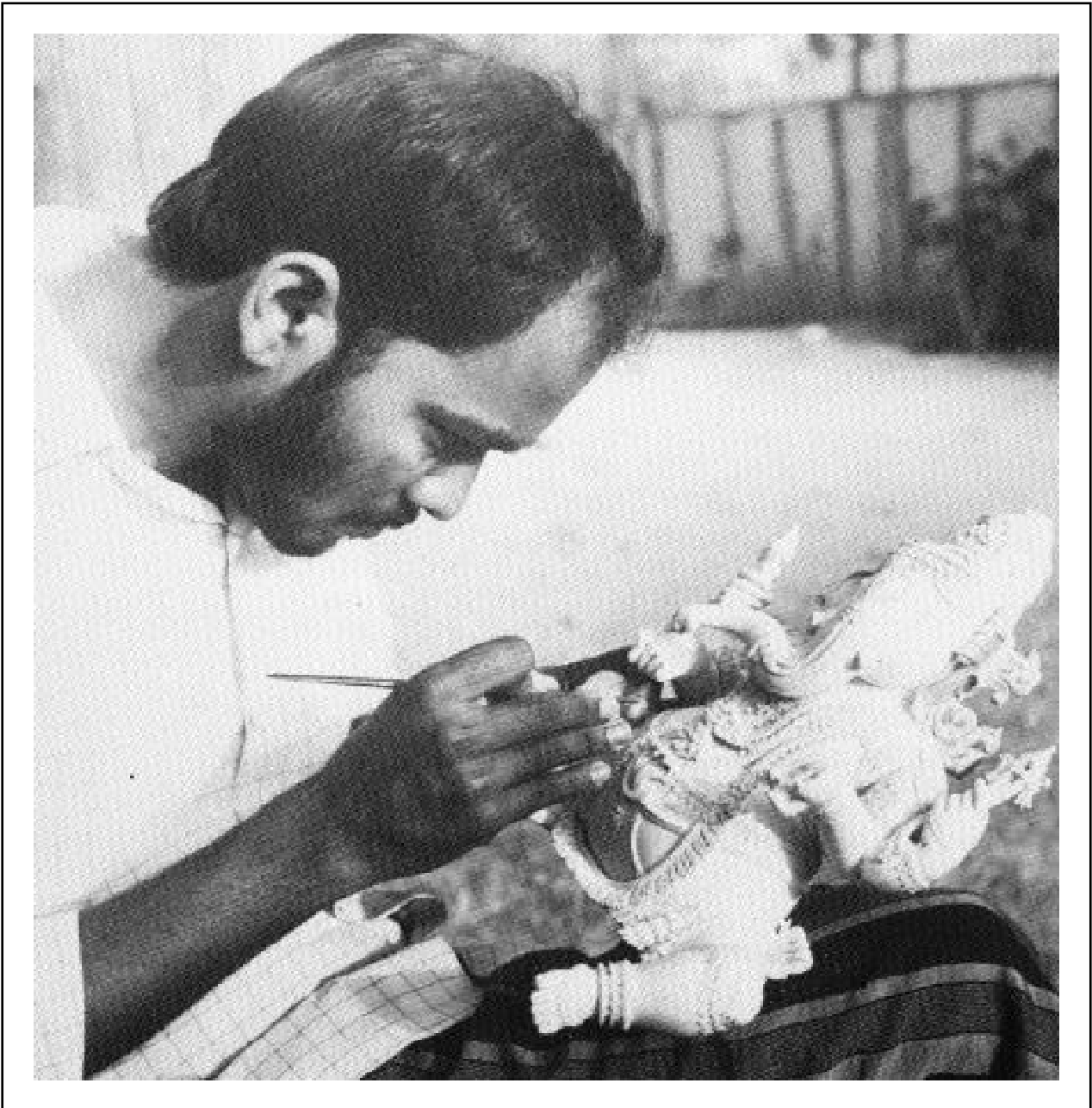


Pachyderm

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Cover Photo:
An ivory carver from South India
concentrates on the finishing touches
of his ivory Ghanesh figure in 1989.
Esmond Bradley Martin

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A notice to contributors

Pachyderm is a biannual publication which has been publishing technical articles relevant to elephant and rhino conservation. The publication's audience has therefore been scientists and authorities actively concerned with or involved in elephant and rhino conservation. *Pachyderm's* distribution is likewise limited to the same audience.

The gravely endangered elephants and rhinos have become symbols of the conservation movement. Today those concerned with their future come from diverse backgrounds. Their increased interest, together with moral and material support, are all contributing to the future of elephants and rhinos. To sustain and encourage this support we must keep them informed on issues concerning these animals.

To achieve this goal *Pachyderm* will be restructured to reach a wider audience. Future issues will be less technical, covering broader elephant and rhino conservation issues. Each issue will consist of a main section, addressing general conservation issues, and a small technical section. There will also be a 'Monitor' section for news items, accounts of new conservation techniques, book reviews, readers' letters and announcements. Special issues covering AERSG conferences and the results of special studies will be produced occasionally. To enhance the size of its audience, *Pachyderm* will also be open to subscription.

Contributors should bear these changes in mind when submitting material. We are looking forward to a popular writing style. References should only be for verification. Illustrative materials such as graphs, maps, black and white photographs and tables must be included and should be kept simple in order to make the message clearer. Please remember that all manuscripts should be double spaced with a wide left-hand margin. The deadline for articles for the next issue is 1 July 1989.

C.G. Gakahu
Chairman, Editorial Board

Chairman's Report

Putting Elephant and Rhino Conservation Plans into Action

David Western

Ozone holes, the greenhouse effect, acid rain, desertification and an extinction spasm have become household words in the 1980s. *Time* magazine featured our battered planet in place of 1988's Man-of-the-Year to alert us to a crisis more inevitable than a nuclear winter. Whether the environmental crisis is real or imagined is a question of when and how it will affect us. Is it surprising that West Germans are more worried about acid rain than Pershing missiles when industrial pollution has already killed 4 million ha. of forest in Europe? Ozone thinning and global warming, though decades away, give more pause for thought among the delicate skinned in Europe and drought-prone farmers in America than among African peasants, for whom the basics of life health, education and progress are paramount. The more immediate and personal the threat, the more it rivets our attention.

Wildlife, a tangible threat to many Africans is, to the great majority, a distant and immaterial factor. If talk of an extinction spasm in the technology-weary West seems a little far-fetched and irrelevant to African peasant farmers, it is understandable. Wildlife has been ubiquitous and troublesome to farmers and herders throughout the continent until the present generation. And, unlike the Americas and Europe, extinction is a stranger. The Pleistocene overkill which put paid to three quarters of the large mammals of the western world left Africa's megafauna almost intact. Little wonder, then, that talk of an extinction crisis seems alien and contrived, more especially because the overwhelming majority of candidates for the evolutionary trash heap are the millions of nameless forest critters that nobody except biologists care about anyhow.

The extinction threat needs to be authenticated and personalized in African terms, just as the case histories of the bison, the great whales, the tiger, the panda and the California condor have done elsewhere. A first hand, gut-wrenching threat to a revered and respected African creature will do more to awaken sensibilities and arouse indignation than any mind-numbing statistics of how many millions of invertebrates might be lost can ever do. If any species fit the bill, it is our largest and most charismatic species, the elephant and rhinos.

There can no longer be any doubt about the threats. Black rhinos are down to around 3,800, northern white rhinos to under 30. Even the elephant, in excess of 700,000, is in trouble over much of the continent. Numbers across the board are halving every ten years. In East Africa the figures are far more alarming. The Kenya population is down from 140,000 in 1970 to 22,000 today, and falling fast. Similar drops have been reported from the Central African Republic to Somalia and most countries south to the Zambezi.

Neither can there be any doubt about the rising public outcry. Where a decade ago the slaughter of rhinos and elephants in East Africa got passing mention locally, in the last year the press has become downright raucous about poaching. You know it has become a personal matter when the tourist associations in Kenya, with 400,000 dependants at stake, take umbrage at the slaughter, and a political issue when MPs start raising merry hell in parliament at the threat to the country's \$350 million tourist industry. But you know it has become more deeply emotional when wildlife clubs begin calling for an ivory export ban and Michael Werikhe, a young Kenyan, raises a million dollars walking through East Africa and across Europe to save the rhino.

Elephants and rhinos are becoming Africa's conservation flagships as the public wakens to the reality of declining numbers and raises its voice in protest at what Africa is losing.

Where should AERSG stand in all this? Should we stick fast by the biological facts, or should we become advocates willing to show our passions and express our consciences.

Science and conscience are not, as I see it, incompatible. Every warden and wildlife biologist is told to stick to policing and research and leave the real issues to others, as if we are devoid of broader concerns and compassion. The truth is that most of us are in conservation because of our feelings for wildlife and a commitment to save it. We should neither shy away from nor be denied our advocacy just because we see sense in making the case tangible to those who do not share our sensibilities. A conscience about nature helps stimulate a rigorous look at the problems and solutions. It is when science is abused in support of conscience and when conscience denies the facts that we run into trouble. The mandate of AERSG is to protect the interests of the species by looking at the facts and figuring out how to alleviate the threats.

AERSG has made its position quite clear in recent years that the rapid slide in rhino and elephant populations, while attributable to several causes, is overwhelmingly due to illegal trade, largely for overseas markets. The entire rhino horn trade and on the order of 90 per cent of the ivory trade is fed by poaching. AERSG, following its 1987 meeting in Nyeri, submitted a strong statement to CITES calling attention to the problem and to the need for urgent action. The results of the Nyeri meeting, to appear as an IUCN publication, are summarized in this issue of *Pachyderm*.

The question is, having laid out the threats and the urgent need for action, what next? This is where we must set aside our personal emotions in the interests of finding widely acceptable solutions. AERSG is in an excellent position to look at the issues, see what drives the commercial trophy trade, suggest how to regulate the markets and take strong protective measures to conserve elephants, rhinos, and the ecological role they play in Africa. That there is no single panacea is obvious. Africa is too big and its cultures, economies and policies too diverse to expect that. We must accept instead a measure of pluralism.

Again, that is what AERSG tried to do at its Nyeri meeting. The result was a series of plans for trade and field action. Unfortunately, these were not quickly or widely disseminated. Meanwhile, many governments and conservation bodies have had to respond to an upsurge in elephant poaching as ivory prices have risen to new highs of \$150 to \$200 per kg. Fortunately, the overall strategy was incorporated into a fund-raising plan entitled the African Elephant Conservation Co-ordination Group (AECCG), put together by a coalition of organizations (including IUCN, EEC, WCI and WWF, in collaboration with CITES). The African Elephant Working Group (AEWG) of CITES subsequently invited submission of the plans, which will be further revised.

AERSG must adapt as the priorities change from identifying the problems to enacting the solutions. Clearly, there was a lack of follow-up action after the Nyeri meeting. This raises the question of whether AERSG's role should end with planning, as it has done in the past, or should go further to include hands-on conservation.

The answer is clear. AERSG has neither the sovereign powers over wildlife nor the fund-raising brief to engage directly in conservation. That is the role of governments, NGOs and donor agencies. The unfilled role we should adopt is that of action broker an agency working between government and NGOs to see that plans lead to action.

With that in mind we have made several changes. First, we have setup regional group the Central and West African, East

African and Southern African to draw in more national participation and make plans more responsive to the diversity of conditions across Africa. Second, we have begun to work more closely with other agencies, such as the CITES African Elephant Working Group, to include more official government representation. Third, we have forged much closer links with NGOs and donor agencies in the hopes of closing the gap between planning and action. Finally, we will, starting with the next issue, change the format of *Pachyderm* to be a more useful medium for conservation.

Several steps have already been taken. The most urgent part of the Nyeri conservation plan concerned black rhinos. By early 1987 both Wildlife Conservation International and World Wildlife Fund had adopted the key features of the Nyeri plan and launched major fund-raising drives. This has led to direct support for rhino conservation in Zimbabwe, Zambia, Tanzania, Kenya and Cameroon and renewed efforts to close trade loopholes, including Taiwan.

The regional groups have also been formed. The Central and West African Group met in Gabon last November to shape its own conservation priorities. The Southern and East African Groups will meet mid-year.

Follow-up action on elephant plans began in earnest in mid-1988, when the African Elephant Conservation Co-ordinating Group was formed. The European Community, WCI and WWF are presently fund-raising for the integrated plan, elaborated in this issue of *Pachyderm*. Other organizations are expected to

join the effort shortly.

In May 1988, AERSG also initiated the Ivory Trade Review Group, detailed in this issue of *Pachyderm*. The aim of ITRG is to review all aspects of the ivory trade and to recommend to CITES and AEWG trade options for conserving the African elephant.

AERSG's role status surveys, conservation strategies and the newly added action-brokering is firmly in the realm of hard-nosed conservation. But there are also grounds for venturing into the emotional realm with which I began. If elephants and rhinos can do for Africa what the whales, tiger, and panda did for conservation in the western and eastern world, why not give substance to the idea of African flagship species? This is precisely what we intend to do. Through a series of studies, partly undertaken by ITRG, AERSG is trying to assess the tangible and intangible values of elephants and rhinos. If pachyderms can alert us to the threat of extinctions in Africa, and raise public sympathy for conserving them, then elephants and rhinos become valuable symbols worth a great deal more than the monetary value of tusks and horns. Link to that the notion of pachyderms as keystone species, animals which play a significant role in creating and maintaining biological diversity, and one has a compelling couplet of emotional and ecological reasons worth exploring and developing.

Pachyderm will increasingly become a forum for discussion and debate centering on, but going well beyond, elephant and rhino conservation. We hope the forthcoming issues will elicit a wide range of views and debates, as well as keep up with current news.

Elephants going off to browse in Amboseli, Kenya.



The African Elephant and Rhino Group Nyeri Meeting

D.H.M. Cumming and R.F. du Toit

A meeting of the African Elephant and Rhino Specialist Group was held in Nyeri, Kenya from 17 to 20 May 1987. The main objectives of the meeting were to: critically review the numbers, distribution and trends of elephant and rhino populations in Africa; exchange information on current research on elephants and rhinos in Africa; examine resources available for the management of protected areas containing rhinos and/or elephants; review aspects of trade in ivory and rhino horn; establish priorities for the conservation of Africa's elephants and rhinos, using information from the above sessions; and discuss AERSG's draft continental conservation strategy for black rhinos.

The costs of the meeting were largely met by the World Wide Fund for Nature (WWF), and additional financial contributions came from the African Wildlife Foundation and the African Fund for Endangered Wildlife. The recommendations of the meeting do not necessarily reflect the opinions of these organisations or of IUCN.

Permission for the meeting was obtained from the Government of Kenya through the Kenyan Department of Wildlife Conservation and Management, which participated actively in the meeting. Apart from IUCN staff, considerable assistance in arranging the meeting was provided by Ed Wilson (WWF Regional Office for East Africa), Esmond Martin and Lucy Vigne.

The proceedings of the meeting are being published by IUCN, but the action plan priorities agreed upon by the group are given below.

Political Action

Reports and discussions on trade raised the following key issues and priorities for political action as of May 1987.

Burundi and the United Arab Emirates are now the major entrepot states for ivory and rhino horn. Burundi has not yet joined CITES and the UAE is about to withdraw from CITES. International diplomatic pressure on these two states to control trade in illegal ivory and rhino horn is urgently required and the forthcoming CITES conference (July 1987) is an opportune time to raise the issue.

Corruption within countries in Africa emerged as a common underlying factor associated with rhino and elephant poaching and the continuing illegal trade in ivory and rhino horn. Poached ivory is entering the international market with legal documents issued by corrupt officials. Governments and heads of state need to be made aware of the problem, to be provided with specific information or illegal activities and to be urged to bring the matter under control. Conservation action in the field will continue to be compromised as long as corruption within official circles is tolerated.

Key individuals involved in the illegal trade in ivory should be identified through the involvement of professional investigators, and governments should be asked to take action to halt their activities.

IUCN and other appropriate organisations should place the issues of elephant and rhino conservation and illegal trade in their products within the forum of the Organization for African Unity. This with a view to more fully informing OAU member states and their governments about the problems of ivory and rhino horn trades and the conservation of these species.

Trade

Rhino horn

Close the Lusaka connection/conduit The major poaching pressure on the Zambezi Valley population is from neighbouring Zambia and the operation is being directed from Lusaka. Action to close this conduit is urgently required. Similar considerations apply to Burundi.

Close internal trade in India and China The manufacture and trade in traditional medicines containing rhino products is still permitted in China and India, among other countries, and there is a need to seek the cooperation of these countries in closing down

this aspect of the rhino horn trade. Although strictly speaking outside the purview of CITES, the matter should be raised in a draft resolution to be placed before the conference of the parties in Ottawa in July 1987.

Continue work on substitutes in consumer countries The initiatives to encourage the use of substitutes to rhino horn in consumer countries should continue.

North Yemen The entry of rhino horn into North Yemen has not ceased despite official bans on the import of rhino horn. Earlier partially successful initiatives to close this trade should be pursued.

Ivory

Investigate illegal trade within Africa There is little concrete information on the illegal trade in ivory within Africa and a comprehensive undercover investigation of the form and extent of this trade is required if effective controls are to be introduced.

Investigate consumption of raw ivory within Africa While reasonably good data are available on the amount of raw ivory leaving Africa, only fragmentary data are available on the levels of production and use of ivory within the continent. Without this information it is not possible to establish the full extent to which elephants are being harvested in Africa.

Analysis and assessment of the ivory quota system The Ivory quota system was introduced in 1986 at the request of the African states which effectively constitute the producer countries for ivory in Africa. The system has been criticized by conservationists and those involved in the legal trade in ivory. There is a need to analyse the statistics on ivory quotas, trade in ivory and trends in elephant populations in Africa and to report on this matter to the forthcoming CITES meeting in Ottawa. The evidence available to AERSG at the Nyeri meeting makes it clear that the present annual continental harvest of elephant is not sustainable.

Field Action

Black rhinos The Continental Conservation Strategy for black rhinos being prepared by AERSG should be completed and published. In order to establish field action priorities for the conservation of wild populations of black rhinos some 37 populations of black rhinos were examined and scored for biological importance, the likelihood of external assistance being successful and the urgency with which such assistance is needed. The priority areas and the field actions and support required in each are listed below.

Zambezi Valley - Zimbabwe This area lies downstream of Lake Kariba and includes a number of components of the Zimbabwean Parks and Wildlife estate, which cover an area of nearly 12,000 sq km. The Mana Pools National Park and the Chewore and Sapi Safari Areas comprise a World Heritage Site within the complex. The Zambezi Valley carries the largest remaining coherent population of black rhinos left in Africa and the only population of more than 500. The population is under threat from Zambian-based poachers, who have accounted for a minimum of 300 rhinos over the last three years. Requirements are for a helicopter to assist in the rapid deployment of anti-poaching forces, a light aircraft for surveillance, and an effective research and monitoring programme to accurately estimate the size of the population and, secondly, to develop monitoring techniques both to assess rhino population trends and the effectiveness of anti-poaching strategies and tactics.

Kaokoland/Damaraland (Kaokoveld) - Namibia A population of approximately 90 black rhinos live in desert or near desert conditions outside protected areas in Kaokoland and Damaraland. There is a need for additional support for patrols and possibly the recruitment of additional auxiliaries who, drawn from the local communities, assist the authorities in patrolling the area. Additionally, there is a need to maintain the existing monitoring programme, which depends on the regular identification of individuals and to support public relations and extension work amongst the pastoral communities living in the region.

Cameroon/Chad These small populations lie on the western extremity of rhino distribution in Africa and represent the only remaining black rhinos in the region. There is no recent information on the number and status of the small population which resided in the Bouba Njida National Park and a thorough reconnaissance survey is required of the park population and reported sightings of rhinos in Chad.

Tsavu National Park – Kenya The population has declined over the last two decades from several thousand to less than 200. There is a need to enlarge the fenced and protected sanctuary created within the park to hold black rhinos. Anti-poaching activities require support and there is a need to establish the numbers and distribution of rhinos remaining in the park.

Selous Game Reserve – Tanzania The Selous Game Reserve of 55,000 sq km. has the potential to hold some 18,000 or more black rhinos. Numbers in the reserve have declined from more than 3,000 in 1980 to less than 300 in 1987. There is a need to review the management of the reserve, establish effective anti-poaching operations and conduct intensive ground surveys and censuses in appropriate areas. The staff of the reserve are urged to collect data on rhino sightings and sign in a systematic way to facilitate these exercises.

Gonarezhou National Park – Zimbabwe Rhinos were introduced into this park of 5,000 sq km in 1971. The 72 animals introduced increased to over 150 but poaching over the last three years had reduced this to less than 50 rhinos. Anti-poaching efforts are complicated by the Mozambique civil war and the movement of refugees through the park. Staffing levels need to be improved and some equipment, particularly vehicles, is needed to support anti-poaching.

Luangwa Valley – Zambia The rhino population of the Luangwa Valley has declined from several thousand to less than 100 within this decade. Support is required for the Zambian Government proposal to establish a protected sanctuary within the Luangwa South National Park. There is also a requirement to strengthen anti-poaching efforts and to further involve local communities in the conservation effort.

Sebungwe Region – Zimbabwe The Sebungwe region of some 15,000 sq km lies to the south of Lake Kariba and comprises a complex of protected areas and communal farming land. The parks and wildlife areas are the Chizarira National Park and contiguous Chirisa Safari Area, the Chete Safari Area and the Matusadona National Park. The rhino population of at least 500 is dispersed between the four protected areas with some animals still living on communal farm land. Major requirements are for extension and public relations work to involve local communities in the conservation of rhinos in the region, establish a highly mobile and efficient anti-poaching unit to pre-empt any poaching threat and to accurately census and monitor the population.

Laikipia Ranch – Kenya This private ranch of 400 sq km contains a rhino population of 47, within an unfenced area of about 190 sq km. A private anti-poaching force of 35-40 men, funded in part by WWF, patrol the ranch and poaching has been negligible over the past six years. Rewarding research on rhino social behaviour and reproductive patterns is being undertaken on the ranch. The anti-poaching work, monitoring and research should receive continued support.

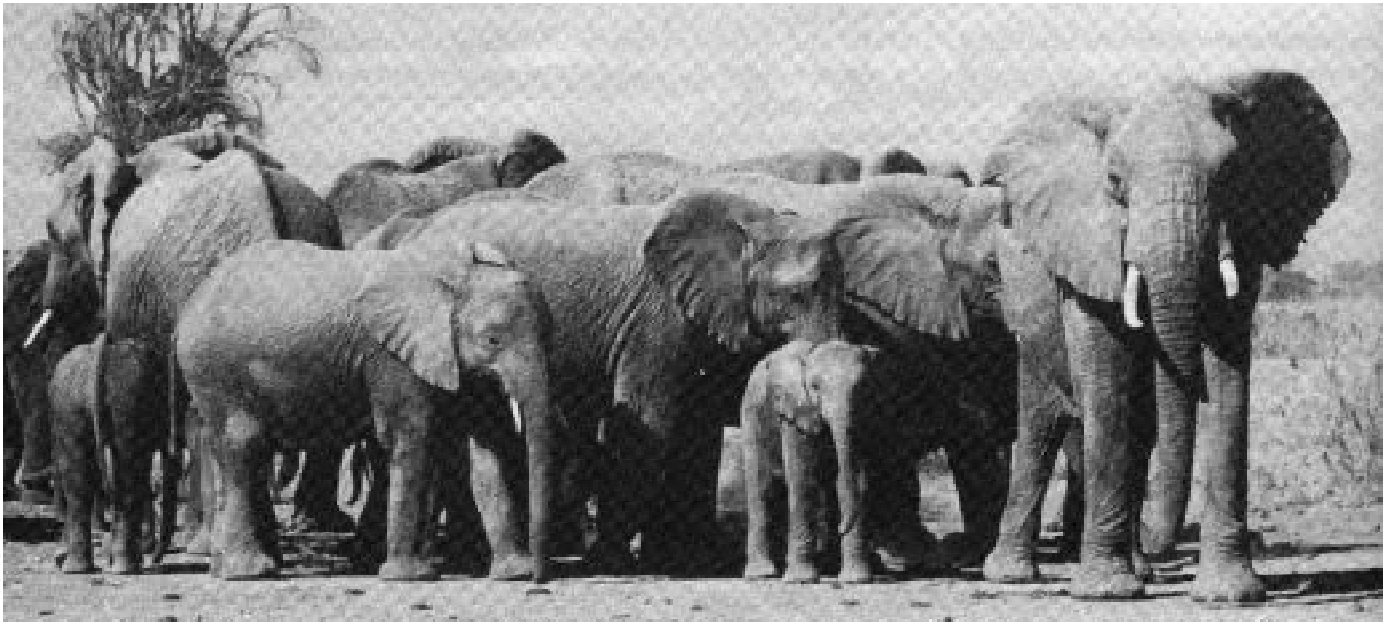
Aberdare National Park – Kenya The rhino population is estimated to be about 60 but no systematic survey has been undertaken over the complete area. A survey is therefore necessary, and requirements for increasing protection for the rhinos must be identified and acted upon. If the intensively-managed rhino sanctuaries in Kenya are successful in breeding rhinos, Aberdare National Park may be important as a release area to absorb and allow continued rapid breeding of rhinos from these sanctuaries.

The above constitute the 10 areas of highest priority for black rhino conservation action. The next five areas on the priority list, in order of importance, are: Mount Kenya National Park–Kenya (est. 40 rhinos); Rubondo National Park–Tanzania (20-30 rhinos); Ngorongoro Conservation Area–Tanzania (20-30 rhinos); Akagera National Park–

Table 1: Estimates of African elephant population sizes between 1981 and 1987 by country within regions.²

Country by region	1981 Estimate	1987 Estimate
West Africa		
Benin	1,250	2,100
Burkina Faso	3,500	3,900
Ghana	970	1,100
Guinea	800	300
Guinea-Bissau	0	20
Ivory Coast	4,800	3,300
Liberia	2,000	650
Mali	780	600
Mauritania	40	20
Niger	800	800
Nigeria	1,820	3,100
Senegal	200	50
Sierra Leone	500	250
Togo	150	100
Sub-total	17,610	16,290
Central Africa		
Cameroon	5,000	21,000
Central African Republic	31,000	19,000
Chad	?	3,100
Congo	10,800	61,000
Equatorial Guinea	?	500
Gabon	13,400	76,000
Zaire	376,000	195,000
Sub-total	436,000	375,800
Eastern Africa		
Ethiopia	?	6,650
Kenya	65,056	35,000
Rwanda	150	70
Somalia	24,323	6,000
Sudan	133,727	40,000
Tanzania	203,900	100,000
Uganda	2,320	3,000
Sub-total	429,521	190,729
Southern Africa		
Angola	12,400	12,400
Botswana	20,000	51,000
Malawi	4,500	2,400
Mozambique	54,800	18,600
Namibia	2,300	5,000
South Africa	8,000	8,200
Zambia	160,000	41,000
Zimbabwe	49,000	43,000
Sub total	311,000	181,600
Total	1,194,331	764,410

²1981 population estimates are questionable. 1981 estimates for Cameroon, Congo, Gabon and possibly Botswana are much too low; precipitous declines in Central African Republic, Zaire, Kenya, Somalia, Sudan, Tanzania, Mozambique and Zambia are more realistic (see page 5 for explanation).



A herd of elephants stay closely together in Kenya.

Rwanda (est. 15 rhinos) and Kasungu National Park — Malawi (est. 20 rhinos). For all these, situation reports are required to specify population sizes and conservation needs.

Northern white rhinos Encourage efforts to co-ordinate the breeding of existing captive northern white rhinos. Support the rehabilitation of Garamba National Park with the northern white rhino as a component of the ecosystem. There is a need to re-introduce a monitoring programme for the population of 18 northern white rhinos in Garamba and to include a strong training component to ensure continuity.

Desert elephants Continue to monitor the status of elephant populations in Mali, Mauritania and Namibia and to encourage appropriate conservation action.

Southern white rhinos No specific conservation action was identified for the southern white rhinos although concern was expressed about the possible overhunting of white rhino on private farms in South Africa. White rhino have become extinct in Mozambique for the second time. Populations in southern Africa

Table 2: Status of rhinos in Africa

WHITE	BLACK			1987
	1980	1984	1987	
Tanzania	3,795	3,130	270	0
C.A.R.	3,000	170	10?	0
Zambia	2,750	1,650	110	6
Kenya	1,500	550	520	47
Zimbabwe	1,400	1,680	1,760	208
South Africa	630	640	580	4,062
Namibia	300	400	470	63
Sudan	300	100	3	—
Somalia	300	90	?	—
Angola	300	90	?	—
Mozambique	250	130	?	0
Camercon	110	110	25?	0
Malawi	40	20	25	—
Rwanda	30	15	15	—
Botswana	30	10	10	—
Ethiopia	20	10	?	—
Chad	25	5	5?	—
Uganda	5	—	—	—
Zaire	—	—	—	18
Total	14,785	8,800	3,800	4,404

outside of South Africa are still low and further restocking and management of these populations merits attention.

West Africa elephants The West Africa elephant population, guessed to number about 17,000 comprises numerous fragmented populations of both forest and savannah elephants. There is very little recent information on their distribution, numbers and status and a priority is to obtain this information as a basis for developing an effective conservation strategy for elephants in the region.

Strengthen the existing wing of AERSG in West Africa and take steps to make AERSG material available in French for dissemination in Francophone Africa.

Forest elephants A sound knowledge of the size of the forest elephant population is crucial to the management of African elephants and to the regulation of the ivory trade. The first phase of the project the development census techniques for forest elephants has now been completed. The second phase of the study of forest elephant numbers and distribution based on further censuses and the classification and delineation of elephant habitats should proceed as soon as possible.

Savannah elephants Regional Elephant Conservation Strategies, i.e. for West, Central, East and Southern Africa, should be developed as soon as possible. These strategies should identify priority populations for the long term conservation of the species and their habitats within each region and generate strategies for the effective conservation and management of elephant populations living outside protected areas. These strategies will define the priorities for conservation action for elephants within each region.

Resource management

Promote the conservation and management of elephant populations in Africa by providing information and advice on: monitoring elephant populations; management and harvesting; legal and administrative frameworks; law enforcement; and the ivory trade.

The main focus of conservation action for elephants in Africa has been on anti-poaching and on attempts to halt the ivory trade. While these may be the most appropriate actions in some cases there are many circumstances where positive management of elephants, as a valuable aesthetic and economic resource, may be more successful. African governments and wildlife agencies need to be made more aware of the options available to them. Improved resource management capability will be a vital component in the implementation of regional conservation strategies for elephants.

Suggested Procedure for Priority Ranking of Black Rhino Populations

Raoul du Toit

WWF Zambezi Rhino Project, Box 8437 Causeway, Zimbabwe

Preamble

Systems for establishing priorities for action to conserve remaining black rhino populations have been developed at the Hwange (1981) and Nyeri (1987) meetings of AERSG. These systems are worthwhile in that they lead those who are assessing priorities through a systematic process in which due consideration is paid to a full range of relevant factors. In order to produce final rankings, each area is given scores for the various factors that are considered relevant (e.g population size, genetic rarity, ecosystem diversity) and the scores for an area are then added to produce a total score to represent that area's priority in continental black rhino conservation initiatives.

A central problem with these systems is that weightings for the factors have arisen in an arbitrary way. Rigorous methodology for establishing the weighting (importance) of one factor relative to another, for the whole range of conservation situations within the species' range, has not been developed. In view of this, an alternative procedure for establishing rhino conservation priorities — with more flexibility in incorporating subjective value judgements — is proposed.

The information on rhino populations is derived from that presented at the 1987 AERSG meeting, at Nyeri, Kenya (the proceedings of the meeting are currently being published by IUCN).

Reasons for ranking

The design of a system for establishing the priority areas for rhino

conservation is obviously dependent upon the objectives of the desired conservation action. These objectives are seen as:

- To build up numbers of black rhinos in Africa as quickly as possible;
- To maintain the existing genetic variability within and between the remaining black rhino populations in the wild.

If these objectives are accepted by international conservation agencies that are able to allocate funds, expertise and other assistance to support rhino conservation efforts in Africa, then a role of AERSG is to indicate, to these agencies, which rhino populations should be the first ones to receive attention in order to meet the objectives.

Main factors to consider in the ranking system

The most important feature of each population (with regard to both objectives outlined above) is simply its size. The current population should be considered together with the likely population that will be present in that area in several years' time, following additions due to natural increase and reductions due to poaching. A five-year time horizon seems reasonable when considering rhino conservation initiatives for particular areas, given the uncertainties associated with poaching activity, government action and land-use changes within Africa. Where rhino populations are expanding in small areas, consideration must be given to carrying capacity; but if it is expected that carrying capacity will be exceeded within five years this need not be regarded as a negative feature since the excess rhinos can be translocated, to restock other areas.

Black rhino contemplating the camera man.



The contentious issue of the likely effectiveness of aid provided by external agencies is best tackled by letting the record speak for itself, i.e. if local rhino conservation efforts have been inadequate (for whatever reason) and therefore do not give grounds for optimism that putting more money in will achieve much, then this will be reflected in the rhino population trends. Since it is one of AERSG's functions to monitor population trends, we can present reasonable estimates of the decline due to poaching in each area over the last five years, and extrapolate with this trend and with the estimated current population to indicate what the population may fall to in five years' time if no additional conservation effort is made.

The assumption that poaching in a large wildlife reserve will continue at the present rate is possibly questionable. For one thing, as the density of rhinos decreases, the ease with which the remaining animals can be found by poachers may diminish. However, as the rhino density decreases, it also becomes more difficult for the animals to maintain breeding contact, and so the natural rate of increase will also diminish thus one effect offsets the other. Even if the estimates of future poached rhino populations are unreliable, this is not a crucial deficiency because the object of the exercise is primarily to present a reflection of the prevailing social/political/economic climate for conservation in each area.

Genetic rarity is obviously an important factor to consider. The difficulty of assigning weightings to the postulated races/subspecies of black rhinos may best be circumvented by allowing the judgement of the genetic rarity value of one rhino group versus another to remain an intuitive process including the opinions of all AERSG members so that a group consensus emerges without need for questionable numerical manipulations.

A major weighting factor in the previous ranking systems has been the "conservation importance", or "ecosystem diversity", of each area. This is obviously an important consideration for conservation funding agencies, since they are concerned with the protection of complete ecosystems containing key species in addition to the black rhino. However, it is perhaps best not to confuse too many issues; if AERSG can present a priority ranking simply for black rhinos, other groups in SSC/ IUCN, WWF or other agencies can then attempt to mesh this list with the priorities for other organisms. There may well be a degree of "double counting" if the AERSG rhino priorities include some consideration of ecosystem diversity, other rare organisms, etc., and these factors are again automatically considered at a later stage when the list of top rhino areas is compared with the lists of areas that are important for other African species, as is presumably done when funding bodies decide where to put their money.

To give initial consideration to the ecosystem diversity aspect, it is suggested that the classification that emerged in the IUCN survey of phytochoria in the Afro-tropical realm is simply shown for each area (where possible) once the final priority ranking has been derived.

The importance of establishing closely-managed rhino sanctuaries in several areas, as a safeguard against the loss of further large wild populations, is becoming increasingly evident. The strategic value of these sanctuaries must be weighed against their high costs and management problems (including the need to avoid future genetic problems); some conservationists may believe that an established or proposed sanctuary has higher priority for support than some efforts to conserve larger populations in poorly protected areas. Allowance should be made for the incorporation of such views within the ranking system.

The suggested procedure

1. List all the areas in Africa which have 5 or more black rhinos (Table 1, column 1). For each, establish the areal extent (col. 2), the current rhino population (col. 3), and the population 5 years ago (col. 5). Indicate the reliability of this information (col. 4 and 6), using the following codes:

- 1 count of known individuals;
- 2 estimate from rhino survey carried out within the previous 2 years;
- 3 estimate based on non-specific survey, or rhino survey carried out over 2 years previously;

4 informed guess.

2. From the estimate of the current population and that of the population 5 years ago, calculate the percentage decline in the population due to poaching over this period (col. 7). There may be a few exceptional cases in which a population has declined due to reasons other than poaching e.g. Hluhluwe/Umfolozozi and these may require explanation in footnotes to the table.

3. Apply the rates of poaching to the current population estimates to obtain estimates of the population levels in 5 years, if poaching continues at present levels (col. 8).

4. For each population, obtain an estimate of the rate of natural increase, r (col. 9). This will vary according to habitat quality, and especially according to rhino density, being low at very low and probably very high densities, and at its highest when populations have not yet reached the carrying capacity of the areas within which they are confined. (If the rate of increase is 5% per year, $r=0.05$).

5. Calculate the population of 5 years hence (col. 11), presuming that poaching Ceased immediately and the population

Table 1: Basic demographic data (as known in 1967)

1	2	3	4	5	6	7	8	9	10	11
Population	Area km ²	1987 Pop.	Rel. 1982 Pop.	1982 Pop.	Rel. Poaching	Poa- ching crease 5yrs	Poa- ched Loss 5yrs	Natural In- Capacity 5yrs	Carrying Capacity r	Natural Pop. in 5yrs
Zambezi	13000	750	3	1000	4	25%	560	0.07		1050
Sebungwe	10000	650	3			5%	618	0.07		912
Etosha	22270	350	3	275	3	0	(447)	0.05		447
Hwange/Mat	18400	300	3			0	(401)	0.06		401
Umf./Hluh.	900	220	2			0	(220?)	0	300	220?
Selous	55000	200	4	2000	4	90%	20	0.03		232
Tsavo	20200	150	4	300	4	50%	75	0.03		174
Kruger	19485	140	2			0	(205)	0.08		205
Kaokoveld	70000	90	2	50	4	?	(115)	0.05		115
Solio	62	75	1			0	(110)	0.08	40	110
GonareZhou	5000	75	3	100	3	25%	56	0.06		100
Luangwa	16600	75	4			70%	23	0.04		91
Mkuzi	251	70	2			0	(94)	0.06	70	94
Aberdares	700	60	4	132	3	55%	27	0.05		77
Laikipia	350	47	1			0	(63)	0.06		63
Ndumu	100	42	2			0	(56)	0.06	40	56
Nairobi	120	40	3	20+	3	?	(56)	0.08	40	56
Mnt. Kenya	700	40	4	40?	4	?	(46)	0.03		46
Itala	297	35	2			0	(47)	0.06	60	47
Cameroon/Ch	5000	30	4	100	4	70%	9	0.02		33
Pilanesburg	500	27	2			0	(38)	0.07	120	38
Ngorongoro	25	4	50			4	50%	12	0.05	32
Rubondo	460	25	4			?	(32)	0.05		32
Nakuru	140	20	1				(27)	0.06	40	27
Kasungu	2300	20	4	30	4	33%	13	0.03		23
Kafue	22400	20	4			70%	6	0.02		22
Masai Mara		19	1	30	3	37%	12	0.03		22
NgengValley	500?	18	2			50%	9	0.04		22
Addo	80	17	1			0	(25)	0.08	30	25
Akagera	2500	15	4			?	(18)	0.04		18
Lewa Downs	20	11	1			0	(15)	0.06	15	15
Amboseli	400	11	1	17	1	33%	6	0.05		14
East. Shores	800	10	1			0	(14)	0.07	40	14
Iwaba	98	8	1				(11)	0.07	30	11
Ol Jogi		7	1			0	(9)	0.06		9
Weenen	49	6	1			0	(8)	0.07		8
Aughrabies	650	5	1				(7)	0.07	30	7
Meru	870	5	4	30	4	80%	0	0.04		6
Manyara	320	5	4	10	4	50%	0	0.04		6
Mwabvi		?								
Angola		?								
Mocambique		?								
Ethiopia/Sudan/ Somalia		?								
TOTALS		3713					+/-3500-			+/-4880

Information on 1987 populations from AERSG meeting, Nyeri, May 1987.

expands at the natural rate. The equation is:

$$N_5 = N_0 (1+r)^5$$

where N_5 is population in 5 years
 N_0 is Current population
 r is rate of natural increase.

6. For each area, establish what the ranking is for its current population, for its future population with unabated poaching, and for its future population with natural increase (Table 2). Add the three ranks together. Rerank the areas according to the sum of the three subsidiary ranks (ranking areas from lowest to highest totals). This effectively ranks the areas on the basis of their current

Table 2: Ranking of areas for population importance

Population	Rank for current population	Rank for 5yr Poached population	Rank for 5yr Natural	Sum	Overall rank
Zambezi	1	2	1	4	1
Sebungwe	2	1	2	5	2
Etosha	3	3	3	9	3
Hwange/Matetsi	4	4	4	12	4
Umfolozi/Hluh.	5	5	6	16	5
Selous	6	20	5	31	9
Tsavo	7	10	8	25	7
Kruger	8	6	7	21	6
Kaokoveld	9	7	9	25	7
Solio	10	8	10	28	8
Gona-re-Zhou	10	12	11	33	11
Luangwa	10	19	13	42	13
Mkuzi	11	9	12	32	10
Aberdares	12	17	14	43	14
Laikipia	13	11	15	39	12
Ndumu	14	12	16	42	13
Nairobi	15	12	16	43	14
Mount Kenya	15	14	18	47	16
Itala	16	13	17	46	15
Cameroon/Chad	17	27	20	64	20
Pilanesburg	18	15	19	52	17
Ngorongoro	19	25	21	65	21
Rubondo	19	16	21	56	18
Nakuru	20	17	22	59	19
Kasungu	20	24	24	68	22
Kafue	20	30	25	75	25
Masai Mara	21	25	25	71	23
Ngong Valley	22	27	25	74	24
Addo	23	18	23	64	20
Akagera	24	21	26	71	23
Lewa Downs	25	22	27	74	24
Amboseli	25	30	28	83	28
Eastern Shores	26	23	28	77	26
Iwaba	27	26	29	82	27
Oi Jogi	28	27	30	85	27
Weenen	29	28	31	88	30
Aughrabies	30	29	32	91	31
Meru	30	31	33	94	32
Manyara	30	31	33	94	32

populations with moderation according to possible natural increases and current poaching pressures.

7. In plenary session, classify the areas, in their order of importance, into three categories according to their need for external assistance: urgent, moderate and low (Table 3. If any participant disagrees strongly with the classification for a particular area, the general opinion should prevail as the individual will get an opportunity for his/her viewpoint to be taken into account at a later stage.

8. Produce a simple analysis of the current classification system that has been adopted by AERSG to separate the various populations into "subspecies"/races/ecotypes/evolutionarily

significant units (or whatever terminology is thought appropriate to describe interpopulation genetic variability), indicating the current numbers, and possible future numbers in 5 years, of rhinos belonging to each conservation unit (Table 4).

9. Give each participant a copy of Tables 1, 3 and 4. He/she is then asked to list the areas in order of importance, taking into account either the group's or his/her own viewpoint on each area's actual requirement for assistance, the need to maintain interpopulation genetic variability, and the need to develop sanctuaries rather than placing continuing emphasis on populations in large "protected" areas. If the participant disagrees with any of the figures in Table 1, or any of the procedures, then this stage gives him/her an opportunity to produce an independent ranking.

In other words, the analysis so far serves as a guide to the individual's decision-making, and need not be regarded as the final statement. If the participant is in fact satisfied that population size is the most important aspect, that the figures in Table 1 are reasonable, that consideration of poaching pressure has effectively side-stepped the thorny question of deciding whether it is worth putting money into an area (with current levels of anti-poaching performance), and that the assessment of requirements for external assistance is acceptable, then all he/she needs to do is to moderate Table 3 according to considerations of genetic rarity.

10. Once each person has produced a listing, all the ranks given to each area can be added and the areas reranked according to their total scores (as in stage 6).

11. This new listing can then be circulated for participants to once more review the ranking that has emerged from the group as a whole and change the order if they feel it is appropriate to do so.

12. The ranks can then again be added and a final listing produced, which represents the overall opinion of the group as to where international conservation agencies should direct their money, etc. for rhino conservation. The IUCN phytochorial classification can be shown for those areas to which it has been applied. For each area, existing or planned national or externally-supported rhino conservation initiatives (or other projects that would help the rhinos) should be outlined, so AERSG can specify the kinds of activities and level of funding that are still required.

Notes

1. The procedure in stages 9-12 is an application of the Delphi process used in business decision-making. This process of iterative review has been found to be extremely successful in reaching a group consensus on issues where value-judgements are involved, and where one or two vociferous or authoritative individuals would otherwise tend to dominate the development of a group's viewpoint. It provides a means of blending the group's reasonably factual knowledge on the status and trends of rhino populations, and potentials for population expansion, with the subjective aspects (requirements for funding and considerations of genetic rarity).

2. While this may seem a lengthy process, the time taken in plenary session is relatively short: the generation of the raw data in Table 1 (although ideally this would be simply a review of data obtained from recent questionnaire returns, and collated prior to the meeting), the classification of areas according to their requirements for external assistance, and the final review of the ranking. The ranking of areas by individuals (stages 9—11) can be carried out during breaks in the meeting. If time is short, these stages could be side-stepped by the Chairman simply producing a priority list (stage 9) and presenting this to the group for endorsement or modification. To carry out the exercise entirely by correspondence would be a feasible, if somewhat protracted process.

3. The system can be refined if more information becomes available on the relationship between poaching offtake and density of rhinos, under different levels of protection (thus enabling

a more accurate assessment of likely rates of poaching over the next 5 years). Also, if we know what range is occupied by rhino in each conservation area, what the existing

Table 3: Requirements for assistance from external agencies

Pop rank	Urgent	Moderate	Low
1	Zambezi		
2		Sebungwe	
3			Etosha
4			Hwange/Matetsi
5			Umfoloji/Hluhluwe
6			Kruger
7	Tsavo		
7	Kaokoveld		
8			Solio
9	Selous		
10			Mkuzi
11	Gona-re-Zhou		
12		Laikipia	
13			Ndumu
13	Luangwa		
14			Nairobi *
14		Aberdares	
15			Itala
16		Mount Kenya	
17			Pilanesburg
18	Rubondo		
19		Nakuru *	
20	Cameroon/Chad		
20			Addo
21	Ngorongoro		
22		Kasungu	
23		Masai Mara	
23	Akagera		
24	Ngeng Valley		
24		Lewa Downs	
25	Kafue		
26			Eastern Shores
27			Iwaba
28			Amboseli *
29			OI Jogi
30			Weenen
31			Aughrabies
32	Meru		
32	Manyara		

* Takes into account high levels of external assistance already being provided and/or high tourism development which should generate sufficient revenue to protect spectacular animals.

levels of anti-poaching effort are (in monetary terms: expenditure per square kilometre) and what the level of tourism development is, we can start to put significant brakes on the poaching declines anticipated in the problem areas.

4. Funding agencies can easily review the requirements for assistance (Table 3); if they disagree with the AERSG assessment, they can modify rankings accordingly.

5. By requiring estimates to be made of specific rates of reproduction and poaching rates, AERSG can improve its understanding of these aspects, when projected populations are compared with actual populations in years to come.

6. The assessment of likely population levels, taking natural increases and poaching attrition into account, assists in setting realistic population targets for the continental rhino conservation effort. Targets that might be set for the next 5-year period are population increases to the following levels:

Western Central Africa	– 50	(this would require translocations and intensive management).
South Western Africa	– 550	
South Central Africa	–3,000	
Eastern Africa	– 650	
TOTAL	<u>4,250</u>	in 1992.

Table 4: Provisional genetic grouping of black rhino
(Following recommendations of Cincinnatti Rhino Workshop, 1986)

Conservation Unit	Current Population	Natural Pop. in 5yrs	Poached Pop. in 5yrs
West-Central Africa			
Cameroon/Chad	30	33	9
South-Western Africa			
Etosha	350		
Kaokoveld	90		
Aughrabies	5		

	445	569	500?
South-Central Africa			
Zululand to Southern Tanzania	2648	3524	2390
Eastern Africa			
Northern Tanzania—Kenya	590	754	542

Note: Where possible, viable rhino populations should be conserved in the different major ecological zones within the above broad conservation units, in order to maintain adaptations to local conditions; e.g. it is desirable to maintain the Tsavo population as a separate subunit in the Eastern Africa unit provided there are sufficient founders to prevent inbreeding rather than immediately mixing them with the other Kenyan populations (which are probably not large enough to be managed without genetic mixing, or have already been mixed).

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The Ivory Trade Review

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The following extract outlines the Ivory Trade Review. ITR is a collaborative study, initiated by AERSG, involving CITES/AEWG, TRAFFIC, WTMU and the funding agencies WCI, WWF, EEC and AWF. The findings and recommendations will be submitted to the African Elephant Working Group's July 1989 meeting in preparation for its recommendations to the CITES full Conference of Parties, to be held in Switzerland later this year.

The study involves a large number of participants working on the ivory trade, elephant population dynamics and public awareness. Directed by a joint committee of the participating agencies, the study is co-ordinated by Stephen Cobb in consultation with the chairman, AERSG.

Introduction

There can no longer be serious doubt about the predicament of the elephant. In May 1987, AERSG concluded on the basis of improved population estimates, computer simulations of elephant demography and a detailed reanalysis of the ivory trade statistics that the demand for ivory is causing a steep population decline. The evidence is compelling.

The continental population is now estimated at around 750,000, down half in a decade. Repeated counts of many populations over much of Africa confirm the overall trend and negate the importance of habitat loss. Poaching is heavy in most elephant populations, even those remote from human settlement. Overall, elephant numbers are declining five times faster than habitat loss and two-and-a-half times faster than human population increase.

Information from the field is corroborated by ivory trade statistics, now greatly improved through the efforts of CITES and TRAFFIC. Constant yields of ivory from the mid-1970s to early 1980s were, it transpires, maintained by an increasing harvest of progressively smaller elephants. The continental population was heavily overexploited by the early 1980s when, according to trade figures, half the animals killed were reproductive females.

Computer simulations of elephant demography have corroborated the field and trade statistics. The models reveal an important and unique characteristic of the ivory trade: natural mortality yields the highest theoretical ivory production. Moreover, annual ivory yields increase progressively with age. Further, because the unit price of ivory increases with tusk weight, the profitability of an elephant's ivory rises steeply with age.

A steep price rise in ivory as elephant numbers have shrunk during the 1980s demonstrates that demand is still high. The continuing uncertainty over what really drives the market, whether it is ivory's scarcity value or the demand for carved products, underscores the urgent need for the present review. Whatever the reason for ivory demand, it continues to halve the population of elephants every 10 years. That rate will, moreover, quicken and reduce the population Africa-wide to around 100,000 in the next 15 to 20 years. And, even though the ivory profits per animal will continue rising, giving additional incentive to poachers, the gross value of ivory to African nations will decline long before then.

The African elephant is vulnerable to extinction for the same reasons as the great whales: it is more profitable to sink the capital value of slow reproducing species into high growth investments. In Africa, where hard currency is sought by governments for development and debt servicing, and by the wealthy or insecure for hard currency, ivory is a highly prized commodity worth \$120 million annually. State ownership, the migratory nature of elephants and the considerable damage they do to farmers' crops make them especially vulnerable to poachers. Most traded ivory originates illegally, showing up the weaknesses in present international trade agreements. Furthermore, the ivory proceeds from many African countries end up in private bank accounts where they do little for development or conservation.

The threats to the elephants and the blatant abuses by importing countries accepting ivory from non-party nations led the African governments to propose the CITES ivory quota system in 1984. Under this system, each ivory producing country sets annual quotas on the basis of sustainable offtakes. Importing nations are required to reject any consignments exceeding the quota for each country. Compliance is monitored by CITES. Though the quota system has reduced illegal imports into consumer nations, it has failed to regulate the ivory trade and slow the rate of elephant loss. Several weaknesses and loopholes are exploited by corrupt officials and international traders. Large consignments of ivory are traded by non-party states, which may explain an increasing discrepancy between ivory offtakes projected from known elephant mortalities in Africa and calculations made from CITES ivory statistics.

The greatest weakness of present legislation is the lack of any mechanism to mandate a globally sustainable offtake of ivory. The large fraction of poached ivory legalized by exporting countries, the mounting volume routed through non-signatory or delinquent signatory nations, the strong incentives to bypass the new international procedures, a rapidly rising human population, increasing poverty and declining economies over much of Africa, combine to form a bleak outlook for the elephant.

Justification

Virtually every African nation has explicit conservation policies for maintaining renewable natural resources and wildlife populations. CITES, of which virtually all African nations with elephants are signatories, expressly aims to regulate trade in threatened species, including the elephant, at sustainable levels. Yet national and international policies notwithstanding, the elephant is becoming ever more threatened by the ivory trade. Strong economic, social and biological arguments for reviewing the ivory trade in relation to conservation policies can therefore be made.

Ivory is traded around the world for pleasure and profit. Yet the way in which the trade works and whether there is any latitude in reducing its impact on elephants is far from clear. For example, we do not know whether ivory prices respond in the same way as say tropical hardwoods to normal international supply and demand. We have little idea of why there is a narrowing price gap between raw and worked ivory, the extent to which traders hoard raw stocks, or the effect that speculators have on future demand. We have little better idea of the role that international currency exchange control and exchange rates play in ivory marketing, or the extent to which governments and private dealers use ivory as secure currency.

That the ivory trade is badly mismanaged from a sustainable resource point of view is indisputable. Computer simulations, for example, have shown that far greater profits could be made from Africa's existing elephant population if it were better managed. Higher ivory yields and unit prices could be obtained by managing populations outside protected areas for the production of larger tusks. Ivory income could be doubled by setting minimum tradeable tusk weights and harvesting only older animals. In other cases the value of elephants is greatly increased by using a wider range of products, such as meat and skin from culled animals, as in Zimbabwe, or through tourism as in Kenya and Tanzania. Ivory profits are not, in other words, the only consideration. National elephant conservation and management plans could ensure a balance between protection and exploitation, between protecting crops on the one hand, and elephants in designated areas on the other. An ivory trade review should help draw attention to the multiple value of elephants.

Strong government controls could complement international measures in stemming the tremendous illegal trade and increasing the value of elephants to African nations. The illegal trade flourishes largely because of private profiteers and corrupt officials. If

undercover trade within sovereign states cannot be solved by international trade agreements, it can and must be addressed continentally, perhaps by the Organization of African Unity, and as a matter of national public interest.

Public sentiment also justifies a review of the trade. Attitudes towards elephants and the ivory trade differ widely: from the hard line of many westerners that no elephants should be killed for ivory or any other reason, to the starving African farmers who would gladly see all elephants eradicated, to the 110,000 members of the Wildlife Clubs of Kenya who actively campaigned for a total hunting ban. The conflict often hinges on who gains and loses from ivory and elephants. It would be meaningless to review ivory trade policies without addressing the broader question of the interest groups and attitudes within the producer and consumer nations.

Finally, an ivory policy review is justified biologically and symbolically. Elephants are conservation flagships which, like the great whales, arouse tremendous public sentiment. They elicit support for wildlife that few other species are able to do and, in a sense, act as a conservation barometer. If elephants can be protected and managed well, the outlook is good for other species. If not, it will be hard to whip up public sympathy and support for Africa's less charismatic endangered species.

The Ivory Trade Review

The review addresses several topics, including ivory markets, the status of elephants, conservation and management policies, and public attitudes that bear directly or indirectly on the ivory trade and the options for its effective regulation. Data will be drawn from existing sources and reports where possible and commissioned studies where necessary.

Ivory as a commodity

Much is already known about the end-uses of traded ivory from surveys commissioned by AERSG, USFAWS and other agencies. Nevertheless, a number of gaps particularly in the internal African carving industry and new international outlets, have yet to be filled. What are the main uses of ivory today? Are there any substitutes and what would be the implications of encouraging these?.

Market networks will also be investigated. The data amassed by the Conservation Monitoring Centre and the TRAFFIC network give an important picture of the size and location of markets, and the movement and price of ivory. The review will collate data from additional sources in the course of investigations into African, Asian, European and North American markets. An important area of investigation will be the pricing steps from poacher to carver and finally to consumer. Far more detail is needed on key actors in the ivory market and how supply, demand and price are related. The extent to which speculation drives price and the impact of illegal consignments on the market will be studied. The movement and volumes of ivory moving outside CITES channels will be investigated in detail because of their significance in estimating the numbers of elephants killed for the trade and in improving trade regulations. In order to anticipate future patterns in ivory trade, the contemporary market studies will be complemented by a review of historical trends. This will include an analysis of the effects of CITES as a whole and of the quota system in particular on both the legal and illegal ivory trade.

Finally, models will be developed to study the impact of various market scenarios on ivory production, prices and profits to the participants. Demographic models already developed by Wildlife Conservation International for the purpose of predicting the response of elephant populations to various hunting regimes, will be refined and applied in this study. They will be used to link elephant population models, economic models and international commodity markets to answer questions such as: What is the optimum harvesting strategy to maximize sustainable ivory profits? and, What is the prognosis for the African elephant under conditions ranging from free markets to producer or trader cartels?

Elephant status and population dynamics The future of the ivory trade is bound to the fate of the elephant. Yet the ivory market operates with little reference to the status of elephants or the potentially sustainable supply of ivory, despite the quota system to which all producer nations are legally bound. A mechanism for

projecting sustainable ivory yields from population estimates and demographic models is urgently needed in a form usable by national wildlife authorities. This mechanism will only be useful, however, if backed by strong regulatory controls within producer countries.

This aspect of the investigation will focus on the status of elephants in all producer countries in Africa. The extensive AERSG data base has been collated on UNEP's Global Information System in Nairobi. A recently updated report by Burrill and Douglas-Hamilton on the status of elephants will be used to estimate sustainable ivory yields for each producer country. Several options for improving the scientific basis of ivory quotas will be considered after reviewing other agencies, including IWC, dealing in global wildlife quotas.

National policies and the value of elephants The value of elephants to society, over and above ivory, will also be considered, largely from a rich source of existing data. Elephants should not be viewed simply as an ivory factory; they have great intrinsic and instrumental value, other than ivory, that should be considered.

Though wildlife policies differ widely among African nations, most have explicit policies for preserving species. Over 200,000 elephants are officially protected within 400 parks and reserves throughout Africa, though even here the species is rapidly losing ground. Despite their decline in protected areas, elephants have considerable value through tourism and found ivory. In Kenya alone the tourist revenues attributable to elephants exceed \$ 10 million. Ivory from natural mortality in parks and reserves is potentially worth \$ 8 million, enough to pay the entire continent's conservation budget. In other cases, especially in forests and wooded savannahs, elephants are important agents of ecological diversification, often to the benefit of humans as well as wildlife. Elephants outside, and in some cases inside, parks and reserves, generate revenues through meat, skins and hunting revenues, at both a national and local levels. These benefits often far outweigh ivory revenues. Against these benefits must be weighed the cost of elephants, especially to local communities, in terms of damage to crops, animal stock, installations and human life. These costs have rarely been calculated, and never for the continent as a whole.

Attitudes towards ivory and elephants Attitudes towards ivory products and elephants vary widely both within Africa and in the consumer nations. Legislative action to ban ivory acquired illegally has recently been passed in the US. In Europe the plight of the elephant is causing great concern to conservationists. A number of African governments have officially banned elephant hunting and - ivory trading, though they may still sell accumulated ivory stocks. How important are public attitudes in influencing policy in key trading nations, and how might they change if the plight of the elephant worsens and publicity widens? What would be the effect of ivory trade bans or import restrictions in different trading nations and regions such as the Far East and United States?.

The review will look at such attitudes, how they are changing or might change with suitable publicity, and how such attitudes might affect the ivory trade.

Options in ivory trading The review will look at a wide range of options open to the producer and consumer nations to bring ivory quotas in line with sustainable elephant populations. It will look particularly closely at the widening private ivory markets, whether they have been affected one way or another by the quota system, and methods of exerting tighter governmental and international control. Is any trading coalition, whether producer cartel, dealer association or grouping of consumer nations established in the interests of sustainability, either possible or desirable? What are the options for improving or complementing the role of CITES? Could a producer cartel and a centralized auction help conserve elephants by setting continental off-take quotas and increasing the ivory returns to producer governments, rather than free-market traders and corrupt officials? These are some of the options the review will explore.

The review team will also outline its analysis of how the trade responds to global social and economic forces, and thus the extent to which trade is amenable to control within Africa.

Report on the Trade in Rhino Products in Eastern Asia and India

Esmond Bradley Martin



A selection of medicines containing rhino products mostly manufactured in China.

Esmond Bradley Martin

Under the auspices of WWF, I returned to Asia in November 1987, to carry out further research on the trade in rhino products, to encourage the use of substitutes, to discuss with government officials possibilities of banning internal trade and to liaise with non-governmental organizations on the problems of rhino conservation. My field-work lasted just over three-and-a-half months, in Hong Kong, Macao, China, Singapore, Malaysia, Thailand and India. In this report, I will describe the present status of the trade in rhino products in each of the countries I visited and only refer to past events insofar as they are relevant to the situation today. For simplicity, each country will be discussed individually.

Hong Kong

In the 1960s and 1970s Hong Kong was the world's largest importer of rhino horn.¹ Its government was, however, one of the very first in Asia to take direct action against the trade, and in 1979 banned imports of horn from all five rhino species. Stocks in Hong Kong at that time had to be registered, and only those which were could receive re-export permits from the Department of Agriculture and Fisheries.

Since then, some rhino horn has been smuggled into the country from Macao, Burma, Indonesia, Malaysia, India, Taiwan and South Africa, according to officers in the Department of Agriculture and Fisheries and various traders in other South-east Asian countries, but the amounts have been small and have come mainly from South Africa. In 1980 a South African Airways pilot was caught bringing in four horns. In 1985, most of the 46.8 kilos of rhino horn confiscated by the Hong Kong authorities was from South Africa.

Even South African government officials have approached the Hong Kong government to try to obtain permission to sell rhino products there. The most recent proposal was made in November 1987, and, like the others, was turned down. The Hong Kong authorities say they are shocked by such South African overtures; after all, South Africa has been a party to CITES since 1975.

At the most recent CITES meeting in Ottawa (July 1987), it was agreed by the party states that due to the rhino crisis, efforts should be made to close down internal trade in rhino products. Therefore, in the British Parliament Prime Minister Thatcher, answering a question posed by Mr Tony Banks on 26 January 1988, stated: "A total ban on the sale of rhino products within Hong Kong will take effect from July this year." On 25 February 1988 the same Member of Parliament queried the Prime Minister whether "the total ban of the sale of rhinoceros products within Hong Kong from July will include all medical substances with an ingredient from any rhinoceros product".² The Hong Kong government has until now refused to prohibit imports of packaged medicines purporting to contain rhino horn, arguing that in court it would be unable to prove scientifically that such medicines actually do include rhino products. Furthermore, Hong Kong officials have said that because pharmacists import tremendous amounts of tablets, tonics and other processed traditional drugs from mainland China, it would be an extremely time-consuming and costly exercise to examine the list of ingredients for each kind to determine if rare or endangered animals species' products are claimed to be in them. They have stated that they do not have sufficient personnel to do this, nor to ensure that such drugs

do not reach the pharmacies. However, Mrs Thatcher replied: "The Hong Kong Government intend that the ban should include all medicinal substances with an ingredient from any rhinoceros product."³

This will be an ambitious undertaking, and the first time that such a step is taken to halt internal trade in rhino products. Hopefully, the removal of packaged medicines claiming to contain rhino horn from the Hong Kong pharmacy shelves will reduce the demand for rhino products, but it could create more problems, such as encouraging smuggling and underground sales. This part of the ban may not have been implemented until the end of 1988. The retail price for rhino horn has already gone up quite a lot in Hong Kong during the past two years, from US\$ 14,282 to US\$ 20,751 a kilo. Traders are telling their clients that it is becoming increasingly difficult to obtain supplies, but the demand still exists and people are buying the horn at the inflated prices in Hong Kong. If dishonest traders decide to take the risk of continuing to supply rhino products, they will stand to earn even greater profits. One cannot foretell what will happen.

Macao

In 1984 and 1985 Macao was one of the two known largest entrepôts for African rhino horn in Asia.⁴ On 19 December 1985 the Portuguese government in Macao put a legal halt to this role and on 22 February 1986 agreed to conform with the principles of CITES. However, in March 1986, according to information supplied by the Macao Economic Services and the CITES Secretariat, one trader imported 89 kilos of rhino horn in ten parcels from South Africa, using false documentation. The parcels were seized by the Macao authorities and returned to South Africa. Further investigation revealed that the trader had earlier imported 500 kilos of rhino horn and hide. He was fined US\$ 15,000 for breaking the law on the second occasion; but in South Africa where the exporter was apprehended, the assessed fine was only US\$ 250. He is a well-known ethnic Chinese with family connections in Hong Kong. In the 1970s he was one of the major suppliers of South African rhino hide and horn to Hong Kong.

Probably the main importers of rhino horn during 1984 and 1985 in Macao were two local people working together in a partnership. One was a Macanese banker and the other a doctor of traditional Chinese medicine, who owns one of the larger pharmacies. In January 1986 I spent several hours with these two men, extracting as much information from them as I could before they became suspicious of my motives. They told me that they first became involved in importing rhino horn when a Muslim Portuguese citizen came to Macao in 1983. This man, who flew out from Lisbon to Hong Kong with about 60 kilos of rhino horn, which probably originated from Mozambique, was harassed by the Hong Kong authorities because of his possession of the horns, but they could not prosecute him in transit to Macao. Nevertheless, the Hong Kong authorities informed their counterparts in Macao of the man's impending arrival and he was put under house arrest in one of the hotels when he came because he did not have an import licence for his horn, which at that time was all that was legally needed in Macao. A couple of months later, after bribing certain people, the man got repossession of his horn, but everyone knew about his case and his dire need to pay the hotel bill for his enforced stay, so the above-mentioned partners bought the horn off him cheaply.

The next time the Muslim came to Macao he had a valid import licence for his rhino horns, which he claimed were also from Mozambique and over ten years old. Some of these were partly carved into sculptures of African heads, which he thought might confuse the Macao authorities. The banker and doctor paid US\$ 500 a kilo for them in 1985 and said that they sold them wholesale for between US\$ 600 and US\$700 to various traders who either kept them in Macao for domestic sales or sent them to Hong Kong and China. The doctor and banker denied ever re-exporting any rhino horn themselves.

The doctor told me that he had, in addition, bought rhino horn from Chinese sailors who had obtained it from Africa and elsewhere. As for supplies of rhino hide, he had obtained some in 1983 which

was poor quality, not having come from recently-killed animals, and he had paid only US\$24 a kilo for it. The doctor furthermore admitted to tricking some of his less astute customers by selling them processed water buffalo skin as rhino hide. There is a lot of fake processed rhino hide for sale in Hong Kong, Singapore, Malaysia and Macao, but usually the pharmacists are honest with their customers and sell it cheaply, under US\$50 a kilo, saying that it is a substitute for dried raw rhino hide. Most of it is manufactured in Hong Kong from thin slices of dried water buffalo skin, and as it is much easier to cut than rhino hide, some people actually prefer to use it.

When the doctor and the banker realized I knew about rhino products, they asked me to bring some to Macao on my next visit. They offered me US\$600 per kilo for good quality rhino horn, US\$ 500 for second-rate and US\$50 for good quality rhino hide, which were approximately the Southeast Asian market prices in 1986. They also advised me on how to do the smuggling: "Use Air France when going to Hong Kong, but do not tell the airline personnel what you are carrying for they might telex the Hong Kong authorities who may refuse to let it come in even though it is legally in transit to Macao. Cover the horns with waterproof paper and carry them on your person."

Since their confiscation of the South African rhino products in March 1986, government officials in Macao know of none other brought into the territory, but they did say to me that their controls are not very effective on goods coming by boat from China and that it is possible some smuggling is going on. After having talked with some of the traders in December 1987, and having examined 34 of the main medicine shops in Macao, I think it is doubtful that there has been very much smuggled into Macao since April 1986. It seems, moreover, that there is a slight decline in local demand for it. The average retail price has dropped from early 1986 to December 1987, and there has been an even sharper decline in the retail price for rhino hide over this period of time. There still is a lot of horn and hide for sale in Macao, which is a territory of just under 400,000 people; two-thirds of the medicine shops have rhino horn available for customers and just over half offer rhino hide.

China

China is the main manufacturer of medicines containing rhino products and it exports them all over the world, particularly to South-east Asian nations. Although China is a party to CITES, and the CITES Secretariat declared in 1985 the international trade in these drugs illegal, China continues to export them for the purpose of earning foreign convertible exchange. Thus, one of the main purposes of visiting China again was to encourage the manufacturing firms too use substitutes for rhino horn.

In December 1985, I had met with the deputy general manager of the China National Medicines Health Products, Import and Export Corporation in Beijing. He then told me that the China Pharmaceutical Research Institute in Beijing was looking into substitutes for rhino horn and that he hoped there would be some which would soon replace the horn used in all the medicines his corporation handled. When I met with him again in December 1987, he said in early 1986 scientists at the China Pharmaceutical Research Institute proposed using water buffalo horn as a substitute, which had pleased him because all the old stocks of rhino horn in the factories his corporation deals with became exhausted in late 1986. All new medicines produced by them now are using water buffalo horn, he claimed. When asked why the labels for these continue to declare that rhino horn is one of their components, he said that the labels itemizing the ingredients must have any changes in them approved by the Ministry of Public Health, and that can take years.

Regrettably, not all the factories manufacturing rhino-based medicines in China have switched to water buffalo horn. Wang Binkao of the Beijing General Pharmaceutical Corporation, Foreign Trade Department admitted to me in December 1987, that his factories were still utilizing old stocks of rhino horn in "An Kung Niu Huang Wan (Bezoar Chest Functioning Pills)"; however, for the domestic market water buffalo horn is used, and the change has

been noted on the label. The amount of rhino horn being consumed by factories under the Beijing General Pharmaceutical Corporation is declining due to the scarcity of stocks, but some of the factories have gone to the extent of smashing antique rhino horn cups to use pieces in the production of their drugs. A few such cups, of artistic merit, have even been taken from the Imperial Palace ("Forbidden City") for this purpose, and so have whole old rhino horns.

Wang Binkao claims that his corporation's factories now use rhino horn only for the "Bezoar Chest Functioning Pills", and do not put it into any of their other manufactured drugs, but he would not tell me when they would stop using rhino horn entirely. For over ten years this corporation has been substituting water buffalo horn for that of rhino in many mass-produced medicines, but one of its factories, the Beijing Tongren Tang, adamantly refuses to use it in any of theirs which are exported. It appears that more support for the use of substitutes for rhino horn should come from the China Pharmaceutical Research Institute, the Beijing Municipal Chinese Medicine Research Institute and the Beijing Tongren Tang Pharmaceutical Research Centre.

Two of the most common medicines containing rhinoceros horn which are available in many parts of South-east Asia are still being manufactured in Tianjin. They are "Nia Huang Ching Hsin Wan (Cow Bezoar Pills)", used as tranquilizers, and the popular "Dendrobium Moniliforme Night Sight Pills" for (according to the label) "relieving dizziness and high fever, reinforcing tonic for building up vital energy and nourishing the blood". These medicines are produced at the Darentang Pharmaceutical Factory in Tianjin (formerly known as Tientsin). On this trip I visited Tianjin, an ugly large industrial city 130 kilometres south-east of Beijing. I discovered that the factory is now using water buffalo horn in these medicines when they are put on the local market (without changing the original label), but that rhino horn is still used for those made for the export market. The assistant factory director, Sun Yu Wei, told me that she had enough horn in stock to continue doing this through 1988 but would have to replenish her supplies in 1989. She was unwilling to stop utilizing rhino horn and said she was unaware of the CITES regulation prohibiting international trade in rhino-based drugs. She put the blame on overseas Chinese for demanding rhino horn medicines, and argued that it was because they wanted them that her factory produced them.

"Laryngitis Pills" are another widely available Chinese patent medicine, taken to cure inflammation and to act against poisons; it is manufactured in Chengdu and distributed by the China National Native Produce and Animal By-Products Import and Export Corporation, Szechuan Native Produce Branch. I went to the Szechuan Provincial Pharmacy Administration Bureau, which controls the manufacturing and export of Chinese medicines originating in Szechuan, and was told that although "Laryngitis Pills" are still being manufactured, rhino horn stopped being one of the ingredients in 1986; water buffalo horn is used instead. The label, however, has not been altered to indicate this. The real reason why the factories and corporations are reluctant to have rhino horn removed from the lists of ingredients in their drugs is that they fear their sales will go down. China earns a great deal of foreign exchange from exporting medicines, and certainly does not wish to lose the custom of overseas buyers. According to the *China Daily* newspaper, the government earned a record amount of money from the export of Chinese medicines and medicinal wines in 1987: US\$ 700,000,000, up US\$ 100,000,000 from the previous year.⁵

At the Guangzhou First Chinese Medicine Factory I learned from one of the managers and another person in charge of obtaining raw materials how rhino horn is obtained for two of its patent medicines. "Shi-He Ming Yan Wan" and "An Gong Nju Huang". Overseas Chinese, in Hong Kong, supply it on the understanding that these medicines will be sent back to them. The manager added that they are not sold locally at all because the government frowns on domestic consumption of imported commodities which are expensive. This factory has two other ways of getting rhino horn: buying it from a government-owned import and export corporation in Guangzhou and from foreign businessmen who bring it in. The

price paid in 1987 for rhino horn from these two sources was 20,000 yuan (US\$ 5,435) per kilo. As the Guangzhou First Chinese Medicine Factory is very large (it employs more than 1,000 workers), pressure should be put on it to encourage the use of a substitute for rhino horn; it has not yet accepted water buffalo horn in place of rhino for any of its medicines.

Besides the old and new stocks of rhino horn held by various import and export corporations and medicine factories in China, there are also some available from private traders and retail traditional medicine shops. On my previous visit to China in 1985, I found horn for sale in Xian (quite old stock, in half the shops I examined) and in Guangzhou (recently acquired stock in 17 per cent of the medicine shops), but none in the medicine shops of Guilin, Kunming, Beijing, Nanjing, Wuxi, Suzhou, Shanghai or Hangzhou. On this last visit, I found no horn in Tianjin, but I did in Guangzhou and Chengdu medicine shops.

In one traditional pharmacy I went back to in Guangzhou I saw a two-and-a-half kilo horn from a white rhino which had not been there before, although there had been others then which have since been sold. Obviously, this medicine shop has considerable demand for rhino horn, which is not surprising since Guangzhou is one of China's largest cities, is geographically close to Hong Kong and the Cantonese, who live here, are traditionally major consumers of rhino products. However, I was taken aback when I discovered rhino horn for sale in Chengdu, the capital of the western province of Szechuan.

The trade in wildlife products in Chengdu has recently expanded tremendously, due to a change in official policy which now allows private ownership of small business enterprises. In 1980 the Free Market Trading Centre, near the North Railway Station, started with fruit and vegetable stalls and a variety of household items for sale. Then in 1985, private dealers in medicinal products took over many of the food stands, and by December 1987, there were 187 selling mostly animal products. In addition, there were many specializing in herbs for medicinal purposes. Among the wildlife products, almost exclusively for medicinal purposes, were bear skeletons (US\$ 27 each), deer heads (US\$ 10), monkey heads (US\$ 4), bear paws (US\$ 20), monkey skeletons (US\$ 3), pangolin skeletons (US\$ 11), a large selection of cat skins at widely varying prices, eagles (US\$ 4), elephant hide (US\$ 8 per kilo), elephant bone (US\$ 27 per kilo), black bear skins (US\$ 130), large leopard skins (US\$ 130), leopard bone (US\$ 163 per kilo) and even a full tiger skin, poorly tanned, priced at US\$217. It was the most bizarre market I have ever visited. As far as the eye could see, monkey skeletons dangled on wires overhead, decomposing bear paws were spread all around, large containers on the ground held a multitudinous assortment of animal bones, leopard and other cat skins were hanging on walls, and skulls from different animals were propped up on tables. Everything was openly displayed, including a selection of 16 pieces of African rhino horn on a metal tray in one of the traditional medicine shops. The manager had purchased this horn for 8,000 yuan a kilo (US\$ 2,174) from the Guangzhou Foreign Trade Department and was offering it retail for the equivalent of US\$ 2,581 a kilo.

When the merchants in the Free Market realized I was primarily looking for rhino horn, they sent a broker to me. He said that he had some for sale which he was keeping at a friend's house a few kilometres away. With my interpreter and driver I followed him on his bicycle and was shown three small pieces of African rhino horn, which the broker wanted to sell to me for \$2,989 a kilo, claiming that would allow him a ten per cent commission on the deal. He also said that these pieces had been purchased by his "partner" from a hospital in Guangzhou. The broker apparently survives on the commissions he makes from the sales he carries out for his partner, who brings back from Guangzhou rhino horn several times a year. The broker bragged that he had taken up this job in 1986 and had sold several hundred grams of rhino horn in 1987, all to privately owned medicine shops, and that he dealt in rhino hide as well, but I did not see any rhino hide for sale in Chengdu.

Most of the rhino horn in Chengdu has come from Hong Kong via Guangzhou. Guangzhou appears to be the main place in China



Animal products for sale in December 1987 at the He Hua Chi Market near the North Train Station in Chengdu, Sechuan.

Esmond Bradley Martin

where private traders are able to purchase supplies. An old man working in a government owned pharmacy in Chengdu said that Guangzhou was still getting rhino horn from Hong Kong despite the bans, and that in 1982 some horn came into China from Thailand, supporting reports given by traders in Bangkok. China is also still buying rhino horn shavings from North Yemen; a Yemeni dealer confirmed one such sale as late as 1987.⁶

China's new economic policy of allowing private entrepreneurs to run some businesses has had the unfortunate effect of increasing trade in wild animal products, and hunters have recently stepped up their activities in Tibet and Szechuan to supply Chinese markets with desired commodities, many of which come from rare species. The Qingping Food Market in Guangzhou has already attracted adverse comment from conservationists for its sales of live wild animals, but the little known Free Market Trading Centre in Chengdu seems incomparably worse and poses a very great danger to wildlife conservation. Action needs to be taken to stop the emergence of any other similar markets, and controls should be enforced to prevent the sales of any endangered animal products in China.

Singapore

Not until a considerable amount of political and economic pressure was put on Singapore did the government ban imports and exports of rhino products (24 October 1986). Shortly afterwards, it also signed CITES and began to implement the Convention on 9 February 1987. Until late 1986, Singapore was regarded as the single greatest problem in trying to halt international trade in rhino products because of its role as an entrepot, easily attracting sellers of Indian and Sumatran rhino horn in particular because of its favourable currency and absence of restriction on such imports.⁷ Since early 1987, however, very little Indian rhino horn appears to be coming in; I saw no new Indian horn in the medicine shops I surveyed, and a major wholesaler of wildlife products told me that new Indian rhino horn is now being smuggled into Hong Kong where traders will pay up to US\$ 15,000 per kilo wholesale. The Hong Kong traders have always been partial to Indian rhino horn, believing that it is the most effective medicinally.⁸ At present, they are doing

better economically than their counterparts in Singapore and are in a position to offer very high prices for the small amounts available.

On the other hand, there does not seem to be a reduction of imports of Sumatran rhino horn into Singapore. These are still being illegally taken out of Sumatra and Sabah, and several managers of Singapore's medicine shops stated in January 1988 that during the past year they had continued obtaining their supplies from Indonesian sailors.⁹

This is particularly distressing news because one of the main reasons why conservationists actively campaigned to get Singapore to ban imports of rhino products was to stop abetting the poaching in Sumatra where the largest populations of the hairy rhino remain. Protection of these animals, which may number 600 on the whole island,¹⁰ is of major importance for the survival of the species. Raleigh Blouch, who carried out extensive field-work on Sumatra's larger mammals and was responsible for locating individual rhinos for John Aspinall's capture project in central Sumatra, estimated that a minimum of ten to 20 were annually being killed for the trade. It is probable that the number is actually much bigger because direct evidence of poaching is very difficult to obtain in the dense jungle. Moreover, Francesco Nardelli, the field manager of the Aspinall project, found snares on three of the six rhinos he captured in Torgamba. He believes that in this small area alone in central Sumatra at least a dozen rhinos are killed in snares every year, and that the population here has been reduced from about 100 in 1974 to only 15 now.

Poaching in Torgamba is carried out by local Sumatrans, who have traditionally set snares for sambar, muntjac and pigs as well as for rhinos. When it became apparent to them that several rhinos were probably still around because of the presence of the capture team, they upgraded their wire snares to steel cable so that they would have a better chance of catching them for their own profit.

In northern Sumatra, especially in Aceh Province and in Gunung Leuser Park, poaching is mainly done by setting pit traps. The local people dig them on rhino paths, about one-and-three-quarters metres deep placing a couple of nipa palm spears upright on the

bottom to impale a rhino. When they catch one, they remove its horns, nails, skin, fat and many of its bones. The horns are mostly exported to Singapore, although occasionally little pieces are taken from them to make a ring or to use in a poultice to hasten healing of human broken bones or sprains. The nails and skin are also exported. It is usually only the rhino bones and fat that are kept by the poachers to sell locally. The fat is considered a good liniment, a litre of which in 1983 cost US\$ 10. The bones are soaked in vegetable oil and then sold as a cheaper substitute for curing sprains and mending broken bones.¹²

I spoke with officers of the Singapore Primary Production Department (responsible for the implementation of wildlife laws), concerning the continued and now illegal imports of Sumatran rhino horn. They said they had not caught anyone importing or exporting rhino products since the ban on 24 October 1986. However, even if a government official suspected that a dealer was handling illegal rhino horn in Singapore, he would have no way of ascertaining whether it came into the country prior to the ban since, unlike in Hong Kong when restrictions were made in 1979, no stock-taking has been required of the wholesalers or retailers, and none of the horn has had to be registered. Nor has the Singapore government encouraged inspection of any of the medicine shops, although members of the Agriculture and Fisheries Department in Hong Kong regularly do so. The Singapore Primary Production Department officers said that they were concentrating their efforts instead on policing the port area to prevent illegal entry of wildlife products. Yet they also admitted that their personnel are not trained in identifying endangered wildlife products and that their shortage of manpower precludes the possibility of checking the medicine shops for law infringement except when a complaint is made. Under the circumstances, it seems the Singapore government would be reluctant to ban internal sales of rhino products in the near future.

Malaysia

There is less rhino horn to be found in Malaysia's capital city, Kuala Lumpur, than in any other major city in South-east Asia. What does exist in this capital is being used up: in 1981 58 per cent of the medicine halls I examined had it for sale, but by early 1988 only four per cent did. Wholesalers were also short of rhino horn; one complained that he had completely run out of it after selling an 80-gram piece from Africa to a Taiwanese for the equivalent of US\$ 23,000 a kilo, an exorbitantly high price. The reason why there is so little horn and other rhino products (only one of the medicine halls had hide and only one had nails for sale) is that the authorities strictly enforce the law on imports and exports, manage the Malaysian rhino populations on the peninsula very well (poaching is not a problem) and carry out spot-checks of Chinese-owned businesses. A certain amount of discrimination against the Chinese is encouraged by the government, and as the Chinese minority is generally anxious about what repercussions there may be for law-infringement, most behave very circumspectly.

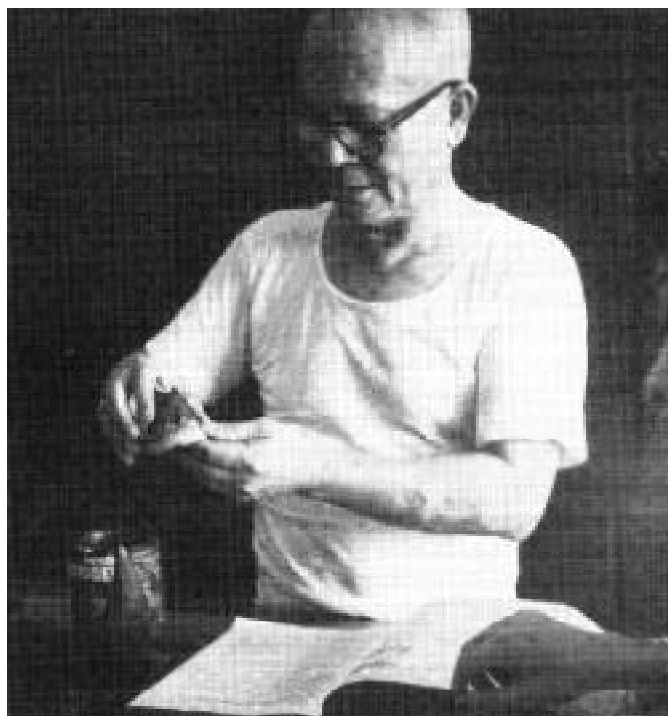
Nevertheless, a certain fascination about rhino horn remains, which may explain the prevalence of large caches of fake ones in the medicine halls. Many of these resemble bumpy goat horn, but they are usually carved from wood and come from Banda Aceh, Sumatra. One pharmaceutical wholesaler told me that Indonesians often come to his office brandishing their passports to prove that they have actually come from Indonesia and blatantly claim that the 20 or 40 such "horns" they have brought with them are genuine from Sumatra. Some traditional doctors may occasionally prescribe cuttings from them to be used as substitutes for rhino horn, but it is rare to see any of these "horns" from which material has been removed. The so-called rhino hide in Kuala Lumpur's medicine halls, except for that in one of them, is the processed variety made from water buffalo hide in Hong Kong. Georgetown (Penang), Malaysia's second city, has no real rhino hide at all in its medicine halls simply because no one wants to pay the price for it, but there is more rhino horn available here than in Kuala Lumpur, probably due to the fact that the country's main traditional pharmaceutical importers are based in Georgetown, and government officers do not carry out as much checking on the products handled by



Esmund Bradley Martin

Mohd Khan bin M Khan Director General of Malaysia's Department of Wildlife and National Parks scrutinizes various rhino parts outside his office in Kuala Lumpur.

wholesale outlets and medicine halls. The Director of Wildlife for Penang told me he had not confiscated any rhino products since being posted here two years ago. Nevertheless, employees in the medicine halls were a little nervous when I asked about rhino horn which was usually kept in drawers or pottery jars, out of sight. No proprietor of any medicine hall would admit that the rhino horn he had was new; all adamantly claimed their stock was many years old. A prominent dealer in medicinal herbs and animal products said that Taiwanese sometimes bring in South African rhino horn for sale, and it is also persons of Taiwanese nationality who are the



Esmund Bradley Martin

A Chinese traditional doctor in Penang, Malaysia examines a medical dictionary and rhino horn.

main buyers of it in Georgetown. Other suppliers are Pakistani and Bangladeshi visitors who have collected rhino horn in Dubai and Abu Dhabi. This is African horn, and it sold wholesale in Georgetown for between US\$ 600 and US\$750 a kilo in 1987, but it fetched higher prices when offered to dealers in Hong Kong.

Rhino products are not in great enough demand to encourage much smuggling into Malaysia now, and when I spoke with the Head of the Customs Department at the Penang airport, he told me that his officers had never found any being passed through the airport during the 14 years he has been working there, although his officers are vigilant.

In short, there is no longer a serious problem with trade in rhino products in Peninsular Malaysia. Very little new horn is coming in and practically no nails nor hide. Consumption is down and even the retail price for rhino horn has declined by over 50 per cent from 1983 to 1988 in Georgetown.

Thailand

Thailand is a major consumer of rhino products and also serves as an entrepot for them. Trade in the Sumatran species has been banned by the government at least since 1972, but the law is openly flouted by proprietors of many Chinese medicine shops in Bangkok, where a greater variety of rhino products is available than in any other large city of South-east Asia. The well-known demand for rhino horn has attracted foreign smugglers, who supply Bangkok with Indian and African species as well. To determine whether the sale of rhino products was a problem in the south of the country, which in recent years has seen substantial tourism growth, I visited Songkhla, Nakhon Siri Thammarat, Phang-Nga, Phuket and Hat Yai, but found rhino horn for sale in only two of these places.

In the extreme southern part of Thailand, Hat Yai is the fastest growing city; its proximity to the border with Malaysia has become an advantage to local businessmen, who are actively encouraging Malaysian visitors by offering bargain-priced electronic goods and clothes, nightclub entertainment which includes sex shows which would not be tolerated in Malaysia, and cheap prostitutes. Hundreds of thousands of Malaysians, especially the Chinese, are now coming up to Hat Yai each year to indulge themselves. However, they do not seem to be the main clients of Hat Yai's four medicine shops, of which two offer Sumatran rhino horn, perhaps because it is so expensive, averaging US\$ 20,910 a kilo. The manager of one shop stated that he had purchased one of his horns from a middleman near the Malaysian border; in that same area in 1986 he had bought some Sumatran rhino hide and nails for only US\$80 from a local hunter. In his shop there were also some rhino bones retailing for US\$ 2,000 per kilo to be used for lowering fever.

Another main tourist destination in southern Thailand is the island of Phuket which is attracting large numbers of western European holiday-makers. In Phuket town there are only three traditional medicine shops run by Chinese (as is the case throughout Thailand), and they do not appear to be prospering. There is little demand for rhino hide or horn (only one shop had any).

Some dealers in Bangkok told me in 1986 that they were obtaining rhino products from Sumatran animals recently killed in the northern part of Thailand and contiguous areas of north-east Burma and western Laos. Therefore, I decided when planning my 1988 trip to visit the Chinese medicine shops in Chiangmai (population: 300,000), Chiang Rai (150,000) and Mae Sal (65,000) which is on the Burma frontier. In Chiangmai, which is Thailand's second city, there was no rhino horn nor hide for sale, although back in 1979 it was available in three of the five medicine shops. In Chiang Rai, even farther north, there were no rhino products for sale, either. However, facing the border with Burma, the town of Mae Sai had rhino hide in one of its two medicine shops. This was purchased wholesale from a trader in Burma in 1984. I think that it is because higher prices are offered in Bangkok that most of the rhino products obtained in the country are taken to the capital for sale now. With its population of 5,000,000, almost all the wealthiest



Esmond Bradley Martin

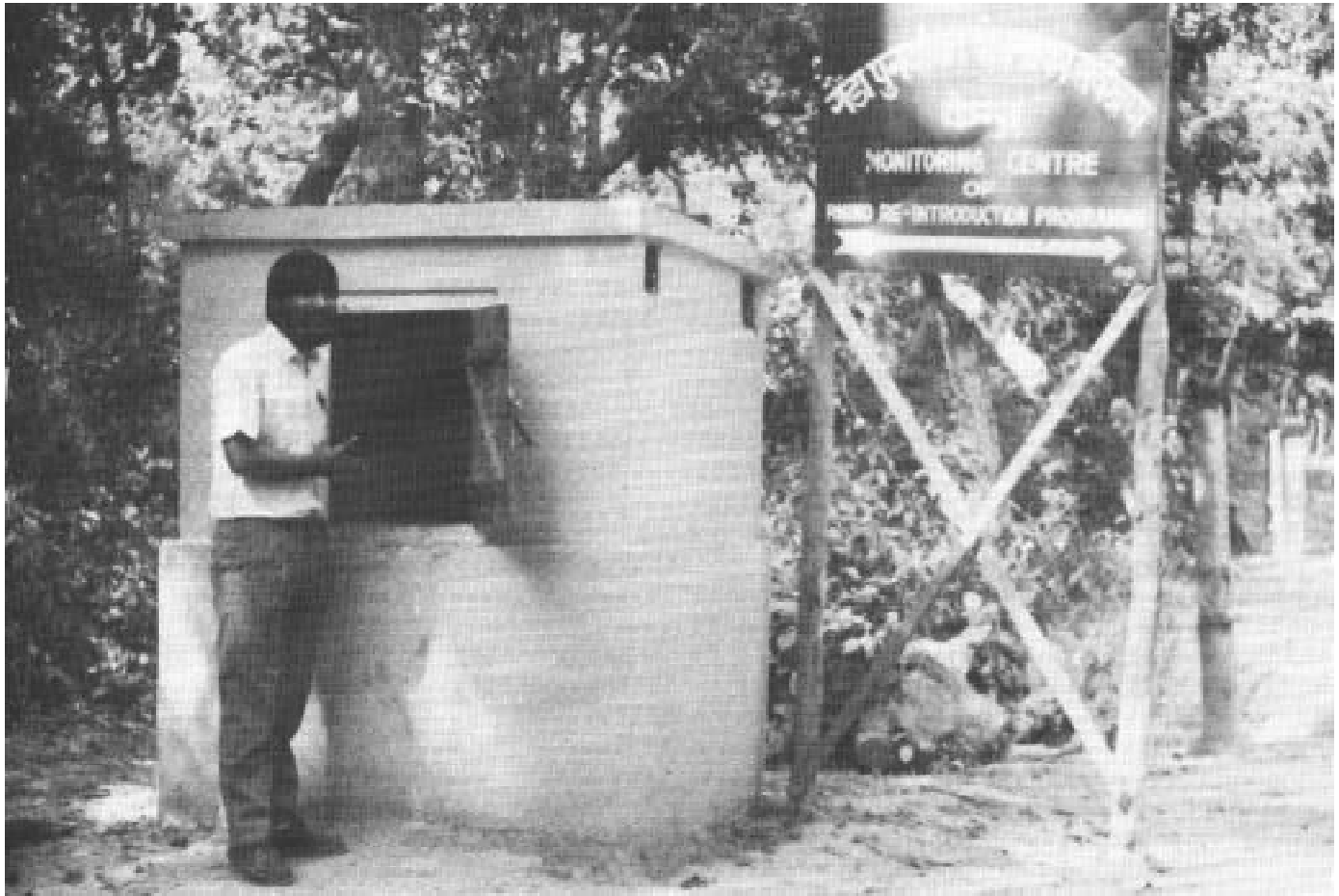
A dried Sumatran rhino penis for sale in Bangkok in 1986.

Chinese live there, and competition among the Bangkok medicine shops for rhino products is very brisk.

Traders in Sumatran rhino products often go from one major medicine shop in Bangkok to another, trying to make the most profit on their sales. Some of the more enterprising shop owners have, however, established their own contacts in remote areas with hunters who send word to them as soon as they kill a rhino. I know one businessman who in 1986 drove all the way from Bangkok to Chiang Rai and four hours beyond, inside Burma where he purchased with Thai baht the entire carcass of a Sumatran rhino which he immediately brought back to Bangkok. He had his employees remove every part from it of any economic value to put on sale in his medicine shop. In early 1988 he was offering a large selection of rhino products at retail prices: horn (US\$ 15,870 a kilo), hide (US\$ 3,170 a kilo for that taken from the shoulder and US\$ 210 a kilo for the rest), nails (US\$ 1,590 a kilo) penises (individually for sale, but priced according to weight at US\$ 3,960 per kilo), dried blood (US\$ 56 a kilo) and dung from the intestine (US\$32 a kilo).

A couple of traders in Bangkok have recently bought rhino horn from the Laotian border, and they claim that there are still some rhinos alive in that country. There are also some old stocks of rhino horn coming out of Laos; Buddhist carvings are on a few of these, which are believed to have belonged to members of the royal family.

Some traders purchase African rhino horn, which is transported to Bangkok mostly by Europeans, especially Germans, who obtain it in small quantities from South Africa or Tanzania. The main retail consumers of this and the Asian rhino horn in Bangkok are Thai Chinese, Taiwanese and South Koreans, but some horn was re-exported to China from Bangkok in 1987. Koreans and Japanese are the main purchasers of the Sumatran rhino penises found in Bangkok's medicine shops, and they use them as aphrodisiacs and occasionally as a cure for



Esmond Bradley Martin

Turiq Aziz, who is studying the rhinos in Dudhwa National park, India, checks the generator which powers the electric wire fence surrounding the seven recently introduced Indian rhinos.

asthma One dealer who had rhino penises in his shop advised cooking them in a soup or with medicinal herbs.

Since products from recently-killed Sumatran rhinos in Burma and Laos (places where the rhino was thought to be extinct) are appearing for sale in Bangkok, it is possible that some are also being marketed from Thailand's own rhino population. Thai Forest Department officials in the late 1970s thought that the rhino was probably extinct here, but they now say there could be some in the Bala Forest in the southern part of the country near the Malaysian border (from where it was reported that one was poached in 1983), in Phu Khieo Wildlife Sanctuary and Kaeng Krachan National Park (where another was reported to have been killed in 1984). In 1986 they heard of rhino tracks having been seen in Three Pagodas Pass on the Burmese border.¹³

It would be advisable to locate precisely the remaining rhinos in Thailand and to initiate a management plan to help them survive, which, under present circumstances, would probably necessitate a fully-protected captive breeding programme. In order to encourage Thai officials to try to stop the trade in rhino products, conservationists could point out that it is the country's own self interest to protect rhinos from the demands of trade. At present, the Forest Department does essentially nothing to check the trade in rhino products even though the responsibility for controlling wildlife trade in Thailand lies with it. No records of stocks of rhino products are required from dealers; managers of traditional medicine shops say that government officers almost never come around to inspect their goods; and, when asked about this, one high-ranking Forest Department official told me: "Our policy towards the traditional medicine shops is to leave them alone." When I persevered about the matter, the excuse was made that the Department personnel do not have the expertise needed to identify prohibited wildlife products and instead they concentrate on the illegal movement of live animals: rare birds which are exported to Singapore, Japan and Taiwan; and elephants, tapirs, clouded leopards and gibbons which go to Laos. However, I was told that

officers of the Forest Department do keep a look-out for illegal imports of python skins and tortoise shell from Kampuchea. It would not be difficult to train a few inspectors to recognize rhino products, and I believe this should be given immediate priority along with international pressure placed on the government of Thailand to stop all trade in rhino products.

India

Indian authorities are fully aware of the demands from trade which instigate poaching, and with over half of all the rhinos in Asia inside its boundaries (95 per cent of which are in the state of Assam), their conservation is taken to be a serious matter. Nevertheless, a sharp and sudden increase in illegal killings of the greater one-horned rhino broke out in Assam in the early 1980s¹⁴ Between 1980 and the end of 1987, 385 of these animals were known to have been poached. There could have been more, but the Forest Department claims that it is able to record almost 100 per cent of the incidents.

Fortunately, since 1985, the number of rhinos being killed has been declining: 50 in 1986 and 41 in 1987. According to Dr M.K. Ranjitsinh, Joint Secretary for Wildlife for the Government of India, and Vinay Tandon, Deputy Director of Wildlife for the Indian Government, poaching has been stemmed by a new central government scheme called "Assistance to Assam for Conservation of Rhinos" through which during the financial years 1985/6 and 1986/7, 10,400,000 rupees (about US\$ 800,000) were allocated for purchasing arms, ammunition and vehicles, and for the construction of new roads, bridges and anti-poaching camps to enable forest guards to perform their duties more capably. In addition, there have been some personnel changes which have improved wildlife conservation leadership and produced positive results, including the promotion of S. Deb Roy to Chief Conservator of Forests and the posting of R.N. Sonowal back to Kaziranga. Some of the Naga people who obtain fire-arms from neighbouring countries and who belong to poaching syndicates

have been caught and are being prosecuted.

None of Assam's poached rhino horn remains in India; poaching syndicates smuggle it out of the country for convertible exchange. My visits to Unani medicine clinics during early 1988 in Old Delhi, Agra, Jodhpur and Jaisalmer revealed no Indian rhino products for sale whatsoever. It is, in fact, rare to find products from any endangered animal species in India's traditional medicine shops as the laws against being in possession of them are strict and enforced. I was quite surprised when a trader in Agra showed me an illegal leopard skin of good quality which he wanted to sell to me for US\$ 1,930. He suggested that I smuggle it into Nepal and take it from there to the Gulf States or Singapore "where the demand for leopard skins is good".

Billy Arjan Singh (one of India's most ardent conservationists) and Dr Ranjitsinh told me about a most regrettable episode which occurred following the translocation of some rhinos from Chitwan Park to Bardia Park in western Nepal. One of the animals escaped and made its way across the border into India. Villagers from Gorakhpur saw the "demon" grazing in their fields and sent for the police to deal with it. The sub-inspector and his subordinates arrived, but none of them knew what the animal was. The sub-inspector fired 32 bullets into it, and when it was dead he had his photograph taken, posing next to the carcass. He is now being prosecuted for having killed the rhino, a serious offence because of the rhino's status as an animal belonging to an endangered species.

Hopefully, the seven rhinos recently moved into Dudhwa National Park in northern India from Assam and Chitwan will not meet the same fate,¹⁵ since people living near Dudhwa have not seen rhinos for over a hundred years. At the moment, these rhinos are well looked after by the park authorities and are kept in a 19-square-kilometre enclosure, surrounded by a low, electrically-wired fence. However, various types of poaching take place in Dudhwa Park, and it may be only a matter of time before the value of rhino horn is ascertained by the local people who have shot, trapped and poisoned 16 tigers in and around the park between January 1987 and February 1988. They also fish in the park illicitly and steal wood, which they move out by bullock cart and the train which passes by.

According to a research fellow, Tariq Aziz, who is monitoring the rhinos in Dudhwa, some villagers have already asked for rhino urine, so they are aware of their presence, even though no poacher has so far come close to one. Smugglers bringing in electronic goods, narcotics and gold from Nepal pass through Dudhwa Park to avoid detection, and I would not be surprised if the smuggling syndicates soon began to urge the local people to kill the rhinos there to supply horn for export.

In India, as in South-east Asian countries, the movement of rhino products requires closer watching in order to learn when, where and how to take action against the illegal trade. India has an excellent record for rhino conservation in the twentieth century, having built up its population from a few dozen to over 1,300 today. The authorities know from experience, that any laxity on their part, usually due to political and tribal disturbances, encourages outbreaks of poaching, but with the increased funding they have recently received and their expectation of further support, morale is presently high, and they are proud of having one of the best-managed rhino populations in the world today. Perhaps their greatest problem is their inability to break the wildlife trading syndicates, but they also need to step up their efforts to make villagers living near rhino sanctuaries aware of the importance of rhino conservation.

Conclusion

New horn, hide, nails and other commodities from rhinos in Asia and Africa are continually being put on to major markets. Hardly any known population of Sumatran rhinos is safe from poachers, and the recent upsurge in the killing of Javan rhinos (less than 60 of this species are thought to exist in the world) illustrates how important it is to close down internal as well as international trade in rhino products in all Asian countries, and to

encourage the use of substitutes for them. All large populations of black and white rhinos in tropical Africa are also very vulnerable to illicit hunting, and almost all the horn taken from them ends up in Asia for consumption. Fortunately, the average wholesale prices of rhino products have not significantly increased during the past few years, but any increase in demand will cause a rise again, and the prices are still so high that new gangs of poachers are invading the existing rhino sanctuaries. It is imperative to improve the protection of rhinos *in situ* by increasing the number of dedicated, honest and motivated guards who are well-paid and given back-up support for their efforts. This will only be achieved when the decision-makers in Asia and Africa put a higher priority on saving the rhinoceros.

Footnotes

1. I.S.C. Parker and Esmond Bradley Martin, "Trade in African Rhino Horn", *Oryx*, Vol. XV, No. 2 (November 1979), p. 157.
2. *Hansard* for 26 January and 25 February 1988.
3. *Hansard* for 25 February 1988.
4. Esmond Martin and Lucy Vigne, "Recent Developments in the Rhino Horn Trade", *Traffic Bulletin*, Vol.9, Nos. 2/3 (13 November 1987). p.51.
5. *China Daily*, "Exports of Medicine Hit Record", 15 December 1987.
6. Esmond Bradley Martin, "The Yemeni Rhino Horn Trade", *Pachyderm*, Number 8 (April 1987), p. 14; and Daniel Martin Varisco, "Horns and Hilts: Wildlife Conservation for North Yemen (YAR)", A Report Prepared for Asia/Near East Bureau Agency for International Development, Washington, D.C. under a co-operative Agreement with World Wildlife Fund-US Project 6298 (December 1987), p. 8.
7. Esmond and Chryssee Bradley Martin, "Combating the Illegal Trade In Rhinoceros Products", *Oryx*, Vol. 21, No. 3 (July 1987), pp. 145 and 147.
8. Esmond Bradley Martin, *The International Trade in Rhinoceros Products*, Gland, IUCN/WWF, 1980, pp. 20-21.
9. For information on smuggling Sumatran rhino horns into Singapore, see "Combating the Illegal Trade", p. 145.
10. This figure comes from Nico van Strien's estimates which were made available to the IUCN/SSC Asian Rhino Specialist Group (see Charles Santiapillai, Compiler, "Proceedings of the IUCN/SSC Asian Rhino Specialist Group Meeting, Kuala Lumpur, 19-21 October 1987", Table 1.
11. Personal communication with Francesco Nardelli in Singapore, 1 January 1988.
12. Personal communication with Raleigh Blouch in Ottawa, 13 July 1987.
13. Information supplied by Jira Jintanugool, Acting Director, Wildlife Conservation Section, Royal Forestry Department, Bangkok, 1 February 1988.
14. See Esmond Bradley Martin, Chryssee Bradley Martin and Lucy Vigne, "Conservation Crisis — The Rhinoceros in India", *Oryx*, Vol. 21, No. 4 (October 1987), pp. 212-218 for an explanation of this poaching.
15. For details of the translocation, see John B. Sale and Samar Singh, "Re-introduction of Greater Indian Rhinoceros In Dudhwa National Park", *Oryx*, Vol.21, No.2 (April 1987), pp. 81-84.

TABLE I
The Hong Kong Government's confiscations of rhino imports

Year	Pieces	Prosecutions
1980	4	1
1981	3	2
1982	2	1
1983	3	2
1984	74(71 chips)	3
1985	9(18kg + 28.8kg scrap)	5
1986	0	0
1987(to Dec. 7)	4(1.7kg)	1

Source: Unpublished data from the Department of Agriculture and Fisheries, Hong Kong.

TABLE II
The Hong Kong Government's confiscations of rhino hide imports

Year	Piece	Prosecutions
1979	13	1
1980	21	2
1981-1984	0	0
1985	4	2
1986-87 (to Dec. 7)	0	0

Source: Unpublished data from the Department of Agriculture and Fisheries, Hong Kong.

TABLE III
Known numbers of rhinos poached in Assam

Area	1986	1987
Kaziranga National Park	41	24
Around Kaziranga	4	0
Orang Wildlife Sanctuary	3	1
Manas Wildlife Sanctuary	2	7
Pobitora	0	2
Other areas	0	7
Total	<u>50</u>	<u>41</u>

Source:P.C. Das, Retired Chief Conservator of Forests, Assam.

TABLE IV
Average retail prices of rhinoceros horn in some major cities of Eastern Asia

Place and Year	Total Number of Clinics and Pharmacies visited	Number & Percentage Selling Horn	Type of horn	Average Price per kg in US\$
Xian, China				
1985	8	4 50%	mostly African	2,413
Guangzhou, China				
1985	12	2 17%	mostly African	18,772
1987	13	2 15%	African	16,304
Chengdu, China				
1987	14	1 7%	African	2,582
Hong Kong				
1979	15	11 73%	mostly African	11,103
1982	50	23 46%	mostly African	15,700
1985	80	33 41%	mostly African	14,282
1987	60	19 32%	mostly African	20,751
Macao				
1979	9	7 78%	mostly African	4,127
1982	14	9 64%	mostly African	7,797
1986	20	16 80%	mostly African	8,644
1987	34	22 65%	African/Asian	8,407
Singapore				
1979	15	8 53%	mostly African	11,615
1983	46	16 35%	mostly African	11,804
1986	33	13 39%	African/Asian	14,464
1988	43	10 23%	African/Asian	17,327
Kuala Lumpur				
1981	26	15 58%	mostly African	19,801
1983	29	6 21%	Asian/ African	17,280
1986	41	4 10%	Asian/ African	11,636
1988	45	2 4%	Asian/ African	23,810
Georgetown, Malaysia				
1983	14	7 50%	mostly African	14,582
1988	30	6 20%	African/Sumatran	6,702
Hat Yai Thailand				
1988	4*	2 50%	Sumatran	20,910
Phuket Town Thailand				
1988	3*	1 33%	?	?
Chianmai, Thailand				
1979	5*	3 60%	Sumatran	11,764
1988	2*	0 -	-	-
Bangkok				
1979	23	12 52%	mostly African	3,654
1986	44	15 34%	mostly Asian	11,629
1988	52	17 33%	mostly Sumatran	13,111

*Complete Survey (all medicine shops examined).
Source: Survey taken by the author.

TABLE V

Average retail prices of rhinoceros hide in some major cities of Eastern Asia

Place and Year	Total Number of Clinics and Pharmacies	Number and Percentage Selling Hide	Types of Hide	Average Price per kg in US\$
Gullin China 1985	3	1 33%	African	85
Guangzhou China 1985 1987	12 13	6 50% 1 8%	South Africa South Africa	146 543
Hong Kong 1985 1987	80 60	31 39% 26 43%	South African South African	403 545
Macao 1982 1986 1988	14 20 43	4 29% 6 30% 18 56%	South African South African mostly African	360 304 212
Singapore 1983 1986 1988	46 33 43	13 28% 5 15% 4 9%	African/Sumatran mostly Sumatran mostly Sumatran	635 496 560
Kuala Lumpur 1986 1988	41 45	3 7% 1 2%	African ?	303 440
Georgetown, Malaysia 1983 1988	14 30	1 7% 0 -	Sumatra -	360 -
Hat Yai, Thailand 1988	4*	1 25%	Sumatran	2,000
Mae Sai, Thailand 1988	2*	1 50%	Sumatran	210
Phuket Town, Thailand 1988	3*	1 33%	Sumatran	610
Bangkok 1986 1988	44 52	8 18% 7 13%	Sumatran Sumatran	395 1,254

*Complete Survey (all medicine shops examined).
Source: Survey taken by the author

TABLE V

Average retail prices of rhinoceros nails in some major cities of Eastern Asia

Place and Year	Total Number of Clinics and Pharmacies	Number and Percentage Selling Nails	Type of Nail	Average Price per kg in US\$
Hong Kong 1985 1987	80 60	2 2.5% 0 -	? -	2,211 -
Macao 1986 1987	20 34	0 - 4 12%	- ?	- 7,903
Singapore 1983 1986 1988	46 30 43	10 22% 8 24% 4 9%	mostly Sumatran mostly Sumatran Sumatran	2,329 554 1,390
Kuala Lumpur 1983 1986 1988	29 41 45	1 3% 1 2% 1 2%	African ? Sumatran	177 ? 2,116
Georgetown, Malaysia 1983 1988	14 30	4 29% 2 7%	Sumatran/African Sumatran	1,968 6,875
Hat Yai, Thailand 1988	4*	2 50%	Sumatran	11,345
Phuket Town, Thailand 1988	3*	1 33%	Sumatran	16,000
Bangkok 1986 1988	44 52	5 11% 7 13%	Sumatran Sumatran	1,487 2,295

*Complete Survey (all medicine shops examined).
Source: Survey taken by the author

TABLE V

Average wholesale prices paid by imports of rhino products in cities of Eastern Asia, 1987

Product	Average Price per kg in US\$
Sumatran horn	10,000
Indian horn	10,000 to 15,000
African horn (in Malaysia Macao and Singapore)	600 to 750
Hide	50 to 120
Nails	180

Source: Survey taken by the author.



A typical medicine shop in Taiwan offering rhino horn for sale

Esmond Bradley Martin

Taiwan: The Greatest Threat to the Survival of Africa's Rhinos

Lucy Vigne and Esmond Bradley Martin

During the past three years, Taiwan (the Republic of China) may have become the world's largest entrepot for African and Asian rhinoceros horn. Prices in Taiwan have soared higher than ever before in the recent history of the rhino horn trade. This thriving traffic in illegal rhino horn and hide, with its little known South African connection, must be dealt with immediately if its disastrous effects on the dwindling rhino populations in both Africa and Asia are to be halted.

Taiwan's economy began to boom in the early 1970s and the country became a major importer of rhino horn. Customs statistics show that 7,281 kilos of rhino horn were legally imported from 1972 to August 1985, and in addition large quantities of horn were smuggled in to avoid import taxes. Pressure was mounted on Taiwan by international conservation organizations, especially the World Wide Fund for Nature (WWF), and its government consequently prohibited imports and exports of rhino products in August 1985. Visiting Taiwan on behalf of WWF from December 1985 to January 1986, Esmond Bradley Martin had meetings with senior officials and three government ministers. These included a Minister of State, Dr Feng-shu Chang, President of the Society for Wildlife and Nature in Taiwan, who had helped to push through the official ban. It was agreed by all that the new restrictions on the international trade in rhino products would have to be enforced and ways to do this were discussed.

When Esmond Bradley Martin returned to Taiwan in July 1988, however, he found that contrary to his hopes, the law was not being upheld. Taiwanese traders had been left unhindered by their government, and the medicine shops were full of new rhino horn. Neither water buffalo horn nor saiga antelope horn had been encouraged as substitutes.

Taiwan has continued to experience rapid economic growth, with one of the strongest currencies in the world today (up by 40 per cent against the US dollar since 1986). Its foreign currency reserves of US\$75 billion are the world's third largest, and the average income is now US\$ 6,000 per person, 15 times higher than what it was in 1970. It is hardly surprising that Taiwanese businessmen are spending some of their money on rare and valuable wildlife commodities. Over 80 tonnes of raw ivory were imported in 1987, although Taiwan has only a small ivory carving industry. Rhino horn has shot up in price, yet traders do not hesitate to buy it, knowing that they will sell it easily. In the city centre of the capital, Taipei, Esmond Bradley Martin visited 60 pharmacies in July 1988. Of these, 44 sold rhino horn. In the centre of Kaohsiung, Taiwan's second largest city and major port, he visited 20 pharmacies at this time, and 18 of them were found to be offering rhino horn for sale.

Many of the 20,000,000 Taiwanese believe in the efficacy of Chinese traditional medicine and prefer to buy a few grammes of rhino horn to reduce fever than consume some modern medicines with their uncertain side effects. Sumatran and Indian rhino horn are considered to be more powerful fever-reducing agents than horn from the black or white rhino. Although Asian rhinos are rare, a quarter of the pharmacies sell Asian horn, and it is so popular that customers are willing to spend on average the equivalent of US\$ 40,000 per kilo for it, the highest retail price in the world now.

The relatively cheaper African rhino horn is more readily available. Several shops have a dozen or so of these horns on display. Shop owners and businessmen realize however, that there has been a sharp decline in African rhino numbers (an

estimated 68,500 for both species in 1970 down to 9,000 today). They have now begun to buy the horn in large quantities for investment purposes, and are competing with one another to purchase this rare and sought-after commodity.

Furthermore, since 1986, Taiwan has become a major exporter of African rhino horn. After Macao and Singapore officially banned imports and exports of rhino horn in December 1985 and October 1986 respectively, Taiwan emerged as the major entrepot for this commodity in Asia, as both Singapore and Macao have enforced their laws against the trade to a considerable extent. According to Taiwanese traders, Hong Kong businessmen are supplying rhino horn for export to mainland China. The People's Republic of China is the biggest manufacturer of medicines containing rhino products, and although it is a party to CITES, which in 1985 declared the trade in these drugs illegal, China continues to market them abroad. There are several factories in China which use African horn (not Asian horn, which is too expensive) to make an assortment of patent medicines. These rhino horn-based drugs are then exported to all parts of eastern Asia, including Taiwan. Exports of traditional medicines have recently become one of China's most important foreign exchange earners, bringing in US\$ 700,000,000 in 1987 alone. The Chinese are so desperate for rhino horn that they have begun destroying beautiful antique rhino horn cups and carvings from the Ching Dynasty, grinding them into powder to be incorporated along with other ingredients in pills to treat such ailments as laryngitis, nosebleeds and fatigue.

This frenetic demand for African rhino horn in China has caused the wholesale price to rocket in Taipei to US\$ 2,486 per kilo almost twice as much as what is offered for it in North Yemen. From April to July 1988, the retail price of African horn in Kaohsiung more than doubled from US\$ 1,536 to US\$ 3,347 per kilo. According to wholesalers in Kaohsiung, Hong Kong businessmen bought 1,000 kilos of African rhino horn from Taiwan between early 1987 and June 1988 to be smuggled into China. Taiwanese traders are anxious to build up supplies for this continuing big market.

In order to meet the demand for African rhino horn in Taiwan and China, Taiwanese traders are importing rhino horn directly from the Republic of South Africa. They also collect the more expensive Asian horn available in Sabah (Borneo), Bangkok, Hong Kong and Singapore, but it is the export route of the African horn which will be described here.

White rhino horn is for sale in many of Taipei's and Kaohsiung's pharmacies, and white rhino hide was available in 40 per cent of the pharmacies visited in July 1988. Although prices for rhino hide have not risen in the past three years, it is still being smuggled into the country along with horn from South Africa. Although this country has the largest white rhino population in Africa, these rhinos are not being killed by poachers. From those animals which die of natural causes in parks and reserves, their horns are kept by various government departments. In the late 1970s, Mozambique had a re-introduced population of white rhinos which was eliminated and perhaps some of this horn found its way to Taiwan. Horns from private ranches in southern Africa and from individuals wishing to sell their trophies added to the supply going to Taiwan. Furthermore, some white rhino horn was probably smuggled into Taiwan following two major thefts from government stores in southern Africa recently.

As for black rhino horn, the network for its illicit movement through Africa to the Far East is more complex, and not all aspects of the trade are clear. We do know that considerable quantities of rhino horn from Mozambique, Tanzania, Zambia and Zimbabwe in the early and mid-1980s were moved via Burundi to the United Arab Emirates and then on to North Yemen and eastern Asia. In 1986, Ian Parker saw 700 rhino horns in Bujumbura, which had supposedly originated from Mozambique. As of November 1987, however, Burundi closed the trade and at least some of the horn, such as that from poached black rhinos in Zimbabwe's Zambezi Valley and from Mozambique rhinos, is now making its way to South Africa.

According to an article in the Botswana Daily News, 13 October 1988, and from confidential sources in southern Africa, in early 1988 Botswana Customs and Excise officials seized rhino horn and other



Esmond Bradley Martin

Two African rhino horns on a counter in a Taiwanese medicine shop.

trophies from a large lorry at the Kazungula Ferry on the border between Zambia and Botswana, which was bound for South Africa. The driver, a Zimbabwean, claimed ignorance of the contraband. The lorry probably started its journey in Zaire, picking up some ivory in Zaire and all the rhino horn and most of the ivory in Zambia, before heading for South Africa. Within a false compartment at the back of the truck were 94 rhino horns, 382 unworked elephant tusks, 34 worked tusks, a collection of ivory trinkets and some python and leopard skins.

South Africa's role as an exporter of rhino horn was noted in a recent press release dated 3 November 1988 from the US Department of Justice immediately following the arrest of three US residents for conspiring to import illegally rhinoceros horn and other endangered protected wildlife species as well as AK 47 rifles into the United States from South Africa. In addition, three South African nationals were charged for their roles in the conspiracy. One of the South Africans, a sergeant major, in August 1988 smuggled a rhino horn into the Chicago area where he was participating in a sky-diving event as a member of the South African Defence Force Parachute Team. He was paid US\$ 1,800 for this horn by one of the American conspirators. The defendants in this case had agreed to sell five to seven rhino horns, which they had obtained in October 1988 in Angola, to a US Fish and Wildlife Service undercover agent for US\$ 40,000 each. It was also revealed in consensually recorded telephone conversations that a total of 14 rhino horns had been acquired in Angola and that these horns were being transported to Namibia (South West Africa) from Angola via South African military vehicles for subsequent shipment to the United States. The horns were apparently from rhinos killed by South African army troops in Angola. The US Attorney indicated that each of the six defendants has been charged only with conspiracy to commit an offence against the United States. This charge carries a maximum term of five years imprisonment and a US\$ 250,000 fine. Several more charges, however, are expected for other offences including violation of federal wildlife laws as well as firearms and customs statutes. This investigation by the US Fish and Wildlife Service, Bureau of Alcohol, Tobacco and Firearms and the Customs Service has uncovered what the US government believes is a significant international group

trafficking in the black market for rhino horns.

The Johannesburg Sunday Times reported on 25 September 1988 that a very well organized group of foreigners working out of Zambia, Zaire, Angola and other neighbouring countries are moving wildlife products, including rhino horn, as a means of getting money out of Africa. The list of traders included Chinese, Greeks and Lebanese. A loophole exists in the South African Customs Union agreement which States that goods cannot be inspected while in transit from Botswana, Lesotho, Namibia, and Swaziland to South Africa. This, no doubt, significantly aids smugglers by allowing free movement of illicit goods among these countries. Once in South Africa, the horns and tusks are reported to be stored in 'safe houses' and then crated and shipped out of the country by freight companies passing off the contents of the crates as cow horns, wooden curios or stone carvings. The Sunday Times investigators disclosed that some rhino horn was shipped from South Africa to central Europe and then to Tianjin, 130 kilometres south-east of Beijing in the People's Republic of China. In December 1987, Esmond Bradley Martin visited this large industrial city and confirmed that the Darentang Pharmaceutical Factory in Tianjin uses rhino horn to manufacture drugs for the export market.

Much of the rhino horn entering South Africa is smuggled out by Taiwanese to their home country. Political and economic ties between the two countries have strengthened in the past few years. Since 1984, 120 new factories in South Africa have been opened and financed by Taiwanese businessmen and another 60 are under construction. There are over 2,000 Taiwanese residents in the country. Some dishonest individuals among them have the ideal opportunity to purchase rhino horn to sell in Taiwan. Every month, about 200 Chinese businessmen fly from Jan Smuts airport in Johannesburg to Taipei. Some illicitly carry rhino horn and hide with them. The smuggled products are easily brought into Taiwan according to information supplied by the traders. Customs Officers are either unaware that the commerce is illegal or are willing to accept a quick bribe of the equivalent of US\$70 to turn a blind eye to a consignment. It is not only Taiwanese businessmen who are involved in this trade. Certain Taiwanese agriculturalists and government officials resident in South Africa as well as sailors are known to be illicitly transporting rhino horn.

Trade in rhino products between South Africa and Taiwan has existed for years. In 1983, for example, a South African dealer in the Cape Province bought 99 kilos of rhino horn at an auction in Windhoek, Namibia, for US\$ 460 a kilo, which he sold to a businessman in Taipei for US\$750 along with some rhino hide for US\$ 60 a kilo. After mid-1985, however, neither country legally allowed this commerce, and the trade gathered momentum underground as dealers in southern Africa responded to Taiwan's continued demand. Smuggling has reached alarming levels now in South Africa and Taiwan, and something must be done to stop it.

More surveillance, especially at airports in South Africa, to prevent illegal shipments of rhino products needs to be carried out. Also, stringent fines and jail sentences should be imposed on those who contravene laws protecting wildlife from trade. In March 1986 a Chinese trader in Macao was caught importing 89 kilos of rhino horn from South Africa. He was fined US\$ 15,000 and the horn was then returned to the exporter in South Africa who was apprehended and fined a mere 500 rand (the equivalent then of US\$250). Penalties for such offences should obviously be increased in South Africa. In Bophutatswana, for instance, an individual found guilty of illegally killing a rhino may be fined 100,000 rand (US\$ 42,000) and sentenced to ten years' imprisonment.

Unlike some countries in eastern Asia, Taiwan has the infrastructure to control the trade if it really wishes to. The Taiwanese government should quickly set up a system of law enforcement to clamp down on the rampant illegal trade in rhino products. Firstly, Customs Officers need to be briefed on how to identify rhino horn and hide, and they should focus special attention on searching passengers' luggage and packages from South Africa. Secondly, all stocks of rhino horn and hide should be officially registered, and the hundreds of horns individually marked. Owners of rhino horns should



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Southern white rhinos.

be given a specific time limit to sell their stocks, after which time all internal sales of horn and hide should be prohibited. This is in accordance with Resolution Conf. 6.10 passed at the 1987 CITES meeting in Canada, which urged all Party States to implement a complete prohibition of sales, internal and external, of all rhinoceros parts and derivatives. Thirdly, government officials should regularly inspect pharmacies to check that no new supplies are coming in, and after the internal ban comes into effect, they should make sure that no horn is sold at all. Strict fines should be imposed for non-compliance, and if shop owners or traders are convicted of a second offence, their businesses should be officially closed.

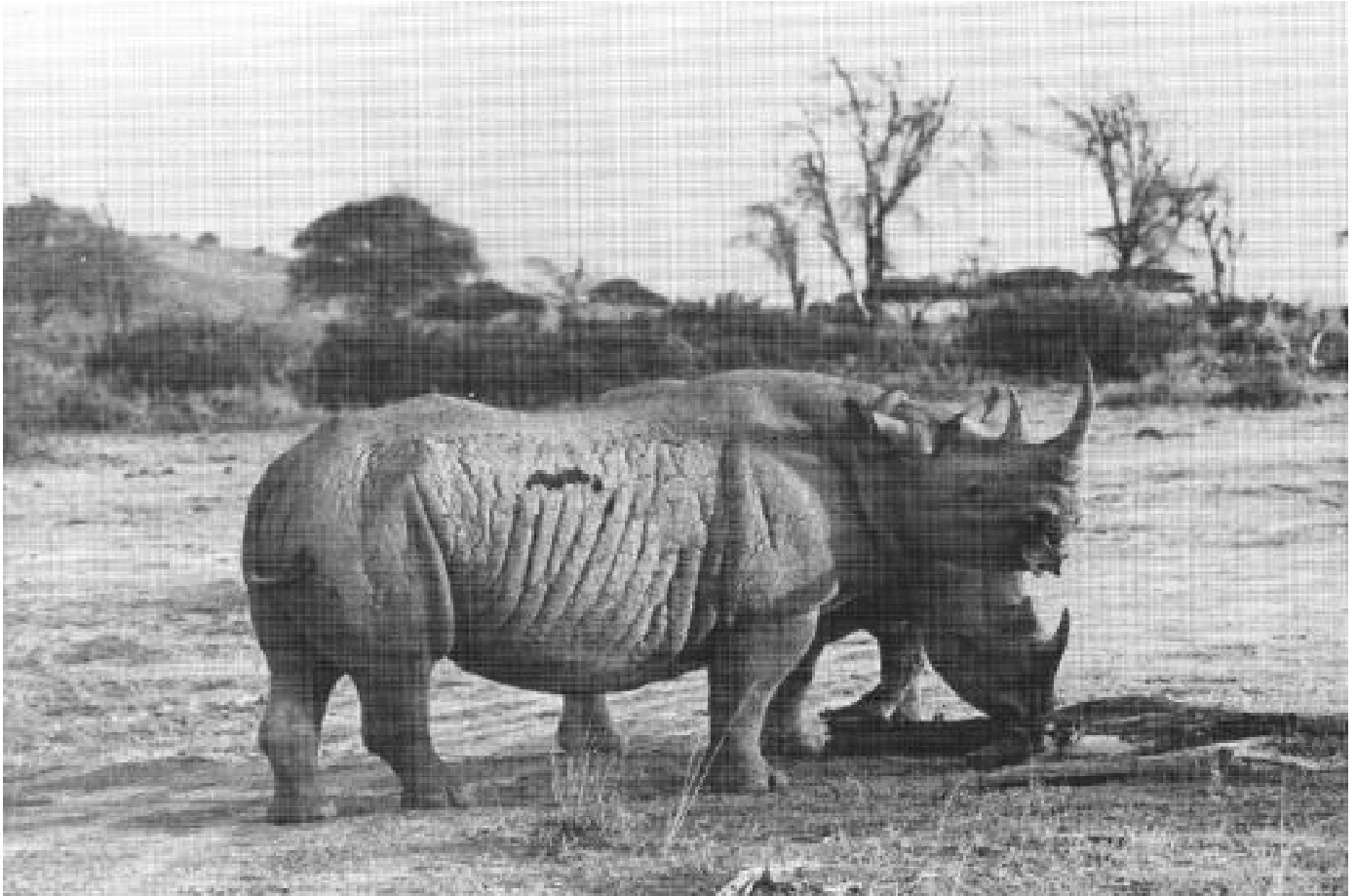


Esmond Bradley Martin

A white rhino horn on display in a medicine shop in Taipei.

The appalling trade in rhino products, which is severely threatening all five species, must not be allowed to continue anywhere. People who are involved in it are too often allowed to go unpunished or are given meaningless fines and unimpressive prison sentences. Governments need to take infringements of their wildlife trade laws seriously, and they will only do so if pressured. The traders are the culprits as they are directly responsible for the continued poaching of rhinos. They deserve harsh punishment.

We would like to thank the following organizations for their financial support: World Wide Fund for Nature (WWF), African Fund for Endangered Wildlife, and Friends of Howletts and Port Lympne.



Black rhinos in Amboseli, Kenya with Mount Kilimanjaro's lower peak in the background.

The Undetected Trade in Rhino Horn

David Western

Summary

Calculations from field data suggest that trade statistics account for a half or less of the rhinos poached in Africa since 1970. Recent trade surveys may have improved the level of detection, but large volumes of poached horn go unaccounted. Trade bans have not discernably slowed the loss of rhinos. The market is far more likely to be throttled by redoubled efforts to protect 3,000 of the remaining 3,800 black rhinos in African strongholds than by trade action.

Introduction

Rhinos in Africa and Asia are gravely endangered or severely threatened. While habitat loss and land pressure have contributed to the decline in all five species of rhinos - the Indian, Sumatran and Javan in Asia, and the black and white in Africa - poaching has posed the biggest threat in recent years. The black rhinos has suffered worst. Since 1970 its numbers throughout Africa have declined from 65,000 to around 3,800 in 1987 (Cumming, 1987). The demand for rhino horn, used for traditional medicines in the Far East and dagger handles in the Near East, has provided the direct stimulus for poaching, following a rapid price rise in the early 1970s reaching wholesale in 1979 \$ 550 for African horn per kilo and \$ 9,000 per kilo for Asian horn. (Martin, 1983).

Trade is virtually the only factor exterminating rhinos now that most are confined to parks and sanctuaries where habitat loss and land conflict are negligible. Where rhinos have been well protected, numbers have increased rapidly, as in the case of southern white rhinos in South Africa (Owen-Smith, 1981), black rhinos in Kenyan sanctuaries (Western, 1987) and Indian Rhinos in Nepal (Martin, 1982). If the trade in horn can be arrested, numbers would

undoubtedly rebound quickly. Space within existing parks and reserves in Africa could, in the absence of poaching, support in excess of 50,000 black rhinos (Western, 1987).

Since 1980 sustained efforts have been made to identify the volume and trading networks involved in the rhino horn trade. Legal trade has been successfully closed under CITES regulations and through specific import bans by non-signatory nations, but that does not mean to say that trade has stopped. Field evidence shows the black rhino population has continued to decline steadily since the late 1970s (Cumming, 1987). The failure of trade bans raises the question of whether we have successfully identified the volume of rhino horn traded annually and all the major markets.

An obvious way to look at the efficiency of trade surveys is to compare the volume of rhino horn entering the market, calculated from field data, and the amount picked up in market surveys. At the Cincinnati Rhino Workshop in 1986, I pointed out that preliminary calculations showed about half the annual output of horn was being missed, suggesting a large unidentified market. The following article lays out the assumptions and calculations used in assessing the volume of rhino horn entering world markets since 1970, as called for at the African Elephant and Rhino Specialist Group's 1987 Nyeri meeting. The analysis ignores the relatively modest amount of Asian horn entering the market

The number of rhinos dying

The number of rhinos that have died each year since 1970 can be calculated from two sets of figures. The first and simplest set is derived by deducting the present from starting population size. In the case of the black rhinos, the population has fallen from

65,000 to 3,800, according to the various estimates given by AERSG (Cumming, 1987). Over the same period, the northern white rhino declined from around 2,000 to around 30 (Western, 1987). The overall losses amount to 61,200 black rhinos and some 1,970 northern white rhinos. The southern white rhino has increased over this period (Western and Vigne, 1984), so there was no net loss. The closely protected herds accounting for the increase would have contributed a negligible volume of horn to the world market.

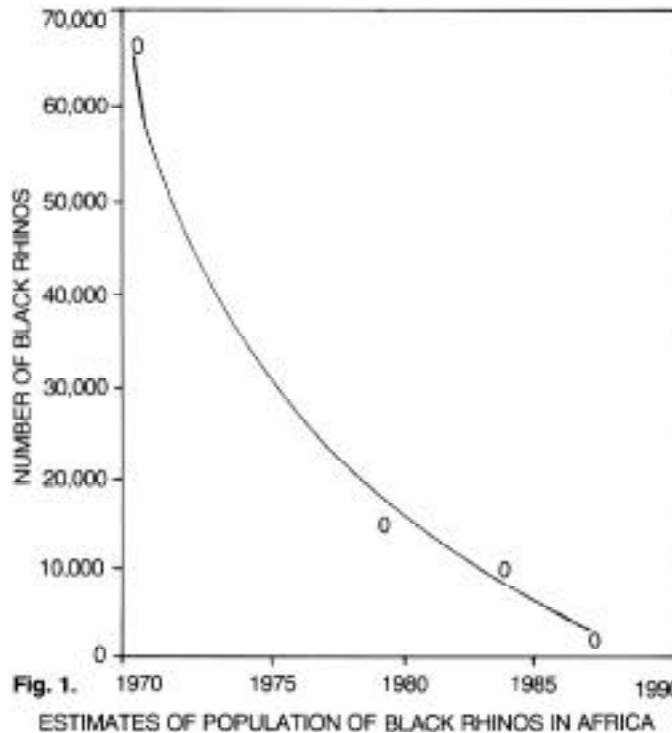
The second set of figures, the additional numbers that were born and subsequently died during that interval (turnover), can be calculated by multiplying the population size for each year by the birth rate, summed for all intervening years. The yearly population size can be inferred from the graph of population decline (Fig. 1). The annual recruitment rate, which varies from 7 per cent to 10.9 per cent (Goddard, 1970) can be calculated from field data. Most figures tend toward the higher recruitment rates. I have taken 7 per cent and 10 per cent to represent a high and low figure. The question is, does heavy poaching lower recruitment rate? The evidence is to the contrary. During a period of heavy poaching in Amboseli, the recruitment rate (Western and Sindiyo, 1972) was similar to that in unpoached populations at Olduvai and Ngorongoro (Goddard, 1970).

The additional deaths due to animals that were born and subsequently died during each year can now be calculated by using the inter-polated population size (Fig. 1), multiplied by the high and low recruitment rates. A similar exercise can be repeated for the northern white rhinos, for which I have assumed a similar range of low and high recruitment rates, consistent with known figures (Owen-Smith, 1981).

The additional deaths due to turnover during the period 1970 to 1987 amount to 33,600 black rhinos, assuming a recruitment rate of 7 per cent, and 48,000, assuming a recruitment rate of 10 per cent. Similar calculations for the northern white rhino give additional deaths of 1,275 and 1,820 at a 7 per cent and 10 per cent recruitment rate respectively. The total number of deaths from direct losses and turnover was 94,800 and 109,200 black rhinos on the low and high recruitment assumptions, and 3,245 and 3,790 northern white rhinos on the same assumption.

The losses attributable to poaching

How many of the animals dying are poached? If poaching accounts for the precipitous drop in rhino population since 1970,



amounting to a 94 per cent loss of black rhinos and 99 per cent loss of northern white rhino, it is reasonable to assume that most horns entered the trade. This argument would apply both to the absolute loss in numbers and turnover. The available field data supports this contention. In Amboseli, Kenya, Western (1972) reported that, minimally, 94 per cent of all rhino deaths in a population where all individuals were known resulted from poaching. Since the rates of loss in Amboseli are consistent with the continental pattern, we can feel reasonably confident of applying similar poaching rates to the total population. I have, therefore, assumed that 90 per cent of all rhino losses are due to poaching for horns.

Losses due to other causes

A certain portion of females killed will have calves too young to

Black rhinos side by side in Ngorongoro Crater, Tanzania.



survive alone. A large portion of orphaned calves are likely to succumb to predators, starvation or other causes. They will not provide much horn to the world market. I have ignored their contribution altogether. Calves two years or younger are especially vulnerable once orphaned. Others will die from natural causes such as disease and predation (Goddard, 1970) and only contribute modestly to the horn trade. Data from Amboseli (Western and Sindiyo, 1972; Western, 1982) show that 8.8 per cent of the mortality was due to orphaned calves and juvenile mortality during a time when poaching accounted for most adult deaths. The figure may be biased on the low side, due to the difficulty of recording mortality in very young calves (Goddard, 1970). I have therefore assumed that 20 per cent of the annual mortality involves juveniles which make no contribution to the horn trade. At two years of age, calves have horns weighing in the order of a kilogram, an attractive target for poachers. I have lumped animals two years and older with adults.

The number and volume of horn entering the trade

The number of rhinos killed for the trade can now be calculated by deducting the non-poached sources of mortality from the total number of deaths calculated for the period 1970 to 1987. This amounts to 30 per cent of all deaths - 20 per cent due to infant mortality, 10 per cent due to adult deaths from causes other than poaching. The number of black rhinos poached amounts to 66,360 and 76,440 on the high and low projection, and the number of northern white rhinos to 2,272 and 2,653 on the high and low projection.

The volume of rhino horn entering the market can be calculated by multiplying the total numbers killed by poachers, multiplied by the mean weight of horns for black and white rhinos. The mean weight of black rhino horn entering the trade is 2.88 kg and the mean weight of white rhino horn entering the trade is 3.68 kg (Bradley Martin, pers. comm.). The overall volume of horn entering the trade between 1970 and 1987 therefore amounts to 199,478 kg and 229,910 kg for black and northern white rhinos using the high and low recruitment figure respectively.

The missing rhino horn trade

We can now look at how much of the horn entering the market is picked up by trade surveys. Esmond Bradley Martin has calculated from numerous surveys (Martin, 1979; 1983; pers. comm.) that the volume of horn traded in Asia amounted to 8,000 kg annually in the 1970s and 3,000 kg annually during the 1980s. These figures are necessarily coarse, but do give some idea of the relative volume detected. Overall, the volume of horn recorded in the Asian market amounts to 101,000 kg or 51 per cent and 45 per cent of the calculated volume of horn poached in Africa between 1970 and 1980, based on high and low assumptions of recruitment rate. That is, roughly half the horn being poached is reported in the Asian trade figures.

What happens to the other half of the horn trade? There are several possibilities.

- Rhino horn production could be overestimated. Though possible, this is unlikely. Counts of large mammals are generally biased on the low side, especially in the cases of the black rhino, a solitary species which tends to lie under cover during the day (Western, 1982). I suspect all the continental estimates are very low. For example, the 1970 figure of 65,000 was based on conservative assumptions at a time when the combined total of Luangwa Valley and Tsavo Park black rhinos alone was 18,000 to 21,000. In all likelihood the Africa-wide population was far greater than 65,000. Similarly, Zimbabwe rhinos, based on uncorrected aerial counts, make nearly half of the 1987 Africa-wide estimate. Yet aerial counts are invariably low for rhinos, often by several-fold (Goddard, 1970).
- Juvenile mortality could be underestimated. This again is unlikely, since the figures have been based on actual life-tables and field data on juvenile losses under heavy poaching.

- The poaching and horn recovery rate by poachers could be overestimated. This too is unlikely. Data from Amboseli give the minimum observed rates of poaching and horn removal. The recovery rates of horn by wildlife officials are of the order of a few per cent, indicating that the poachers, or corrupt wildlife employees, remove virtually all horns for trade. The 95 per cent decline in rhino since 1970 is testimony to the efficiency of poachers. Natural mortality, except for juveniles, has been insignificant over this period (Western and Sindiyo, 1972, Western, 1982).
- A large portion of the horn entering the market goes undetected. This is, in my estimation, the most plausible explanation. Since no markets have been detected in Africa, where the price would in any event be low compared to Asia, the missing trade must either enter known markets in larger quantities than detected, or is passing through unidentified markets. Both seem plausible. Taiwan was evidently a major importer in recent years, though the size of the market was not recognized until 1988 (see Martin this volume). Consignments are known to have been shipped to North Korea in diplomatic baggage, yet no import figures exist. The volume of rhino horns used for dagger handles has only been quantified for North Yemen, though horn is known to be used in other Arab states, such as Oman.

Implications

Trade studies have been extremely important in locating and defining the relative importance of rhino horn markets. However, comparisons with field data show that only a half or less of the horn entering the market is detected. There is some evidence of improvement, however, no doubt as the markets became better defined and the methods more rigorous. The same exercise done above, repeated for 1980 onwards, suggests that market surveys picked up between 59 per cent and 67 per cent based on low and high recruitment rates during this period. Given the bias of underestimating rhino numbers, I consider these to be optimistic figures.

The unabated decline in African rhinos during the 1980s (Fig. 1) shows that poaching has defied all efforts to ban the horn trade. There are obviously too many loopholes to slow a population crash through trade bans. The prospects are likely to worsen as the task of detecting fewer and fewer horns entering the market becomes more formidable and price incentives rise. Markets are likely to wither simply because supplies will dwindle to a trickle in the next three years or so. The market will dry up even faster if increasingly successful efforts to protect rhinos in the wild and in safe sanctuaries are strengthened. Redoubled efforts to consolidate and protect rhinos in safe locations could conceivably protect 3,000 of the remaining 3,800 black rhinos and quash the horn trade more effectively than trade bans.

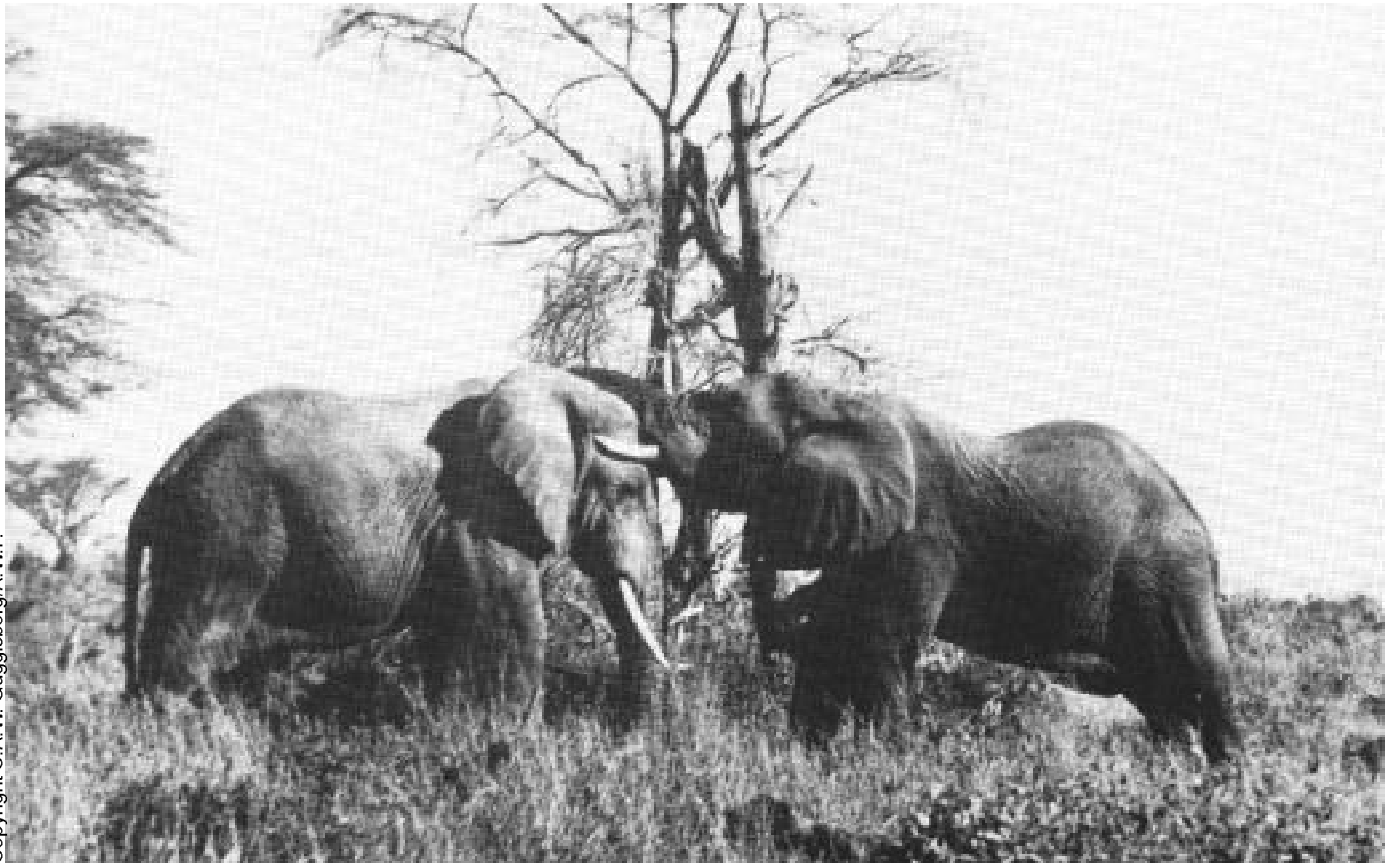
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Some Preliminary Results of the Relationship Between Soils and Tree Response to Elephant Damage

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Elephants fighting in Amboseli, Kenya.

Introduction

Extensive studies of how elephants affect woody vegetation have produced the standard models of elephant-woodland interactions (Laws, Parker & Johnstone, 1975; Caughley, 1976 and Barnes, 1983). These models assume that elephants reduce tree density and therefore reduce their own food availability. The interaction of elephants and woodlands is therefore thought to be cyclic (Caughley, 1976) or to reach equilibrium at low densities of elephants and trees (Law *et al.*, 1975).

It has recently been suggested that under certain conditions elephants cause coppice regrowth of damaged trees, thus increasing browse density within preferred height ranges (Bell, 1981; Jachmann & Bell, 1984 and Bell, 1985). Under such conditions, the outcome of the elephant-woodland interaction may be different from that of the standard models, reaching stable equilibria at relatively high densities of elephants and trees. Results presented here indicate that elephant-woodland interactions may be more site-specific than previously thought.

Vwaza Marsh Game Reserve (VMGR), Malawi, exhibits a variety of conditions ranging from sandy well-drained sites where soil-water dynamics generally favour plant biomass production to clayey poorly-drained sites where soil-water dynamics do not favour plant biomass production (cf. Bell, 1986). This paper examines preliminary data on the relationship between the range of these soil-water conditions in VMGR and how trees respond to elephant damage.

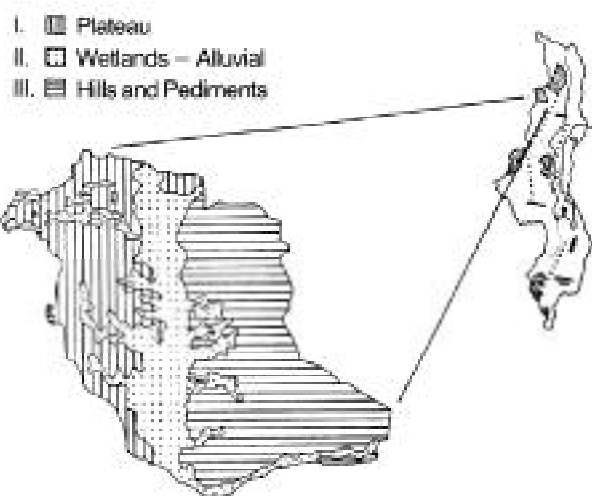


Fig. 1 The geographical distribution of landscape categories in Vwaza Marsh Game Reserve, Malawi.

The area

VMGR occupies 986 sq km of diverse terrain in northern Malawi. It lies on the Central African Plateau on the watershed between Lake Malawi and the eastern lip of the Luangwa rift at

Table 1: Relationship between landscape categories and woodland coppice

Landscape category	Total stems	Stems used	Coppice	%
Plateau		18328	9	32.1
Hills & Pediments	1534	421	14	17.6
Wetlands-Alluvial	487	223	29	13.0

Table 2: Relationship between landscape categories and woodland mortality and woodland coppice

Landscape category	Total stems	Stems used	Coppice	%
Plateau	410	35	1	2.8
Hills & Pediments	4367	525	66	12.6
Wetlands-Alluvial	1742	236	38	16.1

Fig. 2: Plot of log soil-water infiltration rate against 5s% coppice of total elephant used stems in VMGR, Malawi.

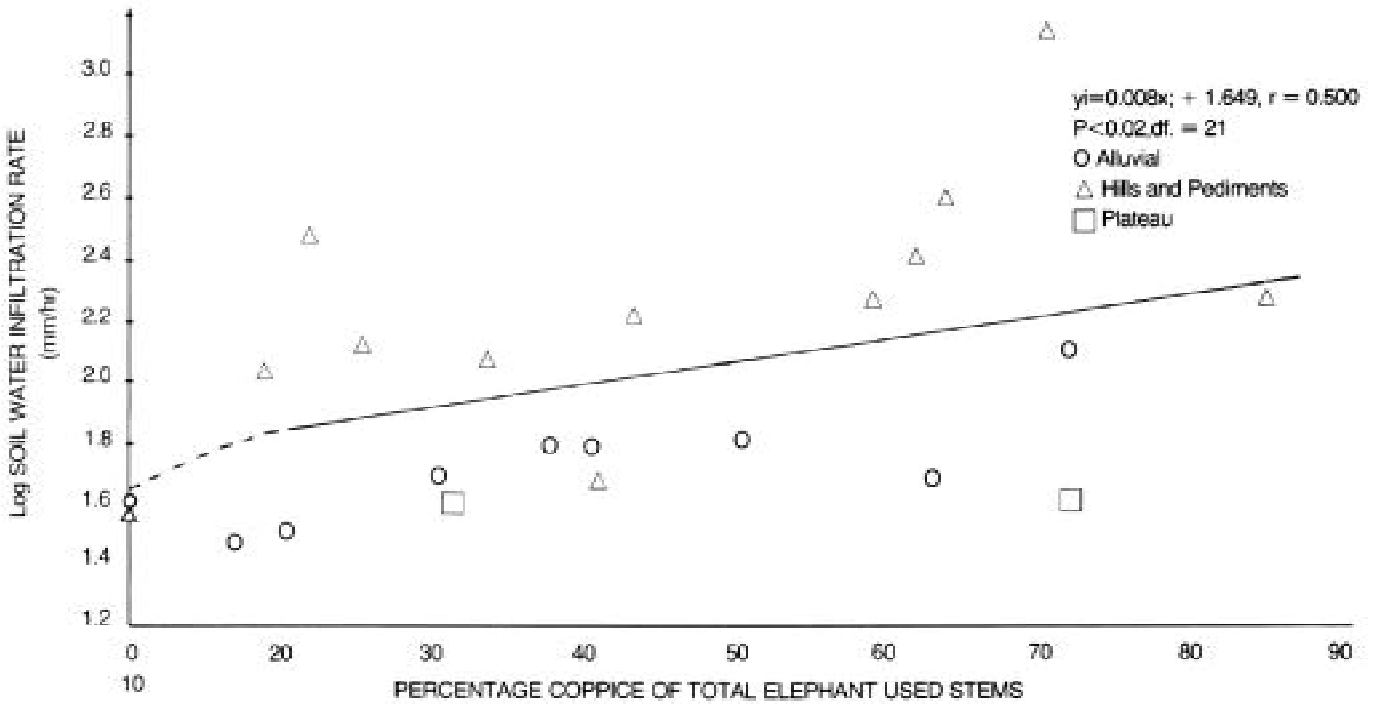
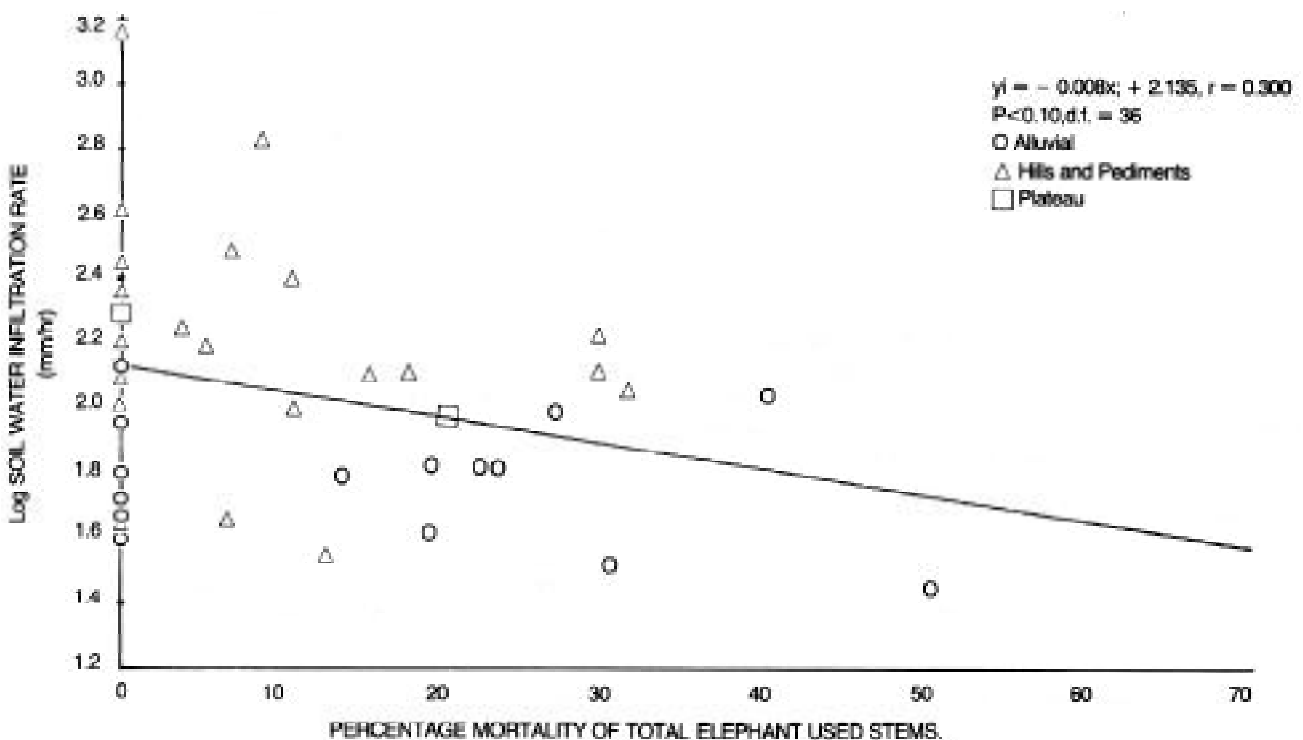


Fig. 3: Plot of log soil-water infiltration rate against %mortality of total elephant used stems in VMGR, Malawi.



about 1000 m. Annual rainfall averages 900 mm across the reserve. The reserve contains the most extensive wetlands on the plateau area of Malawi. The western half of the reserve consists of plateau *Brachystegia* woodland on well-drained sands, clay flats dominated by *Colophospermum mopane* and alluvial marshes.

The eastern half of VMGR consists of wooded foothills of the Nyika massif reaching a maximum height of 1660 m and dominated by *Brachystegia* woodlands on the slopes and broadleaved *Combretum* woodland and thicket in the valleys. The reserve has been classified into three landscape categories based on geology, soils and drainage pattern (Fig. 1). Correlations with vegetation were evident, though distinctive boundaries were difficult to delineate and intergradation common between categories. Specific landscape descriptions can be found in McShane (1985) and McShane & McShane-Caluzi (1987).

Methods

The formulation of a method to investigate tree response to elephant damage is described by Bell (1985) and Bell & McShane (1986). The probability that a tree will coppice or die due to breakage by elephants was related to soil conditions.

Data were collected on a series of 20x50 m quadrats located along transects running east/west through VMGR, cutting across the landscape categories (McShane, 1985). All woody stems over 1 m tall were tagged with metal tags and recorded as to species, height class, circumference class and degree of elephant damage. For each quadrat, two belt transects 4 m wide, running the length of the quadrat, were used to measure tree coppice. Measurements of soil-water dynamics were recorded using soil-water infiltration rings located at each corner of the quadrat.

Damage was enumerated from trees estimated to have been damaged within the last five years by comparing decay rates from trees with known breakage dates in an effort to reduce bias introduced by the disappearance of dead trees over longer time periods. A total of 6,519 woody stems were examined in the tree mortality set and 3,204 woody stems in the tree coppice set.

Results

The hypothesis tested in this study suggests that in some areas, particularly those where soil-water dynamics generally favour plant biomass production (sandy well-drained sites), the characteristic response of the vegetation is coppice, improving food availability to elephant. In areas where soil-water dynamics do not favour plant biomass production (clayey poorly-drained sites), the characteristic response is tree mortality, reducing food availability to elephant.

In Tables 1 and 2 broad trends between position on the catena and the amount of coppice and mortality are evident. The results indicate that woodland coppice is more likely to be encountered on the mid and upper catena levels (plateau and hills and pediments) than on the lower catena levels (wetlands-alluvial). The inverse result is recorded with regards to tree mortality.

Fig. 2 presents the results of a regression between the per cent coppice of all elephant used stems and the log of the soil-water infiltration rate. This shows a correlation between coppice and the more freely drained soils $r=0.500$, $P<0.02$, $d.f.=21$). Fig. 3 presents the results of a regression between the per cent mortality of all elephant used stems and the log of the soil-water infiltration rate. The data indicate a correlation between mortality and the more poorly drained soils ($r=-0.300$, $P<0.10$, $d.f.=36$).

Discussion

Whereas the standard models hypothesize that the effect of elephant on woodland is to reduce tree density and therefore to reduce food availability to elephants, this study indicates that woodland response due to elephant damage may differ over a

range of soil conditions. On sandy well-drained sites, trees respond to elephant damage by coppice regrowth, increasing browse density, which may result in an equilibrium of elephants and trees at relatively high densities of both. On clayey poorly-drained sites trees respond to elephant damage by dying, reducing tree density; results more in line with the standard models. Indications are that elephant-woodland interactions may be more site specific than indicated in the standard models and that the coppice response may be more wide-spread over Africa's range of soil conditions.

Coppice is a common response in the savannah woodlands of W National Park, Niger over a range of soil conditions (cf. McShane, 1987). Preliminary analysis of data collected in this park indicate this may be due to relatively uniform soil-water dynamics throughout the area, plant communities dominated by Combretaceae and plant growth patterns with a large number of stems from 2—20 cm in diameter resulting in a high resilience to elephant damage and relatively low probability of death. Christenson (1976) [quoted in Spinage (1985)] reported a very low tree mortality in Po National Park, Burkina Faso, a park occupying the same type of savannah as W National Park.

This paper has presented only one component of a considerably complex system. A full range of both biotic variables (i.e. tree species, tree size and shape, forage quality and secondary chemicals, plant competition, browse regeneration, tree recruitment, tree coppice, tree mortality, browsing competition with other animals and human influences) and abiotic variables (i.e. climate, geology, topography, soils and fire) must be considered to explain the complex dynamics of elephant-woodland interactions in the diverse habitats in Africa. As these components are examined and different responses under different conditions are described, management goals and the methods of reaching them are likely to differ from site to site.

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AERSG West and Central African region holds inaugural meeting in Gabon

The inaugural meeting of this regional group took place in November last year and was attended by government delegates from Gabon, Congo, Central African Republic, Zaire, Cameroon, Ghana, Liberia, Guinea and Mali.

Top of the agenda was the AERSG Action Plan on rhino and elephant. The Action Plan was rather unpopular with a majority of delegates because most of those who represented governments felt that they had not been adequately consulted when the document was prepared. Concern was also expressed that the Central and West African region was neglected and not adequately catered for in the document.

Despite this, the meeting's discussions were frank. The major areas in the document and in the region which need urgent attention were identified for further action. Among other recommendations, the meeting agreed on the need for a regional database, and outlined holding action projects within country studies on the ivory trade. It was also reported that there are possibly 100 rhinos in Cameroon. This new information calls for a re-evaluation of this country's rating in identifying and funding future rhino projects.

C.G. Gakahu

Sanctuaries offer a future for black rhinos in Kenya

The opening of land for human settlement at the start of this century, together with the current levels of poaching - which were triggered by a high demand for rhino horn - have reduced black rhino numbers in Kenya today to about 500—600. The situation calls for urgent measures to conserve and actively manage these few remaining rhinos, which are faced with extinction. It is no wonder, then, that conserving the black rhino, a species with a 40 million year lineage, remains a critical problem facing wildlife conservationists in Africa. No wonder, too, that the black rhino has become a symbol of the world conservation movement. When a species like the rhino is faced with extinction, there is normally an outcry that everything possible must be done to save it. In an atmosphere of panic and uncertainty, many strategies and techniques are proposed. The main issues centre around the extent to which man can manipulate the few remaining animals in the hope of saving the species. This is because conservationists are caught unawares by the threat of extinction and the options have to be selected on the basis of theory rather than practical experience. Consequently, in most cases, there is an element of risk.

The conservation and management options which have been put forward for the black rhino include: enhancing the effectiveness of anti-poaching forces, de-horning, controlling and ending the trade in rhino horn, captive propagation and the establishment of small sanctuaries. The few remaining rhino herds and individuals are fragmented over their range, which has reduced their opportunities for breeding. In such a situation, the animals are faced with potential problems which can accelerate their extinction. These include environmental changes, disease, demographic fluctuations, such as biased sex ratios, and genetic problems, such as inbreeding depression. The principal aim of

sanctuaries is to control these potential problems by translocating and consolidating the fragmented rhinos into confined areas. Sanctuaries also enhance opportunities for breeding and ensure adequate security.

Translocation, which involves capturing the rhinos either by immobilization or trapping, is not only expensive but also requires personnel with the correct technical skills to ensure that the rhinos do not die. These problems, together with ecological the suitability of the proposed sanctuary, are among the challenges that must be faced before translocation.

In the early 1960s, the Kenya Game Capture Unit translocated some black rhinos from places where poaching was prevalent to safer areas. While some of these rhinos died due to inadequate preparation before capture and the poor technical skills of those doing the capturing, others survived and their populations have continued to increase. Seventeen rhinos were translocated to Nairobi National Park. Today the population stands at 51 having increased at 5.6 per cent per annum. Another 20 were translocated to Solio Ranch, which now has over 80 rhinos, an increase of 9.3 per cent per annum.

Today rhinos in sanctuaries account for about 50% of Kenya's population. These results are an encouraging sign that sanctuaries hold a future for rhinos. The rapid rates of increase show that sanctuaries can provide a source of rhinos for restocking the species in its former range. In the light of this, the Kenya Rhino Rescue Project has officially adopted sanctuaries as the central pillar of a special programme to conserve and manage rhinos. Sanctuaries, some entirely or partially fenced, have been established in private ranches and in government wildlife protection areas. The sanctuaries include:

Private ranches: Solio - 81 rhinos
Lewa Downs - 12 rhinos
Ol Jogi - 9 rhinos
Laikipia - 45 rhinos

Government protected areas:

Nairobi National Park – 51 rhinos
Nakuru National Park – 20 rhinos
Ngulia in Tsavo West National Park – 8 rhinos
Aberdare National Park – 39 rhinos

Improved technical capabilities together with intensive management and surveillance in these sanctuaries, promise better results than those witnessed in the past in the unplanned and unmanaged translocations to Nairobi National Park, Solio and other areas.

Prior surveys to establish the habitat condition and carrying capacity of potential sanctuaries, optimal choice of pioneer animals to avoid inbreeding and loss of adaptive traits, together with management monitoring and surveillance are, however, basic requirements which must be fulfilled to enhance the performance of sanctuaries.

C.G. Gakahu

Diplomat found with ivory

A container was intercepted between the house of the Indonesian Ambassador and the port of Dares Salaam following surveillance by the Tanzania Wildlife Conservation Society.

The container, which was opened on 1 January despite the protestations of the ambassador, contained (among other items): 184 raw tusks, weighing approximately three tons; 24 whole, partly-worked tusks; 82 carved ivory figures; 13 unopened packages of ivory necklaces; 16 ostrich eggs; two gazelle shoulder mounts; various pieces of old ivory; and five zebra skin handbags.

All these items were confiscated. On Friday 13 January, the same ambassador tried to fly out of Dar es Salaam. The police inspected his luggage at the airport and found more ivory.



Black rhino cow and calf

This incident is yet another challenge to world conservation movements, all the more so because reliable sources indicate that Tanzania's Wildlife Division had no knowledge of and played no part in the operation.

AERSG Secretariat

Nairobi National Park: a new importance and value

A census carried out in January this year puts the number of rhinos in Nairobi National Park at a surprising 51. This makes it the single largest population of rhinos in any government sanctuary. Whereas before it was only a model sanctuary, it is now the most important government sanctuary in the country. What is most encouraging about its success is that in the absence of management the numbers have increased steadily from the 17 successful reintroductions in the early 1960s to the 51 today.

One of the organizations that has been interested in this park as a sanctuary is Wildlife Conservation International. In 1988, WCI started to replace the old derelict fence to the north of the park with an electric fence, which is now complete. It has also provided a four-wheel drive vehicle, which will be fitted with a radio and other equipment necessary for surveillance and monitoring of the rhinos on a daily basis.

The need for increased protection and management becomes paramount with such high rhino numbers. The vehicle will be used for ecological monitoring to help identify individual rhinos, as well as for studying their behavioural ecology. Coupled with other vegetation and utilization studies in the park, a badly needed management policy will also be put together.

Helen Gichohi

UK for ban on trade in ivory

The British government has called for a total international ban on trade in new ivory, because of the threat of impending extinction facing the world's elephants.

Environment Minister, Lord Caithness, said he would call for concerted European support for the total ban at the next meeting of European Community environment Ministers in Luxembourg on June 8. He was speaking on his return from an official visit to Kenya, where he saw the situation for himself and discussed with the Government Minister, the problem of poaching and the decimation. He said: "The British government shares the concern that has been expressed about the illegal poaching of African elephants. We and those in the United Nations Environment Programme (Unep) who have carried out surveys throughout Africa, now believe there is a clear case for banning all trade in new elephant tusks at the earliest possible opportunity."

Effective action could only be taken internationally. An opportunity to secure this would be at the Convention on International Trade in Endangered Species (Cites) conference in Lausanne, Switzerland, in October.

There are now about 100 parties to Cites, whose aim is to conserve listed species by controlling or prohibiting trade in them. The United Kingdom applies these controls strictly.

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