

THE TRANSLOCATION OF THE WHITE RHINOCEROS
A SUCCESS IN WILD LIFE CONSERVATION IN
SOUTHERN AFRICA

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A PAPER PREPARED FOR THE CONFERENCE
"THE ROLE OF ZOOS IN INTERNATIONAL CONSERVATION"
ORGANISED BY THE SAN DIEGO ZOOLOGICAL SOCIETY

SAN DIEGO 4 - 6 OCTOBER 1966

20 FEB. 1967

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Introduction.

The history of Wildlife Conservation in Africa is one of dwindling animal populations and shrinking habitats. This paper describes the recovery and re-population of range by one of the rarest large mammals in Africa: the white or square-lipped rhinoceros Ceratotherium simum simum.

Acknowledgements.

Without the outstanding pharmacological, physiological and veterinary knowledge of Dr. A.M. Harthoorn of the University College of East Africa, the translocation of the white rhino could never have been a success. It has been due entirely to Dr. Harthoorn that so much progress has been made in the use of various drugs.

Of the many Game Rangers of the Natal Parks Board who have been a part of the Rhino Capture Team, acknowledgement must be made to N.A.Steele, currently Senior Warden in Zululand, Rangers John Clark, John Tinley, Ken Rochat and the late Owen Letley.

It is also impossible not to mention Colonel J.Vincent former director of the Natal Parks Board, and Mr. John Geddes-Page, currently director of the Board, for their administrative ability and encouragement to the field officers by ensuring a steady flow of materials.

I am also indebted to my old colleague J.M.Feely, who gave valuable advice on the preparation of this paper.

Finally thanks are due to John Vincent, Research Officer Hluhluwe Game Reserve for his careful scrutiny of the final draft.

/Background...

Background.

The range of the species when first seen by white man was throughout southern Africa from the Orange and Umfolozi rivers in the south, to the Zambezi and Cunene rivers in the north. In the period from 1812, when it was first described by Burchell from Kuruman in the northern Cape Province, to the end of the 19th century, the white rhino was exterminated throughout its range except in the relatively minute area at the junction of the Black and the White Umfolozi rivers in Zululand, Natal, now within the Umfolozi Game Reserve (Player and Feely 1960). (Fig.1)

This reserve was proclaimed through the efforts of Charles Saunders in 1897, but in its first thirty-two years, sanctuary for the white rhino was by no means secure, due to the tsetse fly game elimination campaigns. Lang (n.d.) notes: "Before that most regrettable game butchery in 1920 there were, according to the Game Conservator's (Vaughan Kirby) own estimate twice as many" as the twenty-five subsequently left. In 1916 R. Symons, then relieving Game Conservator, saw no white rhino in the course of a six week's tour from the western to the eastern extremities of the reserve, but did see four in the unreserved land north of the Black Umfolozi (unpublished diary).

From 1930 Mr. Douglas Mitchell visited the reserve regularly, and noticed that rhino cows were leaving the reserve to the north and the west in order to calve. The majority of the calves were killed by African (pers.comm.) When in 1939 Mr. Mitchell was appointed a member of the Natal Administrator's executive committee, his first act in office was to have rescinded the decision to abolish the reserve; he thus averted certain doom for the southern subspecies.

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The subsequent history of the white rhino has been by no means uneventful, but by 1960 Lang's original proposal to transfer white rhino to other parts of its old range had become a practical possibility, and indeed vitally necessary. By then the rhino population explosion of the 1940's and 50's was cause for grave concern, not only because of limited food resources within the reserve but also because of the numbers of animals resident in vacant land soon thereafter to be settled by man.

Both of these problems are as yet only partially resolved. Nevertheless the story is now of an expanding population recolonising parts at least of its once wide range.

The problems encountered and the procedures developed in doing this are the subject of this paper.

Physical Characteristics.

There are seven external characteristics which readily distinguish this species from the black rhino Diceros bicornis:

- (i) The nuchal hump formed of muscular and epidermal tissue unsupported by bone (Player and Feely 1960). This hump is of functional significance and forms part of the animal's adaptation to its way of life (Alexander and Player, 1965).
- (ii) The much greater length and size of the head (a full grown adult head weighs 600 lbs).
- (iii) The straight, wide anterior margin of the lips - from which the alternative name is derived.
- (iv) The flat frontal surface of the base of the anterior horn.
- (v) The greater bulk and height of adults.
- (vi) The larger ears, prominently tipped with hairs.
- (vii) The longer distance between the humps formed by the lumbar spines and the pelvis.

Colour.

The colour of both species is very similar, and depends largely on the colour of the mud in which they last wallowed. The origin of the names white and black rhino has always been controversial, but because of the timidity of the white and the aggressiveness of the black, the theory of the early Boer hunters likening the white rhino to the white man, and the black rhino to the fierce tribes of the interior seems most probable.

Habitat.

With the exception of precipitous country and forests a wide variety of savanna vegetation types was formerly inhabited in subhumid to arid climatic zones.

Translocation.

The removal of the square-lipped rhino to former habitats in South Africa was first mooted by the American Dr. Herbert Lang (1929) who advocated capture by nets and removal to the Kruger National Park. Dr. Lang appreciated the political threats to the species. He also realised the dangers associated with having all the rhino concentrated in one small area. It was not until 1960 with the imminent demarcation of new boundaries and the realization that many rhino would be outside of the proclaimed reserve, that a real effort was made to capture them.

Drug Development.

In December 1960 Dr. A.M. Harthoorn, the eminent veterinary physiologist from East Africa, was invited to Natal to experiment with the latest drugs.

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The first drug used on a series of ten white rhino was Gallamine triethiodide, a paralyzing drug. It was discontinued because of the narrow tolerance factor (Harthoorn 1961).

In June 1961 Dr. Harthoorn again experimented with a combination of Themalon (diethylthiambutene hydrochloride) and Sernyl (1-(1-Phenylcyclohexyl) piperidine monohydrochloride). Twelve white rhino were immobilized and all twelve recovered (Harthoorn, 1962).

This drug combination was a big breakthrough; it was possible to capture rhino ranging from 800 lbs. to 4000 lbs.

Some twenty minutes would elapse before the rhino went down. During this time it could travel up to five miles. Only three deaths from the actual drugs could be attributed to this combination.

The disadvantage of this combination was the large amount required. The use of 20 cc. darts limited the darting range. Serious dart wounds also resulted on rhino put into bomas.

The use of Sernyl was discontinued; it was found that after the injection of the antidote some animals fought their crates and got their horns jammed, some of them dying as a result. In the capture of the black rhino Diceros bicornis, however, Sernyl was retained because without it the animal kept on moving.

/In.....

In July 1963 Dr. Harthoorn, in conjunction with Reckitt and Sons Ltd., England, made the new drug M99 available to us. By September 1963 it had been used on wild rhino with success (Harthoorn, 1963). The most successful dose of M99 used on the white rhino has been found to be .5 mgm. M99 plus 1 mgm. Acetylpromazine per 1,000 lbs (Clark in litt.). The reaction time is between 8 to 12 minutes. When hyocine is added - 100 mgm. for a 2,000 - 5,000 lb. animal - the reaction time is quicker but it takes a longer time for the rhino to learn to eat in the boma.

The use of M99 has simplified and streamlined the capture of the white rhino. The rapid immobilization has made it possible to capture rhino in very dense bush. It has also reduced injuries to horsemen and horses because of the shorter distances they have to follow the rhino.

The small amounts of drugs required have reduced the size of the dart from 20 ccm. to 3 ccm. Dart wounds on captive rhino have ceased to exist.

The order in which the M99 drug is put into the dart is as follows:

1. M99 and Acetylpromazine injected into rubber plunger.
2. Hyocine dissolved in 1 cc. of sterile pH4 water then injected into dart;
3. Top up with pH4 water and screw on needle immediately.

Lethidrone (nalorphine hydrobromide) readily reverses the Themalon combination of drugs; within a minute a full grown 4,000 lb. rhino can be on its feet after a 50 mgm. intravenous injection in the ear.

/With....

With M99, 500 mgn. has to be injected intravenously for rhino weighing 1,000 - 5,000 lbs. Reaction time varies between five and ten minutes after the injection. Harthoorn (1965) discusses this drug fully.

Firearms.

The following weapons have been most commonly used during the capture of rhino.

1. Gas powered Palmer Cap-chur gun.

It is not accurate until the user is familiar with the weapon, for the range depends upon temperature and the amount of gas remaining. The dart is also slow moving in flight and easily deflected by wind or pieces of grass. Nevertheless, it has been the principal weapon used and is still being used. It has advantages in very dense bush when rhino have to be darted at close range. Without the invention of this weapon the translocation of rhino would not have been a success.

2. Powder charge gun.

This weapon is a modified 32 gauge shot gun fitted with .303 rifle rear sight. Two types of cartridge, manufactured by A.S. Ruffel and Co.S.A., enable the user to shoot from 30 to 60 yards or from 40 to 100 yards. Feathered flights are preferable to nylon tufted flights. In open country or in the capture of antelope this weapon has proved most useful.

/Techniques of capture...

Techniques of Capture.

The techniques of capture developed by Natal Parks Board Rangers during the early stages of "Operation Rhino" (Hartshorn 1962) have not changed in detail.

The dart is fired either on foot or from a Land Rover. The darted animal is then followed by horsemen until it halts and can be restrained with rope. The horsemen then advise the men at the waiting truck either by walkie-talkie or by one horseman returning. The truck is equipped with winch, rollers and crate which is unloaded in front of the rhino. The antidote Lethidrone, injected intravenously into an ear, enables the rhino to stand up and walk into the crate. A steel plate is put as a step against the crate to assist the rhino to enter. This became necessary because many rhino were tearing the skin near their toes. These wounds became septic and, because of the location of the wounds, were difficult to treat.

In areas such as river beds and the slopes of hills where it was not possible to get a truck, a small injection of antidote would be enough to get the rhino moving. It could then be led to the truck. On one occasion a fully grown adult was led for two miles in this fashion, much to the consternation of tourists and some local African women.

Use of Horses.

Steele (pers.com.) says it is advisable to use two horsemen, particularly in thick bush; one horseman to follow the rhino, the other to go to the nearest prominent point to see where the rhino emerges.

/Steele...

Steele observed that until the drugs took effect, the rhino never hit trees, despite its bad eyesight.

Reaction after darting was almost always to flee but the wind direction often determined how far the rhino would run. The initial disturbance was also a factor - shouting etc. If other rhino were present and became disturbed the darted rhino would continue to run. Darted females appeared to run further than males - particularly adult males, which seemed reluctant to leave their territory.

Keeping a darted animal in sight was facilitated when the dart remained in the animal. Those darted in the rump seldom lost the dart even while plunging through thick bush.

In two areas of the Umfolozi Reserve, the rhino would always run south towards certain thickets which are popular calving areas. Once the rhino were running there seemed to be little danger to the horse of being crushed. If, however, it got behind the horses it often charged and tried to gore them.

When a large group stopped, the riders would dismount and hold the horses' bits to stop the jangling upsetting the rhino.

The situation the horsemen feared most was when rhino ran through buffalo herds, because buffalo would attack without warning, particularly if there were calves in the herd.

The grunt of a warthog, the cry of a hadedah bird or the whistle of a reedbuck often was enough to set a rhino running again.

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On the other hand the black rhino's first reaction on getting a fright was inevitably to charge. This made darting simple. Once darted the black rhino would then take flight and only on one occasion did a darted one wait for the following horsemen and charge.

On one occasion a half-grown white rhino calf was darted. It was accompanied by a large cow. They ran into some dense bush, found they could not go over a 12 foot drop, and turned. The cow then tossed a 950 lb. horse 8 feet into the air.

Most of the horses soon got used to the work and became blasé, even the one that was gored. This cost the life of one of the famous "rhino following" horses when it went nonchalantly to drink at a pan where some rhino were resting. It was gored to death by an irate bull.

Some rhinos, in a partially drugged state, fell over cliffs and were killed. Horsemen were sometimes able to turn partially drugged rhino aside by shouting or alternatively by roping the animal's hind legs.

In particularly dense thickets horses have to be protected from thorns. Coronet guards and aprons are effective. Horsemen wear canvas jackets, crash helmets and gloves. In rainy weather there is great danger for the horsemen when, in trying to avoid buffalo or black rhino, the horses may slip.

Horsemen carry vials of Lethidrone to revive rhinos which collapse while crossing through rivers. The immediate intravenous injection is enough to get them on their feet and out of danger of drowning.

/Reaction.....

Reaction to hunting.

Rhino had not been shot or disturbed for over thirty years, and it was interesting to note how quickly they became aware that they were being hunted.

Once the drugs and capture techniques had been successfully developed the Natal Parks Board authorised the export of square-lipped rhino to zoological gardens all over the world and to re-colonise former ranges in Africa.

The Operation then developed in three main directions:

1. The translocation of square-lipped rhino to zoological gardens and game reserves beyond a motorable distance,
2. To places within a 400 mile radius, and;
3. Capture for marking, release and subsequent study in Umfolozi.

Of the three, it is the first that has been the hardest to master for it required completely new techniques in taming rhino recovering from drugs.

Taming.

Originally four pens patterned after East African trappers were built. Square and made of bush timber, they were subjected to a great deal of bashing by the rhino. The rhino would fight for days to get out, attacking the pens in every conceivable manner - including standing on their hind legs.

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The original pens had an earth floor but the rhino had a tendency to turn it into a wallow. Concrete floors are now being used.

On one occasion a large male escaped at night by climbing over a 6-foot gate (Clark in litt.) It managed to get its front legs over the gate bars, then wormed its way over until it was rocking on its belly. Ranger Clark came out, clad only in a shirt, in time to see the rhino come tumbling down. It was on its feet in a flash and chased Clark into a two ton crate which it hit and moved a good 9 inches.

When using the Themalon/Largactil/hyocine mixture in the 20 cc. syringe bodies, great difficulty was experienced in getting the rhino to eat. Dart wounds became septic and developed into huge abscesses into which a man could put his whole hand.

Sometimes a rhino would be in captivity for sixteen days without eating. Five minutes after release it would be seen grazing within 50 yards of the pens.

The time elapsing before a rhino began eating varied from four to fourteen days, the average being six days.

Indigenous grasses - Panicum sp. Urochloa sp. Themeda sp. - had to be fed to the rhino first, gradually supplemented after two to three weeks by the exotic feeds teff and lucerne (Alfalfa). Feeding was also complicated by the fact that rhino would rest during daylight and become active at night.

Each rhino has marked individuality. One animal was put off by constant attempts to get it to feed and eventually started eating only in the dead of night, when undisturbed. Another would eat only when the gate poles were rattled.

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We attribute this to the fact that when it had almost fully recovered from the drug some green grass Panicum maximum was thrown to it at the gate and the gate rattled to draw the animal's attention to that direction, the noise ever after being an essential feature in a conditioned reflex.

One young animal which sulkily refused to eat for twelve days was force fed with maize meal mixture. A hose from a stirrup pump was forced into its mouth while it was lying resting. Thereafter the animal would eat only while lying down.

On occasions very young calves (three months plus) of females captured or dying of natural causes were brought into the boma. Their smallness made it a simple matter to attend to their dart wounds and within a short period they came to be fed upon being called or rattling a basin.

A mixture of skimmed milk, concentrates, salt and sugar is fed via a brandy bottle until after a few days they can be put on to indigenous green grasses, followed by lucerne (alfalfa).

At a later stage some developed tiny skin sores all over the body, caused by vitamin deficiency. A vitamin B complex syrup added to the milk, and ascorbic acid injected intramuscularly, soon eliminated the vitamin deficiency.

Constipation after recovery from the drugs was always a problem. Fresh dung thrown into the pens would sometimes stimulate defecation. Twice, Neostigmine was used but the muscular cramps must have been extremely painful, for the animal bellowed and was in a vicious mood. This was discontinued because of the dan_gerous consequences without expert veterinarian

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advice being available. (For full discussion of this drug see Barthoorn, 1965).

Course cattle salt mixed with drinking water encouraged the intake of liquids which in turn aided defecation.

In the early days some rhino had to be moved to the Kruger National Park before being completely tamed. These animals defecated from fear during crating and from then on had normal movements.

Getting the animals to feed continued to be a serious problem until Ranger Clark discovered that by adding bicarbonate of soda to their drinking water the rhino would begin eating far sooner (Clark, in litt. 1966).

Serious mortality occurred in July 1963 when Zululand experienced one of the worst floods in its history. Twelve rhino were in different stages of being tamed down for export to various zoos. Fourteen inches of rain fell within a few hours, the Black Umfolozi river rose 50 feet, and the whole game reserve was inundated. Water rushed three feet deep through the rhino bomas. Cold weather followed soon afterwards and six rhino died from causes such as pneumonia. It was a particularly trying time for Ranger Clark, the officer caring for the rhino.

Troubles with feeding and the treatment of dart wounds continued.

A cabled paddock 80 yards long was added, therefore to the rhino bomas. There was an immediate improvement in the condition of animals released into the paddock. The exercise

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caused the severe dart wounds to drain and made the rhino begin eating earlier.

Strange to relate, none of these problems was experienced with the black rhino, despite its aggressiveness in the wild. Most of these animals would be feeding within twenty-four hours and in a few days would be so tame that dart wounds could be hand dressed.

The learning ability of the black rhino seems greater than that of the white. One black rhino female named "Ngozi" (Zulu - danger) had been caught in a cable snare which almost severed the neck muscles. Within a few days it was coming up to the gate to have its neck dressed and would turn it from side to side while the antibiotics were being powdered on.

During its period of convalescence it was noted that it required bundles of grass once every three or four days as well as a supply of browse. If it did not get the grass it became extremely agitated.

When white rhino were brought back to the bomas they had to be kept under constant observation while recovering from the drug; they had a habit of getting their horns jammed in corners of the pens and suffocating to death. Such deaths were particularly prevalent during the early period when Sernyl was included with the drug combination.

Some bomas were constructed of creosoted poles but this was discontinued for creosote seems to irritate the white rhino and to induce serious skin disorders. Rhino in the field seem to have rroted objections to creosoted poles; they will inevitably knock them over.

Reactions immediately after coming round from the drug action varied. A sudden noise of any kind would make them charge the sound. If a human being walked up to the gate of the boma the rhino would charge but nearly always stop

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just before hitting it. Only the occasional animal would hit the gate with its horn.

With the constant construction work going on around pens it was found that the rhino were always nervous and took longer to tame, until Ranger Clark started playing a transistor radio. When the rhino was brought in the radio was switched on and left on for a minimum of seventy-two hours. At the end of this time the animal was much more accustomed to noise, which speeded up the taming period considerably.

In the open pens red-billed oxpeckers Buphagus erythrorhynchus would perch on the rhino to feed on the ticks. Rhino that had been subjected to the taming process for a week or more ceased to react to the alarm call of the oxpecker as they do in the wild.

Rhino that were given a great deal of attention tamed faster than others and would come to the boma gates to be scratched with hard brooms. One rhino (Steele pers. comm.) appeared to be bored while in the pens and spent much of the day pushing lucerne from one side to another.

Whenever possible the crate in which the animal was going to travel was placed in front of the pen, and the animal fed in it.

Clark (pers. comm.) says that females are more suspicious and take longer to tame than males. They could never really be trusted even though they appeared tame. He would never go into a pen containing a female.

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One female that was dying of colic was fed with bottles of cereal, protein and concentrates. Clark was in the pen with it daily for over three weeks, during which time it was completely tame and dependent. Once, however, it had recovered it was dangerous to stay in the pen.

The male, once it trusts someone, can be handled easily - even to waking it from a deep sleep. Even while being loaded onto a truck and pushed around it still remains peaceable.

Recent developments include putting two animals together during the taming period (the area includes boma and 80 yard paddock). It has been found that putting two females together is a sure way to cause trouble. It is possible to put a male and a female together, or two males, but two females of any age except the youngest, usually fight.

There were some animals which refused to accept captivity; although eating and drinking well, they would continue to fight the pen until they had no skin on their heads. Nothing would make them accept captivity.

One illustration of this is interesting. A young, 1,500 lb. animal still with the cow, was often observed near the boma. It was unconcerned about passing vehicles and would hardly look up at anyone who approached to within 20 yards.

When a rhino was needed in a hurry for export, this one was captured. It started eating after the normal interval but instead of settling down as usual, it grew more determined to get out, skinned itself on the forehead and front legs, pulled off the front horn and ripped toe nails loose.

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We decided to release it before it injured itself further. It had then been in captivity for three weeks. The day after release it was seen with the cow, once again unconcerned about vehicles or anyone who went near it.

Another rhino of 1,700 lbs. in captivity refused to eat at all. After two weeks of starvation it was tagged and released. Within 200 yards of the bomas it began eating and continued all day. Two months later it was accidentally recaptured, but after three weeks in captivity it had again to be released because it spent all day attacking the fence cable, mainly at the point where it had once before been released.

Some captured rhino simply sulk. One can do nothing to stop them. Even letting them into an emergency paddock with standing grass two feet high makes no difference. In the end they are so weak they can hardly stand and have to be released.

Partially tamed rhino react to wild one passing in the night, so much so that they would stop eating for as much as a week. They would keep calling to each other and running up and down trying to get out.

One female of 4,000 lbs. named "Masinyane" (Zulu- the one who hurries) was in oestrus when captured. A male kept within sight during the day, but at night tried to rip the boma to pieces, and the staff had to spend most of the night chasing it away. Eventually this cow was taken to Ndumu Game Reserve and released into a big cabled paddock prior to release into the game reserve. Within twenty-four hours the first male ever released at Ndumu knocked down the cable and took the cow away. It was the first animal to calve there.

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The M99/Acetylpromazine/hyocine drug combination has virtually eliminated the problem of dart wounds. This is in the main due to the fact that a 2 cc. projectile syringe is used, instead of the 20 cc. with the Themalon drug combination. Rhino also begin feeding after three to eight days which is an improvement.

Clark (pers. comm.) mentions that it is advisable to use the minimum amount of hyocine on rhino being put into the bomas. Too much hyocine tends to put the rhino off feeding for a longer period.

Horns breaking off has been a frequent occurrence, but an application of stockholm tar aids healing, as does acriflavine and glycerine.

Transportation by Sea.

Clark (pers. comm.) who has accompanied seven animals to the United States, says the animals were not disturbed by bad weather. On three occasions during one trip water was running 18 inches deep through the crates. The rhino were not unduly alarmed. Once it was so rough they had to go without food for two days, even this did not over-concern them.

Crates placed head to head seemed to alleviate boredom, and made the animals calmer. On the first journey via the east coast of Africa, the rhino suffered with the heat of the Suez Canal and were also excited by the smell of land. After weeks at sea they always reacted the moment a land wind blew.

L. Rhue of Western Germany in a letter to Steele (September, 1964) mentions that for several days during a storm the animals had to stand in $2\frac{1}{2}$ feet of sea water day and night. The journey also entailed extreme climatic conditions - very cold on departure from Durban and very hot on arrival at Hamburg.

/White

White Rhino Translocated to other Game Reserves.

(Fig. 2)

Mkuzi Game Reserve, Zululand.

The first rhino to be moved in a drugged state was in 1961 during the experimenting with the Themalon drug combination. A young female was captured in the west of Umfolozi Game Reserve and taken to Mkuzi Game Reserve, 100 miles north. Heavy rain fell during the journey and the truck got stuck. Twenty four hours passed with the rhino in the crate while we struggled to get the truck out of the mud. The rhino cut its foot on release and subsequently died of blood poisoning.

Others, including a full grown female, were captured in 1961 and transported to Mkuzi, making a total of ten animals. Only four remain within the boundaries of the Reserve. Poachers accounted for the majority.

(Table 1)

Ndumu Game Reserve, Zululand.

Eighteen white rhino (ten bulls and eight cows) have been moved to Ndumu Game Reserve since 1961. The rhino settled down remarkable well in what is an ideal habitat. Two rivers - the Usutu and the Pongolo - join within the reserve and many pans are created when the rivers overflow. An abundance of grazing occurs along the pan fringes, much of it cropped to a suitable height by the resident hippo. Patches of dense bush give adequate cover for shade and calving.

Despite the fact that the game reserve is small (25,00 acres) only three rhino tried to get out. One, a young male, walked up the Usutu river bed when the water was very low, and passed the edge of the fence.

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It wandered for 15 miles before being driven back into the reserve.

Initially they were released into bomas then into large paddocks, but this practice was discontinued.

Mortality.

One male died en route to Ndumu. Its death was due to a badly placed exhaust pipe; a following wind blew the fumes into the crate. Another young male was stuck in the mud and drowned. Two females were drowned shortly after release while trying to cross the Pongola river. Another got out of the reserve and headed in a southerly direction; it was shot by African poachers. A calf born in the reserve was taken and killed by a crocodile - the only record in Zululand of predation by crocodile.

Summary of Mortality at Ndumu

| | | | | |
|-----------|----|----|----|-------|
| Poaching | .. | .. | .. | 2 |
| Drowning | .. | .. | .. | 2 |
| En route | .. | .. | .. | 1 |
| Crocodile | .. | .. | .. | 1 |
| | | | | <hr/> |
| | | | | 6 |
| | | | | <hr/> |

Births 6
 White rhino surviving in Ndumu .. 18

Willem Pretorius Game Reserve, Orange Free State.

In March, 1962 the first four white rhino were introduced into the Orange Free State. The animals were transported in a drugged state on a journey of over 400 miles. It also necessitated leaving the hot Zululand low veld (elevation 800') to travel over the Drakensberg mountains (6,000 ft.) the initial translocation took place in driving rain and bitter

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could but the rhino were in good condition at the end of the journey.

Eight have now been translocated. No mortality has occurred and two births have been reported.

White Rhino released in the Kruger National Park.

A large male was introduced into the square mile paddock containing the original four sent in 1961. A. Brynard, Nature Conservator, Kruger National Park (in litt. 1962) mentioned that serious fighting broke out amongst the rhino and the newcomer received a very bad gash and a deep hole on the right hind leg, with some of the muscles being completely severed. The first rhino male had obviously established its territory. The injured rhino had to be destroyed. Two calves have subsequently been born in the paddock (Brynard pers.comm.).

Between 23rd June 1962 and 29th September 1964, 92 white rhino were transported to the Kruger National Park. All these animals were caught and immediately crated, then transported straight through to the Park, a journey of approximately 300 miles.

After October 1962, the National Park authorities decided to release the rhino straight into the field. One large male was attacked by lions and badly injured; it had to be destroyed. Another was attacked but got the better of the fight (Brynard pers.comm.).

Brynard (pers.comm. 1966) told of one incident after release when a Game Ranger on patrol came upon a dead white rhino bull killed by an elephant at a water hole near Shingwidzi in the north of the Kruger National Park. From the surrounding spoor he reconstructed the fight. The two huge combatants had fallen down a 100 foot embankment, but the rhino had

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refused to give way. An inspection of the rhino carcass revealed that it was severely gored by both tusks on one side and had two deep wounds from single tusk stabs.

Brynard (pers.comm.) states that rhino released north of the Sabie river had wandered furthest. Four had crossed into Portuguese East Africa, including one which crossed the border near Shingwidzi and went as far north as the Limpopo.

The rhino released south of the Sabie river wandered, but not to the same extent as those to the north. One female went into Portuguese East Africa and was killed by poachers, while another was drowned shortly after release. Some rhino released in the Crocodile Bridge area walked as far as Skukuza (a distance of 40 miles), remained in the area for a few days, then returned to the point of release.

Ten calves have been recorded (Brynard pers.comm.) but it is unknown how many of these were conceived in Umfolozi Game Reserve prior to translocation.

Rhodesia

The first eight rhino translocated to Rhodesia were tamed down prior to removal; four were put in the Matopos National Park and four in the Kyle Dam Game Reserve.

The rhino left Umfolozi Game Reserve at 0800 hours on the 30th August 1962 and arrived at their destination at 1200 hours on the 3rd September 1962 after a journey of 1,200 miles.

Davison and Condy (1963) recorded that two females were given 300 mgm. each of Largactil an hour before the journey

/commenced...

commenced. It was not necessary to administer any more tranquillisers en route.

By the end of 1965, with the development of land adjoining the Umfolozi Game Reserve for African settlement, it became urgent to remove all the white rhino. The Rhodesian wildlife authorities thankfully accepted a donation of 100 white rhino for their parks. The expense of keeping the rhino in bomas prior to translocation was too great for either the Natal Parks Board or the Rhodesian wildlife authorities.

It was decided to experiment in moving drugged rhino 800 miles immediately after capture.

The first rhino, a young male of 2,500 lbs, was moved in February 1966. (Immobilizing dose: 4 mgm. M99, 100 mgm. hyocine, 4 mgm. Acetylpromazine). The journey to Rhodesia took 28 hours of continuous driving. A total of 15 ccm at 50 mgm. per ccm Largactil (chlorpromazine hydrochloride) was administered during the journey. (Rochat, unpublished report, March 1966).

The second rhino, an adult female of 3,500 lbs. was translocated on 7th March 1966. (Rochat op.cit.). It leaned against the crate door during travelling and partially detached the anterior horn. During the 26 hour journey it had alternating periods of depression and alertness. On arrival at Kyle Dam it attempted to escape through the top of the crate and became violent. When released it became indifferent, drank water and lay down.

An initial dose of 10 ccm Largactil was sufficient for the first 10 hours of the journey, thereafter 3 to 5 ccm at

/50 mgm.....

50 mgm. per ccm as required. The total dosage was 30 ccm.

On 14th August, 1966 the third rhino, a young male of 3,000 lbs. was captured with 2 mgm. M99, 100 mgm. hyocine and 4 mgm. Acetylpromazine.

1 gm. Themalon and 20 ccm at 50 mgm. per ccm. Largactil was given to the third animal during the 30 hour journey.

The addition of Themalon appeared to enable the rhino to travel more comfortably and only right at the end of the journey did it loose its horn.

10 gm. Streptomycin was given to all three animals.

During these long journeys rhino will stand up, moving backwards and forwards, or lie down. When coming round from the drug they can be very violent and slow down the truck by their movements. They even try to climb out of the opening in the top of the crate. Animals travel decidedly better with their tails to the engine.

Subsequently a further six have been transported in an identical manner, without loss. At the time of writing, the operation continues and will do so until 100 have been moved. This rapid method of translocation has undoubtedly saved the lives of rhino which would otherwise have had to be shot.

Marking and release for further study.

Forty three animals have been captured, tagged and released for further study. Two of these animals, an 18 month old female and a 1 year old male, were subsequently

/recaptured.....

recaptured and remeasured. (See Table 2).

The first adult male successfully immobilized (December, 1960) was tagged in the ear with easily identifiable green streamers which remained in position for four months. This animal was followed by the writer and notes made of behaviour and habitat requirements. It was noted that it aggressively defended its territory against other males and that when a female entered its territory every effort was made to keep the female from moving out. Steele (pers. comm.) mentions that this habit is useful in capturing females within a male's territory, for the male prevents the female from running after it is darted.

(Table 2.)

Adult males that have been darted and have run into other male's territories have been attacked after preliminary warnings from the resident males. On one occasion in 1961 (personal observation) a resident male charged an intruding darted male and forced it into a deep ditch. Only by shouting repeatedly and blowing a vehicle hooter was it possible to get the attacker to desist.

(Table 3).

Capture of Black Rhino Diceros bicornis

A programme of capture and translocation of black rhino from unreserved areas to game reserves in Zululand has been carried out since 1961.

Black rhino injured in snares have also been captured treated and released.

Three black rhino were captured with morphine or Themalon plus hyocine and Largactil; two died.

/Four....

Four animals were captured with morphine or Themalon plus hyocine, Largactil and Sernyl; one died.

Seventeen animals were captured with M99, hyocine and Acetylpromazine; two died.

Dosage of M99 is 3 mgm. for a 2,200 lb. animal or 1 mgm. M99 per 700 lbs.

3 - 5 ccm of Taractan at 50 mgm. per ccm must be administered 15 to 20 minutes prior to the injection of Lethidrone required to get the animal up onto its feet and into the crate (Clark in litt.)

Ten black rhino have been translocated to the Ndumu Game Reserve. Eight have survived and one calf has recently been born.

A total of nine animals now occur there.

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SUMMARY

1. The history and distribution of the White Rhino is briefly outlined to indicate the reasons for translocation.
2. External physical characteristics differentiating the White Rhino from the Black Rhino are detailed.
3. Procedures and techniques for capture, transport and keeping in captivity in Umfolozi Game Reserve, are described.
4. The translocation of White Rhino within southern Africa undertaken between 1961 and September 1966 is detailed and illustrated together with the behaviour and history of animals released into former habitats. Brief observations of marked and recaptured animals in the Umfolozi Game Reserve are given, together with details of the most recent census.

TABLE AND FIGURE TITLES, PLATES, TRANSLOCATION
OF
WHITE RHINOCEROS

- Figure 1. Southern White Rhinoceros. Distribution changes in the 19th century.
- Figure 2. Southern White Rhinoceros. Translocations within Southern Africa 1961 - September 1966.
- Table 1. Fate of 441 White Rhinoceros immobilized in Umfolozi Game Reserve.
- Table 2. Growth of two juvenile White Rhinoceros in Umfolozi Game Reserve determined by marking and recapture. Measurements in inches.
- Table 3. Aerial count of White Rhinoceros, August 1965.

Table 1.

| | |
|----------------------------------|-------|
| To zoos | 63 |
| To other game reserves in | |
| Souther Africa | 282 |
| Marked and released for study .. | 43 |
| Deaths in captivity | 41 |
| Deaths during capture | 12 |
| | <hr/> |
| | 441 |
| | <hr/> |

Table 3.

| | |
|--------------------------------|-------|
| In Umfolozi Game Reserve | 606 |
| Out of game reserves | 206 |
| | <hr/> |
| | 812 |
| | <hr/> |
| Adults and sub-adults | 657 |
| Juveniles | 155 |

TABLE 2

| | MALE (Tommy) | | | | FEMALE | | | |
|-------------------------|------------------|-----------------|------------------|---------------|------------------|------------------|---------------|-----------|
| | 12 months | 27 months | 34 months | Estimated Age | 18 months | 30 months | Estimated Age | 30 months |
| Horn, anterior | 9 | 9 $\frac{5}{8}$ | 11 $\frac{1}{2}$ | | 8 $\frac{1}{4}$ | 12 $\frac{1}{4}$ | | |
| Horn, posterior | Forming | 2 $\frac{1}{4}$ | 2 $\frac{1}{4}$ | | 1 $\frac{3}{4}$ | 3 $\frac{1}{2}$ | | |
| Head | 23 | 31 | 30 $\frac{1}{2}$ | | 22 | 29 $\frac{1}{2}$ | | |
| Occiput to base of tail | 68 | 86 | 89 | | 75 $\frac{1}{2}$ | 84 $\frac{1}{2}$ | | |
| Tail | 11 | 22 | 23 $\frac{3}{4}$ | | 17 | 22 $\frac{1}{4}$ | | |
| Heart girth (in full) | 74 $\frac{1}{2}$ | 89 | 95 | | 81 | 100 | | |
| Height, at shoulder | 48 $\frac{1}{2}$ | 55 | 59 $\frac{1}{2}$ | | 44 | 52 | | |
| Bar | 8 | 9 $\frac{3}{8}$ | 9 $\frac{1}{2}$ | | 9 | 9 $\frac{3}{4}$ | | |