

WILDFOWL CONSERVATION IN DENMARK

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Denmark's land area (16,575 square miles) is not much greater than that of the Netherlands which we considered in the last Annual Report. It is not so densely inhabited, the human population being about four and a half millions (as against ten million Dutch), but no less than 110,000 shooting licences are issued each year (as against 20,000 in the Netherlands). Per head of population shooters in Denmark are thus more than twelve times as numerous as in the Netherlands, and some four times as plentiful as in our own country. Small wonder, then that Denmark can claim to be one of the most game-conscious countries in Europe. Land reclamation of the urgent, hungering type we see in the Netherlands is not an important factor and there are no active duck decoys. So the conservation problems are very different in the two countries.

Advisory and Educational Services

The most expensive shooting licence costs only a pound and covers all contingencies, while the cheapest is but two shillings and covers coastal shooting which is free to all "outside the coastline as near as a boat can float". The overall income from these licences is about £75,000 a year and the extraordinary thing is that the *whole* amount is paid into a special Game Fund, administered by the Minister of Agriculture on the advice of a Special Game Council, entirely for the benefit of game and shooting interests! Such an honest use of specialist taxes provides an example which might well be followed in this country, where there is not even a suggestion in official circles (as in the case of the Road Fund) that proceeds from shooting licences be used for conservation purposes.

The first benefit that a sportsman derives from his licence fee is an insurance against hunting accidents other than those caused by very severe carelessness. But the bulk of the Game Fund is distributed towards the Game Advisory Service, the upkeep of reserves and of game breeding establishments, and game research. Some two-thirds of the licence holders join one or more of the hunters organisations, the "Dansk Jagtforening" founded in 1884 and having 30,000 members, the "Landsjagtforeningen af 1923" a younger organisation with slightly more members (as usual in conservation circles some duplication of function appears inevitable) and the "Strandjagtforeningen" which only came into being in 1951 and has 5,000 members. This latter corresponds with our own Wildfowlers' Association of Great Britain and Ireland (W.A.G.B.I.). Nearly every parish has its own hunting community associated with one or more of the national Associations and these communities are served by a body of 13 advisory Game Wardens under a Chief Game Warden, Count Ahlefeldt Bille. Each Game Warden is a highly skilled man with at least four years specialist training behind him before he takes up the post. He has gained experience of and passed written and oral examinations in game management and breeding, shooting practices, game biology, game legislation and organisation, use of firearms and trapping methods, management of dogs, game literature and methods of teaching and propaganda. Each Game Warden is responsible for about 150 of the local

hunting communities, one Warden being concerned solely with shore-shooting interests. In the course of an average year it has been calculated that a Game Warden pays 571 visits to local organisations and individuals, gives 211 talks with and without films—half of these to schools, conducts 80 field courses, writes 511 letters, travels 15,539 miles by car, spends 288 days away from home, puts down 7,391 poisoned eggs and receives £615 plus travelling allowances.

Apart from the technical assistance that these Game Wardens give to shooters, more and more emphasis is being laid on their function in making the mass of people nature-conscious. The part to be played by well constructed and beautiful films is fully realised and many fine ones have been made. In the words of the Chief Warden "It is not our wish to create more sportsmen but we are eager to educate and extend the outlook of those who already have the sportsman's blood in their veins, and—above all—we wish to create a nation of Nature lovers. And we commence our activity in children's schools".

The Game Fund maintains a very fine Hunting and Forestry Museum at Horsholm, 15 miles north of Copenhagen. It is housed in three large buildings, originally stables and barns of a Royal Palace, and beautifully set out. The collections of antlers perhaps weigh a little heavily on the non-specialist especially in one vast room which is 'papered' with several thousand roe deer heads, but there are many excellent demonstration exhibits. These include a collection of specimens of game species with the opening and closing dates of the seasons clearly marked in each case, an interesting section devoted to wildfowling, showing punts, decoys, guns and a monitory case of burst guns. The results of research work on food, diseases and parasites are set out in a demonstration of charts and specimens. A particularly horrifying section is devoted to poachers' weapons and devices, illustrating to the full the fiendish ingenuity of which man is capable. Including as it does buildings devoted to forestry, the wood industry and life in Greenland and the Faroes, the Museum cannot fail to interest and instruct the general public as well as the shooting man.

Protection and restoration

Education, in the broadest sense, is rightly one of the main underpings of an enlightened programme of conservation. Protection and restoration of stocks and habitat form the second, with research an equally important third. Denmark's bird preservation legislation is based on the Game Act of 1931. As in our own much later instrument of 1954, all species of birds are protected with stated exceptions. The open season in general begins on 15 August and extends to the end of December, that is for geese and dabbling duck. For diving duck and sawbills the season extends into January and February, there being variations according to species. The Barnacle Goose and Canada Goose are protected throughout the year. Eider Duck can only be shot from October to December. The Minister of Agriculture has powers in an emergency situation to reduce open seasons or prescribe total protection for a period of three years (after which an Act is required). He can also prohibit shooting during periods of hard frost.

Birds may not be shot between sunset and sunrise except in the case of flighting ducks when the period is extended 1½ hours at either end, calibres

must not exceed 12 bore and automatic guns are prohibited. The use of nets is forbidden, likewise artificial lights and decoy ducks. Mechanically propelled boats can only be used to pursue birds from October to May.

There are some fifty reserves in Denmark, most of which are of value to wildfowl. They come under the Ministry of Agriculture and are governed by a committee representing the ministry, the game organisations, agricultural interests and Denmark's Naturfredningsforening (Nature Protection Society founded in 1911). Of major importance is the reserve in Ringkøbing Fjord on the west coast of Jutland. Comprising the peninsula of Tipperne and the island of Klaegbanken this reserve extends over some two thousand acres. In the autumn Greylag and Pinkfooted Geese spend some time in the reserve, the latter outnumbering the former by two to one, and the grand total being about three thousand birds. Whitefronts occur only in small numbers, their main migration passing to the south. In spring only the Pinkfeet return in any numbers, and these may pile up to a total exceeding that for both species in the autumn. In spring Brent Geese also come in numbers up to a thousand and feed inland. Swans, ducks and waders are present during migration and many breed here. For some years now the position and fates of nests have been noted meticulously and are displayed on large charts in the observatory buildings at the tip of the peninsula. At the time of my visit in October 1957, these quarters had recently been finished and were more than adequate, indeed luxurious, both as regards living accommodation and laboratory work rooms. There is a substantial observation tower adjacent to the buildings, from which a first-class view of the whole area is obtained. The precision with which the geese respected the boundaries of the reserve was particularly obvious from this viewpoint.

The Danes are very keen on restocking programmes for game. Pheasant propagation has in particular been highly successful and has changed the whole shooting picture in the course of this century, and, incidentally taken some pressure off wildfowl. Propagation of the latter takes place at something like a hundred 'duck-farms' throughout the country, generally based on small, specially created marshes. The largest, experimental, unit at Kalø maintains 125 ducks and, a pleasing economy, 25 drakes. Eggs are collected and reared under hens, but the last clutches of the season are left with the ducks. It is recognised that the product of these 'duck farms' replenish local stock (91% were recovered within 10 miles of the release point) but do not increase the migratory population except by reducing shooting pressure on it.

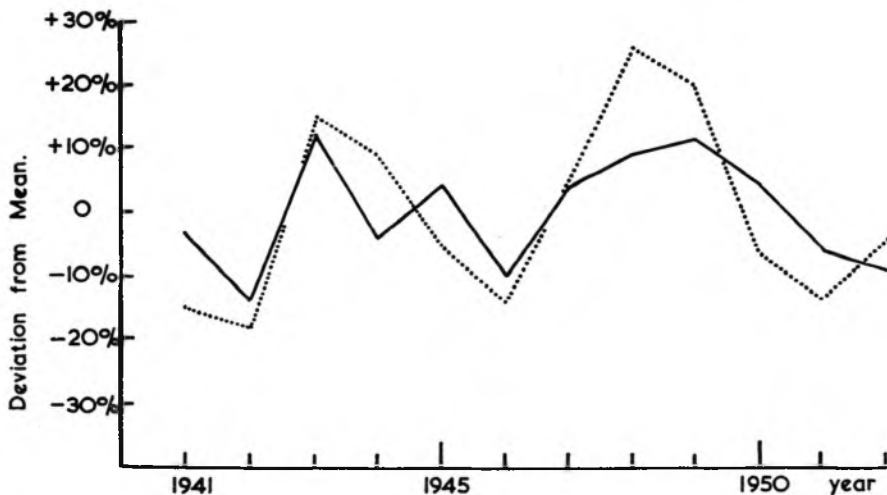
Most of the active habitat improvement measures that we saw were aimed at deer, hares, pheasants and partridges. Little was done for wildfowl. Indeed the nature of the terrain over much of the country precluded such activities even supposing they could be reconciled with the requirements of a very intensive agriculture. However one measure seen deserves to be copied on a wide scale wherever numerous, small lime-pits or marl-pits occur and have filled with water. These were fenced round except on one side where access to the water is left for the benefit of cattle. Cover is planted between the fence and water and these little horse-shoes of vegetation round a pond make ideal breeding places for Mallard as well as other species of birds, especially pheasants. Indeed one that was being demonstrated disgorged a large roe-deer in our faces.

Research

Research on game species is centred on the Game Biology Station at Kalø (founded in 1948), twenty miles north of Aarhus. Here 2,500 acres of woods and arable land is available for experiment, and rearing of Mallard, pheasants and partridges is carried out. The Game Advisor's School is attached and every year four pupils are trained. The scientific staff of four is concerned with many aspects of game research and their work is by no means restricted to wildfowl. The scientists are attached to the Zoological Department of the fine new University of Aarhus and also collaborate with workers in the Veterinary Serum Laboratory in Copenhagen where research into diseases of game is carried out. Several scientists in the Zoological Museum at Copenhagen are concerned with work on the parasites and food of game species.

Research is largely financed from the Game Fund and expenditure is of the order of £12,500 a year. The National Committee for Nature Protection carries out research on various nature reserves. There is a flourishing Ornithological Society (Dansk Ornithologisk Forening, founded 1906) and much first class work is carried out by amateurs, as in this country, and published in the *Dansk Ornithologisk Forenings Tidsskrift*. There are two specialist journals for publishing the results of game research. *Dansk Vildundersøgelser*, containing detailed but popular research reports, has a free circulation of 10,000. Complete scientific reports are published in the occasional Danish Review of Game Biology.

One of the basic problems of conservation is to determine how many head of game are killed by sportsmen each year, how big a harvest is taken of the seasonal crop. For only if the demand be known can it and the supply be matched up, by appropriate measures, to ensure a stable wildfowl population. In this country we have not yet been able to do anything beyond make some 'educated guesses'. In America, where bag-limits are enforced, some progress has been made with sample questionnaires and by direct bag checks. In Denmark the problem was approached with simplicity by requiring



Fluctuations in the annual bag of Hares taken on 22 large estates (broken line) compared with fluctuations in the reported national bag (solid line).

that shooters should fill in a form attached to the shooting licence, stating the exact number of game birds and mammals and 'vermin' that they killed. The apparent naivety of this scheme is rather breathtaking since one feels that the mendacity, conscious or unconscious, that Dr. Kinsey encountered in his studies would be more than matched in accounts of shooting exploits. Moreover the Danish sense of humour is well-known, and is at its best when officialdom is the target. The extraordinary thing is that these game statistics do, taken as a whole, seem to give a realistic picture of the varying toll taken by shooters. The Hare is the most popular game animal in Denmark (rabbits are confined to a small area in the south) and has been the subject of a special investigation. The actual annual bag taken on 22 large estates was known in reliable detail. The fluctuations in this sample (about 1%) bag were plotted as deviations from the average value over a period of years, and compared with the fluctuations of the national bag as shown in the Figure. The two curves are remarkably similar in broad outline and certainly give one more confidence in placing reliance on the national figures. Like Dr. Kinsey we would be well advised not to place much reliance on individual claims. But, given a large enough sample, it does seem that under-estimates and over-estimates tend to cancel out.

The number of birds and animals reported to have been killed has averaged nearly two and a half million *per annum* since the statistics were started in 1941. The main contributions to this total were provided (to the nearest thousand) by the following:

Hares	...	...	389,000
Dabbling Ducks	...	...	350,000
Pheasants	...	...	312,000
Partridges	...	...	305,000
Crows	...	...	198,000
Pigeons	...	...	140,000
Magpies	...	...	137,000
Diving Ducks	...	...	132,000
Gulls	...	...	121,000
Rooks	...	...	72,000
Snipe	...	...	43,000
Curlew	...	...	28,000
Waders	...	...	28,000
Foxes	...	...	23,000
Seabirds	...	...	21,000
Woodcock	...	...	18,000
Birds of prey	...	...	16,000
Roe deer	...	...	16,000
Geese	...	...	9,000
Polecats	...	...	7,000

Smaller numbers of Red-deer, Fallow deer, Sika Deer, Badgers, Pine Martins, Otters, Seals, Black Grouse and Herons are also accounted for each year.

These figures certainly are food for thought, even if they do no more than indicate the approximate level of the toll taken by a hundred thousand sportsmen under European conditions—half a million wildfowl, for instance. In Finland it is strongly felt that the Danes are chiefly responsible for the undoubted diminution in the Finnish Mallard breeding stock (which ringing

studies show as migrating through Denmark). But before stones are thrown it should be remembered that there are three times as many shooters in Britain. True, we do not know whether the proportion of those shooting wildfowl are the same in both countries. This information could be determined, presumably, from the Danish statistics and certainly is much greater than the 5000 members of the Strandjagtforeningen (who would otherwise have to be credited with a bag of a hundred wildfowl apiece). Our own W.A.G.B.I. has not published total membership but it probably represents an even smaller proportion of our 300,000 licensed shooters. So until further information is available the latter figure is as good as any we have for determining relative shooting pressure. The need for better data from our own shooters is paramount and obvious.

The variations in the annual national game bag provide information on the fluctuation in the numbers actually present, although man is not a strictly "density-dependent predator" i.e. he does not necessarily turn from one prey to another when the first becomes scarce. The Danes have also, since 1951, been endeavouring to assess fluctuations and longer-term trends in wildfowl populations by monthly wildfowl counts on the same days as in this country. They have concentrated efforts on three main areas, rather than attempt a network of count points. An analysis of the result to date is expected soon.

As in this country the Mute Swan has increased rapidly in the last few years and in Denmark also there has been pressure brought to put this bird on the shooting list. A full investigation of the bird's population, its food and its relation to other species was made using both direct observation and questionnaire methods. An unusual part of this study was concerned with investigating the damage caused by swans to the bottom vegetation in shallow water. It was concluded that while Mute Swans can interfere with ducks on small restricted sites, in no circumstances can the swans be of importance to the Danish duck population as a whole. It was felt that, with only just over two thousand young swans being produced each year it would be inadvisable to turn 110,000 sportsmen loose on them.

Important work has been carried out on the food of wildfowl, particularly of diving ducks and the fish-eaters, using the technique of stomach analysis. The internal parasites have also been studied in some detail. Both these researches have given valuable leads to the work now being done in this country.

Work is in progress on investigating the habitat requirements of Mallard, with a view to improving available areas and in conjunction with the Mallard rearing schemes. The breeding biology of the Eider has received attention and more recently that of the Greylag Geese breeding in the north of the country. The question of damage done by geese to crops is also being investigated. After some difficulty it has been found possible to round up numbers of Greylags during their flightless period for ringing. Eider Duck have been ringed in hundreds, and the reared Mallard are also ringed. At Amager, near Copenhagen, extensive trapping of shore birds is done and many ingenious variations of the basic cage trap evolved. Very large numbers of waders are trapped, but ducks are less frequently ringed. The trapping area is on an artillery range which complicates operations and unfortunately prevented my visiting the site.

Conclusions

There is no doubt that shooting pressure is high in Denmark, relative to both the area and the human population. Nevertheless, in the absence of duck decoys, the absolute toll taken of wildfowl is of the same order as in the Netherlands. The fact that a much greater number of people are concerned in a way makes more probable a thorough-going conservation in policy and practice. Certainly the complete devotion of licence income to conservation interests is an example to other countries, as is the emphasis now being laid on education and the excellent research work being carried out.

Acknowledgements

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- B. BENZON 1952. The state of bird preservation in Denmark. *17th Bull Int. Comm. Bird Preservation*, 127-130.
- F. SALOMONSEN 1954. Den danske vildtstatistik. *Dansk Ornith. For. Tidssk.* 48/2, 123-126.
- R. SPARCK 1955. Naturfredning i Danmark. *Dansk Ornith. For Tidssk.* 49/2, 69-75.
- H. M. THAMDRUP 1957. Verfahren zur Beurteilung der Grösse der Wildbestände und Jagderträge und von Jahr zu Jahr beobachteten Veränderungen. *Trans. 3rd. Cong. Int. Union Game Biol.*, 101-102.
1957. The organisation and scope of game research in a number of European countries. *Trans. 3rd. Cong. Int. Union Game Biol.*, 73-90.

