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KEYNOTE ADDRESS—VERTEBRATE PEST ANIMALS IN THE PROVINCE OF THE CAPE OF GOOD HOPE, REPUBLIC OF SOUTH AFRICA

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Southern Africa is renowned for its wealth of animal life both in numbers and variety. Antelope in countless herds once roamed the plains, while the large mammals, the so-called big game, have drawn hunters to this continent from all over the world. Selected wildlife products such as ivory, rhino horn and skins have been articles of trade for centuries. But far more important, zoologically, is the fact that in this region representatives of 51 families of mammals occur, a greater variety than are to be found in any other zoogeographical region. These are all placental mammals, and no monotremes or marsupials are bound here. The region is also characterized by the absence of bears, true deer, wild sheep* and goats. Another striking feature is that no less than 12 families are endemic, the most characteristic of which are the hoofed mammals. The antelopes from the major group of herbivorous mammals and probably the most remarkable component of the fauna of this region, numbering at least 30 species and ranging from the large eland (Taurotragus oryx) measuring two m at the shoulder and weighing 700 kg, to the diminutive and delicately built blue duiker (Cephalophus monticola). Although horses do not occur in the wild state, the fossilized remains of a true horse (Equus capensis) have been recorded. The family is, however, well represented by at least four species of zebra.

From the viewpoint of this paper, however, the carnivores are the most important order and are also particularly well represented; in fact, the lion may be regarded as symbolic of the sub-continent. Representatives of the order include the civets, genets, mongooses, and meerkats; the honey-badger, otters, and weasels; the dog family such as jackals and hyaenas; the large cat family, and that peculiar animal, the aardwolf (Proteles cristatus), which is endemic.

The aardwolf is neither a wolf, jackal, or dog. It resembles a large shaggy dog, being greyish fawn in colour marked with vertical bands, and although it shows affinities with the hyaena, it is grouped in a family by itself. It is a shy, timid animal which hunts at night but being a poor runner does not venture far from its burrow. It has weak jaws and poorly developed teeth and is largely a carrion and insect feeder, its favourite food being termites which it licks up with its sticky tongue. It is very rare, many having been killed during operations to control predators of farm stock.

Two species of hyaenas occur in southern Africa, the brown hyaena (Hyaena brunnea), known in the early days as the strandwolf due to the fact that it scavenges on the beaches, and the spotted or laughing hyaena (Crocota crocuta). Hyaenas were so effectively hunted in stock farming areas, that they were practically exterminated and are today largely confined to national parks. Members of the dog family include the endemic Cape hunting dog (Lycaon pictus) and a variety of jackals. Hunting dogs are feared by most animals for they hunt in packs and have great stamina. They are relentless, pursuing their quarry in relays until it is exhausted and can be pulled down. Economically, however, the red or black-backed jackal (Canis mesomelas) is the most important carnivore killing thousands of sheep each year and is consequently hunted constantly. Smaller relatives are the silver jackal or Cape fox (Vulpes chama), which do little damage, and the harmless bat-eared fox (Otocyon megalotis).

The cat family includes a variety of animals from large forms such as the lion and leopard; through the serval and the lynx to the small black footed cat. Due to predation on farm stock few lions occur in the wild today, being found largely in national parks. The leopard (Panthera pardus) is a more solitary creature and was once widely distributed. They have been hunted relentlessly and are now rare, being found only in isolated mountainous regions. Conservation efforts are complicated by the fact that the animal is a predator and hunts over large areas. With the exception of the lynx (Felis caracal), which is a major predator of small stock and game, the smaller cats are rare and enjoy a measure of protection.

* Domesticated sheep were first introduced by the Hottentot tribes.

Unfortunately, many of these animals came into conflict with man and his interests from the earliest times. The Bushmen, who inhabited the southern continent in tribal or family groups long before the Hottentots or the Blacks, lived as hunter-gatherers. They hunted with a small bow and poisoned arrows, a throwing stick, traps, and snares. In all his hunting the Bushman was motivated entirely by the quest for food, and his relationship to wildlife was seldom wasteful and even embodied a measure of respect. He was inclined to regard wildlife either as a potential source of food or as a threat to his own safety. There were superstitions relating to many species and some were regarded as totems which might not be killed. The Bushmen did not keep flocks or practice agriculture. In fact, living entirely on the bounty of nature, they were contemptuous of the later immigrants with their material possessions. The contrast between their way of life and the materialism of modern man is an interesting subject which has been discussed elsewhere (Hey, 1973).

The Hottentot tribes invaded the southern tip of the African continent about 1,000 A.D. These people who called themselves the Khoikhoi, also hunted and gathered wild foods but in addition, they had large herds of cattle and fat-tailed sheep, and milk was an important item in their diet. Apart from the threat of large predators such as lion, leopard, and hyaena to their personal safety, hunting dogs preyed upon flocks which were left unattended by day or not kraaled at night. Their weapons consisted of a long bow and assegais and consequently they welcomed the assistance of the white man with his firearms to deal with predatory animals.

Although Europeans visited the shores of southern Africa occasionally from the 15th century, the first white settlement was only established at the Cape of Good Hope in 1652. Within a short time of their arrival the settlers suffered losses of livestock and crops as a result of the depredations of wild animals. Lions killed cattle within a stone's throw of the settlement and were also a threat to personal safety, while hyaena killed smaller stock.

Van Riebeeck, the first governor at the Cape, planted a dense hedge of wild almond (Brabeium stellatifolium), the remnants of which can still be seen today, in an effort to exclude predators and marauding Bushmen and also introduced the bounty system. The vegetable gardens were plagued by rodent moles, both the Hottentot mole-rat (Cryptomys hottentotus) and the larger dune mole (Bathyergus suillus) and both conical traps and trap-guns were devised to deal with them. Troops of baboons raided the orchards, antelope grazed on the cereals and vegetables, while porcupines (Hystrix africae australis) fed on the root crops. These depredations of wild animals, in addition to the vagaries of the weather, made gardening a most difficult undertaking.

Consequently, one can well understand the attitude of the settlers towards all wild animals that came into conflict with their pioneering efforts. These were considered a plague, and termed "vermin", to be destroyed on sight by any means whatsoever. In fact, it was considered a civic duty to do so. Consequently, all the larger forms of wildlife were soon exterminated in the vicinity of the settlements. From the outset hunting to provision ships and for the pot was common practice. All expeditions to the interior and many farmers lived off the veld for their supplies of meat. Until recently, hunting expeditions for this purpose were still being organized, and venison and biltong (dried game meat) are popular South African foods. As powder and shot were expensive and scarce, other means such as the use of hounds, traps, and poisons were employed to eradicate the smaller pest animals. With the establishment of local authorities, vermin extermination, as it was then called, became a function of the divisional councils, the work being undertaken by hunt clubs financed by a system of bounties.

This was the position in the Cape Province when problem animal control was allocated to the Department of Nature Conservation in 1957. The first step was the appointment of a committee to investigate the position and report on the efficacy of the hunt clubs and the methods used. After a thorough investigation this committee recommended the gradual abolition of the bounty system and its replacement by a system of technical aid. In other words, instead of merely paying bounties on animals killed, the framers were to be assisted by hunters competent in the use of the latest control techniques, and provided with trained hounds and other equipment. The implementation of this programme has been fully described in an earlier paper read to this organization (Hey, 1967).

In developing its programme the Department has always accepted the fact that predators do kill farm stock and can cause extensive losses even where game is plentiful. Sheep farming has always been an economically important activity in the Republic of South Africa and in 1964 it was estimated that over R2 500,000,000 was invested in the sheep and wool

industry which supports over 750,000 persons. The total sheep population of the Republic is approximately 40,000,000 of which 33,000,000 are wool producing. Losses as a result of predation were estimated at approximately R400,000 per annum (R1=\$.75), viz. one percent. At current prices, losses are probably of the order of R1 500,000. There is no doubt that the jackal is the major predator, followed by the lynx.

While sympathetic to the farmer, we are at the same time conscious of our responsibilities in the field of wildlife conservation. We are well aware of the delicate interrelationships between animals and their environment and that no species can be eliminated without disturbing this intricate balance. The fact must be faced that certain forms of wildlife are incompatible with man and, consequently, can only be conserved in national parks or large nature reserves. The establishment of an adequate system of parks and reserves is, therefore, essential for the future survival of these animals.

The Department of Nature Conservation is placed in the difficult position of trying to find a compromise between these oft conflicting interests, and in so doing frequently incurs the odium of both landowners and "purist protectionists". Another fact which must not be overlooked is that for practical and economic reasons, the full spectrum of our wildlife cannot be conserved entirely in national parks and reserves, and consequently, the important role of the private landowner in nature conservation cannot be overlooked. Today the greater part of the Cape Province is subdivided into farms which are the habitat of many species of fauna and flora. We, therefore, need the goodwill of the farmer and cannot alienate this by failing to assist him where he suffers real damage from wild animals. In any case, as matters stand at present, the landowner may eliminate all wildlife from his land without breaking the law, by simply destroying their habitat. The subdivision of farms into small camps to implement the "intensive grazing scheme" could, for example, be the death knell of wildlife. Wildlife conservation, therefore, requires the goodwill of the farmer which can only be assured by sound public relations.

TECHNIQUES

How have we progressed during the past ten years in the implementation of our programme of controlling vertebrate pest animals? This can best be explained by considering the techniques being employed today.

Trained Hounds

Hounds have been used since the earliest times for hunting game and killing pest animals. They were still used extensively when predator control became the responsibility of the Department of Nature Conservation in 1957. Hunt clubs using packs of hounds operated in all stock farming areas of the Cape Province and their activities have been described in an earlier paper (Hey, 1967). There can be no question that poorly trained hounds are not very effective and kill much wildlife apart from their quarry. Consequently, the earlier efforts of the Department were directed towards the breeding and training of the highest quality of hounds and also in training hunters to operate packs efficiently. Maintaining and operating packs of hounds is expensive, however, and their successful operation is limited by weather conditions and terrain. Consequently, as other control techniques have been developed, we have tended to reduce the number of packs throughout the Province.

It is our experience, however, that selected and properly trained hounds are still an effective tool for killing pest animals under certain conditions. Consequently, while there has been a drastic reduction in the number of hounds bred at our stations, the Department has continued to encourage the use of smaller, highly trained packs in intensive farming areas. Selected packs are one of the most effective means of killing the lynx which is still plentiful in some areas where it is a more serious pest than the black-backed jackal. Special terriers have also been bred for dealing with hyrax (Procavia capensis) in suitable terrain.

The Coyote Getter

The coyote getter was introduced to South Africa after my study visit to the United States of America in 1959. It was tested and adapted to South African conditions by Mr. Malcolm Allison of the U.S. Fish and Wildlife Service in 1961, who also conducted the first training course in its use (Allison, 1961). Subsequently, our hunters have continuously modified, tested, and improved the scented baits and we are quite satisfied that today the getter is the most efficient single means of killing jackal. While reasonably selective, as control techniques go, the selectivity of the getter leaves much to be desired as numbers of silver jackal (Vulpes chama) and even more regrettably, the innocuous

bat-eared fox (Otocyon megalotis) are also killed. This is understandable, as these are closely related forms, but unfortunately numbers of mongooses and meerkats (Viverridae) and even an odd ostrich, bustard (Otididae) and monitor lizard (Varanus sp.) are also killed. We are endeavouring to increase the selectivity of this device by modifying the composition of the scented baits and increasing the strength of pull required to detonate the mechanism. While on the subject of jackal, the importance of good fencing to exclude these pest animals cannot be over emphasised. Should the odd animal gain entry to a camp, it is a fairly simple matter to eliminate it by means of hounds or a getter.

Traps

Gin traps in various sizes and shapes, locally known as "slagysters" (slaughtering irons), have been in use for centuries. They are unselective and cruel and have been largely replaced by other means. Considerable attention has been devoted recently to designing an effective live trap and a model has recently been produced which has been used with great success in trapping members of the cat family (Thomson, 1973). Many lynx and even leopard have been caught in areas where they were killing livestock and translocated elsewhere. The problem is that most cats have a strong natural homing instinct and there are few parks or reserves large enough to contain them.

Poisons

Poisonous chemicals have been used since the earliest times to control pest animals, arsenical compounds and strychnine being the commonest. Today the farmer has at his disposal compounds of far greater toxicity, including chlorinated hydrocarbons and the less dangerous organic phosphates. Eggs treated with Malathion are used extensively to control crows and smaller mammalian predators.

The indiscriminate use of poisons which often results in heavy losses of harmless creatures is to be deprecated in the strongest terms. Chemicals should only be used for the control of vertebrate pest animals under exceptional circumstances such as on populations which have reached plague proportions, or in dealing with individual predators that cannot be killed by other means. The use of poisons to reduce seasonal damage of crops or vineyards cannot be justified. In such cases adequate fencing or the use of scaring devices or repellents should be employed. In view of our diminishing wildlife, we can ill afford to use "shotgun" methods for dealing with vertebrate pest animals. A fruitful field of research would be the study of repellents for use in reducing crop damage which is only occasional or seasonal.

In special instances where poison must be used, this should be as selective as possible and the operation carried out by trained personnel. For example, while large-scale live trapping of baboons for medical research has largely eliminated the baboon problem in certain areas, there are times when they do cause considerable damage. During a period of abnormal drought in the Northern Cape Province, one farmer alone claimed to have lost 364 goats to the depredations of baboons in a seven month period. The use of Telodrin (Octochlor-tetra-hydro-methane-ethylene) which was originally produced as a 50 percent wettable insecticide by Shell Chemical Company was tested by Professor Schulz of this Department as a poison for baboons. The M.L.D. for the baboon was found to be 9 mg/kg and was readily taken in fruit at a dosage of 80 mg per bait. Baits treated with telodrin have been used under strict control when and where necessary. In contrast to many other poisons there is no secondary hazard to mammalian or avian scavengers. Recently the use of cage traps, baited with food or with decoys, has been highly developed and in the hands of skilled operators produces excellent results.

Chemicals have also been tested for reducing excessive populations of dassies (hyrax) but poison baits are only taken, and then not very readily, during late winter or times of drought. Considering that the meat of the dassie is edible, in fact it was used extensively in preference to mutton by the early settlers, and the pelt is durable, the solution to the dassie problem would appear to be in encouraging its exploitation as a game animal. With a wealth of large game animals at their disposal, it is understandable that in the past hunters were inclined to regard the dassie as beneath their notice. But the picture is changing rapidly and hunting associations would be well advised to promote the hunting of dassies among the small-bore enthusiasts, as is the case in the United States with squirrels and the ground hogs.

The same principle would apply to the dune mole, a large fossorial rodent often attaining a weight of over one kilogram. While it cannot be hunted for sport, it can certainly be trapped for food. Trapping if carried out consistently and conscientiously

is the most effective means of controlling these pests. With rising meat prices the utilisation of these animals for food would reduce their numbers below pest proportions. In addition to their meat, they have a pelt of high quality.

BIRDS

It has been estimated that some 850 species of birds are to be found in the Republic of South Africa. Some of those which constitute a problem in the Cape Province, for example, the red-billed quelea (Quelea quelea), the red bishop bird (Euplectes orix) and the Cape sparrow (Passer melanurus) were discussed in an earlier paper (Hey, 1967). Our avifauna is also characterised by the number and variety of predatory birds. In the early days the larger members of this magnificent group were regarded as vermin and shot on sight. In this we have merely followed the practice in Europe and America where eagles were hunted until recently. As early as 1957, this Department recognised the important role of predatory birds in nature by declaring all eagles, hawks and owls protected. This legislative measure was backed by an educational programme stressing the value of predatory birds in controlling rodent populations. While these measures did not stop the killing of eagles and hawks, it at least restricted the hunting of them to those farmers who suffered direct losses of stock.

Although all predatory birds are protected in the Cape Province today, a farmer who loses stock from the deprivations of eagles can obtain a permit to destroy the culprits on his own property. This, I believe, is the only practical approach towards this problem.

Most farmers use gin traps set around the carcass of the sheep killed and during the past few years we have been handed a number of eagles caught by the foot or even a toe by this means, for rehabilitation. Our problem is to find suitable areas for releasing such birds once they have recovered. In general, there appears to be a marked improvement in the attitude of farmers towards predatory birds and although some, such as the black eagle (Aquila verreauxi) and martial eagle (Polemaëtus bellicosus) are rare, none can be classed as endangered.

Vultures, belonging to a number of species, were once common in Africa where they played an important role as scavengers. With the disappearance of the large herds of antelope and their major predators, they have also declined in numbers. While not normally regarded as a pest animal, there have been an increasing number of reports recently of kills by vultures of stock weakened by drought or of ewes during lambing. Consequently, farmers are poisoning these carcasses to kill the vultures responsible.

INTRODUCED PEST ANIMALS

The foregoing deals in brief with developments over the past ten years in controlling indigenous vertebrate pest animals. Our problems have been compounded by the introduction of birds and mammals from overseas, some of which have become acclimatised so successfully as to establish themselves in a feral state. Included among these are the international pest animals, the brown or Norwegian rat (Rattus norvegicus) and the black rat (Rattus rattus), but this problem is handled by the public health authorities, and is beyond the scope of this paper. Vagrant domestic dogs have been a problem for many years on farms and in nature reserves near towns and villages. In many townships dogs breed without check, are often not fed and consequently live by scavenging. These starving animals band into packs and hunt wildlife or farm stock. This has been a subject of discussion at divisional, provincial, and even national level for decades. An attempt has been made to solve the problem by increasing the licence for bitches. This has not produced the desired results but fortunately the coyote getter is proving very effective as a method of control.

In the past, we have been inclined to regard the question of vertebrate pest animals entirely from the viewpoint of the welfare of man and his farming activities, and have been inclined to disregard their impact on indigenous fauna and flora. Recently, I have become very aware of the tremendous losses of songbirds resulting from domestic cats. This applies both to feral domestic cats in the country surrounding our towns and cities and to pampered pets in city gardens. Were it not for these predators, there could be many more birds in our gardens and this would add to the quality of city living. How one deals with these pest animals while maintaining friendly relations with one's neighbours I do not know!

In their desire to improve sport fishing, anglers have introduced species from both Europe and North America into our river systems without considering the impact on the

indigenous fishes. Trout (Salmo irideus) and American bass, both the largemouth (Micropterus salmoides) and the smallmouth (M. dolomieu), are now widely distributed throughout suitable river systems and impounded waters in the Republic, where they have practically eliminated the indigenous fishes. These introductions are an asset, however, insofar that they are first class sporting and edible fish. The most unfortunate, and in fact, the major vertebrate pest animal as far as inland waters are concerned, is the European carp (Cyprinus carpio). While providing a certain amount of sport it is a very poor table fish. But its worst feature is that by destroying the aquatic vegetation it completely changes natural ecosystems, thus rendering the water unsuitable for other species. Carp have the habit of taking in and then ejecting mouthfuls of mud from which they extract food in the form of invertebrate larvae and vegetable matter. When present in large numbers, they muddy the water to such an extent that it cannot be used for domestic purposes and even stock will not drink it; such waters also become valueless as habitat for waterfowl. The only effective control measures are draining the impoundment or the use of Rotenone, a derris root derivative. The latter is, however, a very expensive undertaking which is only justified in reservoirs used for domestic purposes.

Cecil John Rhodes is said to have been responsible for the introduction of a number of animals and birds to the Cape Peninsula, including American grey squirrel (Sciurus carolinensis), the Himalayan tahr (Hemitragus jemlahicus), the ring necked pheasant (Phasianus colchicus), the European goldfinch (Carduelis carduelis) and the European starling (Sturnus vulgaris). Although the grey squirrel is now well established in the feral state, its distribution is fortunately limited to the Cape Peninsula and areas of the Western Cape where introduced oaks and pine trees grow. They cause limited damage in pine plantations and orchards, but have become an important predator of the eggs and young of songbirds. They are not hunted for sport or the pot and despite the bounties which were paid for many years, their numbers have not decreased. More effective control in the interests of our songbirds would be desirable.

A pair of Himalayan tahr escaped from a zoo on the slopes of Table Mountain about 35 years ago. Today their numbers are estimated at over 500 and they are beginning to denude the vegetation and cause soil erosion in certain areas. From our experience on Table Mountain, it is clear that the tahr will become a major pest, should it gain a foothold in the mountain ranges of the Western Cape.

Of the introduced birds, the European starling is undoubtedly the most serious pest. Not only is it steadily extending its range, but the population in the Cape Peninsula is increasing to plague proportions. Today it is by far the commonest bird in the area. A comprehensive study of distribution, population density, roosting areas and nesting is being planned at present. As these birds do not congregate at stock feeding lots as is the case in the United States, but disperse to gardens in the Peninsula to feed, population control will be difficult. Killing them at night on the roosting areas seems the most practicable method of controlling their numbers. The other bird introductions mentioned have not gained a foothold as yet. The European sparrow (Passer domesticus), however, has spread from Kimberley along the rail routes and now appears to be replacing the indigenous sparrow in many towns.

CONCLUSION

Good progress has been made towards developing more selective techniques for the control of vertebrate pest animals, during the past ten years. While rendering an efficient service to the farming community, we have at the same time endeavoured to influence public thinking on the value of predators and their importance in maintaining natural balances. Although the emphasis has been on the control and not extermination of any species, we are still a long way from persuading the farming fraternity to accept the principles laid down in the manifesto of Survival Service of the I.U.C.N. vis-a-vis the wolf, viz:

"Wolves, like all other wildlife, have a right to exist in a wild state. This right is in no way related to their known value to mankind. Instead, it derives from the right of all living creatures to co-exist in a manner unhampered by man as part of the natural ecosystem."

Human nature being what it is, and with the tremendous pressure on the land to meet the material needs of an exploding population, it seems unlikely that this credo will ever be generally accepted. There can be no doubt, however, that considerable progress has been made towards achieving an acceptance of the value of wildlife. I believe, therefore, that in the interests of nature conservation, we should also strive towards widening the scope

of our services to include the control of both introduced and native pest animals which affect our wildlife resources, instead of considering only those which affect farming activities. Viewed in this context, most species of wildlife could become pest animals under certain conditions. Consequently, the control of vertebrate pest animals must always remain a function of wildlife management.

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