such situations may not be actually liked by those most closely associated with them.

Three species of kangaroos are primarily involved in this problem, although each species actually poses a separate biological problem. These three species are; the Euro or Biggada, the Red or Plains Kangaroo, and the Grey Kangaroo. Some of the apparent conflicts are common to all these species, but their importance differs.

Local situations also vary markedly with each species. If we disregard the Euros, there are actually two different management situations; firstly, that with respect to the Grey Kangaroos, which are generally found in the areas of close settlement and intensive agriculture, and, secondly, that of the Red Kangaroo. This animal inhabits the more arid parts of the State where human density is low, and the major activity is the extensive grazing of sheep, and, to a lesser extent, cattle, by members of the pastoral industry.

In the former case, the human activities have resulted in the removal of large areas of the native vegetation, and its replacement by crops and pastures. The requirements of intensive agriculture are generally incompatible with the needs of the kangaroos, and these animals are now restricted to a much smaller area than they formerly occupied. This trend of habitat destruction and interference is continuing, and it is the most important factor to be considered with respect to the Grey Kangaroo. In the latter case, the pastoral industry is utilizing the same areas as the kangaroos, and it is necessary to examine the impact of each of these animals on the environment, and to assess their relative values in terms of land usage if the long term return from this land usage is to be optimized. The productivity of this environment is intrinsically low, and highly variable, and it does not lend itself to more intensive forms of production. The problem is thus one of optimizing the value of extensive animal production.

In this respect, the profitability of the established wool industry is low, and it is unlikely that the reduction of the kangaroo populations to insignificant proportions will materially alter this fact. The reason is that this situation is primarily a result of fixed returns from wool, with a continuing increase in the costs of production. In addition to this fact, much of the native vegetation has been adversely affected by the overgrazing of the sheep,

and the value of the pasturage for sheep production has been reduced. The potential for increasing the production of wool in the long run is limited by this reduction in productivity of the range, and it is, in any case, doubtful as to whether any increase in wool production would result in any long term improvement in returns. It could be more reasonable to examine the possibility of diversifying the economic bases of the enterprise.

It is already an established fact that the Red Kangaroo is a valuable animal, and it is practicable for this industry to be managed on a sustained yield basis as part of a conservation programme administered by this Department. Perhaps some thought should be given by the pastoral industry to the possibility of their participation in this enterprise. A change of attitude may be all that is needed to ensure the survival of these animals, while at the same time improving the economics of the grazing industry in these areas."

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PRESTON VALLEY IRRIGATION DISTRICT

The attention of all staff holding a "G" license under the Fauna Conservation Act 1950-1969 is drawn to the following By-Laws of the "Rights in Water and Irrigation Act, 1914-1964, published in the Government Gazette on Friday, December 19, 1969. In these by-laws unless the context requires otherwise -

- (a) "fauna" means the vertebrate fauna which is wild by nature and is ordinarily to be found in a condition of natural liberty in the whole or a part or parts of the State and which is indigenous or introduced and includes any kind, species, sex and individual member of the fauna and also includes terrestrial or marine mammals, birds and reptiles;
- (b) a person shall not shoot, trap, or take any fauna on any land reserved for or vested in the Minister within half a mile of any reservoir.

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In every volume of poems something good may be found.

- Johnson

ESTUARY - INLET FISH PRODUCTION REVIEW

1944-1969

With the commencement of the 1970s it may be of interest to look back at the trend in production. The following production figures were obtained from returns and give some indication of the various fisheries:

MANDURAH ESTUARY

<u>Species</u>	<u>1944</u> <u>(lb.)</u>	<u>1954</u> <u>(lb.)</u>	<u>Live*</u> <u>1964</u> <u>(lb.)</u>	<u>Live*</u> <u>1965</u> <u>(lb.)</u>	<u>Live*</u> <u>1966</u> <u>(lb.)</u>	<u>1967</u> <u>(lb.)</u>	<u>Live*</u> <u>1968</u> <u>(lb.)</u>
Mullet	213,450	251,902	522,591	537,865	734,045	665,771	448,848
Perth Herring	38,999	5,951	118,058	10,838	40,053	14,738	46,846
Whiting	19,475	27,309	21,819	32,467	16,382	46,372	22,165
Mulloway	1,518	1,283	2,155	3,821	7,082	4,291	5,440
Cobbler	not shown	362,252	140,019	24,651	21,254	23,839	12,653
Prawns	34,337	37,931	63,784	35,036	60,259	105,466	79,657
Others	162,422	23,824	70,909	172,209	44,739	102,711	115,216
Total	470,201	710,452	939,335	816,887	923,814	963,188	730,825

WILSON'S INLET

					<u>Live*</u>	
Mullet		33,524	32,902	26,024	32,766	65,508
Sea Herring (Ruff)		19,538	9,537	1,545	167	1,325
Whiting		11,529	12,375	6,297	7,790	14,878
Cobbler		21,819	20,584	31,100	23,396	32,594
Total		111,229	133,283	117,246	125,196	178,205

BUNBURY ESTUARY

<u>Species</u>	<u>1954</u> <u>(lb.)</u>	<u>1964</u> <u>(lb.)</u>	<u>1965</u> <u>(lb.)</u>	<u>1966</u> <u>(lb.)</u>	<u>1967</u> <u>(lb.)</u>	<u>Live*</u> <u>1968</u> <u>(lb.)</u>
Mullet	80,686	85,652	91,679	76,375	117,480	81,308
Perth Herring	-	8,537	40,331	17,295	10,556	19,880
Whiting	14,542	19,979	8,460	9,552	13,029	9,851
Cobbler	4,762	21,011	16,778	5,206	2,919	1,959
Crabs	220	11,325	8,290	26,039	35,100	18,847
Others	42,449	14,293	69,715	64,773	25,713	11,785
Total	142,659	160,797	235,253	199,240	204,797	143,630

BROKE INLET

						<u>Live*</u>
Mullet		3,100	4,908	7,970	12,122	24,714
Whiting		100	153	203	1,043	1,802
Others		190	180	11,648+	1,423	2,246
Total		3,390	5,241	19,821	14,588	28,762

+ Includes 11211 lbs. of prawns

*Columns headed "Live" have figures converted to live weight
All other figures are in landed weight.

PART TIME STUDY ASSISTANCE

The Public Service Commissioner has advised of the revised conditions under which various categories of officers could obtain assistance in the form of time off and for payment of tuition fees.

The new conditions are as follows:

1. Time off to attend lectures for part time students undertaking approved courses

1.1 Time Off

1.1.1 Time off with pay may be granted up to a maximum of 5 hours per week (inclusive of travelling time) to eligible officers where subjects of approved courses are available during normal working hours.

1.1.2 Time off with pay to attend lectures will not be available to officers before they have completed:

1.1.2.1 the equivalent of the first full-time academic year of an approved University course; or

1.1.2.2 the first and second part-time years of an approved course conducted by the Western Australian Institute of Technology or the Technical Education Division of the Education Department,

unless the subjects in question are unavailable outside normal working hours.

1.1.3 External students who are obliged to attend educational institutions for compulsory sessions during vacation periods, may be granted time off with pay (inclusive of travelling time) up to the maximum annual amount allowed to an officer in the metropolitan area.

1.1.4 Officers will be granted time off with pay to sit for the annual examinations of any

approved course of study.

1.1.5 In every case the approval of time off to attend lectures will be subject to:

1.1.5.1 departmental convenience;

1.1.5.2 the officer undertaking an acceptable formal study load in his own time; and

1.1.5.3 the officer making good progress with his studies.

1.1.6 A service agreement will not be required.

1.2 Approved Courses

The courses approved by the Public Service Commissioner for time off to attend lectures are:

1.2.1 University of Western Australia

First degree courses.

1.2.2 Western Australian Institute of Technology

Associateship Courses.

1.2.3 Technical Education Division, Education Department

Diploma courses of a Technical College or School.

1.2.4 Provided that in every case:-

1.2.4.1 the course is being undertaken on a part-time basis;

1.2.4.2 the course is, in the opinion of the Public Service Commissioner, relevant to the officer's career in the Service and is likely to be of substantial value to the State;

1.2.4.3 an officer does not already possess one of the above qualifications except that an officer possessing

a Diploma of the Technical Education Division will be assisted to undertake a degree course at the University or an Associateship course at the Western Australian Institute of Technology; and

1.2.4.4 assistance may be provided in special cases to enable an officer to undertake a second basic degree or associateship or a higher degree in a very relevant area.

2. Payment of Compulsory tuition fees for part-time students undertaking approved courses

2.1 Payment of fees

2.1.1 First and Second Part-time Years -

50% of compulsory tuition fees will be paid at the commencement of each year.

2.1.2 Subsequent Part-time Years

All compulsory tuition fees will be paid at the commencement of each year.

2.1.3 This assistance does not include the cost of text books or Guild and Society fees.

2.1.4 A service agreement will not be required.

2.1.5 Officers who have already paid fees or portion thereof should clearly indicate this and submit receipts or other evidence of payment with their applications for assistance.

2.2 Eligibility

2.2.1 Any officer who undertakes an acceptable part-time formal study load of an approved course provided that:

2.2.1.1 each application for the payment of fees is supported by a satisfactory report and recommendation

from the Permanent Head; and

- 2.2.1.2 the applicant does not hold a Commonwealth or other scholarship covering the payment of fees.
- 2.2.2 An officer who fails a unit will be required to complete that unit at his own expense.
- 2.2.3 Where any doubt arises as to what constitutes an acceptable part-time study load the advice of the Educational Institution concerned will be sought by the Commissioner and regarded as authoritative.

2.3 Approved Courses

The courses approved by the Public Service Commissioner for payment of fees are as follows:

2.3.1 University of Western Australia

First degree courses.

2.3.2 Western Australian Institute of Technology

Associateship Courses.

2.3.3 Provided that:

- 2.3.3.1 in every case the course is, in the opinion of the Commissioner, relevant to the officer's career in the Service and is likely to be of substantial benefit to the State;
- 2.3.3.2 the officer does not already possess one of the above qualifications; and
- 2.3.3.3 assistance may be provided in special cases to enable a graduate officer to undertake a second basic degree or associateship or a higher degree in a very relevant area.

3. Explanatory Notes

3.1 In determining "departmental convenience" Permanent Heads should give due emphasis to the officer's career aspirations.

3.2 "An acceptable part-time study load" would be regarded as not less than seven hours per week of formal tuition with at least half of the total formal study commitment being undertaken in the officer's own time.

In special cases where an officer cannot meet this requirement, for example where he has only one subject to complete, a submission should be made as a special case to be considered on its merits.

3.3 The "relevance" of a course will be determined from a Service rather than departmental aspect. For instance, an officer may be undertaking a course of study which is of no special relevance to his work or his department but which may well be particularly significant in some other section of the Service.

3.4 A first degree or Associateship course does not include the continuation of a degree or Associateship towards a higher post graduate qualification.

3.5 Assistance towards second or higher degrees in special cases would be designed to cover situations such as a graduate embarking on an Associateship in Administration or a Masters Course in Business Administration or a higher degree in a specialist area of great benefit to the Service as well as the officer.

3.6 It is important to note that if an officer fails a unit or units he will not be assisted again for that unit or units whether or not he sat for the examinations unless, where fees are involved, he has refunded fees paid by the Treasury.

4. Method of Application

Officers seeking time off to attend approved courses of study and/or payment of compulsory tuition fees should make application on the appropriate forms obtainable at this Office.

5. Applications by Ex-Cadets, still under Bond, to study outside the State

- 5.1 Ex-cadets who have won an award or obtained other assistance to travel outside the State immediately on completion of a cadetship may be granted leave without pay for up to two years to carry out the terms of their award.
- 5.2 Ex-cadets who have not won an award or received any form of assistance will be granted leave without pay only in very exceptional circumstances.

The contents of this Instruction should be brought to the notice of every officer.

Applications for 1970 should be made as soon as study programmes are finalised and before the commencement of the academic year. Where payment of fees is involved an authority to claim form will be provided by this office for presentation to the teaching institutions.

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STAFF NOTES

The next Honorary Warden's Regional Conference is to be held at Gnowangerup on Friday, March 20, 1970. Honorary Wardens from Fauna Patrol Districts, No. 10 and 12 will be invited to attend as well as other guests.

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Technical Officer Mr. T. John is visiting his family in New Zealand during his period of Annual Leave which he commenced at Christmas.

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Congratulations are extended to Mr. P. Yewers on the birth of his second son. Also on his recent effort to establish a new underwater endurance record.

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To whom nothing is given, of him can nothing be required.

- Fielding

Sea turtle conservation

Dr H Robert Bustard

The conservation of sea turtles, which are found throughout tropical and subtropical seas, poses special problems involving international agreements. There are many economic and scientific reasons for promoting their conservation.

The best-known of the seven species of turtle is the green turtle *Chelonia mydas*, from which turtle soup is made. It may be more than 4 ft long over the shell and weigh 300–400 lb. The largest turtle is the luth or leathery turtle *Dermochelys coriacea* with a shell length of up to 8 ft and a weight of over half a ton. The other species are the hawksbill *Eretmochelys imbricata*, whose carapace shields provide tortoiseshell, the loggerhead *Caretta caretta*, the two species of ridleys, *Lepidochelys kempi* and *L. olivacea*, and the flatback *Chelonia depressa*, the least known of the world's sea turtles.

Most species of sea turtles are now rare and threatened with extinction in large areas of their range. It is interesting to investigate why they have become scarce.

Sea turtles evolved from land-dwelling reptiles which laid eggs and they have retained this one vital link with life on land. The female turtles come ashore to dig a nest on a sandy beach above the high tide mark. During incubation many nests are destroyed by predators (mainly mammals and monitor lizards) and the hatchling turtles are heavily preyed upon as they enter the sea. Many are lost to predators as they grow, but with each year's growth they have fewer enemies, until, when they are adults, only very large sharks can eat them. Only one in a thousand baby turtles entering the sea will survive to breeding age. Although this seems a very high level of mortality, the long life and rate of egg laying must be considered. Once breeding age is reached after 4 years or more, depending on the species, several clutches of eggs are laid in a nesting season. The green turtle, which nests only about every third year, lays a clutch of eggs every 15 days throughout the summer. When the average clutch of 110 eggs is multiplied by 6 or 8, the egg production per female is impressive. Furthermore, each adult female probably survives to breed a number of times. In order to maintain their numbers, each pair of adult turtles has to produce only two others surviving to adulthood to replace them. Viewed in this way, turtles do not seem threatened. Nor would they be but for the demands of modern man.

Turtles have been eaten by coastal peoples for many thousands of years. It was the colonisation of America by Europeans, however, which began the spectacular decline in turtle numbers there and led to the first protective legislation which was passed in Bermuda in the early 17th century. Since then turtles have been slaughtered in their thousands in many parts of the world for export to European cities, and more recently the United States, to make the famous turtle soup served at banquets round the world.

As we have seen turtles are adapted to withstand the very high mortality rate among their young, but man takes the adults, especially the breeding females, which are easy prey as they are slow and clumsy on land. In many parts of the world the females are killed before they

have laid their eggs which means that three years' egg production is lost.

To the demand for turtle soup can now be added the demand for their meat, both for native and tourist consumption, and for their leather, which has recently become very fashionable. In 1967, for instance, 336 tons of ridley turtle skins were taken in Mexican waters alone. The eggs, too, are taken for food, and on some beaches people collect every clutch. Operations of this kind will clearly result in the rapid extermination of turtles in these localities. Young turtles are taken for their shells or to be stuffed whole for sale to tourists.

A secure future for the world's sea turtles depends, in my opinion, on two main lines of research. The first of these is a thorough study of the population biology of the species in order to state precisely when a population is being overexploited and what level of egg consumption and annual take of large turtles is permissible without driving them into extinction. When this is done, Governments will probably be more likely to protect the turtle populations as they will then have statistics on which to base their control figures and a profitable resource can be easily recognised. As well as being an important source of protein, so badly needed in much of the tropics, the calipee, used to make soup and the skins in particular are a valuable cash crop. In many parts of the world, however, the migratory habits of the turtles make effective conservation a very difficult task, as international agreements, which are extremely difficult to achieve, are needed.

The other alternative is to devise a scheme whereby turtles can be regularly bred in captivity. Certainly it is possible to rear baby turtles commercially in captivity, although little large-scale work has been attempted. The damage in commercial turtle ranching is that it will merely increase the demand for eggs, posing a further threat to the species, so it is essential to encourage them to breed in captivity. Once this is achieved 'battery turtles' can safely be produced, which would help to reduce the pressure on the wild populations.

The extremely localised nesting beaches are used by large turtle populations, so it is especially important to preserve them. In developed countries many rookeries have been disturbed or ruined completely by wasted developments. It is essential for the main breeding areas to be set aside as national parks.

For the last five years I have worked on sea turtles on the Great Barrier Reef of Australia and last year, following my recommendations, the Queensland Government extended complete protection to all species of sea turtles and their eggs throughout the State of Queensland in Queensland waters. The coastline of Queensland covers 3 200 miles and the Barrier Reef 1 250 miles, so this legislation protects the large sea turtle populations of the six species which occur there. This legislation has provided a huge natural study area where research can be carried out to help conserve populations elsewhere. There are now plans to set up other national parks for sea turtles in Queensland; already the cabinet has approved a national park specifically for the flatback turtle.

If sea turtles enjoy total effective protection by law, combined with national parks to protect their habitats (in this case nesting beaches) then their future is assured.

WHO OWNS THE WATER AREAS OFFSHORE AND HOW FAR?

Ownership of offshore waters is one of the major problems to be resolved before the sea can be exploited peacefully. No country owns the floor of the open ocean. In the past, the traditional limit was 3 nautical miles, the effective distance a cannonball could be fired in the days of sailing vessels.

Now nations choose a distance between 3 and 12 miles from their shores. Within these limits they may exercise control of shipping; there is, however, no clear requirement for other nations to recognize this sovereignty. The United States recently changed its territorial water claim from 3 to 12 miles.

Although waters were originally designated territorial for defense purposes, nations are now also concerned with protecting their fishing and mineral rights. The continental shelves are important for future harvest of marine life and minerals. The Geneva Convention of 1958 provides for a nation the sovereignty over its continental shelf to a depth of 200 meters or to the depth of exploitation of natural resources. Several Latin American countries have made claims of exclusive fishing rights to a distance of 200 miles from their coasts. ('Questions About The Oceans,' U.S. Naval Oceanographic Office.)



WHAT EVERY SEAMAN KNOWS OR WHAT SOME LANDLUBBERS DON'T!!

The following glossary of sea terms and their equivalent in ordinary language is appended and respectfully dedicated to whom it may be interesting and helpful:—

- Aft—to or at the back
- Alleyway—passage
- Amidships—centre of ship
- Beam—width of ship
- Bow—front of ship (pointed end)
- Bulkhead—walls or partitions
- Deadlights—metal porthole covers
- Deck—storey or floor
- Deckhead—ceiling
- E.T.A.—estimated time of arrival
- Forward—to or at the front
- Great Circle—shortest distance between two points on the globe
- Hold—cargo space below decks
- Lee—sheltered from wind
- Log—ship's daily written record
- Port—left side facing forward
- Quarter—abaft the beam
- Starboard—right side facing forward
- Stern—back of ship (blunt end)
- Swell—oceanic undulation
- Topsides—up top
- Walking the plank—obsolete!