conservation

Further report on the development of Saanane Island, and its role in wildlife conservation in East Africa

B. McCULLOCH[1]
Veterinary Investigation Centre, Mwanza, Tanzania
J. JONATHAN and S. C. DUNNETT[2]
Game Division, Mwanza, Tanzania

50

In a previous report, an account was given of the initial development of Saanane Island as a zoological garden (Achard & McCulloch, 1967). In this present article, attention is drawn to some of the management problems which have arisen over a longer duration; to benefits which have accrued; and to the future role of Saanane in wildlife conservation.

Viable herds of nine Grant's zebra *Equus burchellii boehmi*, 14 eland *Taurotragus oryx* and six White-bearded wildebeeste *Connochaetes taurinus albojubatus* are established on Saanane. There is also a herd nucleus of four impala *Aepyceros melampus*. Of these animals, three zebra, eight eland, three wildebeeste and two impala were born on the island. The animals range freely but have developed their main habitat in the central glade, where food supplements are provided. The zebra are dominant and are the first to sample the supplementary ration. It is only after they are satisfied that they allow other species to feed. Surprisingly, the eland, which on the Serengeti are very shy, have become remarkably tame and it is possible to get very close to them. One bull eland, which became aggressive and lost an eye in the course of a fight with another male was shot, in case it became generally troublesome and attacked visitors to the garden. Wildebeeste and impala are timid and are quick to retreat at the advance of man or other animals. A pair of Masai giraffe *Giraffa camelopardalis* are free in the garden, and are frequently seen in in the central glade. Waterbuck *Kobus defassa* were released on Saanane but have since swum to the mainland and disappeared. Bushbuck *Tragelaphus scriptus* and warthog *Phacochoerus aethiopicus* run loose on the island. They are very shy and are seldom seen. However, they will probably be observed more frequently as their numbers build up.

Three Grevy's zebra *Equus grevyi* were presented to Saanane by the Kenya Game Department. One female died leaving a pair of adults. Unfortunately, the male Grevy's was frequently attacked by the Grant's stallions and it was necessary to enclose the Grevy's specimens. These are now exhibited along with four Cape buffalo *Syncerus c. caffer*. The two buffalo pairs, brought to the island as yearlings, are now mature and both the females are in calf. An adult pair of Bohor reedbuck *Redunca redunca tohi* are enclosed in a nearby pen as the male is very aggressive. This pen also houses two Marabou storks *Leptoptiles crumeniferus*. Eleven dik-dik *Madoqua kirkii* and one male Grey duiker *Silvicapra grimmia* are kept in a wire-fenced grass park. Six of the dik-dik were born on the island. In this pen are a large number of Leopard tortoise *Testudo pardalis*. Unfortunately, their eggs are invariably eaten by monitor lizards which raid the pen from the lake shore. Seven crested porcupines *Hystrix galeata* are kept in a completely concrete enclosure to prevent their escape and the consequent destruction of the vegetable gardens.

One Uganda red-tailed or copper-tailed monkey *Cercopithecus nictitans*, two Patas monkeys *Erythrocebus patas*, one chimpanzee *Pan troglodytes*, and two Olive baboons *Papio anubis* are on exhibition. These primates are secured by light chains to separate trees, where small shelters have been built for them. Black-faced grivet monkeys *Cercopithecus aethiops* are indigenous

[1] Present address: Veterinary Division Headquarters, Box 9152, Dar-es-Salaam, Tanzania.
[2] Present address: 38 Warrender Park Terrace, Edinburgh, Scotland.

International Zoo Yearbook 5 1965 pp. 135–142

to Saanane, and are frequently seen in parts adjacent to the central glade.

Numerous Helmeted guineafowl *Numida mitrata* were released on the range. These birds now breed regularly, and each January a new hatch can be seen. In the two flight aviaries breeding records are poor. Out of 24 exhibited species, only Egyptian geese *Alopochen aegyptiacus* and Chinese geese *Anser cygnoides* have laid eggs. There have been two hatches of Egyptian goose eggs, and eleven goslings have been reared in captivity. A Chinese goose laid one clutch of eggs. Unfortunately the eggs were destroyed by a Settler lizard *Agama agama* which had taken up residence in the aviary.

Four baby elephants *Loxodonta africana* were introduced to Saanane. One died in 1965 and, in 1966, the Tanzania Government presented one to the Scottish National Zoological Park and another to President Gamal Abdul Nasser of the United Arab Republic. The remaining elephant, known as Usa, is a very popular exhibit. It has thrived on Saanane and is now about two metres tall at the withers.

The only predatory carnivores in the zoo are East African Hunting dogs *Lycaon pictus lupinus*. These animals have bred successfully, and four out of eight pups were reared in 1967.

Three Nile crocodiles *Crocodilus niloticus* which were about half a metre long in 1964, have now reached two metres. These reptiles are kept in an open air enclosure, which is surrounded by a dry cement covered moat.

At Saanane the bulk of the rain falls between October and May. The other months, June to September, make up the dry season. In the wet season there is a good growth of grass and browse and at the lake shore there is grass throughout the year. In the central part of the island, the sward becomes grazed out towards the end of the dry season. Natural grazing and browse are, however, supplemented throughout the year. Elephant grass *Pennisetum purpureum* is cut on the mainland shores of the lake and is brought to Saanane by boat. Most of the herbivorous species enjoy this supplement, which is kept succulent by storing it in the lake. Millers' and brewers' waste is made freely available on the range, in the paddocks and in other enclosures.

Birds are fed a mixture of grains – millet, maize and beans – proprietary grain mashes and fruit. Red palm oil is added to the feed twice a week. In each of the two aviaries a heap of wildebeeste and zebra dung acts as a medium for the development of fly and other insect larvae. The heaps are kept moist throughout the year and the birds are frequently seen feeding at them. Succulent green plants from the lake shore, and minced meat, are available for those birds which wish to pick at them.

Fish is caught off the island, and offal is obtained from the Mwanza abattoir. Fish and meat are fed to the crocodiles and Marabou storks; fish, meat and fruit to the primates; and meat and maize porridge to the Hunting dogs.

The grazing areas of the island, the pens and paddocks, carry more animals than would be advisable under normal husbandry conditions. Steps were therefore taken to control gastro-intestinal parasites as a routine procedure. In May and December of each year faecal samples from each species are examined, and nematode egg counts are recorded. Irrespective of the results of these examinations a comprehensive treatment of all animals and birds is undertaken in June-July, and January-February. The drugs used are phenothiazine, piperazine citrate, or a mixture of equal parts of the two. To dose free-ranging and paddocked animals the drugs are mixed in the supplementary feed, once every ten days for a total of six treatments. Other species which are accustomed to handling, for example the elephant and the primates, are treated individually by mixing the drugs in oranges, bread or some other favourite food.

Routine control breaks down with confinement, and a close watch is required on the health of some of the restricted animals. For instance, the primate exhibits appear to be prone to hookworm infestations and treatment with suitable drugs, such as tetrachloroethylene, must be introduced as and when it is required.

In the latter part of 1964, when the zoo was first established, there were deaths from malnutrition. Some were associated with the retention of captured animals in pens on the mainland. An account of this mortality is reported in a previous work (McCulloch & Achard, 1965).

Towards the end of 1965, there was a shortage of grazing and browse on Saanane. To alleviate the position the four elephants were moved to the mainland, but one died of malnutrition shortly

after arrival. Post-mortem examination showed that the stomachs and bowels were full and contained normal ingesta. However, the pericardial, perirenal, omental and subcutaneous fat deposits were completely depleted. The other three elephants responded to the introduction of grain and grain meal supplementary feeding.

A pair of Black rhinoceroses *Diceros bicornis bicornis* were brought to Saanane in late 1964. The female gave birth to a calf in May 1965. By July 1965, all three rhinoceroses were suffering from corneal opacities. Oral administration of vitamin A and supportive antibiotic therapy was introduced. Unfortunately, the calf died. The eye condition resolved completely in the male, but in the female serious damage to the internal structures of the eyes led to permanent blindness. In February 1966, this cow developed acute diarrhoea, and died three days after the onset of symptoms. Post-mortem examination showed that much of the mucosa of the large intestines was in the form of dried, hardened and raised diphtheritic plaques. The bull rhinoceros subsequently showed bouts of diarrhoea which appeared to respond to vitamin A therapy. The administration of vitamin A was established as routine practice. Unexpectedly, in September 1967, this male had a peracute attack of diarrhoea and died within twenty-four hours. Post-mortem examination showed acute inflammation of the glandular part of the gastric mucosa. No clear cut diagnoses were reached concerning the deaths of the rhinoceroses. It was felt, however, that dietary deficiencies were predisposing factors in the mortality.

Two mature cock ostriches *Struthio camelus massaicus* died after having been on exhibition for a little over three years. Post-mortem examinations showed marked ulcerative necrosis of the large intestines. No specific diagnoses were made, but again dietary deficiencies were regarded as responsible for the deaths.

Three Spotted-necked otters *Lutra maculicollis* have died since the zoo was started. Post-mortem examinations, carried out on two of them, revealed melanosis and pneumonia.

Saanane is the only zoo in Tanzania, and is therefore a source of attraction to many visitors especially from Mwanza township and the densely populated surrounding parts. In this area, the cotton and livestock industries, together with essential food crop production, are the principal forms of land usage. Apart from the scavenging hyaena there is no room for wildlife over a vast area of country. Unfortunately, in a developing country such as Tanzania, where the annual per capitum income is in the order of £20 (Tanganyika & Zanzibar, 1964), there are no large sums of money available for zoo development. For this reason, capital expenditure on pens and buildings has been kept low, and as many specimens as possible were introduced on to the available range. It is our experience that this system works satisfactorily, provided that there are sufficient specimens of any one species to form a herd unit. The herd unit appears to offset problems of public security, as within this structure flight reflexes create general unease and even the most venturesome animal retreats with the main body of the herd from a visitor or an attendant. Any males leaving the herds and taking up solitary residence will be shot or removed from the garden, as will any other animal which shows signs of aggressive activity, other than that associated with normal behaviour within a herd. It is considered most important that herd structures be maintained and this will be borne in mind during future culling operations. Exhibition of herds, rather than single or paired specimens, is a real attraction for visitors.

Single specimens have proved unsatisfactory on Saanane. They tend to become aggressive and to seek human company. They then require to be penned and this, in turn, leads to an increase in the daily volume of work. However, when funds become available it is hoped to construct a fenced path through the central glade. It should then be possible to release most of the single and paired specimens, with the assurance of a good measure of public safety.

Adequate diets have not been formulated for the animals and birds in pens and paddocks. It is probable that the deaths of the rhinoceros and ostrich and the poor breeding performances in the aviaries, are due to dietary deficiencies. It has been recognised, for instance, that vitamin A plays an important part in the health of captive wildlife. Manton (1965) reported that several workers were of the opinion that deficiencies in this vitamin lead to disorders in zoo animals. As far as Saanane management is concerned there is a need to reassess the dietary requirements of

the enclosed specimens and, as adequate funds become available, to develop a basic feeding routine along the lines laid down by Ratcliffe (1966) and Wackernagel (1966).

The exhibition of Hunting dogs has been a mistake as there are, as yet, insufficient funds to provide for them adequately. Predators require to be housed in properly designed and well constructed dens and enclosures. At Saanane the dogs are kept in a 6×3 m den, which is divided into two sections. The front is of weldmesh and is open to the public. This type of construction is patently inadequate, and it seems advisable to delay the exhibition of other predators, such as lion *Panthera leo massaica*, leopard *Panthera pardus* and cheetah *Acinonyx jubatus* for another three years, during which period it should be possible to acquire sufficient funds to carry out the necessary constructions.

Apart from the Hunting dogs' den, all the pens, paddocks and aviaries have been built as open air enclosures. Only a few have sections which provide shelter from the rain. All enclosures, however, have been sited at or around trees, which supply adequate shade for the exhibits.

There is an open pavilion where light refreshments can be obtained and which also serves as a lecture room. With the exception of four training institutes based on Mwanza there is limited demand for this facility. But it is hoped that, with encouragement from the Education Department, the number of rural school visits will increase annually, and that a visit to Saanane will become a profitable part of the syllabus for all pupils of 8 to 15 years of age. Paradoxically, it is in the rural areas where there is the least appreciation of wildlife.

ACKNOWLEDGEMENTS

We wish to thank Game Scout G. Mbwana, who has done much to ensure efficient running and steady progress on Saanane. We also wish to thank Mr S. Kasimbala and Mr R. Tungaraza for technical assistance, and Mr R. S. Buberwa and Mr R. Kalasha for their help with routine administration. We are grateful to the Director of Game, Mr H. S. Mahinda, and to the Director of Veterinary Services, Mr T. S. Lwebandiza, for permission to publish.

REFERENCES

ACHARD, P. L. & MCCULLOCH, B. (1967). Creation of a zoo in Tanzania–Saanane Island Game Reserve. *Int. Zoo Yb.* 7: 235–240.

MANTON, V. J. A. (1965). The seventh international symposium on diseases of zoo animals. *Vet. Rec.* 77: 1181–1183.

MCCULLOCH, B. & ACHARD, P. L. (1965). Mortality in the capture of game animals. *Oryx* 8: 131–142.

RATCLIFFE, H. L. (1966). Diets for zoological gardens: aids to conservation and disease control. *Int. Zoo Yb.* 6: 4–23.

TANGANYIKA & ZANZIBAR (1964): *Tanganyika Five-Year Plan for Economic and Social Development*. I. Dar es Salaam: Government Printer.

WACKERNAGEL, H. (1966). Feeding wild animals in zoological gardens. *Int. Zoo Yb.* 6: 23–37.

Preserved sperm as a tool for the preservation of rare mammals

PROF. J. MORTELMANS[1] and W. VAN DEN BERGH[2]

[1] *Societé Royale de Zoologie d'Anvers, Antwerp, Belgium*

[2] *Director, Societé Royale de Zoologie d'Anvers, Antwerp, Belgium*

It oftens happens that a zoo has only a single representative of a rare animal species and thus cannot breed from it. Effectively the animal is 'dead' since it cannot contribute to the population. Theoretically the solution to the problem is simple, send it to another zoo for mating. But, in fact, great difficulties stand in the way. There is the risk to the animal itself, the problems of its capture and transport and the import and quarantine regulations. As an illustration of these difficulties we need only recall the insuperable problems we met with when, in 1961, we tried to