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COVER PHOTO: Each species from the primitive lichen through to the higher flowering plants occupies an important niche in the rain forest.

TRANSVAAL PROVINCIAL ADMINISTRATION NATURE CONSERVATION DIVISION

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nylsvley - a new provincial nature reserve for the transvaal and a centre for ecosystems research

On March 25, 1974, the Nature Conservation Division of the Transvaal Provincial Administration assumed control over the farm Nylsvley. Situated some 10 kilometers south of the small town of Naboomspruit in the northern Transvaal, this attractive area will in due course be proclaimed as the twentieth nature reserve of the Nature Conservation Division. Some unique geographical features and some planned future activities on the reserve will prove interesting to conservationists, scientists and anyone with a concern for the Transvaal's diverse wildlife resources.

Running through the centre of the reserve is the well-known Nylsvlei. The Nyl River rises in the hills north of Warmbaths and meanders through 120 kilometres of attractive bushveld savanna to eventually join the Magalakwin River near Potgietersrust.

Nylsvlei is a unique area, with numerous kinds of plants and animals living together. More than 400 different species of birds have been recorded as either living there or visiting the vlei. It is not only the vlei, with its precious water, which attracts the diverse fauna, but also the mixture of different plant communities, ranging from marsh to open grassland to various types of woodland. The science of ecology has long recognized that diversity in habitat means a diversity in animals living in those habitats.

The Nylsvley nature reserve will provide new habitat for some of the province's rare antelope, particularly the roan antelope and the reedbuck. At present the only protected roan population in the Transvaal outside of the Kruger National Park is a rapidly-growing herd on the Percy Fyfe Provincial Nature Reserve. Within the next few years this herd will be split and a new population established at Nylsvley. Reedbuck are very particular about the type and quality of habitat they occupy, and their numbers have dwindled alarmingly over the past few years. It is hoped that the extensive areas of lush, tall-grass vlei on the new reserve will lead to a substantial increase in reedbuck numbers there and provide an opportunity to study this elusive animal.

However, the main centre of attraction at Nylsvley for the next few years will not be the attractive vlei with its abundant fauna and flora, but the adjacent bushveld. This area, dominated by numerous wild syringa (*Burkea africana*), "lekkerbreek" (*Ochna pulchra*) and *Terminalia* trees, is one of the 11 different kinds of bushveld savanna found in the Republic, and has been chosen as a site for the country's Savanna Ecosystem research project. The project is a co-ordinated effort by the Council for Scientific and Industrial Research, the Department of Agriculture, the Transvaal Nature Conservation Division and most of the Republic's universities. Over the next few years scientists from many disciplines will study this piece of bushveld in fine detail. They will examine the soil, the vegetation and the diverse animal types very carefully, but more important, they will determine how all these plants and animals *interact* with one another and how they are affected by the non-living portions of the *ecosystem* such as rainfall and soil. A better understanding of the workings of this natural system will enable conservationists and agriculturalists of the future to conserve and utilize the bushveld to best advantage. The various types of bushveld and lowveld cover nearly two-thirds of the Transvaal. The bushveld on Nylsvley is still in a relatively natural state and will serve as an example of how such a natural system works.

the effects of immobilising drugs on different species of game animals

dr. a. m. harthoorn

Drug immobilisation of wild animals is now commonly being used by most countries on the African continent, and the technique has made considerable progress since it was first used here just over a decade and a half ago. The method may now be regarded as a tool for the use of conservation officers and is increasingly being used by those associated with wild animal management such as veterinarians, conservation officers in national parks and nature reserves, biologists and game farmers. It may be useful at this stage to take a closer look at the method and drugs available and how the various species of animals react to the drug effects.

In many ways chemical capture of wild animals, that is, the restraint of wild and captive wild animals by means of drugs injected from a distance with a special syringe fired from a projector, is becoming more complex. At the recent International Symposium on Immobilisation of Wild Animals some fifty drugs were described. The newer drugs are easier to use as they are less species-specific and have a wider safety margin. This means that animals are tolerant to overdoses and the chances of them becoming sufficiently immobilised even if underdosed is greater. Also, the person concerned with a limited number of species need not concern himself with very accurate dosage rates once the optimal rates for his species have been determined.

It is misleading to regard drug immobilisation as a simple and easily applied method of animal capture. The costs tend to be high and at least a working knowledge is necessary of the animals' reactions and requirements. The cost of drug immobilisation has recently been computed at the Nuffield Unit of Tropical Animal Ecology during the capture of buffalo and elephant. The number of hits registered was 70 out of 127 shots, in itself unusually good. Out of some 130 hits only 51 syringes functioned correctly. The others failed through plunger malfunction, blocked needles, needles breaking or the syringe bouncing off, and needles being blocked by skin or cartilage. The number of lost and damaged syringes was 30. In all 2,5 shots were necessary for every successful immobilisation. This resulted in a fairly high cost for each animal immobilised, namely R38 for an elephant and R42 each for buffalo who take a higher dose of etorphine hydrochloride, the principal drug used. In addition, equipment consumed amounted to R11 and R12 respectively with a further R41 and R18 for transport costs giving a total of R90 and R72 respectively for each elephant and buffalo. When using drugs other than etorphine, for which an antidote is provided within the original cost structure, the price of nalorphine or similar antidote must also be taken into account. The cost of immobilising smaller animals is less but the number of misses and therefore of lost syringes tends to be higher.

Chemical immobilisation is mandatory for the capture of the largest land mammals such as elephant, rhinoceros and hippopotamus and even giraffe. Large mammals such as buffalo and eland are difficult to catch by mechanical means. Medium and small antelope are commonly caught by driving into corrals and nets, although drug immobilisation is frequently used if they are tame enough to be approached fairly closely, or a helicopter to carry the marksman is available. There seems little doubt that, once injected, the danger of shock to the animal is greatly reduced as compared to driving into nets. On the other hand it may not be possible to effect the injection without disturbance of the animals, or without severe chasing by airborne or surface vehicle. In these cases the impact on the animal must be carefully weighed and the disadvantages associated with the need to come close to the subject for injection. From a moving vehicle it is usually necessary to approach a running animal to within 20–30 m, while if they are herded into nets or enclosures the animals may never have to extend themselves fully until actually captured. Conversely it has been shown that certain animals such as nyala tend to suffer severe mortality when captured near water holes after running no more than 100 – 200 m, indicating severe stress from struggling in the net itself or soon after in the holding enclosure or crate. The reaction of the various animals depends primarily on their awareness or otherwise of the capture team or marksmen. If these have been seen or winded the animal may well react with flight. If, on the other hand, the approach has been unobserved the initial injection may induce almost no running reaction. Most animals are, however, aware of the syringe and the discomfort of its presence. The smell of the syringe, is also liable to cause disturbance.

As the drug becomes absorbed the reaction will reflect the type of drug or drug combination used. The morphine-like compounds favoured for most capture today tend to cause unrest so that the subject may start to run. Subsequently it will wander aimlessly and eventually exhibit the typical exaggerated leg movements refered to as 'hackney gait', owing to its resemblance to the stepping of trained carriage horses. The reaction of the animal to drug effects will differ considerably according to the species or group. It is convenient to divide the animals into groups for this purpose.

Larger animals such as the elephant and the squarelipped rhinoceros do not readily show excitement as a result of "morphine" effects. In these, immobilisation drugs such as etorphine may be used on their own, or together with a synergist hyoscine hydrobromide. These large animals take relatively little drug in relation to their weight, e.g. about 6 mgm etorphine is needed for an adult buffalo weighing 500 to 600 kg and only 5 mgm for elephant who may weigh nearly ten times as much. No tranquilisers, therefore, need be used for these animals although a little is usually added, partly to fill the syringe and dilute the contents, but also for a degree of synergism that even extremely small amounts of tranquilisers such as acetylpromazine appear to exert even at dosage rates as low as 1 to 5 mgm per 500 kg body weight.

The second group comprises those animals that respond well with little excitement to synthetic-morphine and tran-

quiliser mixtures, such as zebra and wildebeest. These animals appear to immobilise very readily with little excitement and become completely tractible when under the influence of these drugs. There is little danger involved in handling these animals in the immobilised state even if they remain on their feet.

The third group includes the more dangerous and aggressive animals such as oryx, roan and sable. These are only safe to handle if large amounts of very powerful tranquilisers are used. Doses of 300 mgm or so of azaperone are effective as is also rompun which is virtually an anaesthetic.

These compounds are used in combination with fentanyl; the latter can be effectively neutralised by an antagonistic drug and the animal will remain under the tranquillising effect of the azaperone or rompun. Sometimes etorphine is used together with fentanyl and the tranquilisers; it too can be neutralised by antagonists. It is a general rule that the greater the number of synergistically acting compounds in a drug mixture, the smaller the total dose required.

Fourthly there is a group of highly nervous animals that tend to run as a reaction to morphine-like compounds. Animals such as nyala and kudu are therefore difficult to immobilise with the commonly used compounds. For these also carefully balanced mixtures of immobilising and tranquillising drugs are necessary, with usually several tranquillising drugs being used simultaneously for their synergistic effect. Many of the smaller antelope also fall into this category so that for these mechanical means of capture are often preferred. Where these animals are in enclosures a double technique of injection is often successful. This entails making a primary injection of the tranquillising drugs only and administering the immobilising dose only when the animals are deeply tranquillised or sedated.

Immobilising techniques today constitute a fairly effective and humane method of animal capture. The method is relatively simple where it is confined to one or two species for whom a methodology has been worked out in detail. The use of centrally acting narcotic-type drugs have advantages in that the animals are apparently oblivious of their surroundings and appear to remember little or nothing of their experience. They have disadvantages in causing untoward reactions such as excitement in certain species. Their safety margin and general reliability is such, however, that they have tremendous advantages over compounds formerly used. The potential user should, however, familiarise himself beforehand with the idiosyncracies of the animal to be immobilised as well as with other problems such as holding and transport and of the costs likely to be involved.