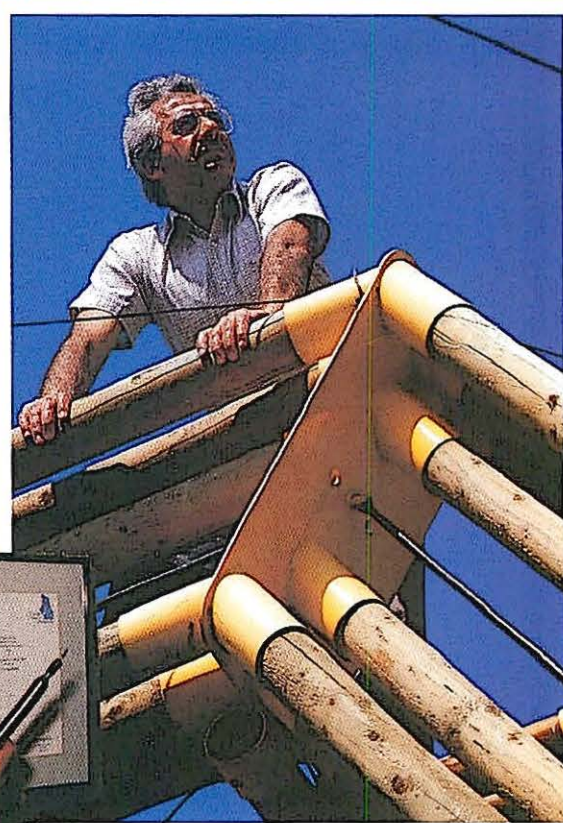
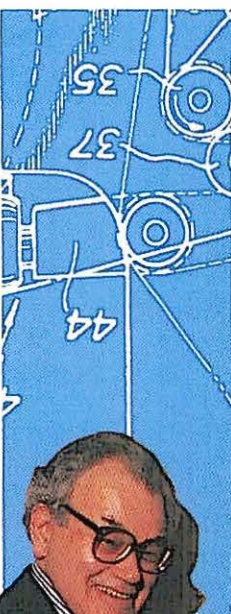
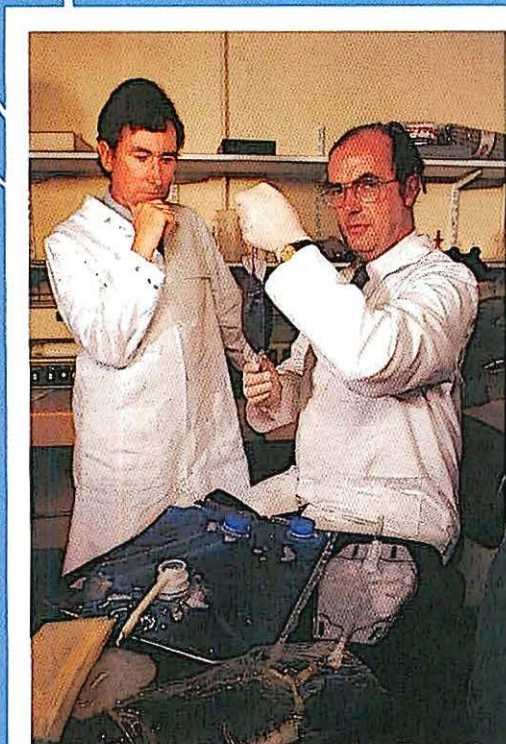
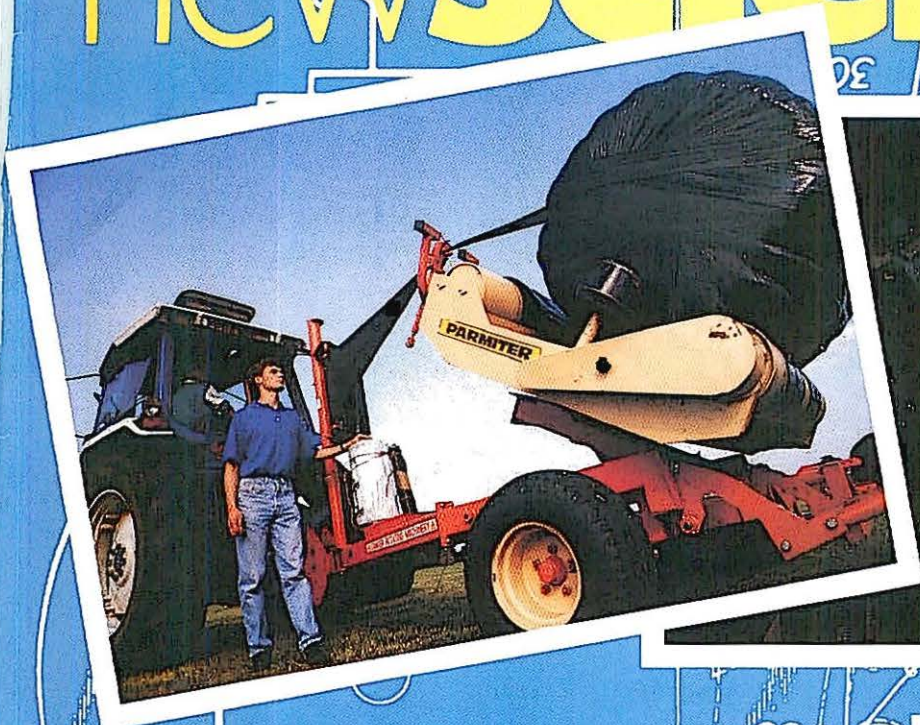


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Putting a stop to rhino poaching



Can we end rhino poaching?

The illegal hunting of rhinos for their horns threatens the five remaining species with extinction. Some say the trade should be stopped, others believe we can control it

Colin Tudge



Christie's Colour Library

Figures carved from rhino horn often hint at the material's supposed aphrodisiac properties

ONLY 11 000 rhinoceroses of all five species now survive, yet between 1970 and 1987 at least 40 000 were killed to provide the 100 tonnes or so of rhino horn that were traded in international markets. Poaching remains the greatest immediate threat for all species. Virtually all conservationists agree with the World Wide Fund for Nature (WWF) that the first and most important task must be to eliminate poaching. After that, we can ask what else needs to be done.

The good news, as the recent Rhinoceros Symposium in San Diego* revealed, is that rhino poaching can be curtailed; and largely as a result of this, several populations—the Great Indian; the black rhinos of Kenya; and the northern race of the white rhino in Zaire—are now increasing, while populations in southern Africa are

stable. Everyone agrees on the need for policing, though it is not entirely clear how best to pay for it.

The WWF represents the orthodox view, and contends that the rug must be pulled from under the poachers' feet by stamping out the market in rhino horn completely. A southern African school, represented at San Diego mainly by the Zimbabweans, feels it will be better and safer, at least in the longer term, to conduct an "official" and "legitimate" trade in trophy hunting and in rhino horn, and use the very considerable revenue thus accrued—up to \$10 000 (about £5800) a kilogram for African horn, and \$50 000 for Asian—to support the wardens and provide local people with an economic reason to protect their own wildlife. The same disagreement—between the southern Africans who want a controlled trade and others who want to see trade banned completely—exists in the case of the elephants and their ivory (see "Elephants and the ivory tower", *New Scientist*, 26 August 1989).

In the short term, however, while rhino numbers are still very low, the WWF approach must surely prevail. Even if "legitimate" trade is eventually allowed, the traffic must first be regulated. Is this possible? And if so, how?

Who wants rhino horn?

Task one is to understand the trade, and here, we owe much to WWF's Esmond Bradley Martin, an American geographer who has spent the past 12 years finding out exactly who buys what, from whom, at what price, and why. Along the way he has exploded many a Western myth. It was assumed at the start of the 1980s that China was the chief importer and consumer of rhino horn, for medicines. Not so. At that time—though not any more—Yemen, in the Arabian peninsula, was the chief consumer. At that time, it imported 1500 kilograms of African horn per year—about half the annual harvest—to fashion into dagger handles. Rhino horn may not sound too promising for this purpose, as it is hardened protein, keratin, compounded from hairs. But when polished it is beautiful, like a grained, dark, translucent amber.

Neither is it the case, as Westerners assume, that rhino horn is used mainly by the Chinese as an aphrodisiac. Martin found that

this is true only in India, and that the aphrodisiac trade accounts for less than 1 per cent of the whole. Rhino horn has been important to Chinese medicine for at least 2000 years, but mainly to treat fever, flu and convulsions. In other Asian countries other parts of the rhino are used for various purposes: the blood, for example, to treat menstrual disorders.

Encouragingly, it seems, the trade can be regulated and even stopped, and in this there are three vital factors. First, there must be legislation that is enforced. Secondly, there must be substitutes, for people will not change the customs of centuries overnight. The joker in the pack is the third factor, economics: for scarcity increases the price of horn (as has happened since 1986) and hence the incentive to poach. But downturns in the economy of purchasing countries offer at least a temporary respite, which might be made more permanent.

Legislation has two layers. First there are the rules of CITES, the Convention on International Trade in Endangered Species, with its 110 national signatories. In 1987, CITES extended its long existing ban on international trade in rhino horn to embrace domestic trade. Until then, countries could continue to use horn, while claiming that it came from stocks. China was especially adept at this.

But the general CITES ground rules must be backed by domestic legislation and policing. Yemen has achieved this, following negotiations with Bradley Martin in the mid-1980s, and has also developed substitutes, so that Yemeni men are now sporting dagger handles of buffalo horn, camel nails and plastic. As a result, the Yemeni trade has diminished to a trickle. It is also true, of course, that the Yemeni economy has sagged, while the Taiwanese are now more able to pay for rhino horn.

Japan, which imported 800 kilograms of rhino per year in the 1970s to make medicines, has virtually legislated the trade out of existence. It joined CITES in 1980, and its government told pharmacists and doctors not to prescribe rhino horn, while at the same time urging the use of substitutes.

Others worthy of mention are Hong Kong, which perhaps has the most comprehensive trade policy, suppressing import, export and domestic sale; Macao, which prohibited all internal trade in 1988; Malaysia, which has suppressed trade, promoted substitutes and dramatically reduced its demand; Burundi in central Africa, which clamped down on trading in 1987;

Pushing wildlife to the brink of extinction: between 1970 and 1987 at least 40 000 rhinos were killed worldwide

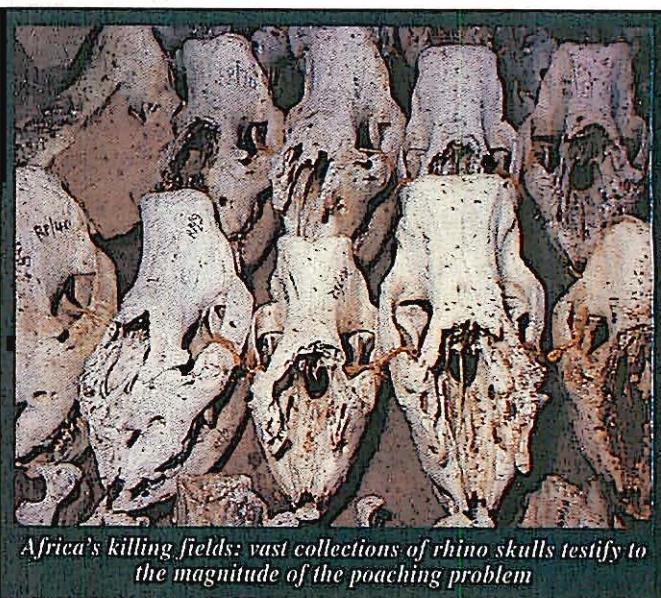
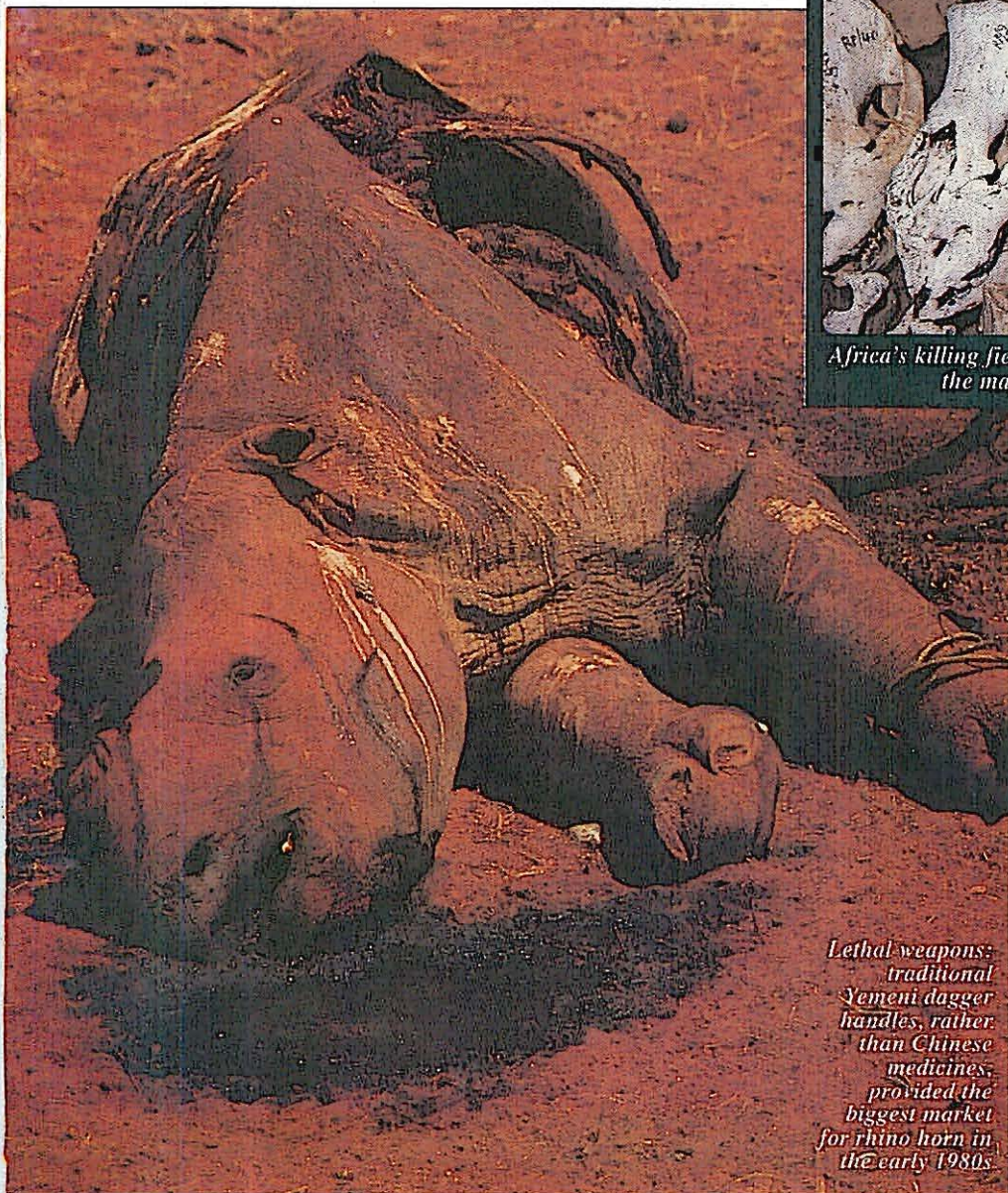
Dubai, in the United Arab Emirates, which halted trade in 1989; South Africa, which set up its Endangered Species Protection Unit in 1989 to stop smuggling to Taiwan and elsewhere and, for example, intercepted some Taiwanese smugglers with 114 horns in 1990; and Kenya, which also conducts a vigorous "rhino war" and has set-up reserves in which its black rhinos are now increasing ("Time to save rhinoceroses", *New Scientist*, 28 September). But the example to all the world is surely Nepal, one of the poorest countries in the world, which in 1974 deployed hundreds of soldiers to guard the Royal Chitwan Park. In 1968 Nepal had only 95 great Indian rhinos. Today, in Chitwan, it has the second largest of the world's great Indian populations, with 400. And there are two guards for every rhino.

Four countries remain problematical, however: China, South Korea, Taiwan and Thailand. China once had rhinos of its own—the Javan rhinos—but had already rendered them rare by the 8th century AD. It has been importing other countries' horns ever since. China refuses to enforce the 1987 ban on domestic trade because, it says, it is still dispersing horn that was acquired before 1981, the year it joined CITES. But the truth is that it still imports an estimated 650 kilograms per year. It still exports too, for few of the local Chinese can afford to buy the enormous amounts of medicine China produces. One drugs company has been using buffalo horn as a substitute since 1974, but it also

continues to use rhino horn, to keep its customers happy.

Taiwan seems to be where the money is. All sorts of people—businessmen, sailors and tourists—smuggled horn into Taiwan from South Africa until 1988. Then South Africa quashed exports, and the African trade has all but stopped. Interest has shifted to Asian horn—which is thought to be more "concentrated" (because the horns of Asian species are smaller) and is five times the price. Importers pay more than \$20 000 per kilogram for Asian horn, and retail it at up to \$60 000; businessmen invest in rhino horn as they would in old masters. Taiwan banned the international trade in 1985, though Bradley Martin found, in 1989, that the ban was not enforced. But Taiwan has begun to register its stocks, and says it may ban all domestic trade within the next three years.

Thailand is one of the world's centres for black marketeering. Bangkok sells more rhino products than anywhere else, and, says Bradley Martin, horn, skin, nails, penises and dried blood are ►



Africa's killing fields: vast collections of rhino skulls testify to the magnitude of the poaching problem

Lethal weapons: traditional Yemeni dagger handles, rather than Chinese medicines, provided the biggest market for rhino horn in the early 1980s



Panos Pictures

Fotograf/Patricia Althie

Old enemies join forces in Namibia's war against poaching

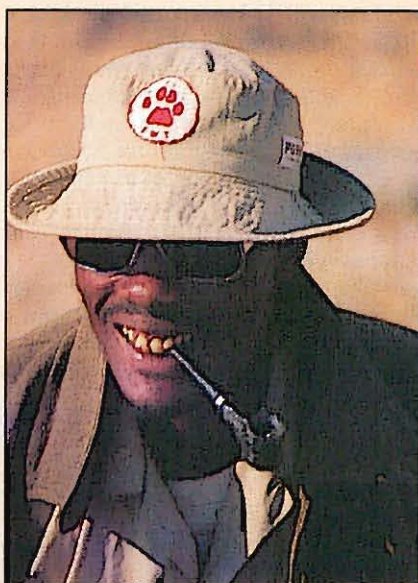
IN THE ARID, remote hill country of northwest Namibia, where sparse thornbrush and poisonous euphorbia shrubs break the monotony of rocks and sand, lives Africa's largest population of truly wild black rhino. Finding them is far from easy. It demands an exhausting day with expert trackers, many of whom are quite literally poachers turned gamekeepers.

Working with local conservationists, the trackers use their old poaching skills to keep tabs on the rhinos, trailing them for hours, sometimes days, across the barren landscape of Damaraland and Kaokoveld. The slightest clues—an upturned stone, a broken twig or sand scattered across a bare rock—are all they have to go on.

Their painstaking efforts have revealed that over 100 rhinos now live in the area, compared to less than 60 a decade ago. The figures are part of a broader success story: the fact that rhino poaching is being halted all over Namibia. A range of innovative anti-poaching strategies, backed by the World Wide Fund for Nature, has helped Namibia's rhino population first to stabilise, and then slowly to recover. At present the population stands at around 500 animals.

The rhinos of Damaraland are particularly vulnerable to poachers. The vast areas over which they roam mean that more traditional methods of protection such as anti-poaching patrols are all but useless. Instead, Namibian government conservationists have relied on one of the more imaginative, not to say controversial, methods of deterring poachers: removing the horns from selected rhinos, thereby cheating the poacher of his prize.

"Dehorning" in Damaraland started in 1989 (*New Scientist*, Science, 18 November 1989) when conservationists were at a loss to know how to deal with an upsurge in poaching. The upsurge coincided with the last months of the bush war preceding Namibia's independence in April 1990, during which high-powered weapons became widely available to the local people. Around 25 rhinos were killed in northern Namibia then, and the population of



Namibia's special Anti-poaching Unit includes former SWAPO fighters

Damaraland was particularly badly hit.

The idea for dehorning evolved from conservationists' experiences of moving rhinos, sedated, away from vulnerable areas. Removing the ends of horns, or "tip-ping", became the main way to avoid damage to the horns during the journey. The ease of the operation encouraged the Game Capture Unit, based at Etosha National Park, to attempt to remove a whole horn. So far a total of 12 rhinos have been dehorned.

Worthless prey

Fortunately, the open nature of the terrain makes the absence of horn on a rhino conspicuous from a distance; poachers can see it is a worthless catch before they fire. Whether the same would be true in thick grassland or bush is unclear, though we may soon find out. Zimbabwean conservationists have recently embarked on a dehorning experiment in the comparatively lush grounds of Hwange National Park.

Another factor which makes dehorning practicable in Damaraland is the scarcity of potential predators. There are only a few lions and hyena, which have been known to take rhino babies. Nor do the rhinos seem to need their horn for feeding purposes such as bulldozing down small trees to reach the foliage.

Since the experiment began two years ago, the dehorned animals have been closely monitored for ill-effects. Zoologists had predicted that dehorned animals would have problems, ranging from defending their young, to relating to—and indeed mating with—rhinos with horns. The Game Capture Unit insists, however, that the operation has worked like a dream. Dehorned females have mated with normal males, producing at least three calves which the mothers have successfully defended against predators. In every respect they appear to behave as normal.

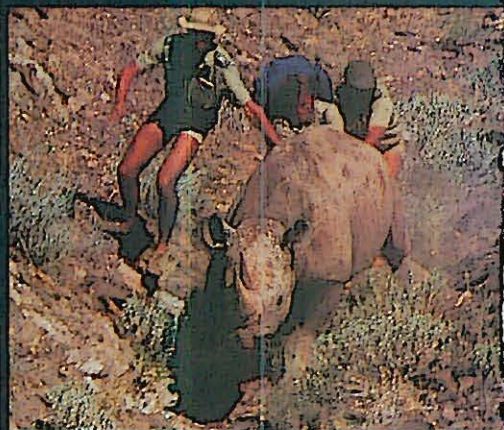
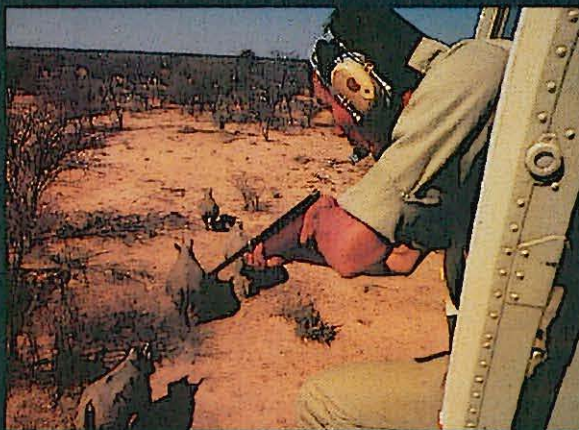
Certainly, dehorning seems to do nothing to still the animal's notoriously unpredictable temper. One rhino recently gave emphatic proof of this when it charged a team filming it for a documentary. After scattering the crew, the rhino unceremoniously smashed their equipment with its hornless, but still lethal, snout.

Conservationists may have allayed the worst fears about dehorning, but does the approach work? The fact that no dehorned rhino has yet been shot suggests it does. And although the operation will need repeating every few years (rhino horns regrow at an annual rate of roughly 8 centimetres for the front horn, and 5 centimetres for the rear) dehorning is relatively inexpensive compared with the costs of employing teams of armed wardens.

We may not, however, have seen the last of the controversy. At present all horns that are removed are added to a growing pile in government bank vaults. The ban on trade in rhino horn, made by the Convention on International Trade in Endangered Species (CITES), means that countries like Namibia cannot sell their stocks to raise money for ploughing back into conservation schemes. The policy of selling stocks

Dehorning a rhino, the Namibian way...

Trackers pick out a suitable animal, preferably a calf about to leave its mother, and then tranquillise it with a dart fired from a helicopter. After treatment with anaesthetics, the two horns (a smaller one lies behind the main horn) are sawn off and the stumps painted with tar to protect against infection. The whole procedure takes less than half an hour.



is fiercely supported by every conservationist I met in Namibia, but strongly opposed by international groups such as the WWF. To legalise even a limited amount of trading in rhino horn, the WWF argues, is to risk triggering an upsurge in poaching worldwide.

But this argument is unlikely to stop Namibia pressing for the right to sell some of its horns. Recent techniques for tracing the geographical origin of horn samples, which Colin Tudge describes in the main part of this article, could strengthen Namibia's hand. If it does prove possible to trace horn origins to within a few kilometres, then in theory one could restrict trade to horns obtained by dehorning.

Elsewhere in Namibia other anti-poaching strategies are also recording surprising victories. A new 21-strong Anti-Poaching Unit has been set up in Etosha with funding from the WWF. In its first two years, the unit has slashed the number of rhinos poached from 22 in 1989, to just one in 1990 and none so far in 1991. The unit has been forged, surprisingly, from a mixture of ex-fighters from SWAPO (South-West Africa People's Organisation) and their former opponents in South Africa's elite *koevert* force. The fearsome reputation of the latter in particular may partly explain the unit's success.

In contrast to neighbouring Zimbabwe, fire fights between poachers and the unit are rare—the majority surrender on sight. But Etosha's chief warden, Allan Cilliers, gives much of the credit to the "hearts and minds" work which the unit carries on in the villages of Ovamboland near the park's perimeter. "They go into the villages and talk to the headmen, building up relationships with them. This way they can warn people, not only of the penalties for poaching, but also of the fact that less wildlife means less tourism in the area, and less income for the locals.

"It's about showing people that they have a long-term investment in rhinos and other game, which will earn them much more than the few hundred rands they get from poaching." This concept is also being developed to good effect in the Kaokoveld and northern Damaraland, where a system of "community game guards" has been set up, again with WWF backing, after talks between local development workers and leaders of the local peoples, the Damara, Herero and Himba. In return for a small monthly stipend, the guards keep an eye on the rhinos and other wildlife in their home area and report any suspected poachings. For the most part, local villagers seem pleased to cooperate with the scheme. Many identify a thriving population of game with times of plenty. "It's God's farming," said one local chief. "If the wild animals go, it means times are hard."

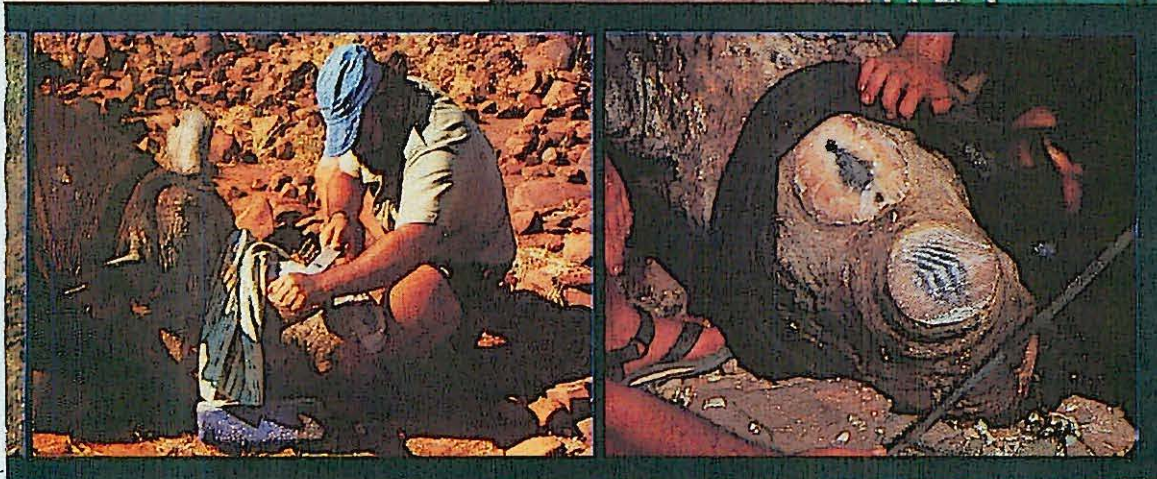
This ecologically sound whimsy is

fleshed out with a new government scheme in which meat from carefully controlled culls of game such as giraffe, wildebeest and buck is given to the local community in return for its cooperation with stamping out poaching.

Development workers with the Himba people have won the cooperation of safari operators to charge a small levy on each tourist coming into the area. The money is shared among Himba villagers and helps to fund craft marketing.

"We used to get food and money from shooting animals," said one old man, "and now we get it from people coming to look at them. It's better that way." With their numbers having almost doubled over the last eight years, the rhinos probably think so too.

Martin Wright



► "readily available". Thailand belongs to CITES, but suffers from what he calls "bureaucratic inertia", while its authorities lack legislative teeth. According to TRAFFIC (the Trade Records Analysis of Flora and Fauna in Commerce), Thailand "makes a mockery of others' conservation efforts".

But if you really want rhino horn (as WWF comments in its campaign report of April this year), then "South Korea is the place to go". The South Korean government outlawed the use of rhino horn in manufactured medicines in 1983, and banned imports in 1986. But TRAFFIC found it in more than 80 per cent of medicines in Seoul as recently as 1988. South Korea refuses to join CITES, and has made no move to register its existing stocks. This must be done if the black market is ever to be controlled.

Overall, Bradley Martin feels that conservationists are "winning the war" against the trade in rhino horns. Rhinos are not declining as fast as they were, and some significant populations are increasing. But many countries still need a change of heart. Nepal has shown that poor countries can succeed if they have the will, while South Korea shows that the relatively rich may do next to nothing.

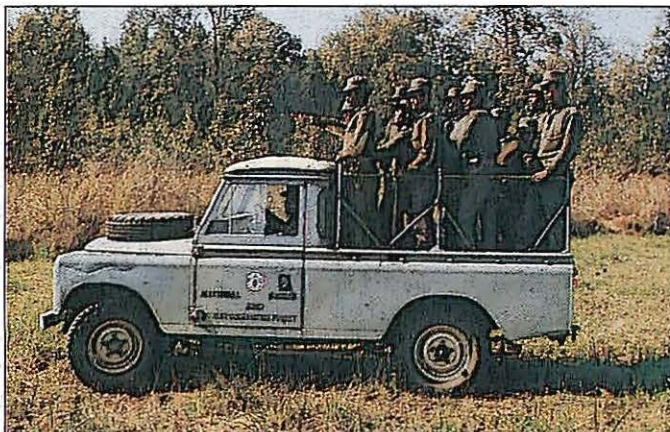
Substitution is a key issue, and many consumers—including both the Yemenis and the Chinese pharmacists—have shown their willingness to accept the horns of buffaloes or of saiga an-

telope. However, in 1990 Paul Pui-hat But and his colleagues from the Chinese University of Hong Kong showed that rhino horn in high doses does indeed reduce fever in rats, and although buffalo horn also had some effect, it worked only in larger amounts. Aspirin would probably have worked best of all, but this apparently was not put to the test. Aspirin derived originally from willow-bark, and could surely qualify as a "natural" cure.

However, conservation will not work unless preserving wildlife is good for the local people. Sustainable exploitation is not the point of conservation, but it makes conservation possible. In East Africa, Richard Leakey, director of the Kenya Wildlife Service, believes that exploitation should mean tourism, which already provides Kenya with a third of its income. To hunt the animals is, he believes, both wrong and misguided. So he seeks to ban the trade in rhino horn and ivory altogether.

The southern Africans, however, notably South Africa and Zimbabwe, believe that tourism alone cannot provide the income they need, and that additional income from controlled trophy hunting and a legitimate trade in rhino horn and ivory would help to ensure that local people remained well disposed to the animals, and provide funds to expand the reserves.

The southern Africans certainly deserve to be listened to. South Africa, for example, has a rapidly expanding human



For the anti-poaching patrols of Nepal, the war is far from over

Mark N. Boulton

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population. Its wildlife has poor prospects unless it can help meet human needs. But South Africa also has some of the world's best-run national parks (including the enormous Kruger park, measuring 300 by 80 kilometres) and best-protected wildlife. Thus, the southern white rhinos, once thought to be extinct, are now approaching 5000, and account for almost half the rhinos in the world. Zimbabwe's policy is to allocate wildlife to local people, to exploit as they will, including for trophy hunting.

When conservation is working and numbers are increasing, culling quickly becomes necessary. The booms and crashes in populations that probably often occur naturally throughout a continent can be disastrous in small reserves. Even southern white rhinos are now locally in surplus (meaning they cannot be supported at home, and there is nowhere else for them to go). Hunters pay \$30 000 to shoot a white rhino—plus what they pay for the guide and the rest. At least one South African reserve more than pays for itself by allowing limited trophy hunting. Animals die naturally, too, and in well-run parks their horns are recoverable. South African and Zimbabwean parks have huge reserves of ivory and horn, worth many millions of dollars on the open market. It can seem foolish not to sell what they have.

Furthermore, the southern African policies do seem to be good for wildlife. Zimbabwe is unique in devoting 22 per cent of its total area to wildlife reserves and in placing one-third of its land under wildlife management. When others can match such a record, say the southern Africans, then they will have a right to lay down the law. In the meantime, Zimbabwe is asking CITES for a concession to trade in a very controlled way—strictly between governments—in horn and ivory.

Ideally, we would say *vive la difference*: let each country protect its wildlife as it thinks best. But, say the Kenyans, if the southern Africans create a legitimate trade, poachers will steal horn and ivory from everywhere, and feed it into the markets. What is needed, then, is a way of telling the origin of a particular horn or tusk—whether from forbidden Kenya or legitimate Zimbabwe. Now, Nick van der Merve of Harvard University and his colleagues have provided such a method.

The technique is based on measurement of light-stable (non-radioactive) isotopes by mass spectrometry, in the gases produced when minute samples of horn or ivory are burnt. The ratio of light-stable carbon isotopes, carbon-12 or carbon-13, varies

within a plant, depending on its method of photosynthesis. Thus tropical African grasses, which adopt the so-called "C4" method of photosynthesis, finish up with a different carbon-12 to carbon-13 ratio than the trees and shrubs, which are "C3" photosynthesisers. These ratios are conserved (or at least, vary in predictable ways) within the tissues of the animals that feed on the plants. Thus you can tell what a herbivore has been feeding on from the proportion of carbon isotopes in its tissues.

Similarly, the ratio of the light-stable nitrogen isotopes, nitrogen-14 and nitrogen-15, in a plant (and hence in the animal that eats it) varies according to the rainfall. The reasons for this are unknown.

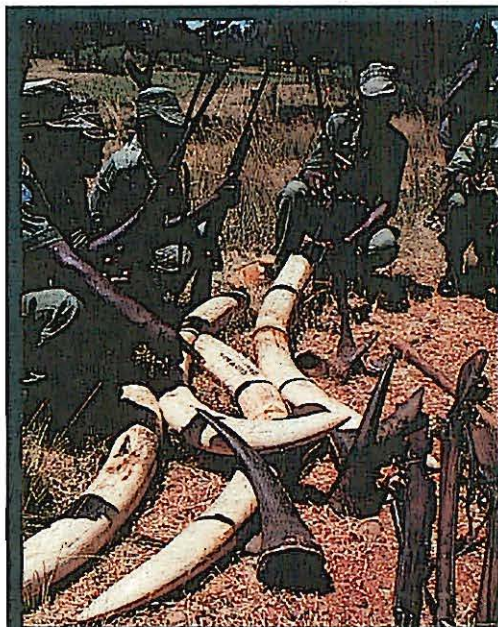
Finally, the ratio of different isotopes of certain metals—such as strontium, lead and neodymium—varies according to the soil type. Van der Merve says: "Measurement of isotopes of these three kinds of element—carbon, nitrogen, and a metal—gives a triangulation that enables you to pinpoint the origin of a piece of tissue, including horn or ivory, from anywhere in the world, often to within a few kilometres."

The wardens who provided van der Merve with the samples for his first trial laid a few traps. They included a rhino horn, the tip of which gave readings that were spectacularly different from those of the base. Van der Merve despaired, for if there was such variation in a single horn, he felt, then the entire method was flawed. Then the wardens explained: "This particular animal was born and brought up in place X, and then translocated to place Y!" The tip and the base of the horn, in short, had been nourished from different soils. The technique had, in fact, pinpointed both locations exactly.

Van der Merve's isotope technique should be a significant advance. It could in theory enable the Kenyan hands-off policy to coexist with the more bullish southern African approach. Both approaches work in their context, and it would be a pity if their separate efforts cancelled each other out.

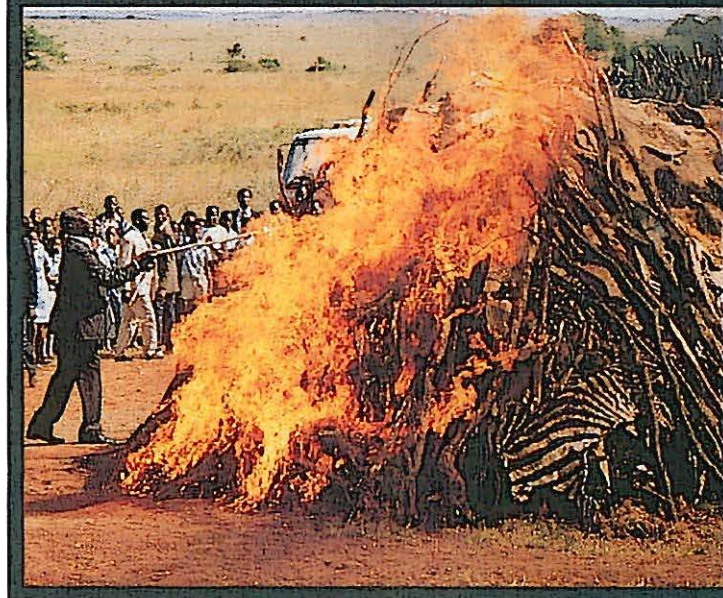
Rhinoceroses have been taken frighteningly close to extinction. But in the "war" to conserve them we do seem to have reached, as Winston Churchill said in a slightly different context, "the end of the beginning". So far, conservationists can claim at least a narrow victory. □

*International Rhino Conference, 9 to 11 May 1991, organised by Oliver Ryder to mark the 75th Anniversary of the Zoological Society of San Diego. Colin Tudge is a biologist and freelance science writer. His latest book, *Last Animals at the Zoo*, is just published by Century-Radius.



Caught in the act: Zambian game wardens reveal a catch of ivory, rhino horn and guns—all taken from poachers

Fiery gesture: Kenya has shown its commitment to stamping out all trade in rhino horn by burning many of its stocks. But in southern Africa conservationists favour controlled trade and trophy hunting



S. Robinson/NHPA

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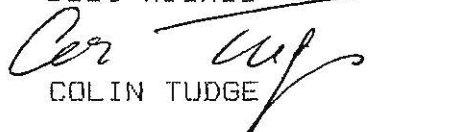
Dr Tom Foose
CBSSG
IUCN
12101 Johnny Cake Ridge Road
Apple Valley
MN 55124

Dear Tom,

It was a great pleasure to meet you in San Diego last May. *New Scientist* is at last publishing my two articles based on the rhino conference, and I have asked them to send you copies, which should arrive soon. I hope I have represented your ideas fairly!

I also hope we will have opportunity to talk again before too long.

Best wishes


COLIN TUDGE