

*Book Review***ANTARCTIC SEALS
Research Methods and Techniques**

Edited by R.M. Laws

Cambridge University Press 1993

ISBN 0-521-44302-4

390 pp

Price \$84.95; £50.00

This excellent manual of research methods on Antarctic seals (which has application to all seal species) has been a long time in gestation, originating as it did from the terms of reference of the SCAR Group of Specialists on Seals which was formally constituted in 1974. The necessity of standardizing research methods stemmed from the international nature of the SCAR Group and from the various national Antarctic programmes, when it became clear that if results from different programmes were to be comparable then the data must be collected according to agreed methods. Furthermore, because of manpower shortages, inexperienced workers were often asked to collect information on pinnipeds in the Antarctic and it was therefore necessary to instruct them on how this should be done.

In some cases the delay in publication has been used to bring the chapters up-to-date (e.g. immobilization, age determination, diet, bioenergetics), but in others this has, unfortunately, not been done e.g. telemetry, where the progress in satellite-linked instruments has moved beyond the experimental stage described in the book. Sophisticated units are now commercially available.

The book starts by giving good descriptions and a key for field identification of the seven Antarctic species, with approximate weights and measurements and neat ink sketches of each by Dr Richard Laws. It continues by discussing the difficulties of censusing seal populations, where at any time an unknown fraction of the population will be at sea and cannot be counted. Chemical immobilization has likewise always presented problems in pinnipeds, because of unpredictable and highly variable reactions to the drugs, which have resulted in many mortalities. Modern drug combinations have eased the problems in some species, but in others it remains a risky venture to attempt to capture seals using drugs.

The chapter on telemetry and electronic technology illustrates the fact that this is one of the fields in which the most spectacular advances have been made in recent years. Today

the miniaturization of solid-state memory chips has enabled the deployment of highly sophisticated instruments on seals which can collect continuous data on behaviour at sea, including location, swimming speed and dive depths and duration. However, these instruments must be recovered in order to transfer their data to a portable computer. The most recent innovation, which obviates this necessity, is the development of satellite-linked instruments which transmit their data automatically when the seal surfaces. These data are received by satellite and relayed to ARGOS in France for transmission to the relevant research workers. This is a major advance, as the researcher can receive new data while sitting in his or her office, and not have to mount time-consuming field trips to recover the instruments. Much previously unavailable information on the foraging habits and locations of seals can be gathered using these instruments.

Understanding seal population dynamics requires knowledge of the age structure. Methods of age determination, which in seals primarily involve the examination of teeth for growth rings either in the dentine or the cementum, are therefore important. This method is certainly not without error, and known-age animals are required to validate it, but it is the best available. A recent innovation is the ability to extract teeth under anaesthesia from live seals captured in the field, for later examination in the laboratory. This enables ages to be assigned to tagged animals other than pups, thus increasing the sample size of tagged known-age animals.

Other important topics dealt with are reproduction, diet and bioenergetics. Diet is significant not only for its intrinsic interest but because of conflict with local fishing industries. Consequently establishing not only what species of fish and squid are eaten but also the quantities and size classes of prey and the seasons of consumption are vital for computing the total annual consumption of commercially important species by the seal population.

The study of bioenergetics is important in understanding how animals partition their activities through time. During periods of foraging and lactation when shuttle trips are made out to the feeding grounds and back to nurse the pup, as in fur seals, measurement of weight change alone is inadequate as a gross measure of energy used. Here the use of radio-isotopes, such as doubly-labelled water, which is injected into the animal in known quantity, provides a sophisticated, though expensive, method of accurately measuring food intake and energy used during critical phases of the life cycle.

Dr Richard Laws, the editor of this fine volume, has 30 years of experience in seal research and is to be congratulated on bringing together the contributions of many scientists which will be of inestimable value to seal biologists for many years to come.

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