facts that may be seen in electron micrographs. The increased numbers of reacted grains after exposure of emulsion-covered grids to a magnetic field may serve to shorten the times needed for exposure and reduce the amount of radioactivity needed in thin sections to obtain satisfactory electron autoradiographs.

A more detailed account of this work will be published in *Laboratory Investigation*.

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[1] O'Brien, R. T., and George, L. A., *Nature*, **188**, 1461 (1959).

## Status of the Grey Seal

The leading article in *Nature* on "The Grey Seal and British Fisheries"[1], by relying on Rae's[2] appendix, gives a wrong impression of our knowledge of the status of the grey seal (*Halichoerus grypus*) in British waters both now and in the past. There has in fact at no time been adequate information on which to base a reliable estimate of the total population of this species. Added to this ignorance there has been, and still remains, much confusion with the common seal (*Phoca vitulina*), and the recent work of several zoologists on the biology of the grey seal has resulted in the discovery of previously unknown breeding groups which are not necessarily new colonies. An increase in knowledge of a species does not mean that there has been an increase in its numbers.

Without direct total or sample counts neither absolute nor comparative populations can be estimated except by recourse to indirect methods. The biology of the grey seal creates difficulties at all stages; for example, although the breeding season extends for about three months, the breeding cows are present only for two to three weeks, so that on no one day can they all be counted together; some have departed before others arrive. The same applies to the pups, although they are present on the average for 4–5 weeks. The number of breeding bulls is much smaller, possibly as little as one-tenth that of the cows. Does this represent all the bulls of comparable ages with the cows, or are the others alive but at sea? Again the non-breeding individuals are conspicuous by their absence[3–5]. They must be at sea or in some unknown proportion hauled out on rocks which are not used for breeding.

At other times of the year the grey seals are distributed over fairly wide areas of the seas around the coasts of Britain, as marking investigations have shown. No counts are possible under these conditions.

To make a reasonable estimate of the population, it is therefore necessary to have some idea of a life-table. Davies[6] attempted this, but, where no information was available, had to make assumptions such as the age of puberty in both cows and bulls, and the potential longevity. Annual mortality-rates were taken from Kenyon and Scheffer for the northern fur-seal. Since Hewer[7] has shown how to determine the age of a grey seal, we now know that Davies's assumptions were incorrect. The cows do not live for twelve years but for more than thirty. They do not have their first pup when two years old but when about six. Such knowledge materially affects any calculation of population numbers. The position of the bulls is still obscure; but I am informed that there may well be fewer than half as many bulls as cows in any colony, taking non-breeding and breeding individuals together. This alone would reduce the estimated population by 25 per cent.

The moral of this surely is that we should forget all previous guesses and figures since they cannot do more than lead us astray. Instead of arguing on the basis of valueless data, our efforts should be directed towards getting the data needed for reasonably sound estimates.

Meanwhile it should be remembered that even if the total number of grey seals is two or three times as great as the wildest estimate so far made, it would still be a comparatively rare seal on a world scale. The Norwegian catch of young harp and bearded seals combined (which is less than 50 per cent of the total catch) is about 300,000 per annum in recent years. Such figures could only be maintained on populations vastly in excess of that of the grey seal.

R. S. R. Fitter

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[1] *Nature*, **188**, 773 (1960).
[2] Rae, B. B., *Seals and Scottish Fisheries* (H.M. Stationery Office, London and Edinburgh, 1960).
[3] Darling, F. F., *A Naturalist on Rona* (Oxford Univ. Press, 1939).
[4] Darling, F. F., *Natural History in the Highlands and Islands* (London, 1947).
[5] Hewer, H. R., *Proc. Zool. Soc., Lond.*, **128**, 23 (1957).
[6] Davies, J. L., *Proc. Zool. Soc., Lond.*, **119**, 673 (1949).
[7] Hewer, H. R., *Nature*, **187**, 959 (1960).

## Root-knot Nematodes and Legume Nodules

Published descriptions of the course of infestation of roots of legume species by root-knot nematodes (*Meloidogyne* spp.) are not new. As early as 1932 Godfrey and Oliveira[1] followed the process of infestation in cowpea (*Vigna sinensis*) in root observation boxes containing sterilized soil.

In the Leguminosae, where the phenomenon of symbiotic nitrogen fixation is so significant, little appears to have been done in investigating the interrelationships between *Rhizobium* spp., root-knot nematodes and their leguminous hosts, either under experimental or natural conditions. There is a mere mention by Van Schreven[2] and Masefield[3] regarding the possible role of the nematodes in modifying nodulation and nitrogen assimilation. Christie[4] reported finding root-knot nematodes in the nodules of soybean plants that were otherwise apparently free from nematode galls.