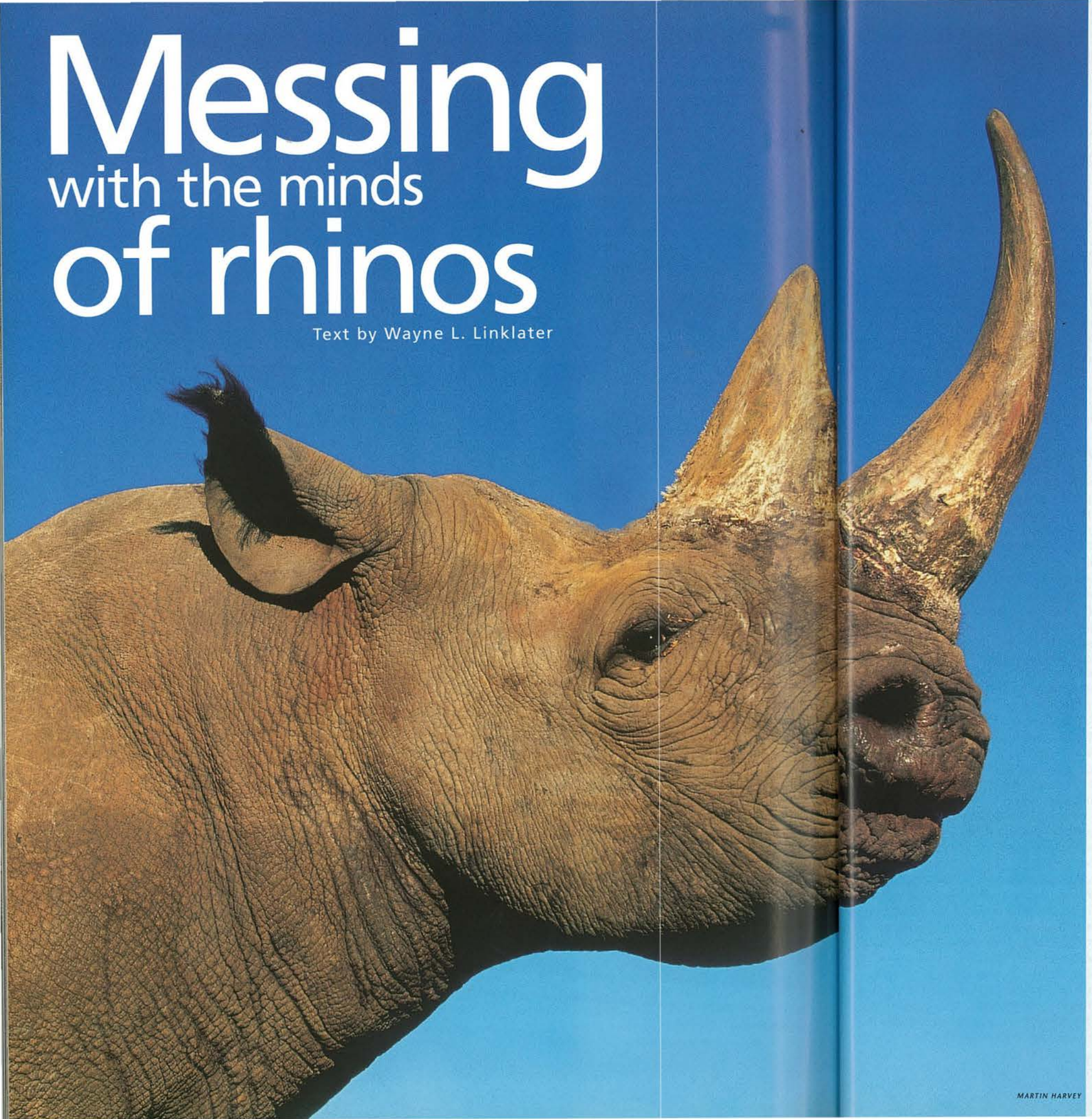
Messing with the minds of rhinos

Text by Wayne L. Linklater



MARTIN HARVEY

It has been a long, hard day at work and you're glad to be home. You unlock your front door, open it and step into your living room – and stop dead. Someone you don't recognise is standing by the drinks cabinet and, having helped himself to your favourite whisky, is casting a possessive eye over your CD collection and an unfriendly sideways look at the photos of your family. You are both threatened and defensive. What is your response?

If you are a black rhino, you don't hesitate: you drop your head, lower your horn and charge. If the intruding rhino has recently been released into your area, it won't know where to flee. It is unfamiliar with its new environment and has never met you. It is confused and unsure of itself. A moment of indecision could prove to be its last. Your one ton collides with the newcomer at up to 50 kilometres per hour. Your horn is almost a metre long and, sharpened to a rapier point on the trees and rocks of your home, it makes massive puncture wounds in your opponent. Your initial impact and subsequent thrusts could prove fatal. Or the fight could go on for hours as you try to chase the intruder from your home.

This is a scenario played out time and again when black rhinos are moved from one reserve to another in an effort to ensure the species' survival. Black rhino numbers have dropped from about 65 000 in 1970 to around 3 000 today, and the animals are scattered across Central and southern Africa in populations that are either too small to be self-sustaining or so large that they are vulnerable to outbreaks of disease, overstocking or illegal hunting. In an attempt to create a balance, a massive programme of capture, relocation and release has been shipping black rhinos out of parks that have been safe havens for them over the past three decades – like Etosha in Namibia and Umfolozi in South Africa – and settling them in new sites. The hope is that both old and new populations will grow quickly and interbreed as they did before the advent of fences and hunting.

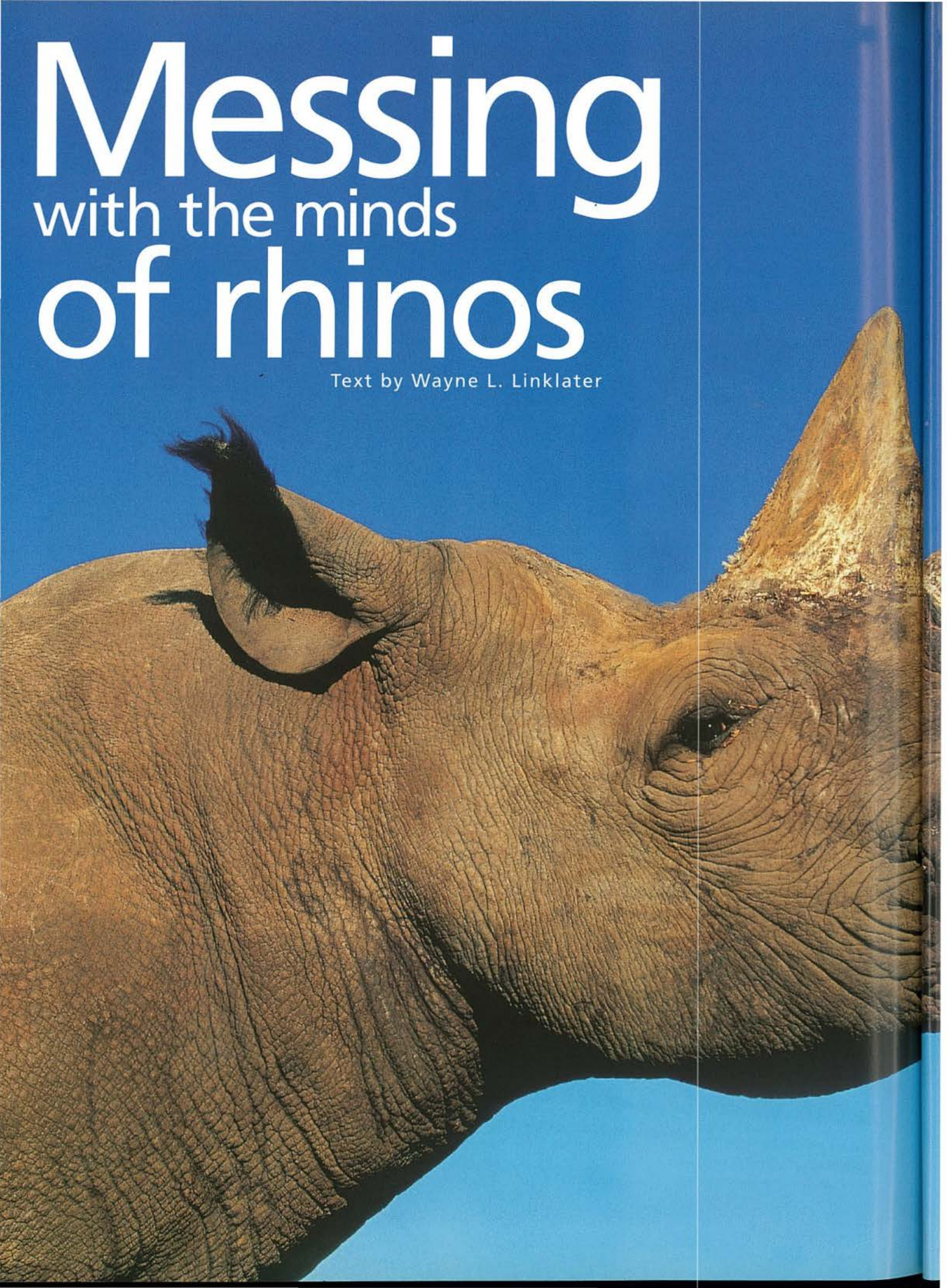
This translocation programme is winning important battles in the war for rhino conservation. Throughout southern Africa its success in reducing losses from poaching, re-introducing black rhinos to new reserves and supplementing the genetic stock of established populations has been convincing. Nor is it only the recipients that benefit. Parks with healthy rhino populations must ensure that they have enough resources to enable their rhinos to breed at their greatest potential. By providing animals for relocation they help to keep their own populations productive and healthy.

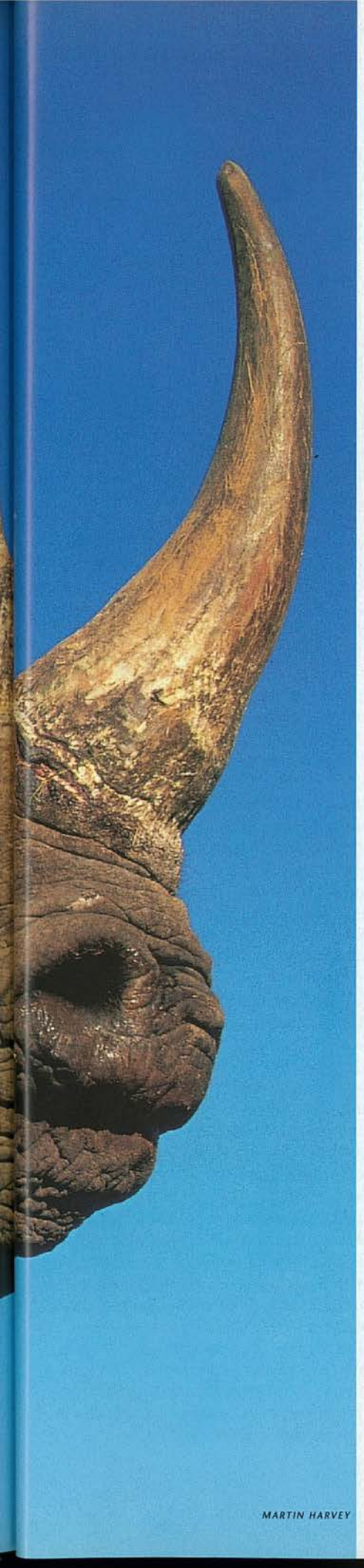
But there is a catch. Black rhinos, particularly males, fight unfamiliar rhinos that intrude into their home ranges, often killing them. Clearly, a solution to this problem would make an important contribution to rhino conservation, and researchers at the Center for Reproduction of Endangered Species (Zoological Society of San Diego) and the Terrestrial Ecology Research Unit (University of Port Elizabeth) think they may have found one. By a sleight of hand – or, more aptly, a sleight of nose – they aim to modify rhino behaviour through scent and thus reduce fight-related deaths. In 2002 they began a research programme in South Africa and Namibia to establish whether rhino smells can be used to fool resident rhinos into being less aggressive.

Rhinos are largely loners with poor eyesight but a well-developed sense of smell. The fact that they go to a great deal of effort to distribute their dung and urine – both sexes spray their urine and kick their dung around as it is deposited – suggests that their sense of smell is the main sense they use when interacting with other rhinos. Just as a domestic mare will urinate copiously when she is most receptive to mating, perhaps female black rhinos urinate much more when they are most fertile. And, like pet male dogs that liberally anoint and check out car tyres and other prominent sites for the smells of other dogs, male rhinos anoint their home range with their urine and investigate the urine and dung of other rhinos. Also, black rhinos create large communal piles of dung, called middens, at what appear to be strategic locations ▶

Messing with the minds of rhinos

Text by Wayne L. Linklater





MARTIN HARVEY

It has been a long, hard day at work and you're glad to be home. You unlock your front door, open it and step into your living room – and stop dead. Someone you don't recognise is standing by the drinks cabinet and, having helped himself to your favourite whisky, is casting a possessive eye over your CD collection and an unfriendly sideways look at the photos of your family. You are both threatened and defensive. What is your response?

If you are a black rhino, you don't hesitate: you drop your head, lower your horn and charge. If the intruding rhino has recently been released into your area, it won't know where to flee. It is unfamiliar with its new environment and has never met you. It is confused and unsure of itself. A moment of indecision could prove to be its last. Your one ton collides with the newcomer at up to 50 kilometres per hour. Your horn is almost a metre long and, sharpened to a rapier point on the trees and rocks of your home, it makes massive puncture wounds in your opponent. Your initial impact and subsequent thrusts could prove fatal. Or the fight could go on for hours as you try to chase the intruder from your home.

This is a scenario played out time and again when black rhinos are moved from one reserve to another in an effort to ensure the species' survival. Black rhino numbers have dropped from about 65 000 in 1970 to around 3 000 today, and the animals are scattered across Central and southern Africa in populations that are either too small to be self-sustaining or so large that they are vulnerable to outbreaks of disease, overstocking or illegal hunting. In an attempt to create a balance, a massive programme of capture, relocation and release has been shipping black rhinos out of parks that have been safe havens for them over the past three decades – like Etosha in Namibia and Umfolozi in South Africa – and settling them in new sites. The hope is that both old and new populations will grow quickly and interbreed as they did before the advent of fences and hunting.

This translocation programme is winning important battles in the war for rhino conservation. Throughout southern Africa its success in reducing losses from poaching, re-introducing black rhinos to new reserves and supplementing the genetic stock of established populations has been convincing. Nor is it only the recipients that benefit. Parks with healthy rhino populations must ensure that they have enough resources to enable their rhinos to breed at their greatest potential. By providing animals for relocation they help to keep their own populations productive and healthy.

But there is a catch. Black rhinos, particularly males, fight unfamiliar rhinos that intrude into their home ranges, often killing them. Clearly, a solution to this problem would make an important contribution to rhino conservation, and researchers at the Center for Reproduction of Endangered Species (Zoological Society of San Diego) and the Terrestrial Ecology Research Unit (University of Port Elizabeth) think they may have found one. By a sleight of hand – or, more aptly, a sleight of nose – they aim to modify rhino behaviour through scent and thus reduce fight-related deaths. In 2002 they began a research programme in South Africa and Namibia to establish whether rhino smells can be used to fool resident rhinos into being less aggressive.

Rhinos are largely loners with poor eyesight but a well-developed sense of smell. The fact that they go to a great deal of effort to distribute their dung and urine – both sexes spray their urine and kick their dung around as it is deposited – suggests that their sense of smell is the main sense they use when interacting with other rhinos. Just as a domestic mare will urinate copiously when she is most receptive to mating, perhaps female black rhinos urinate much more when they are most fertile. And, like pet male dogs that liberally anoint and check out car tyres and other prominent sites for the smells of other dogs, male rhinos anoint their home range with their urine and investigate the urine and dung of other rhinos. Also, black rhinos create large communal piles of dung, called middens, at what appear to be strategic locations ▶

in their range and these are visited and contributed to regularly by other rhinos.

Clearly, black rhinos depend on their sense of smell in their social lives and when making decisions about where to live. Indeed, scent might be like 'vision' to the poorly sighted rhino, a solitary creature that must communicate with its potential mate, rival or neighbour before seeing, perhaps even meeting, them. If this is the case, then the idea to be tested is whether rhinos can become acquainted with one other through their scent without actually meeting. If they can, and it seems very likely, then it might be possible to modify the way black rhinos behave towards each other when meeting for the first time.

It has been a long, hard day at work and you're glad to be home. You unlock your front door, open it and step into your living room – and stop dead. Someone is standing by the drinks cabinet ... but after your initial fright you recognise him. It's your neighbour. You see him occasionally and chat over the fence, but are seldom in one another's houses. You are surprised. You hesitate. You ask, 'What are you doing?' You move towards him and assess the situation. You are assertive but cautious. You want to know why he is here and give him a chance to explain and leave in peace. After all, he might be here for good reason and you don't want to spoil a neighbourly relationship that has been OK so far. He offers excuses, sidles towards the door and returns to his side of the fence. You let him know you don't want to be surprised like that again. You feel uncomfortable, resolve to keep an eye on him, but eventually relax and settle into the evening routine of whisky and CDs.

In this scenario a conflict occurs but without bloodshed because you recognise the intruder, hesitate and begin communicating with him directly, giving you both the opportunity to resolve the conflict without anyone getting hurt. Can we fool black rhinos into behaving less aggressively to newcomers by causing them to think a real intruder is a neighbour?

In the rhinos' world, where scent is the source of much of their information about their habitat and other rhinos, then scent might be used to familiarise rhinos with one another before they meet – and thus reduce the tendency for the first response to an intruder to be all-out attack. When translocating rhinos, this means exchanging dung and urine between the new arrival and the resident rhino at a release site. It may seem bizarre, and field-hardened conservation managers may be sceptical, but the scientists are unfazed. 'There is good evidence from other animals that this idea works,' says Ron Swaisgood, a researcher on scent communication among giant pandas and white and Indian rhinos. 'However,' he adds, with customary scientific caution, 'we have a long way to go before we are at that point with black rhinos.'

BLAIR REID (2)

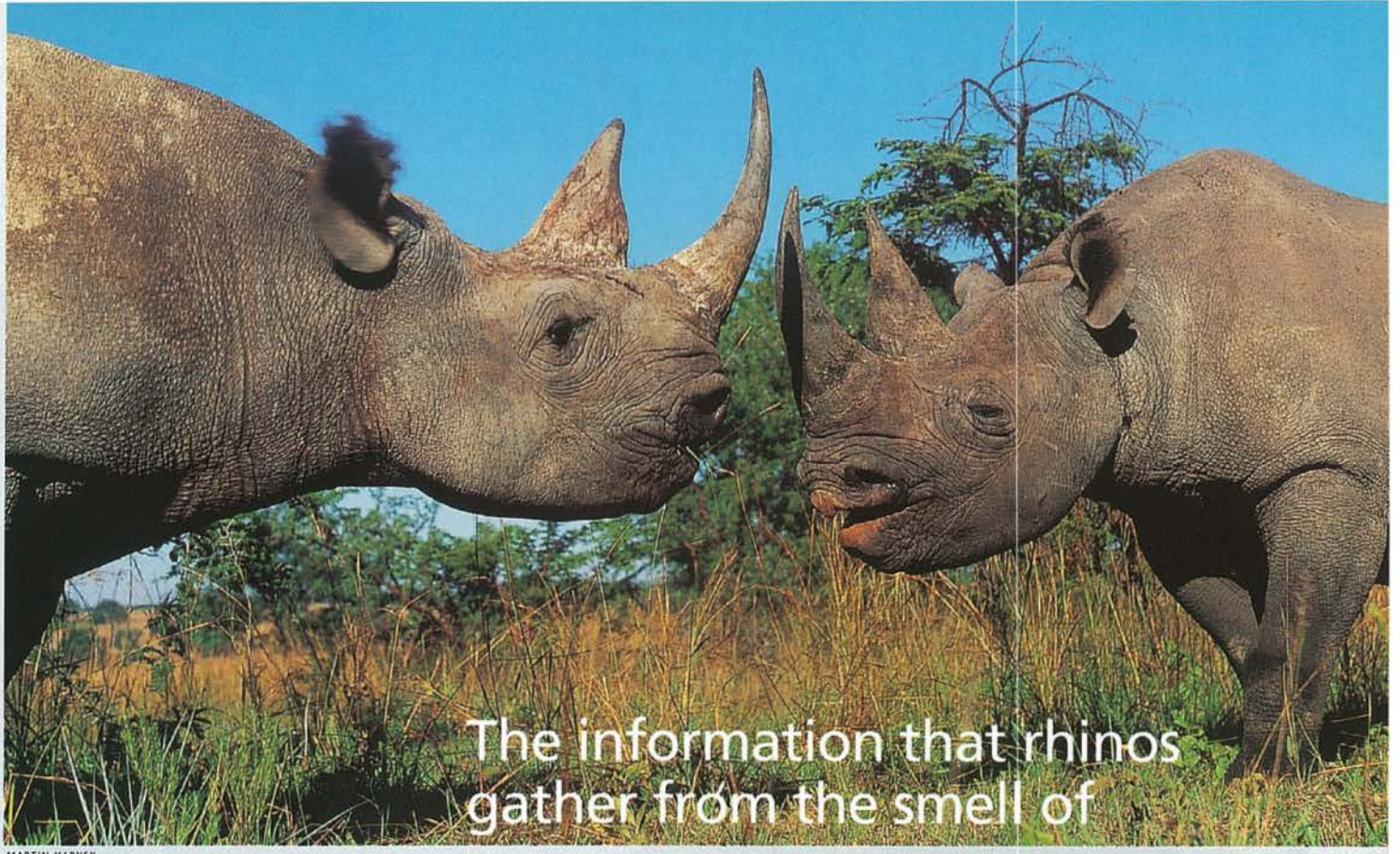
WAYNE LINKLATER (2)

Ongoing research into black rhino behaviour in Namibia and South Africa involves (top to bottom) collecting the fresh urine sprayed onto a bush by a male rhino for analysis of the chemical content of its scent; inserting a radio transmitter into a rhino's horn to facilitate tracking; measuring a dung-scrape-mark; and observing a tracked rhino at close quarters.

It's not as if the idea is new; rhino biologists have been playing with the notion of using dung to encourage rhinos into new habitat for the past 20 years. But perhaps the time has come to expose it to scientific test. First, however, we need to know what black rhino scents are made of, how do the rhinos use scent, and what do the different scents mean to rhinos?

To find an answer to the first question, we collect fresh dung from a wild rhino, analyse its chemical composition by means of a gas chromatograph-mass spectrophotometer (or 'chemical nose') and determine what molecules are found in the smell of that rhino's dung. We then observe how another rhino – either one in captivity just prior to release or one in its home range – reacts to it. In the case of a rhino in its home range, we sneak up on it while it is asleep, lob the dung nearby, preferably upwind, and move back, waiting for the rhino's inquisitive nature to draw it to the scent. Alternatively, we install a camera at a communal midden or at a waterhole where we have placed the dung.

When a rhino encounters a new scent it may respond in a number of different ways, perhaps huffing through its almost closed mouth or snorting through its nostrils or, like a horse or antelope, lifting its upper lip and raising its head and neck to full stretch in a posture known as flehmen. Black rhinos sometimes drop their own dung or urine on the strange dung in a behaviour we call over-mark, or they counter-mark by placing their own dung or urine nearby. In one particularly elaborate reaction, which we call a dung-scrape-mark, a black rhino kicks forwards and backwards as it drops its own dung, thus scattering it around and leaving trenches in the earth with its feet, and then it drags its rigid hind legs through the dung, continuing sometimes for hundreds of metres.



MARTIN HARVEY

The information that rhinos gather from the smell of dung would probably astound us in its complexity

These are only a small sample of the many behaviours we have observed black rhinos perform when they find dung. The behaviours and sounds used, and their sequence, change according to whether the dung the rhino smells comes from a male or female, an immature or an adult, or a rhino they have or have not smelled before. In fact, the information that rhinos gather from the smell of dung would probably astound us in its complexity. Once we have a better understanding of it, and of how the rhinos use it, we can test whether scent really can be used to modify the aggressive behaviour of black rhinos.

In experiments in Namibia and South Africa, we are using translocated rhinos and model rhinos to help us arrive at a conclusion. Before a translocated rhino is released into a new population, it is kept in captivity for 10 days to a few weeks and during this time we collect its dung and distribute it around the release area. The resident rhinos find the new scent during their movements in the area, sniff it and respond, and in the process become familiar with the new rhino's smell and the information it carries. At the same time we collect their fresh dung and take it back to the captive rhino, giving it the opportunity to become acquainted with its new neighbours. After the new rhino has been released, we observe its behaviour and that of the resident rhinos, comparing it with the behaviour of rhinos that were not previously introduced to one another by scent.

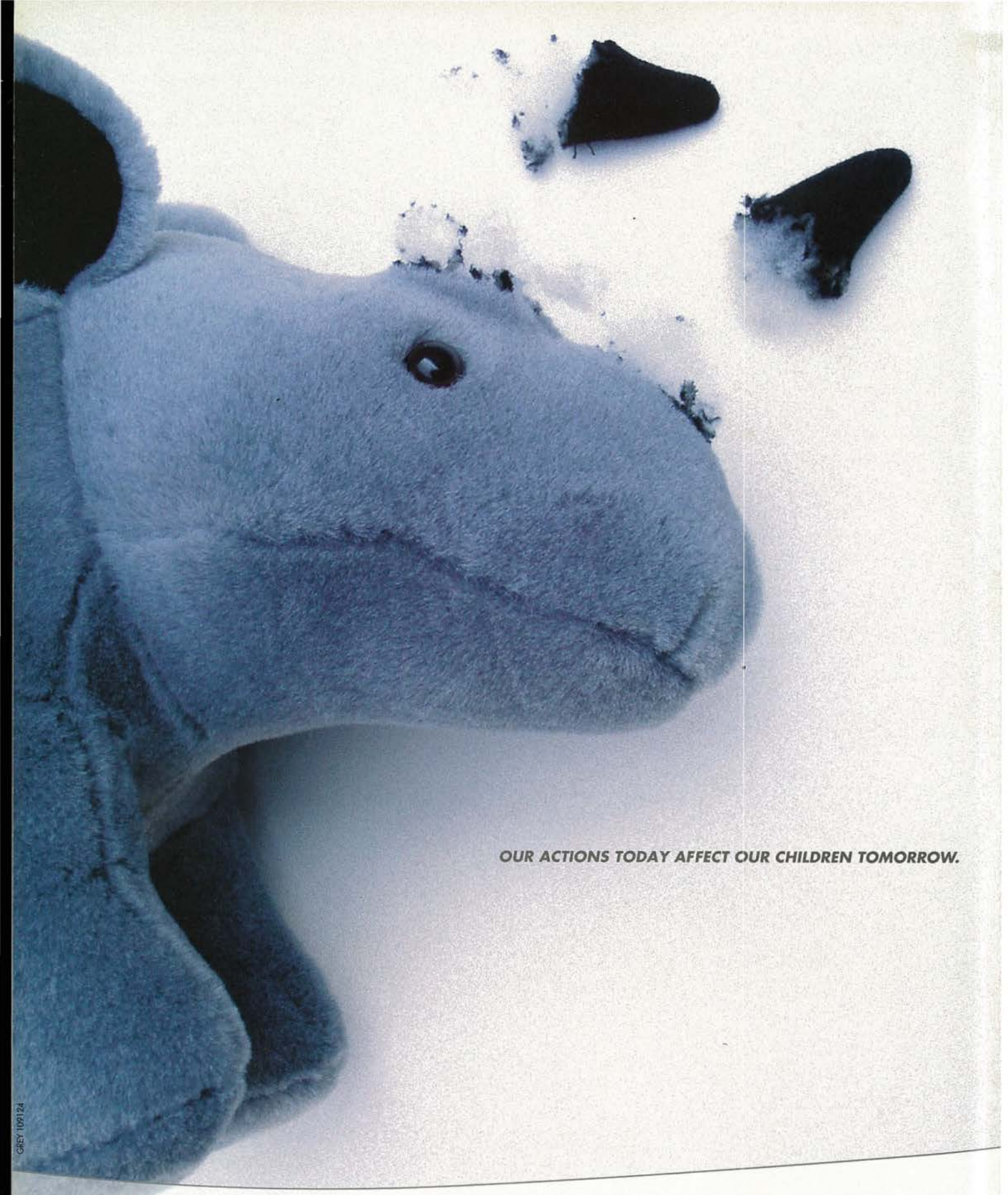
We track the rhinos' locations by means of radio transmitters in their horns and spend as much time as possible actually with them, watching and recording their behaviour, assessing their body condition and checking for evidence of fighting. We also use trained trackers to follow rhino spoor and measure how the rhinos scent-mark and use the reserve, and how they monitor and encounter one another.

In other trials, we are using rhino models to gauge a resident's reaction to an intruder, taking advantage of the rhino's poor eyesight. The model, a rhino profile cut from a foam sheet or from simple cotton sheeting, is scented with a strange rhino's dung and then set up near a sleeping resident rhino. On being woken, the resident at some point recognises the model as an intruder and we record how it behaves towards it. By noting differences in aggression towards models with familiar or unfamiliar scents, we can judge whether exposure to a new rhino's scent reduces the resident rhino's tendency to attack.

In these ways we hope to find out whether black rhinos will tend to hesitate and communicate rather than immediately attack an unfamiliar animal in their new home. Messing with the minds of rhinos in this way will, we hope, make a valuable contribution to black rhino conservation. ■

ACKNOWLEDGEMENTS

The work described is made possible by the Center for Reproduction of Endangered Species, Zoological Society of San Diego, USA, and the Terrestrial Ecology Research Unit, University of Port Elizabeth, South Africa. I acknowledge the assistance of Ezemvelo KZN Wildlife; Mauricedale Game Ranch; South African National Parks; the Ministry of Environment and Tourism, Namibia; and Ron Swaisgood, Ruth Hannon, Blair Reid, Braden Crocker, Zoe Brocklehurst and Laurence Wahlberg. Lastly, my thanks to the several game reserves in Namibia which contributed to this study but, out of concerns for rhino security, cannot be named here.



OUR ACTIONS TODAY AFFECT OUR CHILDREN TOMORROW.

GREY 109124

That is why Mazda has committed over R12 million to preserving wildlife and the ecology. Each year since 1990, we have invested R1 million in conservation projects such as TRAFFIC, an organisation that monitors and investigates the trade in endangered species. So that we leave our children a heritage they can continue.

mazda
WILDLIFE FUND