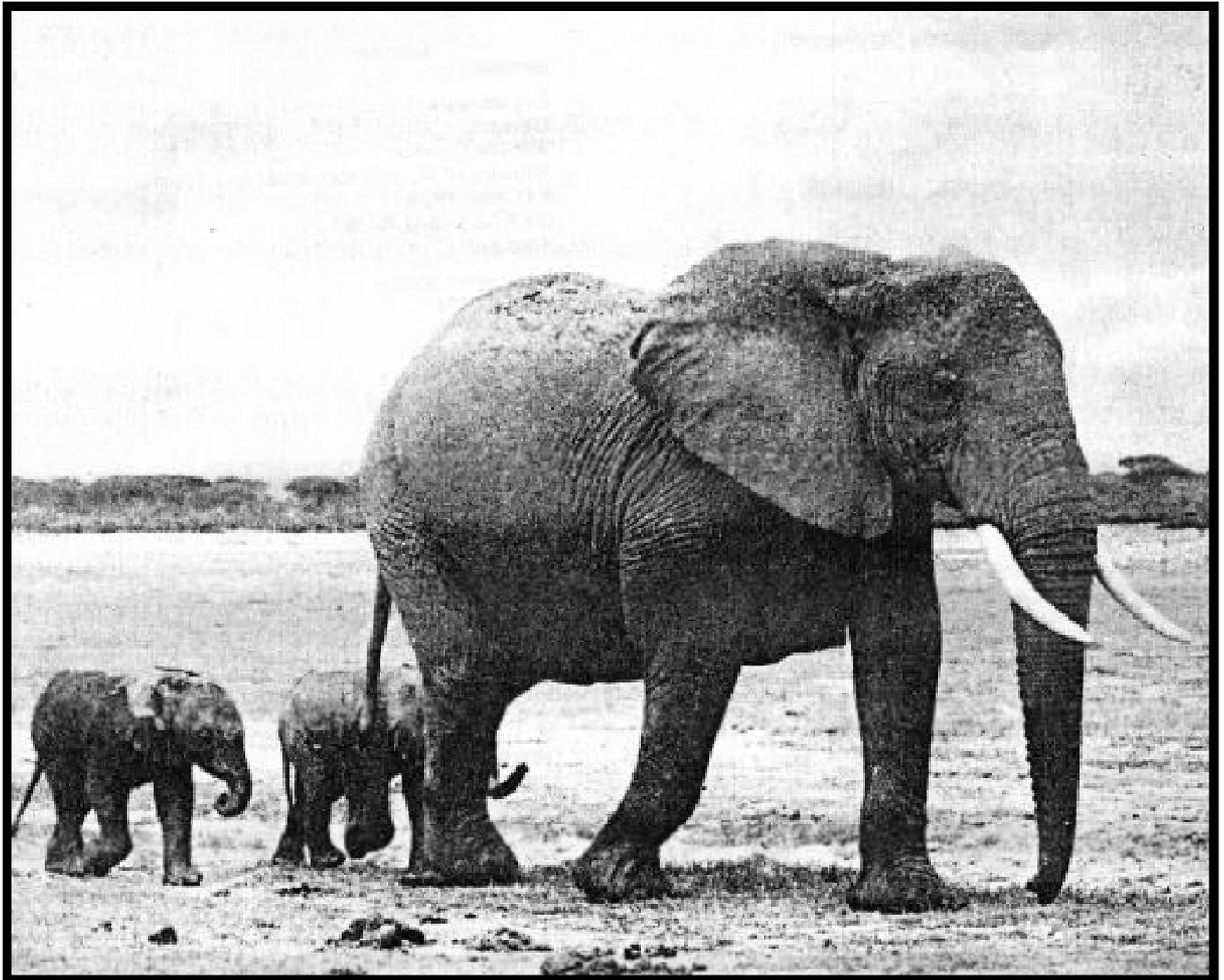


# AFRICAN ELEPHANT & RHINO GROUP NEWSLETTER



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INTERNATIONAL UNION  
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SPECIES SURVIVAL COMMISSION

**ARC**  
Animal Research and  
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# Chairman's Report

Elephants and rhinos share a great deal more in common than their large size. Both occur widely throughout Africa from coastal flats to alpine meadows, and from parched deserts to wet equatorial forests. Both are hunted for trophies and their products are traded throughout the world; both are threatened over much of their range by over-utilization and by agricultural expansion. Both too are widely viewed as a monitor of how well our conservation efforts are succeeding — the logic being that if we cannot save the biggest and most dramatic of Africa's animals, what hope is there for the rest? Whether this is a valid assumption or not is immaterial; indisputably the fate of elephants and rhinos has helped alert our conservation consciousness and redouble our efforts to preserve natural areas vast enough to contain them.

The similarities between elephants and rhinos inevitably led to parallel efforts to conserve them and to a considerable redundancy of effort and competition for funds, with the more beleaguered rhino losing out to the more glamorous elephant. This at least seems to have been the thinking of IUCN's African Elephant and Rhino Specialist Groups at a joint meeting held in Wankie during 1981. The result of the week-long gathering was an impressive document spelling out the conservation priorities. By using a variety of biological, economic, and political criteria, the Wankie meeting established the areas and populations which should be given most attention. In essence the outcome was a synthesis of the Pan African surveys conducted by the elephant and rhino specialist groups over the previous few years, and a formula for defining a continental conservation strategy. The results have since been published in an IUCN/WWF summary document, entitled "Elephants and Rhinos in Africa — a Time for Decision." The detailed technical proceedings have still not been published.

The success at Wankie led IUCN to combine the elephant and rhino specialist groups. By August, 1982 I had been appointed Chairman and in September the first meeting of the African Elephant and Rhino Specialist Group (AERSG) was held in Nairobi. I will try to convey the gist of what has happened since AERSG was formed, and what plans we have for the next couple of years.

Although there were many good reasons for combining the elephant and rhino specialist groups, it is worth considering the rather daunting problems it created. Ordinarily IUCN's specialist groups are made up of individuals who volunteer their time in order to assess the status of species, and to define plans to conserve them. In the case of elephants and rhinos, things were a little different. International concern over their imperilment added a sense of urgency that could not await the sedate pace set by voluntary efforts. To speed the process NYZS and WWF provided funds for a secretariat for both the African Elephant Specialist Group, headed by Iain Douglas-Hamilton, and the African Rhino Specialist Group headed by Kes Hillman. Both Chairmen devoted their entire time, and that of a small staff, to the task. Largely because of their efforts the Wankie meeting was able to synthesize the results of their surveys and produce a conservation plan for Africa.

However, the newly appointed group was faced with twice the work of either previous group, but without the benefit of a full-time executive. Furthermore, the urgency is even greater

for rhinos and certain elephant populations than it ever was, and the impetus established by the former elephant and rhino groups, and by Wankie, has slipped considerably in the meantime. In an effort to streamline our activities and regain the lost momentum we have reorganized AERSG.

The first meeting of the group was held in Nairobi between 27th to 29th September, 1982 to decide how AERSG would function and what its priorities would be for the ensuing year. I will briefly review the outcome of both topics.

The newly constituted group has a Chairman who initiates and coordinates activities; a Deputy Chairman, Robert Malpas, who coordinates all activities in our Nairobi Office; two Vice Chairmen, Esmond Bradley Martin and Richard Bell, who provide technical and scientific guidelines; and regional representatives, Anthony Hall-Martin (Southern Africa), J. Ngog-Nje (Central West Africa) and David Cumming (South Central Africa), who coordinate localized activities and provide a regional perspective. Two other regional representatives will be added shortly to cover West and Central Africa. AERSG also has more than 30 members and a number of other consultants who contribute with information and to our decisions. We have, initially at least, kept the membership deliberately small. We will add new members as the pace quickens and our responsibilities widen. With its Chairmen and regional representatives the group should be able to meet more regularly than in the past and reassess the priorities more frequently. A second meeting is already scheduled for 17th April in Harare, Zimbabwe, with the intention of reviewing the trade in rhino and elephant products prior to the CITES meeting in Botswana immediately afterwards.

New York Zoological Society is helping by supporting the Chairman and Deputy Chairman, the salary of a full-time researcher, secretarial and computer services and administrative costs. Office space has been kindly provided in the African Wildlife Foundation's field headquarters in Nairobi.

The first task of AERSG was to review the conservation priorities established at Wankie and consider whether they were still valid. The general consensus was that little had happened to change the Wankie priorities, and that most of our efforts in the first year should be devoted to implementing them. Although most emphasis was placed on implementing conservation programmes there was a clear recognition that we must also continually revise data on the status of species, and monitor the trade in their products, if we are to understand more about how ecology, politics and commerce will affect elephants and rhinos in Africa in the coming years. Without such continuing reviews, conservation action will always lag behind the circumstances it is trying to anticipate and circumvent. In the same vein the meeting also stressed the need to study the biology of species and subspecies, and to ensure that captive breeding programmes provide a failsafe for biologically important races, such as the forest elephant, and the northern white rhino.

How have those initial discussions and intentions translated into practical action? I can only briefly summarise what has happened since our Nairobi meeting and how we intend to expand our efforts. The purpose of our Newsletter is to regularly circulate information about projects that are underway,

issues that must be addressed and improvements that can be made in our abilities to conserve elephants and rhinos. We hope to produce the Newsletter twice a year.

In 1981 the Wankie meeting recognized that the northern white rhino (*Ceratotherium simum cottoni*) presented the most urgent conservation challenge, yet, in spite of funds already allocated by WWF, no action had been taken. The Nairobi meeting of AERSG set as its first priority the task of initiating a conservation programme. Pat Rogers of UNDP Zaire had already been in contact with IUCN over the plight of white rhinos in Garamba National Park, and Ian Hughes and Kes Hillman were sent on an emergency mission in November 1982 to report on what could be done. As a result of their visit, and urgent pleas from the Zaire government, anti-poaching equipment is on its way to Garamba to help protect the rhino population, now reckoned to number in the low tens, down from over 400 in the early 1970s. Kes Hillman is also engaged on a much larger survey, recommended by AERSG, that will assess the status of northern white rhinos and recommend what action can be taken to conserve them in Zaire and Sudan, the two countries where they still occur. Kes Hillman reports more about the project in this Newsletter.

An equally vital project is Esmond Bradley Martin's recent survey of the trade in rhino horn in the Far East. The results of his findings are summarized in his report and will form the basis of decisions made at the Harare meeting to close the remaining avenues of trade. There is good reason to think that concerted action now could soon eradicate most of the remaining trade. The African Wildlife Foundation recently spearheaded a publicity campaign that caused North Yemen to ban the import of rhino horns. If successful, the ban could lead to a significant improvement for the black rhino since over 40% of all horns traded found their way into North Yemen during the late 1970s. Bradley Martin advocates that similar diplomatic and press campaigns could work in Far Eastern countries.

We have been actively concerned with other aspects of rhino conservation, including rhinos on private ranches in Africa and the United States. In Kenya many of the remaining 1000 or so rhinos are found on private ranches where land owners protect them. Since it costs a rancher considerable money, it is not unreasonable that he should expect support from public conservation bodies. However, there are many issues that concern us about how this is done, and we have been helping to formulate ideas for a policy that would enable Kenya to promote rhino conservation on private lands, yet still guarantee that the State, which legally owns all wildlife, could ultimately benefit in the process and safeguard rhinos should a rancher no longer want to preserve them. Incentives for private conservation efforts must be recognized, but so too must the rights of conservation organizations who help with funds. No less than any government agency, conservation bodies are accountable for the projects they support. How this might be accomplished to the general satisfaction of ranchers, government, and conservation bodies, is now being discussed.

A similar situation applies in the United States where a number of Texas ranchers are trying to obtain and breed black rhinos from Africa. Under what conditions should private efforts be encouraged? What responsibility does the rancher have to ensure that rhinos obtained under the guise of conservation are appropriately managed? That is an issue we are much concerned about. In principle we approve of the idea if it helps reduce the public burden of conserving species, but we are

unwilling to do so in practice unless the rancher is prepared to accept certain responsibilities. The American Association for Zoological Parks and Aquaria is presently preparing certain guidelines that should, we consider, be the prerequisites of breeding rhinos on private land in the U.S.

Turning next to elephants, our first priority has been to help direct conservation efforts to designated priority areas, such as Selous Game Reserve in southern Tanzania and Garamba National Park in Zaire. New studies are also underway to update information on the volume, source and destination of ivory coming out of Africa. The Wildlife Trade Monitoring Unit in Cambridge together with Esmond Bradley Martin and Ian Parker are presently analysing the trade statistics and will present their findings in time for the Harare meeting where the information will be reviewed and decisions made on any conservation action thought necessary. Early indications are that extremely large consignments have been leaving Sudan in the last two to three years and that mean tusk weights have fallen substantially, signalling an over-utilization of elephants. Informants in South Sudan report that large poaching gangs are decimating elephants and rhinos in a manner reminiscent of Kenya in the mid-1970s. Aerial counts of Western Equatoria suggest that the elephant population has dropped by a half between 1976 and 1980. Since Sudan is a member of CITES and actively seeking outside support for its conservation efforts, our next task is to consider what emergency measures can be used to curb illegal hunting.

As Ian Parker showed in his ivory report to the US Fish and Wildlife Service, we can glean a great deal about the status of elephants in Africa by monitoring the trade in ivory. However, we still do not know what ivory parameters are most reliable, or how sensitive they are to changes in elephant populations. To explore the potential of trade statistics more thoroughly, Tom Pilgram of the University of California, Berkeley, has embarked on a statistical analysis of what a piece of ivory can tell us about the elephant from which it was extracted, and thus what trade statistics ultimately tell us about the status of the population from which a given consignment was drawn. He elaborates upon this theme later in this Newsletter. We hope eventually to formulate guidelines for how the ivory trade can be better regulated in those countries which intend to manage their herds on a sustainable basis. The meeting in Harare will address the topic in some detail.

We also hope to initiate a study of the forest elephant (*Loxodonta africana cyclotis*), a sub-species of the African elephant which is still somewhat of an enigma. We do know from the substantial volume of ivory assigned to *cyclotis* that it must be numerous. But how numerous and how widely it is distributed is uncertain. We know even less about its basic biology, ecology and social organization, yet it could play a key role in maintaining the patchwork of equatorial forests and the high faunal diversity associated with it. It is exciting to think that such a large and important animal is still virtually unknown biologically.

Finally, we are also in the process of launching a new Pan African survey of elephants and rhinos, a process we hope to complete later this year, and one that should enable us to review the trends of the last three years and help us to define a new conservation strategy sometime in 1984.

Future issues of the Newsletter will elaborate on the projects we have begun and offer a variety of news and viewpoints on elephant and rhino conservation in Africa.

David Western

# The Status of Northern White Rhinos

Northern white rhinos (*Ceratotherium simum cottoni*) were discovered for the western world in 1900. At that time the only previously known white rhinos belonged to the southern race, (*C.s.simum*), south of the Zambezi, over 2500 kilometres away. These had been reduced to relict populations once said to number 10 individuals. Now the situation is reversed. There are over 3000 southern white rhinos re-distributed throughout their former range and we are faced with a question for the northern whites: 'Can we achieve a similar conservation success, or do we allow the whole sub-species to become extinct?'

At the start of this century, the northern white rhino probably occurred west of the Nile from the north-western corner of Uganda and north-eastern corner of Zaire, north through Sudan to just above Shambe and west roughly between 5 and 9 to the present Central African Republic and southern edge of Tchad. Throughout this range it had a very patchy distribution, probably determined negatively by the presence of people and positively by the burned riverine grasslands associated with areas of savanna woodland and available water. Areas that were given theoretical conservation status included: Ajai Sanctuary and the forest reserves of Mt. Kei and Otze in Uganda; Parc National de la Garamba in Zaire; Nimule and Southern National Parks and Shambe and Numatina Game Reserves in Sudan; Reserve de Zemonga and Parc National de Goz Sassoulka in C.A.R. and Tchad.

The placid white rhino, grazing in open grasslands and blissfully unaware of what is happening downwind, is easy prey for man. The conservation forces of these countries have often had inadequate resources to protect their vast areas and wars have taken their toll. White rhinos are now extinct in seven, probably eight of the above 'sanctuaries'. Parc National de la Garamba has generally offered the best protection and in 1965 Sidney wrote that ". . .the future of this Reserve is vital to the survival of the northern race in the same way as the Umfolozi Reserve in Natal is the last hope for the survival of the southern race". She was right.

Garamba was well protected after its creation in 1938 and the reported 100 rhinos that existed then had increased to an estimated 1000 to 3000 before Simba guerilla forces occupied the park in 1963. In 1972, Curry-Lindahl estimated that 900 to 1000 had been killed during the disturbances. With regained control of the park, numbers increased again and 490 were estimated to be present by an FAO aerial survey in 1976. Around 1978/81 another wave of poaching hit the park.

The civil war in Sudan also eliminated many rhinos there. The famous rhinos of Nimule were wiped out and most of those near Juba and in Yei district and Numatina have been destroyed. In Uganda, all those in West Nile Province were killed during Amin's time and the subsequent liberation war and only the odd one or two remain of those translocated to Murchison Falls National Park in the 1960s. In 1969/70 Corfield and Hamilton were unable to confirm the existence of white rhinos in eastern C.A.R. though they have since been found in the west. They have almost certainly been lost from Tchad.

As a result of the 1979/80 survey of the status of rhinos in Africa, the northern white rhino was identified as the most endangered of the African rhinos and projects were developed for



Figure 1. An informer shows Gabriel Gurguri, Senior Wildlife Officer in Shambe, a skull of a poached northern white rhino.

their conservation in the then relatively high density areas of Shambe Game Reserve in Sudan and Parc National de la Garamba in Zaire, Funds were not immediately available, however, and a new wave of poaching took hold of both countries around 1979/81 as the commercial value of the horn became more widely realised and arms more easily available, Following the re-affirmation of the northern white rhino as a high conservation priority at the Wankie meeting of the Rhino and Elephant Groups and the A.E.R.S.G. meeting in Nairobi in September 1982, an 'Emergency Mission' went to Kinshasa and Garamba in October/November 1982, consisting of Ian Hughes, Kes Hillman and Paul Dutton, as well as Pat Rogers of FAO and Mankoto ma Mbaelele, Directeur Scientifique et Technique of the Institut Zairois pour la Conservation de la Nature (IZCN). We ascertained that rhinos still exist in Garamba, although in low numbers, and we proposed an initial project for immediate aid for anti-poaching as well as long term assistance.

Starting in January this year, a more detailed survey is being carried out by Kes Hillman, in conjunction, for the aerial work in Garamba, with Markus Borner of Frankfurt Zoological Society (FZS) and with members of IZCN and the Wildlife Dept., Southern Sudan. Funding for the ground work is from World Wildlife Fund. The aerial work is carried out with the support of FZS and the Global Ecological Monitoring System (GEMS) of UNEP.

The overall objective is to find out how many of the northern white rhinos are left and what can be done for their conservation. In Zaire this has involved carrying out aerial and ground censuses and making detailed conservation recommendations. In Sudan the priorities are to assess the situation in the areas most recently known to have had reasonable populations of white rhinos (Shambe Reserve and Southern National Park) and-to follow up leads on other possible populations.

The results so far are depressing for Sudan and dangerously low but optimistic for Garamba.

## *Sudan*

Our information to date in Sudan is based on:

- a) Previous knowledge from ground and aerial surveys in the Shambe Reserve and Southern National Park.
- b) Reports from government officials, hunters and local people.
- c) Vehicle and foot surveys.

We identified four areas worth investigating:

- a) Shambe Game Reserve and adjacent areas.
- b) Southern National Park between Sue and Ibba rivers.
- c) The proposed Lantoto National Park, adjacent to Parc National de la Garamba.
- d) The area between Tonj and Meshra.

Starting from the lowest priority:

- d) There have been no confirmed reports since 1976. An aerial reconnaissance is considered necessary and may be carried out in April/May.
- c) The Lantoto area, south of the Yei-Maridi road was covered as part of the Garamba aerial census. It is an attractive, gently hilly area with moderate to thick cover of broadleaved woodland, but very limited availability of water. Almost no animals were seen, apart from an occasional duiker or warthog. Its main value is as a buffer zone to Garamba. It is questionable whether the Sudanese authorities should invest a large part of their limited resources in protecting the area but it is certainly worth improving its legal conservation status.
- b) The situation in Southern National Park represents Southern Sudan's biggest immediate conservation problem. Since the 1980 dry season, the Southern Region has been invaded annually by poachers from the north. Well-armed and mobile, with horses, came Is and pack donkeys, they have caused havoc for wildlife and people alike. They concentrate mainly on elephants but kill anything of value and have almost certainly eliminated the white rhino in the west of the region. Each year the poachers have moved further south and east and this year are in greater force than before. They have completely occupied Southern National Park and in March there were estimated to be between 15 and 30 camps in the Park with 10 to 300 men in each. They are far better armed than the Southern Region Wildlife Department staff that are trying to combat them and are equipped with new G3 automatic weapons, radio communications and helicopter support.

It has not so far been possible to carry out a systematic count over this war zone, which in 1980 was estimated to hold 168 white rhinos, but an intensive count over the rhino area is planned for May when rains have moved the poachers out. So far 220 tusks have been captured from poachers, but it is estimated by one source that 5,000 and by another source that 30,000 elephants have been killed each year. Average tusk weight of elephants shot by one safari company fell from 49 lb to 36 lb from 1980/1 to 1981/2. The large elephants that were easily found 4 or 5 years ago have long gone. Most of the poached tusks weigh only a few pounds each.

This organised poaching has political and military links. Unless stopped, there is no hope for Sudan's northern white rhinos and very little hope for the wildlife as a whole. A well organised, equipped and maintained anti-poaching effort is

needed in the south, but it will have minimal effect unless the central government takes action to stop the poaching and the export of ivory.

- a) Most of the ground work in February was in the Shambe and Alliab Dinka areas, Rhino poaching only started in these regions in the last 2 or 3 years, but in that time it has eliminated, most of the rhinos.

In the Shambe area we worked with the Senior Wildlife Officer, Gabriel Gurguri and his honey hunter 'informers'. They had reported 24 rhino sightings in 4 locations since 1981.

We covered six locations, concentrating on likely areas such as the few water holes and the places where rhinos had been reported. Despite several promising leads, no fresh rhino spoor was seen and it appears that most of the alleged sightings of rhino tracks were of doubtful validity. The most recent reported sighting of live rhino was in July 1982. Most rhino poaching was from late 1979 to 1981, Our preliminary conclusions are that:

1. The Shambe region no longer contains enough northern white rhinos to justify a major investment for their conservation but the limited help promised by IUCN/WWF is still badly needed and will be productive.
2. The proposed full Game Reserve area should be officially gazetted as soon as possible with an initial compromise on limited grazing and watering rights in the south east, but total human exclusion in the north west.
3. The best hope for the area is for an agreement to be made between the Ministry and a reputable safari company for the long-term tourist development and conservation of the Reserve. There has been a preliminary acceptance of this idea and an initial meeting has been held.

## *Zaire*

Garamba National Park (4900km<sup>2</sup>) in Zaire is now the best hope for conservation of the northern white rhinos in the wild.

Aerial and ground surveys were carried out there in March as follows:

- a) A 10% systematic aerial sample count was made over the whole park and surrounding game reserve and the proposed Lantoto National Park, directly comparable with that carried out by the FAO team in 1976.
- b) A 46% intensive aerial sample count was made over the southern third (1609km<sup>2</sup>) of the park, during which only rhinos and elephants were recorded,
- c) The park staff carried out their regular ground count, walking transects spaced at 2km intervals over the southern third of the park.
- d) Simultaneous high intensity 'total' counts were made by guards walking 500m spaced transects and by ourselves flying over an 84km<sup>2</sup> rhino 'concentration' area.
- e) The total number of individually recognised animals was extrapolated.

Six rhinos were seen within the aerial sample transects and another five individuals outside. The preliminary estimate from the 46% count was 15. From aerial and ground observations approximately 17 individuals can be accounted for. The results from the high intensity counts indicate that some rhinos

may have been missed from the air, but inconsistencies in the ground counts make it impossible to apply correction factors. Our estimate therefore from a critical examination of all results is that at least 15 to 20, possibly more, white rhinos still exist in Garamba. They are confined to a fairly localised area.

The population is dangerously low but should be viable if a major input is made in Garamba and the northern whites already in captivity are managed to improve breeding with potential for genetic exchange. Garamba is a beautiful, productive and well-watered area with large numbers of other animal species, particularly buffaloes and elephants (of which there are estimated to be 5000 in 1600km<sup>2</sup>). Another major advantage is the well established infrastructure which can be re-developed.

The park staff lack equipment, funds, vehicles and supplies but IZCN has already taken steps to concentrate on rhino protection and research under Mankoto ma Oyisenzo and has invited an expatriate researcher. Some of the equipment priorities identified during the November mission have already been met. Other urgent requirements are needed immediately. A larger project should be developed to ensure that the rhinos are protected and managed along with the whole ecosystem.

Patrol bases are presently being established in the rhino area for intensive surveillance. Radio collaring is suggested as part of the future programme of intensive protection and management.

Strong possibilities exist for tourist development of the Garamba, which has several unique features, in particular the only African elephant domestication project. Although there are only four surviving trained elephants, there are proposals to catch and train more.

An excellent chance now exists to save the last most viable northern white rhinos in the wild, while conserving and developing a fabulous area. It must be seized.

The results of the survey have emphasised how important it is to develop the breeding and management of the northern white rhinos already in captivity. It was believed that there were only fourteen in captivity but recent information indicates that there are more. The possibility of consolidating these animals into two groups is being considered and the International Union of Directors of Zoological Gardens and American Association of Zoo Parks and Aquariums have agreed to oversee a programme. The largest group at present is the eight in Czechoslovakia which are breeding, but slowly. Artificial insemination is being developed and it is possible that semen could be collected from immobilised wild rhinos in Garamba.

An investment of money and effort is needed now for a co-ordinated programme of conservation in the wild and development of captive breeding to ensure that northern white rhinos and their habitats continue to exist.

Kes Hillman

## Selous Aerial Survey 1981

On behalf of the Tanzanian Rhino and Elephant Task Force a census was carried out in the Selous Game Reserve in Southern Tanzania in 1981. About 35% of the 55,000 km<sup>2</sup> Game Reserve was surveyed and the results were compared with a survey that had been carried out by Douglas-Hamilton in 1976.

The elephant numbers seem to have remained stable between 1976 and 1981. Numbers counted were 82 628  $\pm$  17% in 1976 and 85 504  $\pm$  12% in 1981. As data could be compared only for the wet season, when visibility is not optimal, the estimate is conservative. The actual number of elephants is probably nearer 100,000.

Elephant skeleton densities have increased by about 50% from 1976 to 1981 and the ratio of dead to live elephants has risen from 7.8% to 12.3%. This indicates a higher mortality rate in the elephant population. The distribution pattern of skeletons along access routes and close to settled areas indicates that the higher mortality in elephants is due to poaching.

We can conclude that the elephant population of the Selous remained at about the same level between 1976 and 1981, but that poaching in the more accessible areas has markedly increased.

Survey data seem to suggest that the total (corrected) number of rhinos in the Selous has decreased from about 5,000 to about 3,000 animals in the last five years. These figures must however be considered with reservations. Although there were

high 95% confidence limits on both counts (46% and 44% respectively) our ground counts showed clearly that aerial surveys have only limited value for counting rhinos. Using the results of ground counts we worked out a rhino correction factor of x 2.55 in the wet season for that specific area and vegetation cover. We were unable to work out a correction factor for the dry season, due to different behaviour patterns of the rhinos, who concentrate in riverine forest and thickets during this season.

According to professional hunters and Wildlife Division staff, rhino poaching is occurring occasionally but has not yet reached an alarming level.

The 3,000 rhinos estimated make the Selous black rhino population the largest in the world.

Up to date the best protection for the wildlife in the Selous Reserve was the vastness and inaccessibility of the area. SHELL is at present building seismic roads into three quarters of the Selous Game Reserve, thus making it unfortunately also accessible to illegal hunting.

A number of recommendations were made to improve protection and management of the Selous. The AERSG is making a high level approach to SHELL, to assure their cooperation in minimizing the negative effects their present work has in the Selous Game Reserve.

Markus Borner

# Musth discovered in the African Elephant

A long-standing controversy in the field of elephant biology has recently been cleared up with the discovery that musth definitely occurs in the African elephant. The phenomenon of musth (which has been likened to rutting behaviour) in male Asian elephants is well-known both in the wild and in captivity in Asia as well as in zoos and circuses around the world. A male in musth secretes from the temporal glands, has a continual discharge of urine, becomes very aggressive, and in captivity is very difficult to handle. These physical and behavioural characteristics are displayed periodically generally once or sometimes twice a year for each individual. When domestic male elephants come into musth they have to be chained up, taken off work and given reduced feed. Stories abound in the literature of musth males killing their mahouts or their keepers and trainers in zoos and circuses.

Elephant observers including naturalists, hunters, biologists and game wardens, have speculated on the occurrence of musth in the African elephant, since in so many respects African and Asian elephants are similar, but they concluded that it did not occur. The main reason for this conclusion is the apparent difference in activity of the temporal gland between the Asian and African elephant. In the Asian elephant, with rare exceptions, only males in musth secrete from the temporal glands and this secretion is the prime indicator of musth. In the African elephant males, females, juveniles and even young calves secrete from the temporal glands frequently. Elephant observers could find no relationship between the secretion and sexual or aggressive behaviour and so they concluded musth did not occur and furthermore, that the secretion in the African elephant was related to another, as yet unknown, function.

We started our long-term study of the elephants of Amboseli National Park in 1972, and continuous observations have been made on individually known males since September, 1972. The population presently consists of 620 animals of which approximately 164 are adult males.

In our study of the bulls we were not looking for musth, nor were we even trying to discover the function of the temporal gland. However, as the long-term records began to accumulate we started to see some unusual phenomena among the bulls in the older age classes (those over about 30 years). We first started to notice some of these males with continuously dripping urine which was accompanied by a strong odour and a greenish colouration to the end of the penis and part of the sheath. We referred to this phenomenon as the “green penis syndrome” or “GP”. In addition when the bull had the GP syndrome he had swollen temporal glands and copious, thick secretion from the glands. This secretion appeared different in consistency from that of females, juveniles and younger males.

We also noted that males with GP were not in their usual haunts, the bull areas, but were in the company of females, busily moving through the group testing each female in turn. We soon learned to be wary of any bull with GP as these males were very aggressive, not only towards other males but towards observers as well. Later in our study we found that this aggressive behaviour was due to very high counts of the male hormone, testosterone. Even-



Figure 2. Amboseli bull elephant

tually we could recognise the subtle signals of musth at a distance. For instance, as a precautionary measure we often smelled the air as we arrived at a large group. And we learned to recognise the “musth walk”—a head high, chin in, ears tense strut—visible at several hundred meters away.

Over the years we found that each bull has a particular few months of the year during which he comes into musth. For example, M126 has come into musth in June, July and August every year for seven years and M13 has been in musth in March, April and May every year for six years. However, some males exhibit musth for only a day or two while others may remain in musth for upwards of five months. The duration and timing of musth periods is dependent on a complex interaction of environmental and social factors such as rainfall, vegetation biomass, number of available females and male dominance status.

For more detailed information on musth in the African elephant see the following references:

- Poole, J.H. and Moss, C.J. 1981. Musth in the African elephant. *Nature*, 292: 830—831.
- Poole, J.H. 1982. Musth and male—male competition in the African elephant, Ph.D. Thesis, University of Cambridge.

Joyce H. Poole  
Cynthia J. Moss

# Follow-up to stop trade in Rhino products in Asia

From 1979 to 1981, Dr. Esmond Bradley Martin carried out investigative research on the international trade in rhinoceros products, under the sponsorship of WWF and IUCN. In the reports he submitted, he recommended that steps should be taken to bring to a halt the international trade in rhino products and to decrease the demand by consumers for rhino horn, skin and hooves. He has recently returned from another trip to Asia, sponsored by WWF / IUCN, African Wildlife Foundation and African Fund For Endangered Wildlife, for the purpose of implementing measures to stop this trade, which still remains a threat to the survival of rhinos in the wild.

From October 1982 to February 1983, I visited ten Asian countries in order to discourage pharmaceutical wholesalers from further dealings in rhino products, to explain to practitioners of traditional Chinese medicine why they should no longer prescribe rhino drugs, and to publicise in the mass media the plight of the rhino in Africa as well as in Asia, so that consumers would be more willing to use substitutes. Also, I studied the present state of the international trade in rhino products to find out what additional efforts could be made to stop it.

I discovered that despite a sharp decline in the amount of new rhino horn reaching the world market from 1980 to 1982, there has generally been only a small increase in its retail price in most Asian countries. If the demand for rhino horn had continued on the same scale as it was three years ago, there would have been substantial price increases relative to its lesser availability. Because this is not the case, the encouraging conclusion can be drawn that there is a significant decrease in demand among consumers in Asia for rhino horn.

Specifically, the quantity of new horn reaching the world market has fallen from eight tonnes per year between 1972 and 1978 to less than four tonnes annually from 1979 to 1982. Since the number of rhinos in Africa was reduced by half during the 1970 decade, poachers have now found it more difficult to locate rhinos; furthermore, some of the African countries which had been among the main suppliers of rhino horn (Kenya, Zimbabwe and South Africa) have initiated tactics which in turn have greatly restricted the movement of rhino horn across their borders.

Concerning the retail prices for rhino horn in Asia, on average they have increased by only 20% since 1979, about 8.5% a year, roughly the same as inflation. As for rhino hide, a kilo in Hong Kong has gone down in retail price from \$423 in 1979 to \$376, and its decrease in price in Singapore is even more spectacular during this period: from \$923 to \$635. Wholesale, average costs of rhino horn have remained the same since 1979: \$550 for African horn per kilo C.I.F. South-East Asia, and \$9,000 per kilo for Asian horn.

There are many reasons for the declining demand in rhino products today. First, and most importantly, Hong Kong and Japan have stopped importing them, in 1979 and 1980 respectively, and these two countries were the largest consumers of rhino horn for medicinal purposes. In Hong Kong, where pharmaceutical traders produce numerous books and brochures on

traditional drugs, these now include explanations why rhino horn is no longer being imported; and in Japan, the government itself sent letters to pharmacists requesting that they promote the use of substitutes for rhino horn. Such actions are commendable: they have helped to lower domestic demand and, possibly, they will also discourage illegal imports. Secondly, saiga antelope horn is now much more widely used as a fever-reducing drug in Asia than it was, partly because of my own efforts to persuade importers, doctors and pharmacists in oriental medicine to use it instead of rhino horn; but, mainly, because it is a very much cheaper drug and is acceptable as a substitute for rhino horn in traditional medicine. The retail price for a kilo of saiga horn in Singapore, for example, is around \$230, while a kilo of rhino horn is \$9,876 for African species and \$19,170 for Asian species. Thirdly, since Hong Kong is a major entrepot for most traditional Chinese drugs, and can now only supply to other countries stocks of rhino horn imported before the 1979 legislation, pharmacists elsewhere in Asia are aware that it will become increasingly difficult to obtain via Hong Kong. Moreover, because the traders in Hong Kong do not want to lose their rhino horn customers to foreign pharmaceutical firms which will supply rhino horn, they are doing their utmost to sell other drugs as substitutes. Fourthly, the sharp rise in the wholesale price of rhino horn which was \$35 a kilo in 1972, led to the appearance of fake rhino horn shavings and tips of water buffalo horn being marketed under the name of rhino. This has made customers suspicious; consequently, some would rather buy a packet of dried herbs or saiga antelope horn when in doubt about the genuineness of the rhino product they are offered.



Figure 3. A typical Chinese Medical Hall in Penang, Malaysia.

**TABLE I**  
**AVERAGE RETAIL PRICE FOR RHINOCEROS HORN PER KILO IN LATE 1982/EARLY 1983**

Place	Origin of Horn	Price per Kilo
Hong Kong	mostly African	\$ 15,700
Japan	African	2,516
Osaka	African	2,243
Kyoto	African	1,934
South Korea		
Seoul	African	1,797
Pusan	African	1,930
Taegu	African	1,475
Macao	mostly African	7,797
Philippines (Manila)	mostly African	10,706
Brunei (Bandar Seri Begawan)	mostly African	6,895
Indonesia		
Medan, Sumatra	Asian	2,847
Semarang, Java	?	11,679
Singapore	mostly African	11,804
a)	African	9,876
b)	Asian	19,170
Malaysia		
Kuala Lumpur	Asian/African	17,280
a)	African	9,876
b)	Asian	24,256
Georgetown, Penang	mostly Africa	14,582
a)	African	5,415
b)	Asian	27,557

Source: Survey taken by author.

Fifthly, already worldwide publicity about the decline in rhinos has reached the ears of city dwellers in Asia, through the mass media and even by word of mouth, with the result that many would-be customers of rhino horn are no longer asking for it when they visit their traditional pharmacies. From interviews I carried out, however, this is not usually because they appreciate the need for conservation, but because they don't believe there are any more rhino horns available.

While the demand for rhino products in Asia may be beginning to wane, curtailment of the trade is still a long way off. Efforts to cut it short are hampered not only by those who flout laws prohibiting the movement of rhino horn across certain international borders, but also by loopholes in legislation and even the absence of restrictions in some countries. Without effective controls on this trade, rhino horn can continue to reach the main markets and if such supplies become substantial, the demand could escalate once again.

There is also the major challenge of North Yemen. Its location is close to African rhino sources, the demand for horn remains high there, and it is well known that even though the government made rhino horn an illegal import in late 1982, it is still coming into the country. Smuggling is nothing new to North Yemen: traders have managed to bring in and take out other illegal goods with impunity. Regarding rhino horn, traders are now arriving on scheduled airline flights to Sanaa with rhino horn from the southern Sudan in their baggage.

The role of Singapore as a legitimate entrepot for rhino horn

is perhaps the biggest problem insofar as the trade in this product for medicinal purposes is concerned. Moreover, during the past few years there has been a definite increase in the amount of rhino horn and skin coming into Singapore from Sumatra because the Singapore dealers generally offer higher prices, and the horn can freely enter the country. There is not even a duty levied on rhino products. The simplicity of getting rhino horn on the market in Singapore is why Indian rhino horn is being smuggled out of Calcutta to this destination. Ominously, there has recently been an upsurge in poaching of Indian rhinos in Assam.

China is still exporting vast quantities of various manufactured tablets containing rhino horn. These are to be found in traditional medicine shops throughout Asia—in Japan, South Korea, the Philippines as well as in Singapore, Hong Kong and Macao. In selling such manufactured medicines the traditional pharmacists continue to cater to the demand for rhino horn. Since the rhino horn is not readily identifiable in these drugs from China, they are technically allowed to be imported by countries which have ratified C.I.T.E.S.

Hong Kong traders are legally allowed to continue to export their old stocks of rhino horn; and since 1976, when they had to obtain licences for rhino horn, 2,535 kilos have either been consumed domestically or exported. Additionally, there are some stocks of rhino horn held in Hong Kong which have never been registered, and some of them are now being smuggled out, mainly to South Korea.



Figure 4. Rhinoceros hide, mostly from the white rhinoceros in South Africa, is used by the Chinese in Macao, I-long Kong, Singapore and Malaysia to cure skin diseases. In this photograph, a Chinese pharmacist displays on the left the underside of a dried piece of rhino hide and on the right the top side.

Today South Korea is one of the most important consumers of rhino horn. It is still legal to import the horn there if it is declared and the 42.5% tax levy is paid on it. In both Seoul and Pusan, the second largest city in the country, I found rhino horn for sale to the public. In fact, it was available in 62% of the 76 oriental medicine clinics I visited in Seoul. The official import statistics for 1981 record 142 kilos of rhino horn entering the country, but this is not the correct figure; the total annual imports were probably more than double that. Nor is the place of export given in the government's statistics correct; the vast majority of rhino horn imports — both legal and illegal — come from Hong Kong, not Indonesia.

Although neither the demand nor price for rhino horn has significantly increased on international markets since 1979, the incentives for poachers to supply it from the remaining 16,000 rhinos in Africa and the 2,000 in Asia are still tremendous. Therefore, in order to relieve some of the pressure on rhinos in the wild further action must be taken against the trade. I suggest the following recommendations:

### RECOMMENDATIONS

1. An important personality in the world of conservation should visit Singapore, South Korea, Taiwan and Brunei to urge the governments of these countries to ban imports and exports of rhino products. Each country has the infrastructure to enforce a ban, and this would deal a severe blow to the international trade. In the case of Singapore, which is presently unwilling to become a C.I.T.E.S. member, arguments could be presented to the government that their already enacted legislation to protect Birds of Paradise and orang-utans from international trade should be extended to encompass rhino products.

It is unlikely that either South Korea or Taiwan would take over Singapore's role as an entrepot, but their use of rhino horn is so extensive that the closing of their doors to its importation is imperative. On the other hand, Brunei must stop imports not because it is a major consumer but because it could become in the future an entrepot for rhino products.

2. Continual encouragement of the use of saiga and water buffalo horn as substitutes for that of rhino should be given to the proprietors of traditional medicine shops in Asia. Also, the use of water buffalo hide as a medicinal product instead of rhino hide should be encouraged.

3. Publicity on the plight of rhinoceroses in Asia and Africa has proved effective in cutting down the demand for rhino products; therefore, it should be intensified in the English, Chinese, Japanese, Korean and Malay languages.

4. The Agriculture and Fisheries Department of Hong Kong should prohibit further exports of "old" rhino horn stocks.

5. In order to help the North Yemen government enforce its new law against rhino horn imports, someone familiar with the trade should visit this country for the purpose of ascertaining particulars on the present smuggling activity and how to curtail it. In addition, a strategy should be developed that will entice the carvers of expensive dagger handles to use a substitute for rhino horn.

Esmond Bradley Martin

**TABLE II**  
**AVERAGE RETAIL PRICE FOR RAW RHINOCEROS**  
**HIDE PER KILO IN LATE 1982/EARLY 1983**

Place	Origin of Hide	Price per Kilo
Hong Kong	South Africa	\$ 376
Macao	South Africa	360
Brunei	?	376
Singapore	Indonesia, Malaysia and South Africa	635

Source: Survey taken by author. TABLE III

**AVERAGE RETAIL PRICE FOR RHINOCEROS**  
**HOOVES PER KILO IN LATE 1982/EARLY 1983**

Place	Origin of Hooves	Price per Kilo
Singapore	Indonesia, Malaysia and South Africa	\$ 2,329
Georgetown, Penang	Indonesia and South Africa	\$ 1,968

Source: Survey taken by author.

TABLE IV

## PERCENTAGE OF PHARMACIES HAVING RHINOCEROS HORN FOR SALE IN LATE 1982/EARLY 1983

Place	Total No. of Shops Examined	Rhino Horn	No. Having Rhino Horn	Percentage
Hong Kong	50		23	46
Japan				
Osaka	5		3	60
Kyoto	15		15	100
Nara	4		4	100
South Korea				
Seoul	76		47	62
Pusun	8		8	100
Taegu	20		16	80
Macao	14		9	64
Philippines				
Manila	17		4	24
Cebu	5	(total count)	0	0
Zamboanga	2	(total count)	0	0
Davao	2	(total count)	0	0
Brunei				
Bandar Seri Begawan	5	(total count)	2	40
Seria	3		0	0
Indonesia				
Medan	21		1	5
Yogyakarta	4	(total count)	0	0
Solo, Java	2	(total count)	0	0
Semarang, Java	7	(total count)	2	29
Singapore	46		16	35
Malaysia				
Kuala Lumpur	29		6	21
Georgetown	14		7	50

Source: Survey taken by author.

## The Elephants of Gangala-na-Bodio

The first African elephant training station was set up by King Leopold in 1899 in what was then the Congo. In 1927, the station was moved to Gangala-na-Bodio, beside the present Parc National de la Garamba. In its heyday more than 35 trained elephants were present at the station. Initially, Ceylonese mahouts helped with the catching and training, but subsequently this work has been done by Belgians and Zairois. The elephants are trained with the help of older, reliable animals known as moniteurs. The latest wild caught elephant was captured in 1957.

Today there are only four elephants left, all females. One, *Luiro*, is trained as a moniteur. The elephants are no longer worked, but are kept in training by collecting fodder daily.

The potential for developing tourism around these trained elephants as part of a coordinated project to rehabilitate Garamba is clearly enormous. Indian wildlife officials have expressed an interest in redeveloping the project, and FAO is already actively involved. Such action may yet save Africa's only elephant domestication centre.

Robert Malpas



## Black from the brink



Figure 6. Poached elephants littered all three of Uganda's national parks in 1979 and 1980.

In the 1960's, three well-ordered national parks, Queen Elizabeth, Murchison, and Kidepo, existed in Uganda. They enjoyed firm political support, a sound economic basis, and an ecological problem of too many elephants. Then, in 1971, with the military coup of Idi Amin, tourism collapsed, the country's economy was wined, law and order deteriorated. High government officials and security officers sponsored elephant and rhino poaching in the national parks. By the end of the war with Tanzania in 1979, around all three parks automatic rifles had proliferated. Ex-military personnel, villagers, tribesmen, and poachers were all better armed than the rangers.

The 1980/81 aerial surveys sponsored by WWF showed that every species except Uganda kob declined markedly. In Queen Elizabeth, only 150 elephants were counted in the open areas where formerly there had been 3000. In Murchison, north of the Nile, only 1200 elephants remained out of a 1973 population of 5000, but in the isolated southern section the decline was even more catastrophic — only 160 remained out of a population that had numbered 9000 seven years previously. Kidepo, censused a year later, still had a more or less intact elephant population of 411 but neither here nor in Murchison were any rhino, black or white seen from the air.

Furthermore, there were clear signs that poaching was still in progress. Heavy gunfire could be heard almost every week in all three Park headquarters, and fresh carcasses littered the elephant's range.

Rangers lived without pay, transport, communications, uniforms and, in Kidepo in the north, under conditions of starvation.

For a year, the parks were run on a hand to mouth basis, with inputs from the FZS, AWF, WWF/IUCN, National Geographic Society, and expatriate volunteers. With this support from the outside world, by the end of 1980, elephant poaching in Kabalega had greatly decreased. This voluntary aid filled a vital gap from April 1980 to March 1981, while plans submitted by the government to UNDP and EEC for more substantial aid were coming to fruition.

The UNDP and EEC programmes covered material and tech-

nical aid including communications, transport, uniforms, food, air support, training and operational backstopping. VHF sets were installed to link ranger patrols to vehicles and airplanes, and a long-range HF system linked all the parks with Kampala headquarters.

Patrols were intensified on the ground, coordinated from the air, and supplied by newly opened tracks and air-drops. New rangers were recruited and trained.

In Murchison, where efforts were first concentrated, success can be measured in terms of elephants found dead and number of guns recovered.

	Elephants found dead	Guns Recovered
1980	120	14
1981	13	43
1982 (Jan.—Sept.)	1	23

A second series of aerial counts was made in 1982. Kidepo where 420 elephants were counted showed no significant change from the previous year. In Murchison 980 elephants were recorded north of the Nile, which may represent a drop from the estimate of 1200 two years earlier, but the elephants were found in areas of thicker bush than before, which may have lowered the estimate. In Queen Elizabeth, however, 428 elephants were counted, compared to 150 in 1980. Evidently, they have emerged from the forest or have immigrated from Zaire.

Both Murchison and Queen Elizabeth are now experiencing a massive regeneration of woody vegetation, triggered by the decreased elephant density. The recovery of habitat provides ideal conditions for the recovery of elephant populations, should their security continue to be guaranteed.

The Uganda National Parks have survived a period of catastrophe, largely due to "islands of dedication" within the organisation, and through the rapid and flexible aid which this has generated since the liberation war.

It may be concluded that unwavering international support for National Parks here and elsewhere is vital in times of adversity, instability and political turbulence.

I.Douglas-Hamilton

## AERSG initiates new analysis of Elephant data

The report on the ivory trade in 1979 by Ian Parker was significant for its demonstration of the potential of ivory trade statistics for detecting trends in the status of elephants in Africa. Parker himself, however, pointed out the tentative nature of many of his conclusions and recommended follow-up studies to examine and expand his results.

Parker's recommendations have since been implemented in a variety of ways, such as by increased monitoring of trade in ivory, but only limited work has been done to elaborate the relationship between tusk statistics and the status of the elephant populations from which the tusks come. A new two-stage project is directed at just this area of research.

The first stage will examine the extent to which information about individual elephants can be derived from individual tusk measurements. The most important kinds of information for our purpose are sex and age which as Parker has amply demonstrated can be discerned from tusk measurements with some accuracy.

The Animal Research and Conservation Center computer facility in Nairobi will extend his study examining a variety of mathematical models to describe the relationships between sex and age and such tusk measurements as length, circumference, and weight. These models will be checked both statistically and

biologically. Measures of statistical confidence will be used to determine the reliability with which generalizations can be made. In addition, general theoretical problems in the use of this type of model will be examined using the latest biological information from the field, in particular, from studies of known-age elephants.

The second stage will use the models developed for individual elephants as a basis for deriving information about elephant populations from tusk populations. Parker demonstrated that tusks can be used to determine some aspects of mortality patterns and it should be possible through various types of mathematical modelling to make assumptions as to what sort of population structure and mortality patterns acting together would be needed to produce the ivory in international trade.

The models of population structure should provide information on the health of the elephant population and the sustainability of the ivory trade in its present form. The results will doubtless be tentative, but it should be possible to make predictions which would help determine their practical validity. The models will be designed to reduce the complexity and to improve the reliability of conclusions reached from long-term ivory trade monitoring, while using that information as a constant check against their validity.

Tom Pilgram

## North Yemen bans the importation of Rhino horn

From 1972 to 1978 the merchants in North Yemen imported about 40% of all the rhinoceros horn which came onto the world market. This horn was used for the making of dagger handles and some of the chippings were re-exported to Eastern Asia where they were used for medicine.

In an attempt to stop this trade, the African Wildlife Foundation under President Robert Smith initiated in 1982 a public mail campaign to the Prime Minister of North Yemen. Hundreds of Americans signed cards complaining about the importation of rhino horn into North Yemen. Within a few months the North Yemen government acted and in August 1982 banned all imports of rhino horn. Mr. Robert Smith and the African Wildlife Foundation are to be congratulated for their efforts.

Although making the importation of rhino horn into North Yemen illegal is an important conservation measure, steps must now be implemented to make sure that the law is enforced. The passing of legislation is one thing, the enforcement of it is another.

If North Yemen does indeed stop this trade, then the demand will be sharply reduced for rhino horn, taking off some of the pressure on the wild rhino populations in Africa.

Esmond Bradley Martin



Figure 7. Most North Yemeni men wear daggers everyday, some of which have handles made of rhino horn

# Book Review

RUN RHINO RUN by Esmond and Chryssee Bradley Martin  
Chatto and Windus, London 1982 Price 9.95

The slaughter of elephant populations for their ivory in a number of African countries in the last decade has been given great prominence by the international news media. Concurrently an even more serious but less understood destruction has been taking place — that of Africa's rhinos. In *Run Rhino Run*, Esmond and Chryssee Bradley Martin put down, for what I believe is the first time the full story behind the massive poaching of rhinos in Africa and Asia over the past decade.

The book opens with a chapter on rhinos in history and mythology, which sets the scene for much of which is to follow and explains the peculiar fascination which man has had for the rhino, and for rhino products, down the centuries. Next, the authors take a brief look at the ecology and behaviour of rhinos in the wild — a popular account, this, for the general reader, since the authors are the first to admit they do not have an extensive field knowledge of rhinos. There follows a chapter which documents the slaughter of rhinos in both Asia and Africa, from historical times up to the massive poaching of recent years.

The major thrust of the authors own research and conservation activities are dealt with in two chapters which deal with rhino products especially horn. Following their investigations in the Far East, the authors clear up the confusion which has long existed over the uses to which rhino horn are put in the

Orient. The authors excel in their in-depth explanations of the intriguing historical, mythological and economic conditions which have given rise to the demand for rhino horns for medicinal purposes by the Chinese in particular. The myth, perpetrated in the western world, that the horn is used as an aphrodisiac is clearly and firmly dispelled. In this account, and the chapter on the rhino trade which follows, the Bradley Martins' manage to get across to the reader some of the flavour and mystique of the oriental medicine shops, which makes the book a pleasure to read despite its very serious contents. Their detailed explanation of the economics and *raison d'être* of the trade itself provides a firm basis for future action by international conservation organisations, who until recently have been hamstrung by the absence of any real understanding of the motivation behind the trade.

In the last chapter, the authors look at the prospects for rhino conservation in the wild.. I would take issue with their statement at one point that aid provided to Uganda's parks in 1980 was a waste of time (in an article in this newsletter Iain Douglas-Hamilton explains just how important this aid was in reversing the disastrous situation there). There can be no general rule in such instances, and each situation must be looked at as it arises on its own merits. This criticism aside, the chapter is an able summary bearing in mind that in a popular account such as this it is impossible to really go into all the intricacies in any depth.

All in all, this book is a lucid and timely account which should do much to inform and arouse the interest of the general public at a time when the world's rhinos need all the support they can get.

Robert Malpas

*The views expressed in this Newsletter are those of the authors and do not necessarily represent those of IUCN, SSC nor AERSG.*

*Most of the articles in this Newsletter have been contributed by Nairobi-based members. This was necessary for the first issue, but we very much hope that in the next and subsequent issues other members and consultants to A ERSO elsewhere will send in articles and news to give the Newsletter a more Pan-African viewpoint. The Newsletter will be produced twice a year. We await your contributions!*

Robert Malpas  
Editor