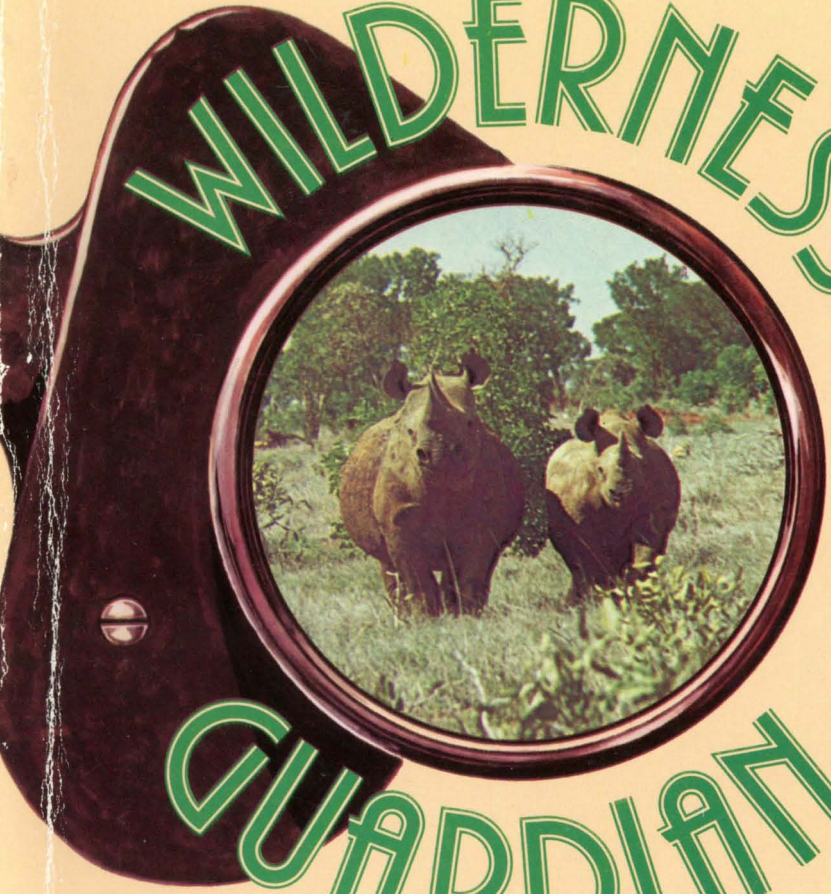
THE WILDERNESS GUARDIAN



A PRACTICAL GUIDE TO FIELDWORK RELATED TO WILDLIFE CONSERVATION

WRITTEN AND COMPILED BY TIMOTHY CORFIELD

The David Sheldrick Wildlife Appeal

AFRICAN WILDLIFE FOUNDATION AWF

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CHAPTER 15
ADDENDUM

An instruction guide to the most commonly and most successfully used methods in rhino capture, handling, transport and release.

by J.R.B. Flamand, K. Rochat, M.E. Keep

Introduction

All the modern methods of capture of both black and white rhinos *(Diceros bicornis* and *Ceratotherium simum)* rely on their immobilisation with a drug mixture followed by physical handling.

Different techniques employed will depend on the availability of more or less sophisticated equipment, the terrain and vegetation type of the area one works in, and the ultimate purpose of the capture operation.

The earliest attempts at immobilisation of rhino with Morphine-like compounds (Harthoorn, 1972) injected by means of a dart, made the capture relatively simple and safe, both for the capture team, and for the rhino.

Since then, a number of workers have modified and improved the drug mixtures.

An account follows on the capture, handling, transport and release of wild rhinos, as practised in the Natal game reserves.

The basic description is for black rhino, and generally applies to white rhino as well, but where differences exist, these will be described where those differences occur.

Darting equipment

Darts

The darts required have a capacity of 3 ml, and needles 50 mm long, with a collar half way down the shaft are ideal. The sharp needle tip should be slightly bent over towards the central axis of the needle to avoid getting a plug of skin blocking the lumen.

There is a choice of 2 types of dart.

a) 3 ml Palmer darts obtainable from Palmer Chemical and Equipment Company, Inc, Palmer Village, Box 867, Douglasville, Georgia, U.S.A 30134.

b) 3 ml plastic darts, available from Fauncap, P.O. Box 2284, Nelspruit, 1200, South Africa.

In the Palmer darts the plunger is forced forward by Palmer Cap-chur charges fitted behind the plunger, which are detonated on impact with the animal. 4-10 ml Cap-chur charges must be used to provide sufficient force to inject the drugs quickly.

In the Fauncap darts the plunger is forced forward by a spring holding the drug mixture under pressure. Drugs are prevented from squirting out of the dart by a rubber cap fitting tightly over the tip of the needle, which slides to the needle hilt on impact with the animal.

Gun

The most useful gun for projecting the darts is the Palmer "Long range projector",

powered by Co_2 gas. This has a maximum useful range of about 20 metres and is most suitable if used from a helicopter or vehicle. It can be obtained from Palmer Chemical and Equipment Company as well.

Fauncap darts can be fired from a Fauncap gun or an adapted Palmer "extra long range projector" powered by a powder charge. It is accurate for ranges up to 60 metres with these plastic darts.

Preparation of darts

The darts are prepared by coating the inside of the barrel with a thin coat of silicone grease (a smooth rod can be used) and the plunger pushed into the back of the barrel. The Cap-chur charge is then firmly pushed into the back of the plunger with the movable spring end towards the back of the dart. The tail of the dart is then screwed on tightly (hand tight). For ease of identification of darts with different doses in them, it is useful to use a different coloured tail for each of the different dose darts. This is particularly important when one is going to catch any size rhino encountered when one should prepare darts for adult, sub-adult and juveniles.

Fauncap darts are loaded with drug mixture through the front end by means of a long needle inserted through the dart's needle. Only once the drug is in the dart and the rubber cap is in position does one put the drug under tension with the spring and tail piece screwed in.

In all cases when preparing darts for darting, a suitable antidote for human use should be at hand in case of accidental administration. Naloxone hydrochloride (Narcan, Endo laboratories) is the most suitable and a person capable of administering it should be present. Check that the Narcan has not expired.

The mixture most used by the Natal Parks Board capture team for black rhino is a mixture of Etorphine Hydrochloride (Reckitt and Sons Ltd, England) and Fentanyl Citrate (Janssen Pharmaceutica), with or without Azaperone added. There seems little advantage in adding Azaperone to immobilise the rhino, but it can be used to tranquillise the animal for the period immediately after the antidote has been given by administering 100-200 mg 10 minutes prior to administration of antidote.

Recommended optimal dose regime of drugs for the immobilisation of Black Rhino.

	Narcotics		Narcotic antagonist	
	Etorphine	**Fentanyl**	**Nalorphine**	**Diprenorphine**
Adult	1 mg	30 mg	200 mg	4 mg
or	2 mg	—	200 mg	4 mg
Sub-Adult	0.5 mg	15 mg	100 mg	2 mg
or	1 mg	—	100 mg	2 mg
Juvenile	0.25 mg	10 mg	75 mg	1 mg
or	0.5 mg	—	75 mg	1 mg

Etorphine is supplied in 20 mg vials with diluent, and solutions containing 5 mg/ml are made up by adding 4 ml of diluent to the vial.

Fentanyl citrate is made up to 15 mg/ml by adding 41.7 ml sterile water to 1 gram of dry powder (1 gram contains 640 mg of active substance with a volume of 0.9 ml in solution).

Nalorphine hydrobromide (Lethidrone) is made up to 25 mg/ml by adding 60 ml of sterile water to 1 gram dry powder.

Nalorphine hydrobromide should be used in preference to Cyprenorphine or Diprenorphine sold with the Etorphine as it gives a more consistent and better reaction. However, if Lethidrone is unavailable Diprenorphine (M5050) can be used.

(Note: the dose of Nalorphine antidote is related to the size of the animal and not to the dose of narcotic administered).

For white rhino a different drug mixture is used. It is necessary to add Hyoscine to the mixture to facilitate roping the animal. If it is not used, the rhino keeps moving away from anyone approaching it.

Recommended optimal dose regime of drugs for the immobilisation of white rhino:

	Immobilising mixture			Narcotic antagonist	
	Etorphine	Fentanyl	Hyoscine	Nalorphine	Diprenorphine
Adult	1 mg	30 mg	50 mg	250 mg	4 mg
	2 mg	—	50 mg	250 mg	4 mg
Sub-adult	0.5 mg	15 mg	50 mg	200 mg	2 mg
	1.0 mg	—	50 mg	200 mg	2 mg
Juvenile	0.25 mg	10 mg	25 mg	100 mg	1 mg
	0.5 mg	—	25 mg	100 mg	1 mg

The prepared darts can be held in a row on a board by means of Terry clips. This ensures that darts don't clatter about in the vehicle and reduces the risk of losing some of their contents.

In the case of Fauncap darts it might be preferable to carry the darts with the tails off and only put the drug in under pressure when ready to be used.

Darting technique

First ensure that the firing mechanism of the dart gun is functioning properly. In the case of Co_2 gas guns, check that the cylinders are full by blank firing.

Have a push rod in the vehicle in case one needs to remove a dart from the gun as can happen when one changes one's choice of rhino.

The selection of the capture technique depends on the availability of material and funds. A helicopter is ideal, but if the bush and terrain permit it, an open roofed vehicle with its windscreen down can be used. Otherwise darting on foot is possible.

Two way radio communication is essential between the capture and recovery teams, if these are separate. In the helicopter, earphones are essential to reduce wind noise.

Helicopter darting

The helicopter provides the easiest method for finding, darting, and tracking rhino. It can also be used for driving the rhino to an area that provides easy access for handling and loading purposes before it is darted.

The approach to dart should be as close as possible (10 to 20 metres) to avoid deflection of the dart in the down-draught of the main rotors, and the dart should be fired forwards at 45^0 to the horizontal.

Ideally the rhino should be hit high on the hind-quarters or neck side but virtually any spot will give immobilisation.

Once the rhino is darted, the helicopter should rise to as high as possible so as not to disturb the darted rhino and allow it to settle down. Once the rhino is groggy it is pointless trying to drive or turn it.

The darter in the helicopter should have a rope with him so that, should the rhino approach dangerous terrain such as a gully, he can rope the hind leg and tie it to a tree (see later).

Vehicle darting

The vehicle should be a 4 x 4 sturdy type with an open top and lowered windscreen.

Once a rhino is found, one rushes as close to it as possible. The rhino must be running directly away from the vehicle and not across its path, as in the latter instance darts tend to bounce off. One should also dart forwards from the vehicle.

Black rhino often charge the capture vehicle. It should be allowed to do so and darted when it turns around to move away.

Once the rhino is darted the vehicle should not follow closely as this merely chases it further away. It should thus trail behind and two men jump off immediately to track the rhino. They should carry a portable walkie-talkie set to communicate with the vehicle once the rhino is immobilised. They should also carry a rope to put around a hind leg once the rhino becomes groggy.

On foot

The stalking and darting on foot is obvious. In this instance, it is most important to be aware of the capabilities and limitations of one's dart gun before any attempt is made, as a second shot rarely presents itself. The gun should thus be thoroughly tested before to acquaint oneself with its range, etc.

Plastic darts may be preferred when working on foot because of their greater range and accuracy.

Follow-up

Handling

Two men should follow the rhino once it has been darted. These can be on foot or, in open country, on horse-back. They should be as quiet as possible to create the least disturbance. They should also be equipped with a walkie-talkie to communicate with

the vehicle, and a 35 mm thick 10 metre long nylon rope with a slip noose at the end.

Once the rhino is groggy it should be approached quietly from behind and the noose slipped around its back leg and tied to the nearest tree or if no trees are available, to the vehicle. The easiest way of putting the noose on is to put it under the foot when the rhino lifts it and pull it up between the hock and the pad. Otherwise the rope is put round the leg and slipped through the noose. This rope should remain on the rhino until it is ready to be loaded.

Once the recovery team has reached the rhino, the rhino's head should be covered with sacking to shield the eyes from the sun.

If the rhino has fallen onto its side, it is important that it be pulled or pushed onto its brisket. The rhino need not necessarily be square on its brisket and can lie slightly to one side. The back legs should be pulled under the animal and not extended behind it. The fore legs sometimes stay straight in the standing position. This doesn't present a problem and the rhino can be left like this.

Treatments

The dart should be removed and a penicillin intra-mammary preparation injected deep into the dart wound. A precautionary dose of long-acting penicillin is injected intramuscularly in the neck and some of the intra-mammary ointment is put in the eyes to prevent the cornea drying. Any wounds can be sprayed with a wound aerosol, and, if required, the rhino can be sprayed against ectoparasites at this stage. Tick grease preparations should not be used as they tend to burn the skin.

If it is felt that the black rhino should be tranquillised after revival, Azaperone at the following dose can be administered intramuscularly 10 minutes before the anticipated time of giving antidotes: 200 mg for adults and sub-adults, 100 mg for juveniles.

Loading

The area immediately in front of the rhino should be cleared of bush and rocks so that the crate can be off-loaded and positioned there, as close as possible to the front of the rhino, especially with black rhino. The head should be roped by putting a noose on the head with the rope between the eyes and horn dorsally, and behind the jaw below. The slip knot should be at the top.

The other end of the rope is passed through the crate to the other side and it is tied to the recovery lorry or at least 6 people should man it. Just before the antidote is administered, the rope must be pulled taut. The sack can be removed at this stage and the leg rope slackened, but not removed.

Once everything is ready, the antidote is administered rapidly intravenously in an ear vein. The antidote may be given intramuscularly should intravenous injection prove difficult. Arousal in this case will take much longer, up to 10 minutes. Wait one minute to allow the antidote to take effect before attempting to rouse the rhino. Rousing can be very effectively done by means of a cattle prodder (An ideal one is made by Kawe (West Germany) applied to the underside of the tail or around the anus. The reaction of black rhino is particularly rapid, so the pulling team on the head must be ready. A person standing on the side should direct the pulling operation as the pullers cannot see the rhino on the other side of the crate.

Once the rhino is in the crate the doors must be closed securely. The foot rope must

be removed while the head rope holds the rhino in the crate. Then the head rope can be removed from the top of the crate by means of a hooked stick or by hand if the rhino seems calm.

The crate may now be loaded, but from the opposite end to the unloading so that the rhino races backwards once it is on the truck. This is to make unloading easier and to prevent the head region from being damaged during emergency halts. Check that the rhino doesn't push into a corner of the crate with its nose and risk suffocation.

Sledge loading

Although lateral recumbency is not recommended for rhino due to the risk of radial paralysis, should no suitable crates be available, an alternative method of transport over short distances consists of trussing them on sledges with rope. The sledges can then be winched onto a truck with the narcotised rhino on them and the antidote given at the destination once the sledge has been unloaded. This technique has been used by Haigh (1977) in Zimbabwe.

Special problems

Heat

The hottest hours of the day should be avoided in the hot season as some animals die of heat exhaustion.

The helicopter also cannot fly as easily. Should the animal be heat stressed (manifested by profuse sweating) the rhino should be splashed with water.

Moving rhino from inaccessible or difficult loading areas

Should a rhino come to a halt in difficult terrain, such as in a *donga* or river bed, it can be led out by administering a small quantity of antidote, sufficient for the animal to regain a degree of consciousness, and yet remain tractable.

Once both ropes are attached to the rhino, and the sack covers the eyes, the antidote can be given intravenously in relation to the size of the animal and the depth of narcosis.

An adult can be given 50 mg Nalorphine, a sub-adult 25 mg and a juvenile 10 mg. With at least 6 people on the head rope and four on the back leg rope and the sack still over the head, the animal can be led slowly right into the crate. The prodder should only be used in moderation.

Once in the crate, the sack can be removed and the remainder of the antidote administered intravenously or intramuscularly.

Rhino refusing to stand

The reason for a rhino refusing to stand can be due to any of the following.

a) Rhino in poor condition and too weak
b) Injecting antidote perivascularly (around the vein)
c) Old Nalorphine having lost its effectiveness
d) Relative overdosing of antidote.

A rhino unable to stand should be given at least 10 minutes and then half the initial dose of antidote can be repeated. It has been found that when a black rhino doesn't

stand up at the first attempt it often dies, so if it doesn't stand it is best to leave it to relax and recuperate and try to get it up a bit later.

A respiratory stimulant such as Doxapram hydrochloride ("Dopram", A.H. Robins) can also be tried. Repeated doses of antidote should be avoided as it has a depressant effect of its own.

Avoid having the rhino lying down for too long as the risk of circulatory and nervous damage increases the longer it stays in one position. If a rhino has to be lying down, it should be turned over occasionally.

Overdosing with narcotic

This can happen when an animal is in very poor condition. It can be recognised by the bulging eyes and respiratory distress. Partial antidote must be given immediately (50 mg Nalorphine for an adult, 25 mg for a sub-adult and 10 mg for a juvenile), even if it is given intramuscularly. A vein may be difficult to get because of the lowered blood pressure.

Rhino overtaking crate after being given antidote

Should the rhino not enter the crate but go to one side the leg rope must be used to stop the animal and the crate pulled forward and lined up with the rhino's head once again. The rhino can then be pulled in by force.

Underdosing

This can happen if a larger than estimated rhino is darted, or if the dart contents are injected subcutaneously, or if the dart lodges into bone. Re-dart with half the initial dose, but in the case of white rhino, exclude a second dose of hyoscine.

Transport

The transport of field rhino and boma trained rhino require different approaches.

Field rhino are rhino that are transported directly to their destination from the field capture operation. These should be animals that do not have too far to travel (2 days or less), are in a crate strong enough to hold them, and are in prime condition. Where possible, the rhino should always be released directly to their new locality, provided the area is large enough and contains adequate food.

Boma trained rhino are animals that have adapted to feeding in captivity and can thus be transported over greater distances and be fed and watered en route. They usually undergo a 6 week or more conditioning process before being shipped. Injured animals and ones in poor condition can also be held in bomas to allow recovery and improvement in condition.

a) The transport should be carried out with the rhino's head facing backwards.
b) It should be kept on its feet for the first 12 hours at least (this can be done with a prodder or stick) to prevent neuromuscular damage, and no tranquillisers are necessary provided the crate is strong enough to hold them. Thereafter, check the rhino every 4 hours while en route to check that the rhino can stand.
c) For rhino travelling long distances from the field or the bomas in hot conditions, water should be used to wet them down, and adequate air ventilation should be assured.

d) Initially, after a rhino has been given the antidote and has recovered, it can be restless and become violent, but once it has resigned itself to the surrounding crate, there is no problem. Black rhino usually settle down quicker than white rhino and accept the crate quicker.

There should be adequate bedding for field rhino if they are to be moved any long distances taking more than 12 hours.

There is no advantage in trying to feed or water field animals as they will not eat and it causes unnecessary disturbance.

Transporting boma-trained rhinos

These animals should have adapted to captivity to the extent that they can be fed and watered en route without undue problems. (See below for boma training).

To load these animals, they should be darted with 0.5 mg M99 for adults and 0.25 mg M99 for sub-adults and juveniles, and once the drug takes effect (15-20 mins) they should be goaded into their crates by offering food or making noises to attract their attention and the crate shut behind them. Juveniles can be locked into the crates without the M99 drugging.

Rhino are crated individually, and never communally. Adequate bedding should be provided.

The crate can now be loaded and transported, or the rhino transferred to another crate or specially designed transport truck if required. They should be fed twice daily and watered once a day.

Boma training

Black rhino should always be unloaded from the field into individual pens. White rhino of equal size may be put in communal pens.

The rhino should be facing the boma when unloaded and walk out (and not back out) when the door is opened.

They should then be left quietly alone, but rhinos with another rhino in an adjoining pen (even black rhino) settle down quicker.

Black rhino

Black rhino can be fed their preferred browse and first grade leafy lucerne immediately. They usually take to feeding in captivity from the start and pose no special problems providing the holding pens are strong enough to contain them.

On the second day antelope cubes, or good quality horse cubes can be mixed in with lucerne. Browse can then gradually be reduced after about 10 days, or once the rhino has taken to lucerne and cubes.

Adequate clean drinking water must be available at all times.

Black rhino can be kept like this indefinitely and do well. Because of their rapid adaptation to captivity and to feeding, black rhino generally do not require a long boma training period. However, it should be stressed that even a boma trained black rhino can easily be upset and aroused by careless handlers or onlookers.

White rhino

White rhinos take less easily to captivity and feeding in the bomas. It is sometimes worth putting an already boma-trained rhino with a wild one of similar size to quieten the newcomer, and to encourage it to eat more quickly.

On the first day white rhino aren't fed because they won't eat anyway. On day 2 they are fed a mixture of palatable green grass and good *Eragrostis curvula* (teff) hay or lucerne. Cubes can be added, mixed in with the fodder.

White rhino usually do not eat readily for about 4 days, and if they fail to eat by the end of 10 days, these animals should be returned to the wild immediately.

Once they are feeding well, the green grass can be withdrawn and the rhino fed solely on good hay and/or lucerne, mixed with cubes. Their average intake is ½ to ¾ bale of either hay or lucerne. An adult may get 4 kg cubes twice daily.

Once the rhino has settled down well, a convenient method of getting rhino accustomed to their transport crate is to feed and water them in a crate. The crate should lead off from the holding pen, and prior to transport from the bomas, the rhino can be closed in the crate to get used to the confined conditions.

Treatments

The common ailments of the Rhinoceros in holding enclosures and their treatment

Superficial wounds are by far the most common ailments which need attention in the bomas. They usually fall under two headings.

Self-inflicted after capture: Usually grazes on the face from pushing the walls of the bomas and the bars of the crate. Also ones on the limbs from attempting to climb over or through the cables of the runs. The horn may be loosened or broken right off as a result of knocking it on the boma or crate. Healing is slower in the former than in the latter case.

Acquired before capture: These may be situated almost anywhere and are often "poke" wounds caused by other more powerful rhino. They may be shallow or deep, fresh or old.

The treatment of these wounds is much the same whatever the cause of the injury. If the wound is dirty or suppurating it must first be cleaned. This is best done with a jet of water from a hose, or by preparing a weak solution of antiseptic, e.g. 212 disinfectant or Dettol, and cleaning the area with a stirrup-pump spray. Do not soak the floor of the boma in the process. If not dirty or infected, the wound can be treated without the initial washing.

Large wounds are best treated with **Acriflavine** in **glycerine** (1:500) initially, followed by **Acriflavine** in **watery solution** (1:1000). The **glycerine** mixture penetrates better, but the **watery solution** encourages scab formation in the latter stages of healing, which drops off eventually, leaving healthy healed skin underneath. The **Glycerine** and **water solutions of Acriflavine** are supplied already diluted and may be applied using an old hypodermic syringe or plastic oil-can directly from the bottle. The area from which a horn has broken should be treated in a similar way.

Constipation

This condition sometimes occurs while the animals are changing over from a natural diet to an artificial one of lucerne. The symptoms to be looked for are as follows: loss of appetite, a hard distended abdomen, listlessness, none, or very hard dung in the boma, standing, straining and rapid breathing due to the abdominal discomfort.

The treatment is **magnesium sulphate** (Epsom salts) given in the drinking water. No other water must be available for the animal, so that it has no option but to drink the medicated water.

Dose:
114 g (4 oz) per 340 kg (750 lbs) animal.
228 g (8 oz) per 680 kg (1500 lbs) animal.
456 g (1 lb) per 1360 kg (3000 lbs) animal.
Repeat in 36-48 hours if necessary.

Diarrhoea

This is a result of enteritis which is itself caused by unfamiliar foods or bacterial infection, or both. Sudden changes in weather conditions causing a "chill", particularly in new arrivals is another cause. Change the diet back to a normal one — to the food eaten in the wild state.

The symptoms are listlessness, straining, rapid breathing due to discomfort and perhaps a high temperature. Sometimes the animals will continue to eat, but usually they stop altogether or eat only a very little. A loose motion is found in the boma. When standing, straining, the rhino may frequently pass small quantities of liquid motion.

If the cause is thought to be dietery and not bacterial, **kaolin** alone is sufficient treatment.

Dose: 57 g (2 oz) for 91 kg (200 lbs) calf.
227 g (½ lb) for 454 kg (1000 lbs) animal.

If a bacterial infection is thought to be involved, **kaolin** plus **sulphamezathine** or **terramycin** should be given.

Dose: Sulphamezathine (solution 33 $\frac{1}{3}$ % w/v) — 1 cupful (140 cc) per 680 kg (1500 lbs) with the **kaolin** at the above dosage, and put into the drinking water.
Terramycin — 5000 mg (5 g) per 454 kg (1000 lbs) body weight also mixed with **kaolin** in water.

Pneumonia

This usually follows damp, cold weather, particularly if the rhinos are kept under cover and dry. Therefore, if there is a sudden unfavourable change in the weather it is essential to keep the animals warm and dry, and the sand on the floor of the boma dry.

The signs are as one would expect: listlessness, laboured, often noisy, breathing.

Antibiotics plus vitamins are the drugs of choice. **Terramycin powder plus vitamin B complex** can be put in the drinking water.

Dose: 5000 mg (5 g) per 454 kg (1000 lbs) body weight plus 70 cc (½ cupful) per day per 454 kg (1000 lbs) body weight of **vitamin B complex.**

An injection, either with an hypodermic syringe or dart, is more effective than by putting the drug in the drinking water.

Pen/strep injection

Dose: 10 ml per 227 kg (500 lbs) body weight, initial dose, followed by 7 ml per 227 kg (500 lbs) body weight for 3 more days. Vitamin B 12 (Cytamen 1000" — 2 cc mixed with the Penicillin).

The treatment should be continued for 3 or 4 days.

Eye infections

These are either **keratitis** or **conjunctivitis,** or both. They are bacterial infections following tissue damage caused by dust or a blow. The damage is characterised by a yellow thick, or watery clear, discharge. If possible the area should be washed, with clean water and veterinary eye drops squirted into the eyes. If the washing is not practical then apply the medicine only. This should be repeated twice daily.

Foot infections

These are seen when bacteria invade wounds or cracks of the feet. They break out when the animals are kept under wet, dirty conditions. If the rhinos are kept in dry, clean bomas, foot infections will rarely occur.

Acriflavine in **glycerine** should be applied to the feet while the animal is lying down. Put down plenty of dry sand to cover the floor of the boma.

Poor condition

This usually follows one of the above-mentioned conditions, in which case the treatment described should be followed. On the other hand, an animal may be in poor condition as a result of not settling down well in the bomas following capture in the veld. If this is the case, one must try and build up the rhino's resistance by careful nursing, attention to the diet and the use of a tonic and stimulant. **Vitamin B complex** should be added to the drinking water, as described under Pneumonia, plus 140 cc (1 cupful) per 680 kg (1500 lbs) body weight of **Sulphamezathine** solution.

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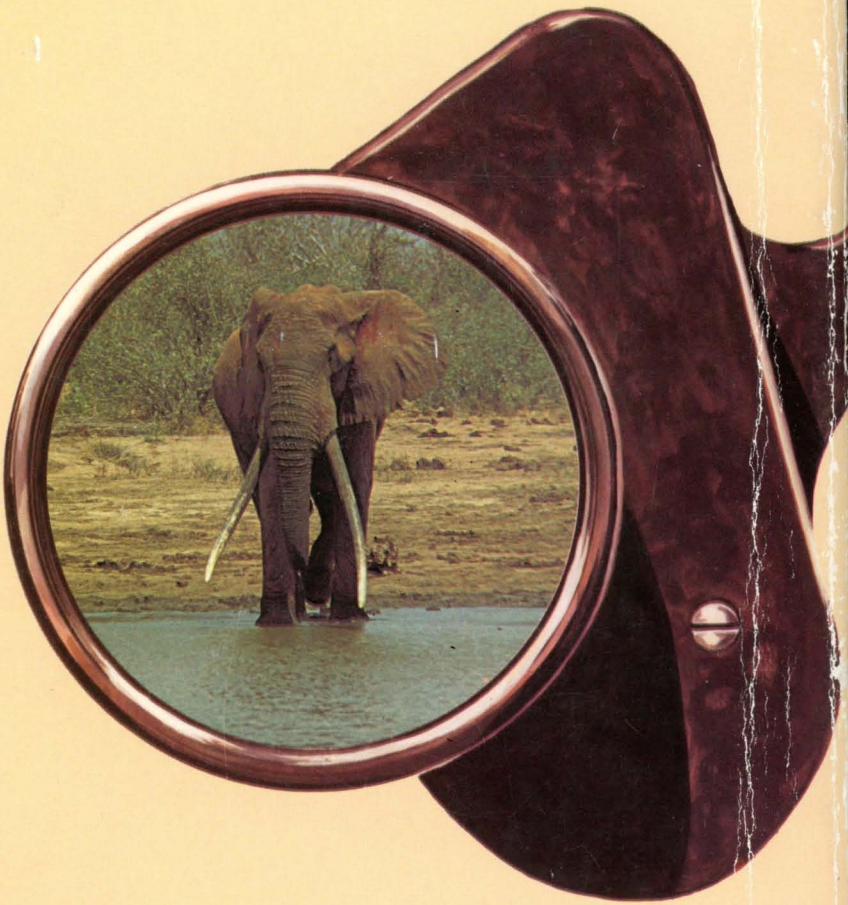

IN MEMORY OF DAVID SHELDRICK M.B.E
FIRST WARDEN OF
TSAVO EAST NATIONAL PARK KENYA

COVER DESIGN BY A.L McNAUGHTON