Kruger National Park,
Letaba camp
South-Africa
1/11/96-

Africa's VANISHING WILDLIFE

Chris Stuart

Tilde Stuart

Half title: *The slaty egret* (Egretta vinaceigula) *has the most restricted distributional range of any African mainland heron.* PHOTO: *Clem Haagner, ABPL.*

Title pages: *The wild dog* (Lycaon pictus) *is the second rarest canid on the African continent and is heavily persecuted despite this.* PHOTO: *Beverly Joubert, ABPL.*

Facing page: *Hamadryas baboon* (Papio hamadryas) *populations have been affected by severe drought.*

Below: *The bearded vulture* (Gypaetus barbatus) *occupies high montane country, mainly in the Drakensberg, Ethiopian Highlands and Atlas Mountains.*

Contents: *The Table Mountain ghost frog* (Heleophryne rosei) *is restricted to a few locations on the mountain that dominates Cape Town.* PHOTO: *Atherton de Villiers.*

ISBN 1 86812 521 1

First edition, first impression 1996

Published by
Southern Book Publishers (Pty) Ltd
PO Box 3103, Halfway House 1685

Cover design by:	Alix Gracie
Cover photograph by:	Shaen Adey, ABPL
Maps by:	Alix Gracie C.C., t/a Design Dynamix, Cape Town
Designed by:	Alix Gracie C.C., t/a Design Dynamix, Cape Town
Set in:	Adobe Garamond 9.7/12
Reproduction:	Hirt & Carter Repro, Cape Town
Printed and bound by:	SNP Printing Pte Ltd, Singapore

CHAPTER 3

RHINOS

On the horns of a dilemma

This medicine is carefully prepared from the best selected Rhinoceros Horn ...

Description and taxonomy

Of the five living rhino species, two, the white rhinoceros *(Ceratotherium simum)* and the black rhinoceros *(Diceros bicornis)* are found only in Africa. The names "white" and "black" rhino are deceptive. Both species are similar in colour: usually different shades of grey, depending on the dust, soil or mud in the area where they occur. We prefer the name square-lipped or grass rhino for the white rhino, and hook-lipped for the black rhino, because these names refer to the most obvious difference between the two species. However, the use of black and white is so entrenched that we will follow convention so as not to confuse the reader.

The white rhino is the second-largest land mammal, secon only to the elephant, with body mass in adult bulls exceedin two tons and shoulder height almost reaching 2 m. It is larg than the black rhino, and also differs from it in having a larg distinctive hump on the neck. This hump was a favourite de icacy in the days when these animals were much more nume ous. The head is long and carried close to the ground. Th broad square muzzle, from which it draws its alternative nam is distinctive. The ears are large and pointed. The horns, mad up of hair-like tubular filaments, are located one behind th other on the front of the face. The record front horn length

an amazing 1,58 m.

The black rhino reaches about half the mass of its white cousin. Average shoulder height is 1,6 m. It has no raised hump on the neck and the triangular, prehensile upper lip is distinctive. Despite its markedly smaller size, this rhino can also bear horns of considerable length: the record is 1,2 m.

The two African rhino species have survived in their present form for at least three million years. Ancestors that were distinctly similar to modern rhinos had been around for as much as 40 million years.

At present, two subspecies of white rhino and four subspecies of black rhino are recognised. Although the father of modern taxonomy, Linnaeus, first described the black rhinoceros in 1758, the southern race of the white rhinoceros was only described in 1817 and its northern race as late as 1907. However, the presence of the northern white rhino was already known in the last years of the 19th century.

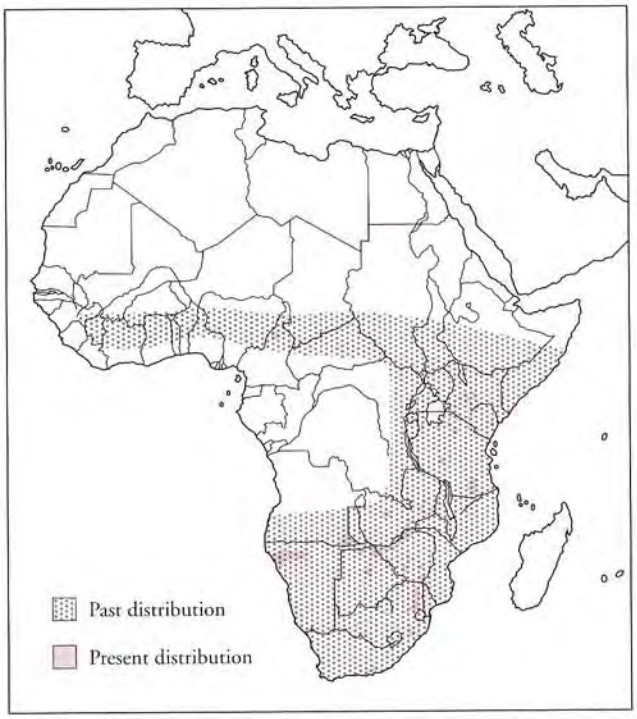
The two white rhino races are widely separated. The northern form *(Ceratotherium simum cottoni)* is now restricted to Garamba National Park in Zaïre on the Sudanese border, with perhaps five individuals in Sudan. The southern form *(C.s. simum)*, apart from numerous introduced and reintroduced populations, survives in northern KwaZulu-Natal province and the Kruger National Park (South Africa), where the single largest population is resident.

Differences between the two subspecies are minimal, with *cottoni* said to be somewhat longer in the leg and shorter in the body. These differences are difficult to detect in the field and may well not be valid, given the small numbers examined. Because the white rhino once occurred over large areas of savanna Africa, even extending into the southern Sahara when it was better watered, and almost certainly formed one contiguous population in the not too distant past, evolutionary differences will be limited. Nevertheless it is of great conservation concern to protect the minute northern population, the last white rhinos occurring naturally above the equator.

In the case of the four recognised black rhinoceros subspecies mitochondrial DNA sequencing suggests only very small sequence divergence between them (less than 0,4%). These differences are so minute that perhaps no subspecies should be recognised. However, they may have some hidden and unknown adaptive specialisations. It is therefore expedient to recognise the subspecies as valid, at least until such time as it is possible to prove, or disprove, their validity.

Below: *Black rhinoceros* (Diceros bicornis) *on the lush green plains of the Ngorongoro Crater, Tanzania.* Photo: *Gavin Thomson, ABPL.*

	BLACK RHINOCEROS	WHITE RHINOCEROS
	Diceros bicornis	*Ceratotherium simum*
Total length	3,5-4,3 m	4,5-4,8 m
Tail length	70 cm	1 m
Shoulder height	1,6 m	1,8 m
Mass	800-1 100 kg	♂ 2 000-2 300 kg ♀ 1 400-1 600 kg
Home range	0,5-500 sq km	1-20 sq km
(The size of the home range of both species depends on conditions such as food availability, shade and water)		
Social structure	solitary	groups of 1-5
Gestation	450 days	480 days
Birth mass	40 kg	40 kg
Diet	browse	graze
Habitat	bushed areas	open woodland; short grasses
Number surviving in 1994	*D.b. bicornis* 519	*C.s. simum* over 5 000
	D.b. longipes 35	*C.s. cottoni* 36
	D.b. michaeli 489	
	D.b. minor 1 200	
TOTAL	2 243	over 5 036



BLACK RHINOCEROS

Distribution and habitat

Before we head into the tragic present and future of both of Africa's rhino species, perhaps we should first take a glimpse at their much rosier past. When reading old accounts written by naturalists, hunters and travellers, one starts to realise how abundant rhinos were, in particular black rhinos.

In the historical accounts dealing with rhinos it is unfortunately seldom possible to distinguish between white and black. However, there is sufficient documentation to allow us to draw conclusions on their former range. We know from historical accounts that the black rhino was distributed from Nigeria eastwards to the Horn of Africa, and throughout east, central and southern Africa. When the first Europeans settled in present-day Western Cape (South Africa), black rhinos were wandering the bush country within sight of Table Mountain, the great sandstone ridge that dominates the city of Cape Town.

As far as we are aware the first documented record of the black rhino in the Cape is from one Leendert Janssens, who along with several companions was shipwrecked in Table Bay in 1647. He reports that they shot a rhino and notes that "... the flesh was firm and tasty."

One of Governor Van Riebeeck's earliest reports to mention rhinos was based on an account by one of his men:

> *In the evening marched 7 miles. Saw two rhinoceroses which charged us and threatened to destroy us, but God protected us. Jan Verdonck had to abandon his hat and sword ... Took our rest for the night alongside a brook, in God's name ... Had to leave this place when two rhinoceroses advanced upon us.*

All this within a few kilometres of Cape Town! A rather bloo thirsty and gruesome account of an encounter with a bla rhino was recorded by one Johan Nieuhof in 1654:

> *We heard that a rhinoceros, or nosehorner, was fallen in a marsh and, because of its weight, could not get out. Commander Rietbeek sent some soldiers with muskets, but the bullets rebounded from its hard wrinkled skin. They cut an opening in its withers and fired into this until at last they killed it. The horns are still preserved in the Fort at the Cape and from them at times healths are drunk.*

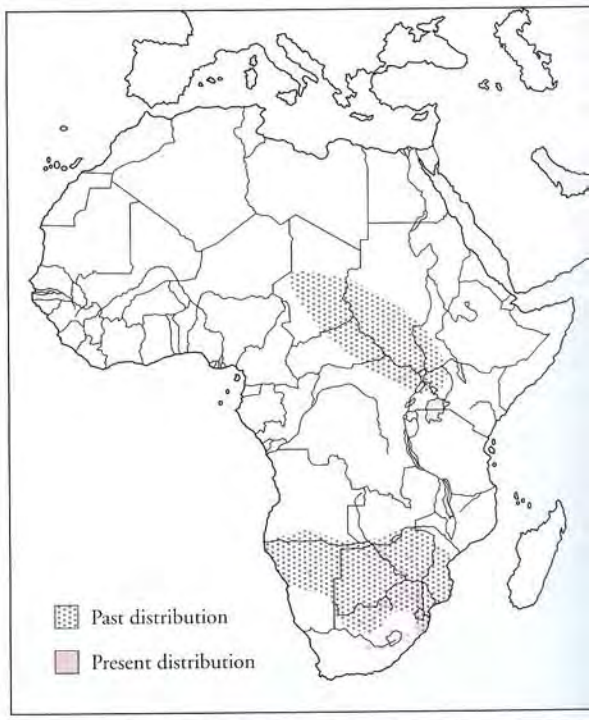
We find one description of the so-called "Cape" rhinoce particularly delightful, written by Kolben in 1731:

> *His mouth is like that of a Hog, but somewhat more pointed ... He is not fond of Feeding on Grass, chusing rather Shrubs, Broom and Thistles. But the delight of his Tooth is a Shrub ... the Rhinoceros-Bush.*

The description leaves no doubt that these are black rhin Similar accounts can be located for most areas through their former range.

White rhinos probably did not occur anywhere near Ca Town. Reports of the white rhino are more scanty, prima because of its more limited distribution. Also, its less aggress nature is not conducive to tales of daring and bravery.

No accurate estimates of past abundance are available either white or black rhinos but some authorities have e mated that 60 years ago probably as many as one million bl rhinos inhabited the savanna woodlands of central, eastern a



WHITE RHINOCEROS

Above: *White rhino* (Ceratotherium simum) *cow with calf.*

southern Africa. Today a total of barely 2 000 survive, a frightening 0,2% of the past estimate.

The black rhino once occurred in the following countries: South Africa, Swaziland, Namibia, Botswana, Angola, Zimbabwe, Mozambique, Zambia, Malawi, Tanzania, Kenya, Uganda, limited areas of Zaïre, Somalia, Ethiopia, Sudan, Central African Republic, Chad, Cameroon, Nigeria and Mali.

There is considerable uncertainty as to how far west the black rhino ever occurred, although it was definitely present at least until 1935 to the north of the Benue River in Nigeria, in the vicinity of the Yong Plateau and along Nigeria's border with Cameroon. Much earlier reports by Arabs and local people who operated in the area between Lake Chad and the upper Niger River frequently mentioned rhino sightings. Sir Harry Johnstone, writing in 1906, mentioned that the tribal group known as the Mandingos in northern Liberia assured him that rhinos once lived in their tribal area. They could identify the animals from pictures. We hold the opinion that there is no reason why black rhinos should not have occupied much of the acacia woodlands of the Sahel belt through west Africa, but hard evidence is lacking.

However, there are definitely no rhinos surviving to the west of Cameroon today. The last remnants of the "western" race of the black rhino, *Diceros bicornis longipes,* hang on to a precarious existence in northern Cameroon. A mere 35 are all that remain. Over the years there have been persistent rumours of black rhinos occupying areas within forests inland from the greater Gulf of Guinea, in for instance Congo, but as far as we know these have never been verified. Given the types of habitat rhinos occupy today it would seem unlikely that they ever lived in tropical lowland forests, except marginally in association with more favoured habitats.

At the beginning of this century the black rhino was considered to be very common in Zambia but by 1934 the countrywide population was estimated at fewer than 1 500.

Further northwards Tanzania was once home to a large percentage of Africa's rhinos. The following gives some idea of the great numbers occurring in suitable habitat: in 1887, close to Mount Kilimanjaro, John Willoughby shot 66 black rhinos in just four months; the hunter Delegorgue killed 56 rhinos on an expedition lasting eight months. During the First World War, when this was German territory, hunting parties made regular forays in order to hunt rhinos for their meat, which was used to feed the black askaris.

In Kenya, one relatively small area, associated with the Makueni tsetse-fly belt, was designated for human settlement in 1948. This entailed the shooting of many game animals, including an incredible 1 000 or more black rhinos. One

hunter operating in Kenya claimed to have personally shot 1 600 black rhinos, mostly in official cropping programmes. Today Kenya's total rhino population is about one third of the number killed by that one man!

It is hard to imagine today, but only a few decades ago visitors to the Kenyan national parks were routinely warned, "Find your rhino before it finds you!" The warning was issued because rhinos, which can be aggressive, were so plentiful. Today the average visitor is lucky to catch even a fleeting glimpse of this prehistoric-looking animal in any Kenyan conservation area. In Tsavo National Park, in south-eastern Kenya, black rhinos were estimated to number between 6 000 and 9 000 in 1969. When the park was first proclaimed in 1948 this total may have been much higher, perhaps double. Daphne Sheldrick has said of the number of black rhinos in Tsavo in the 1960s, "They were so thick on the ground, if you didn't see 40 in an afternoon, you'd had a bad day." It is surmised that the decline of this particular population was associated with a considerable increase in elephant numbers, to more than 35 000. Elephants tend to outcompete rhinos for similar food plants. The decline in rhino numbers could also be directly linked to the catastrophic drought that hit south-eastern Kenya in 1961.

Above: *Removing the horns from a white rhino.* Photo: *Bruno Nebe.*

In 1980 it was estimated that a total of about 20 000 black rhinos survived in Africa, although some reports put the figure as high as 30 000. By 1984 numbers had dropped to fewer than 9 000, and two years later barely 4 000 still roamed the bushlands of Africa. In 1989 a mere 3 000 were left and in 1992 numbers had fallen below 2 600.

These figures are shocking enough, but when one looks at the declines in a few specific countries the true enormity of the disaster hits home. Zambia had a national population of 2 750 black rhinos in 1980; now there are fewer than 40. Tanzania had an estimated 3 795 rhinos in the same year and today there are fewer than 130 – probably far fewer.

Kenya lost 98% of its rhino population between 1970 and 1985 but today it is one of only two countries that have stable and growing populations. Since 1985 the Kenyan rhino population has expanded by 5% per year under intensive protection. There are about 500 rhinos in Kenya now. Although this is good news, we should not lose sight of the fact that there may have been 18 000 rhinos in that east African country in 1969.

Zimbabwe's black rhino population, until recently the largest of any country, has gone from perhaps 1 400 in 1980 to no more than 300 today. One estimate puts the figure at 120 in December 1994. This population is still under severe pressure, despite vast sums of money pumped into poaching control. An illustration: in August 1994 an intensive capture operation was carried out in a 6 000 sq km block in the Zambezi Valley which was believed to hold a fair number of rhino. Only one cow and a large calf were found!

By far the most seriously threatened black rhino subspecies is *Diceros bicornis longipes,* now found only in tiny fragmented populations in a very limited area of Cameroon, with a mere 35 surviving at the time of writing. By the time you read this the total is almost certainly lower.

There are now no naturally occurring black rhinos outside the KwaZulu-Natal province in South Africa, although satellite populations have been introduced or reintroduced to a number of conservation areas, including Augrabies Falls, Vaalbos, Kruger and Addo national parks and a limited number of provincial and privately owned sanctuaries. The population in Addo is of the east African subspecies *michaeli.*

White rhinos, once abundant north of the Victoria Nile, were estimated to number only some 335 individuals there in 1957. In 1928 an estimated 130 or so white rhinos managed to cling to survival in Uganda, but by 1950 this population had grown to about 500. However, from that time there was a steady decline. In 1963 it was known that only 71 animals remained – the price of rhino horn was rising! In an attempt to save the northern white rhino, 15 animals were darted and removed to the apparent safety of Uganda's Murchison Falls National Park. The Ajai sanctuary was set aside specifically to conserve a remnant population. In 1972 about 120 white rhinos lived in Ajai but by 1978 they had been reduced to 80. In the same year only 25 were known to live in Murchison. The fate of the Ugandan rhinos was sealed when the Tanzanian army invaded in order to overthrow the dictator Idi Amin. By 1980 white rhinos were but a memory in Uganda.

In 1958 more than 1 000 northern white rhinos were estimated to roam Garamba National Park in Zaïre, and in the early 1950s perhaps slightly more than 1 000 still occurred in southern Sudan. How times and circumstances have changed, with probably fewer than 40 animals in both countries combined today!

The picture for the white rhino is somewhat brighter in South Africa, which has about 5 000 individuals. However, the figure has suffered a "paper reduction" of perhaps 800 rhinos following apparent counting overestimates in the Hluhluwe-Umfolozi-Corridor Game Reserve complex controlled by the Natal Parks Board. So at the stroke of a pen perhaps 15% of South Africa's white rhino population was "lost" and we are left

WHITE RHINOCEROS

Ceratotherium simum

Subspecies	Country	Estimated number	Trend	Comment
C.s. cottoni	Sudan	5	falling	
	Zaïre	31	rising	
C.s. simum	Botswana	27	falling	from SA
	Kenya	90	rising	from SA
	Namibia	80	falling	from SA
	South Africa	4 700	rising	
	Swaziland	40	falling	from SA
	Zimbabwe	200	falling	from SA

BLACK RHINOCEROS

Diceros bicornis

Subspecies	Country	Estimated number	Trend	Comment
D.b. longipes	Cameroon	35	falling	
D.b. michaeli	Kenya	414	rising	
	Rwanda	15	falling	
	South Africa	28	rising	from Kenya
	Tanzania	32	falling	
D.b. bicornis	Angola	10	falling	
	Namibia	489	rising	
	South Africa	20	rising	from Namibia
D.b. minor	Angola	40	falling	
	Botswana	5	falling	
	Mozambique	50	falling	
	South Africa	771	rising	
	Swaziland	6	falling	from SA
	Tanzania	95	falling	
	Zambia	40	falling	
	Zimbabwe	300	falling	

with about 4 200 animals.

The white rhino (both subspecies) has become extinct in recent years in the following countries (note that this includes reintroduced populations in three countries): Angola (RI), Central African Republic, Mozambique (RI), Uganda and Zambia (RI). The distribution of this species was much more extensive in the distant past. The black rhino has become extinct in Central African Republic, Ethiopia, Malawi, Nigeria, Somalia, Sudan and Uganda. Although there is a slender chance that tiny numbers of rhino may still cling to life in these countries, they are extinct as breeding populations, with little or no chance of recovery.

The accompanying table is based on information compiled by the IUCN/SSC African Rhino Specialist Group in 1992 and published in 1993, although we have updated totals for several countries where declines in populations have continued.

Although for some countries the population estimates are fairly accurate, for others it is highly likely that the true totals are much lower. These countries include Angola, Mozambique and Rwanda, where warfare and banditry have curtailed the activities of researchers and conservation workers.

The predominantly falling trend in rhino numbers is likely to continue despite attempts at stopping illegal trading. Although South Africa has secure and growing rhino populations at the time of writing, we are of the opinion that they will come under severe pressure in the near future.

Behaviour

Rhinos lie up in the shade during the hot midday hours. Despite their cumbersome appearance they can reach a speed of 40 km/h when under stress. Both African rhino species have acute senses of smell and hearing but their eyesight is very poor. Although the white rhino is generally more docile than its smaller cousin, this should never be taken for granted as charges resulting in fatalities are not unusual.

Bulls only start competing for oestrus cows from about the age of 12 years, when they can first establish territories. Cows start breeding from about their fourth year. Although calfs may be dropped at any time of the year, in KwaZulu-Natal there are calving peaks in March and July. The single calf, with an average mass of 40 kg, is dropped after a gestation period of about 480 days for the white rhino and 450 days for the black. The calf is able to walk and suckle within three hours of birth. The calf of the white rhino runs in front of the mother, this being in contrast to the calf of the black rhino which runs behind, or at the side of, the cow.

The white rhino is the more social of Africa's two rhino species. A typical grouping consists of a territorial bull, subordinate bulls, cows and their accompanying young. The territorial bulls usually only move out of their area if they do not have direct access to water, leaving every three or four days to drink and wallow. These are usually linear movements with little detouring between the bulls' territory and the water source. In nearly all cases the same pathways, or routes, are followed.

Territory-holding white rhino bulls are in general tolerant of male intruders if they show subordinate behaviour and make no threatening gestures. This tolerance decreases when an oestrus cow is in the vicinity. The size of bulls' territories is quite small, with one study in KwaZulu-Natal (South Africa) revealing an average of 3 sq km. Size is, however, dictated by the quality and abundance of food. Cows occupy home ranges of between 6 sq km and 20 sq km that may overlap the territories of several bulls. Although fights over territories are usu-

ally avoided, severe conflicts do on occasion occur, particularly when a bull is in the company of a receptive cow. Bulls mark their territories by depositing large dung middens around the area's perimeter and within it. The hind feet are frequently used to scuff freshly deposited dung, and the ground after urination. Urine spraying is also used in the marking of territories.

Most feeding takes place during the cooler daylight hours, as well as at night. White rhinos are strictly grazers, the large lips cropping off the grass, as the animals lack incisors. They are very selective feeders, with only a few grass species making up the bulk of their food.

Unlike its larger cousin, the black rhino is a solitary animal, although on occasion several may gather at waterholes or at sites with mineral-rich soils. Bulls and cows only consort briefly to mate and the single calf may accompany the mother for between two and four years. The accompanying calf is driven off during the cow's next pregnancy, or at the birth of the next offspring.

Black rhinos live in an established home range but they are not territorial in the sense that they defend their areas against other rhinos. Home ranges of both bulls and cows may overlap with those of others in a population. Adult bull black rhinos do, however, establish a dominance hierarchy, particularly in areas of fairly high density. Fighting takes place between established bulls to determine dominance and in competition for cows in oestrus.

Home range sizes vary according to the abundance and quality of food, as well as access to water. Generally, the more arid the region in which the animal lives, the larger the home range. Home ranges vary from 0,5 sq km to over 500 sq km. This latter range was recorded in the desert lands of north-western Namibia.

Despite black rhinos' mainly solitary nature they can live at very high densities. In the Lerai Forest in Tanzania, 23 black rhinos were known to live in a 2,6 sq km stand of mainly yellow-barked acacias in the Ngorongoro Crater, prior to the massive declines resulting from poaching.

Black rhinos feed during the cooler daylight hours and at night. In arid areas black rhinos may be forced to move considerable distances between their home range and surface water. These movements are nearly always linear in nature and rarely include detours.

The dung may be deposited at midden sites, or at random throughout the home range. Several individuals may defecate at the same midden. Bulls kick the freshly deposited dung vigorously with the hind feet at the midden sites, leaving distinct grooves in the ground. It is probable that this serves some marking function that is as yet not properly understood. It is easy to distinguish the dung-balls of the two rhino species by examining their content. Those of the white rhino are made up of relatively fine plant fibres, whereas those of the black rhino contain more coarse, woody material.

The black rhino's prehensile, pointed upper lip is used to grasp leaves and twigs which are then either snapped off or cut through by the cheek-teeth. Plant parts out of reach of the mouth may be broken off by "horn-thrashing", and on rare occasions black rhinos may raise their front feet off the ground, giving them additional reach. Browse, meaning plant parts taken from trees and bushes, forms most of their diet and they are selective feeders. Acacia trees supply a large percentage of their food, with euphorbias being important in some areas. In certain regions they are said to eat the large fruits of the sausage tree *(Kigelia)*, one of the few herbivores to do so. Green grass is usually taken in small quantities but in some locations, such as on the floor of the Ngorongoro Crater in Tanzania, grass forms an important component of their diet.

Although lions and spotted hyaenas will on occasion take young rhinos of both species, and rarely adults, their principal enemy is without doubt humans.

Conservation

Probably no large wild mammal has declined so rapidly and dramatically as the rhino, as a direct result of hunting.

The conservation of both rhino species has become a matter of critical importance: they are hovering on the edge of extinction. Originally hunted mainly as a "problem animal" and as a trophy, in recent years they have been slaughtered on a massive scale for their horns. The horns are used as an ingredient in Asian traditional medicine. Highly prized dagger handles are also made from them in Yemen. We should point out that contrary to media reports, powdered rhino horn is not in general demand as an aphrodisiac. Only in India, particularly in Gujerat and Bengal, is rhino horn reputed to be used for this purpose.

A vast array of traditional medicines are produced from various rhino parts, not only from the horns. Sliced or powdered rhino horn is most commonly used as a traditional remedy for high fever, but also as a cardiotonic, antipyretic, antitoxin for snake bite, and headache treatment. In Asia many traditional healers believe that the horns of Asian rhinos are best for this purpose. For this reason they fetch higher prices than African rhino horn.

A company operating from Johor Baharu in Malaysia produces a medicine called Three Legs Brand Rhinoceros Horn Anti-fever Water. It carries the following notification label:

> *This medicine is carefully prepared from the best selected Rhinoceros Horn and Anti-Fever Drugs, and under the direct supervision of Experts. This wonderful medicine acts like a charm in giving immediate relief to those suffering from: Malaria, High Temperature, Fever affecting the Heart and Four Limbs, Against Climate Giddiness, Insanity, Toothache, etc.*

With such a wonderful health billing, who could resist? However, it has to be said that no scientific trials have supported the claims made for the healing properties of rhino horn.

Strangely, rhino horn is extremely rare in use in African traditional medicine. Before the explosion in demand outside Africa rhinos were therefore generally left unmolested.

Although rhino products have been part of the Asian medicinal armoury for many centuries massive pressure on buying

countries, such as China, Taiwan, Singapore and Hong Kong, in recent years seems to have slowed but not stopped the flow of rhino horn. This is of course not just as a result of more effective law enforcement. There are simply very few rhinos left to supply the market.

Alternatives to rhino horn, such as saiga horn, are coming increasingly into use but none of these is deemed to be as effective as rhino horn. Some traditional healers even specify that the best horns come from recently killed rhino bulls and that the tip of the horn is the most effective portion.

A prized symbol of Yemeni manhood is the traditional curved dagger, the *jambia*, the handle of which preferably should be carved from rhino horn. Yemeni men flocked to the worker-hungry Saudi Arabia and the Gulf States after the 1969 Yemeni civil war. All workers in these wealthy countries were extremely well paid. This meant that the Yemeni workers were able to take large sums of money home to what was then one of the poorest nations in the world. It is estimated that one sixth of the Yemeni population was working in neighbouring countries in 1978. Their sudden wealth generated an unprecedented demand for the daggers with their carved rhino horn handles. Between 1969 and 1977 it is estimated that the horns of 8 000 rhinos were imported into North Yemen. Because demand was leaping ahead of supply, rhino horn prices continued to rise.

Poachers usually only remove a rhino's horns, as speed is of the essence, but there is also a market for its skin, viscera, penis and toenails. When trade was allowed in rhino products a number of game farmers in South Africa could offer surplus white rhino bulls to sport hunters for the horn trophies, and the farmers then marketed the skin for considerable sums in the Far East.

There is a misconception about who profits most from the trade in rhino horn. Poachers receive a miniscule proportion of the sums made by the retailer. Remember that the end user buys only a few grams of rhino horn at a time, but is prepared to pay an exorbitant price for it.

The quoted price of rhino horn obviously does not reflect the final retail price. Nevertheless a comparison of the quoted price over the years is illuminating. Between 1909 and 1914 the London wholesale price of rhino horn went as high as US $9,30 per kilogram and in 1929 it reached $22,68, but in the 1930s the price dropped to an average of $6,93. By the early 1950s it again cleared the $20 mark, with a slight increase in the 1960s. By 1976 the trouble really started, and the price began to climb at an unprecedented rate, helped along by the entry of the Yemeni market for rhino horn. By 1978 the wholesale price had reached $300. This was a meteoric rise, but the retail price charged for the small amounts of horn in traditional remedies rose much more sharply still. Today the retail price of rhino horn may top many thousands of dollars (we have been given a figure of about $17 000 per kilogram).

The estimated amount of rhino horn entering the world market between 1972 and 1979 implied the loss of about 22 000 rhinos each year. The combination of diminishing numbers of rhino and increasing sums of money for their products caused all five species of rhino to disappear from much of their ranges.

Conservation of the two African rhino species took on an air of absolute desperation, particularly in the past five years. The first attempts to conserve rhinos had involved both the northern and southern white rhino, but the black rhino was still relatively abundant and believed to be safe. Attempts to secure the white rhino in Uganda ended in catastrophe and extinction. The white rhinos in Garamba National Park in north-eastern Zaïre were under severe pressure but they have survived, although there are now only just more than 30 individuals.

The saga of the southern white rhino has had a much happier ending, thanks to Operation Rhino. A remnant population had clung to survival in the triangle of land between the Black and White Umfolozi rivers in South Africa. There is no accurate figure as to how many animals survived here but it was certainly no more than a few score. One estimate puts the figure as low as 30 but this has been questioned in some circles. The status of this area as a game reserve had been confirmed by the then Natal Provincial Council in 1939. Over the next 20 years, with increased protection, there was what can best be described as a rhino population explosion. It was feared that the animals would have a negative impact on the vegetation. In 1960 it was decided that some animals would have to be moved, both to prevent overgrazing and to create satellite populations so that a major catastrophe would not destroy the entire population.

Above: *A deborned black rhino.* Photo: *Bruno Nebe.*

With the advent of the drug M99 in 1963, the immobilisation and transport of rhinos became feasible. Operation Rhino was launched. Up to 1969, 627 white rhinos were translocated to various reserves, zoos and animal parks (one Natal Parks Board report puts the figure at 616). In 1963-64, in Operation Kruger Park, 97 white rhinos were translocated to that South

African sanctuary. Further translocations to it followed and today the world's largest white rhino population is found in the Kruger National Park.

Sadly, translocations to other national parks such as Hwange in Zimbabwe and Chobe in Botswana are now viewed as failures. Although they were initially very successful, the authorities were unable to cope with the subsequent massive increase in poaching. Several thousand white rhinos had been captured and moved to areas within their former range, but the new populations outside South Africa have been heavily poached.

Over the past three decades several thousand southern white rhinos have been distributed from the KwaZulu-Natal reserves to many other parts of South Africa, to southern and east African countries and to numerous zoos and animal parks throughout the world. Although most reintroduced populations in South Africa have thrived, other African translocations have had a generally sad record.

Let us take the example of Botswana: the loss of the reintroduced white rhinos in that country can be largely ascribed to the indifference of the Department of Wildlife and National Parks. During the 1970s over 70 white rhinos were translocated from KwaZulu-Natal (South Africa) to Botswana. It is estimated that natural growth probably doubled this initial population to 150 individuals by the mid-1980s. However, in the latter part of 1992, during the course of an intensive survey, only seven white rhinos were counted. Even taking into account animals that may have been overlooked, the total could not have exceeded 12 rhinos.

A short time later a capture operation was launched to save these animals from the poachers' guns. Only four rhinos could be traced. They were translocated to the Khama Sanctuary. Of these four, two rhinos turned out to be individuals originally translocated from KwaZulu-Natal. A glare of publicity surrounded this exercise and much credit was given to Botswana's Department of Wildlife and National Parks. However, one cannot help but wonder what these conservation officials were doing while the poachers were decimating the rhino population. Rather than being given credit, officials should have been heavily censured and "high heads" should have rolled!

In July 1984 the Department of National Parks and Wildlife Management of Zimbabwe put into action Operation Stronghold, an attempt to arrest the drastic increase in poaching. Despite the best efforts of some staff members the entire exercise proved to be an unmitigated failure, and the Zimbabwean rhino population has been brought to the brink of extinction. From the middle of 1984 to the end of 1991 at least 954 rhinos were killed for their horns; 145 poachers were shot and four conservation officials lost their lives. The majority of rhinos died in the Zambezi Valley but those elsewhere were not spared the poachers' bullets. Particularly hard hit were the white and black rhinos in the Matabeleland national park, Hwange. The only small populations that have remained largely untouched are those that were introduced to privately owned ranches towards the centre of the country.

There are now three options for the conservation of rhinos, particularly black rhinos: horn removal, translocation to small and highly protected sanctuaries within the rhino's natural distribution area, and translocation to ranch areas in other countries with a suitable climate and food plants similar to those utilised by rhinos.

Horn removal is a controversial last-ditch attempt to prevent the extinction of the black rhino in some areas. It has been undertaken in the Damaraland-Kaokoveld area of north-western Namibia and in the Zambezi Valley and elsewhere in Zimbabwe.

Some conservation authorities view de-horning with a large degree of apprehension, for the following reasons: it is an acknowledgement that control has been lost over the particular rhino population, and in certain areas it has not proved to be as successful as was originally expected. The largest populations of both species of rhino, now in South Africa, have not been de-horned but this may have to be done in the future, particularly in the more vulnerable reserves.

The de-horning of black rhinos in north-western Namibia, known as Operation Bicornis, was necessitated by a sudden upsurge in poaching. The massive depletion of rhinos to the north had caused the middlemen to move their attentions to

Above: *White rhino bull wallowing, Mkuzi Game Reserve.*

the relatively large rhino populations to the south of the Cunene-Zambezi river line. The Namibian authorities had to act, or lose their rhino populations. It was decided to de-horn the black rhinos of Damaraland. These lived in relatively open terrain and, as they had been studied for a decade, the individuals and their home ranges were known. Animals were located, darted and de-horned. Then they were monitored.

One aspect that has worried wildlife managers is the impact that horn removal may have on the behaviour of rhinos. In Damaraland the rhinos rarely, if ever, used their horns when feeding, for example to break high branches. However, animals living in the dense bush of the Zambezi Valley may well do so, and de-horning could have a detrimental effect on them.

Horn removal may also affect the ability of rhinos, particu-

larly cows with small calves, to defend themselves against large predators such as lions and spotted hyaenas. It is unclear what impact, if any, de-horning could have on general interactions between individuals, for instance between a horned and a de-horned rhino.

In May 1992 the government of Zimbabwe, in an act of desperation, embarked on the logistically nightmarish operation to de-horn all of the country's wild rhinos. It was viewed as essential to the survival of these animals in the country that until recently had held Africa's largest national herd of black rhinos. This move followed the experimental de-horning of the Hwange National Park population of white rhinos towards the end of 1991. In the initial capture of 71 animals, five individuals died but in later captures no losses were suffered. Techniques had been refined.

When de-horning a rhino the horns are cut off either with a handsaw or a small chain saw. Then the edges are filed down and the remaining stump covered with Stockholm tar. Unfortunately this is not a permanent solution: the horns, like fingernails, regrow and the entire exercise has to be repeated. The rate of regrowth varies, but the front horn is estimated to regrow at 6,7 cm per year, and the back horn at half this rate. What has to be remembered is that even a small length of horn is saleable. All rhinos should therefore ideally be recaptured and de-horned at least once a year, but the costs would be beyond the means of most countries.

In the open country of north-western Namibia, would-be poachers in theory can clearly see whether a rhino is carrying horns, or is de-horned, but in the dense bush of such locations as the Zambezi Valley poachers find it much more difficult to make this determination. A number of de-horned animals have died as a result.

It is certainly preferable to see a live, de-horned rhino in the wild than a bloated and maggot-filled carcass with a bloody, hacked skull; nevertheless it is a sad indictment against humans that these magnificent mammals have to undergo these indignities to save them from people who covet their horns for carved dagger handles as proof of manhood or for medicines of dubious benefit.

The concept of closed sanctuaries, initiated in Kenya, holds out considerable hope for the protection of small populations of rhinos under intensively protected conditions. In Kenya highly protected populations are located on privately owned ranches such as Solio, which lies in the wooded plains between the Aberdares and Mount Kenya, and in small sanctuaries such as Nakuru National Park. Such sanctuaries have the advantage that limited finances can be concentrated and specifically targeted, rather than spread over large parks without any visible benefit. Other advantages are that one can concentrate a greater number of better-equipped guards in a smaller area, and that installing such devices as electric fencing is more economical. For the rhinos an advantage is that they are in closer proximity to each other, which increases their chances of locating each other and mating. In many areas where poaching has greatly reduced rhino numbers, individuals are now widely scattered, which limits their chances of encountering each other.

The trend towards closed sanctuaries is being followed in Zimbabwe, where small numbers of rhinos are being moved to smaller and more easily controlled areas, away from troublesome national boundaries.

Except for a few populations in South Africa, and possibly in Namibia in the short term, closed sanctuaries offer the only hope for rhinos, particularly the black, to survive in the wild.

The only other option that remains is to establish viable numbers of rhinos, again particularly the black, on other continents. The long-term goal is to be able to reintroduce populations within their former range if demand for rhino horn disappears and conditions once again become favourable. The most suitable countries are determined on the basis of their climate, habitat, food plants and the ability to offer adequate protection. Rhinos have already been sent to the south-western United States of America and to Australia, and the programme will no doubt be expanded in the future.

Existing African populations of the black rhino that are considered to be crucial for survival are those in Cameroon; Damaraland and Etosha in Namibia; the Hluhluwe-Umfolozi-Corridor, Itala, Mkuzi and Kruger in South Africa; Nairobi and Solio in Kenya; Selous in Tanzania; and Hwange and the Midlands Conservancy in Zimbabwe. Key populations of the white rhino are in Garamba in Zaïre (the only site remaining for the northern race); the Hluhluwe-Umfolozi-Corridor, Itala, Kruger, Loskop, Manyaleti, Mkuzi, Ndumo, Pilanesberg and Sabi Sand in South Africa; Hwange in Zimbabwe and Solio in Kenya (the only two viable populations of the southern race outside South Africa).

What a sad testimony to the greed of humans that the total African rhino population has been reduced to fewer than 7 000, and is decreasing still. We can only hope that the demand for their horns can be staunched and the rhinos will once again have their day in the African sun.

Below: *White rhino cow "growling" at approaching bull.*