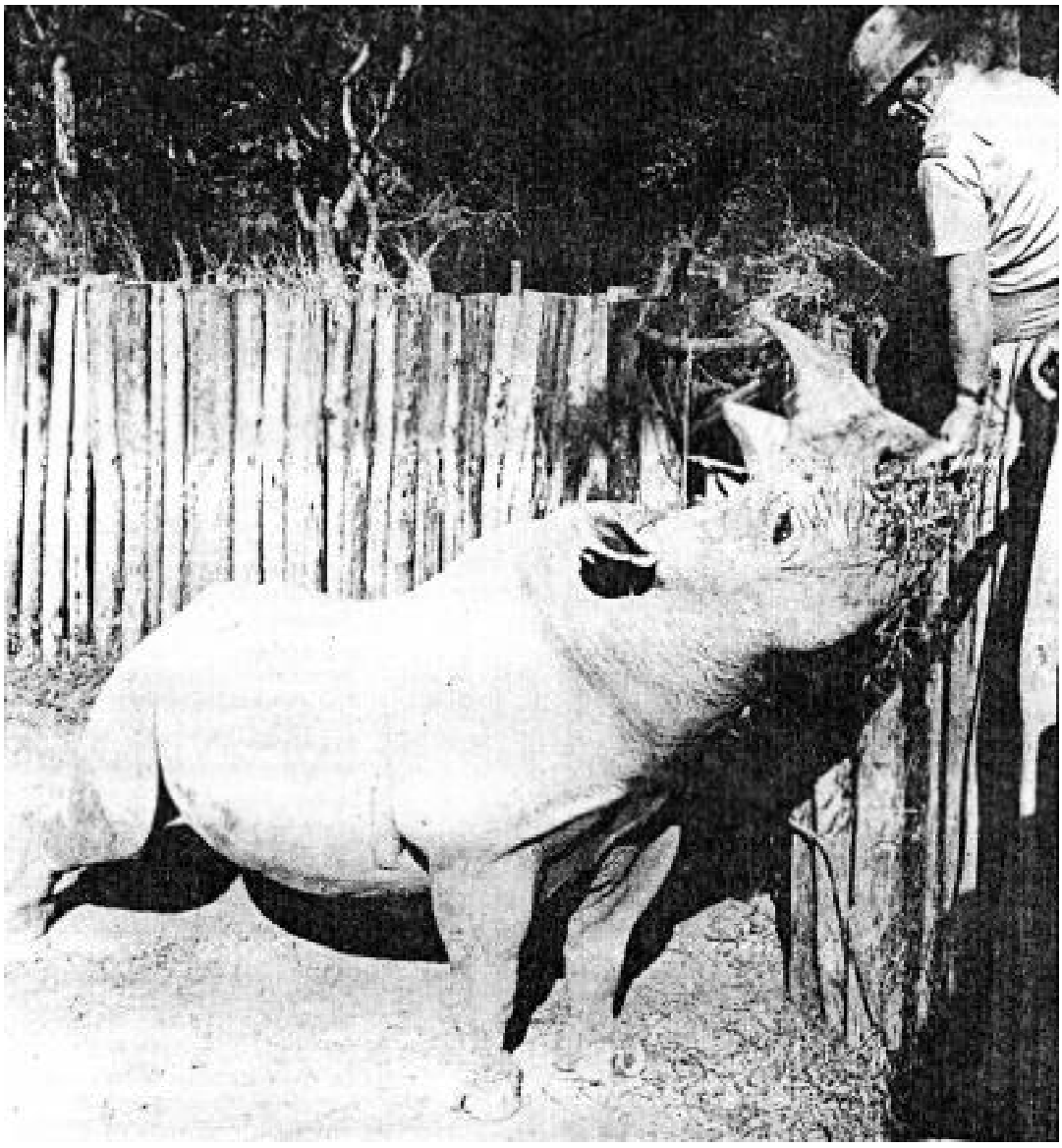
PACHYDERM

NEWSLETTER OF THE AFRICAN ELEPHANT AND RHINO SPECIALIST GROUP



NUMBER 5 JULY 1985

INTERNATIONAL UNION FOR CONSERVATION
OF NATURE AND NATURAL RESOURCES
SPECIES SURVIVAL COMMISSION

WICI
Wildlife Conservation
International

PRODUCED WITH THE ASSISTANCE OF:
WICI, WILDLIFE CONSERVATION INTERNATIONAL THE CONSERVATION
DIVISION OF THE NEW YORK ZOOLOGICAL SOCIETY
SAVE, FOUNDATION TO SAVE AFRICAN ENDANGERED WILDLIFE
WWF, WORLD WILDLIFE FUND

SAVE

WWF

Membership List

(Note: since the group is not yet fully convened this list is incomplete

CHAIRMAN

Dr. D.H.M. Cumming
P.O. Box 8437 Causeway
HARARE
Zimbabwe

VICE CHAIRMAN

Dr. Esmond Bradley Martin
P.O. Box 15510
NAIROBI
Kenya

Dr. David Western
Wildlife Conservation International
P.O. Box 62844
NAIROBI
Kenya

MEMBERS

Dr. J.L Anderson
Deputy Director, Research
National Parks Board
P.Bag X2078
MAFIKENG 8670
Bophuthatswana

Dr. R.F.W. Barnes
c/o NYZS
Instut de Recherche en Ecologie Tropicale,
B.P. 180,
MAKOKOU,
Gabon.

Dr. R.H.V. Bell
Senior Research Officer
Department of National Parks & Wildlife
Kasungu National Park
P.O. Box 43
KASUNGU
Malawi

Dr. Markus Borner
Frankfurt Zoological Society
P.O. Box 154
MWANZA
Tanzania

Dr. P.M. Brooks
Chief Research Officer
Natal Parks, Game & Fish Preservation Board
P.O. Box 662
PIFTERMARITZBURG 3200
Sooth Africa
(Regional Representative for South Africa)

Dr. G.F.T. Child
Director
Department of National Parks & Wildlife Management
P.O. Box 8365 Causeway
HARARE
Zimbabwe

Dr. Iain Douglas-Hamilton
P.O. Box 54t667
NAIROBI
Kenya

Jean-Marc Froment
Project CAF/78/006
B.P. 872
BANGUI
Central African Republic

Dr. A. Hall-Martin
Senior Research Officer
Kruger National Park
P.Bag X402
SKUKUZA 1350
South Africa

P. Hitchins
P.O. Box 8
MFOLOZI Natal
South Africa

Muembo Kabemba
Directeur Scientifique et Technique
Institut Zairois pour la Conservation de le Nature
Boite Postal 868 Kin 1
KINSHASA
Zaire

Dr. A.A. Karani
General Manager
National Range Agency
P.O. Box 1759
MOGADISHU
Somalia

Gilson Kaweche
Chief Wildlife Research Officer
Box 350173
CHILANGA
Zambia

Prof. F.I.B. Kayanja
Department of Veterinary Anatomy
Makerere University
Box 7062
KAMPALA
Uganda

Dr. Dale Lewis
P.O. Box 18
MFUWE
Zambia

Hanne Lindemann
Gronholtvej 358
3480 FREDENSBORG
Denmark

F. Lwezaula
Director, Wildlife Division
Ministry of Natural Resources & Tourism
P.O. Box 1994
DAR-ES.SALAAM
Tanzania

R.B. Martin
Department of National Parks & Wildlife Management
P.O. Box 8365 Causeway
HARARE
Zimbabwe
(Regional Representative for South-Central Africa)

Cynthia Moss
Amboseli Elephant Research Project
P.O. Box 48177
NAIROBI
Kenya

Dr. J. Ngog-Nje
Director
Ecole pour la Formation des Specialistes de la Faune
Boite Postal 271
GAROUA
Cameron

Dr. Norman Owen-Smith
Centre for Resource Ecology
University of the Witwatersrand
JOHANNESBURG 2001
South Africa

I.C.S. Parker
P.O. Box 30678
NAIROBI
Kenya

Dr. C.A. Spinage
The Bungalow
Steventon Road, East Hanney
WANTAGE OX12 OHS
United Kingdom

R.D. Taylor
Matusadona National Park
P. Bag 2003
KA RI BA
Zimbabwe

J.L Tello
Box 1319
MAPUTO
Mocambique

Dr. Bihini Won wa Musiti
Chef de Service Chasse
Institut Zairois pour la Conservation de la Nature
Boite Postal 868 Kin 1
KINSHASA
Zaire

POACHING: ZIMBABWEAN RHINO

A number of rhino have been translocated from the Zambezi Valley to less vulnerable areas. However, this still leaves a large population at risk from international poaching gangs.

Photo by Dick Pitman, copy right Dick Pitman 1965

Chairman's Report

The problems surrounding the conservation of elephant and rhinos in Africa are daunting and will no doubt remain so. The major underlying causes of the problem are human population growth and requirements for land. While these are not our direct concern they are overriding realities and impose severe constraints on the opportunities for conservation. We have to work within the limits of those constraints and to do so with any measure of success requires firstly that we have accurate information and a good understanding of the problems which beset rhino and elephants. Secondly, whatever action we advocate or support must, if it is to endure, be politically acceptable and enjoy support in the areas where rhinos and elephants live. This requires that we have within the Group a diversity of talents and expertise and particularly those of scientists, conservationists, and administrators. In convening the Group for the present triennium I have borne these needs in mind. It is one matter to monitor, study, define and advise on effective conservation measures; it is quite another to successfully implement conservation programmes. As David Western pointed out in his last report (Pachyderm No.4), AERSG cannot tackle both parts of this equation. We need to focus on what we can do best and it seems to me that that is to provide needed scientific and technical information, assist in defining problems and priorities and advise on how they might best be tackled. Without a sound basis of information and informed analysis conservation action is very likely to founder or be wasted on the wrong things. This has been a recurrent problem in Africa and one which is in no small measure due to an enthusiasm for conservation action whether or not sufficient data exist or the underlying causes of the problem are understood. Like my predecessor I see our major function as that of providing good information on the status and trends of elephant and rhino populations in Africa, and stimulating the research and analyses necessary to generate new ideas arid new approaches to the problems we face. If we can achieve this then not only will we provide a very necessary service to Government and NGO conservation effort but we will be using our expertise in the most effective manner for the conservation of elephant and rhino. Which, after all, is the major function of this group.

The change in Chairman of the Group and the change in the location of the Group headquarters from Nairobi to Harare has inevitably interrupted progress in the Group's activities, The AERSG office is now partially established in Harare. The Department of National Parks & Wildlife Management has provided office space and associated facilities. The Foundation to Save African Endangered Wildlife, SAVE, has generously provided for a secretary, some office expenses and equipped the office with microcomputers, printers and an electronic typewriter which can also be linked to the microcomputer. Wildlife Conservation International, WICI, who bore the major costs of the Group during the previous triennium is meeting the costs of publication and distribution of Pachyderm. World Wildlife Fund has undertaken to fund the Scientific/Executive Officer to the Group and meet some travel costs. Funds for travel to meetings will be provided for by UNEP through IUCN. Needless to say it has taken some time for these aspects to fall into place. The secretary was appointed at the beginning of June, the scientific officer has still to be appointed and the Group, particularly for the West African region, has still to be fully convened.

Since the Botswana meeting the Chairman and the two Vice Chairmen (Esmond Martin and David Western) met in Nairobi in February and further elaborated the priorities agreed upon at the Gaberone meeting. The current action plan for elephant and rhino is outlined below. It will form the basis for a further examination of priorities at our next meeting which is scheduled to be held at the Victoria Falls in Zimbabwe on the 21st and 22nd September, 1985.

CURRENT ACTION PLAN

(As defined at the Botswana Meeting in September 1984 and at a meeting of the Chairman and Vice Chairmen in February 1985)

FIELD PRIORITIES

1.Northern White Rhino.

1.1 Draft a position statement on the northern white rhino following the undertaking by President Mobutu of Zaire to ensure the protection of the species in situ. The draft would be put to the group at its next meeting.

1.2 Encourage efforts to coordinate the breeding of existing captive northern white rhino.

1.3 Re-examine the evidence for the sub-specific status of the northern white rhino. This is a key factor in decisions relating to the conservation of the northern white rhino and it is essential that better evidence is available on which to judge the present stand taken on its conservation.

2. **Forest elephant.** Promote censuses of forest elephant by supporting Barnes' studies and by encouraging primate researchers to include elephant in their census work.

3.**West African forest elephant.** Establish an active arm of the AERSG in West Africa.

4.**Black Rhino**

4.1 National Rhino Conservation Strategies. National rhino conservation strategies would be encouraged initially in Tanzania, Zambia, Zimbabwe and Namibia. (A national rhino conservation plan is already underway in Kenya).

4.2 Sub-specific status of black rhino populations. Pan African and national rhino conservation plans need to rest on sound information on the subspecific status of black rhino populations and on sound data on the genetics and management of small isolated populations. Research on both of these aspects of the conservation biology of black rhino would be encouraged and hopefully much of it can be tackled by the AERSG Scientific/Executive Officer.

5. **Desert elephant and rhino.** Continue to monitor status of populations in Namibia, Mauritania and Mali and to urge appropriate conservation action.

6. **Central African elephant and rhinos.**

6.1 Promote an aerial census of elephant and rhino populations in the Central African Republic.

6.2 Investigate the legislative and administrative arrangements relating to the ivory trade in central African states since it seems likely that many conservation problems and problems relating to the control of the ivory trade may stem from an inadequate legal base.

7. **Selous Game Reserve and Luangwa and Garamba National Parks.** Promote close monitoring and improved conservation in these protected areas.

TRADE PRIORITIES

1. **Rhino horn.**

1.1 Investigate the source of rhino horn reaching South Korea.

1.2 Investigate the movement of rhino horn within Africa.

1.3 Examine and compare information on the decline of rhino in Africa with information on rhino horn entering the trade.

2. **Ivory.**

2,1 Complete surveys of the ivory trade and ivory carving industries within Africa.

2.2 Complete the computer modelling of ivory yields and harvesting strategies undertaken by Pilgram and Western and add an economic model to the population models.

Since the Botswana meeting there has been progress on some aspects of the action plan. Richard Barnes has started his studies on forest elephant in Gabon. An aerial census of elephant and rhinos in parts of CAR has been completed by lain Douglas Hamilton and the reports indicate greatly depleted elephant populations and an absence of black rhino in areas where they were formerly abundant. Recent reports from Jean-Marc Froment and Clive Spinage suggest that black rhino may very soon be extinct in the CAR. The only other populations of the subspecies **Diceros bicornis longipes** are those in the Cameroun. Aerial surveys in the Luangwa valley have been conducted by Gilson Kaweche and Dale Lewis and these reveal further declines in the elephant populations of the Luangwa valley. On trade issues Esmond Martin has completed his study of the ivory trade in Malawi and has started a study of the ivory trade in Zambia. World Wildlife Fund have allocated funds for a project to alert doctors and pharmacists in the Far East to the plight of the rhino in an attempt to persuade them to stop prescribing rhino horn. This programme will be conducted by Esmond Martin in his capacity as a consultant to WWF.

A major development since the Botswana meeting has been the initiative taken by Governments in Africa Who, in collaboration with the CITES secretariat, have agreed to establish a quota system for the export of ivory. They have also endorsed a proposal to establish a unit within the CITES Secretariat which will monitor all international transactions in ivory. These two major developments follow the consultancy completed by Rowan Martin for CITES and in which many members assisted with information and advice. The new system only comes into operation next year and we have still to see to what extent it will serve to promote the conservation and legitimate utilisation of one of Africa's major wildlife resources as well as curb the continuing elephant poaching and illegal trade in ivory.

The preservation of viable populations of rhino in the wild in Africa remains a dominant challenge. Black rhinos in Africa now probably number less than 9 000. The catastrophic decline of black rhino in the CAR and the recent upsurge in international commercial poaching for rhino horn in Zimbabwe is indicative of the threats that persist. Since the article by Dick Pitman and Glen Tatham was written a month ago the tally has risen to 51 rhino killed by poachers since January this year. White rhino have become extinct in Mocambique for the second time and their numbers in the wild outside South Africa are not showing any great increase. The formulation of National Strategies for the conservation of rhino is more important than ever. Equally important are the studies on illegal trade and the political initiatives proposed by the Wankie (now Hwange) meeting in 1981 some of which have still to be actioned.

David Cumming

The aim of PACHYDERM, the AERSG Newsletter, is to offer members of the group, and those who share its concerns, brief research papers and factual articles on conservation matters of topical interest related to elephant and rhino conservation in Africa. Brief items of news on recent developments in the conservation of elephant and rhino are also welcome.

Readers are reminded that material published in PACHYDERM does not necessarily reflect the views of IUCN, SSC, AERSG, nor those organisations supporting AERSG and the publication of the Newsletter.

We will welcome articles of up to 3 000 words for the next two issues of PACHYDERM. Deadlines for submission will be the 6th December, 1985, and the 16th May, 1986, respectively. We will publish suitable black and white photographs and graphics and may edit articles. Research papers may be refereed.

David Cumming
Editor

The Elephants of Burkina-Faso, West Africa

C.A. Spinage

Project UPV/82/008, c/o UNDP, B.P. 575, Ouagadougou, Burkina-Faso.

Burkina-Faso, formerly Upper Volta, is a country of 274 200 km^2 situated in the centre of western Africa surrounded by Mali, Niger, Togo, Benin, Ghana and the Ivory Coast. Approximately 10% of the country lies in the sahelian zone with a rainfall of 500 to 600 mm per year during normal years; 59% is in the soudanian zone with a rainfall of 600 to 1 000 mm per year, and 31% is in the soudano-guinean zone with a rainfall of 1 000 to 1 200 mm per year. There is a long dry season from October to April. For the most part the country is flat, covered with a woodland vegetation dominated by **Terminalia** species and fire-induced grasses such as **Hyparrhenia** species. The fauna is typically West African, characterised by roan antelope, western hartebeest and Buffon's kob.

There seems to be scanty information on the previous history of elephants in this country. Formerly a French territory comprising part of the A.O.F., or Afrique Occidentale Francaise, the first game law, dated 14.11.1913. provided for the control of elephant hunting, allowing expatriate hunters a maximum of five elephants on licence per year. The next law was not until 1925 when a general hunting and wildlife law was passed, which also made provision for the first parks in the A.O.F. In November1973 elephant hunting was forbidden for five years, the ban being renewed for a further five years in June 1979. This was superseded by a law in December 1980 banning all hunting until further notice. No reference in these laws was made to any ban on trade in ivory or other elephant products.

The elephant is the savanna elephant, the country being outside the tropical forest zone. Those that I have seen appear to be large, but the tusks are always small. This is probably due to a long history of hunting pressure which does not allow the elephants time to mature. The area is in the West African "firearm zone" where firearms and elephant hunting have probably existed since well before colonial times. Roure (1968) states that the elephants in the south-eastern area, in the region of the 'W' National Park, were heavily

hunted until 1947 by bands of Haussa and Djerma armed with home-made guns which fired poisoned arrows; although Urvoy (1929) refers to "some teams of Bariba hunters" hunting along the MÈkrou river (the river which runs through the 'W' National Park) where they had named seven camp sites at which they would be sure to find a herd. This author states that several "much rarer" Peulh and Dendis hunters ventured to the north. At this time the area was well populated with game due to the absence of people resulting from sleeping sickness, onchoceriasis and tribal wars.

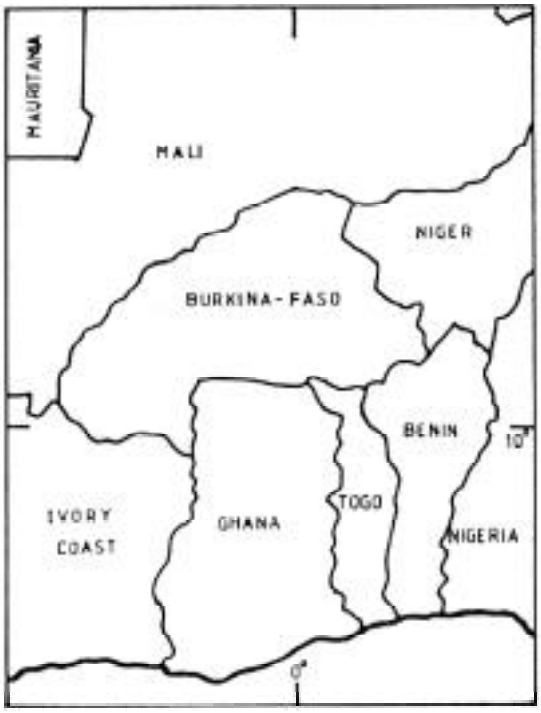


Figure 1. Location map of Burkina-Faso.

Roure refers to tusks reaching only 10 to 12 kg each in 1968, and the largest that I have seen were of the order of 15 to 16 kg found in PÙ National Park in 1976. Of 62 pieces in government custody dating from before 1982, the mean weight is 3,9 kg. A male skull in the Singou area which I estimated, extrapolating from Law's criteria, to be 28 years of age, was calculated at 29 years of age from the diameter of the dry tusk alveolus.

Apart from attempts to estimate numbers in the Deux-BalÈ forest or woodland (Sihvonen 1974) and the PÙ National Park (Heisterberg 1977), the first large-scale attempt was that of an FAO project in 1981-82. This gave an estimate of 2 500 for the whole country, of which 1 700 were estimated to occur in the south-east; 600 in the south-central region, and 200 elsewhere, The total could be a fifty percent underestimate when the small numbers which are scattered in the western part of the country are considered, as well as the seasonal incursions both in the extreme north and in the south-west. The distribution map (Fig. 2) suggests that there may be five groups; one based in the 'W' National Park in the east, dependant on the MÈkrou river, one on the river Singou, one on the Red Volta river in the region of PÙ National Park and the Sissili river at Nazinga; one on the Black Volta river in the region of the Deux-BalÈ forest, and a further population based on the Black Volta river in the region of the Mare aux Hippopotames, or Lake of the Hippopotamus. The country-wide estimates from the ground and aerial counts are given in Table 1.

The Singou river dried out completely in 1984 and probably accounted for elephants being seen in the Arli reserve in the dry season where Green (1979) reported them as only occurring during August to December, or during the rains. According to Boy, who knew the area in 1950-56 and mapped the main elephant tracks (Fig. 3), and quoted by Roure (1968), there appeared to be two main elephant groups, one based on the MÈkrou river and one between the Kompienga and Doubodo (wrongly called Arli) rivers. The first group concentrated on the MÈkrou in the dry season but dispersed

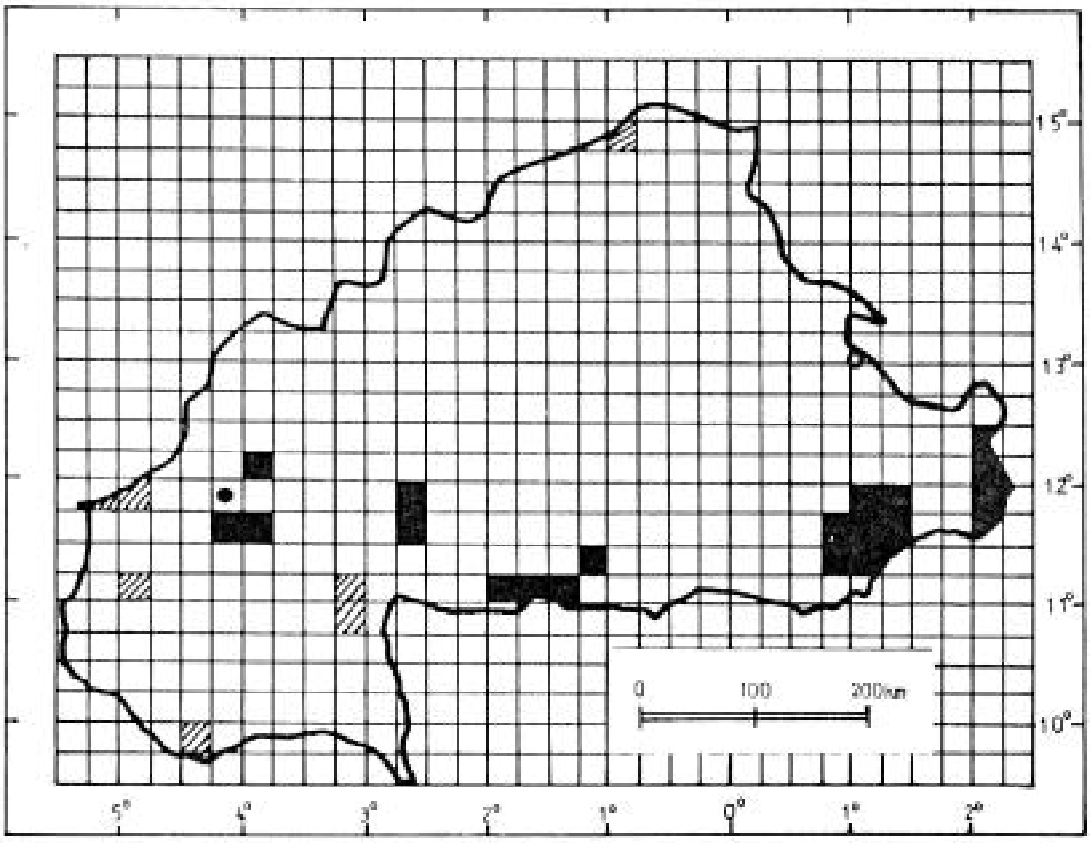


Figure 2. Known elephant distribution in Burkina-Faso. Blocked squares permanent populations; hatched squares wet season range; blocked circle last occurrence 5-7 years ago; open circle 14-20 years ago.

in all directions at the onset of the rains. The western group was found in the region of the Doubodo and Arli rivers in the dry season moving north and west at the first rains, one group allegedly travelling as far north as the Sirba river, 130 km distant, This latter

Table 1. Population estimates of elephants in Burkina-Faso from FAO surveys 1981–1982 Area

Area	Foot counts	Air counts	Density/km^2
'W' National Park	0	600 ± 340	0.27[1]
Arli region	0	0	0
Deux-BalÈ reserve	60	150 ± 180*	0.16
PÙ National Park	220	230 ± 600	0.25
Nazinga area	0[2]	500 ± 600	0.25
Singou reserve	–	590	0.30
Pama reserve	–	800	0.35
West Pama region	–	50	0.03
Total		**2920**	**0.21**

[1]end of dry season estimate is 260, density 0.11.
21984 foot counts (mean of three) gave 216herd is more likely however to have come from Niger and has not now been seen for 14 to 20 years, according to local reports. The two main groups still exist in these two zones, numbering possibly 600 and 1500 east and west respectively. The ribbed trunks of the baobab trees along the Singou river suggest that, perhaps twenty to thirty years ago, elephants were very numerous in that area; but on a visit in January 1984 I noted only two freshly-gouged trees along about 35 kilometres of river, and a few old half-gouged-out trees.

Between 1969 and 1983 elephants were only seen in the Nazinga area, to the south of the PÙ National Park, during the dry season, but remained there throughout the year in 1984, while at the same time the majority seems to have left the Pô National Park. In 1973 Heisterberg estimated the Pô Park's population to be 250, with a mean group size of 7.4, and considered that the park would reach its carrying capacity, which he put at 350 elephants, in 1980. However the 1982 census suggested that the population had remained stationary in numbers, with a total of 230.

Olivier (1983) has referred to the Malian Gourma elephants which visit the northern extremity of Burkina-Faso in the wet season around the month of August, where they are allegedly hard hit by poachers. This is, however, unlikely, as there is limited travel in this region during the rains and Benoit (1984), who has studied the area in some detail, categorically states that they are not hunted in Burkina-Faso. According

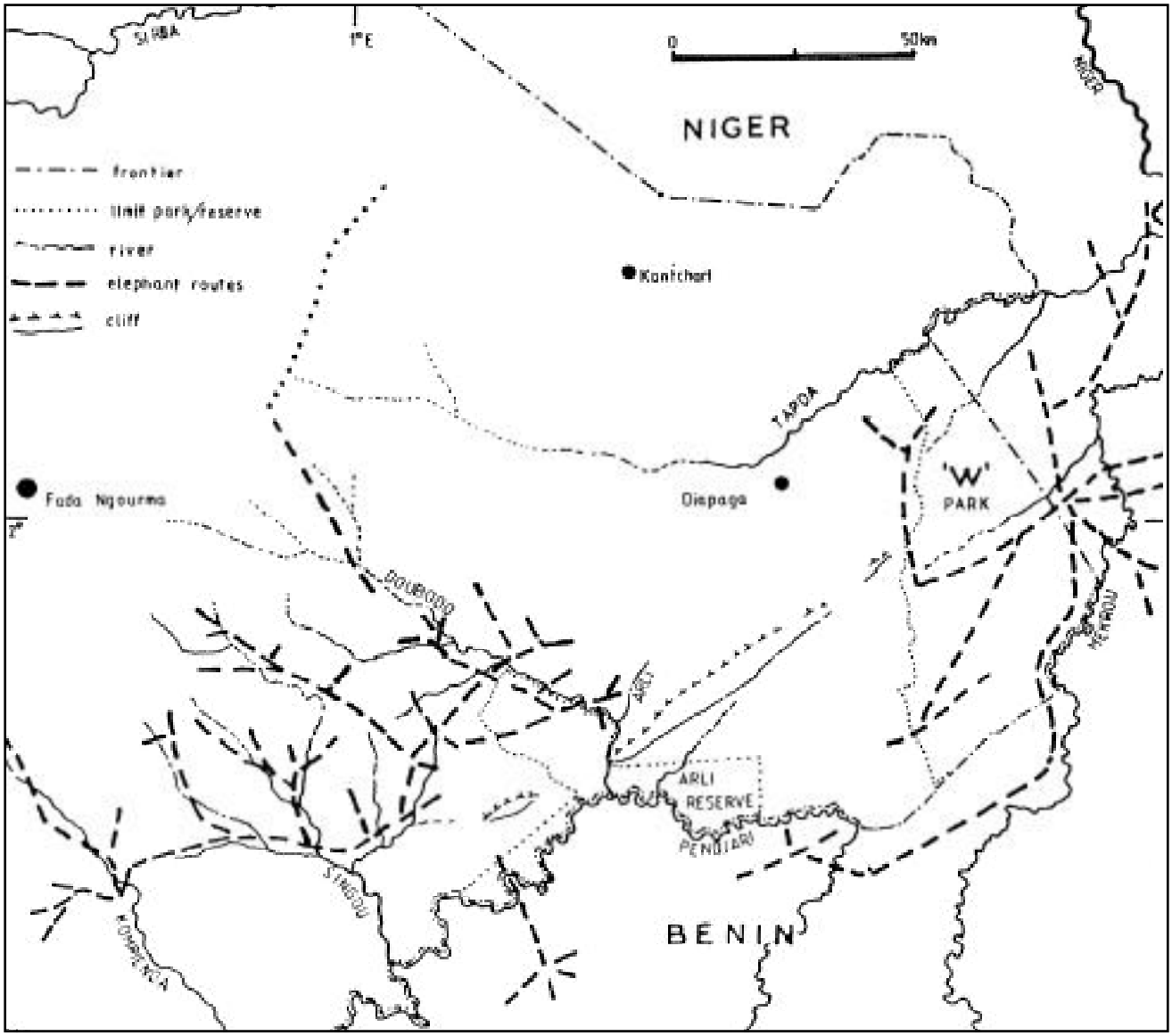


Figure 3. Movements of elephants in the southeast 1950 to 1956, modified after Boy (1956).

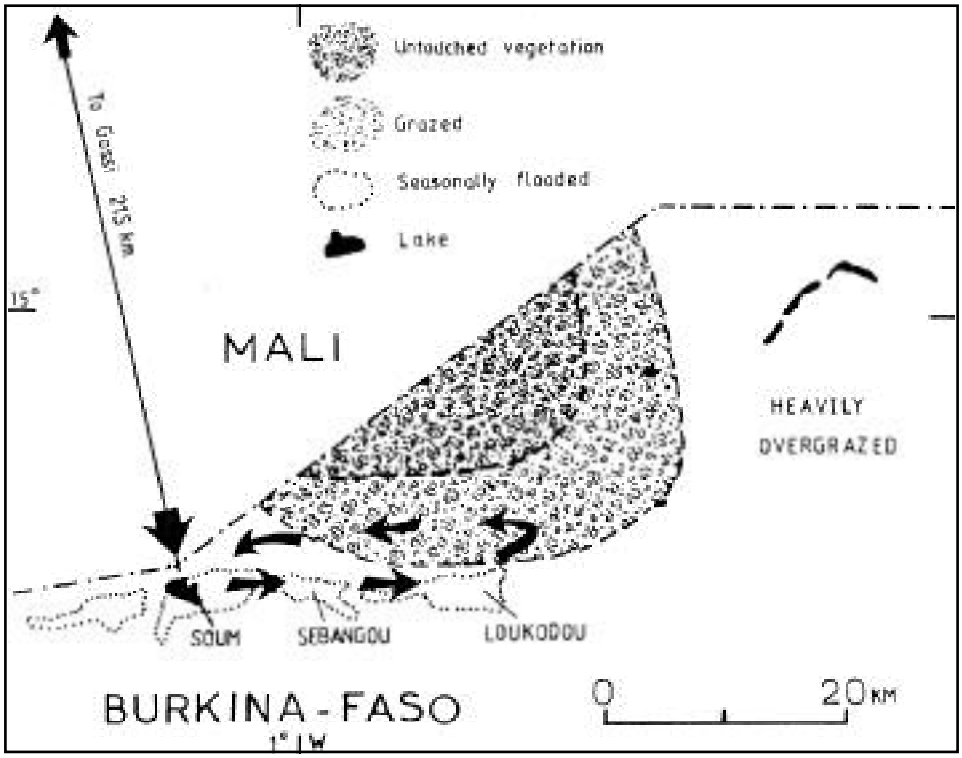


Figure 4. Alleged movements of the Gourma elephants in Burkina-Faso during July/August to September.

to this author, a herd of one to two hundred follows a set itinerary, possibly from Lake Do on the Niger river in Mali, via Lake Gossi, to Lake Soum in Burkina-Faso. Here it splits into small groups visiting Lakes Sebangou and Loukodo (map Fig. 4), and a little lake called Fété Tilloki. This migration appears to be long-standing since an old herdsman related how, when he was a small boy, his herd of cattle was charged by an elephant at Lake Fété Tilloki, this being about 1910 to 1915. In September they return to Lake Soum where they regroup before returning north. Benoit considers that they mostly browse in the region and must have suffered during the drought of 1973, but the **Anogeissus-Mitragyna** woodland which they frequent is also in the process of being destroyed through misuse. Part of the region that they traverse contains the last remnants of sahelian vegetation in Burkina-Faso as it is unexploited by pastoralists due to lack of water in the dry season. There are however continual pressures to develop a well in the area, which would mean the destruction of this last remaining natural vegetation.

There are no studies as such on elephants in Burkina-Faso apart from a brief study of the feeding habits of elephants in the PÙ National Park conducted by Christenson in 1976. 35 percent of all trees in his study plots showed evidence of use of elephants. Species observed to be fed upon were: **Mitragyna inermis,** young **Daniellia oliveri, Vitellaria paradoxum, Lannea acida, Piliostigma thonningii, Gardenia** species, **Tamarindus indica, Lonchocarpus laxiflora, Balanites aegyptiaca, Combretum** species and all **Acacia** species. Young **Detarium microcarpum** were uprooted at the beginning of the rains and the roots eaten. **Balanites** was recorded as being particularly preferred but not very common in the area. Every baobab showed signs of tusking, and many were in advanced stages. In 1976 three fell due to tusking alone, and one due to fire plus tusking. The other favoured tree for de-barking was **Burkea africana,** with 50% of trees greater than seven metres tall dead from this cause. Regeneration of this species was however good and Christenson calculated overall tree mortality at about 0,5 or 0,75% of the total population; a very low estimate compared with some other areas of Africa.

The extent of poaching is difficult to assess. It is certainly increasing but there is no organized, large-scale poaching. Perhaps 200 elephants are taken per year throughout the country. Small amounts of ivory are on sale in the capital Ouagadougou and in Bobo-Dioulasso, the next largest town. Probably not more than 50 to 100 carvings are available in the former town, and perhaps 100 or so bangles. A carved tusk about 15-20 inches long costs about 120 dollars, asking price 200 dollars. Pieces about 8 inches high are about 60 dollars with an asking price of 100. Bangles likewise cost from 12 to 50 dollars, the price depending on the skill of the bargainer. Carving is limited in design and generally not attractive. All carvings are of small tusks of elephants probably 4 to 6 years old. Probably most poached ivory is exported.

Burkina-Faso has a growing human population of over six million inhabitants and is classed amongst the poorest nations of the world, while the increasing drought of recent years has compounded its problems of land misuse and malnutrition. Official policy is nevertheless to preserve its remaining elephants, but such preservation can only be effective with outside financial support.

REFERENCES

Benoit, M. 1984. Le SÈno-Mango ne doit pas mourir. ORSTOM, Paris.

Boy, A. 1956. Diapaga éléphants, buffles. Unpublished map.

Christenson, B. 1976. Tree utilisation by the african elephant in PÙ National Park, Upper Volta. Typescript.

Bousquet, B. 1982. Diversité de la faune et évaluation numérique et Èconomique des populations de grands mammiféres. Document de terrain no. 8, FO:DP/UPV/78/008, FAO, Rome.

Green, A.A. 1979. Density estimates of the larger mammals of Arli National Park, Upper Volta. Mammalia 43: 59-70.

Heisterberg, J. 1977. Flora and fauna of PÙ National Park, Upper Volta, West Africa. Unpublished Master's thesis, University of Purdue. Olivier, R. 1983. Mali's elephants suffer in drought. AERG Newsletter (2): 14-15.

Roure, G. 1968. Animaux sauvages de Haute-Volta et des pays voisins. Direction des Eaux et ForÍts, Ouagadougou**.**

Sihvonen, J. 1974. Inventaire de la faune du parc national des Deux-Balés, Haute-Volta, et recommendations pour son amÈnagement. 39pp mimeo.

Urvoy, Y. 1929. _e Mékrou et le Double V. Bull. Comité de l'Afrique Francaise. Fév.: 135-140.

Malawi's Ivory Carving Industry

Esmond Bradley Martin

Malawi's ivory carving industry is considerably older than Zimbabwe's, Botswana's or South Africa's, all of which were established only in the 1970's. The people of Malawi also have a long tradition of trading in raw ivory, going back to the sixteenth century when the Maravi, Makua and especially the Yao began to have commercial contacts with the south-east African coast in what is now southern Tanzania and Mozambique.

While ivory was one of their most important trade items (Alpers, 1975), no evidence has yet been found that the Yao or other people of Malawi carved or worked ivory at this time. However, if any commodities from ivory were made, they would not have been traded to the coast because the buyers wanted raw ivory, primarily for the Indian market. Later, in the middle of the nineteenth century, when there was a sharp increase in the demand in Europe for ivory, the buyers also wanted raw ivory—not worked. Furthermore, there is no report of carved ivory items from Malawi by any of the traders, Mozambique government officials, hunters or explorers. Nor is there any reference to an indigenous ivory carving industry in Malawian oral traditions. The major study of the Yaos, by Yohannah Abdallah with Sanderson, goes into detail on the economic and artistic achievements of the Yao people in the latter half of the nineteenth and early twentieth centuries, but neither does it mention any ivory carving at all. It is extremely unlikely, therefore, that there was an ivory carving industry in Malawi prior to World War I; there certainly were some individual items made, such as ivory bangles which chiefs wore, but this cannot be interpreted as a significant organized commercial trade.

According to David Anstey, the first Head of Malawi's Department of National Parks and Wildlife, the ivory carving industry began in the 1920s when several Yaos were shown how to carve ivory by resident Singhalese of Zomba. These Singhalese were not full-time carvers in what was then the capital of Malawi; they were businessmen and government employees who simply initiated the activity. This information was given to David Anstey by one member of the Sadiki family, probably the best known ivory carving family in the country. The old man Sadiki, who is still alive but over seventy-five years of age, said that his father had been taught how to carve ivory by one of these Singhalese who in turn taught him. Ian Parker, one of the world's authorities on ivory, and who carried out research in Malawi, also states that the Singhalese were responsible for beginning the ivory industry in Malawi (personal communication with Ian Parker). That carving ivory items for commercial sales at least predates World War II was confirmed to me by the older carvers I interviewed in Malawi. One of these carvers, Morse Yatina, who is still practising the craft, had learned how to do it from his father, in 1946, many years after it had become the family's livelihood.

Stylistically, there are some similarities between the ivory carvings of Sri Lanka and Malawi, especially in wild animal sculptures which are fatter and more round than those carved in Malawi's neighbouring countries. Moreover, both Sri Lankan and Malawian ivory carvings are made using comparable hand tools, not electrically powered instruments as in Zimbabwe, Botswana and South Africa.

In 1954 when Vivian Wilson, former Director of the National Museum of Rhodesia, visited Malawi, there were only about twelve ivory carvers in the whole country; they were all Yaos, located mostly at Nkhotakota, not in Limbe or Blantyre. Nkhotakota is the largest traditional town in Malawi, and Vivian Wilson went there to see some of the ivory carvers. He found them housed in simple thatched huts. He remembers that almost all the work consisted of carving elephants onto medium-sized tusks of fourteen to sixteen kilos each, and was told by the carvers that they had purchased their raw ivory from the Wildlife Department in Limbe.

When Vivian Wilson went back to Malawi in 1970, he visited Blantyre which had in the mean time become the ivory carving centre. He noted that tusks with elephants carved onto them were then being sold for between $32 and $36 each (personal communication with Vivian Wilson).

In the late 1960's and early 1970's almost anybody could walk into the office of Forestry and Game and purchase ivory from the Game Ranger. In 1971 the price of a kilo of ivory was $2,64. Although most of the carvers at that time were Africans, according to David Anstey, financial assistance towards the industry was provided by resident Asians and Europeans.

The first major government policy on the ivory carving industry of Malawi came about in 1973, following the meeting of the Director of the National Parks and Wildlife Department, David Anstey, with President Banda to discuss the sales of raw ivory. It was decided that the locally registered ivory carvers should have first call on all raw ivory, but any surplus could be sold by the Department for foreign exchange. The Department would hold sales of ivory specifically for licensed trophy dealers, and the ivory would be priced roughly the same as on the world market, Thus, the priorities of the Malawian ivory carvers were to take precedence over exports of raw ivory. A directive was initiated on 31 March 1973 also stating that ivory sold to local trophy dealers could not be exported in raw form. Since then, President Banda has continued to support the local carving industry as a legitimate enterprise based upon legal acquisition of ivory from the country's elephants. There is no other head of state in southern Africa who has taken such a strong position in favour of a domestic ivory carving industry.

The Department of National Parks and Wildlife (part of the former Department of Forestry and Game) held its first official sale to the trophy dealers in December, 1973, when 283 kilos of ivory were sold. From 1974 to 1978 there were two or three sales annually, and the average amount of ivory sold per year was 1,187 kilos. Beginning in 1979 the number of sales was increased to a minimum of four sales a year because some trophy dealers complained that they were too far apart.

Over the ten-year period from 1974 to 1983, an average of almost exactly one tonne of ivory was annually sold at these government sales. However, a marked decline in purchases came about after 1976 when the record amount of 1,641 kilos was sold, and by 1983 only 497 kilos were bought by the trophy dealers. The average weight of each tusk sold also decreased sharply: from 9.45 kilos in 1978 (the first year for which I have specific statistics) to 4.45 in 1982, although there was a slight rise in 1983 to 5.18 kilos.

Foreign tourists like to purchase heads made out of ivory. (Esmond Martin)

A rational conclusion based on these two sets of declines (in the amount of ivory bought by the dealers and almost a halving of the average tusk weight) is that quantities of illegal ivory increased in Malawi, and that the trophy dealers were buying a higher proportion of their raw material from illicit sources.

In order to protect the smaller ivory dealers from the richer, larger ones, the Department has never allowed a true auction. Instead, it has set prices for various sizes of tusks, roughly based on those of the international market, and has limited the amount of ivory that any single dealer is allowed to buy. At the February, 1982, sale ivory under ten kilos was priced at $43,50 per kilo, 10-17 kilo tusks $54,30, and tusks weighing 18 kilos and above were $65,20. If a rich dealer wanted to purchase too much of the ivory available, the Department would simply request him to buy the larger pieces (which the smaller dealers could not afford) or stop him completely from buying. However, the Department was unable to sell most of the ivory it offered from 1981 to 1983 to the trophy dealers because they were obtaining their supplies from ivory illegally imported from neighbouring countries and from elephants which had been poached in Malawi.

By 1979 the Head of the Department of National Parks and Wildlife and senior customs officials were aware that the country was full of illicit ivory (personal communication with David Anstey). There was field evidence of illegal killings of elephants, and there had also been a series of major confiscations of illegal consignments coming in from Zaire and Zambia. These confiscations led to special export sales: a dealer from southern Africa purchased about two tonnes of this ivory from the Customs Department (personal communication with the Managing Director of the company). Also, another southern African company purchased two lots from the Customs Department for export; one was 660 kilos with an average tusk weight of 5.89 kilos for $54, 50 a kilo in 1979, arid the other was 1,087 with an average tusk weight of 7.5 kilos for $64,80 a kilo in the following year (personal communication with the Managing Director of this company.

In accordance with the 1973 directive, still today the only Malawians permitted to purchase ivory from the Department's sales are registered trophy dealers who are not allowed to export it in raw form. On the 1983 list there were thirty-two individuals or firms which were allowed to buy the raw ivory. Of these, three were European-owned ivory businesses: one Greek (now the largest consumer of ivory in the country) and two of British origin, one of which also has the largest wood carving industry in Malawi. In addition, there was one Indian who had a shop in Blantyre and one Kenyan, also located in Blantyre, the commercial capital of Malawi. Of the Malawian-controlled ivory businesses, about half were owned by Yaos and half by non-Yaos, and they generally worked at their own homes and did not have separate retail establishments in city centres.

Of these thirty-two registered ivory trophy dealers in Malawi, ten are in and around the new capital Lilongwe (the majority are located in the suburbs of Old Lilongwe), ten are in Blantyre (the largest city in the country), three in Limbe, two in Zomba and seven in other areas. The main reason that the majority of the trophy dealers are located in Lilongwe and Blantyre is that these are the places where most expatriates work and foreign tourists visit, and they of course are the main purchasers of carvings, accounting for at least ninety per cent of all the sales, The remainder is bought by Indians and Malawians, mostly in the form of jewellery. There has not been much of a demand by Malawians for ivory products, however, because they are more expensive than products made out of bone, wood and, more recently, plastic.

Most of the smaller ivory trophy dealers have their workshops in the suburbs of either Old Lilongwe or Blantyre. Usually, the workshop is part of their residential compound. The carvers sit around a large table or on a work bench, surrounded by many different hand tools: rasps, drills, files, hammers, chisels and awls. Except for one trophy dealer, B.J. Sadiki, no electrically powered tools are use' by Malawi's carvers, although in Zimbabwe, Botswana and South Africa almost all the carving is carried out using electrically driven band saws and dentist drills. The Malawians give three main reasons for keeping to hand tools. First, they say that they are used to them and do not want to change their techniques. Secondly, they claim that individuality is maintained by not producing identical items with electric machines. Thirdly, they admit that there would be economic constraints against importing machines and spare parts for them.

Dr. Richard Bell, Senior Research Officer of Malawi's Department of National Parks and Wildlife, examines some tusks which are being offered for sale at public auction in Old Lilongwe, March 1984. (Esmond Martin)

Some of the carvers work for a specific trophy dealer, while others work for several dealers, changing back and forth, according to who has a supply of raw ivory. None of the carvers (except those who are also trophy dealers) are registered by the Department of National Parks and Wildlife, and because so many carvers move around from one dealer to another, it is not possible to state exactly how many of them there are. In early 1984 there were an estimated 80 to 100 different carvers (all men), but the majority were not working full time in ivory. During the month of February, most of those who were residents of Old Lilongwe were not working in ivory at all, due to the shortage of the raw material. Some of these were unemployed; others were carving wood or had other part-time work.

The ivory carvers are not generally paid a salary, but are paid for what they produce. The maximum a carver can earn in a day is about $21, although the average amount of money earned by an ivory carver is much lower. The Sadiki family, with considerable numbers of hired carvers in Blantyre, claims that their carvers earn from $30 to $40 a month and are provided with free accommodation and water. The largest single employer of ivory carvers in Malawi is John Demetriou, a Greek and the owner of Safari Curios, the largest curio shop selling ivory products in the entire country. He has fourteen carvers working for him at his factory at Mangochi, north of Blantyre, almost on the lake. When his carvers spend a full day working on ivory, they earn about $5. At other times, when his ivory supplies have run out, they carve wood.

In addition to his skilled carvers, Mr. Demetriou employs two assistants for polishing ivory. They earn only $1 1,50 as a basic wage, and $23 maximum in a month, yet this is still higher than what an unskilled farm worker earns in the area. There are probably between fifty and seventy ivory assistants in all Malawi; they earn on average about $15 per month. In contrast to carvers and polishers in other southern African countries, the Malawians earn relatively little, but it must be remembered that salaries in general are much lower in Malawi and that the cost of living is considerably less.

Malawi's ivory products fall into two categories: statues (of wild animals and human heads) and jewellery. The elephants, rhinos and other animals carved in ivory are distinctive in that they are rather primitive in design and each one is slightly different due to the fact that it is hand carved. Larger pieces of ivory are often carved into human heads, but these are not particularly unique. A craftsman will spend about two days sculpting a head; then he will hand it over to an assistant to finish the work, scraping, sandpapering, washing and finally polishing it, The Malawians, unlike any other southern Africans, use "Brasso" to polish ivory. This metal polish works very well and produces a bright finish.

Aside from bangles, most jewellery can be made from small pieces of ivory, including off-cuts and waste from sculptures. One of the few modern tools used in the Malawian carving industry is B.J. Sadiki's electric drill for making holes in beads. More ivory jewellery is sold in Malawi than ivory sculptures. Necklaces, brooches, bangles, rings, pendants and earrings are all very popular.

Malawian ivory carvers make good quality chess boards. (Esmond Martin)

The average mark-up on an ivory piece after the cost of the material, labour and other expenses are included is about 60%. Since trophy dealers usually sell carved items directly from their own premises, there are few middlemen involved in the carving industry. The most expensive items are carved tusks which can sell for over $2,000 each. Plain polished tusks are also in demand, and the most expensive one sold recently was a 22 kilo tusk for $2,280. A carved head sells from $60 to $300, depending on its size, quality, and from whom it is purchased. Chess sets, with only the "white" pieces made out of ivory (since the craftsmen never dye or add colour to raw ivory), retail for $55 for a crude set with wooden pieces for "black" and $270 for a better finished set with malachite pieces for "black".

More profit is made by the trophy dealers selling ivory jewellery than from carvings, which is the case in most countries with ivory industries. However, the ivory jewellery made in Malawi is unattractive. Dealers in South Africa and Zimbabwe are especially disparaging. and they criticize quite rightly the very rough workmanship of it. Some rings in Malawi retail for only between $1,25 and $3,80; obviously one cannot expect quality at these prices. It seems that often small pieces of ivory left over from larger carvings are made into jewellery for the express purpose of using up the ivory. Little imagination or creative skill is put into this work; consequently, it is not just the workmanship but also the designs which render Malawian ivory jewellery inferior. Neither are Malawi's ivory bangles comparable to those from other southern African countries, even though the more experienced and proficient carvers work on these, which must be carved from expensive tusks, weighing over ten kilos. A bangle can be bought for as little as $6 on the street and thicker types in shops are usually no more than $23.

On the other hand, Malawi's ivory carvers excel in their animal sculptures. Elephants are the most popular, followed by rhinos and hippos. These are usually more suggestive than realistic and have a certain pleasing quaintness. They are cheap (about $2,50 for 2.5 centimetre hippo) and are often sold in sets of a dozen in slightly varying sizes and poses.

However, since a lot of Malawi's ivory items are not as sophisticated as those produced elsewhere and the workmanship on them is not generally of high quality, few pieces are exported wholesale. The Malawi trophy dealers also give other reasons for the lack of exports. They claim that all their items can be sold within the country, so why bother trying to sell them elsewhere? Besides, the trophy dealers, who are mostly Africans, simply do not have the contacts in South Africa, Europe, the United States or Japan to market their items in these major ivory consuming countries. Many of them do not even have outlets to curio shops in Malawi's towns, and potential buyers must somehow find their way to their workshops which are often on back roads several kilometres away from commercial centres.

A further impediment which limits exports to South Africa, one of the largest markets on the continent, is that Zimbabweans are dumping their carvings and jewellery at 50% discounts on South African wholesalers in order to circumvent the exchange controls of their own country (Martin, 1984). While some South African dealers may well turn a blind eye to the illegality of Zimbabweans who do this, they are more reluctant to deal with Malawian carvings. After all, they are in sympathy with Zimbabweans who are under economic constraints due to the policies of that government, and some of the Zimbabwean carvings are of high quality and different from what is produced locally in South Africa. Malawian carvings, conversely, are not up to South African standards, and what is even more serious is the fact that dealers in South Africa know that now much of the ivory used in Malawi comes from poached elephants. They do not want to encourage such sources which can only hurt the ivory business in the long run.

Within Malawi, sales of ivory carvings are increasing now that foreign tourism is once again on the upswing. In 1981 there were 24,776 tourists and in 1982 22,422 who came to Malawi for holiday purposes (**National Statistical Bulletin**). This has compensated for the loss of many European expatriate residents who have left the country since 1979 when their jobs were handed over to Malawians, It has also brought about another interesting development —the use of substitutes for elephant ivory.

Hippo teeth and cow bone are much cheaper, and items made from them can be sold at higher profits. The Department of National Parks and Wildlife sells hippo teeth for $9,25 a kilo (in March, 1984) and 785 kilos have been sold by the Malawian government at the ivory sales between 1978 and 1983. Although carvers find it much more difficult to work than elephant ivory because the enamel has to be removed from it first and what remains is much harder and more brittle, elephant bridges, crocodile sculptures and pendants can be made from it which vaguely resemble real ivory carvings. Some dishonest dealers in Malawi sell various cow bone and hippo teeth items to unsuspecting tourists more easily than they could to expatriate resi-

dents, which is one reason why they are now doing this. However, there is another reason, completely different, which also explains why they are using bone and teeth. Theoretically, every tourist who buys an item made from ivory must obtain an export permit for it from the Department before leaving the country. There are notices displayed in all the curio shops and in the hotels explaining this. Some tourists do not want to be bothered with the bureaucracy this entails and so refrain from buying ivory. Street hawkers take advantage of their feeling, and tell them very glibly that permits are not required for carvings made from hippo teeth. In fact, many of their sales are conducted using this argument. However, it is not true, and actually anything made from hippo or elephant ivory in Malawi is supposed to have an export permit.

The tourists who go to Malawi and buy ivory jewellery and carvings are either unaware or do not care that some of the ivory now used comes from illegal sources. Although the average Malawian carver consumes only about a third the amount of ivory which a Zimbabwean uses in a year because he does not work full time in ivory and uses only hand tools, the approximately 90 carvers are consuming about 2,250 kilos a year, or 25 kilos per carver. The amount of raw ivory sold by the Department from 1980 to 1983 dropped by over 50%, but during that time the ivory industry did not significantly decline, according to evidence supplied by the ivory trophy dealers themselves. It is probably correct to say that from 1981 to 1983 about twice as much ivory was bought illegally than what was purchased from government sales. Extensive interviews with traders and evidence from poaching incidents, both inside and outside Malawi, indicate that it is likely that some 1,500 kilos of illicit ivory annually supplemented the industry's yearly average of 668 kilos from the Department during these years.

The raw ivory officially offered for sale to the trophy dealers in Malawi comes from elephants killed on control, elephants which die from natural causes and from tusks government officials have confiscated. Between 1977 and 1982, 299 elephants were shot for crop raiding and other related causes; over half of these elephants were killed in Central Region (Clarke, 1983), especially just outside Kasungu National Park where elephants are particularly prone to go during the rainy season in search of maize on small farms. As for the ivory collected by the Department from elephants which die either naturally or from poachers' bullets, most of this comes from within the national parks and game reserves. There are approximately 2,350 elephants in Malawi; about 800 inhabit Kasungu National Park, 400 the Nkhotakota Game Reserve, 300 the Vwaza Game Reserve, 300 the Liwonde National Park; only about 550 are elsewhere.

Over the past decade there has been a lot of ivory moved into Malawi from the neighbouring countries of Zambia, Mozambique and Tanzania. With the partial collapse of the economies of these countries resulting in shortages of food and essential consumer items, Zambians, Tanzanians and Mozambiqueans have moved almost anything of value outside their boundaries in order to exchange it for necessities they cannot buy at home. There was an annual per capita negative growth rate of .9 of one per cent in the economy of Zambia from 1970 to 1978 and an appalling minus 5.5 per cent in Mozambique during this same period (**1980 World Bank Atlas**). Consequently, it is hardly surprising that Malawi, with its annual growth rate of 3.1 per cent per capita, is an attractive market for ivory smugglers who can sell their tusks there at reasonable prices and pick and choose from imported and locally produced consumer items available in the shops.

The amount of Tanzanian ivory entering Malawi now is considerably less than it was a couple of years ago, due to the convenience of "the Burundi Connection" for Tanzanian smugglers, but it is noteworthy and so is that which comes in from Mozambique. mainly via Nsanje and Dedza. However, by far the largest proportion of Malawi's illegal ivory imports are presently of Zambian origin. Some 140 kilometres from Malawi's western boundary is one of the largest populations of elephants in the world, in the Luangwa Valley. There are no reliable figures on how many elephants are poached each year, yet a comparison between a census of elephants made by Caughley in 1973 and a somewhat similar census carried out by Douglas-Hamilton in 1979 indicates a forty per cent decline in the Luangwa Valley's elephant population in that almost seven-year period. Serious commercial poaching started there around 1974, and it continues today. On the eastern side of the valley, poachers (who are mostly Zambians) sell ivory to Malawians for about $9 a kilo; they in turn transport it by foot and vehicle out of the valley into Malawi (personal communication with Phil Berry, former Warden of the Save the Rhino Trust Luangwa Anti-poaching Unit).

Elephant poaching in Malawi became much more serious in 1977, partly due to the sharp increase in the international price for raw ivory. Very quickly, the number of animals known to have been illicitly killed in Kasungu National Park jumped from sixteen in 1977 to 55 in 1981 (Bell, 1984). Most of the poachers in Kasungu were Malawians using muzzle-loading guns. After killing an elephant for its ivory, they usually removed and dried the meat on the spot. Then they carried it to the villages for local consumption and sale. As in most rural parts of Africa, there is a high demand for meat in Malawi,

The villagers around Kasungu National Park sold the ivory to middlemen for between $4 and $8 a kilo; they offered it to trophy dealers in Blantyre and Lilongwe for between $11 and $19 a kilo. These middlemen were neither as wealthy nor as sophisticated as their East African counterparts, and were more susceptible to prosecution.

Once strong leadership and discipline were re-introduced to Kasungu Park, matters changed. When Matthew Matemba was appointed the Warden of Kasungu in 1981, he learned that there were about 250 people living around the park, who were involved with the illicit killing of elephants. Of these, between twenty and thirty were habitual offenders. Gradually, he collected information on them and also began confiscating illegal firearms in villages surrounding the park. While he was only able to pick up six firearms in 1981, the following year he collected forty-eight (Bell, 1984), and also was able to arrest several people suspected of having poached elephants. He methodically interrogated these men, obtaining from them names of additional suspects. Matthew Matemba also cultivated good relations with his own staff by holding regular meetings with them and encouraging their anti-poaching efforts. He increased their foot patrols which were more effective than vehicle or aircraft surveillance in the thick vegetation that covers most of Kasungu, and by getting his men to walk around the park more and to spend nights in secluded areas, the amount of elephant poaching decreased remarkably. In 1983 only seven elephants were illegally killed (Bell, 1984). Wisely, Matthew Matemba also made a strong appeal to the Malawi Congress Party officials in the area, urging them to hold

Ivory carvers in Malawi often work together, seated around wooden tables in the sunlight, using hand tools.
(Esmond Martin)

public meetings to condemn poaching, arguing that the wildlife of the country was an invaluable heritage and should be strongly protected.

Although poaching is not now a serious problem in Kasungu, demand for ivory from illicit sources has not decreased, and it appears that perhaps partially on account of Matthew Matemba's success in Kasungu, the Vwaza Marsh Game Reserve has now become the centre for elephant poaching in Malawi. About 25 were illegally killed there in 1983 (Bell, personal communication). Another area where some elephants were illegally taken in 1983 was Nkhotakota Game Reserve, but the overall picture over the past year or so is that poaching is now on the wane; the Department believes it now has better control of the situation.

Some, but not the majority, of the officers of the Department of National Parks and Wildlife would like to see the country's ivory carving industry stopped entirely. They seem to feel that their efforts to protect elephants would be easier and more successful if no ivory carvings were made in Malawi. However, banning the industry might well cause more problems rather than solving those that presently exist.

For more than half a century ivory carving has been a livelihood for Malawians. It is they, not foreigners, who run and operate most of the ivory businesses. In so doing, their work is more truly African than that of South Africa, Botswana or Zimbabwe, giving it an added appeal to tourists, Moreover, the government earns a substantial amount of hard currency from the sale of ivory items to tourists. If the government closed down the industry, not only would it lose this revenue, it would be directly responsible for depriving several hundred people of employment, for it is not only the carvers who make money from ivory, it is also their assistants, the polishers, the salesmen in curio shops and others who are involved in the ivory trade.

It cannot be said that the ivory industry is reducing the elephant population of Malawi, for that has remained more or less stable since 1977, and it is capable of producing a sustained yield of ivory for the carvers, The carvers rightly believe that ivory is a renewable resource; they would not accept being prohibited access to it, and would probably continue to make ivory items anyway, thereby driving the industry underground and complicating the means of monitoring and controlling it.

Therefore, instead of contemplating banning the making of ivory jewellery and carvings, the Department of National Parks and Wildlife should take a realistic view of the present situation, study the abuses and rectify them. One of the most important things the Department could do to remove from trophy dealers the temptation of buying illegal ivory is to hold ivory sales more often. As it is now, according to some trophy dealers, few potential buyers know until a week or so beforehand when an ivory sale is going to take place, and it may be months between sales, Trophy dealers are caught unprepared and more often than not they are without the necessary capital at the time. Therefore, they claim that they have little alternative other than buying on the black market when they want to replenish their supplies.

Although every tusk sold by the Department is registered with a number and no raw ivory can legitimately be acquired except from the Department's sales, it is easy for dealers to declare that their carvings are made from legal tusks when they are not. All a dealer has to do when he sells an ivory item to a tourist who wishes to obtain an export permit for it is to state on a receipt the number of any tusk he has recently bought from the Department as being the source of raw ivory for it. The Department almost automatically then issues the export permit; there is usually no check on how many items have reportedly already been made and exported from a particular tusk, and because of this practice the Department itself is inadvertently legalizing many items from poached ivory. However, in the past few months, according to the Director of the Department, there has been more checking and some dealers have actually had their ivory pieces confiscated.

The making of ivory items from illegally obtained tusks would also be discouraged by requiring all ivory carvers to register their names and addresses with the Department. Their premises could then be inspected from time to time, as in Zimbabwe, and tusks in their possession which have not been bought from the Department could thereby be confiscated. Furthermore, the carvers should be required to keep records listing each item they have made from a tusk.

The Department, with the assistance of the police, should enforce the law prohibiting all street hawkers from selling ivory items. It is well known that their sources are, for the most part, illegal. The presence of the hawkers is a constant irritant to the legitimate ivory trophy dealers who point out that since hawkers have no overheads, the prices for their ivory items are cheaper than those in the shops and attract tourists. They rightly believe that most tourists who buy ivory in the streets are not about to bother with obtaining an export permit for it, Moreover, even the most conscientious of the visitors to Malawi is going to wonder why there is so much fuss about the necessity of export permits when ivory can be openly sold in the streets in front of shopping centres by the least reputable type of salesman.

The need for stricter controls on the ivory carving industry is not however, due to lack of proper management of elephant populations by the Department of National Parks and Wildlife now. Indeed, Malawi's elephants are far better conserved than in most countries of Africa, thanks to constructive measures taken, especially during the

Table I. Raw Elephant Ivory Sales by the Department of National Parks and Wildlife to Malawian Trophy Dealers

Date		Kilos	Value in U.S.$		Average price per kilo	Average tusk weight
1973	December	283	n/a		n/a	n/a
1974	April	337	n/a		n/a	n/a
	August	439	n/a		n/a	n/a
	Total:	776	n/a		n/a	n/a
1975	April	383	n/a		n/a	n/a
	July	392	n/a		n/a	n/a
	September	469	n/a		n/a	n/a
	Total:	1 244	n/a		n/a	n/a
1976	February	426	n/a		n/a	n/a
	June	647	n/a		n/a	n/a
	September	568	n/a		n/a	n/a
	Total:	1 641	n/a		n/a	n/a
1977	February	633	n/a		n/a	n/a
	March	225	n/a		n/a	n/a
	September	500	n/a		n/a	n/a
	Total:	1 358				
1978	February	605	20 661		34.15	10.25
	September	311	19 585		62.97	8.41
	Total:	916	40 246	Average:	43.94	9.54
1979	February	227	16 728		60.39	5.77
	April	244	15 295		62.68	10.61
	August	209	12 713		60.83	n/a
	December	205	11 426		55.74	6.83
	Total:	935	56 162	Average:	60.07	7.19
1980	February	252	12 694		50.37	4.20
	April	301	16 437		54.61	7.72
	September	387	18 521		47.86	7.17
	November	278	12 922		46.48	6.32
	Total:	1 218	60 574	Average:	49.73	6.18
1981	January	243	10 230		42.10	6.75
	April	179	9 119		50.94	5.767
	June	154	8 318		54.01	4.81
	September	161	8 810		54.72	5.03
	November	58	3 419		58.95	4.83
	December	197	6 006		30.49	
n/a						
	Total:	992	45 902	Average:	46.27	5.56
1982	February	67	3 107		46.37	3.72
	July	129	6 054		46.93	5.38
	September	120	5 180		43.17	6.00
	November	144	6 156		42.75	4.00
	December	56	2 324		41.50	3.11
	Total:	516	22 821	Average:	44.23	4.45
1983	January	79	3 904		49.42	3.29
	June	43	1 808		42.05	1.79
	October	375	17 777		47.41	7.81
	Total:	497	23 489	Average:	47.26	5.18

Source: unpublished reports from the Department of National Parks and Wildlife, Malawi.

past two years. Nevertheless, in the neighbouring countries where economic constraints are grave, the temptation to poach is rife and as long as there is an easy means of disposing illegal ivory onto Malawi's market, people will continue to do so. There is the possibility, also, that because money can be earned this way, Malawians may in turn sometime follow suit more readily. It would not entail much expenditure of funds nor manpower to close the loop-holes that permit the forementioned irregularities in Malawi's ivory trade. If the Department were to do this, it would have a positive effect on elephant conservation.

Table II. Hippo Teeth Sold at Regular Ivory Sales by the Department of National Parks and Wildlife

Date		Weight in kilos	Value in U.S.$
1978	February	66	852
	September	311	3 724
	Total:	377	4 576
1979	February	27	514
	April	73	1 359
	August	20	356
	December	30	559
	Total:	150	2 788
1980	February	75	1 218
	April	41	693
	September	5	43
	November	2	12
	Total:	123	1 966
1981	January	23	205
	April	9	92
	June	14	132
	September	4	48
	November	5	45
	December	8	72
	Total;	63	594
1982	February	22	193
	July	10	110
	November	2	21
	Total:	34	324
1983	January	12	131
	June	18	186
	October	8	81
	Total:	38	398

Source: Unpublished reports from the Department of National Parks and wildlife, Malawi.

Table Ill. Elephants Killed in Malawi on Official Control

Year	Northern Region	Central Region	Southern Region	Total
1977	16	31	8	55
1978	15	22	31	68
1979	9	16	7	32
1980	8	31	10	49
1981	5	23	12	40
1982	4	31	20	55

Source: John E. Clarke, **Principal Master Plan for National Parks and Wildlife Management,** Vol. I, Malawi Government, Department of National Parks and Wildlife, Lilongwe, September 1983.

Table IV. Estimated Numbers of Elephants in Malawi in 1984

Location	Estimated Numbers
Kasungu National Park	800
Nkhotakota Game Reserve	400
Vwaza Marsh Game Reserve	300
Liwonde National Park	300
Majete Game Reserve	200
Nyika National Park	100
Mangochi-Namizimu Forest	100
Phirilongwe	100
Thuma Forest	50
Total:	2 350

Source: Richard Bell, personal communication.

LIST OF REFERENCES

Abdallah, Yohannah B., The Yaos, Arranged, Edited and Translated by M. Sanderson, Government Printer, Zomba, 1919.

Alpers, Edward A., Ivory and Slaves in East Central Africa, London, Heinemann, 1975.

Bell, R.H.V., "Law Enforcement in Malawi Conservation", **African Elephant and Rhino Group Newsletter,** Number 3 (June 1984), pp. 7-8.

Caughley, G. and Goddard, J. "Abundance and Distribution of"Elephants in Luangwa Valley, Zambia**", East African Wildlife Journal,** Volume XIII (1975), pp. 39-48.

Clarke, John E., Principal Master Plan for National Parks and Wildlife Management, Volume I, Malawi Government, Department of National Parks and Wildlife, Lilongwe, September 1983.

Douglas. Hamilton, I., Hillman, A.K.K., Holt, P., and Ansell, P., "Luangwa Valley Elephant, Rhino and Wildlife Survey", Typed Report to"IUCN/WWF and NYZS, October 1979.

Malawi Government, National Statistical Bulletin, 1982 and 1983.

Martin, Esmond Bradley, "Zimbabwe's Ivory Carving Industry", **Traffic Bulletin,** Volume VI, Number 2 (25 June 1984), pp. 33-38.

World Bank, 1980 World Bank Atlas, Washington D.C.,

Acknowledgments

I would like to express my appreciation to the Tokyo Ivory Arts andCrafts Association, the Osaka Ivory Manufacturers Association, Tom Milliken, TRAFFIC (Japan), World Wildlife Fund International and the IUCN for supporting my research on the ivory trade of Malawi.

In Malawi several people were very helpful to me. I wish to thank Mathew Chikapa, John E. Clarke, John Demetriou, Eugene Dzanjalimodzi, H.S. Jamsana, Wilson Kamwendo, Henri Nsanjama. Bakari Sadiki, W.J. Sadiki, Morse Yatina and MS Gwedeza Zulu. I am particularly thankful to David Anstey and Moses Kumpumula for the advice and suggestions they gave me on this study.

Richard Bell gave much of his time to me at Kasungu and was especially helpful in sharing his detailed knowledge on elephants. He very kindly made many valuable comments and criticisms for which I am very grateful.

Ages of Black Rhinos killed by drought and poaching in Zimbabwe

Kevin Dunham

Senior Ecologist Mana Pools National Park P.Bag 2061, Karoi, Zimbabwe

In the 1982/83 wet season, rainfall in the Zambezi Valley in northern Zimbabwe was only 430 mm (compared with the 17 year mean of 783 mm). During the following dry season, at least 23 black rhinos, 104 elephants, 120 impala and 100+ buffalo died in the northern section of Mana Pools National Park, mainly within a few kilometres of the Zambezi River (Fig. 1). Some animals died when they became stuck in mud as inland pools dried up, but it was assumed that most of the deaths resulted from malnutrition. Deaths were also reported in the Safari Areas surrounding the Park. Rainfall in the 1983/84 wet season was again low (399 mm), but the dry season mortality of all species was low and only 15 rhinos were found dead throughout the Valley. Most rhino skulls found were collected by management staff. The approximate age of each animal was determined on the basis of tooth eruption and wear (Hitchins 1978).

The age structure of the drought victims was compared with that of rhinos shot by poachers: thirteen skulls came from animals shot in the Chewore/Dande region in late 1983/early 1984, two skulls were from the north of Chewore Safari Area and sixteen skulls were from rhinos shot by Zambian poachers in the Urungwe Safari Area in the first half of 1985.

The age distributions are presented in terms of 5 year age classes (Fig. 2). In the 1983 drought, many of the rhinos which died were less than 10 years old. The numbers dying increased with age in animals over ten years of age to reach a second peak amongst the 30-40 year olds. In 1984, the pattern was somewhat different, with most dead rhinos being under ten years of age. Foster (1965) reported the age structure of rhinos which died in the 1961 drought in Tsavo East N.P. When his age classes are approximated to those used here, it is found that the number of dead rhinos is about equal in all age classes.

The age structures of the two samples of poached rhinos were similar (Fig. 2): there was a peak in the number of animals killed in the 6-10 year class. Since poaching is probably non-selective (except for a possible bias against juveniles), this peak may indicate a high proportion of immature and young adult animals in the population. If so, the fact that a relatively large number of rhinos in this age class died during the drought may simply reflect their abundance in the population. Alternatively, it could be argued from these data that 6-10 year olds have a high death rate and are particularly susceptible to drought, poaching and, probably, other causes of mortality. However, a life table for the Tsavo rhino population showed that mortality was at a minimum in this age class (Goddard 1970) and it is unlikely that the reverse is true in the Zambezi Valley. A high proportion of 6-10 year olds in the population may be a reflection of the relatively high degree of protection from poaching and disturbance which the rhinos enjoyed in the Valley during Zimbabwe's pre-independence war.

It is interesting to compare the age structure of the rhinos dying in the 1983 drought with that of the dead elephants. Whereas the numbers of under 10 and over 30 year old dead rhinos were about equal, far more young elephants died than old ones (of 104 dead elephants, 67% were under five and only 9% over 40 years old). The elephant population in the Valley is believed to have been increasing over the past half century and there are probably relatively few animals in the oldest age groups, compared with the more stable rhino population.

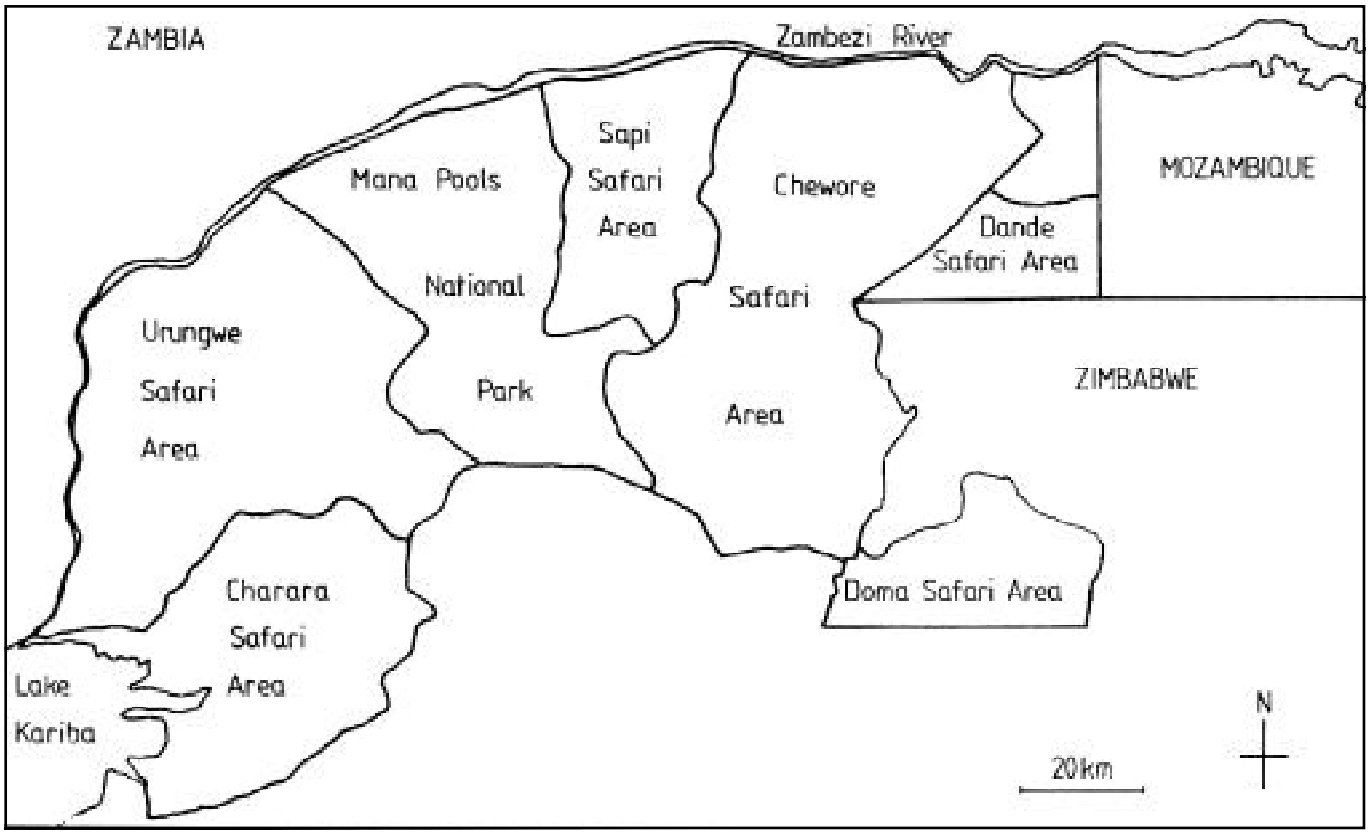


Fig. 1 Map of northern Zimbabwe showing Mana Pools National Park and the surrounding Safari Areas

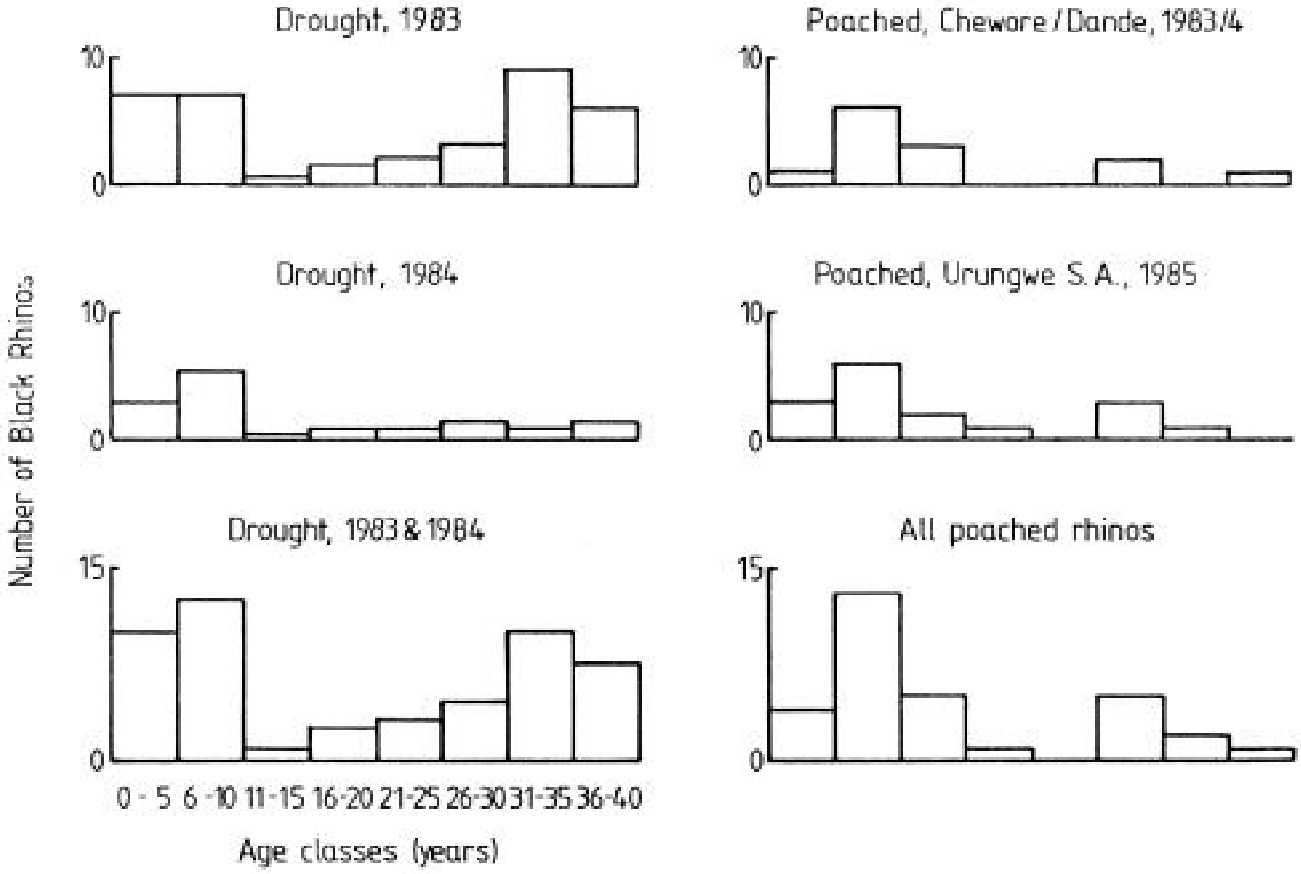


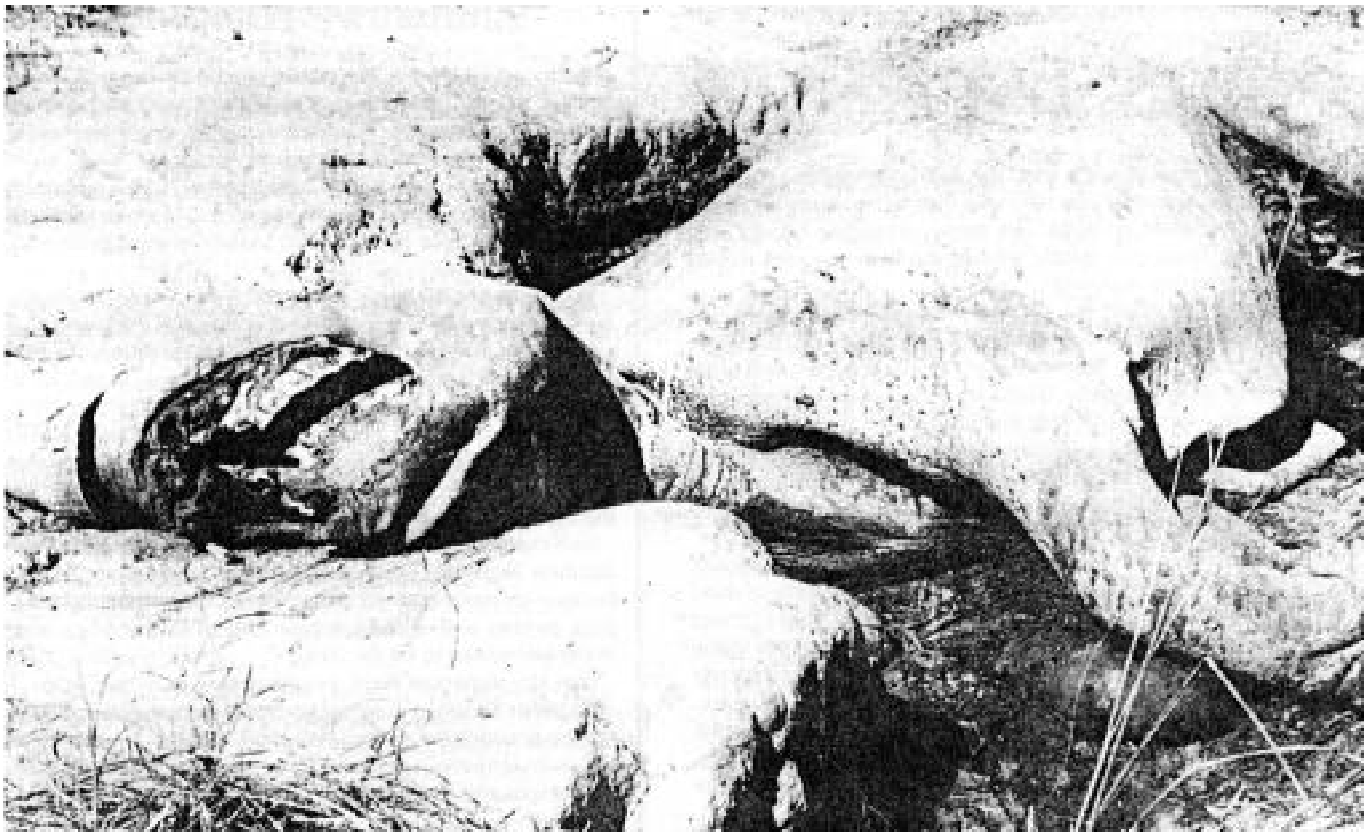
Fig. 2 Numbers of black rhinos of different ages dying from drought and poaching in the Zambezi Valley

References

Foster, J.B. (1965) Mortality and ageing of black rhinoceros in East Tsavo Park, Kenya. E. Afr. Wildl. J.3:1 18-119.

Goddard, J. (1970) Age criteria and vital statistics of a black rhinoceros population. E. Afr. Wildl. J. 8:105-121.

Hitchins, P.M. (1978) Age determination of the black rhinoceros (**Diceros bicornis** Linn.) in Zululand. S. Afr. J. Wildl. Res. 8:71-80.



Black rhino death at a waterhole during the 1982/83 drought in the Zambesi Valley. (Dick Pitman)

Rhino Poaching, Zimbabwe

Dick Pitman and Glen Tatham

Zimbabwe's black rhino population, as readers of PACHYDERM may have noted, is now the second largest in Africa. The country is also conspicuous as the only one in which rhino numbers have actually increased over recent years–a happy situation that may not last very much longer in the light of recent developments...

The majority of this population is concentrated in a relatively small area: the Middle Zambezi Valley, a protected wildlife complex consisting of one national park and several safari areas that lies downstream of the Kariba dam and extends east almost to the Mocambique border.

Until this year it had escaped the kind of commercial rhino-horn poaching that has plagued the Luangwa Valley, a few hundred kilometres to the north, and that has virtually annihilated the species elsewhere on the continent.

However, reports indicate that rhino have become shy and difficult to hunt in these other areas because of heavy poaching. Meanwhile, the Middle Zambezi Valley has a 200km river frontage that also forms the Zimbabwe-Zambian border, It has a dense black rhino population that has not been hunted for several decades: in many parts of the region, such as the Mana Pools National Park, the rhino have become well accustomed to the presence of humans, both on foot and in vehicles. As a result, both the Valley and its animals are highly vulnerable and difficult to police effectively with the limited finance and manpower available to the Zimbabwean Department of National Parks and Wildlife Management.

It therefore came as no surprise to local conservationists to learn, in January this year, that an armed gang had crossed into Zimbabwe from Zambia and killed three female black rhinos. This marked the beginning of a series of incursions that has so far accounted for 25 animals; in every case the horns have been removed and the rest of the carcase left to rot. Though possibly minimal by the standards of the slaughter elsewhere, the incursions have been deeply worrying to both professional and amateur conservationists: they may well presage a concerted and extremely damaging attack on one of the few viable black rhino populations still left in Africa.

The poachers —who have been armed with hunting rifles —chose the first good rains in several years to make their move. Many tracks had become impassable; tall grass and dense vegetation offered easy concealment; spoor was quickly washed out by heavy rain, making follow-ups difficult or impossible.

Government agencies reacted with commendable speed. All available National Parks staff were immediately drafted into the Valley and deployed on patrols. They were later reinforced by elements of the police and other armed forces. This had the effect of slowing the rate of the incursions – but not of halting them altogether. Early in June, well after the rains had ended, two rhino were killed in one morning by a gang that entered and left Zimbabwe within hours. At the same time another gang was thought to be hiding somewhere within the wildlife area.

So far several Zambian nationals have been arrested, together with five heavy-calibre sporting rifles, ammunition, and a quantity of rhino horn. A few weeks ago another poacher was shot and killed in a contact with Parks staff. However, they are mostly small fry: during their trial in Zimbabwe, the Zambians often maintained that they were merely "porters" and even that they did not know they were in Zimbabwe. Meanwhile several more poachers escaped across the Zambezi: at the time of writing, efforts to persuade the Zambian government to return them for trial, and to move against people believed to be behind the poaching outbreak, have failed to produce visible results.

The ultimate answer"– an end to the international rhino horn trade and a halt to its use in the Yemen and the Far East –seems to lie a long way off. It is at least likely that the Zimbabwean horn is travelling northwards through Africa and ending up as djambia-handles in the Yemen: but a Far Eastern connection cannot be ruled out. Members of at least one foreign embassy have approached Zimbabwean parks staff for rhino horn, which indicates that the potential for illicit trade already exists within the country.

Thus the Department of National Parks is thrown back on the admittedly unsatisfactory need to combat poaching on the ground. Historically the Valley has been lightly manned and the Department has, to some extent, relied on the presence of safari hunters and tourists in many areas to deter poaching incursions. But the hunting season lasts only from April to September; and it is unrealistic to expect that the police and armed forces now deployed will be able to remain in the Valley for an indefinite period.

The Zimbabwean government has announced its intention of reinforcing the Parks presence in the Zambezi Valley and of creating specialised anti-poaching units to cover the region. However, as the country is still recovering from three years of drought and a global recession, and still has to devote a lot of time and effort to combatting dissident activities in the troubled Matabeleland province, it may be unrealistic to expect overnight results.

One part-answer, which may ease the financial strain, may lie in the provision of equipment such as four-wheel-drive vehicles, radios, weapons and camping gear by outside agencies. SAVE, of New York, has already made moves to help in this regard; and the local Zambezi Society has offered to initiate a co-ordinated fund and equipment-raising campaign in tandem with the Zimbabwean Wildlife Society and the National Conservation Trust.

Zimbabwe Hits Back

Two poachers have been shot and killed in the Zambezi Valley so far this year. Another two have been wounded and six arrested during a series of contacts — some involving exchanges of fire — during the period from January to June.

National Parks patrols, aided by the police, have impounded five hunting rifles, all Winchester and Brno .375's and have also confiscated fourteen rhino horns in addition to those recovered by SRT in Zambia.

Several men have already appeared in court. Three have so far been convicted of offences including illegal hunting and the carrying of unlicensed weapons. One has been ordered to pay $5 000 in compensation –the current "book value" of a rhinoceros – to the Zimbabwe government.

Their defences often included an avowed ignorance of the location of the Zimbabwe-Zambian border, and of the aim of the incursions. Others insisted that they "had only come across for the day" to act as porters.

Such explanations got short shrift because the kilometre-wide Zambezi forms the international border at this point—and because the parties carried sacks of bread, maize meal, cooking pots, torches and skinning knives as well as the Brnos and Winchesters used to kill the rhinos.

Thus far, sentences have averaged two years per man — criticised as "derisory" in some quarters. However, Parks officials have expressed reasonable satisfaction: those so far convicted are relatively minor offenders. Three others, accused of killing three rhinos each, have been remanded for what are likely to be much heavier sentences.

Another part-answer lies in a continuing scheme to translocate a number of black rhino from tile Zambezi Valley into less vulnerable areas such as the Hwange National Park, where they were shot out by hunters early in the present century and are now slowly rebuilding their former strength.

Whatever the solution may be, local opinion is adamant that concerted action should not be delayed until matters reach crisis proportions. Hopefully, government will be able to provide the necessary manpower and financial muscle. Otherwise, the creation of a non-governmental agency along the lines of Zambia's Save the Rhino Trust may have to be considered. In either case, there is no time for lengthy debates: a renewed onslaught during the 1985-86 rains seems virtually certain.

Another vital matter concerns international co-operation. Although some Zimbabwean rhino horn was recovered by Zambia's SRT roadblocks on the Chirundu-Lusaka road'—which crosses the heart of the Zambezi Valley – there has been no concerted effort to help Zimbabwean investigators in tracking down and arresting the Zambian links in the chain, in spite of some very high-level diplomatic and other approaches. Once again, without this co-operation Zimbabwe is forced to rely exclusively on heavy ground patrols and cannot capitalise on the information it gleans from the sacrificial pawns it arrests in the Zambezi Valley.

With prices for rhino horn soaring over the $10 000 per kilogram mark in its ultimate markets, high risks can bring high rewards, Increasing sophistication and indeed aggression, both by poachers on the ground and by middle-men further up the chain, needs both dedication and resources to fight effectively. In spite of all the thousands of words devoted to rhino poaching —including this current addition – the key lies in money, manpower, and international pressure on end users. Otherwise the Zambezi Valley rhino may follow those of the rest of Africa into oblivion.

Recent Developments in the Japanese Ivory Trade and the Implementation of Cites in Japan

The importation of ivory into Japan has never effectively lent itself to control. Previously, the importing companies were either affiliated with the Tokyo Ivory Association, the Osaka Ivory Association, or were totally independent with no affiliation whatsoever. The two regionally based associations are composed not only of importers, but also carvers, craftsmen, retailers, and other related concerns not directly involved in ivory importation. Occasionally in the past, importing members of a particular association have agreed to act in unison regarding specific trade policy and this has provided a small degree of control in the trade. However, as associations the Tokyo and Osaka groups function independently of each other and consequently do not always agree to pursue uniform policies. At the other extreme, the ivory trade activities of the independent importers have remained totally unaccountable to any outside interests.

Because the trade is characterised by such diverse commercial interests, recent attempts to establish controls have been frustrated. Although Dr. Esmond Martin was successful last August in obtaining promises for specific trade reforms from the importers affiliated with the Tokyo Ivory Association, the agreement was quickly abandoned because the Osaka association would not agree to adhere to the same import guidelines and the independent companies, who are heavily involved in the trade irregularities, were not approached at all.

Likewise, last Fall when Chris Huxley of the CITES Secretariat met with members of the two ivory associations in a meeting arranged by the Ministry of International Trade and Industry (MITI), frank discussions were not forthcoming because the importers present were reluctant to discuss their activities in front of other association members who are not involved in ivory importation. From the Secretariat's view it appeared that the ivory dealers were behaving in an uncooperative manner.

As a result of the kinds of problems these encounters produced and the mounting international criticism of Japanese ivory import practices, it was tacitly recognised by both the industry and the government that the ivory importers needed to be organised into a single cohesive body for control purposes. As a result of an Administrative Guidance request issued by MITI, the Zoogei Bukai (Ivory Importers' Group) was officially established within the Japan General Merchandise Importers' Association in December 1984.

This new group brings together for the first time the 25 ivory importing companies, including independents, plus representation of the two ivory associations into one body. Collectively the Zoogei Bukai members account for 98% of the total Japanese ivory import trade.

MITI quickly availed itself of the Zoogei Bukai and issued Administrative Guidance to the ivory importers to establish an interim import policy before the new trade regulations'–which will prohibit the use of country of origin certificates–take effect in April. Included in the MITI directives were total prohibition on trade from Burundi and Singapore, and a more stringent policy regarding trade from Zaire, Sudan, Uganda and Chad, and all re-export trade.

Although the MITI guidelines are welcomed and hold promise for 1985, they are in fact too late to mitigate the widespread abuse that marked last year's trade. The total for 1984 reached 473 tonnes —second only in Japanese history to the 475 tonne record set in 1983–and included more than 185 tonnes attributed to the Congo, Sudan and Zaire, all countries with export bans, and 33 tonnes from Burundi, a major conduit for poached ivory in Africa. The 1984 Customs statistics reveal the emergence of other serious abuse in the Japanese trade including one possible new route. Large quantities of ivory attributed to Uganda were first imported into Japan in August. This trade was steadily maintained through December making the Uganda total just under 100 tonnes and only two tonnes behind the single largest exporting country, the Central African Republic. In previous years a "Uganda Connection" has not been evident in the Japanese Customs data.

The government's Administrative Guidance did, however, begin to have effect in January of this year. An 18 tonne shipment from Singapore with Burundian documents noting Uganda as the country of origin was confirmed by the Japanese Foreign Ministry not to have been sanctioned by the proper Ugandan authorities. As a result, it was refused entry into Japan, becoming the first case of its kind. Since then other smaller shipments transited through Dubai have been stopped at Customs where they presently remain pending the outcome of government investigations.

It should be pointed out that Administrative Guidance has no real legal authority of its own and depends largely upon the co-operation of the importers themselves for its effective use. If, for example, the government refuses importation solely on the basis of Administrative Guidance and the case goes to court, the importer will win the case hands down. In that respect, it is noteworthy that the ivory importers have fully co-operated with the government in cases to date.

Despite the myriad of problems that have marked the past, the future clearly offers promise. The establishment of the Zoogei Bukai seems to provide a forum for effective control. Both the Zoogei Bukai and the Japanese government have maintained close contact with TRAFFIC (Japan) since the first of the year, particularly regarding

the cases stopped by Customs. As an indication of their future intentions, the Zoogei Bukai meeting on February B, 1985, passed four resolutions as follows:

1) "We will try to decrease the amount of imports and refrain from re–-exporting ivory, in order to secure the regular import of ivory.
2) We will co-operate with the African countries in the export quota system which is now under consideration.
3) We will support the establishment of the Ivory Unit at the CITES secretariat.
4) We will co-operate with and exchange information with the CITES Secretariat, TRAFFIC (Japan) and World Wildlife Fund Japan."

TRAFFIC is hopeful that the resolutions above will take positive form and, in doing so, the conservation of African elephants will be greatly advanced.

The address of the Zoogei Bukai is:

Zoogei Bukai
Japan General Merchandise Importers' Association
2-4-1 Hamamatsucho
Sekai Boeki Center Building
Minato-ku
Tokyo 105, Japan.

Tom Milliken, Director,
TRAFFIC (Japan).
February 22, 1985.

Book Review

The Japanese Ivory Industry, by Esmond Bradley Martin (World Wildlife Fund, Japan, 1985)

Most published work on ivory has tended to be either statistics-laden analyses of the effect of the trade on elephants, or adjective-laden descriptions of the work of the great masters. There is a significant gap in our knowledge of what happens to elephant tusks between the packing crate and the collector's shelf.

Esmond Bradley Martin, who has previously done landmark research into the rhino horn trade, is helping to fill that gap. He has already published several articles on the ivory industries of African nations, in **Pachyderm** and **Traffic Bulletin**. The subject of this review is a beautifully-produced booklet describing the Japanese ivory industry.

The book opens with several pages of photographs and drawings of stages in carving, from stacked tusks to a range of finished products including seals, musical instruments, and figurines. The photographs of the figurines are especially attractive, but unfortunately show up the merely average drawings.

The text begins with a description of the history of the ivory industry in Japan. The industry extends back several centuries, but only began to consume really large quantities of ivory in the 1970's. Since then, Japan has become the world's largest ivory importer, and is unique in that almost all the ivory that is imported is consumed internally.

Most of the ivory is made into personal seals, which are used in lieu of signatures. Dr. Martin describes their place and importance in Japanese society, and their techniques of manufacture. He goes on to describe the other products made from ivory, such as jewellery, musical instruments, and artistic carvings. The carvings, done by master craftsmen, receive a deservedly long description in the text, having already provided the high points of the photographs.

Dr. Martin goes on to describe the activities of the ivory dealers and the ivory trade associations. It is interesting that as early as 1980 they were expressing concern over the sustainability of the annual ivory offtake. This concern has recently been expressed in the associations' support for genuine enforcement of CITES regulations by the Japanese government.

The booklet ends with a number of tables containing a great deal of interesting and useful information. These may be the most important part of the book for those actually studying the trade.

All in all, the booklet is useful far beyond its small size, because it fills a large gap in our knowledge. It is unfortunate, in this regard, that it was four years in publication, so the latest information is for 1980. This in no way diminishes the import of the facts it does contain, however, and the book makes a key contribution to our understanding of the forces affecting the ivory trade.

Its strength serves to point out a glaring weakness; the limited information available on the Hong Kong carving industry. Ian Parker, who deserves credit as the first, and still most important, filler of the crate-to-shelf information gap, did valuable research into the Hong Kong industry in the mid-1970's. However, his findings, which are now a bit dated, are available only in his mammoth Ivory Report, which is not published. Perhaps he should be supported to carry out and publish an in-depth follow-up study, to describe in more detail the other major ivory consumer.

Tom Pilgram
WICI, Nairobi

New Procedures for controlling the Ivory Trade

ROWAN MARTIN

In September 1983, at the meeting of the African Forestry Commission of the FAO, the Working Party on Wildlife Management and National Parks recommended that African ivory producing countries set quotas of ivory for export, and this recommendation was reaffirmed at the Seminar on CITES implementation held in Brussels in June1984. Following the Brussels meeting the CITES Secretariat initiated a consuitancy to pursue the proposals with African states, and this consultancy was carried out by Rowan Martin from the Zimbabwe Department of National Parks and Wildlife Management between November 1984 and March 1985. At the same time, John Caldwell and Jonathan Barzdo of the WTMU in Cambridge prepared a report on the world trade in raw ivory in 1983 and 1984.

Sixteen ivory producing countries were visited and the report was divided into 3 sections dealing with elephant population estimates, a method for setting quotas, and the administrative procedures which would be required to make the quota system work.

The population of African elephant was estimated at slightly over one million animals, and a simple model of elephant numbers and the volume of ivory entering the trade confirms that the population is unlikely to lie outside limits of 0.8-1.3 million animals. Models of ivory harvesting suggest that an annual ivory harvest of about 700 tonnes is more than populations can sustain and quotas should be set to reduce this substantially. It would be possible to produce over 750 tonnes of ivory from a million elephants with good management, but not with the present strategy of selectively killing older animals.

The method suggested for setting quotas is based on the utilisation policy of the country concerned, and relies on estimates of animals which die naturally, animals killed as a result of management

programmes, and animals killed illegally. Allowances are made for surplus stocks and confiscations, and the quota is separated into amounts which will enter the international trade, amounts which will be used by domestic carving industries and tusks which will be exported as sporting trophies.

For the system to work, both international and internal administrative procedures need to be put in place. Of these, perhaps the internal issues are the more critical since it is only in this area that illegal hunting can be contained and the internal carving industries controlled.

The recommendations from the report together with proposals from the CITES Secretariat were discussed at the 5th Meeting of the Parties to CITES in Buenos Aires in April 1985. A resolution proposing the introduction of the quota system was adopted by the meeting with no dissenting votes.

The key aspects of the new system are as follows:

1. Ivory producing countries will set a quota of tusks which they expect to export in 1986.
2. All present stocks of ivory held by both producer and non–producer countries will be registered before the end of 1986.
3. An Ivory Unit will be established within the CITES Secretariat which will maintain a data bank of the registration numbers of all tusks in trade, or likely to enter' the trade.
4. A set of referral procedures will be initiated whereby no shipment is cleared by an importing country until the CITES Management Authority in the exporting country has confirmed the authenticity of the export with the corresponding Management Authority in the importing country. Copies of all export documents will be sent to the CITES Ivory Unit to enable them to monitor quotas and assist in the referral procedure.

The new system should result in improvements, certainly in the ivory traffic between Party States. Hopefully the process of quota setting will focus the attention of the wildlife agencies in producer countries on improving the management of elephant populations and critically identifying the sources of ivory entering the international trade. If all Party States co-operate and the CITES Ivory Unit is successful, the possibility exists of having a daily knowledge of the location of all tusks in legal trade – which would be a major development.

Letters to the Editor

Elephants and Woodland –A Reply

It was a novel experience for me to be lectured by Lindsay and Olivier on my philosophical bias against dynamic change in ecosystem structure (are there other kinds of change?) and about the differences between ruminant and non-ruminant feeding strategies. While I admit that the paper by Jachmann and myself could have been better expressed, I would like to argue the following points:

According to Maglio (1973) the modern African elephant, **Loxodonta africana**, is relatively primitive in its browsing dentition, and evidently remained a forest or forest-margin species until the demise of the grazing **Elephas recki** which occupied the East African savannas until about 35 000 years b.p. On the question of whether the elephant is primarily a grazer when circumstances allow, I am aware of Olivier's (1978) work indicating that **Elephas maximus** selects strongly in favour of monocots in an Asian forest environment; nonetheless, grass makes up a small proportion of its diet. Similarly, with **Loxodonta** we have examined the browse-graze ratio by means of carbon isotope ratios in bone, determined by Julie Lee Thorpe at the University of Cape Town. We find that the browse-graze ratio is a function of woodland density and ranges from about 100% browse in closed forests to about 50% browse in open areas such as Tsavo East. We are now looking for samples from primarily grassland habitats, and would be glad of some Amboseli specimens. However nobody appears to argue that elephants perform better on a diet of pure grass than on a diet containing a substantial browse fraction, or disputes that browse is critical as a dry season food reserve. We may therefore eliminate the first branch of the argument, that the reason elephants kill trees is because to do so stimulates grass production (which it does) and thereby enhances elephant food supplies.

We may assume, therefore, that (perhaps excepting permanent marsh conditions) elephants require a diet consisting of at least 50% browse on a year-round basis. Therefore a key factor in determining elephant population performance is the density of available browse, that is, browse about 3m above ground. The question now is: how does use by elephants affect this value?

Tom McShane and I are currently examining the factors that control the probability that a tree will die or coppice as a result of breakage by elephants, at a number of locations in Malawi. The factors we have identified are as follows:

(a) The probability of tree death seems to be higher in certain species irrespective of other factors. Susceptible genera are **Acacia, Commiphora**, and **Adansonia**, among others. **Brachystegia, Julbernardia, Isoberlinia, Colophospermum**, some combretums, terminalias, and a range of other species characteristic of the moist-oligotrophic savannas have a higher probability of coppicing, although under certain conditions, as with **Brachystegia boehmii** in Sengwa and Chizarira, Zimbabwe, they may be killed.

(b) Climate: The probability of tree death seems to be higher in more arid areas, particularly below about 600 mm per annum.

(c) Soil conditions: The probability of tree death seems to be higher in soils of higher fertility and lower infiltration rates. Since those factors are mutually correlated, it is hard to distinguish the primary determinant. Perhaps both are involved: more fertile soils support higher biomasses of elephant, leading to more intense use of the vegetation; higher infiltration rates allow greater moisture availability to tree roots and hence may allow coppicing more readily, as well, perhaps as allowing heavier investment in chemical defence. However, in "overdrained" sands moisture availability is low; this may account for the tree death in Sengwa-Chizarira.

(d) Tree size and shape: The probability of tree death is greater in very small and very large trees, while in trees from 2-20cm in diameter the probability of coppicing is relatively high. Further, a tree that has been coppiced once has a low probability of death due to further elephant use. Weyerhauser (1982) made the same point concerning survivors of ring barking.

(e) As a result of the last factor, stand history becomes important. Young stands or stands that have been subject to cultivation or previous elephant use are more resilient to elephants then protected mature stands.

The effect of coppicing is to increase the density of available food for elephants for the following reasons:

(i) Tree biomass production is stimulated during regrowth;

(ii) Edible biomass is produced within the height range accessible to elephants;

(iii) Regrowth is of higher primary quality, being younger and thinner than mature material; the effect on secondary chemical defences is unknown and subject to dispute;

(iv) The edible biomass is denser in space, leading to larger amounts per trunkful and hence faster intake;

(v) The breakage pattern has the above effects preferentially in preferred species (Jachmann 1984).

Under what conditions do trees respond in this way to elephant use? We argue that over most of the range of both the African and Asian elephants (taking a risk with Olivier involved) the coppice response is characteristic of elephant-woodland interactions. First, there can be no doubt that in most areas of plateau miombo, elephants and woodland can exist in a coppice equilibrium. In Kasungu National Park airphotos indicate that an equilibrium of this type has persisted over at least 40 years. What happened before this is hard to say, although the carbon isotope ratio method does provide a possible avenue to examining the history of elephant-woodland interactions since the browse-graze ratio as indicated by bone isotope ratios appears to be a simple function of woodland density, so that an index of tree density could be obtained from archaeological material. Similarly, the miombo margins of the Luangwa valley appear to be in coppice equilibrium with elephants, although elephant densities are no longer stabile as a result of illegal hunting. Some areas of better drained escarpment miombo do not respond in this way, as indicated above, but these make up a small proportion of the central-southern African mesic savannas. Similarly, Tom McShane has detailed data from Parc "W" in Niger indicating that the West African broad-leaved savanna responds by coppice equilibrium. As for the forest areas, I am not aware of any reports of reduction of forest density by elephants, except at its margins in conjunction with fire, as in Uganda. Primary forest, in fact, is a rather poor habitat for elephants, and much of Olivier's (1978) Ph. D. thesis was devoted to proving, very successfully, that secondary forest, modified by cultivation and elephant activity, provides a more suitable habitat with much more edible material within reach. Alan Rodgers reports similar situations in India.

We conclude, therefore, that it is only in certain of the arid eutrophic savannas that the long term effect of elephant use is to reduce browse availability, and even here this outcome is by no means universal. Rick Weyerhauser (1982), for example, has shown that in Manyara National Park the density of **Acacia tortilis** plants has doubled over about 10 years as a result of the removal by elephants of the mature canopy, thus allowing seedling regeneration. Here, the absence of fire may be a key factor.

We now come to the question of whether elephant behaviour towards trees is adaptive or maladaptive. We may define a trait as adaptive if its probability of representation in the next generation is equal to or higher than that in the current generation, as maladaptive if it is lower. We will leave aside the question of whether tree-damaging behaviour is genetically or socially transmitted, since from the point of view of this argument the two are probably equivalent except in rate of change; we will assume that natural selection operates similarly in both cases.

The immediate advantages to the individual elephant of pushing over trees are the short term effect of bringing the edible biomass within reach, and the more speculative social advantages proposed by Hendrichs and Hendrichs (1971) (wrongly attributed by us to Douglas-Hamilton). If the tree coppices or if it is replaced by regeneration, the elephant obtains further advantages, listed above, delayed by 5-15 years but well within its life span, to say nothing of that of its kin group. We may conclude that, in situations where tree damage results in increased food availability due to coppicing or regeneration, tree damaging behaviour is clearly adaptive in both short and long terms. These situations we believe to cover the majority of elephant habitats.

The question remains, then, of whether tree damaging behaviour is maladaptive in those few situations where neither coppicing nor regeneration occur and a period of low browse availability ensues. The morel look around, the morel have trouble in locating good examples of this type, but certainly Tsavo and Murchison Fails have provided evidence of substantial elephant declines resulting from elimination of woodland while Ruaha and Hwange might have done so had it not been for the poaching and culling respectively. Why, in these situations, has tree damaging behaviour persisted? There seem to be a number of alternatives.

Lindsay and Olivier appear to arguing that a non-tree-damaging trait could hot penetrate a normal elephant population because the short term advantages of allowing the individual to feed on the canopy or bark will invariably outweigh the long term disadvantages of reducing the browse supply, that is, they are worried about a group selectionist argument. Against this, I would quote the situation in Namibia where, according to Anthony Hall-Martin, the desert elephants do not damage trees, but feed on them on a sustainable basis, implying that where the long term disadvantages of tree damage are sufficiently strong, a non-tree-damage trait can penetrate the population. In fact the clan system of elephants, with its relatively exclusive use of resources by kin groups, provides rather favourable conditions for the spread of resource-use limitations through kin-selection.

An alternative possibility is that the tree-dam aging trait has not in fact persisted in the localities named. Do we know that it has survived the crash in Tsavo? It would be worth checking. (This alternative implies that the stable limit cycle has not been a regular feature of elephant-woodland interactions, but don't worry, I am one of Caughley's most fervent admirers).

A third possibility is that the surviving elephant populations will capture the regeneration (when it occurs) in a coppice equilibrium, again implying that the pre-Park mature woodlands were a man-induced artefact.

A fourth possibility is that the stable-limit cycle has been a regular feature of the arid-eutrophic savannas but that, following each crash, the affected areas have been recolonised by elephant from surrounding moist-oligotrophic areas, carrying with them the tree-damaging trait.

On the whole, I prefer the last alternative. Is mailadaptive the right word for this situation? Perhaps not, does it matter?

Finally, after all this technical detail, I ask myself what Lindsay and Olivier are **really** worried about. Usually this kind of argument has its roots in some concern about culling. If so, let me once again make my position perfectly clear: The decision as to whether or not to cull is only indirectly related to the technical aspects of the elephant-woodland interaction; it depends on the objective for the area and rests equally on a set of aesthetic decisions (Bell 1983). Neither the compression model nor the stable limit cycle model nor the coppice equilibrium model by itself argues for or against culling. In Kasungu National Park, for example, the master plan calls for maintenance, through elephant culling, of the mature woodland structure with its specialised woodland fauna (sable, roan, hartebeest, etc) of part of the Park, and for no manipulation of the areas already stabilised as coppice equilibrium (Bell 1981).

R.H.V. Bell, Senior Parks & Wildlife Officer (Research),
Dept. of National Parks and Wildlife,
Malawi.

REFERENCES

Bell R.H.V. (1981): An outline for a management plan for Kasungu National Park, Malawi. In Jewell P.A., S. Holt and D. Hart (Eds). Problems in management of locally abundant wild mammals. Academic Press, New York. pp 69-89.

Bell R.H.V. (1983): Decision-making in wild life management with reference to problems of overpopulation. In Management of large mammals in African conservation areas. R.N. Owen-Smith (Ed). Haum, Pretoria. pp 145-172.

Hendrichs H. & Hendrichs U. (1971): Dikdik und Elefanten: Okologie und Soziologie zweier afrikanisher Huftiere. Munich. Piper Co.

Jachmann H. (1984): The ecology of the elephants in the Kasungu National Park, Malawi. Ph.D. Thesis, University of Groningen.

Maglio V.J. (1973): Origin and evolution of the Elephantidae. Trans.Am.Phil.5oc.**63**(3):1-149

Olivier R.C.D. (1978): On the ecology of the Asian elephant. Ph.D. Thesis, University of Cambridge.

Weyerhauser R. (1982): On the ecology of the Lake Manyara elephants M.Sc. Thesis, University of Yale.