

*SEALS AND MAN*

*A study of interactions by W. Nigel Bonner*

This new book by Nigel Bonner is primarily based on a series of lectures he gave at the School of Fisheries at the University of Washington. But by no means this has led to an assemblage of lectures, on the contrary, it resulted in a noteworthy book, full of biological information on seals and still to be read like a roman. The author incorporates his nearly two decennia experience in seal research in this book on a special aspect of the seal biology and, therefore, its subtitle is right in place.

The book starts with reviewing the existing information on the origin of seals, a debate which is still going on in literature. But it was a wise conclusion just to summarise the different present opinions and leave the matter as being less relevant to this study. One major statement I like to emphasize is his statement that the major cause which has enabled us to recognize the various pinniped species today is not their feeding pattern but their difference in breeding strategy. I agree to a large extent to that theory although I would not rule out completely the possibility that also in some cases first of all the availability of food forced the less dominant species to shift either its food preference or it had to inhabit other breeding grounds which required a specific breeding strategy.

Nevertheless, it is clear that the reproductive need to return to land - or ice - created the conditions by which much of man's interactions with seals occur.

A next chapter in his general description of the pinnipeds are the physical adaptations to the sea. Apart from the species specific adaptation I enjoyed his general view on both physical and social features of this group of marine mammals. The reference towards Bartholomew's model to describe the evolution of pinniped polygyny is elegantly discussed on hand of several examples from different seal species.

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Hunting obviously can not be overlooked when discussing interactions of seals and man. Interesting information has been collected on the paleolithic engravings of seals in north western Europe and also the importance of that early hunting for the people living in coastal settlements in the Stone Age and after. It is not a great step to the up to now still existing hunt of eskimos although I read little regret between the lines that with the abrupt stride of the eskimos into the age of modern technology the deterioration of hunting skills and knowledge started. It is a true statement I believe that with the disappearance of the concept selfsufficiency also the awareness of the balance between the numbers of seals present and the ones which could be taken, faded away.

This kind of self-regulation facilitates our way to the next chapter on harp seals and Pribilof fur seals. The annual hunt on harp seals has been described in detail in a vast amount of literature.

That heavy exploitation is a typical example of the change from subsistence sealing to commercial sealing. The history of the hunt on both harp seals as well as northern fur seals is described and gives a good insight in the development of sealing legislations although those could not prevent that both the harp seal and the fur seal showed dramatic decrease in numbers in the past.

In a detailed way the author mentions chronically the events which characterized the several stages in the sealing from pure administration of the hunt up to population assessments and the setting of quotas to be taken by international bodies, supported by the respective countries concerned. I can hardly remember any other group of marine mammals where so much scientific effort has been put in. Both for harp seals and northern fur seals intensive research projects provided numerous data and especially in harp seals the mathematical models used to assess population size are of a high standard. Despite the availability of numerous data the uncertainties in population modeling still hamper reliable estimates for future trends in population size. As the author states, this is not at least due to the fact that other factors playing a role in the stability of the ecosystem of which the seals form a part, are not fully understood. Although not quoted as such, I assume that the author agrees when one concludes that much more research need to be carried out in order to safeguard the objectives set by the present management schemes.

The next three chapters in the book are completely devoted to seals in the Southern Hemisphere including the Antarctic. The author shortly presents the distribution of the eight species which form the genus *Arctocephalus* in North and South America, Africa, Antarctica, New Zealand and Australia. Like in the North, also the aboriginal people in South America, Tasmania used seals as source of food and skins. But also here commercial sealing gradually increased. The main difference with the sealing in the North is the fact that sealing in the beginning was more a by-product of the whaling industry.

Especially in this part of the book I feel that the author finds a good balance between the anecdotal information he supplies and the scientific discussion on the increasing amount of obtained data on population size, pup production and mortality in the antarctic fur seals on south Georgia, *Arctocephalus gazella*. It was here that the author started his research on seals and he is one of the scientists who are still active in seal research in that area and so our information is at first hand. Especially the antarctic fur seal is a good example of how a group of seals is discovered, heavily prosecuted to near extinction and after recovery followed by a subsequent rediscovery. Such a cycle is well documented illustrated from 1775 on for *Arctocephalus* around South Georgia.

A special chapter in the book is devoted to the giant under the seals, the southern elephant seal. The biology of the species is described and again the data on the size and weight the massive bulls (4.5 m and nearly 5 tons!) impresses the reader, especially when one realizes the great sexual dimorphism. The author further gives us insight in the annual cycle of this animal and describes the built up of the harem system after the arrival of the first bulls after winter at the breeding grounds.

It is not surprising that also here sealers in the eighteenth century did not ignore this source, because due to its thick blubber layer (17 cm) a large elephant seal could easily yield one third of a ton of oil!

Again as in other areas research on these animals started gradually and in the beginning of the fifties R.M. Laws started to investigate elephant seals on South Georgia. It is in no way exaggerated when the author states that this was a fortunate event for the future of the stock. It was during this study that laws developed the hypothesis that age determination in elephant seals can be carried out by examining annual growth zones in the dentine of its canine tooth. His hypothesis was confirmed by branding of seals and is now world wide used in nearly every population study on seals. That finding offered the opportunity to show that the condition of the herd had deteriorated i.e. the age composition was heavily skewed towards the younger age classes. After adoption of his recommendations it turned out that the population recovered again. This is another good example given by the author how a group of seals went through the stage of initially uncontrolled exploitation, a subsequent depletion followed by recovery as a result of lifted sealing pressure based on scientific advice.

The following chapter deals with four seals species occurring in the Antarctic: Weddell, Crabeater, Leopard and Ross seal. Each species is described in terms of their biology as far as the existing information reaches. The author points clearly out that only in the last decennium man have been able to visit and work in remote places on the pack ice. In relatively short descriptions the information on distribution and food ecology is presented. I very much appreciate his multispecies approach because especially in the Antarctic, food availability is crucial for the dispersal of the several seal species. Theories about niche occupation in all kinds of animals find their practice in this environment. In some graphs it is made clear that the four species divide up the available niches among them resulting in ecological radiation and (consequently?) morphological differentiation. When two species occur in the same area they utilize different food resources or when they exploit the same food they occur in different areas.

There is good evidence that the intense whaling in that area reduced whale stocks considerably altering in that way trophic balances. Correctly the author states that this has not inevitably to lead to postponed puberty while increased food availability has the opposite effect so the result could be no change at all. Nevertheless it is a good example to show that even in a vast area ecological webs can be disturbed and it is no science fiction that the increasing interest in exploitation of krill in the Antarctic is a potential threat to the seals and no doubt also to penguins and whales. The example given by the author that e.g. nearly 15 million crabeater seals depend for 80 % on krill as their food supply fully justifies his plea for a firm basis for the conservation of the entire antarctic marine ecosystem and the Convention on the Conservation of Antarctic Marine living Resources (Canberra, 1980) might be a good step forward.

The chapter on seals and fisheries deals with the main sorts of damage seals are supposed to cause to fisheries: direct damage by destroying fishes in nets, destroying of nets, depletion of fish stocks and seals as parasite hosts. The several aspects of damage are discussed on specific examples and it becomes clear that in salmon fishery in local areas seals can cause a lot of damage. On the other hand the author points out that often certain individuals can be blamed for that, so focused hunting on those specialists could solve the problem considerably. The part on depletion of fish stocks is not convincing to me. What I really miss in this part are well documented examples of such a depletion.

In many cases where seals have been blamed to reduce fish stocks it turned out that other factors were responsible for the decline e.g. the capelin stocks in the N.W. Atlantic recovered lately to its original level in spite of increasing harp seal populations. I would have appreciated a discussion on two major questions in this respect: 1) would the fish consumed by

seals otherwise have been caught by fisherman? and 2) what is the damage to the fisheries caused by overfishing, may be predation by seals will appear as being of minor importance compared to the impact by fisheries.

I especially feel that such a discussion could be fruitful because to my knowledge nowhere in the animal kingdom a predator has been able to "control" its prey.

In the last but one chapter the increasing grey seal population in the United Kingdom is treated. In a profound way the history of protection measures is given and the increase of the total numbers around Great Britain illustrated by the grey seal population occurring on the Farne Islands. No wonder that conflicts between fisheries and seals play a major part here but the author succeeded to give an objective report which will not have been easy because, as a member of the Sea Mammal Research Unit, he was directly involved as one of the advisory bodies to the government. I very much agree with the last line in that chapter because it is here that on a small scale a discussion starts on the question whether hunting of seals has to be carried at all as long as scientific evidence is provided about the effects of large seal population on fisheries. As long as that kind of information is lacking any action will be an administrative one and should not be sold as a scientific advice.

Indirect human impacts on seals is the last chapter. The impact of pollution and manmade disturbance are the two topics here. The effects of both pollution and disturbance is reviewed but, unfortunately, the information provided is not always the most recent one. Especially the results of extensive seal studies in the Wadden Sea area are lacking and of particular interest are the results and conclusions of a toxicological study which goes beyond the more traditional way of just producing levels of contamination in tissues.

Summarising I would like to congratulate the author with his new book. I personally very much appreciate the balance he finds between historical data of interest and biological information on the several species in relation to evolutionary strategies.

He does not just review existing information but gives his own interpretation when he feels it is necessary. It would be a good thing for the society when every scientist would embody his experience and opinions in this form, and I am sure that this work contributes to a better understanding of those splendid creatures, our seals.

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