

# Pachyderm

A PUBLICATION OF THE AFRICAN ELEPHANT AND RHINO SPECIALIST GROUP

1989

NUMBER 12



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



Produced  
and funded by

**WILDLIFE  
CONSERVATION  
INTERNATIONAL**



Cover Photo:  
12,000 kgs of ivory being burnt to  
evidence Kenya's commitment to  
stamping out the ivory trade.  
Copyright David Western

#### Editorial Board

Dr C.G. Gakahu -Chairman  
Dr O. Western  
Dr E.B. Martin  
Barry Goode  
Lucy Vigne

*Pachyderm* Office  
Wildlife Conservation International  
1st Floor, Embassy House  
Harambee Avenue, Nairobi

All correspondence should be sent to:  
*Pachyderm*  
Wildlife Conservation International  
P.O. Box 62844 Nairobi, Kenya

Tel: 21699/24569  
Telex: 22165 WC NYZS KE  
Fax: 729176

#### A notice to contributors

*Pachyderm* is a biannual publication of the African Elephant and Rhino Specialist Group (AERSG), one of the specialist groups of the Species Survival Commission (SSC) of IUCN. *Pachyderm* offers information, news and opinions about issues related to conservation and management of elephants and rhinos with especial reference to Africa.

We welcome articles written in a popular style and research papers. Contributions, which normally should be no longer than 2,000 words, are acceptable either on disk, in any usual format,

# Pachyderm

1989

Number 12

## Contents

- 
- |       |   |
|-------|---|
| 2     | <b>Chairman's Report</b><br>Ivory Trade under Scrutiny<br><div style="text-align: right;"><i>David Western</i></div>  |
| <hr/> |   |
| 4     | <b>The Decline and Fall of India's Ivory Industry'</b><br><i>Esmond Bradley Martin with Lucy Vigne</i>  |
| <hr/> |   |
| 2 2   | <b>Doctoring Rhinos: Diseases seen in Kenya</b><br><i>John Francis Jonyo</i>  |
| <hr/> |   |
| 2 4   | <b>Zambia's Pragmatic Conservation Programme</b><br><i>Dale Lewis</i>   |
| <hr/> |   |
| 2 7   | <b>Luangwa Rhinos: "Big is best, small is feasible"</b><br><i>Leader-Williams</i>   |
| <hr/> |   |
| 2 9   | <b>Tracing Ivory to Its Origin: Microchemical Evidence</b><br><i>R.H.V. Bell, J.P. Kelsall, M. Rawluk and D.H. Avery</i>  |
| <hr/> |   |
| 3 2   | <b>The Ivory Trade and the Future of the African Elephant</b> - Summary of the Interim Report of the Ivory Trade<br><div style="text-align: right;"><i>Review Group</i></div>   |
| <hr/> |   |
| 3 8   | <b>The Rhino Product Trade in Northern and Western Borneo</b><br><i>Esmond Bradley Martin</i>   |
| <hr/> |   |
| 4 2   | <b>The Ecological Role of Elephants in Africa</b><br><i>David Western</i>   |
| <hr/> |   |
| 4 6   | <b>Monitor</b> <ul style="list-style-type: none"><li>- Forest Elephant Survets in Central Africa</li><li>- Namibia Dehorns Damaraland Rhinos to Thwart Poachers</li><li>- Dehorning Rhinos in Damaraland - A Controversial Issue</li><li>- Aberdare Rhino Sanctuary</li></ul> |
- 

or as manuscripts, which should be double spaced with a wide left-hand margin. References should only be for verification. Illustrative materials such as graphs, maps, black and white photographs must be included and should be kept simple in order to make the message clear. The deadline for articles for inclusion in the next issue is 28 February 1990.

Contributions do not reflect the views of AERSG, SSC or IUCN.

**C.G. Gakahu**

**Chairman, Editorial Board**

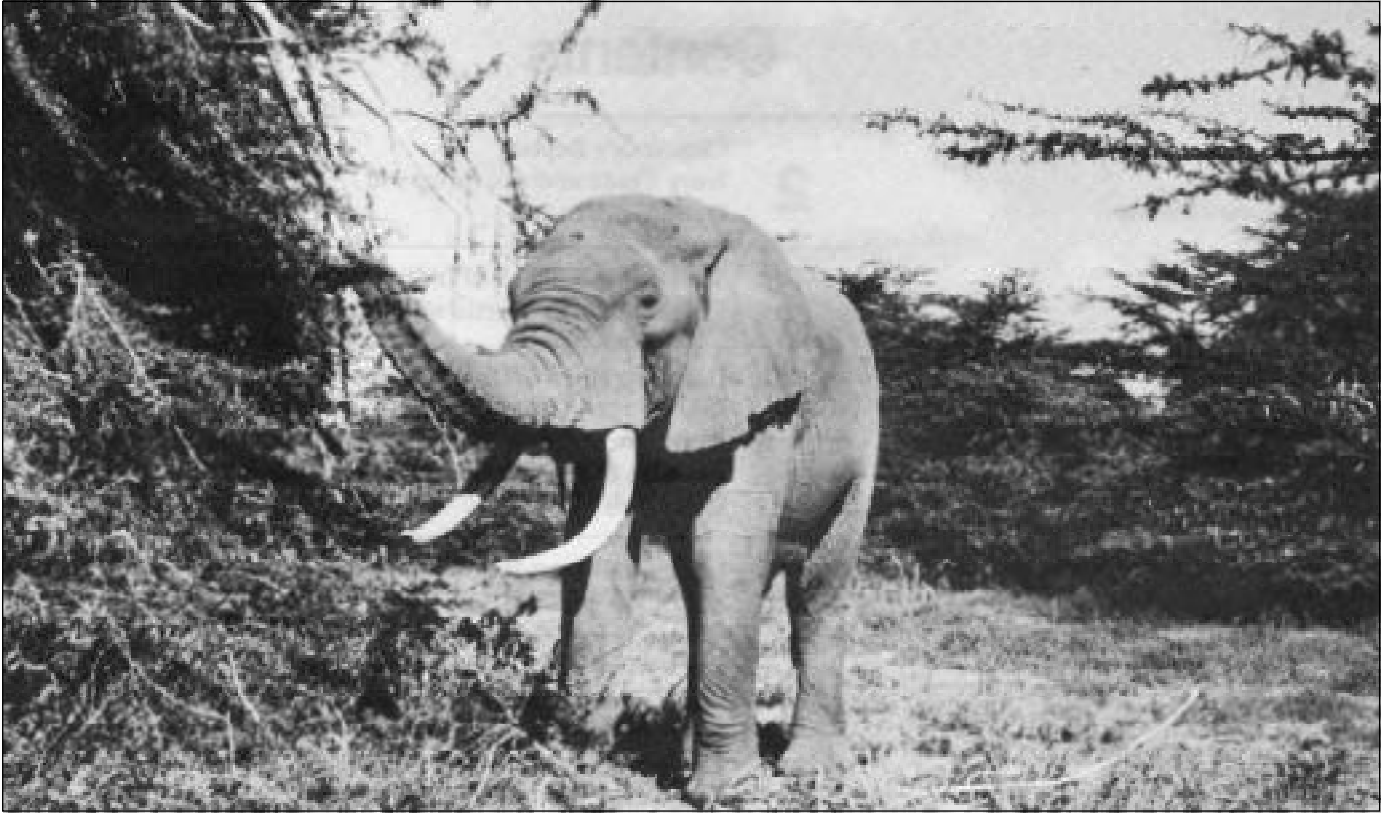


---

# Chairman's Report Ivory Trade under Scrutiny

David Western

Copyright C. A. w. Guggisberg/A. W.F.



*Bull Elephant in Amboseli*

The breakneck speeds with which ivory bans were imposed by the United States, Europe, Hong Kong and Japan at the beginning of June has left traders and producers baffled and angry. Speed and decisiveness are, after all, hardly qualities to describe the ponderous progress by which conservationists have reached a consensus on the status of the African elephant. What led to such prompt action by the main ivory consumer countries during two weeks in June? An appeal by several African governments, press coverage of ivory poaching and a non-governmental media campaign all contributed, but perhaps no factor catalyzed the chain reaction so rapidly as the study released by the Ivory Trade Review Group (ITRG) on 1 June. A summary of the study and its recommendations is given in this issue of *Pachyderm*.

An independent study of the global ivory trade and its impact on the African elephant, outlined in *Pachyderm* No.11, was initiated by Wildlife Conservation International (WCI) early last year. In July 1988, AERSG, TRAFFIC, the Wildlife Trade Monitoring Unit (WTMU) and CITES Secretariat supported the ITRG, which was formally convened in Nairobi later that month. During a ten-month period, the study, funded by WCI and WWF

with subsidiary projects covered by U.S. Fish and Wildlife Service, EEC and AWF, brought together more than 35 specialists who were to produce an independent review of the trade; the collaborating agencies were not bound by the results. The African Elephant Working Group (AEWG) of CITES later asked ITRG to submit its findings to its July 1989 meeting in Botswana. The CITES Secretariat also commissioned reports by Ian Parker, Rowan Martin and Graeme Caughley on various aspects of the ivory trade.

The findings of both the Caughley and ITRG reports concluded that the number of elephants was in sharp decline due to the ivory trade. The Caughley report, a simulation model of the ivory trade, predicted East Africa's elephants would be virtually extinct in five to seven years, and Africa's population in 15 to 20 years. Caughley's model assumed elephant numbers would shrink at an accelerating pace as poachers increased their effort to supply the ivory market as herds dwindled. Though completed in December 1988, the Caughley report was not circulated by the CITES Secretariat to AEWG members until June, notwithstanding its gravity.

---



---

The ITRG report took a slightly different tack by considering the age structure of populations in addition to overall numbers. It also made the more conservative assumption that poaching off-take would remain a constant rather than increasing fraction of the remaining population. The ITRG model also recognized regional differences in the status of populations, where the Caughley model made no distinctions. Despite the differing assumptions, both the Caughley and ITRG models draw the same conclusions. At the present levels of poaching, the ivory trade will bring elephants close to extinction.

The ITRG report stressed the highly skewed age and sex structure of Africa's elephant herds, a point borne out by the decline in tusk weights in recent years and by direct observations in the field. The large males, which once produced most ivory for the trade, have been killed off, leaving a preponderance of females and their young. Compared to ten years ago, twice as many elephants are now killed to supply a tonne of ivory. The volume of trade, which increased from around 220 tonnes a year in the 1950s to some 1,000 tonnes a year during the 1980s, is quickly contracting as the herds diminish; increasing wealth in Asian countries is cited as the main reason for the trade's expansion. With over 80% of all raw ivory coming from poached elephants, the present CITES ivory control system is clearly failing to stem the grave threat to the African elephant.

According to the ITRG report's economic analysis the benefit Africa derives from the trade is trivial. Because most of the profit is skimmed off by middlemen and corrupt officials, less than US\$ 5 million of the over US\$ 50 million value of annual ivory exports sees its way back into government coffers. In all but the one country which serves as a conduit for smuggling, ivory shipments provide a minuscule portion of export earnings. More to the point, a preoccupation with the ivory trade masks other, often far greater, benefits due to elephants. The tourist income accruing to elephant viewing in Kenya is, at US\$ 50 million annually, worth more than Africa's total realized ivory export earnings. Sport hunting and the sale of meat and skins are also lucrative, especially in southern Africa. Elephants help to diversify both savannas and forests; the loss of the African elephant would reduce biological diversity and possibly lead to accelerated extinction of other species. No less important, the elephant is a conservation flagship, a species that evokes strong sympathy and can, given public support, help protect the ecological integrity and diversity of Africa ecosystems.

The ITRG report, in looking at policy options, considers sustainable utilization the preferred conservation tool. However, because populations are rapidly collapsing and the sustainable ivory off-take is so reduced by over-hunting, the report supports Appendix 1 in the interests of the African elephant as a whole, despite the health of a few exceptional populations in southern Africa. The weaknesses inherent in a ban are acknowledged, but no other option offers better hope of conserving elephants. The report suggests that the prospect of a ban on the trade will lead to a further price surge and an escalation of poaching, which can be restrained only by immediate import bans in consumer countries; it stresses the need for complementary conservation measures in the field, along the lines of AERSG's Nyeri Action Plan (*Pachyderm* No. 11).

The simultaneous release of the document in Hong Kong, Washington, D.C. and Gland, Switzerland, was widely covered by the press and played a significant part in inducing the bans on ivory imports announced the following week by the United States and the European Community, and by Hong Kong shortly afterwards. Japan, which received the ITRG report within a few days of its release, introduced an import ban on all worked ivory and raw ivory from all non-African states.

The ITRG findings and recommendations were presented at the AEWG meeting in Botswana during the first week in July. The meeting, where central and west African nations were poorly represented (Senegal alone was present from the latter), divided along geographic lines, with the eastern African countries supporting the ITRG findings and the southern African countries claiming that the results were inapplicable to their situation. The states in favour of Appendix 1, including Kenya, Tanzania and Somalia, felt that continued trade in southern Africa would provide a conduit for illegal ivory from the north. The southern states, while accepting the inadequacy of existing ivory controls, argued that culling programmes to contain expanding elephant populations reflected good management, which should be rewarded by ivory revenues.

Although attempts were made to reconcile the two positions, no satisfactory compromise was reached. Part of the reason for the lack of agreement lay in heated discussions as to whether poaching was contained by good management, as Zimbabwe claimed, or if the lack of poaching in southern Africa was serendipitous: the latter view suggested by the case of Botswana, a country where an elephant population is rapidly expanding despite being much less protected than most East African herds. Mediators were appointed to try to reconcile the different positions during the weeks before the full Conference of Parties in Lausanne.

AERSG did not take a formal position at the Botswana meeting since none of the studies were available in time for a full review by the members. In the coming three months the regional chairmen will need to consult their members before we can attempt a consolidated statement. It will not be an easy task given the prior positions adopted by most states and the diversity of opinions AERSG members hold. The ivory trade is a hot political issue in Africa today, involving gross corruption and the loss of dozens of lives each year. Kenya, in a show of determination to prevent the ivory trade, burned its 12 tonnes of stock-piled ivory on 18 July. At the widely publicized event, President Moi called on other African states to ban the trade and destroy their ivory stocks. Clearly, the matter will be decided as much by politics as technical arguments.

One thing is beyond doubt, The elephant has become an international issue. Whatever the outcome of the CITES meeting in October, I suspect that public awareness will ease the pressure on elephants within a year by reducing ivory demand and spurring on conservation efforts.



# The Decline and Fall of India's Ivory Industry

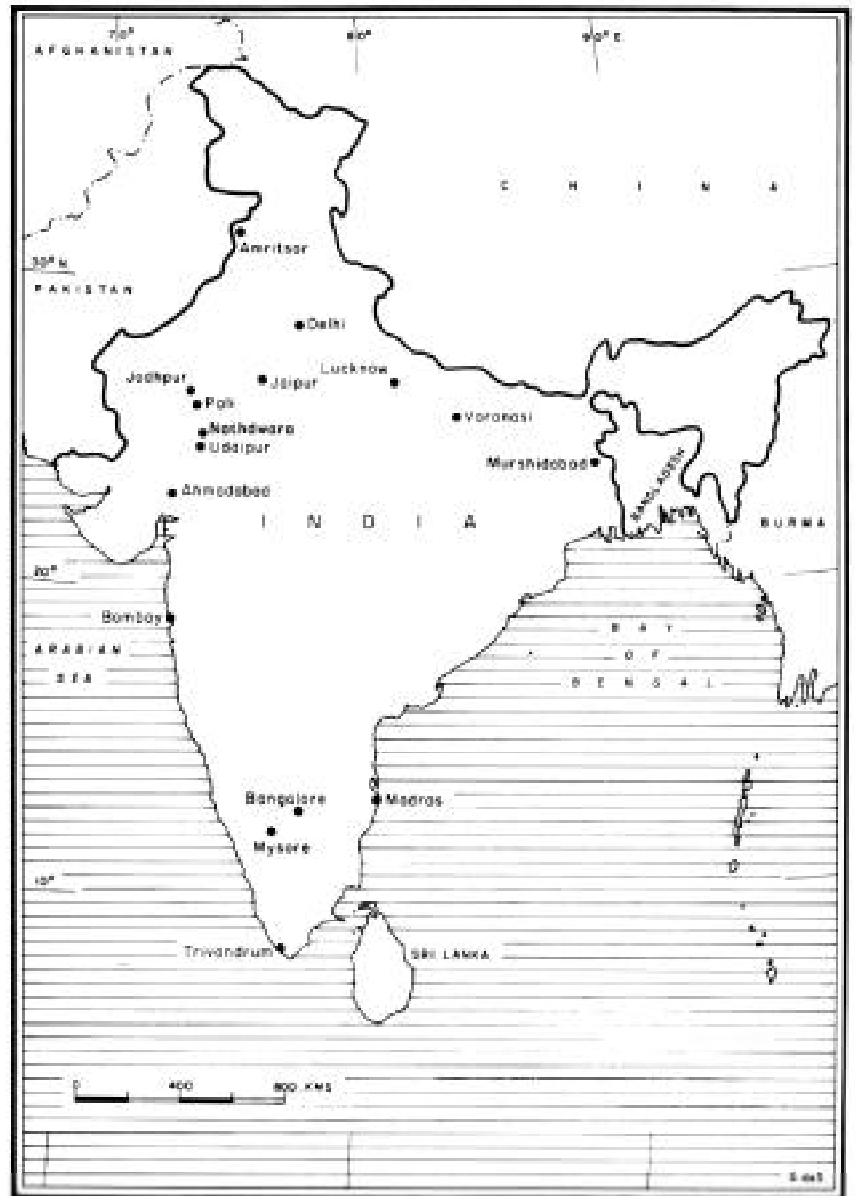
Esmond Bradley Martin with Lucy Vigne

## Historical Background

Elephant ivory has been a highly esteemed natural resource in Indian culture for thousands of years. Although it is not known when Indians began to carve elephant tusks, by the time of the Harappan culture (2500-1750 BC), ivory was already being made into animal figurines, jewellery, dice, inscribed seals, hairpins, combs and containers.<sup>1</sup> By the year 1700 BC, the ivory industry had become so sophisticated that dealers and carvers had formed guilds<sup>2</sup>. We know that Indian ivory was exported to the court of Darius I in Iran during the 6th century BC and that ivory was used by Indians in unique ways in the 2nd century BC, such as for snaffle rings on horses' bridles. At Nevasa, in the present state of Maharashtra, about the time of Christ, ivory bangles were already being made on lathes<sup>3</sup>. In eastern India, especially in Orissa, by the 13th century, some of the finest ivory objects in the world were being produced: chariots, palanquins, balconies, beds and the famous throne legs. Some people believe that erotic ivory carvings are new in India, being made to appeal to the taste of European and Japanese tourists, but this is not true: in Orissa in the 13th and 14th centuries master craftsmen were producing intricate ivory sculptures of couples in all sorts of acrobatic positions of love-making.<sup>4</sup>

With the advent of the Mogul rulers in India during the 16th century, the carving and painting of ivory plates in the Persian style flourished. Many of the ivory craftsmen worked for the Muslim emperors at their courts in Delhi and Agra, carving back-scratchers, dagger-hilts and gunpowder flasks made entirely from ivory. In his autobiography, Emperor Jahangir (1605-1628) mentions by name several ivory carvers and notes that he gave an elephant to one of them as a present.<sup>5</sup> In the Mogul period, which embraced three centuries of Indian history (1526-1858), ivory carving was carried out in Hyderabad, Goa, Madras, Mysore, Maduri, Trivandrum, Orissa and Amritsar. The Mogul rulers maintained many elephant battalions which produced sufficient supply to allow for ivory pillars, doors, furniture and inlaid ceilings.

The European colonization of the Indian sub-continent led to the introduction of new technology and ideas which wrought extensive change to the ivory industry. With the elimination of the Mogul emperor in 1858, craftsmen lost their greatest patron



CENTRES OF IVORY MANUFACTURING AND PAINTING IN INDIA IN 1988

and could no longer afford to spend many months working on a single item. On the other hand Europeans in India and at home developed a taste for ivory carvings, and provided the incentive to produce more items and to produce them quickly. The foreigners particularly wanted chess sets with snarling tigers and kings mounted on elephants, fancy pieces, but they did not have to be delicately carved. Thanks to the introduction of sharper and stronger tools which facilitated their work, a form of mass production emerged, and less and less emphasis was placed on high quality workmanship. Dr. G.N. Pant, an art historian at the National Museum in Delhi, believes that ivory carving during the latter part of the 19th century declined from an art to a craft.<sup>6</sup>



## India's Imports of African Ivory

Although statistics for the 19th century are incomplete, there was a gradual increase over the period in Indian raw ivory imports from Africa.<sup>7</sup> The two main ports which handled this trade, Bombay and Surat, were receiving an annual average of 150 tonnes of ivory between 1803 and 1819, and the prices paid for it during that period were actually declining. However, from 1820 to 1857, the annual average increased to 234 tonnes, and the prices also went up, indicating a greater demand.

From 1830 to the late 1850s, 54% of all the ivory imported to Bombay, mainly via Mozambique, Zanzibar and Aden, was re-exported to Britain, 6% re-exported to China, and only 37% was retained in India. The value of these re-exports increased at an average rate of 2.8% per year.<sup>8</sup> From 1874 to 1881, imports declined slightly to an average of 225 tonnes annually, but the amount used within India increased; for example, of the 210 tonnes imported during the financial year 1883/84, 54% was retained.<sup>9</sup> From the 1870s to World War I, India continued to be one of the largest ivory markets, as an importer and re-exporter, rivalling Britain (343 tonnes imported a year from 1886 to 1913), Antwerp (265 tonnes on average per year from 1888 to 1913), USA (159 tonnes on average per year from 1884 to 1911) and Germany (152 tonnes on average per year from 1880 to 1896).<sup>10</sup>

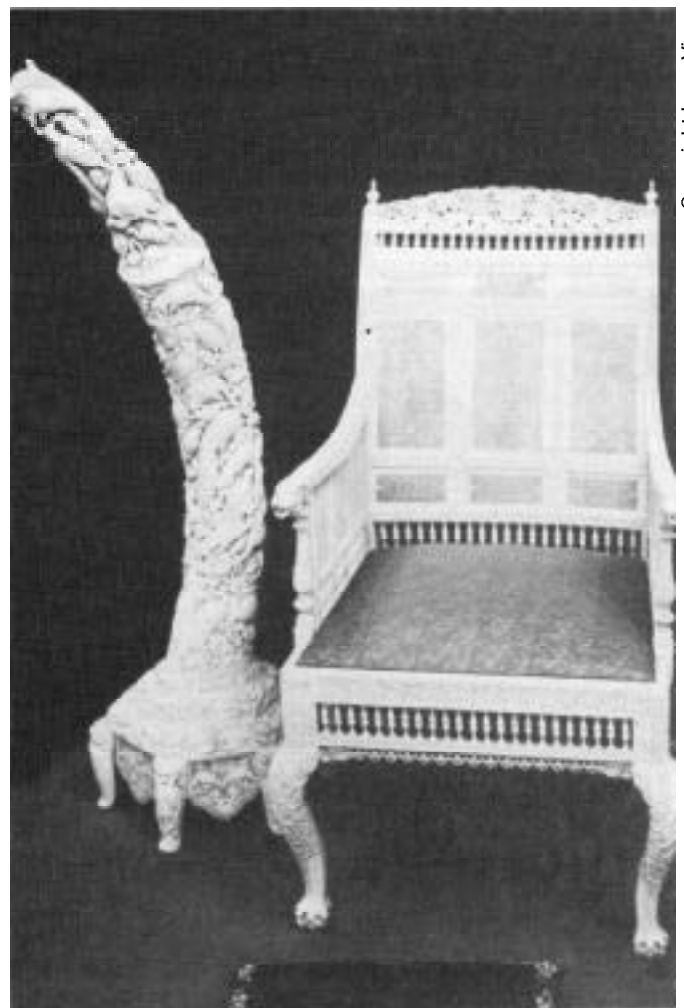
Although the world-renowned 1903 Delhi Exhibition highlighted India's historical and contemporary ivory carving, the amount of raw ivory imported between the two World Wars declined, and the industry slowed down. From 1919 to 1939, India imported about 125 tonnes per year. We also have statistics on India's exports of indigenous elephant ivory during this period: between 1918/19 and 1938/39, an annual average of just over a tonne went to Japan, mainly from Bengal and from Burma, which was then still part of India.<sup>11</sup> The seemingly odd practice of importing African ivory while exporting indigenous ivory had existed at least since the latter part of the 19th century and came about because the Japanese preferred the harder Indian ivory and were willing to pay a premium of about 23% more for it between 1918/19 and 1925/26.<sup>12</sup> Moreover, the Indian carvers preferred African ivory because, being softer and less brittle, it is easier to carve and less prone to cracking. The Indian dealers liked it because the tusks were so much larger.

For a brief period after World War II, India was one of the major importers of African ivory, taking an annual average of 246 tonnes between 1944/45 and 1946/47, but this quantity dropped to an annual average of 115 tonnes in the 1950s. By 1958 Hong Kong had become the world's largest ivory importer, closely followed by Japan which, unlike India or Hong Kong, did not re-export it to any degree and by the 1970s was the world's greatest ivory consumer.

In the 1960s, India's official imports of raw ivory were down to 50 tonnes a year. Zanzibar, which had been the main source of imports, providing more than half of India's total intake since 1950, underwent a revolution in 1964 and its role in the international ivory trade collapsed. While mainland Tanzania, Kenya and Uganda still had ample ivory, it was becoming

difficult for Indian traders to import it legally. On the other hand there was a large exodus of Indians from the East African countries when these became independent, and many who returned to their homeland took large consignments of ivory with them as a means of externalizing their wealth. No one knows how much ivory was smuggled into India during the 1960s, but traders in Bombay have told me that there were "tens of tonnes". Nevertheless India's importance as an international ivory market continued to diminish and fall further behind Hong Kong and Japan.

Illegal imports of ivory from East Africa continued in the 1970s, but sharply diminished in the 1980s. Had it not been for them, India's ivory industry would have declined much earlier than it did. After independence in August 1947, it had become increasingly complicated for Indian traders to obtain convertible currencies; then, in the 1960s, the Indian government issued strict controls on import licences, and traders wishing to bring in ivory could not easily obtain them. Furthermore, high import duties were put on ivory, which discouraged the trade. The duties rose to 120% in 1978, and during the 1970s legal ivory imports fell to an average of 20 tonnes per year.



Copyright Lucy Vigne

*This intricate ivory chair is part of a furniture set completed in the 1950s.*



In the 1980s, up to 30 March 1987, an average of only 13.24 tonnes of African elephant ivory was legally imported into India each year, according to Indian Customs' figures, or 9.46 tonnes yearly according to the CITES statistics from the Indian Management Authority in New Delhi. The discrepancy in these two sets of figures cannot entirely be explained by the fact that CITES uses a calendar year and Customs a financial year. Since the Indian government raises considerable revenue from ivory imports, it is likely that the Customs' figures are more accurate, but the important point is that both show a very marked further decline. For 1988, CITES recorded just 2.1 tonnes, most probably the lowest ever for ivory imports into India.

Aside from the restrictions imposed by the Indian government, traders have experienced difficulty in buying raw ivory in Africa during this decade. In some African countries, the government puts all the ivory into a single consignment and sells it to one buyer only. Indian traders say that they do not have the money to purchase a whole consignment, which may be a very large quantity, and when this happens the tusks vary considerably in weight and quality. In fact, the majority of tusks so sold often weigh under 5 kg each. Indian traders usually want to buy tusks between 5 and 10 kg in weight, but they have no choice when the ivory is sold in bulk and not by lot.

Private ivory exporters have been abolished in many African countries, including Kenya. The exporters were often Indian residents with whom traders in Bombay maintained close contact. This ensured that the traders knew when ivory stocks were available and whether the ivory was what they wanted. After losing their personal contacts in the African trade, Indian buyers were not sure how to go about ordering ivory from the source countries.

By the late 1970s, some of the main Indian ivory importers had stopped trying to buy directly from Africa; instead, they made arrangements with Hong Kong dealers who allowed them to buy small quantities and select individual tusks. This strategy added greater expense to their purchases, further hampering their business.

## The Market for India's Carvings

At the end of the 19th century, India was one of the top three ivory manufacturing countries in the world. Thousands of craftsmen were processing not only imported African ivory but also Indian ivory from the local elephant population. Although we do not have statistics on China's ivory industry during the first half of the 20th century, it is probably true that India was the largest manufacturer of ivory items from 1900 to 1957.

Since the middle of the 19th century, foreigners have been the major purchasers of Indian ivory carvings. One authority estimated that "90% of the indigenous production was finding its way into foreign countries prior to World War II",<sup>13</sup> Although this percentage is probably an exaggeration as there was a thriving trade in ivory bangles for local consumption, there is no doubt that the industry made every effort to cater to foreigners; during World War II many skilled craftsmen even left their homes in Agra, Jaipur and Gwalior to go to Delhi to supply ivory animal figurines, vanity sets, cigarette boxes and jewellery to the foreign troops stationed there.<sup>14</sup>

The foreign demand for Indian carvings was discussed at length by Sir George Watt who compiled the official catalogue of Indian art for the 1903 Delhi Exhibition. Having visited almost all of India's best-known ivory carving centres, he provided a wealth of information on them, describing in detail regional specialities, how craftsmen were trained, and where the ivory they carved originated. Practically the only information lacking is the number of craftsmen in various cities and how much ivory was used in the industry. We cannot assess the value of the ivory industry at the turn of the 20th century, but it certainly produced many of the ivory items most sought-after in Europe.

According to Watt, the four most important ivory carving centres were Delhi, Murshidabad, Mysore and Travancore. In Delhi, Watt wrote, most craftsmen were Hindus, although the older examples of carvings to be found there were made by Muslims for the Mogul emperors' courts. The modern pieces, "mainly such as meet the requirements of the European demand", included table ornaments of miniature elephants, camels, horses and carriages; card cases and chessmen; glove boxes and paper cutters; mats woven from threads of ivory; and miniature paintings on ivory, "an art that has attained marvellous perfection in Delhi". As for the sculptures, "there is always a stiffness, a want of flexibility and a clumsiness that is most reprehensible". Other places in northern India which had significant numbers of craftsmen were Amritsar, where combs were made for Sikhs, and Pali, near Jodhpur in Rajasthan, where bangles were produced in great quantities.

Murshidabad developed its ivory industry, Watt tells us, because of a lack of back-scratchers in Delhi, and the Murshidabad



*Ivory statues of Hindu gods and goddesses are the most common carvings from southern India.*



carvers doing the work in the early part of the 20th century were hereditary idol-makers. In addition to the back-scratchers, they soon began supplying the market with models of bullock carts, processions and marriage ceremonies. Watt did not like the “flat and flimsy style” of Murshidabad’s ivory work, and he called it a “modern abomination” which “could hardly have originated in any other province than Bengal”. Nevertheless, Watt was very impressed with the ivory carving just south of Bengal, in Orissa. He described a splendid tortoise made there, concluding that “the life-like texture and anatomy of the legs and neck of the animal raise the artist who produced this wonderful creation to a position of equality with the ivory carvers of Europe, Japan or China”.

Sir George Watt thought that the ivory carvings from southern India were the best produced in India during this time. Travancore’s sculptures were superb, and some of the most intricate carving was carried out in Trivandrum, the state capital. In Mysore, the inlaying of ivory into wood far surpassed the work done in any northern locality. In Vishakhapatnam, ivory veneer work was excellent and the finest examples were howdahs.<sup>15</sup>

## The Decline of the Indian Ivory Business in the 1970s

Regrettably, there is no contemporary data published on the structure of India’s ivory industry prior to the study I made in 1978. Much of what I discovered was published in an article I wrote for *Oryx*, and I refer readers to it for details on the ivory imported, the major centres processing ivory, the types of items made for the tourist market, craftsmen and their working conditions.<sup>16</sup>

I estimated that there were 7,200 ivory craftsmen in 1978,<sup>17</sup> but the amount of raw ivory available to them from indigenous elephants, legal and illegal imports, would probably not have allowed for an average of more than a few kilos per person in a year. The main importers were still based in Bombay, as they had been for over a hundred years, but there were also some significant importers in Delhi, the capital. Almost all of them were complaining about the upsurge in raw ivory prices on the international markets, and those who were bringing in supplies legally and paying the 120% duty felt that the government was crippling the ivory industry.

The effects of the high prices and government restrictions were particularly noticeable in the bangle trade. Ivory bangles had traditionally been worn by Hindu women, and the making of them was, and still is, the major use of ivory for domestic consumption. When Indian ivory was destined for bangle-making, the domesticated elephants were sometimes given extra salt to enhance the shine of their tusks when polished. According to custom, a maternal uncle would present a bride with a set, or many sets, of ivory bangles which she would wear at her marriage ceremony. These bangles had to be new, not secondhand. Among the higher castes of Hindu women, they would be worn only during the first year of marriage, then replaced with gold or silver bangles<sup>18</sup>. In some castes, however,



Copyright Lucy Vigne

*An ivory bangle-maker in Bombay hand-spins with the rod a tube which holds the tusk. As the tusk rotates, he cuts through it to produce the rough bangles.*

the women continued to wear their ivory bangles throughout life, and these were even left on them when they died and their bodies were burned on wood fires. If the husband died before the wife, it was often the practice to smash the bangles as a sign of the end of the marriage. Art historians have occasionally remarked that it seemed unnecessary for the bangles to be of ivory, as in many instances they were so highly decorated with golden threads, tinsel and dye (usually red for good luck) that the nature of the ivory was disguised; and despite being an ideal medium for carving, the ivory marriage bangles were not worked. By 1978, only brides of middle and upper classes could afford ivory bangles, and the custom was only prevalent in Bombay and the states of Rajasthan and Gujarat — even in these states, plastic was being substituted for ivory among the majority of the population. In Rajasthan, some women in 1978 still wore many pairs of ivory bangles, often covering their arms from the wrist to the elbow. Among the Rajputs, the traditional warrior ruling class who comprised 20-25% of Rajasthan’s population, almost every bride wore ivory bangles for her marriage ceremony even though the wealthiest often replaced them with gold jewellery afterwards. In Gujarat, a higher percentage of Hindus bought bangles made of ivory in the 1970s; a pair cost between US\$ 5 and US\$ 290. The bangles were made in many towns of Gujarat.

such as Ahmadabad, Patan and Baroda, even though this state did not possess many ivory craftsmen. The bangles purchased in Rajasthan were mostly from Gujarat, but the town of Pali,



near Jodhpur did still produce some. An average skilled craftsman could make as many as six pairs in a day, using a *sanghada*, a primitive lathe hand powered by a bow. At that time some of the bangles were being carved while the more expensive had gold threads attached to them. There were various widths of bangles ranging from extremely thin to very thick.

Because ivory had become so valuable in the 1970s, sometimes a woman's bangles would be removed from her body before it was put on the funeral pyre; and sometimes the bangles would be salvaged from the ashes of the wood fire which would be insufficiently hot to consume either bone or ivory. And, when a husband died first, the widow no longer smashed her ivory bangles, but just put them aside.

There were huge quantities of old bangles in the towns and villages of Gujarat and Rajasthan, and some in the Punjab and West Bengal in the 1970s. In 1974 a Delhi trader made a major effort to encourage businessmen in those states to go around collecting the old bangle ivory, which they did, sometimes for as little as three rupees per kg; they sold it to the Delhi trader for between five and 100 rupees per kg. He, in turn, passed it onto other ivory firms to make bangles for foreigners.

In using the old bangle ivory, which came mainly from Cutch, Budj, Baroda, Jodhpur and Bikaner, the craftsmen cut each bangle into half and fitted two silver clasps to make the original

large enough to fit a European wrist. These became very popular with the tourist trade, and the profits made on them were very high because, even at the maximum wholesale price of US\$ 13 a kg, it was much cheaper than new imported ivory. However, the ivory in some of them was from Indian elephants, and after India became a party to CITES in October 1976, the export of anything made from Indian ivory was technically illegal, although it was practically impossible to enforce the law since the authorities could not distinguish between Indian and imported African ivory. Export permits were only granted by officials in Delhi when satisfied that the ivory was from African elephants and legally imported. Ivory items sent out of India in the 1970s by the wholesale and retail trade required permits but at that time tourists did not need them for what they bought and took away in their suitcases.

It was not only old bangle ivory of Indian origin that was reaching the market for eventual export as tourist items in the 1970s. Some state forest departments were selling raw ivory from their domesticated elephants and elephants that had died in reserves and parks. Much of this went to local carving industries, including state-operated handicraft corporations. During the middle and late 1970s, the forest departments of the southern states of Karnataka, Kerala and Tamil Nadu together sold over a tonne of Indian ivory a year,<sup>19</sup> knowing that this ivory would end up being carved into items that would be purchased by foreign tourists.<sup>20</sup> One businessman in Bangalore regularly bought whole tusks from the Maharajah of Mysore's private collection of Indian ivory. When I was at the headquarters of the Trivandrum Forest Department in January 1979, a consignment of 515 kg of Indian ivory from the Maharajah of Travancore was being registered for sale to traders. Such ivory, in addition to legal and illegal imports from Africa, was expensive. One of the largest ivory firms in India decided to set up a factory in Gujarat's Kandla Free Trade Zone in order to bring in the material without paying the import duty. This was allowed, on condition that all the product would be exported. Between 25 February 1976 and 24 January 1979, 8,404 kg of raw ivory were imported, about 80% of which came from Kenya. Since this ivory was not technically in India, it does not appear in India's Customs' statistics. In 1978 the factory had 40 craftsmen using electrically-powered tools, such as dentists' drills, to make jewellery, ornaments and small charms. Out of the 7,677 kg of ivory actually used 21% went into the making of larger items, 18% into smaller pieces, especially charms, and 61% was waste. Over this almost three-year period, the craftsmen each consumed on average 62 kg of raw ivory a year, an astoundingly high average for Indian craftsmen. However, 60% of the 7,200 craftsmen at that time did not use any of the electrically-powered tools which had been introduced into the country in the early 1950s. Even though they allow for much more rapid work, still today carvers in the south shun them and use instead simple hand files and chisels to carve.

The craftsmen as well as the traders were very pessimistic about the future prospects of the ivory industry in India. By 1979 there were only half as many craftsmen as there had been ten years earlier, and some had begun carving cheaper substances, wood and bone. They were not well paid artisans, receiving on average US\$ 60 a month; moreover, most of them were not regularly

Copyright Lucy Vigne



*Ivory craftsmen in southern India never use electric tools.*



employed with salaried jobs, but earned their income from doing piecework for the traders. The traders, having more and more difficulty importing ivory legally, and having to pay higher and higher duties, complained that their ivory products could no longer compete on the international market with those produced in Hong Kong where ivory was duty-free. This did not apply to the home market since no worked ivory was allowed into India. They were also discouraged by all the bureaucratic procedures they had to follow to export ivory and the pressure being exerted by certain Indian conservationists to close down the entire industry.

## The Ivory Industry in the 1980s

On my return to India in 1989 with my project co-ordinator, Lucy Vigne, to study the ivory trade, I found that a number of major changes had occurred. Several traders I had interviewed in 1978 had stopped dealing in ivory because, they said, it was no longer worthwhile. Delhi had taken over from Bombay as India's main importing city. Trivandrum, which had had the majority of ivory craftsmen, had practically collapsed as an ivory carving centre.

The reasons for the changes are primarily those due to the Indian government's implementation of stricter controls. These controls have led to a vastly increased amount of paperwork demanded by the Indian CITES Management Authority which has its headquarters in New Delhi. Indian traders have found it extremely time-consuming and inconvenient to arrange the arrival of their ivory shipments legally anywhere but in the capital. The trade is now carried on mainly by air to Delhi, rather than by sea to the port of Bombay.

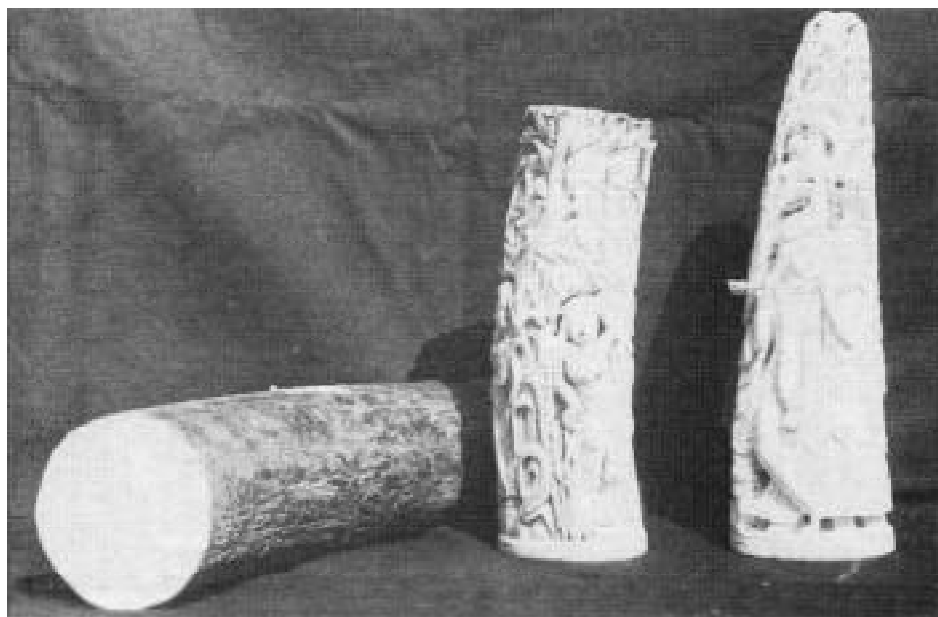
India has been highly successful in controlling its ivory trade. Government officials say that it is imperative, in order to conserve elephant populations both in India and Africa. Another reason may well be that the Indian government is embarrassed by its ivory traders. Conservationists worldwide are vociferously decrying the use of ivory and attempting to make it as unfashionable to wear ivory jewellery as it was to wear a leopard coat in the 1960s. The Indian government is rightly proud of its efforts to conserve wildlife in parks and reserves, and there are officials who look upon the ivory trade as a blemish on India's reputation for good conservation management. One proclaimed the ivory trade "should die a natural death".

The Indian CITES Management Authority is much stricter about ivory imports than required. For example, the CITES Secretariat legalised Singapore's holdings of ivory when that country became a member in 1987, but the Indian CITES management Authority would not allow any of that ivory into India, on the grounds that it had no "country of origin" documentation

and that it had probably come from poached elephants in Africa and been exported illicitly; later the consignments legally went to India's ivory competitors in Hong Kong, China and Japan. Moreover, no ivory is permitted to come into India from South Africa, despite the fact that elephants are culled in Kruger National Park because there are too many of them, and the money earned from exporting their ivory is income for conservation. Imposed for political reasons, this ban denies the traders ivory from one of the most legitimate sources. With African ivory becoming scarcer and much more expensive in the 1980s, with the already mentioned difficulties in purchasing it from source countries, traders in India were also faced with exorbitant import duties which rose to 140%. Albeit, government statistics indicate that the importers were grossly under-estimating the value of the ivory they bought. For instance, in 1986 and 1987 when the world market price for a 5 kg tusk was around US\$ 80, they were stating its value at under US\$ 30 and claiming that the tusks they purchased were "broken, cracked or rotten".

Aside from setting up a business in a duty-free zone, there was another legal way to avoid the high import duties; this was by obtaining an "advance licence" for ivory imports. However, anyone who brought in ivory under this licence was likewise required to export all the carvings made from the ivory. Government officials rigorously checked that such a licensee complied to the regulation.

The Indian government tightened the restrictions on internal trade upon amending the Wildlife Protection Act of 1972 in November 1986. No longer was any Indian ivory allowed to be sold within the country. Although some state forest departments were given a grace period of six months to dispose of their stocks, would-be buyers knew that if they purchased any they could not legally make any items from it to put onto the market. To prevent mix-up between Indian and African ivory carvings, the permits which tourists now had to obtain to export any that they



*A mammoth tusk is easily distinguished from an elephant tusk by its dark outer layer. Once carved, however, it can be confused with elephant ivory.*



purchased were very complicated. They were supposed to obtain a "legal procurement certificate" from the Chief Wildlife Warden of the state in which they bought the ivory and submit that to the CITES Management Authority in Delhi, which in turn would check the import records for the raw ivory and the licence of the dealer who sold the ivory piece. It took time to do all this, and tourists did not only buy ivory in Delhi, but in many other parts of India; that meant it took even more time to send in the applications and receive the permits in return. Recently, the CITES Management Authority has opened regional offices in Bombay, Madras and Calcutta; still, that has not made it much simpler if a tourist buys ivory elsewhere.



*Mammoth ivory carvings sometimes have dark streaks on them as can be seen on the statue on the right.*  
Copyright Esmond Bradley Martin

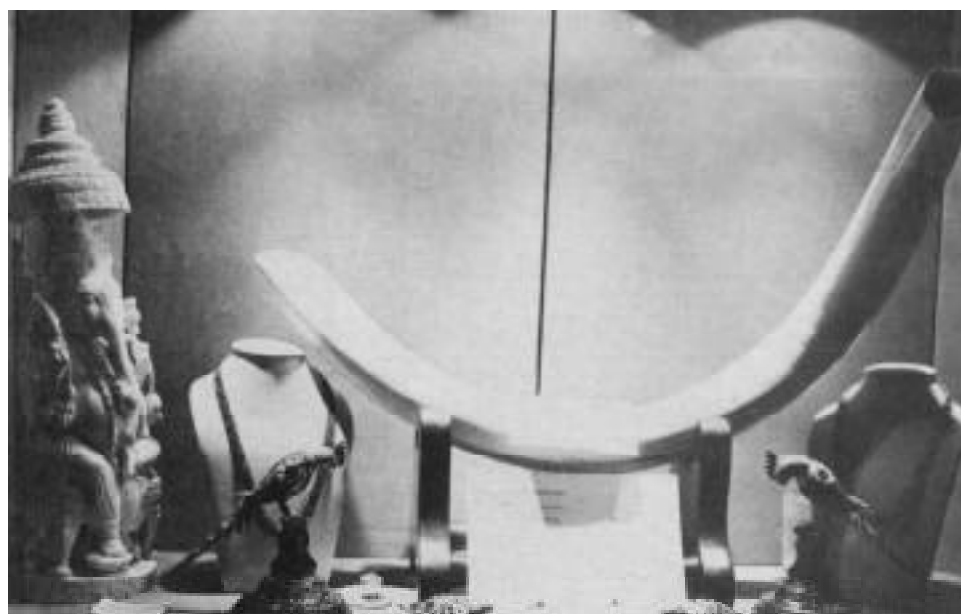
keepers have to prove that their stocks tally with their shop records, and if an inspector is particularly officious, insisting on weighing various ivory pieces, it is likely that problems will arise even if scrupulous records have been kept. Ivory loses moisture in the dry season and is consequently lighter then. If a piece has been accounted for in the wet season, it will not be the same.

It is no wonder that dealers are now saying it is not worthwhile to deal in ivory. As for the carvers, many of them are illiterate and have no understanding of the regulations. Some of them become very agitated when an inspector arrives at their home in a village, fearing what the neighbours will say.

The most irksome of the new internal regulations on ivory that came into force with the amendment were those which required all ivory factories, dealers, exporters and even individual carvers to be licensed annually and to submit monthly returns on the amount of ivory purchased, the number of pieces made from it, their weights and a record of their sales. There are government inspectors who go round to shops and carvers' premises to make random checks that these regulations are followed. The shop-

## External Sources of Ivory

There is no doubt that Indian traders obtain illegal supplies from abroad; these added significantly to the legal imports from Africa in the 1980s as noted in an earlier section of this report. The Indian government has not been able to stop ivory smuggling, which is perhaps another reason for the increased vigilance on manufacturers of ivory items. We were told about a Bombay businessman alleged to have brought in by boat at least 2 tonnes of ivory from Dubai in late 1987. Supposedly, this ivory made its way into the interior of Gujarat where it was made into bangles and sold locally to avoid the need for documentation. Other ivory traders were furious over the matter, not so much by the smuggling but by the fact that the ivory was of illicit African origin and the businessman had been able to buy it for about half the price demanded on the world market. We did not learn who the businessman was, although several traders spoke of him and said they would turn his name into the authorities if it happened again.



*The recently carved mammoth ivory Ghanesh on the left weighs 6kg and is for sale in Delhi for US\$ 8,000. Beside it is an unusually shaped mammoth ivory tusk being sold for US\$ 25,000!*

In an attempt to conserve foreign exchange, the newly-independent government of India in 1947 prohibited the importation of gold.



Dubai businessmen correctly perceived that Indians would not forego this store of wealth, and by the 1960s they were importing millions of dollars worth of gold for re-export to India and Pakistan by dhow, the traditional sailing vessel. Those used for smuggling in the western Indian Ocean have very powerful engines enabling them to outrun most patrol boats. Businessmen in other Sheikdoms in the Gulf are also pursuing lucrative interests in sending goods to India, and it is very probable that ivory is sent from the United Arab Emirates, notorious for their role in wildlife trade. In the 1980s the Indian authorities stepped up their efforts to prevent gold from being landed on the beaches of Gujarat, but because smugglers can make at least 40% profit on their activities, they have not given up. There is some evidence that they are now landing illicit cargoes farther south, on the coasts of Karnataka and Kerala which, coincidentally, are closer to the few remaining carvers in Trivandrum<sup>21</sup>. If ivory is among these illicit cargoes, it would probably be in small amounts and it might possibly originate in Tanzania, as many tusks have been illegally leaving the Tanzanian coast in the 1980s.

Another possible source for illegal ivory is Singapore. A well-known Indian conservationist in southern India claims that the Tamil community in Singapore has family and business connections in Madras, the capital of Tamil Nadu, and that this community is illegally supplying raw ivory to Madras, which eventually finds its way to carvers in Bangalore and Trivandrum. Lucy Vigne and I found no evidence of this trade. Of course, it is conceivable that large consignments could be brought into India and stockpiled for future use, in which case we would have been unable to discover their presence. However, we suspect that if stockpiling on a large scale were taking place, the information would have leaked out to some of the big traders. It is more likely that contraband from Singapore, like that brought in by dhow from the Gulf states, would largely consist of luxury goods and electronic items which carry duties of over 200%.

Although there is no evidence of hippo teeth or narwhal tusks coming into India, in 1986 two people in Jaipur legally imported 5 tonnes of Siberian mammoth ivory. One told me that because he was a Jain by religion he wanted to save living elephants from the ivory trade. Possibly, the fact that he had to pay only US\$ 25 per kg for the mammoth ivory had something to do with his decision to buy it. However, his hopes to make huge profits from it were soon dashed. Mammoth ivory is extremely hard and brittle and hence very difficult to carve. It rapidly wears out tools and gives a higher percentage of waste. Carvers insisted on 20-25% higher fees when working on it. Even though details can be carved more intricately on it, cracks often develop. The traders have had to have many exquisitely detailed sculptures painted to cover up such cracks. There was also the problem that when just polished, the ivory has a yellowish colour which is not popular, and it is also marked with brown or black lines; the craftsmen tried to carve items in such a way that these lines only showed on the backside of them. Retailers found that the mammoth ivory carvings did not command a good market price and demanded a discount of up to 50% of what they would pay for similar carvings in African ivory. A 17.5 cm high figure, weighing 360 gm was priced at only US\$ 132 in a first class

hotel shop in New Delhi in 1989. One of the traders, having had little success in selling carvings he had made from the mammoth ivory, by early 1989 decided to sell the raw tusks, polished only, as antique curiosities; we saw one unusually-shaped tusk which was twisted. It was a metre long and weighed just 6 kg. The asking price was a ludicrous US\$ 25,000. The shop-owner no doubt believed that a very rich and rather ignorant person would purchase it because of its uniqueness. If a tourist were to buy it, he would not be allowed to export it: the government, in April 1988, banned imports and exports of mammoth ivory, fearing that carvings from it would not be easily identifiable and so enable illegal exports of Indian ivory.



Copyright Esmond Bradley Martin

*Sometimes domesticated elephants' tusks are cut off to sell as shown here at Amber Palace near Jaipur.*

## Internal Sources of Ivory and Poaching

Within India there are several sources of ivory available to the traders, but since the 1986 amendment to the Wildlife Protection Act, they are illegal. Nevertheless, some traders continue to make use of all but the state forest department supplies. Some, too, have encouraged the illegal killing of elephants in India. Realizing that poaching had become more remunerative and significant, the government abolished all import duty on raw ivory in April 1988, to lessen the pressure on Indian elephants.

Old bangle ivory and collections of trophy ivory are two examples of sources which are practically as much in demand as they were in the 1970s. Especially after transactions in Indian ivory became illegal, Maharajahs and other wealthy people found it more profitable to sell their ivory to traders; moreover, the traders were hardly likely to report them to the authorities for not paying taxes.



Used for timber removal, temple processions, circus and zoo displays, film-making, wedding processions and tourist activities, the 3,000 or so domesticated elephants in India generally have their tusks or tushes pruned to prevent accidents. Some of this ivory also reaches traders. Although there is a controversy among scientists on how much ivory an elephant can produce in a year, probably the average bull of ten to 25 years old produces 1.4 kg of new ivory each year.<sup>22</sup> At Amber, near Jaipur, where there is a private tourist company with 42 elephants to take visitors up a hill to visit the old palace, the manager said that he sometimes has as much as 7.5 cm annually removed from a tusk on a bull. He also said that his cows' tushes are usually trimmed every two to three years, but the amount of ivory removed is very little. A hand saw is used to do the job. In February 1989, the black market price for ivory from domesticated elephants in Jaipur was US\$ 265 per kg and it was being bought mainly by ivory painters and carvers. It is very difficult to try to estimate how much ivory domesticated Indian elephants produce because there are no data on the sex ratios, tuskless individuals, ages, numbers of deaths per year, etc., but a rough guess might be a minimum of 300 kg which could have entered the trade yearly in the 1980s.



*A domesticated elephant in the Kerala Forest being guided by his mahout to move a log.*

State forest departments are required to keep records on all the ivory they collect from dead elephants, and these are checked. If some went missing or if the records showed a sudden decline in the amount gathered, there would be serious problems. Therefore, it is unlikely that significant quantities from this source reached traders after 1986. Some of the forest departments now have large quantities of ivory in their strongrooms and will have to make space for more if the present policy of simply holding the ivory continues indefinitely. In early 1989, the Kerala Forest Department had 2 tonnes,<sup>23</sup> the Mysore Forest Department in Karnataka had 406 tusks weighing 2.2 tonnes,<sup>24</sup> and in Tamil Nadu there was said to be about 2 tonnes,<sup>25</sup> although we were unable to confirm this. Kerala sold no ivory whatsoever during the 1980s, but Karnataka did, prior to the ban. It went to the local handicrafts board.

Estimates of India's wild elephant population vary between 16,595 and 22,261<sup>26</sup>. Some are killed for the trade every year, but there is actually little poaching in the east central region<sup>27</sup> or in the far north.<sup>28</sup> According to official records, 14 elephants were poached in Meghalaya between 1960 and 1981, four in Tripura between 1961 and 1981, and 14 between 1975 and 1980 in North Bengal.<sup>29</sup> Although Dr. D.K. Lahiri Choudhury, the main authority on northeast India, says that these statistics "err grossly on the lower side", he also states that in this region "poaching of elephant is not a serious problem"<sup>30</sup>. Recently, Dr. Choudhury notes, a few elephants have been killed in the northern part of West Bengal, two in southern Bengal and a small number in Orissa's Simlipal National Park. Furthermore, there is occasional poaching in East and West Siang, Triap, Dibang Valley and the Lohit civil districts of Arunachal Pradesh. Some tribes in Mizoram and Nagaland have traditionally killed elephants for meat and have almost exterminated them from parts of these areas. Whether the ivory from these elephants reaches the trade is not clear; Dr. Choudhury does not know what happens to it.<sup>31</sup> From the north and central regions of India, we can guess that maybe 20 elephants a year, on average, were killed in the 1980s, making available about 360 kg of ivory.

Poaching has been more intense in the three southern states: Tamil Nadu, Karnataka and Kerala. The official statistics only cover certain periods: 85 elephants in Tamil Nadu between 1975 and 1983, three from April 1988 to February 1989; 78 from 1975 to 1983 in Karnataka, 26 in 1983/84 six in 1984/85, 15 in 1985/86, 11 in 1986/87 and six in 1987/88<sup>32</sup>. No reliable figures exist for Kerala, although it is well known that extensive elephant poaching occurred in the Periyar Tiger Reserve during the late 1970s<sup>33</sup>; the Chief Conservator of Forests in Kerala from 1981 to 1988 is of the opinion that on average ten tuskers were killed a year during the early 1980s, but this number was reduced to just four in 1988.<sup>34</sup>

The person who has done most research on illegally killed elephants in southern India is R. Sukumar. He says that from 1980 to 1986 a minimum of 100 elephants succumbed to poachers in the south each year, which is well above the official figures given. He estimates the average weight of a poached tusk at 9.5 kg. Taking 190 tusks, since some of the animals would only have one, and multiplying by 9.5, he calculates that at least 1,800 kg of ivory would have been available from the south to traders during that period.<sup>35</sup> During 1987 and 1988, when poaching abated, perhaps only 900 kg were available.

Many of the elephants in southern India are in reserves and national parks which straddle the state boundaries of Tamil Nadu, Karnataka and Kerala, making it easy for poachers to move from one state to another and thereby avoid pursuit by police or forest department guards who are generally confined by the borders. In southern India, poachers, usually from villages adjacent to parks and reserves, operate in gangs of up to 30 men, several of whom carry guns. These used to be only muzzle loaders but recently some gang members have obtained modern rifles from Tamils with connections in Sri Lanka. A gang leader may pay local informants to disclose the location of large tuskers. The poaching is, in fact, selective: the gangs do not go after cow elephants because they have only tushes, and the smallest bulls

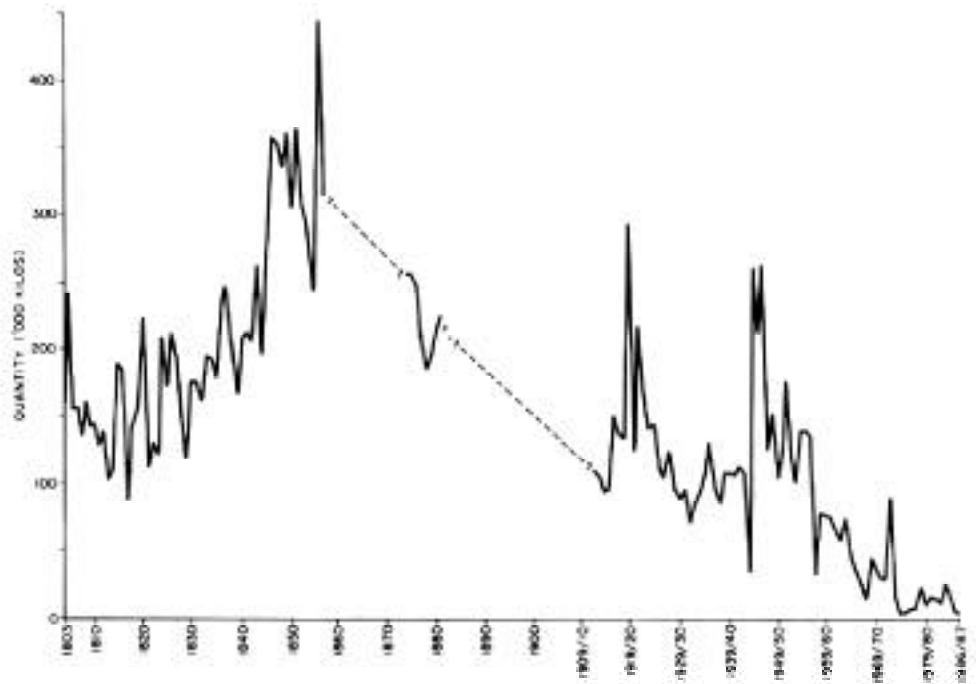


shot are usually five years or older. The largest bulls poached may carry as much as 25 kg of ivory per tusk.

When a gang enters a protected area, the members go on foot and stay for several days, during which time they may shoot as many as eight tuskers, hacking out the ivory with axes. Sometimes, they also take the tail hairs. Carrying their trophies out of the park or reserve, they rendezvous with a vehicle whose driver takes the tusks and tail hairs to a middleman in a nearby village or town. Tail hairs are bought locally for under a dollar each, to be made into rings and bracelets as lucky charms purported to ward off evil spirits. The tusks often pass through a chain of middlemen, the last one selling them clandestinely in Trivandrum. Rarely is the poached ivory exported, although the former Chief Conservator of Forests in Kerala told us that in 1988 government officials intercepted six very large baskets labelled “wooden toys” but containing 300 kg of Indian ivory en route to Calcutta to be shipped to Hong Kong via Singapore. The people in Trivandrum who had collected this ivory for export had been paid US\$ 140 per kg for it.

One poaching gang in particular exasperated the authorities. It was led by a criminal known to have killed seven people. This gang operated in the Nagarhole-Bandipur-Mudumalai-Wynad-Sathyamanglam conservation area which, even though not vast, extends across the boundaries of the three southernmost states. At the end of 1986 and in early 1987 the gang succeeded in killing at least 15 tuskers. Finally, the forest departments of the three states pooled their resources and met regularly to co-ordinate efforts to eliminate elephant poaching. They acquired more wireless sets to better communications with their men in the field, and they increased the number of modern weapons for their staff. They improved their intelligence-gathering network to find out who was involved in poaching, and they greatly increased the number of tribal people and others to patrol the reserves and track down poachers. Although most villagers were so terrified of the leader that they thought they would be killed if they co-operated with the authorities, informants finally revealed the whereabouts of the gang. In 1987, forest department officials managed to surround the group while they were trying to collect illegal supplies of sandalwood, but suddenly the gang leader shot the Range Officer from Sathyamanglam in the chest, mortally wounding him, and managed to escape. Soon afterwards, though, the officials from Bandipur caught up with the gang again, killed one of the poachers and took several guns. The photograph of the leader had been widely circulated, stating that he was wanted - dead or alive. He has still not been caught, but has given up poaching at least temporarily and gone into

OFFICIAL IMPORTS OF RAW IVORY INTO INDIA FROM 1803 TO 1986/87



hiding. The joint measures taken to combat the elephant slaughter by the forest departments, the government’s increased fines and prison sentences for convicted poachers and the regular inspections of the premises of ivory craftsmen and retail dealers in Trivandrum and Bangalore have effectively reduced elephant poaching. Today, the elephant population in the south is on the increase.<sup>36</sup>

It is not possible to give anything like a total weight of ivory annually available to the trade from all sources —internal and external, legal and illegal.<sup>37</sup> We can only estimate the minimum amount per annum in the 1980s, namely 23 tonnes a year between 1980 and 1984, and 15 tonnes a year between 1985 and 1988. It is important to stress that these are minimum figures. If most of this ivory did go to craftsmen for carving, their average consumption would be higher than that I estimated for their use in the 1970s, when writing my article for *Oryx*. However, as we were able to carry out more research on this matter during our recent trip to India, I believe that my earlier estimate should be increased. Certainly, there has been less ivory available to Indian craftsmen during the 1980s than in the previous decade.

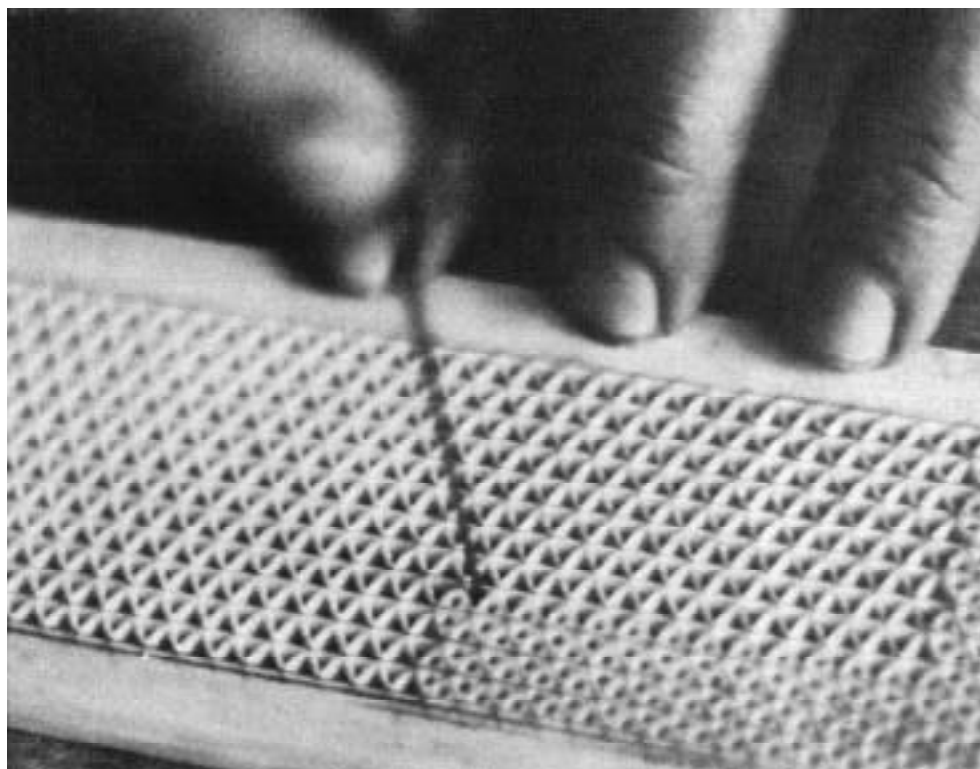
## Carvers and their Masters

Of the vast range of objects fashioned from ivory, the majority are manufactured in the Delhi area by about 450 craftsmen. Professional and master craftsmen generally use electrically-powered tools everywhere, except in the south. With the noticeable exception of Bangalore, the quality of ivory carving has declined during the past decade. Carvers are rarely salaried, but paid for piece-work. The dealers’ argument is that a salaried workforce has no incentive to complete a job on time and causes labour problems. Ivory painters and polishers receive less than carvers and are also usually paid for piece-work. There are some women painters and polishers, but only men do carving.



The craftsmen are very worried about their future prospects in the ivory trade, not only because of the shortage of raw material but also because of the restrictions on that which is available. Many carvers have given up. From 7,200 in 1978, their numbers fell to an estimated 2,060 in 1988. Most of the master craftsmen are now old and retired. In the Delhi area, there are only a dozen or so still working. Unlike in the past, they are not encouraging their children or grandchildren to learn their skills.

The highly intricate carving for which India is famous, such as “jali” (lace-work tracery, usually on furniture) is rapidly disappearing. It takes a decade or longer to produce a jali screen, and dealers do not have craftsmen make them now as they are



*“Jali” work as shown here is extremely time-consuming to produce. This panel is to be incorporated within a 2 m high ivory screen which is taking two master carvers about eight years to complete.*

doubtful whether any ivory sales will be allowed in ten years’ time. Instead, the dealers are urging the craftsmen to produce items quickly and inexpensively for immediate sale. Innovation is lacking. Although many dealers complain about the present status of the ivory trade, they have made no effort to form a national association to protect their interests. They are mostly very wealthy men — one has a collection of 38 vintage automobiles, including several Rolls-Royces — and for years they have been diversifying their business interests. In particular, they have been producing handicrafts which they sell to tourists in India and also export. Some have moved out of ivory entirely, not wanting the vexation of regulations which, if infringed even inadvertently, could lead to lengthy investigations and other importunities.

The most important ivory firm which has given up in the 1980s is that which had the factory in Kandla Free Trade Zone, mentioned earlier. The firm started in 1901, based in Calcutta.

Its extensive operations spread to many parts of India, but those in Trivandrum closed in 1984, Kandla in 1985, Delhi in 1985, Varanasi and Bombay in 1987. It no longer has any interest in ivory.

## Some Economic Aspects of the Indian Ivory Industry

The biggest raw ivory importer in India during the late 1980s is a Delhi-based firm which is also responsible for manufacturing and exporting the largest amount of finished products. The two salaried employees presently earn only US\$ 86 a month making jewellery and decorative items. Other workers are brought in

when needed, paid for piece-work, and make about US\$ 165 a month because their production rate is much higher. In addition carving is sub-contracted to craftsmen in Jaipur, Jodhpur, Varanasi and Murshidabad, who make sculptures, chess sets, lamp-stands, boxes and charms. In 19846 tonnes of ivory were consumed, 4 tonnes per year in 1985 and 1986, and 3 tonnes per year in 1987 and 1988. From this five-year total of 20 tonnes, 10.6 tonnes of finished ivory pieces were exported. During the financial year 1986/7 3.6 tonnes were exported at a declared value of US\$ 680,157, and in 1986/7 1.7 tonnes at US\$ 454,275. During 1986 the raw ivory, free of import duty under the advance licence system, cost US\$72 per kg.<sup>38</sup> This was processed in 1987 and 1988, and sold at US\$ 260 per kg, giving an average 90% mark-up from the raw ivory cost to the manufacturer’s selling price, taking into account the 47% wastage factor. The wholesaler adds

another 50% when he sells it to the retailer, making the cost US\$ 390 per kg. The retailer in turn adds another 100%. Thus the value added to a piece of ivory from raw material to finished retail product is almost sixfold.

If the wholesale price for an item is US\$ 100, roughly US\$ 40 will be the cost of the ivory, US\$35 the cost of labour, and US\$25 the gross profit. In 1980 this firm exported almost all its ivory products to Europe, and only 10% went to the USA. In 1988, however, 25% went to the USA and the rest, half of which was jewellery, went to Europe.

When a manufacturer is able to sell some of his ivory waste, he makes a little more profit. However, that does not regularly happen; it is usually given away or thrown out. There are some uses for ivory powder. The most popular seems to be for alleviating baldness, in which case the powder is burnt, mixed with an oil and applied to the scalp. In Gujarat it is believed that



a woman's infertility can be cured if she mixes ivory powder with honey and takes this "medicine" twice a day for a week. Some people take regular doses of ivory powder in hope of improving their memory, and there are some others who think haemorrhoids can be cured if a concoction of the powder mixed with an equal amount of rusted iron is applied<sup>39</sup>. Ivory powder sells for about US\$1 per kg in Bombay.

What is the value of the India ivory industry as an entity? The dealers themselves are unwilling to divulge the necessary figures (attempts at evading tax are rife), so we must look elsewhere. The official statistics of the Indian CITES Management Authority show that in 1987 2.9 tonnes of worked ivory were legally exported, compared with 4.4 tonnes the year before. Of the 1987 amount, the USA took 52%, Italy 10%, France 10%, Canada 4%, Spain 2.5%, UK 2.5%, West Germany 2.5%, Greece 2.5% and 14% went elsewhere.<sup>40</sup> However, although we know that the major purchasers of some of the most expensive ivory items are the Gulf Arabs, the CITES 1987 figures show that buyers from these countries only purchased 20 kg of worked ivory. Of course, CITES and Customs statistics only show official exports with proper documentation; many ivory items sold in India are exported illegally by tourists whose suitcases are generally not examined on departure from the country.

The CITES Management Authority admits that about an additional 30% of worked ivory was exported by tourists carrying the goods out the country in their personal luggage.<sup>41</sup>

Therefore, if we add 30% to the official CITES export figures, then 3.8 tonnes of worked ivory were exported in 1987. In reality, this figure should be higher. If the 3.8 tonnes of finished ivory had the same value as did the worked ivory from the largest wholesale exporter of finished ivory products in India, then the wholesale export value of India's ivory industry in 1987 was worth a minimum of US\$ 1,500,000, or a minimum retail value of US\$ 3,000,000. Another set of figures from the Development Commissioner of Handicrafts in Delhi gives the declared wholesale value of ivory exports for the financial year 1985/86 at US\$ 1,279,350 and for 1986/87 US\$ 1,325,400<sup>42</sup>. These and the values calculated from the CITES figures are similar enough to lend credence to the estimates made as to costs and profits, but they do not take into account the full amount of exports. One trader told us the ivory illicit exports could equal in value those officially documented. We think he was exaggerating as it is unlikely there would be sufficient raw ivory for manufacturing which would allow that.

## The Ivory Centres

**Delhi** Although Delhi has only recently become the main ivory importing city, it is not a newcomer to this aspect of the trade. Some of the biggest retail shops date back to before the 1857 Indian Mutiny and a few of these have habitually imported their own ivory which they locally manufacture, now paying between US\$ 100 and US\$ 132 a month to salaried professional craftsmen and about US\$ 165 to those who do piece-work. On average, ordinary ivory painters and polishers earn about US\$83 a month. The older shops are opposite the gigantic

17th-century Jama Masjid Mosque in Old Delhi; the more modern are in the southern part of the city, near the Qutab Minar which is another major tourist attraction but where parking problems are less acute. Some of the ivory shops have impressive premises displaying antique items, not all of which are for sale. There is a tremendous variety of carvings available in Delhi from all over the country as well as locally made, and people buy more ivory here than anywhere else. Retail prices are very high for the best pieces. The most expensive we saw was a suite of furniture consisting of a sofa, two chairs and a table. The proprietor of the shop was asking US\$ 2,000,000 for it. He turned down an offer of US\$ 1,000,000 by a Saudi Arabian in 1987. The furniture was carved by a man and his two sons who spent 25 years making it, completing the job in 1978. The same family of craftsmen made a 2 metre by 2 metre jali screen which took 15 years to do. Its owner refuses to sell it as he says nothing like it could be made today. For the same reason, a gigantic ivory chess set of Moguls vs Rajputs with the major pieces 60 cm tall is not for sale. Among the most outstanding works of ivory for sale in Delhi is a 45 cm high screen carved with bird scenes on both sides; it is priced at US\$ 33,000. Ibises, peacocks and cockatoos decorate the heaviest carved pair of tusks for sale; weighing 42 kg, they are priced at US\$ 300,000 and a customer from Dubai bid US\$ 225,000 for them, but this was refused as being too low. A Ghanesh elephant god, 65 cm by 35 cm, painted and partly covered with gold leaf, can be purchased for US\$20,000.

One wonders how a shop-owner would handle a tout if it turned out that he had brought a customer who purchased one of the more expensive items. Touts have become increasingly more aggressive in Delhi, and include taxi and auto rickshaw drivers, tour operators and hotel staff as well as men on the street looking for tourists to lure into a shop in hope they will buy something and a commission handed over. Touts receive on average 20%



*This master carver in Delhi has been working for eight months on this 6 kg tusk and his carving is almost finished.*



of the final retail price, and they are especially active around the ivory shops. To avoid this, many shop-keepers will ask their tourist customers to leave when a tout is standing by, or taxi driver waiting, explaining the problem and suggesting that they return on their own or, if they come by taxi, to enter a nearby shop and later make their way undetected into the ivory showroom. The tout is a nightmare for many ivory merchants in Delhi.



*Paintings on ivory plates are mostly produced in Jaipur such as this one by the eminent artist, Bannu.*

**Jaipur** Jaipur has the largest number of craftsmen today, some 760, half of whom specialize in painted pictures on ivory. While the finest Mogul-style painting on ivory is still produced in Delhi, probably the total output here is greater than in the capital. The ivory for pictures is thinly cut from solid tusk tips, using electric band saws. The slices, called plates, vary in size from 5 cm by 7.5 cm, weighing about 6gm, to 12.5 cm by 20cm at 40 gin. A 15 kg tusk is needed for the biggest plates, and if a larger picture is painted, plates will have to be joined together. The cutting of ivory into plates is a major part of the ivory business in Jaipur, and many which are painted in Delhi have been cut here. The wholesale price is between US\$ 528 and US\$ 990 per kg, depending upon the thickness of the plates.

In Jaipur an artist may spend a fortnight painting a typical Mogul scene on a 10 cm by 19 cm plate which is sold retail for between US\$ 160 and US\$ 280. Modern paints are not popular among the better artists; still preferred are those made traditionally from crushed stones mixed with gum and water for most colours, although a certain flower produces a distinctive yellow and the bark of a tree purple. Clay is used for white. Often gold leaf is used to heighten detail. Probably the most expensive ivory paintings made today in Jaipur are by the artist Bannu; one of

his 15 cm by 11 cm portraits of an Indian woman sells retail for at least US\$ 660 of which he receives half.

American buyers usually choose paintings of traditional Mogul court scenes; Italian and Spanish customers often purchase erotic paintings of explicit Indian love-making scenes; Indians prefer traditional Hindu gods and goddesses on theirs. The quality of the Jaipur ivory paintings varies from poor to excellent, and the prices accordingly.

Because the agricultural potential of Jaipur, and most of Rajasthan, is limited by lack of water, handicrafts and the production of fine arts have long been an alternative source of employment, one which was especially encouraged by the Maharajahs in this state. Since the late 1960s, unlike other ivory craftsmen, the number of Jaipur ivory painters has increased. With an average take-home pay of US\$ 100 per month, their labour is cheaper than in Delhi. Some work illegally without being licensed. Painting makes no noise and the thin plates can easily be hidden. Quite a few tourists have become much more interested in buying an ivory painting instead of a statue or an ornament, and they are aware that the better bargains are to be found in Jaipur. Some tourists, who want ivory pieces but not the bother of obtaining permits to export them, now smuggle their purchases out of the country; ivory plates are ideal as they weigh little, lie flat in a suitcase and take up little space. Those who do go through all the procedures of obtaining export permits also realise that it is much easier to transport a painting on ivory.

Another Jaipur speciality is ivory charms, especially elephants. Typically, the style has remained unchanged, but it is no longer popular with European tourists. The charm-making enterprises have consequently foundered in the 1980s. However, one merchant studied a catalogue of ivory carvings from Hong Kong and in 1982 started to copy the style of carved figurines of Chinese people. His business has become very successful; in fact, he has a Japanese clientele, which is very surprising as few Indian carvings are attractive to the Japanese. Other ivory dealers in Jaipur have begun copying his work. Also in Jaipur, there has been a tradition of making new ivory look like old. Small carvings of gods, chessmen and ornaments are treated sometimes with tea, henna or coffee to imitate the slight brownish tinge that the blood in ivory brings forth in pieces over a hundred years old.

**Bombay** One of the world's largest cities and a major ivory importer until the 1980s, Bombay has never been a significant ivory manufacturer. Particularly in connection with first-class hotels, there used to be quite a few retail shops promoting ivory products, and one would expect still to see a lot of ivory around. In comparison to what I saw in 1978, there is not. The paperwork involved in selling an ivory item to a tourist is, of course, a problem. However, the fact that retailers have been forced to reduce significantly their profit margins in the 1980s due to the high cost of ivory and strong competition from Hong Kong is an even more likely reason.

Bangle-making is just about the only ivory business in Bombay, located where tourists never go, in the very congested Third Bhoiwada Section. There one finds five small, cramped shops



with craftsmen sitting on the floor, working hand-powered lathes to produce bangles for Gujarati and Rajasthani brides living in Bombay. The left-over scraps are used to decorate wooden boxes. It is actually in these workrooms that the sales are made, and the atmosphere is reminiscent of what many parts of Bombay must have been like in the Victorian era.

**Trivandrum** The fall in the trade in Trivandrum was the greatest of any ivory carving centre during the 1980s, and was brought about almost entirely by the government's various restrictions. Traditionally, Trivandrum carvers obtained their supplies from elephants in the southern part of the country; not until a big importer in Bombay started a factory in Trivandrum in 1966 did they use much African ivory. During the factory's last full year of production, 550 kg of raw ivory, costing US\$ 119 per kg duty-paid, were consumed to make 385 kg of finished ivory pieces valued at US\$ 128,713. The wastage factor of 30% was very low because only hand tools were used, but the factory-owner wanted his carvers to modernize their techniques and sent one to Varanasi to learn to use electric drills. This was an unsuccessful endeavour as the man refused to work with them on his return to Trivandrum, correctly stating that hand tools can produce finer carvings; none of his co-workers would switch either. In 1984 the factory-owner's Kerala state wildlife licence for manufacturing ivory was refused renewal. He had to close down his business. The carvers who had depended upon him for their livelihood in the ivory industry thus lost not only their jobs but also their source of raw ivory.

At that time there were still around 1,800 ivory craftsmen in Trivandrum, but their supplies of legal ivory were fast dwindling as the Kerala Forest Department sold none. Some Trivandrum businessmen began buying African ivory from firms in Bombay, and some obtained illegal supplies, but the shortage was already acute. Furthermore, nothing made from Indian ivory had been allowed to be exported since 1976 when India became a party to CITES, and many retailers in the main tourist centres would not buy from Trivandrum as they

did not want to risk having Indian ivory items in their shops. While some worked Indian ivory from Trivandrum ended up in the Gulf countries, it was usually taken there by migrant workers from southern India, and the quantity was relatively small in the 1980s.

The worst blow, of course, was the 1986 ban on the use of Indian ivory. Some Trivandrum carvers did continue to use what they could obtain, but selling items made from it became even more problematical. To try to save the industry, eight registered ivory companies in Trivandrum formed the Imported Ivory Licensees, Manufacturers and Traders Association in 1988 to try and import African ivory, which they planned to share amongst themselves. However, the association's members had no idea how to go about buying ivory abroad. In early 1989 they pleaded with us for the names and addresses of African ivory exporters as they had not so far succeeded in importing any whatsoever, nor had any individual carver even though the government had expected craftsmen to start to import their own ivory when duties were abolished.

Recently, some Trivandrum ivory businesses have been buying the so-called "broken, cracked or rotten" ivory imported by dealers in Bombay when duty was still applicable. Because it was declared cheap, the sales records reflect this; in fact, the Trivandrum purchasers pay in cash the difference to make up the full market price of African ivory. Illicit Indian ivory sells for US\$ 157 per kg in Trivandrum today, a third less than legal African ivory. Whatever the means Trivandrum

businesses use to obtain ivory, there is simply not enough to support the craftsmen.

Their numbers have dropped from 3,000 in 1978 to well under 100 now. Many of those who gave up went into woodcarving, but unless they use sandalwood, they cannot earn nearly as much as they did when they worked ivory, and that is also a product in short supply and controlled by the state government.



*Jaipur craftsmen have recently started making Chinese-style ivory figures.*

Copyright Lucy Vigne





*This craftsman in Bangalore works only with hand tools producing high-quality carvings.*

**Bangalore** Bangalore's ivory industry is dominated by a merchant family from Trivandrum, who set up a carving factory here years ago to avoid Kerala state communist party politics which have caused many labour problems. The son who now runs the business has always been interested in ivory, his father having hawked carvings door-to-door to the British in India in the 1920s.

In the 1960s and 1970s, when many ivory businesses were beginning to decline, this merchant was expanding his. In 1982 he had his carvers, whom he brought with him from Trivandrum, begin making metre-high statues of Hindu gods and goddesses. He sold his first one to a wealthy man in Bombay, whose friends greatly admired the work and ordered some for themselves. Now he has pre-paid orders for the next two years. He sells directly to his customers; he does not supply to retail shops nor does he sell to other traders the raw ivory he imports.

Although the merchant complains that Trivandrum carvers "drink and womanize", he has respect for their abilities. His employees, although they are uneducated and mostly illiterate, earn more than a civil servant with a university degree on first appointment: they receive an average US\$ 164 monthly salary,

and the highest paid artisan is presently making US\$ 2%. Guaranteed a regular income by being salaried, rather than paid for piece-work, they are allowed to take whatever time needed to complete a job and are under constant supervision to ensure that they are doing their very best work. Their finished pieces are among the finest produced in India.

Following tradition, everything is carried out by hand. After an ivory tusk is divided into the pieces needed for various items, the most skilled artisan makes a pencil drawing of the figure to be carved, which is then roughly cut out using a mallet and steel chisels. Another carver carries out the more detailed work, and someone else does the final touches on the face of the god or goddess. None of the statues is the work of a single artisan. When the carving is completed, a moistened breadfruit leaf is rubbed over the statue to remove any stains; the polished finish is achieved by buffing with porcelain powder mixed with water.

The merchant's 30 artisans are using 300-400 kg of raw ivory per annum, or 11.7 kg per craftsman. In a typical year they produce six to eight of the very large statues which sell for around US\$ 16,000 each, 25-30 smaller figures for US\$ 650 to US\$ 3,300, six to eight boxes for US\$ 460 to US\$ 1,000, and ten to 15 elephant sculptures for US\$ 200 to US\$ 1,000. One of the most expensive statues was a 135 cm tall Krishna bought by a Delhi businessman in 1987 for US\$ 57,860. The merchant is very proud of having Indian patrons for the works of art his craftsmen produce, and he thinks that the finest ivory carvings made today should remain in India.

## Conclusion

India's ivory industry is dying. Illicit supplies of raw ivory, infringements of regulations on the use of ivory and illegal exports have led the government to enact and enforce increasingly harsh restrictions, stronger even than those proposed by the CITES Secretariat, with the result that importers, dealers, manufacturers, retailers and craftsmen are giving up their roles in the ivory trade.

Well aware that illegalities still exist, the Indian government has not, however, banned the ivory trade. An attempt at compromise has been made to resolve the conflict of interests between the people whose livelihood is earned from ivory and the conservation needs of the elephant. Unlike several countries which have closed down the ivory industry but still have severe poaching problems, India's elephant population is presently increasing.

The ivory dealers and manufacturers are wealthy and educated; they have been able to diversify their businesses successfully. The people who have suffered are the ivory craftsmen who have few assets. More than 5,200 of them have lost their jobs since 1978. It has not been easy for them to find alternative employment even though the state handicraft corporations are encouraging them to work other materials. The remaining 2,060 produce a lot of tourist trinkets of no intrinsic merit; only a few make quality ivory carvings and paintings. As one trader said, the "endangered species" in India is the skilled artisan, not the elephant.



## References

1. *Ivory: An International History and Illustrated Survey*, New York, 1987. p.87.
2. G.N.Pant, "Romance of Indian Ivory Carving" (unpublished paper), New Delhi, 01988, p.<sup>10</sup>.
3. Pant, pp.8-9.
4. *Ivory*, pp.206-207.
5. *Ivory*, p.208.
6. Personal communication with G.N. Pant, New Delhi. 9-10 February 1989.
7. A.F. Thorbahn, "The Precolonial Ivory Trade of East Africa: Reconstruction of a Human-Elephant Ecosystem", a dissertation submitted to the University of Massachusetts, September 1979, pp.51, 53-54,57 and 60; and I.S.C. Parker, "The Ivory Trade", an unpublished report for Iain Douglas-Hamilton, on behalf of the United States Fish and Wildlife Service of the Department of the Interior, and IUCN. Nairobi, June 1979, Vol.4, various tables.
8. Thorbahn, pp.51-60 and 65.
9. G.F. Kunz, *Ivory and the Elephant in Art, in Archaeology and in Science*, Garden City, New York, 1916, p.437.
10. Parker, Vol.4, various tables.
11. George Watt, *A Dictionary of the Economic Products of India*, London, 1890, Vol.III, pp.226-227.
12. See sources in Table 1 for these specific years.
13. Government of India, Council of Scientific and Industrial Research, *The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products*, New Delhi, 1960, Part V. I-L, p.<sup>1</sup>9.
14. *The Wealth of India*, p.19.
15. George Watt, *Indian Art at Delhi 1903, being the Official Catalogue of the Delhi Exhibition 1902-1903*, London, 1904, pp.172-193.
16. Esmond Bradley Martin, "The Craft, the Trade and the Elephants", *Oryx*, Vol.XV, no.4, August 1980, pp.363-366.
17. In 1978 there were 3,000 cratsmen in Kerala, 2,000 in the Delhi area, 800 in Jaipur, 600 in Mysore City, 200 in Varanasi, 200 in Murshidabad, 150 in Amritsar, 120 in Gujarat State and 130 elsewhere Martin, p.364).
18. Kunz, p.103.
19. R. Sukumar, "Ecology of the Asian Elephant (*Elephas Maximus*) and its Interaction with Man in South India", a thesis for the degree of Doctor of Philosophy submitted to the Faculty of Science, Indian Institute of Science, Bangalore, May 1985, Vol.2, p.423.
20. The Kerala Forest Department's last auction took place on the 23 December 1976. The prices ranged from 440 rupees a kilo (about US\$ 49) for female tushes to 731 rupees a kilo for Class I Ivory (unpublished data from the Forest Department, Trivandrum).
21. *Indian Express* (Bangalore), 6 March 1989.
22. Personal communication with R. Sukumar, 1 March 1989.
23. Personal communication with P.N. Surendran, 27 February 1989.
24. The details of these stocks are as follows:

Class I	82	pieces weighing	1.347	kg
Class I	140	pieces weighing	313	kg
Class III	24	pieces weighing	126	kg
Class IV	260	pieces weighing	416	kg
Total:	406		2,202	kg
25. Personal communication with the Additional Chief Conservator of Forests, Wildlife Preservation, Karnataka, 4 March 1989.
26. Unpublished data from the Ministry of Environment and Forestry and Wildlife, Delhi.
27. S.P. Shahi, "Report of the Asian Elephant Specialist Group, Central India Task Force", in "*The Status of the Asian Elephant in the Indian sub-continent, IUCN/SSC Report 1980* (edited by J.C. Daniel), Bombay, no date, p.42.
28. R.D. Gupta. "Elephants in Northern India", *WWF Monthly Report*, January 1986, p.5.
29. D.K. Lahiri Choudhury, "Elephants in North-East India", *WWF Monthly Report*, January 1986, pp.10 and 16.
30. Letter from D.K. Lahiri Choudhury to Esmond Martin, 8 March 1989.
31. Letter from D.K. Lahiri Choudhury to Esmond Martin, 8 March 1989.
32. Sukumar, Vol.2, Table 12.1 between pp.413 and 414; unpublished statistics from the Ministry of Environment and Forestry and Wildlife, Delhi; and M.K. Appayya. "Karnataka Wildlife (1986-87)", unpublished report, Bangalore, 1987.
33. Sukumar, Vol.2, p.415.
34. Personal communication with N.M. Pillai, Trivandrum, 28 February 1989.
35. Sukumar, Vol.2, p.247; and personal communication with R. Sukumar, Bangalore, 1 March 1989.
36. The sources for this section on the illegal killing of elephants are: interviews with R. Sukumar, P.N. Surendran (Additional Chief Conservator of Forests, Wildlife, Kerala). M.K. Ranjitsinh (Joint Secretary Wildlife). S.C. Sharma (Joint Director Wildlife). Rajesh and Ramesh Bedi (film-makers), N.M. Pillai, M.K. Appayya (Additional Chief Conservator of Forests, Wildlife Preservation, and Chief Wildlife Warden, Karnataka). B. Prabhaker (Assistant Conservator of Forests, Wildlife Preservation, Mysore) and Ajay Desal (Scientist with the Bombay Natural History Society Elephant Project, Mudumalai Sanctuary). In addition, see Sukumar, Vol.2, pp.409-441 and J.C. Daniel (principal investigator). *Study of the Ecology of Some Endangered Species of Wildlife and their Habitats - The Asian Elephant (Report October 1985 to September 1987)*. Bombay, pp.115-116.
37. There is no evidence that any of the raw ivory shipped into the two free trade zones of Kandla and Varanasi (2.8 tonnes were imported to the latter during its existence from 1985 to 1987) was illegally removed from the zones and sold to local businessmen.
38. In January 1989 the importer paid a Hong Kong trader US\$ 190 per kg for Somali ivory tusks weighing between five and ten kg each.
39. Interview with H.M. Mohsin, an Unani medicine practitioner and General Secretary of the Unani Tibbi Conference, Ahmadabad, 27 March 1980.
40. Government of India , Ministry of Environment and Forests, Department of Environment, Forests and Wildlife, *CITES Annual Reports 1986 and 1987*, New Delhi, 1987 and 1988, various pages.
41. Personal communication with S.S. Bist, Assistant Management Authority, CITES, New Delhi, 1 February 1989.
42. Personal communication with Rakesh Kumar, Export Promotion Officer, Export Promotion Council for Handicrafts, New Delhi, 10 February 1989. According to unpublished data from the Development Commissioner, Handicrafts, New Delhi, the wholesale values of the Indian ivory industry for earlier years are as follows: 1982/83 US\$ 869,565, 1983/84 US\$ 1,287,129, 1984/85 US\$ 845,070.



TABLE 1  
OFFICIAL IMPORTS OF RAW IVORY INTO INDIA FROM 1898 TO 1955/5

YEAR IN KILOS	QUANTITY IN US\$	VALUE /KILO IN US\$	PRICE / KILO IN US\$	SOURCE	YEAR	QUANTITY IN KILOS	VALUE INUS\$	PRICE / KILO IN US\$	SOURCE	YEAR	QUANTITY IN KILOS	VALUE INUS\$	PRICE / KILO IN US\$	SOURCE
1803	162,849			1	1853	297,412			1	1843/44	37,783	218,644	5.79	8
1804	242,540			1	1854	289,377			1	1844/45	282,863	1,287,786	4.90	8
1805	155,214			1	1855	242,578			1	1845/46	211,898	1,001,959	4.73	8
1806	157,536			1	1856	448,239			1	1846/47	263,090	1,282,858	4.88	8
1807	137,273			1	1857	315,915			1	1947/48	127,829	637,213	4.98	8
1808	161,900			1	1874/75	257,298	544,128	2.11	2	1848/48	152,982	966,828	6.32	9
1809	143,584			1	1875	257,922	941,049	3.65	2	1949/50	102,727	750,177	7.30	9
1810	145,963			1	1876	248,024	1,060,487	4.28	2	1950/51	124,013	654,836	5.28	9
1811	128,509			1	1877	207,150	808,283	3.90	2	1951/52	178,876	1,037,581	5.87	10
1812	138,977			1	1878	184,163	702,335	3.81	2	1952/53	119,491	802,687	5.04	10
1813	102,796			1	1879	195,845	718,224	3.67	2	1953/54	101,218	545,821	5.39	11
1814	109,332			1	1880	213,966	832,176	3.89	2	1954/55	140,396	800,923	5.70	11
1815	190,534			1	1881	232,175	885,175	3.81	2	1955/56	141,628	1,086,178	7.54	11
1816	185,178			1	1882	920,175			3	1956(Apr/Dec)	98,470	895,488	7.06	12
1817	88,376			1	1883	836,885			3	1957	134,217	828,137	6.17	12
1818	142,667			1	1883/84	209,754			4	1956	32,890	247,038	7.51	12
1819	157,761			1	1884	929,703			3	1959	78,074	664,284	8.51	12
1820	224,094			1	1885	75,207			3	1980(Jan/Mar)	18,751	205,100	10.94	12
1821	111,897			1	1886	1,200,900			3	1960/81	74,982	802,106	10.70	12
1822	130,026			1	1887	1,066,261			3	1961/62	68,844	805,259	11.70	12
1823	122,909			1	1904/05	2,478,890			5	1962/63	58,352	712,652	12.21	12
1824	209,898			1	1912/13	109,967			6	1963/64	73,249	814,378	8.39	12
1825	172,949			1	1913/14	105,625			6	1964/65	46,092	303,845	6.59	12
1826	212,314			1	1914/15	96,422			6	1965/66	35,762	308,425	6.82	12
1827	195,759			1	1915/16	97,209			6	1966/67	26,567	303,685	11.43	12
1828	148,191			1	1916/17	150,652	866,606	5.75	6	1967/68	13,932	105,041	7.54	12
1829	119,669			1	1917/18	136,924	769,202	5.62	6	1968/69	45,420	290,508	7.02	12
1830	175,945			1	1918/19	132,356	716,648	5.41	6	1969/70	37,916	276,627	7.30	12
1831	175,140			1	1919/20	292,909	2,020,272	6.90	6	1970/71	30,053	224,806	7.48	12
1832	162,218			1	1920/21	125,212	715,816	5.72	6	1971/72	89,950	176,446	1.96	12
1833	195,497			1	1921/22	219,760	1,089,606	4.96	6	1972/73	13,557	167,612	12.36	12
1834	192,426			1	1922/23	163,362	886,731	5.42	7	1973/734	3,080	81,105	19.84	12
1835	180,496			1	1923/24	142,813	750,963	5.27	7	1974/75	5,403	157,430	29.14	12
1836	224,000			1	1924/25	147,624	844,531	6.40	7	1975/76	4,919	114,371	23.25	12
1837	246,983			1	1925/26	111,042	805,353	7.25	7	1976/77	8,998	247,743	27.53	12
1838	201,321			1	1926/27	103,199	671,074	6.36	7	1977/78	10,841	339,295	31.30	12
1839	167,705			1	1927/28	125,431	754,460	6.01	7	1978/79	22,174	452,488	20.41	12
1840	209,187			1	1928/29	96,786	629,271	6.50	7	1979/80	10,980	468,497	42.67	12
1841	211,378			1	1929/30	90,504	528,854	5.84	7	1980/81	16,840	528,932	31.41	12
1842	205,741			1	1930/31	93,661	502,142	5.36	7	1981/82	13,363	386,819	28.95	12
1843	281,717			1	1931/32	71,813	260,961	3.63	7	1982/83	11,067	297,403	26.87	12
1844	197,800			1	1932/33	83,050	281,742	3.39	7	1983/84	27,537	778,917	28.29	12
1845	280,426			1	1933/34	96,911	329,054	3.40	7	1984/85	14,470	366,161	25.30	12
1846	359,082			1	1934/35	107,811	383,150	3.55	7	1985/86	4,876	124,848	25.60	12
1847	352,227			1	1935/36	132,539	456,080	3.44	7	1986/87	4,467	127,592	28.56	12
1848	334,361			1	1936/37	96,233	307,210	3.19	7					
1849	381,572			1	1937/38	84,681	280,127	3.31	7					
1850	306,663			1	1938/39	108,161	361,685	3.34	7					
1851	367,603			1	1941/42	111,860	298,180	2.67	7					
1852	306,214			1	1942/43	109,215	345,834	3.16	7					

Sources:

- (1) Peter Frederick Thorbahn, "The Precolonial Ivory Trade of East Africa: Reconstruction of a (12) Government of India, Department (later: Director General) of Commercial Intelligence and Human-Elephant Ecosystem". a dissertation submitted to the University of Massachusetts (September 1979), pp.53-54 pages.
- (2) Edward Balfour, *The Cyclopaedia of India and of Eastern and Southern Asia, Commercial, Industrial and Scientific* London, 1885), Third Edition, Vol.V, p.389.**nn**
- (3) *Statistical Abstract relating to British India from 1877/8 to 1886/7*, No 22, Her Majesty's Stationery Office (London, 1888), various pages.
- (4) George Frederick Kunz, *Ivory and the Elephants In Art, Archaeology and Science* (Garden City, New York 1916), p.437
- (5) Kunz, p.470.**B**
- (6) Government of India Central Publications Branch, Commercial Intelligence Department, India, *Statistical Abstract for British India with Statistics, where available relating to certain Indian states from 1912 1913 to 1921-1922* Calcutta, 1924), various pages.
- (7) Government of India Central Publications Branch, Commercial Intelligence Department, India, *Statistical Abstract for British India with Statistics, where available relating to certain Indian states from 1922/23*, various years and pages (with slight change to title).
- (8) Government of India, Department of Commercial Intelligence and Statistics, India. *Accounts Relating to the Sea-borne Trade and Navigation of British India*, (Delhi), various years and pages.
- (9) Government of India, Department of Commercial Intelligence and Statistics, India, *Accounts Relating to the Sea-borne Trade and Navigation of India* (Delhi) various years and pages.
- (10) Government of India, Department of Commercial Intelligence and Statistics, Calcutta, *Relating to the Foreign Sea and Air borne Trade and Navigation of India*, various years and pages.
- (11) Government of India, Department of Commercial Intelligence and Statistics, Calcutta, *Accounts Relating to the Foreign (Sea, Air, Lend) Trade end Na vi gation of india*, various years end pages.

- (12) Government of India, (Department) later: Director General) of Commercial Intelligence and Statistics, Calcutta, *Monthly Statistics of the Foreign Trade of India* (Delhi), various years and pages.

TABLE 2  
OFFICIAL RE-EXPORTS OF RAW IVORY (AFRICAN ORIGIN) FROM 1943/44 TO 1956

YEAR	QUANTITY IN KILOS	VALUE IN US\$	PRICE PER KILO IN US\$
1843/44	0	0	-
1944/45	0	0	-
1945/46	12,296	66,952	5.61
1846/47	41,292	201,552	4.88
1947/48	32,971	104,587	3.17
1848/49	79,413	2,974	4.15
1849/50	499	2,674	5.78
1950/51	2,479	10,331	4.17
1951/52	254	869	3.42
1952/53-56	0	0	-

**NB** From 1956 onwards, very little raw ivory of African origin was legally exported from India annually because of government restrictions.

Source: same as Table 1



YEAR	QUANTITY IN KILOS	VALUE IN US\$	PRICE PER KILO IN US\$
1916/17	633	1,631	2.58
1917/18	117	427	3.65
1918/19	439	3,149	7.17
1919/20	1,802	15,565	8.64
1920/21	813	6,744	8.30
1921/22	2,458	13,752	5.60
1922/23	742	4,326	5.83
1923/24	2,751	22,164	8.06
1924/25	3,066	20,998	8.85
1925/26	1,631	12,712	7.79
1926/27	365		
1927/28	231		
1928/29	307		
1929/30	103		
1930/31	650		
1931/32	1,286		
1932/33	5		
1933/34	102		
1934/35	21		
1935/36	461		
1936/37	1,517		
1937/38	1,683		
1938/39	1,593		
1941/42	3,085		
1942/43	0	0	-
1943/44	0	0	-
1944/45	18	?	-
1945/46	0	0	-
1946/47	673	14,929	22.18
1947/48	2,934	23,625	8.05
1946/49	1,155	9,754	8.44
1949/50	7,054	86,480	12.26
1950/51	680	3,214	4.73
1951/52	802	6,600	8.23
1952/53	3,486	27,501	7.89
1953/54	3,275	23,077	7.05
1954/55	1,464	12,162	8.31
1955/56	1,776	15,405	8.67
1956/57	2,325	23,369	10.05

LOCATION	NUMBER
Delhi area	450
Jaipur	780
Udaipur and Nathdwara	300
Jodhpur and Pali	190
Amristar	25
Lucknow	30
Ahmadabad	30
Bombay	15
Murshidabad	40
Varanasi	20
Trivandrum	45
Madras	10
Bangalore	40
Mysore	5
Others	100
Total	2,060

PLACE	MIN	MAX	REFERENCE
North Kanara	40	40	
South Kanara	50	80	
Malnad-Bhadra	100	150	
North Wynad	800	800	
Bandipur	1,200	1,500	
Nilambur	300	500	
Eastern Ghats	1,800	2,000	
Nalliampathis	800	1,000	
Periyar	700	900	
Agasthyamalai	150	200	
South India	5,740	7,150	R Sukumar 1965
Palamau	65	65	
Singbhum	200	200	
Dalbhium	70	70	
Simlipal	375	648	
Kuldiha	25	25	
Hadgarh	10	10	
Satkosia/Baisapalli	300	400	
Chandaka	21	57	
North Keonjhar	25	25	
South Keonjhar	110	150	
Ushakothi/Khalasoni	110	216	
Kapilas	40	50	
Madanpur	250	300	
Lakhaura	50	60	
Mahendragiri	10	15	
Khurda	21	21	
East Central India	1,682	2,312S	P.Shahi 1965
Sub Himalayan Tract	3,008	3,633	
South Bank	1,070	2700	
Kaziranga	1,725	1,946	
Garo and Khas	5,500	3,500	
Jainti Hills	150	175	
South Cachar	100	150	
Tripura	120	150	
North East India	8,703	12,254	D.K Lahiri Choudhury 1985
Terai	425	490	
Dudhwa	25	25	
North India	450	515	R.D. Gupta 1985
Andaman Islands	20	30	M.K. Ranjitsinh
Totals	16,595	22,261	

PLACE	MIN	MAX	REFERENCE
Arunachal Pradesh	1,000	1,100	
Assam	400	500	
Tripura	20	20	
West Bengal	40	40	
North India	750	750	
South India	700	700	
Total	2,910	3,110	R Sukumar
1965			

LOCATION	SPECIALTIES IN IVORY
Delhi	Paintings jewellery, magic bells, tusks, table lamps boxes, screens, seals, erotic figurines, elephants, paper knives, drop licks, cigarette holders, dice ad toothpicks
Jalpur	Paintings Indian gods and goddesses, charms, Chinese-style human figurines and animals
Lucknow	Fans, lamps and boxes
Ahmadabad	Bangles
Udaipur	Paintings
Jodhpur	"Chip work" Ivory chips are used to cover wooden animals ad boxes
Trivandrum	Human figurines, Ghanesh (elephant-headed Hindu god) figurines, other Hindu gods and goddesses, and flower pots
Marshidabad	Bullock carts, peacock boats, and elephants with howdahs
Bangalore	Hindu gods and goddesses
Armitsar	Chess sets and boxes
Varanasi	Chess sets and lamps
Bombay	Bangles and pendants
Madras	Hindu gods and goddesses
Mysore	Inlay work on furniture ad pictures

LOCATION	PRICE 14US\$
Bangles	2-430
Necklaces	5 - 265
Plain seal, 6 cm long	20
Elephant figurine, 2.5cm high weighing 35g	59
Chop sticks (pair)	105
Far 30 cm span	160
Magic ball (16 balls)	430
Carved tusk, 37cm long, weighing 510 g	490
Chess sets of good quality	520 - 4,000
Fully carved tusk weighing 11 kg	20,000

We would especially like to thank the following individuals who so willingly helped us with the research we carried out in India: M.K. Apayya, Rajesh Bedi, Ramesh Bedi, S.S. Bist, J.C. Denial, Ajay Desai, Balbir Singh Gurm, S.C. Joshi, Promode Kant, Rakesh Kumar, G.N. Pant, N.M. Pillai, B. Prabhaker, M.K. Ranjitsinh, Bittu Sahagal, Mohan Sharma, R Sukumar and P.N. Surendran.

We would also like to express our appreciation to Chryssee MacCasler Perry Martin for assisting us in the preparation of the report and to WWF for financial support.



---

# Doctoring Rhinos: Diseases seen in Kenya

John Francis Jonyo

The current number of black rhinos (*Diceros bicornis*) in Kenya stands at about 500, and some 50 white rhinos (*Ceratotherium simum*) are on private ranches. Most of the black rhinos are fragmented over a wide range reducing opportunities for breeding and genetic interchange and hence accelerating the rate of extinction. Conditions have been worsened by breeding depression caused by environmental changes and demographic fluctuations such as biased sex ratios and genetic problems. Disease can also be considered as having an effect on the rhino population in Kenya and these remarks are based on animals seen during the major rhino translocations carried out in Kenya between 1986 and 1988.



Taking blood from an immobilized rhino

## The “Natural” State of Health

Wild herbivores are known to be resistant to and carriers of diseases which, while not harmful to them, can be transmitted to domestic animals in areas of mixed grazing. Examples are buffaloes (*S. caffer*), which carry protozoan parasites (*Theileria*) and the foot-and-mouth virus, and wildebeests (*C. taurinus*), known to transmit the deadly disease of malignant catarrhal fever to calving cattle. Transmission is either by intermediate hosts like ticks or directly through saliva or faecal material deposited onto the pastures and ingested by the domestic animal.

Although they seldom graze in areas where domestic animals wander around, tests have shown that rhinos are infected with many types of disease, most of which are suppressed except in times of stress. Such stress, be it due to capture, nutritional problems or even environmental change, can lower the resistance of the body so that the underlying diseases exhibit themselves as infections which can lead to death if untreated.

## Blood Diseases

Once a rhino has been immobilized blood is routinely collected from either the ear-vein or a vein in the front leg into 10 ml vials containing anticoagulants or into sera bottles. When the blood is smeared onto a slide and stained with Giemsa certain protozoan parasites are seen in the thin blood films. These include *Theileria* and trypanosome parasites ranging in type with areas of capture. *Theileria* species found in rhino blood are non-pathogenic while the trypanosome, which causes Nagana in cattle, can be of various kinds such as *T. brucei* which was isolated from a clean black rhino moved from Nanyuki into

Tsavo-Ngulia Sanctuary. The infection was seen within two weeks of the move and was due to heavy tsetse fly (*Glossina pallidipes*) challenge. The animal was treated with Berenil, a trypanocidal drug, and seen to improve but was found dead three weeks later, more probably due to traumatic injuries from a fight with another rhino than from infection. There has been some controversy as to the effect of trypanosomes on the black rhino which is known to be an animal indigenous to the savanna equatorial lands that have the most numbers of tsetse flies in Africa. There are black rhinos living perfectly well in Tsavo and the Masai Mara, areas with plenty of tsetse flies, and it is only when animals born and raised in “tryps-free” areas are moved into fly areas that problems arise. White rhinos are not so resistant to the fly challenge compared to black

rhinos although after initial treatment five white rhinos survived well in Meru National Park — until killed by poachers. The clinical manifestations of trypanosomiasis in the rhino include depression, increased salivation, increased body temperature and emaciation due to decreased feeding; in the later stages of the disease jaundice occurs leading to death. Treatment includes administration of several drugs, some curative, others prophylactic. Survivors do acquire some immunity to reinfection. Avoiding the transfer of clean rhinos from “tryps-free” areas to fly infected areas is the best way to avoid losses from this disease. Movement of infected rhinos from one part of the Republic to another might introduce a new type of the infection into an area clear of the parasite which may then multiply in other herbivores if a fly vector is available. It is therefore of paramount importance to screen the rhinos being moved into the different sanctuaries and treat them before release. Solio rhinos moved to Nakuru Sanctuary were trypanosome-free and they went from one non-fly zone to another.

---



---

## Infectious Diseases

Bacterial infection is the most common and easiest to diagnose because it shows in the form of an abscess or as pus oozing from a wound on the skin. The bacteria which live on soil easily contaminate an injury and if not treated may spread into the blood as the thick skin of rhinos can prevent an abscess from rupturing to the surface. Pneumonia and pus from the nose can result from an infection which would be due usually to staphylococcus, streptococcus, anthrax bacilli, salmonella or brucella organisms. Young hand-reared rhinos commonly suffer from bacterial diarrhoea accompanied by loss of appetite or increased temperature. The treatment of bacteria is administering antibiotics by injection or as creams, sprays and ointment. It is routine to give such injections to captured rhinos before reviving them.

Most rhinos are carriers of viruses but, unless the animal is stressed by capture and translocation, are usually resistant to infection. Sometimes, if transportation under sedation is of prolonged duration, upon revival the rhino is observed to be listless, with increased respiration, nasal discharge and lack of appetite. It does not respond to the antibiotics and vitamins administered and sometimes dies in the pen.

Mostly seen as skin-patches, fungal infections are picked up when rhinos scratch on trees or in pens which have held infected animals: anti-fungal creams and injections are available for their treatment. Warts have been seen on captured rhinos. Usually of small size, just raised above the level of the skin, they can be surgically removed while the rhino is under sedation. Any bleeding is arrested and the site sprayed with antibiotics to stop any secondary bacterial invasion.

## Parasitic Diseases

The principal internal parasites are worms which live in the gut of the rhino and are ingested with the browse in the form of eggs or larvae. Parasites range from bet-larvae in the oesophagus, lung worms of different types in the rumen, small and large intestines and lungs to even liver flukes in rhinos which feed in marshy areas. Assessment of parasitic load is determined by measuring the amount of eggs shed by the helminths in a gramme of fresh rhino faeces. Animals in pens are known to develop a high egg count per gramme and treatment with anti-helminths is therefore essential. The drug is given in drinking water or by hiding the tablets in a piece of sugar cane. Tapeworms have also been reported and treated in these animals.

Domestic and biting flies, ticks, mites, fleas and lice all have been observed on the skin of rhinos. Open wounds provide entry points for bacteria and enable flies to lay their eggs or deposit micro-filariae nematodes in the skin while tsetse flies introduce mechanically the trypanosome. Every black rhino in Kenya has wounds which vary in number with the fly zone

and the age of the rhino and can in fact help in estimating how old a particular animal is. Treatment is with healing oils and antibiotic creams.

## Breeding Diseases

Breeding is most important for the rhinos translocated into sanctuaries. Oestrus in female rhinos occurs at intervals of 38-58 days and is characterized by frequent urination and increased respiration, both visible and audible. Oestrus lasts 24 hours and, if copulation is successful, after 474-488 days of gestation a single calf is born. Some diseases interrupt the normal reproductive cycle and cause premature birth or infertility. Two such, brucellosis and vibriosis, were tested for in the sera of all Solio rhinos sent to Nakuru; no animal was positive, giving high hopes for successful breeding. In future all areas of rhino capture will be tested for breeding diseases.

## Inflicted Wounds

Fighting between males for territory or females sometimes causes serious injury and nearly all rhinos captured from the wild are found to have old traumatic wounds from fighting, rubbing on trees, thorns, arrow heads or even bullet wounds. Most of the wounds become infected by invading bacteria but with time heal leaving scars on the skin. More serious wounds should be treated with antibiotics.

## Nutritional Deficiency Diseases

The number of rhinos moved into a new sanctuary has to be balanced with the availability of rhino browse in the area and the availability of fresh water. The level of fluoride in the water and the levels of different essential mineral salts available in the water, soil and vegetation must be all taken into account. A deficiency in the feed, water or mineral salts will be exhibited either as a loss of body condition, uncoordinated movement, infertility or, in extreme cases, death. Corrections can be made by supplementing the feed with salts containing minerals such as copper, selenium, molybdenum and magnesium.



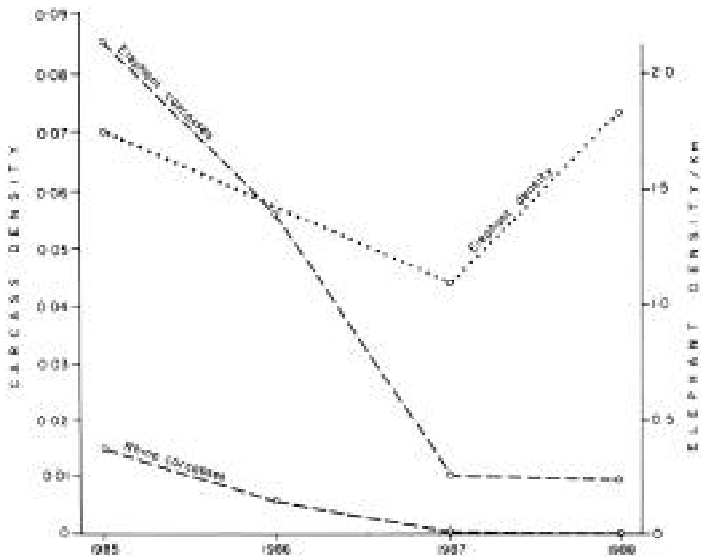
*Typical suppurating wound caused by bacterial infection*

---



# Zambia's Pragmatic Conservation Programme

Dale Lewis



**Fig 1.** Number of fresh poached carcasses found during patrols in Lower Lupande expressed as number per sq km. Given also are elephant density estimates for the 55 sq km monitoring zone for 1985, 1987 and 1988.

Over the past ten years illegal hunters have killed nearly 95% of Zambia's black rhinos and more than 50% of its elephants have suffered the same fate. While not so precipitously, numbers of most other species of wildlife have declined as well. In response to the statistics, Zambia re-examined its policies, and a new and radically different approach to the conservation of wildlife has emerged. It started in Chief Malama's area just outside South Luangwa National Park where a dozen young residents of the area volunteered to help protect the wildlife. They worked under the supervision of their local village leaders and the National Parks and Wildlife Service (NPWS) and became known as Village Scouts; their success in reducing illegal hunting was overwhelming. Today, Zambia has a formal Village Scout training programme and each year over 120 scouts are assuming duties in their respective Chiefdoms throughout the nation.

## The Source of Policy

Village Scouts, local village leaders and technical extension officers of NPWS now form a partnership in Zambia's wildlife conservation. As a result resources are being conserved and sustainable uses are offering benefits ranging from employment for local residents to revenue earnings which pay for management costs and community development projects. The significance of this partnership is that traditional village leadership is encouraged to help formulate conservation practices with an African perspective and therefore with greater public acceptability. Consequently the administration of wildlife management in rural areas has become more effective in combining views and ideas from both technical staff of the government and the local residents; national parks' personnel have had their customary roles as law enforcement officers modified to function more as servants of the rural people.

This new policy of conservation in Zambia is called the Administrative Management Design (ADMADE) and applies specifically to land designated as game management areas, of which there are 32 surrounding most of Zambia's 18 national parks. By strengthening their role as buffer zones to the national parks, ADMADE is reducing the incidence of illegal hunting in these protected areas while also minimising other human activities disruptive to park management. The policy design of ADMADE was formally presented in a government document prepared by NPWS (Mwenya, Kaweche and Lewis 1987) and is obtainable from that department.

## Simplicity and Adaptability

If third world countries have a poor record for putting conservation high in their national planning priorities it may well be because conservation, as traditionally defined, does not adequately address the needs and aspirations of their people. ADMADE does not emphasize conservation *per se*, since "conservation" in rural Africa often has the connotation of regulations, law enforcement and restrictions, but stresses the benefits to and responsibilities of local residents who are prepared to share their lands with wildlife. Neither does it dictate the methods used to achieve such a reconciliation between wildlife and rural residents. Instead, ADMADE provides a simple design for administering wildlife management through local participation and leadership together with guarantees that certain revenues accrued from the area will return to the local villages in the form of employment and community development. The way village participants use this design will reflect their traditional respect for the area, tribal customs and an appreciation of the legal uses now available to them under the programme, giving ADMADE flexibility and adaptability in dealing with local issues concerning wildlife resources since solutions now come from the local residents themselves.

To understand how ADMADE achieves this requires an appreciation of Zambia's ethno-geography and political system. Within its national borders Zambia has a vast cultural diversity with a total of 73 tribes having different dialects or languages as well as different land-use practices. In most cases a game management area (GMA) is within a single tribal area but in some more than one tribe is involved. ADMADE has established for each suitable GMA a policy-making body comprised of the ruling chiefs for the area, resource officers and senior-level government leaders including the area's Member of Parliament, District Governor and District Political Secretary. This body is referred to as a Wildlife Management Authority. When convened, tribal customs and the values of the traditional rulers merge with the technical views and opinions of the resource specialists and government. The District Governor, the highest ranking political leader in the district (or county), is Chairman and he along with the other government and Party officials can use their influence to facilitate the recommendations of the Authority.



---

## What is Needed

A necessary precondition for the establishment of a Wildlife Management Authority is that its respective GMA be able to sustain sufficient annual income from wildlife to support the needs of management, such as the local Village Scout programme, and to fund the projects identified by local residents for community improvement. An area from which revenues are generated and in which they are utilized is referred to as an ADMADE Unit. Units correspond to GMAs except where the latter are too large to be administered effectively as a single Unit; a NPWS officer is designated Unit Leader.

The Authority's task is to adopt an annual programme of wildlife management as recommended by its Unit Leader and to approve budgets to support this programme and that for community development projects. These must be within the allowable limits of a revenue sharing formula adopted by ADMADE under which the Wildlife Conservation Revolving Fund, which retains the initial earnings from each unit, allocates 40% of these revenues to the Unit's wildlife management costs and 35% to community development. The remaining 25% is shared between NPWS to help support the management costs of the adjacent national park and the Ministry of Tourism for the promotion of tourism. Once these budgets are received by the Wildlife Conservation Revolving Fund the respective amounts are transferred into two separate accounts which are administered by the Authorities themselves and are subject to periodic inspection by an independent audit.

## Responsibility

The programme of wildlife management adopted by the Authority is administered by the Unit Leader who also supervises the work of those local residents employed by or serving voluntarily under the Authority, Village Scouts being the main source of permanently employed manpower. The role of Unit Leader is therefore particularly important to ADMADE's success and a special six month training programme is required prior to his assignment. He is expected to reside in the Unit as an effective member of the community, learn the local dialect and establish close ties with chiefs and headmen to promote discussion and understanding of issues affecting wildlife management.

One specific way a Unit Leader does this is by serving as secretary to the Wildlife Management Sub-authorities which are formed for each chiefdom. Each Sub-authority is chaired by its own Chief; the headmen and other prominent individuals of the community are members. The agenda for Sub-authority meetings typically relate to issues concerning the wildlife resources in the chiefdom. There may be a need, for example, to discuss disciplinary measures to be taken in respect of a particular Village Scout, a policy on the coordination of early burning, ways to reduce crop damage from wildlife, and employment provided by the professional hunter in the area. The purpose of these meetings is to identify problems and resolve them with the full involvement of the local community. The Unit Leader ensures that solutions are kept within the law and encourages rational uses of wildlife to help underpin the management and development needs of the Unit. Wildlife Management Sub-

authorities also have the responsibility of agreeing on improvement projects they wish the Authority to finance from the share for community development and only proposals agreed on by the Sub-authorities will be considered by the Authority for funding. It is therefore in the interest of the Chief to see that his own Sub-authority convenes and that the best local expertise is recruited to help carry out the needs of wildlife management for his area. In this way the resource will return a growing amount of net revenue. To encourage such an attitude of leadership and responsibility for improved wildlife management ADMADE requires that Village Scouts be recruited only by the Chiefs. Thus traditional leadership in the community is recognized in order to promote a more positive relationship with NPWS and hence advance the objectives of ADMADE.

## Contentious Concepts

ADMADE depends upon hunting certain species to finance the preservation of wildlife in general. To many the idea of safari hunting is repugnant and ADMADE also depends on donor assistance to help provide some initial investments to enable its Units to operate effectively. However, aid often comes from institutions whose support originates from societies having ethics that clash with the idea of killing any wildlife. Zambia is convinced that if conservation is to succeed and gain acceptance within its own boundaries the means must conform to the needs and realities of socioeconomics. An examination of the impact ADMADE has had on the local elephant and rhino populations in Lower Lupande Unit may provide an assurance that ADMADE's policy is the best of all possible solutions that can be offered. The following data are made available from the Lupande Development Project (Lewis, Kaweche and Mwenya 1988) which was the precursor to ADMADE and has become the model Unit for the national programme.

## Elephants

In South Luangwa National Park and its adjacent areas, including Lupande, a 40% decrease in elephant numbers occurred from 1979 to 1985 and the decline was attributed to illegal hunting (Lewis 1986). During this period elephant poaching was a serious problem but unlike the park, where the preferred weapon for hunting was an automatic firearm, in Lupande the chosen weapon was the traditional muzzle-loading gun (Lewis, Kaweche and Mwenya 1988). As an index of change in elephant numbers in relation to the work of Village Scouts, a 55 sq. km area within Lower Lupande was monitored for elephant density during the implementation of the Lupande Development Project. In addition field patrol reports made by Village Scouts throughout the whole area were used to substantiate any new sightings of elephants where their presence had not been previously noted. Rates of poaching were measured as the ratio of total carcasses suspected of having been poached (i.e. tusks removed, bullet wounds, etc.) to the total area covered during a year's patrolling. From 1985 to 1988 poaching rates in Lupande decreased substantially (see Fig. 1). Although elephant density remained relatively unchanged in the 55 sq. km monitoring zone, in areas considered the outer limits of the elephants' range sightings were made in 1988 where none had been made in 1985 (unpub. data, 1989).

---



---

## Rhinos

Considering the critical plight of black rhino conservation in all of Africa, the story of Lupande's black rhinos is even more spectacular. Specific details will be omitted from this paper for security reasons, but based on two separate surveys undertaken in 1984 (Chimbali, 1984 and 1988; Lewis and Chanda, 1988), as well as annual field patrol reports, it is clear that the rhinos in Lupande are breeding and their numbers are not decreasing. Furthermore, the rhino poaching rates have dropped abruptly during this period; from 1986 to 1988 there has been no reported rhino carcass throughout Lupande.

Much of the credit for this trend must be given to the local Village Scouts who have demonstrated their abilities and concern for protecting their own wildlife resources from illegal uses. The unseen or unknown variable is the extent of social resistance to poaching within the local communities where villagers might engage in poaching themselves or indirectly by giving outside hunters lodging in exchange for meat. Indications from the attitude survey taken in Malama area show perceptions toward wildlife conservation are changing and that the people's recognition of the legal benefits from wildlife may be discouraging illegal uses (Lewis, 1988).

## Money: the Motive Power

Fuelling this entire process of change is the money generated from safari hunting which in 1988 totalled US\$ 511,000 from the 12 ADMADE units in operation. While donor assistance of US\$ 120,000 made most of the necessary investments for capital improvements more than 90% of the recurrent costs of the Units were met from the 40% share of the safari hunting concession fees. As local involvement in the management of wildlife improves and intensifies, the capacity of these Units to generate increasing revenue on a sustained-yield basis will most certainly enlarge. Furthermore, non-consumptive uses, such as tourist lodgings, sales of live animals to game ranches, etc. will be identified and exploited. Regardless of these other uses, however, ADMADE recognizes that revenue earned from safari hunting represents the largest net profit that wildlife can sustain to help

meet the Unit's management costs and it is for this reason that the Managing Director of the safari hunting company with the concession for a given Unit is a full member of that Wildlife Management Authority and the resident professional hunter operating in a chiefdom is a member of the Wildlife Management Sub-authority.

## A Look to the Future

At the end of each year an annual planning workshop is convened to bring together all Unit Leaders and senior NPWS officers for a review of each Unit's progress and to solve any problems under ADMADE that require a departmental decision or policy change. It was remarked during the 1988 workshop by the NPWS Chief Wildlife Research Officer that "ADMADE started off as a baby, able only to crawl. Then it learned to stand and soon began running. Now it must develop its brain to know where it needs to go". ADMADE is evolving a "brain" and it is doing so at an astonishing pace that perhaps reflects the involvement that ADMADE seeks from so many levels of expertise and background. Its very foundation is the local community, the traditional rulers and the appointed government leaders. Within its first year when more than 15 Wildlife Management Authority meetings were held, important issues of wildlife management were discussed and resolved. In Sichifula-Mulobezi a problem of encroachment by village settlers on land important for wildlife was taken up and the local chiefs exercised their own powers to solve the problem effectively. In Mumbwa over-hunting by non-residents was condemned and the Authority refused entry to licensed hunters until a more effective system could be implemented to protect their area from this abuse. In Lunga-Lushwisi the Authority recognized that the Unit had too few camps to adequately police their area against illegal hunting, and in their first year three new camps were constructed for deployment of their Village Scouts. In Munyamadzi the Unit Leader needed somewhere to live, and the local community supplied a government house that was built for a school teacher who never occupied it. The list goes on, but the message is clear: a new and successful "grass-roots" approach to conservation has taken shape, one in which Zambians have determined the techniques and style.

## References

- D. Chimbali, Chendini Survey of Black Rhino, unpublished report for National Parks and Wildlife Service, Zambia, 1964.
  - D.M. Lewis, Survey of perceptions toward wildlife for two village communities with different exposure to a wildlife conservation project *ADMADE Research Publication No.2*, Associated Printers, Lusaka, 1966.
  - D.M. Lewis, G.B. Kaweche and A.N. Mwenya, Wildlife conservation outside protected areas - a lesson from an experiment in Zambia, *ADMADE Research Publication No.2*, Associated Printers, Lusaka, 1988.
  - D.M. Lewis and G. Chanda, Chendini Survey of Black Rhino, unpublished report for National Parks and Wildlife Service, Zambia, 1988.
  - A.N. Mwenya, G.B. Kaweche and D.M. Lewis, *Administrative Management Design for Game Management Areas (ADMADE)*, National Parks and Wildlife Service, Government Printers of Zambia, Lusaka, 1987.
-



---

# Luangwa rhinos: “Big is best, small is feasible”

N. Leader-Williams

The conservation of large and therefore genetically viable populations of black rhinos within large protected areas poses a problem that has been discussed previously in *Pachyderm*: “big is best, small is feasible” (Western 1984). Tsavo’s population of black rhinos and elephants was depleted during the 1970s and by the early 1980s only small numbers of rhinos remained in Kenya. At that time international attention became focused on the plight of both black rhinos and elephants and very high conservation priorities were given to Selous and Luangwa because these areas contained Africa’s largest populations of each species (Cumming and Jackson 1984). No reader of *Pachyderm* needs to be told that the conservation effort has like Humpty Dumpty ‘had a great fall’ and it is now a matter of trying to better the performance of ‘all the king’s horses and all the king’s men’ and put back together a realistic policy (Western 1984). Probably less than a hundred scattered rhinos currently survive in either Selous or Luangwa, where in the early 1980s there were a few thousand.

The seriousness of the situation in the Selous took some while to be appreciated because no full-time researcher was based there in the 1980s (Western and Vigne 1984 with Douglas-Hamilton 1984). However, I for one had the sorry task of witnessing the decline of Luangwa’s rhinos and elephants during 1980-85. Over that period data were collected from both an intensive study site and over more extensive areas using law enforcement patrols (Bell 1986), both to make recommendations for improved conservation in Luangwa and to document any lessons that could be learnt for future conservation initiatives.

## Big is Rarely Big Enough

When I arrived in Zambia there was a mood of optimism in conservation circles. ‘Save the Rhino Trust’ (SRT) had recently been established with what was then WWF’s largest ever single grant of US\$ 0.5 million over three years and believed it was succeeding in its aims because patrols were capturing large numbers of offenders (Anon. 1980-85). This represented a great improvement on the 1970s when the National Park and Wildlife Service had lacked the resources to undertake any patrolling. But was it enough? To answer this question it was obviously necessary to monitor trends in rhino and elephant numbers rather than to count captured offenders and by 1982 it had become clear that SRT was not succeeding (Leader-Williams 1985). Individually recognized rhinos were being killed in the study area, around 70% skulls found throughout Luangwa valley were axed and scouts were seeing fewer rhinos on their patrols (Leader-Williams 1988; Leader-Williams and Albon 1988).

On the one hand SRT had received a very large grant and needed to appear worthy of support if it was to raise further funds after WWF’s grant ran out in December 1982. On the other, the funds allocated to SRT had only permitted it to field an anti-poaching unit of 22 men in Luangwa, too few to cover the 16,660 sq km

of national parks let alone the 34,910 sq km of game management areas. As a solution to the problem I recommended in early 1983 that SRT should retrench to cover the areas of a few hundred sq km where rhinos still survived in higher densities (Leader-Williams 1985), utilizing the rule-of-thumb that scouts need to be at an effective density of one man per 50 to 20 sq km (Cumming, Martin and Taylor 1984; Bell and Clarke 1986). In the event SRT responded with only a partial reorganisation. This was effected initially by some redeployment and assigning one or two permanent patrols to one small area, and latterly by an increase in manpower following NORAD’s funding of SRT in 1984.

By 1985 it was clear these changes had been fruitless. Rhinos had declined at rates varying from 99% to 24% per year since 1979, the lower rates being for the more heavily patrolled smaller areas where rhinos were still sighted relatively regularly; elephants too had recognized such areas of comparative safety by moving into them. However the point was that rhinos and elephants still continued to be shot in all areas, the effort was spread too thinly to prevent the decrease of rhinos in any sector. In a formal analysis of the data from Luangwa, it was shown that rates of change in rhino and elephant sightings by patrols were directly related to patrol effort, corrected for size of area and initial sighting rate (Leader-Williams and Albon 1988). Extrapolation of the relationship to a 0% change in rhino numbers does indeed suggest that SRT should have concentrated all its available manpower in one small area of 400 sq km. We return, therefore, to the fact that the quandary that “big is best, but small is feasible” was not faced squarely in the 1980s.

## Why Big was Really Small

One apparent anomaly remains to be explained, that of the apparently large grant awarded to Zambia by WWF in the expectation that SRT would be effective at curtailing illegal exploitation of rhinos and elephants over the large area of the Luangwa valley. Zambia is amongst that group of countries which spends relatively little (in Zambia’s case US\$ 11 per sq km per year in 1980) on their conservation areas. However it appeared that no one set the size of the WWF grant against another rule of thumb current in the early 1980s, namely that around US\$ 200 per sq km needed to be spent annually to maintain the integrity of conservation areas (Cumming, Martin and Taylor 1984; Bell and Clarke 1986). This was later confirmed by the direct relationship which resulted from comparing the spending on their conservation areas by different countries and their success at protecting rhinos and elephants (Leader-Williams and Albon 1988). Thus the supposedly large WWF grant to Zambia was really only sufficient to protect around 700 sq km over three years, a conclusion not too different from that reached by considering the distribution of patrol effort within Luangwa. The grant was large in only one context, comparison with other grants made, or perhaps affordable, by conservation

---



---

organisations. In the more pertinent context, that of what it realistically could have been expected to achieve, the grant was in fact small.

## What is a Realistic Value

The annual sum of US\$ 200 per sq km that it was necessary to spend in 1980 to maintain the integrity of conservation areas and talk of grants of US\$ 0.5 million being small may make subscribers to conservation despair at its apparent high costs. However, it is important to be aware that in situ conservation is much more economical than ex situ conservation. At the normal density of 0.4 rhinos per sq km, effective protection of each animal would have cost US\$ 500 per year in 1980 if all conservation costs were charged to rhinos as the main indicator species. Moreover, 1 sq km of Africa normally contains a lot more than 0.4 rhinos, in the case of Luangwa around 2.2 elephants, a few hundred impala, many thousands of trees and much else besides. Even if the sum for effective protection of African conservation areas has risen to US\$ 400 per sq km today, it is still safe to say that in situ conservation represents excellent value for money. This can be amply demonstrated by comparing in situ costs with London Zoo's animal adoption scheme which is based on what it costs to look after and feed one animal for a year (Anon. 1988). Adoption of a rhino costs £2,000 and of an elephant £ 6,000. Thus the pachyderm equivalent of 1 sq km of Africa kept in a zoo can be estimated conservatively to cost £ 14,000(0.4 x 2,000 + 2.2 x 6,000) or US\$ 22,000.

## A Little can do a Lot

The lessons here for those who fund conservation are fairly obvious. Adequate resources must be invested to achieve given

objectives in conservation. Funds invested or utilized at "dilute" levels merely delay the inevitable and are ultimately wasted. Hence, the relatively small sums that international conservation agencies and NGO's have available to spend on valuable species in developing countries are most likely to achieve results in one of two contrasting situations. First, in low-spending countries only if they are concentrated at appropriate levels over small areas, in the case of rhinos within formal fenced sanctuaries or high-priority core areas. Second, over large areas only if funds are allocated to a relatively high-spending country like Zimbabwe which now needs extra resources to prevent Zambians killing rhinos in the Zambezi valley.

Can the concept "big is best and feasible" ever become a reality for large conservation areas in low-spending countries? Clearly not without more funds than can be invested by conservation organisations or, more importantly, without rectification of the socio-economic problems attendant upon people living within or around conservation areas (e.g. Marks 1984; Dalal-Clayton and Lewis 1984; Bell 1987). Sorting out the latter, and maintaining and/or rebuilding large populations of valuable species, most probably requires the funding of conservation and rural development projects by international aid organisations. The Luangwa Integrated Resources Development Project, funded by NORAD, is now under way and it can only be hoped that appropriately directed schemes which allow local residents to participate in plans for their conservation areas, coupled with enhanced investment in infrastructure and policing, will permit the recovery of elephants and rhinos to the point where they can contribute more directly to the rural economy of the Luangwa valley. After witnessing this particular Humpty Dumpty falling off the wall, I do hope that he can be put back together again.

## References

- Anon. Save the Rhino Trust Newsletters, Lusaka, 1980/85, mimeo.  
Anon. *Adopt an animal at London Zoo*, Zoological Society of London, 1988, mimeo.  
R.H.V. Bell, "Monitoring of illegal activity and law enforcement in African conservation areas", *Conservation and Wildlife Management in Africa* (eds. R.H.V. Bell and E. McShane-Caluzi), Peace Corps, Washington, 1988, pp.317-351.  
R.H.V. Bell, "Conservation with a human face: conflict and reconciliation in African land use planning", *Conservation in Africa: people, politics and practice* (eds. D.M. Anderson and R. Grove), Cambridge University Press, Cambridge, 1987, pp.79-101.  
R.H.V. Bell and J.E. Clarke, "Funding and financial control", *Conservation and Wildlife Management in Africa* (eds. R.H.V. Bell and E. McShane-Caluzi), Peace Corp., Washington, 1986, pp.543-546.  
D.H.M. Cumming and P. Jackson, *The Status and Conservation of Africa's Elephants and Rhinos*, International Union for Conservation of Nature, Gland, Switzerland, 1984, pp.24-25.  
D.H.M. Cumming, R.B. Martin and R.D. Taylor, "Questionnaire survey on the management and conservation of elephants and rhinos", *The Status and Conservation of Africa's Elephants and Rhinos* (eds. D.H.M. Cumming and P. Jackson), International Union for Conservation of Nature, Gland, 1984, pp.46-62.  
B. Dalal-Clayton and D.M. Lewis (eds.), *Proceedings of Lupande Development Workshop: an integrated approach to land use management in Luangwa Valley*, Government Printer, Lusaka, 1984.  
I. Douglas-Hamilton, "Elephant and rhino population trends In Selous, Tanzania", *Pachyderm*, No.4, 1984, p.18.  
N. Leader-Williams, "Black rhino in South Luangwa National Park: their distribution and future protection", *Oryx*, No.19, 1985, pp.27-33.  
N. Leader-Williams, "Patterns of depletion in a black rhino population in Luangwa Valley, Zambia", *African Journal of Ecology*, No.26, 1988, pp.181-187.  
N. Leader-Williams and S.D. Albon, "Allocation of resources for conservation", *Nature*, No.336, 1988, pp.533-535.  
S. Marks, *The Imperial Lion: human dimensions of wildlife management in Africa*, Westview, Boulder, Colorado, 1984.  
D. Western, "Humpty Dumpty and the rhinos", *Pachyderm*, No.3, 1984, pp.4-5.  
D. Western and L. Vigne, "The status of rhinos in Africa", *Pachyderm*, No.4, 1984, pp.56.
-



# Tracing Ivory to Its Origin: Microchemical Evidence

R.H.V. Bell, J.P. Kelsall, M. Rawluk and D.H. Avery

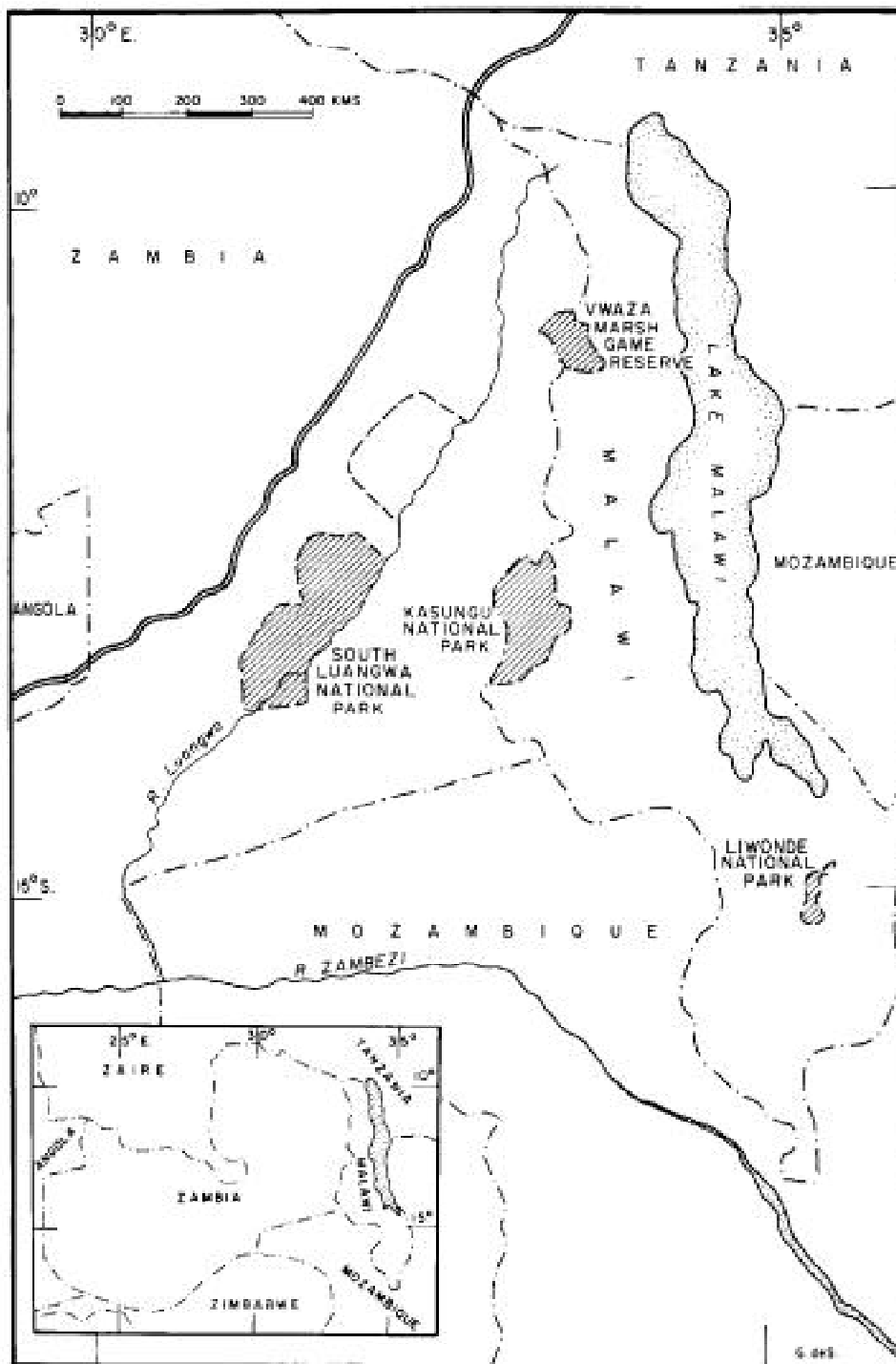


Fig 1. Map showing the areas from which ivory samples were collected.

A number of studies have indicated that animal tissues vary in microchemical composition as a result of local differences in geochemistry being transmitted to the animal through the food supply. Efforts have been made to determine the rivers where salmon originate<sup>1</sup>, the nesting sites and moulting origins of snow-geese<sup>2</sup>, the regional origins of Alaskan moose<sup>3</sup> and the local origins of game animals in Alberta, Canada<sup>4</sup>. There are many other examples, most of which have had moderate success.

Chemical differences can be measured by a variety of techniques and we used two, fluorescing X-ray spectroscopy and electron beam microprobe. Ivory samples from three protected areas in Malawi and one in Zambia, were analyzed and the concentrations of a number of elements were determined. The preliminary results reported here indicate that the microchemical differences found are related to the place of origin; scatter diagrams for values of some pairs of elements exhibit non-overlapping clusters for the four areas. The present findings show promise that the technique may well have ecological applications, say in providing information on the degree of interchange of elephants between areas, and on long term vegetation trends; it may assist in archaeological and historical research on the trade in ivory, an approach under investigation by Harbottle and Silsbee (unpublished); and finally, the method might be used in law enforcement, particularly in detecting smuggling and documentation abuse. The technique may also become relevant to other wildlife products such as rhino horn, turtle shell and crocodile skin.

## The Experimental Material

Twenty-seven samples of ivory, each from a different elephant, were collected from the Vwaza Marsh Game Reserve, Kasungu National Park and Liwonde National Park in Malawi and the South Luangwa National Park in Zambia. The areas are separated by settlement and there is no movement of elephants between them except possibly for Kasungu and Luangwa. (Fig 1.) The sample tusks were taken from elephants shot on control on the area boundaries, and most were from adult males between 25 and 40 years old killed in 1980 and 1981.

A rectangle of about 3 sq cm and up to 0.5 cm thick was hacksawn from the thin ivory surrounding the pulp cavity at the base of the tusk. The sampling location was chosen because this thin



ivory has no commercial value and is the most recently laid down in the life of an elephant obviating uncertainty due to possible movements during earlier existence.

Prior to analysis samples were cleaned in an ultrasonic cleaner containing detergent and then washed in distilled water and alcohol to remove the stains of blood, soil and vegetable matter which characteristically form a crust on raw ivory.

## The Experimental Method

Eighteen samples, five each from Kasungu and Liwonde National Parks, and eight from Vwaza Marsh Game Reserve, were analyzed by the X-ray fluorescing spectrometer using the method described by Kelsall and Burton<sup>5</sup>. Three different sets of instrumental conditions were needed: Condition 'A' to maximize the calcium and phosphorus signals; Condition 'B' to minimize calcium and maximize zinc and strontium; Condition 'C' to obtain the otherwise undetectable barium signal. (See Table 2).

The three conditions theoretically permit analysis of all elements between atomic numbers 12 (magnesium) and 92 (uranium) at the parts per million level. However the ability of the instrument to detect specific elements varies largely and some contained in ivory and detected by other methods have not been found by this instrument.

## The Experimental Findings

The results of the X-ray spectroscopy are shown in Table 1, and scatter diagrams of three pairs of elements are shown in Figs 2-4. In these scatter diagrams, the data clusters from the three different areas in Malawi are in some cases distinct and non-overlapping. The distinguishing scatter sets are:

Kasungu Vwaza	:Calcium(B)/Zinc(B)
Kasungu – Liwonde	:Calcium(B)/Zinc(B) and Calcium(B)/Barium(A)
Vwaza- Liwonde	:Strontium (B)/Barium(C)

Results from the electron beam microprobe are summarized in Table 3 and a scatter diagram showing calcium (potassium-alpha) ratios against phosphorous and magnesium is shown in Fig 5. The data clusters for Kasungu and South Luangwa are distinct and non-overlapping on this basis.

Of interest is that the X-ray spectroscopy data scatter diagrams show that the ivories from Kasungu and Liwonde exhibit the greatest differences. The variation between ivories from either of these and that from Vwaza is not so marked. Kasungu and Vwaza produce dentine with a high degree of overlap in most parameters and the degree of relationship corresponds to the gross geochemistry of the areas themselves. Both are situated on the central African plateau and are underlain mainly by gneiss rocks of the precambrian basement. Elephants in the two areas eat a similar range of grass species and the woodland is dominated by species of the genus *Brachystegia*. Liwonde, by contrast, is situated on the floor of the Malawi rift valley and its soils are mainly recent alluvium with outcrops of nepheline

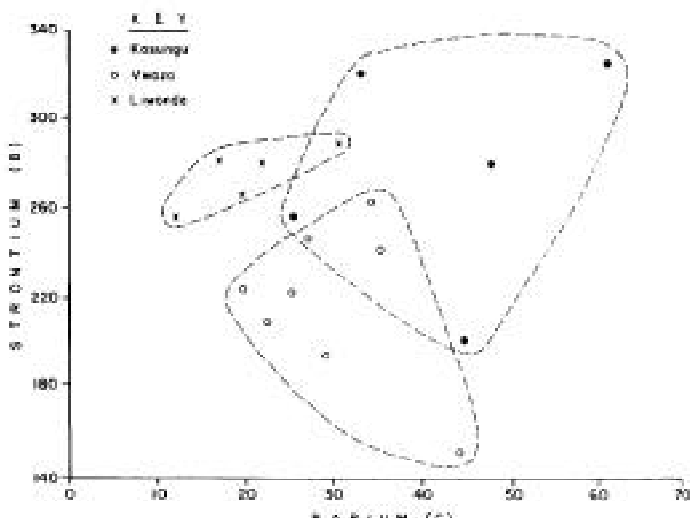


Fig 2. Scatter diagram of values for strontium(B)/Barium(C). Values in X-Ray intensity, counts/sec.

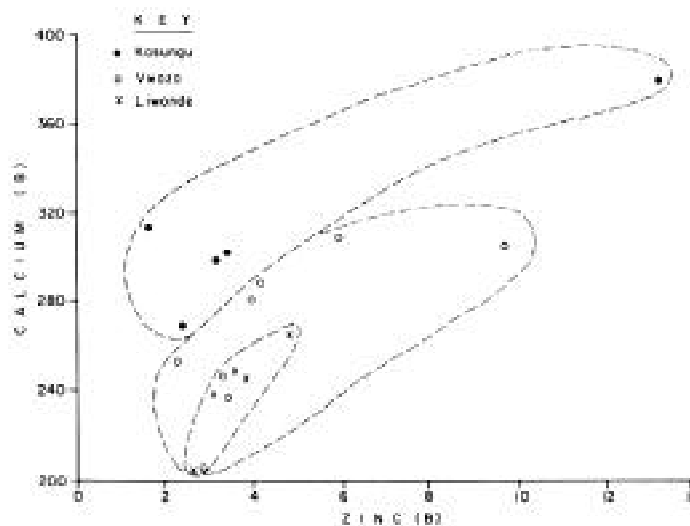


Fig 3. Scatter diagram of values for Calcium(B)/Zinc(B). Values in X-Ray intensity, counts/sec.

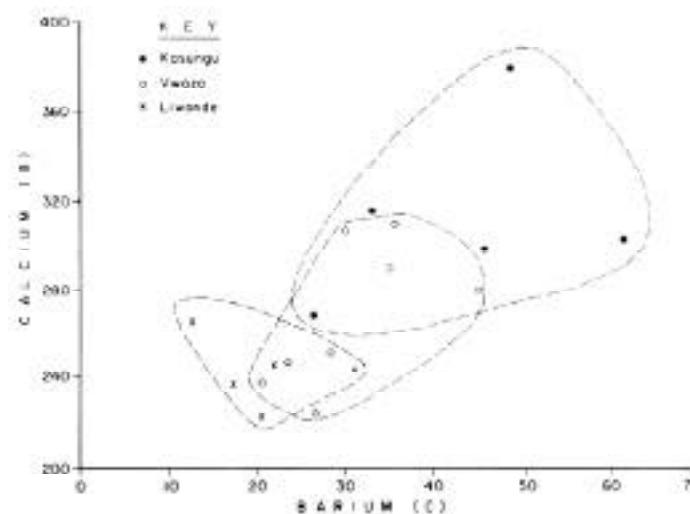


Fig 4. Scatter diagram of values for Calcium(B)/Barium(C). Values in X-Ray intensity, counts/sec.



cyanite. The grasses tend to be of higher quality and the woodland is dominated by *Colophoopermum mopane*. The data from Liwonde appear to be more homogeneous than those from either Kasungu or Vwaza. This may be because the fewer elephants in Liwonde are usually confined to a smaller and ecologically more homogeneous area.

Sample KU-12-79 from a 41 year old bull shot on control in Kasungu National Park shows some very anomalous values for a number of parameters. Post-mortem examination showed that, some years before its death, this animal had suffered a severe gunshot wound in the lower jaw causing a complete fracture of the right ramus. Although the wound had healed, the bone of the lower jaw did not unite and that this probably affected the animal's feeding was indicated by extensive malformation of the teeth. It is possible that the anomalous chemistry of this elephant's ivory may be related to the wound either through its effect on feeding or dental metabolism.

TABLE 1  
X-RAY INTENSITY IN COUNTS PER SECOND

'C'	'A'		'B'			
WAZA MARSH GAME RESERVE						
TUSK SERIAL NO.	P	Ca	Ca	Zn	Sr	Ba
MZ-03-78	739	3,564	304	9.7	195	30
RU-20-79	806	2,941	288	4.2	241	35
RU-27-79	772	3,162	279	4.0	150	45
RU-04-80	933	3,244	309	5.9	264	35
RU-21-80	295	2,489	236	3.4	221	20
RU-24-80	871	2,914	252	2.3	246	28
RU-29-80	377	2,644	222	2.8	223	26
RU-30-80	336	2,732	245	3.3	197	23
LIWONDE NATIONAL PARK						
TUSK SERIAL NO.	P	Ca	Ca	Zn	Sr	Ba
U-01-80	549	2,953	265	4.8	257	12
U-03-80	508	2,679	247	3.6	282	22
U-04-80	465	2,574	238	3.2	281	17
U-06-80	500	2,712	245	2.7	291	31
U-10-80	485	2,560	223	2.6	267	20
KASUNGU NATIONAL PARK						
TUSK SERIAL NO.	P	Ca	Ca	Zn	Sr	Ba
KU-17-79	1,322	3,801	377	13.2	281	48
KU-03-80	491	2,785	312	1.6	323	33
KU-21-80	951	3,694	301	3.4	331	61
KU-26-80	451	2,925	267	2.4	255	26
KU-41-80	868	3,860	297	3.2	202	45

'A''B'AND 'C' are separate analyses, each done under different instrumental conditions.

TABLE 2  
INSTRUMENTAL CONDITIONS FOR THE ANALYSES IN TABLE 1

Instrumental Condition	'A'	'B'	'C'
Tube voltage*	7 kev	35 kev	47 kev
Is current*	0.25 ma	0.35 ma	0.55 ma
Filter	None	Ag	Cu
Vacuum	Yes	No	No
Per cent dead time	30	30	30
Counting time	100 sec	250 sec	250 sec

\*pulsed tube mode

TABLE 3  
ELECTRON BEAM MICROPROBE RESULTS

CALCIUM (K-ALPHA) RATIOS	Phosphorus	Magnesium
KASUNGU NATIONAL PARK		
KU 6	0.641	0.018
KU 12	0.646	0.015
KU 25	0.803	0.049
KU 53	0.581	0.022
SOUTH LUANGWA NATIONAL PARK		
LU 1	0.561	0.009
LU 2	0.569	0.016
LU 3	0.557	0.000
LU 4	0.568	0.010
LU 5	0.519	0.004

## A Reference Library for Ivory

On the basis of the limited analyses carried out to date it is clear that the microchemistry of ivory differs in relation to origin and that differences may be sufficiently consistent to be used as the basis of a system for identifying the source against a library of reference samples. The first requirement is to analyze a large enough number of samples to allow a multivariate analysis to be made. The chemical variation within individual tusks due to movement and vegetation change, the distinction among different age and sex classes of elephants and the extent of chemical overlap between ivory from different areas must all be determined if the method is to be of value. If this can be done then we will be able to determine the provenance of ivory more simply than oil paintings - an ability which many conservationists would consider worth a Picasso or two.

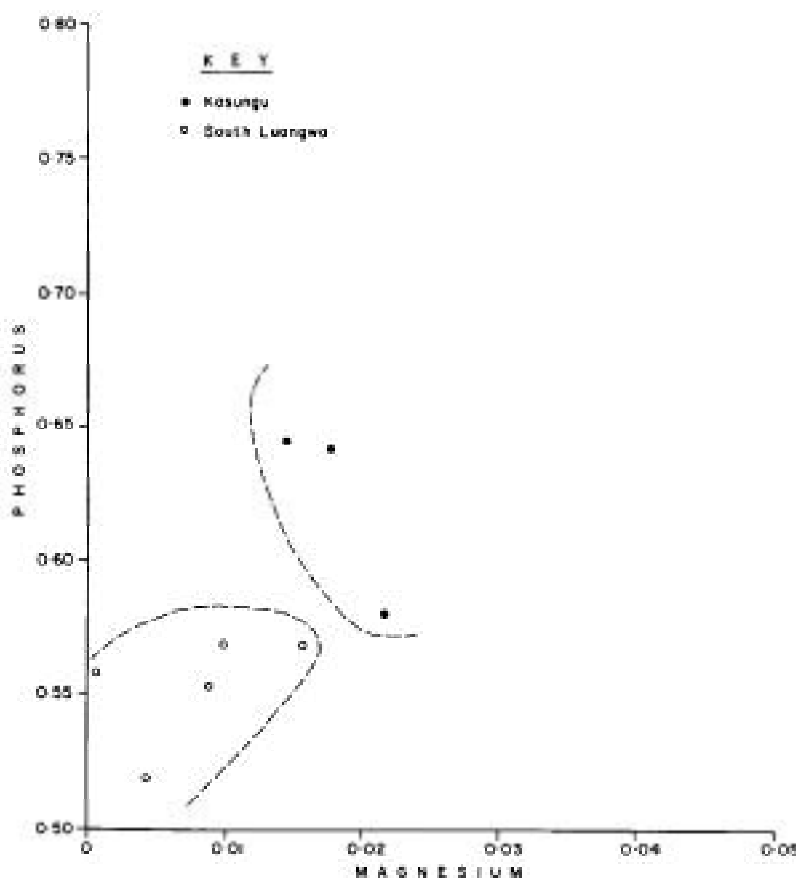


Fig 5. Scatter diagram of values of Calcium (K-alpha) ratios, Phosphorus/Magnesium

## Acknowledgements

We would like to thank Mr. P.S.M. Barry for providing ivory samples from the South Luangwa National Park and the staff of the Science Research Council Laboratories at Brown University, USA, for carrying out the electron bears microprobe analyses.

## References

1. L.A. Lapi and T.J. Mulligan, "Salmon stock identification using a microanalytical technique to measure elements present in the fresh-water growth region of the scales", 1981, Journal of the Fisheries Research Board of Canada.

2. J.P. Kalsall and R. Burton, "Some problems in identification of origins of lesser origins of lesser snow-geese by chemical profiles", 1979, Canadian Journal of Zoology, 57(12), pp.2292-2302.
3. Frenzmman, Flynn and Arneson, unpublished.
4. Personal communication with Wishart and McClymont
5. J.P. Kalsall and R. Burton, "Identification of origins of lesser snow geese by X-ray spectrometry, Canadian Journal of zoology, 54 (4), pp.718-732.



---

# **The Ivory Trade and the Future of the African Elephant**

## **SUMMARY OF THE INTERIM REPORT OF THE IVORY TRADE REVIEW GROUP**

### **Introduction**

The African elephant is severely threatened by ivory poaching. All attempts to cut the trade to sustainable levels have been futile and hampered by a paucity of information on the trade. But the problems facing the elephant have no simple solution.

The Ivory Trade Review Group came into being in mid-1988, as a result of an initiative taken by Wildlife Conservation International (WCI). The Group first met in Nairobi in July 1988 and established the scope of the work it would undertake, how this would fit into the wider issues of elephant conservation in Africa, and which organizations would be principally involved in the studies. The Group had a second meeting in Nairobi in November 1988, immediately after the first meeting of the CITES African Elephant Working Group.

The main institutional participants in the Ivory Trade Review Group are the AERSG of IUCN, the TRAFFIC network, WTMU (the Wildlife Trade Monitoring Unit of the World Conservation Monitoring Centre, Cambridge, UK) and the CITES Secretariat. The review involved 35 specialists working on different aspects of the ivory trade.

Core funding for the work came from two principal sources, Wildlife Conservation International and World Wildlife Fund. Additional funds for particular aspects of the work have come from the U.S. Department of the Interior, Fish and Wildlife Service (Intra African Trade Studies), from the African Wildlife Foundation (the effects of poaching on elephant herd composition), from WWF (the ivory trade in India) and from the European Economic Community! WWF African Elephant Conservation Programme (database on elephant numbers and trends). A number of parts of the work of the Group are still in progress. These will be completed to produce a Final Report in time for the CITES Conference of the Parties.

The following is a summary of the ITRG's preliminary findings and recommendations. The Main Report, detailing those parts of the Group's investigations which have been completed, was presented to the African Elephant Working Group on 5 July 1989.

### **The Fall in Elephant Numbers**

The African elephant has declined in numbers by at least 50% in the last ten years. In 1979 there were estimated to be at least 1.3 million elephants in Africa. In 1987 the figure had dropped to 750,000. Estimates coming in now from work under way in the rainforests of Gabon, Congo, Zaire and Cameroun and from the great Parks of East Africa, suggest that today's figure is about 625,000. No more authoritative figure is available from any other source.

Of those that remain 45% are to be found in the rainforests of Central Africa, 31% in Southern Africa, 21% in East Africa and a mere 3% in West Africa.

The downward trend is closely correlated with the adequacy of protection. Only 1.5% of the elephant's total range of six million sq. km. lies within strictly guarded and adequately financed protected areas. Where the wildlife service is underfunded, elephants are killed inside, as well as outside, the reserves and National Parks. In East Africa, for example, 56% of elephants inside parks and 78% of those outside them have disappeared in the past ten years.

### **The Effect on Elephant Herds**

The pursuit of bull elephants for their ivory has been so intense in some areas that they now comprise less than 5% of adult elephants. There is now evidence that in places where bulls are so rare, a female is likely to come to oestrous without being detected by a male. Such missed mating opportunities depress the reproductive rate of the population.

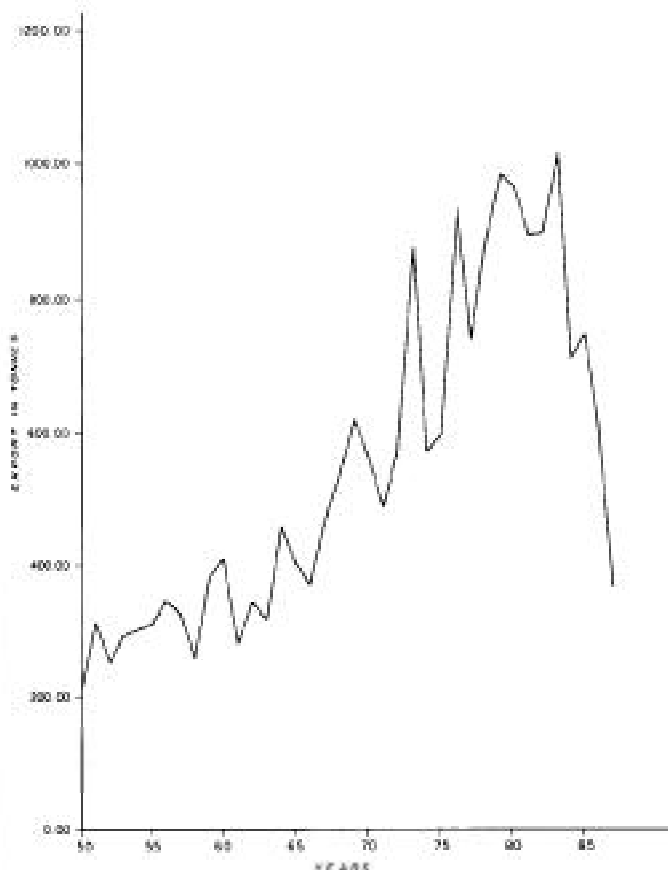
With most of the bulls gone, the hunting pressure turns on the females and immatures, which are now producing most of the tusks coming out of Africa. As the females are killed, so their calves are left to die after them: deaths of orphans may now account for up to one in three of all elephant fatalities. Successful elephant society depends on leadership of family groups by mature matriarch females; in one Tanzanian population only 15% of families now have such leadership, compared with a norm of 75%. These radical disruptions in the family and reproductive structure of the herds may be as important in determining the future as the simple decline in numbers.

### **Ivory Exports from Africa**

Africa has produced increasing quantities of ivory over each of the last four decades. An annual export of around 200 tonnes in the early 1950s rose to around 900 tonnes by 1979, a level that was maintained for seven consecutive years. With the disappearance of the big males, the mean tusk size declined rapidly, which meant that ever larger numbers of ever younger elephants had to be killed to supply the same tonnage. For example, with a mean tusk weight of 9.8 kg in 1979, a tonne of ivory was made possible by the deaths of 54 adult elephants, most of whom at that time were bulls; in 1987, with a mean tusk weight of 4.7 kg, a tonne of ivory would have come from 113 elephants and a further 55 would have died as orphaned calves, yielding no ivory. The quantity of ivory exported dropped to around 600 tonnes in 1986, to half of that in 1987 and to less still in 1988. The 300 tonnes produced in 1987 represented the deaths of almost as many elephants as the 900 tonnes produced in 1979.

---





**Fig. 1.** Minimum annual volume of raw ivory exported from Africa between 1950 and 1987,

The countries which have exported the largest quantities of ivory are Sudan, Burundi (which has no elephants), the Central African Republic and Congo, each of which exported over 900 tonnes between 1979 and 1987. Most of this was undoubtedly ivory from neighbouring countries, particularly Zaire and Tanzania. The illegal ivory trade has preoccupied conservation bodies throughout Africa and the consumer nations for decades. Despite the concern, the ivory trade has flourished, at least in part because some African nations have argued that ivory generates important revenue for conservation. One result is that the government controlled legal trade is virtually indistinguishable from the illegal traffic.

## The Effects of the Trade

Mathematical models have been used to predict what will happen to Africa's elephants in the coming years. They are based on the best possible information about elephant numbers and population structure and on the recorded numbers and weights of tusks exported from each country.

The non-linear models show that, if the average rates at which the populations were hunted between 1985 and 1987 were maintained, the numbers would have dropped to half their 1987 levels by the end of the century. Further, an increase in the rate of harvesting of as little as 10% per year could reduce the halving time to seven years, and virtual extinction would come in 15 years. If present hunting levels were simply kept up, extinction might take as much as 50 years.

The models were used to predict all the different ways in which reduced levels of hunting, and other measures such as minimum permissible tusk sizes, might be used to bring the off-take under control. The effect of the present system, in which voluntary quotas are set by African countries, was explored, again on the basis of 1985-1987 data. It can be shown that the predicted 1989 mortality will lead to a halving of the continental population in about seven to eight years; even a halving of the present death rate would lead to a halving of the population in under 15 years. The hunting toll, currently averaging around 10% of the living population per annum across the continent, would need to be reduced to 1-2%, at most, for the present numbers to stabilize. The sustainable level of ivory production, with populations in their present state, does not exceed 50 tonnes per year for the whole of Africa.

These predictions are based on data which are not perfect, but whatever adjustments one makes, such as increasing or decreasing by 25% the estimated number of elephants and/or the volume of ivory leaving Africa, the general conclusion is the same: exploitation of elephants to supply ivory, as currently practised throughout most of the continent is quite unsustainable. It should be added that all of the biases in the model are on the conservative side and that in some southern African countries, notably Zimbabwe and Botswana, where elephant management is adequately financed, the situation is different.

To be realistic, we cannot assume that individuals will stop hunting elephants simply because scientists have shown that the off-take is not sustainable. There is considerable evidence today to substantiate the view that it is hunting for ivory to supply the trade, and not habitat loss or human population increase, that is responsible for the severity of the drop in elephant numbers. Consequently, nothing other than the most radical solution is likely to stem the decline. This is more easily said than done.

## Africa and the Ivory Trade

What is ivory actually worth to Africa? Optimistic views of this have been one of the main reasons for justifying the continued existence of the trade. A comprehensive analysis of export volumes from each country, at the year's current international price for raw ivory, shows that the apparent value of African exports dropped from over US\$ 60 million in 1979 to some US\$ 37 million in 1987, despite the doubling of the price in that time. But this does not mean that African governments see anything like that amount of revenue. Evidence from African customs statistics show that ivory is usually declared at about 10% of its true value; although elephants belong to the state virtually everywhere in Africa, ivory is almost always sold by private individuals; albeit more ivory now appears to leave Africa with valid documentation than previously, the circumstances of its apparent legitimacy are often clouded with suspicion.

Only in one African country has ivory ever represented a significant proportion of export earnings; 10% of Central African



Republic's export earnings came from ivory in one or two years. This was mostly the ivory of elephants from neighbouring countries, a pattern that is repeated again and again across the continent, frequently because of the strengths and relative convertibility of the currencies of adjacent states. Only in one or two countries in Africa is there an authorized local carving industry that is supplied by ivory legitimately obtained in that same country. Clearly, the contribution of such an industry will not show up in tables derived from the export value of raw ivory; on a continental scale, the value is small. In most countries, the value of ivory to the export economy is rarely greater than one percent. This fact is very important, since the perpetuation of the ivory trade is often justified by its value to African economies. Ivory only achieves its true worth to African governments in those rare countries where elephants are adequately managed, and where ivory revenues are directly invested in wildlife conservation.

## The Other Values of Elephants

It is not only because of ivory that elephants are valuable. Their economically unqualified value to ecosystems is immense. Rampant poaching of elephants is affecting the biological wealth of Africa's savannas and forests for elephants play a vital role in dispersing seeds and creating a patchwork of habitats, ensuring a diverse variety of plants and animals in the process. While their sustainable value to African economies through tourism is not at present calculated it may turn out to exceed, in just one country, the value of ivory for all the range states together.

## The Demand for Ivory

The major demand for raw ivory over the last ten years has been in Hong Kong and Japan. The ivory that is carved in Japan is mostly sold there and stays there; Japan is now the world's largest consumer of ivory. Hong Kong is the centre of the world's ivory trade, but much of the ivory carved there is re-exported, principally to Japan, the USA and Europe. The markets in Japan, in particular, serve a demand that has many centuries of tradition behind it, and will not change without major alterations in public attitudes.

In recent years, on its way to Hong Kong and Japan the ivory has often been passed through a number of staging posts, such as Dubai, Singapore, Macao and Taiwan, each of which has been chosen for the convenience of some legislative loophole. This is a practice employed by certain unscrupulous traders. The ivory trading associations in both Hong Kong and Japan have been at some pains to comply with each successive new set of international and national restrictions. Analyses of the economics of the demand for ivory in Japan indicate it is rising out of proportion to the rises in real incomes. In other words, as Japanese people get richer they have a relatively higher requirement for ivory. By contrast, the demand is relatively insensitive to increases in price. These two results argue against trying to curb the want by the imposition of high import tariffs or retail purchase taxes. Analysis of demand in Hong Kong shows that

it is not very responsive to price increases. The Hong Kong picture is less clear-cut than that of Japan because of its major role as re-processor and re-exporter of ivory. Interest and exchange rates both affect demand, but they are irrelevant in the context of the search for policies for the control of the ivory trade. Economic evidence suggests that ivory has not been a particularly promising hedge against inflation; analysis of trade confirms this.

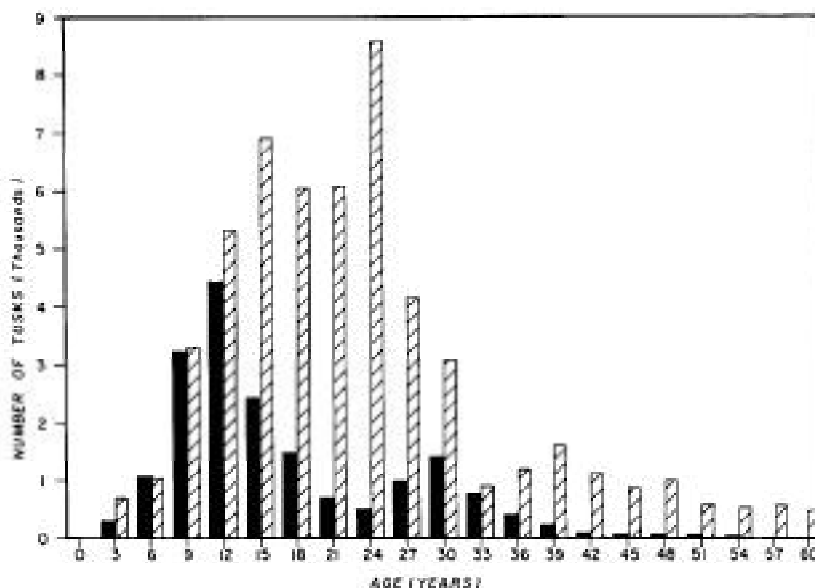
## Trade Structure

The Group investigated the state of the ivory trade in several consumer nations including Hong Kong and Japan, as mentioned above. A remarkably consistent pattern emerges of a declining trade. Detailed questioning showed this is partly due to changing public attitudes, particularly in Europe and the USA, to buying ivory, and partly due to improved procedures for the control of the trade. Traders and retailers are generally aware of the decline of the African elephant populations, but not of the present gloomy prognosis. The number of traders, carvers and retailers, as well as the output of carved ivory, is decreasing everywhere. In Hong Kong and China the industry reports diminishing stocks, in part because of the rapidly rising prices.

Our economic analysis of the long-term rise in Japanese demand shows it to have been insensitive to price rises, but growing with Japanese incomes. Nevertheless, questioning in Japan shows that demand has started to decline over the last three years. The central fact is that it has not yet dropped nearly enough.

## Policy Options

The Group has investigated the legal, economic, commercial and biological options for reducing the trade to levels that bring it within the biological limits of sustainment. Critical issues are: the enforceability of any proposal, the corresponding investments in elephant management. Consideration as policy



**Fig. 2 .** Age structure of heaving hundred (level 1) populations calculated from tusks granted CITES export permits between 1986 and 1988. Male:Female sex is assumed to be 15:85. Black is male, hatched is female.



options was given to each of: Appendix I listing, Appendix II with zero quotas, improvements to the CITES control procedures, taxes and tariffs, Ivory Producers Cartel, an Enforceable Producers Agreement.

The Group recognizes that a ban, not associated with incentives, will fail to conserve the supply and manage the demand. A ban may provide as much encouragement, through raising prices, to expand the trade as to constrict it.

Critical to the success of any measure must be concerted efforts at unity of purpose by all African range states, and equally concerted efforts to restrict demand in present and potential consumer countries. The intermediary countries, trading in raw ivory or processing it, are of less importance. The economic self-interest of states required to limit their ivory trade, must be realistically designed into any programme to accompany a ban.

The management of the trade, the predominantly illegal character of the ivory that enters it, the clear predictions about the future of the elephant population and the equally clear economic indications that demand in the main consumer countries is likely to rise steeply as wealth increases, have led the Ivory Trade Review Group to the conclusion that the trade is not operated in the interests of the African elephant, which is consequently threatened with extinction throughout much of Africa unless radical measures are taken in its favour.

The Group recognizes that there are populations of elephants, in a small number of range states, that appear at present not to be threatened, but considers that the interest of the species as a whole, throughout the continent, is the primary concern. The long-term aim of elephant conservation in Africa, and of all the many other aspects of habitat and species management that this implies, must be to re-establish substantial and stable populations, as a basis for tourism and, where appropriate, sustainable harvesting of ivory and other products. Short-term costs must be borne, and not by Africa alone, if these long-term

goals are to be met.

## Conclusions

In order to arrive at preliminary conclusions about the appropriate course of action that might be adopted at the next Conference of the Parties to CITES, the ITRG convened a two-day meeting at the Nuffield Foundation in London, on 22-23 May 1989.

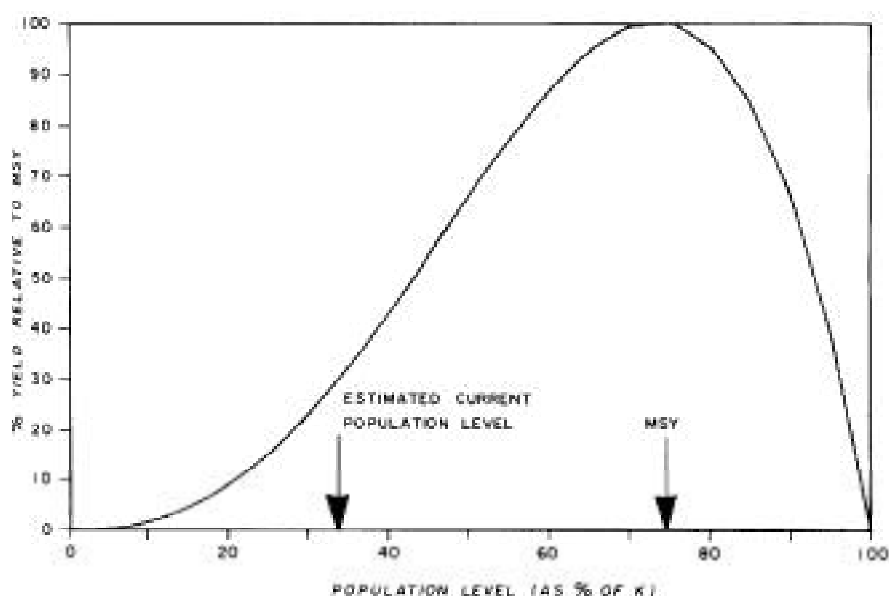
The meeting was attended by representatives of each of the four original institutional members of ITRG (IUCN/AERSG, WTMU, TRAFFIC and CITES Secretariat), by representatives of all bar one of the bodies that had funded the studies and by the majority of the individual participants in the studies. The major themes that are described in each of the preceding sections of this report were presented verbally to the meeting by the principal authors. This presentation included a summary of the policy options.

The Group could not fail to be impressed by the implications of the population modelling. The extreme gravity of the situation throughout the majority of Africa, not only in terms of numerical decline but also in terms of the collapse of the reproductive potential of elephant herds, convinced people from all disciplines of the need to take drastic, continent-wide action.

The means whereby the Group arrived at consensus was that, in the first half of the meeting, each person present was asked to give his views on whether or not an Appendix I listing for the African elephant was an appropriate solution for its conservation, within the context of the juridical competence of CITES. Nobody present believed that Appendix I alone would transform the prospects for the elephant, nor would it halt the illegal trade in ivory. Within that context, everybody voiced their misgivings on one aspect or another of the problems associated with an Appendix I listing.

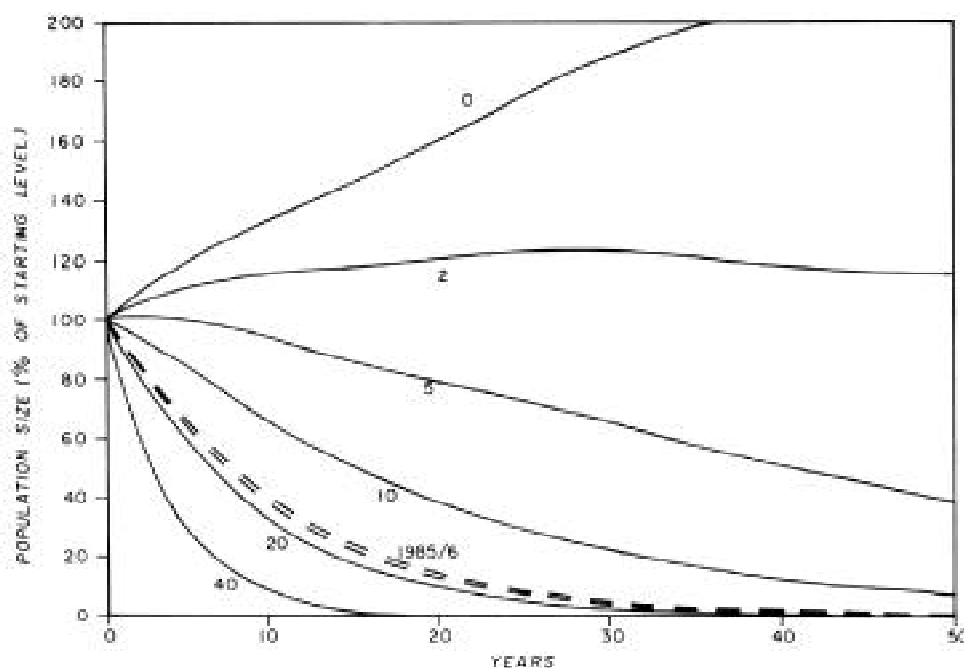
Nevertheless, in a free expression of personal standpoints, all bar two were prepared to agree that an Appendix I listing was the appropriate solution to the continental problem.

The two who refrained from expressing an opinion were staff members of the CITES Secretariat, who stated that they were as concerned as anybody to try to ensure the conservation of the elephant and that if the Parties to the Convention resolved that this should best be done by means of an Appendix I listing, they would do their utmost to serve the will of the Parties. They also expressed their doubts about the certainty of purpose of at least one African state that had submitted an Appendix I proposal but had also submitted an export quota for 1989. Finally, they made it quite clear, that as servants of the Parties, they should not try to influence the Parties' right to decide for themselves what was the most appropriate course of action.



**Fig. 3.** Estimated current yield in ivory is approximately one third of maximum sustainable yield due to heavy over-hunting.  $K$  is carrying capacity.





**Fig. 4.** Projections for heavily hunted (Level 1) populations under different levels of hunting mortality. Dashed lines show projections assuming a continuation of the 1985 and 1986 hunting intensity.

Having made the decision that the right course was to recommend an Appendix I listing, the Group devoted the rest of its time at the meeting discussing, in four working groups, the consequences of a listing and the solutions that needed to be found to concomitant problems. These are outlined on the recommendations, which appear below.

## Recommendations

Having reached the conclusion that, problems notwithstanding, Appendix I was the proper course to follow, and having discussed the implications of it, the Group felt that it would be generally helpful if it made an unambiguous statement of its position, on the basis of the conclusions it had thus far reached.

Accordingly, it issued a statement on 1 June 1989, in which it recommended:

1. The transfer of the African elephant to Appendix I of CITES.
2. An immediate, voluntary, suspension of external trade in ivory, imposed by all States capable of doing so, pending the outcome of the October Conference.
3. An immediate global publicity campaign urging people throughout the world not to buy ivory.
4. Provision of additional financial aid to African countries for elephant conservation, on the shortest practicable time-scale.
5. Raising of a new fund for elephant conservation by the conservation bodies principally concerned, especially to support public awareness campaigns but also to assist practical conservation measures on the ground.
6. Intensification of the programme of implementation of the African Elephant Action Plan drawn up by WWF, WCI, IUCN and the EEC.

The reasoning behind these recommendations

- which must be seen as constituting a single package, with short-term and long-term components - needs brief explanation.

The transfer of the African elephant to Appendix I of CITES is proposed because no other measure is sufficiently unambiguous to clarify the law enforcement situation in trading centres around the world. The Group also believes it to be the only immediate way to bring home a clear message to the ivory-buying public in the major consumer nations. It also believes that the criteria for transfer to Appendix I are satisfied.

The immediate voluntary ban on trade is proposed because it is already clear, from the recommendations made to CITES, that the legitimate international trade in ivory is very likely to be halted in the near future. Whatever the outcome of the debate on this issue at the 7th Conference of the Parties to CITES next October, the ivory trade throughout the world is already aware of the likelihood of a ban. The recommendations of the Group will add to the already considerable political weight behind this call for change. In the five months between now and the Conference, and in the 90 days that will elapse between any Appendix I listing adoption by the Conference and its coming into effect, we may expect an unprecedented movement of ivory around the world. Traders will be trying to get rid of stocks, and manufacturers, particularly in Hong Kong and Japan, trying to acquire them. The price of ivory is likely to rise rapidly. It is hardly conceivable that this will not, in its turn, stimulate unprecedented poaching efforts. The immediate voluntary ban offers the best practicable hope of damping down this pressure and closing loopholes as fast as possible.

The immediate global publicity campaign is needed to alert people throughout the world to the seriousness of the situation, and to the reasons why they should not buy ivory. This is particularly important, and sensitive, in the Far East. It is a very substantial task, which needs to be done with the utmost urgency and professionalism. In the longer term, publicity is also needed in order to influence demand, which will not lightly disappear, particularly in Asia. Techniques for driving ivory out of fashion in Europe and North America are well known, but scarcely tried in Asia. They will require money, imagination and skill. This is evident from the fact that the use of rhino horn - which lacks the centuries of art and cultural tradition that is vested in ivory in Asia - has not been stopped by rendering the trade illegal or seeking to reduce demand by persuasion.



---

**Additional financial aid is needed:**

- to assist African wildlife, customs and enforcement departments to cope with the expected increase in poaching and ivory trafficking over the coming months
- to co-ordinate and carry out a massive global campaign to reduce demand
- to improve monitoring and surveillance, including the compilation, from existing sources, of a comprehensive trader database, in anticipation of the closure of the trade
- to support a universally acceptable conservation programme that serves, indirectly to offset the potential lost revenues from ivory sales, and to return national populations to stability; this task has already been started by the African Elephant Conservation Co-ordination Group.

A co-ordinated plan is needed because of the worldwide nature of the trade and continent-wide need for conservation.

In Africa the biggest strategic change must be to assist Governments to realize the far greater economic benefits that accrue from long-term conservation, such as tourism and, in some countries, safari hunting, rather than mining elephants for their ivory. A strategic approach to this, on a continental scale, has been laid out by WWF, WCI, IUCN, the EEC and others, in their African Elephant Action Plan. The benefits of this plan would go far beyond the interests of just the elephants. To make sense of the strategic approach to elephant conservation, an African Elephant Conservation Agency is required, based in Africa, to co-ordinate the action, the science and the monitoring of the illegal trade that will certainly continue. This needs to be set in place without delay.

The current proposals should be seen as no more than the beginning of a long and difficult process. There is no quick solution to the problem of the ivory trade and its effects on elephant populations. All the actions cited above will need to be continued if the species, and all the ecological and economic benefits associated with it, is to be sustained. This will require commitment and money. An Appendix I listing must be seen as the beginning of a new commitment to elephants and the countries that support them. It must not be an end in itself.

The effectiveness of an Appendix I listing will in part depend upon the unanimity of the trading states. If Parties to the Convention take Out a Reservation on this species, as they are entitled to do, much of the potency of the legislation will be lost, since a Reservation means that they would be entitled to continue uncontrolled trade in ivory. This would give the ivory trade a continuing legitimacy in the eyes of consumers and would doubtless ensure that those countries became conduits for other nations' illegitimate ivory. The same effect would be had by trade between those countries that have not signed the Convention, the non-Party States. It follows that the worldwide publicity campaign proposed above must also seek to influence all governments to move in unison, in relation both to CITES listing and co-ordinated action to deter illegal marketing of ivory and other elephant products. To compensate for lost revenue, there must be a massive increase in support to wildlife management authorities. National and donor governments, and conservation agencies, must act fast to make this possible. Donor governments and conservation agencies must be prepared to invest in elephant conservation to a level that generously exceeds that value of the unrealized ivory benefits.

There are genuine risks in the approach proposed here. Making the trade illegal will drive it underground and transfer revenues from governments to criminals. Market prices may rise to reflect scarcity and the higher costs of operation. Only a vigorous, well-financed, united programme of action can hope to succeed. But the Group concludes that to persevere with the present inadequate approach is to make the extinction of the world's greatest land animal inevitable.

**For further information contact:**

Outside Africa:

Dr Stephen Cobb

Co-ordinator

Ivory Trade Review Group

International Development Centre

Queen Elizabeth House

21, St Giles

OXFORD OX1 3LA

UK

Tel: 44 865 273637/723325

In Africa:

Dr David Western

Director

W.C.I.

P.O. Box 62844

Nairobi

KENYA

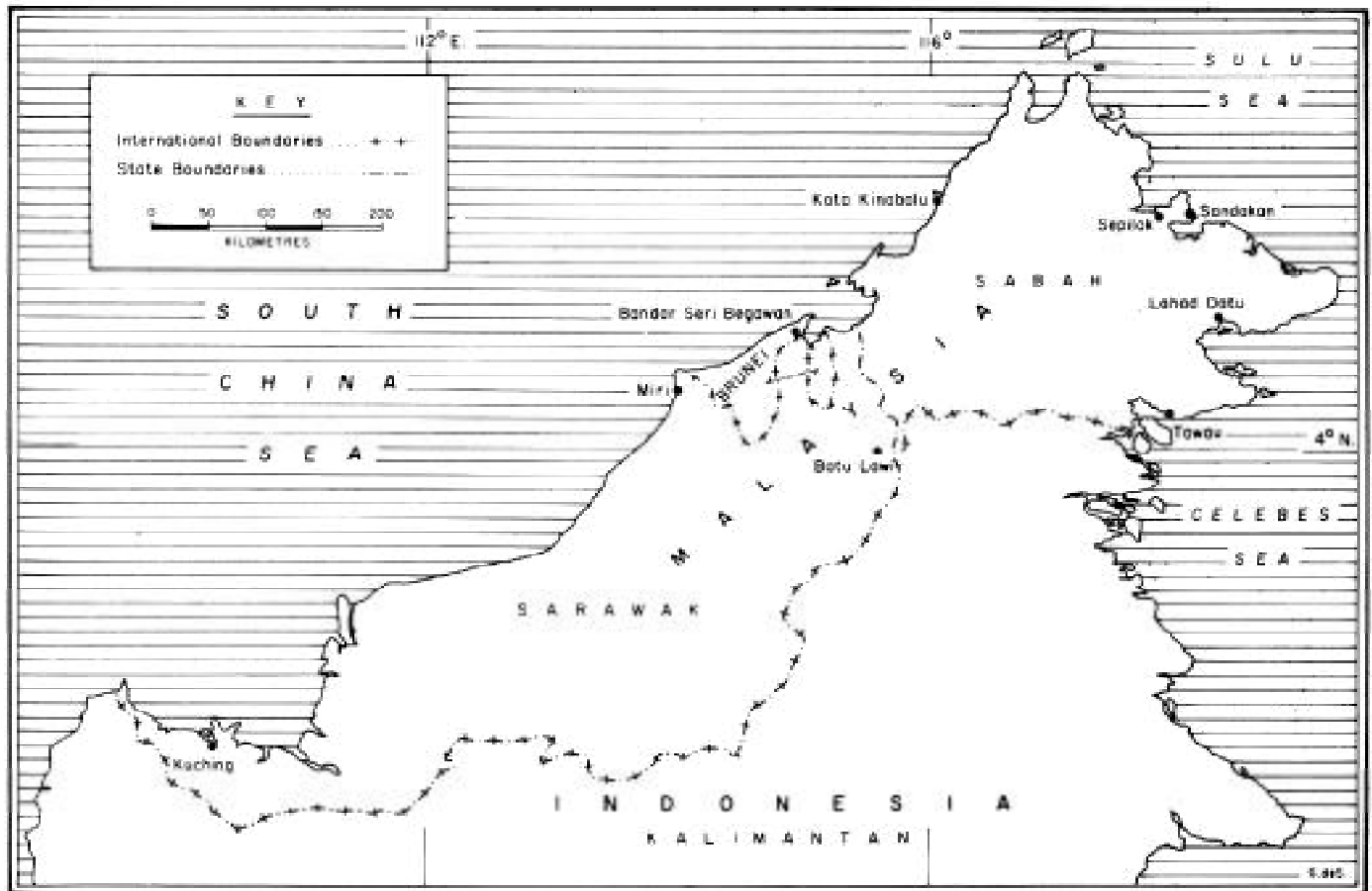
Tel: 2542 21699/24569

---



# The Rhino Product Trade in Northern and Western Borneo

Esmond Bradley Martin



Northern and western Borneo, comprising the Malaysian states of Sabah and Sarawak and the Sultanate of Brunei, have carried on a trade in rhino products, both internally and externally, for centuries; but it appears that only Sabah has a significant rhino population left today. Having surveyed the trade in Brunei and Sabah in 1986, I returned to Borneo in July 1988, to carry out further investigations and to try and discover what measures can be taken to impede the trade.

## Sabah

The official estimate of the number of rhinos in Sabah state is 30; however, some people believe that there could be close to a hundred. It is generally agreed that the majority of the rhinos are in the southeast of Sabah and that these are the largest grouping on the island. There has never been a census of Sabah's rhinos, so the figures are only guesses. On the other hand, we know from wildlife traders in Borneo that a minimum of ten pairs of horn are annually exported from Sabah.

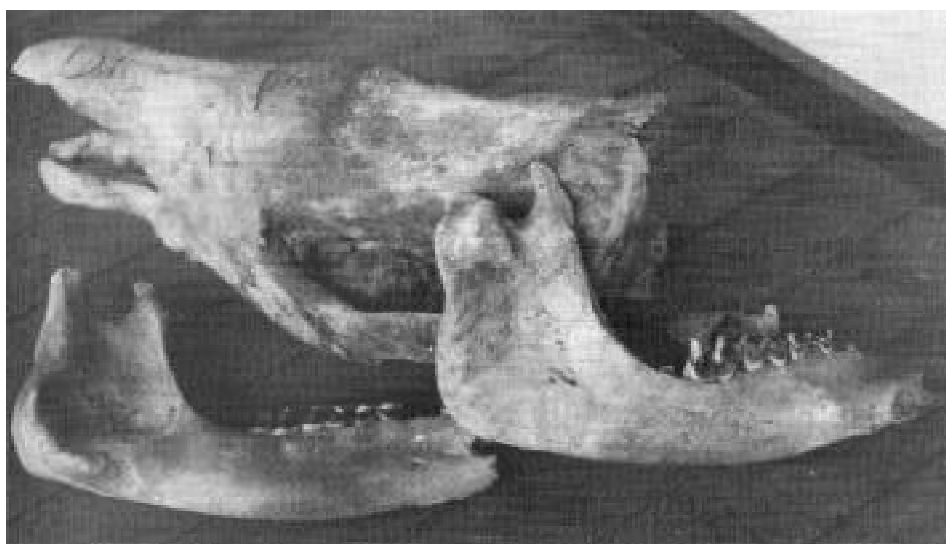
Most of the hunters are older Iban tribesmen who migrated from Sarawak to Sabah in the 1950s, in search of jobs or agricultural land in rural areas. They have recently been encouraged by dealers to intensify their poaching activities because of a growing demand for rhino horn in Taiwan which has in turn increased

the prices being offered for it in Singapore and Hong Kong. When the Ibans hear about the presence of a Sumatran rhino in a certain area, they get together in gangs of three to ten and go into the forest, taking with them 12-bore shotguns, cooking utensils, salt, sugar, rice and coffee. They are good trackers who are able to identify rhino spoor — not just footprints which do not last long in the moist soil, but also vegetation which has been damaged by browsing rhinos. Once they have learned the particular habits of the rhino they are seeking, there is a very good chance that they will eventually come across it. They are willing to spend a month or more in their search, and they usually plan to ambush the animal in a mud wallow, where they shoot it, remove the two horns, nails, some hide, meat and bones.

## The Value of a Rhino Horn

It is difficult to ascertain present prices being paid to hunters for the rhino products they supply to traders, but I did learn that a poaching gang northeast of Tawau received the equivalent of US\$ 7,300 for the pair of horns, nails, a good portion of hide and a few bones in 1987; northwest of Tawau, in the highlands, another gang made US\$ 2,700 from the sale of just one horn in 1988. In the town of Tawau, which has a population of about 100,000, there are three traders who buy rhino products from poachers.





*Skull of a Sumatran rhino*

According to reliable sources in Sabah, only a few cases of rhino poaching are specifically known by the authorities since 1978 because there are not enough rangers patrolling the state. There are just 32 for an area the size of Austria. Even when poachers openly sell to middlemen, there is little success in apprehending the offenders. For example, in 1978, an employee working in a timber company killed a Sumatran rhino with a shotgun and sold the pair of horns, nails and a little hide to the Chinese owner of a general store for about US\$ 1,500, but news of this reached the wildlife officers too late for anyone to be arrested. In 1981, a young Sumatran rhino was trapped by a group of timber camp workers who brought the valuable parts into the town of Lahad Datu for sale. Wildlife officers heard that they were being kept in a private house which they raided. They found the rhino hide but nothing else. They then set up a surveillance of the Chinese medicine shops in Lahad Datu but failed to catch the poacher who was trying to sell the nails to one when he suddenly became suspicious and fled.

## The “Chinese Connection” in Tawau

Most of the Sumatran rhino horn exported from Sabah is handled by a syndicate of Chinese dealers conveniently located in the port of Tawau which is in the extreme southeast of the state, on the Indonesian border. This is a rough frontier town with numerous legal and illegal immigrants from the Philippines and Indonesia milling around the streets. Some of these immigrants work on agricultural plantations and in timber camps, but there is quite a large number involved in smuggling cigarettes, clothing, spices and handicrafts from port to port in small fast boats.

Tawau has other assets which also contribute to its role as the major entrepot for rhino horn in Borneo. There is an airport serving Kalimantan, another source for rhino products, and there are good roads into the hinterland where the poachers operate. Also, there is a relatively large and wealthy Chinese community with close links to Singapore. Furthermore, the Wildlife Department is far away in Kota Kinabalu.

It appears that one of the members of the Tawau syndicate is the owner of a Chinese restaurant which specializes in preparing

medicinal stews. Another is probably one of the more prominent medicine shop owners. At the time of my visit he was offering the only Sumatran rhino horn for sale in a shop; it was priced at US\$ 20,851 a kilo retail. He gave me a lot of information, but I was unable to find out from him who might be the third member of the syndicate, although he confirmed that there was a third. He told me the horn and nails collected in Tawau come from rhinos killed in Sumatra as well as in Sabah and that these products are exported primarily to Singapore but occasionally also to Hong Kong. Relatives of the syndicate members flying out of Tawau carry them in suitcases and deliver them to pre-

arranged contacts. The medicine shop owner showed me some photographs taken in Singapore of a trader with ten Sumatran rhino horns which he claimed had come from Tawau a couple of years ago. When I told him that I would like to have copies, he refused because he did not want to part with any which had his “friend” in them; however, the next day he did give me copies of other pictures showing just rhino horn which he said had been more recently sent to Singapore from Tawau. I discovered from discussions with pharmacists in other Tawau medicine shops that Indonesians frequently bring in rhino horn and nails from Sumatra and Kalimantan to sell. In early 1988, an Indonesian businessman offered a Sumatran rhino horn to a medicine shop for US\$ 15,690 a kilo; another Indonesian came in with 16 rhino nails for which he wanted US\$6 each.

While Tawau is obviously the main centre for rhino horn trade in Sabah, some sales do take place in other towns. I found no horn in Sandakan; but until January 1988, the Wildlife Division of the Forest Department had its headquarters here, and officers did inspect the shops for contraband. In the state capital, Kota Kinabalu, the medicine shop owners are now keen to dispose of their rhino products, apparently because the Wildlife Department has moved in. Of the 18 medicine shops, only two have any horn left. I learned that two others had sold their horns earlier in the year to Singaporeans, and a third had, just the morning before I made my visit, sold all his horn to “a Chinese merchant from Tawau”.

## Steps That Might be Taken

Sabah’s Wildlife Department officials are aware of their inadequacies and they are trying to improve their attempts to control poaching. The Department has been allocated money to pay for doubling its staff of rangers by the end of the year; but even so that will not be enough to provide the protection necessary. It would perhaps be advisable for the officials to consider trying to win the support of the Ibans for rhino conservation and bringing them in to fill the additional ranger posts. Certainly they are the most qualified people in the state to patrol the rhino habitat



and without their help the animals are probably doomed.

Insofar as the trade in rhino products is concerned, the Sabah Wildlife Department should send out senior officers with orders to confiscate all Sumatran rhino products from medicine shops throughout the state, and to repeat the exercise at various times. The Department should also set up an intelligence gathering network, especially in Tawau, so that members of the syndicate may be caught and that exports of rhino products may be stopped. There is not much demand for them locally because they are so expensive, and if the Chinese traders learn that a major effort is being made to combat the trade they will-probably be afraid to continue it.



*Sumatran rhino in captivity*

Unlike most places having a rhino population, Sabah is not short of funds to pay for rhino conservation. The government has been generous in its financial backing and deserves praise for this; however, there is an apparent lack of expertise, particularly in Sabah's rhino capture programme. In early 1986, a substantial sum was allocated to rhino conservation, primarily for catching isolated rhinos for breeding in controlled surroundings. Of the four caught in pit traps, two died, probably of stress although they did have old bullet wounds, one escaped and the remaining one is on public view in a small pen at the orangutan rehabilitation centre in Sepilok, near Sandakan. All four rhinos were male, and it is believed that most females have already been taken by poachers since they are easier to find because they have smaller home ranges and tend not to be loners. Further evidence of harassment by poachers is the fact that three of the rhinos caught had injuries from snares and/or bullets. For comparison, in peninsular Malaysia where nine rhinos are now in captivity all but one are females. Law enforcement is more intensive there, and traditional hunting for rhinos is rare. Since Sabah has now at least temporarily stopped its capture operations, its captured male rhino should probably be sent to Malacca to be with the others. The Sabah government could earn good publicity for this which also makes sound conservation sense.

## **Sarawak**

In Sarawak there are very few rhinos. Many conservationists presumed they were extinct until August 1986, when the zoologist Julian Caldecott confirmed the presence of three near the Kalimantan border at Batu Lawi, a remote area where there are no human settlements nor logging activity. Although he never

saw the actual rhinos, there is no doubt about their existence, and more of their tracks were seen again in June 1988. Dr Caldecott believes that there are other rhinos in the general area (personal communication, July 1988).

At present Sarawak's rhinos do not seem to be in great danger from poachers even though traders in the state capital, Kuching, know of them. I heard an extraordinary report of a man in Miri, a town in northern Sarawak, who contacted the owner of a pharmacy in Kuching this year to inquire whether he would purchase the horn from a rhino that a friend of his knew the whereabouts. If he could be certain that he could sell the horn, a hunting party would be organized to go after it. The medicine shop owner not only declined the offer but put off the idea entirely by stating that there was no real demand in Kuching for it and no one would pay much for it.

It has not been since the 1960s that rhinos have been killed in Sarawak for trade. Then Dayak and Iban hunters went after them as in the 1930s Kelabit tribesmen had, but they stopped after they had eliminated those in the lowlands. People in Sarawak do not have contact with rhino horn traders in Tawau, and outsiders have not come in to hunt. The rhinos are thought to be so few in number that it would not be worth either the time or effort to seek them out in their rugged highland refuge to which access is extremely difficult at present.

## **Protection Needed**

Nevertheless, the area should be gazetted as part of the proposed Pulong Tau National Park. It is possible, otherwise, that logging could begin; and, according to Philip Njau Jalong, the Head of the National Parks and Wildlife Office of Sarawak, the government does not favour the idea of translocating the animals because the expense would be very great indeed and the natural habitat is not being destroyed as in Sabah, peninsular Malaysia and Sumatra. Moreover, greater protection needs to be given to



The stocks of rhino horn that are available in two of Kuching's medicine shops are very old, and no one seems interested in them; no rhino hide nor nail is for sale. It may well be that because the medicine shops' owners have been unable to sell off their old horn that they do not wish to deal in any new supplies; this is the best deterrent to poaching there could be, but if businessmen from Singapore, Hong Kong and Taiwan begin asking for rhino horn when they pass through Kuching, the situation could change.

There has been a consistent worry among conservationists that the Sultanate of Brunei could become a major entrepot for rhino products, particularly after the legal ending of Singapore's role in the international trade. Fortunately, this has not happened, and I do not think it will. When I went to Brunei in 1986, there were less rhino products for sale than when I made my first visit in 1982. In July 1988, only one medicine hail in the capital, Bandar Seri Begawan, had any rhino horn at all for sale, and that was from an African rhino and had been purchased in Singapore in early 1988. Although it did not enter the country legally, it was for consumption in Brunei, not for re-export.

The government of the Sultanate is concerned with conservation issues and has legally entrusted to the Brunei Museum the care of the country's wildlife. In 1978 the Wildlife Protection Enactment was passed, which includes prohibiting the export of any Sumatran rhino products. While there is no law against such imports, since February 1987, following a letter officially received by the Brunei government from H.R.H. The Duke of Edinburgh, President of WWF International, a special permit must be issued for imports of products from any rhino species. According to a senior Customs official, such a permit has not been granted to anyone, and it is unlikely that one ever will be. Despite the fact that I discovered one African rhino horn recently

## Sabah is the Only Hope

Nairobi, November 1988

I would like to express my thanks to the World Wide Fund for Nature which supported my visit to Borneo. The following people in Sabah, Brunei and Sarawak were most helpful to me and I wish to thank them for all their information and hospitality: Eusof Agaki, Patrick Andau, Elizabeth Bennett, Julian Caldecott, Philip Ngau Jalong, Olive Marsh, John Payne and Anwar Sullivan.

Place and Year	Number of Pharmacies Visited	Number and percentage selling Horn	Types of Horn	Average Price per kg in US\$
1. Addis Ababa	10	100%	100%	100%
2. Bishoftu	10	100%	100%	100%
3. Dire Dawa	10	100%	100%	100%
4. Harar	10	100%	100%	100%
5. Jimma	10	100%	100%	100%
6. Mekele	10	100%	100%	100%
7. Gondar	10	100%	100%	100%
8. Bahir Dar	10	100%	100%	100%
9. Debre Tabor	10	100%	100%	100%
10. Debre Berhan	10	100%	100%	100%
11. Addis Ababa	10	100%	100%	100%
12. Addis Ababa	10	100%	100%	100%
13. Addis Ababa	10	100%	100%	100%
14. Addis Ababa	10	100%	100%	100%
15. Addis Ababa	10	100%	100%	100%
16. Addis Ababa	10	100%	100%	100%
17. Addis Ababa	10	100%	100%	100%
18. Addis Ababa	10	100%	100%	100%
19. Addis Ababa	10	100%	100%	100%
20. Addis Ababa	10	100%	100%	100%
21. Addis Ababa	10	100%	100%	100%
22. Addis Ababa	10	100%	100%	100%
23. Addis Ababa	10	100%	100%	100%
24. Addis Ababa	10	100%	100%	100%
25. Addis Ababa	10	100%	100%	100%
26. Addis Ababa	10	100%	100%	100%
27. Addis Ababa	10	100%	100%	100%
28. Addis Ababa	10	100%	100%	100%
29. Addis Ababa	10	100%	100%	100%
30. Addis Ababa	10	100%	100%	100%
31. Addis Ababa	10	100%	100%	100%
32. Addis Ababa	10	100%	100%	100%
33. Addis Ababa	10	100%	100%	100%
34. Addis Ababa	10	100%	100%	100%
35. Addis Ababa	10	100%	100%	100%
36. Addis Ababa	10	100%	100%	100%
37. Addis Ababa	10	100%	100%	100%
38. Addis Ababa	10	100%	100%	100%
39. Addis Ababa	10	100%	100%	100%
40. Addis Ababa	10	100%	100%	100%
41. Addis Ababa	10	100%	100%	100%
42. Addis Ababa	10	100%	100%	100%
43. Addis Ababa	10	100%	100%	100%
44. Addis Ababa	10	100%	100%	100%
45. Addis Ababa	10	100%	100%	100%
46. Addis Ababa	10	100%	100%	100%
47. Addis Ababa	10	100%	100%	100%
48. Addis Ababa	10	100%	100%	100%
49. Addis Ababa	10	100%	100%	100%
50. Addis Ababa	10	100%	100%	100%
51. Addis Ababa	10	100%	100%	100%
52. Addis Ababa	10	100%	100%	100%
53. Addis Ababa	10	100%	100%	100%
54. Addis Ababa	10	100%	100%	100%
55. Addis Ababa	10	100%	100%	100%
56. Addis Ababa	10	100%	100%	100%
57. Addis Ababa	10	100%	100%	100%
58. Addis Ababa	10	100%	100%	100%
59. Addis Ababa	10	100%	100%	100%
60. Addis Ababa	10	100%	100%	100%
61. Addis Ababa	10	100%	100%	100%
62. Addis Ababa	10	100%	100%	100%
63. Addis Ababa	10	100%	100%	100%
64. Addis Ababa	10	100%	100%	100%
65. Addis Ababa	10	100%	100%	100%
66. Addis Ababa	10	100%	100%	100%
67. Addis Ababa	10	100%	100%	100%
68. Addis Ababa	10	100%	100%	100%
69. Addis Ababa	10	100%	100%	100%
70. Addis Ababa	10	100%	100%	100%
71. Addis Ababa	10	100%	100%	100%
72. Addis Ababa	10	100%	100%	100%
73. Addis Ababa	10	100%	100%	100%
74. Addis Ababa	10			

<b>Sabah</b>					
<b>Kota Kinabalu</b>					
<b>1986</b>	18	2	1%	Sumatran	14,697
<b>1988</b>	21*	210%	African	Sumatran 4,070	20,350
<b>Tawau</b>					
<b>1988</b>	18*	1	6%	Sumatran	20,851
<b>Brunei</b>					
<b>Bandar Seri Begawan</b>					
<b>1982</b>	5	2	40%	mostly African	6,895
<b>1986</b>	7*	1	14%	?	3,797
<b>1968</b>	8*	1	12%	African	6,614
<b>Sarawak</b>					
<b>Kuching</b>					
<b>1988</b>	12*	2	17*	mostly African	9,666

**Source:** survey undertaken by the author



# The Ecological Role of Elephants in Africa

David Western

Elephants can be considered in many ways: economically, culturally, symbolically, aesthetically, educationally and scientifically, to mention the most common. Another kind of value judgment is the ecological. There are two problems with ecological arguments for conserving species. First, the ecological details are seldom obvious to anyone but an ecologist, and second, it is difficult to show the consequences of losing a species until after the species is extinct.

This is not to say that predictions about the outcome of extinctions are lacking. A growing number of ecologists are pointing out the likely consequences in the coming decades of losing species. These projections are necessarily generalities and have little to say about specific effects due to losing say the giant panda or the black rhino. None the less, the science of conservation biology, drawing on knowledge of the roles played by predators, pathogens, pollinators, seed-dispersers and so on, is improving its forecasts. Certain “keystone” species play an inordinate role in maintaining the linkages in a food web, to the extent that their extermination would cause a cascade of change or extinctions in ecosystems.

What of the elephant? Can we predict the consequences of its extinction or near eradication in Africa? Most of the early studies of the effects due to elephant were conducted in national parks,

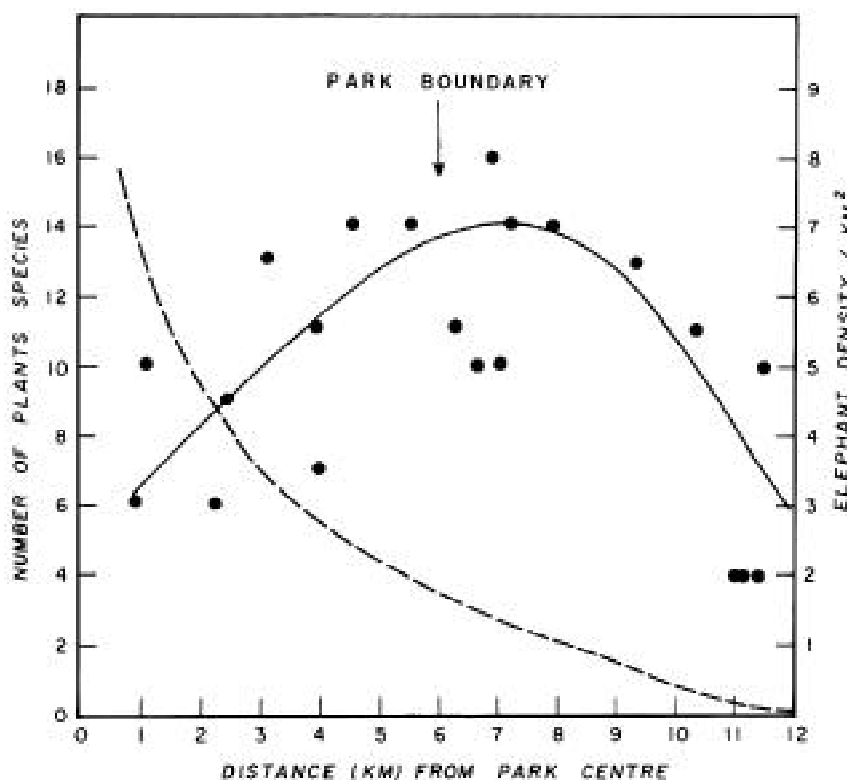
where densities were unusually high due to range compression, or in commercial forests, such as Budongo in Uganda. Not surprisingly these studies stressed the negative impact of elephants — a reduction of biological diversity in parks and an economic loss of timber in forests. In contrast, more recent studies stress the importance of elephants as agents of seed dispersal, in increasing habitat mosaic in forests and in diversifying mammalian communities.

These views of the ecological role of elephants are not necessarily contradictory. The issue revolves round whether elephants are free-ranging or compressed by human pressures. I will give a number of examples of the keystone role of elephants in African ecosystems, drawing on firm evidence from natural “removal experiments”, supported by other evidence. This will lead to a discussion of the ecological implications of losing elephants using the analogy of mega-faunal extinctions in Central American dry forests and the cascade of Pleistocene extinctions recently attributed to the loss of large mammals between 25,000 and 10,000 years ago.

## Elephants and Savannas

A compelling example of what happens to biological diversity when an area is void of elephants comes from Amboseli in Kenya where poaching has produced a natural removal experiment.

Prior to 1950, elephant numbers in the Amboseli basin, the focus of wildlife concentrations during the dry season, were low. The evidence suggests elephants were scarce in Amboseli late last century, perhaps due to ivory trading, and increased steadily through the early decades of this century. Elephants migrated seasonally in and out of the basin, like most other herbivores, until the mid-1970s when poachers killed more than a third, causing the remaining animals to concentrate in the national park, the dry season range. Here their concentration increased several-fold. The contraction in range led to a density gradient within the formerly uniform woodlands of the Amboseli basin, with extremely high densities in the national park falling away to negligible levels beyond the park boundary. What were the consequences for vegetation? Both the number and relative abundance of plant species were affected. Comparably few plants, dominated by one or two species, are located in areas of low to negligible elephant density and in the central park, where elephant densities are exceptionally high (more than 4 per sq. km.). Conversely, two or three times as many species, contributing far more evenly to total plant abundance, are found in areas of moderate elephant density. What does this pattern mean?



**Fig. 1.** Plot of the number of plant species (—) along an elephant density gradient, (---) in Amboseli. Most species are found in areas of intermediate elephant density, fewest in areas where elephants have been compressed or eliminated.

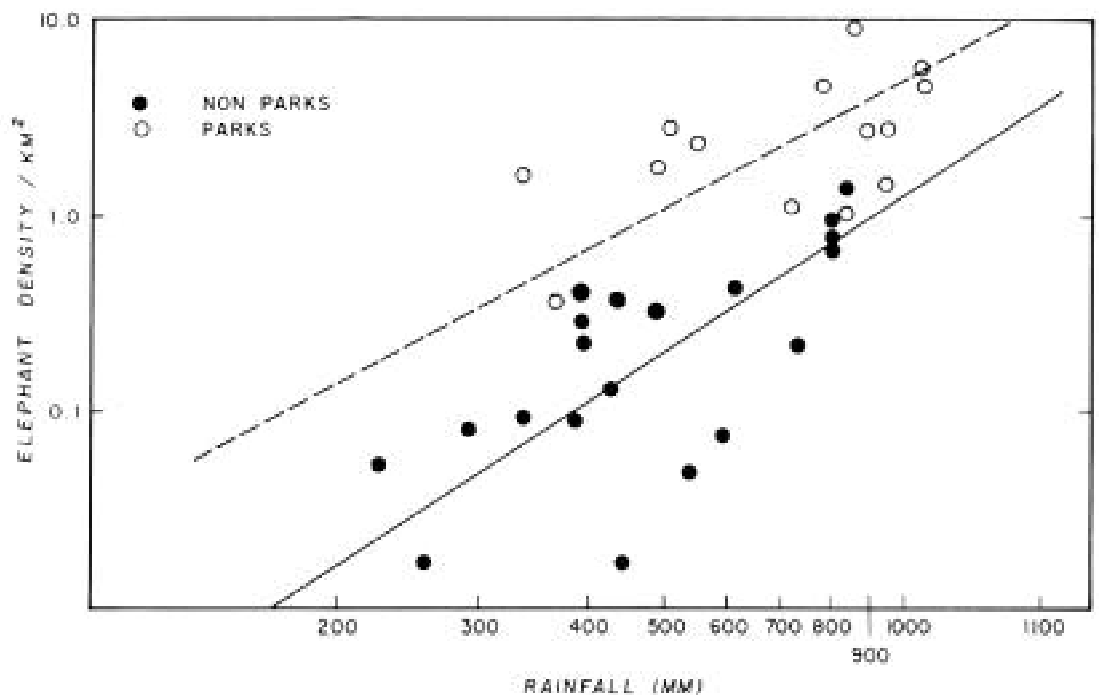


With few elephants present, the basin vegetation becomes dominated by one species, the yellow-barked acacia, a fast growing tree forming dense stands over 25 m tall. Woodland groves become so dense that little light penetrates to the understorey, and consequently a few species of light tolerant herbs invade the woodland floor. Unlike moist tropical forests, only a few arid-adapted plants, narrow leaved to withstand desiccation, can tolerate deep shade. The presence of elephants in moderate numbers opens up the dense woodland canopy, allowing a proliferation of species in the light gaps. The invading species, including shrubs, herbs and grasses, in turn reduce the germination rate of fewer trees, reducing their domination.

This pattern is perhaps typical of much of the savannas where elephants, until recent years, lived in moderate densities, moved widely and were frequently edged on by hunters, pastoralists and shifting cultivators. The exceptional concentrations in the central Amboseli are historically unprecedented in dry areas. Here the year-round densities within the woodlands exceed 3.5 per sq km, and in the core area exceed 6 per sq km, figures higher than compressed populations in far wetter areas such as Murchison Falls Park in Uganda. The present densities in Amboseli did not prevail in the past when elephants had the chance to move uninterruptedly.

Elephants, in modifying Amboseli's vegetation, also indirectly shape its wildlife community. The following analysis is a preliminary summary of the results from the long-term census records.

Census results from aerial counts show significant increases in grazer biomass (zebra, wildebeest, Thomson's gazelle and buffalo) and decreases in browser and mixed feeder biomass (giraffe, impala, Grant's gazelle) within the park where elephants have reduced the woodlands and swamp-edges, and expanded grasslands. A reverse decrease in grazer biomass and increase in browser biomass has occurred where woodlands have proliferated outside the park. The most equitable mix of grazers and browsers is found in the mosaic of woodlands and grasslands associated with moderate elephant densities straddling the park boundaries.



**Fig. 2.** Elephant biomass for 34 East African populations showing a five-fold difference between non-parks and parks, a reflection of the push-pull effect of vulnerable and protected areas.

## Other Savanna Examples

Woodlands and bush-land are the dominant feature of the African savannas, contrary to the popular image of open plains. In the absence of cutting, burning and elephants, grasslands often give way to dense bush-land. Elephants can reverse such encroachment, as seen in Tsavo, Kruger and Ruaha, an event that favours grazing animals and often increases overall animal production. Many commercial ranches, such as Galana and Laikipia in Kenya, owe much to elephants.

Elephants also “facilitate” pastures for other species including livestock, whether or not tsetse are present. Vesey-Fitzgerald in 1960 described how elephants and other large herbivores opened up floodplain marshes to an array of medium and small ungulates in Lake Rukwa, Tanzania. I have also described how elephants in Amboseli open up swamp and swamp-edge pastures to other herbivores, including domestic stock, by feeding on and trampling down tall sedges, and promoting growth of higher quality grasses. This phenomenon is undoubtedly widespread, especially in the single rainfall belt of central Africa and Sudan, where grass grows 3 to 4 m tall and becomes rank and unpalatable for smaller herbivores, unless grazed down or burned.

Given the widely accepted view that bio-diversity is the primary goal for biological conservation, there are firm ecological grounds for concern over the current status of elephants in the savannas. From the observation that savanna ecosystems are least diverse at low and high elephant densities, one can argue that the savannas are already becoming simplified on a large scale. This deduction can be made from the skewed distribution





*Elephants in Queen Elizabeth National Park, Uganda*

of elephants (Fig. 2). Elephants cluster into two discrete classes — high and low density — with very few in the intermediate range. The two classes correspond to parks and non-parks, to those areas where elephants concentrate for safety, and those where they flee from human threats, largely poaching. Both parks and non-parks are likely to lose diversity as a result, the first from too many elephants, the second from too few.

What little we know about the ecological role of elephants in forests suggests that they play a similar role in the savannas, as the following examples show.

Elephants are important agents of seed dispersal. Alexandre, in 1976, found 21 of 71 species he sampled in Tai Forest, Ivory Coast, were adapted to dispersal by elephants. Elephants are obligatory dispersers for a number of trees, especially those with large tough seeds, implying that these species will dwindle in number once elephants are exterminated.

Elephants play a second and equally essential role in creating forest gaps. The formation of gaps by tree falls, wind-throw and other natural factors helps to diversify tropical forests. The upper canopy layers intercept so much light that little reaches the forest floor. Understorey vegetation is therefore sparse, a fact reflected in the low abundance variety of vertebrates on the forest floor. Elephants create and expand gaps and, in the process, open up a more productive and varied ground layer to a range of other vertebrates, including gorillas, forest hog, bush pig, bongo, buffalo and duiker. The high proportion of gap and secondary forest species of plants and animals in African forests suggests its patchiness is a natural feature. Over a third of the plants in Ghanaian forests are secondary forest species and a

quarter of the lowland forest birds in sub-Saharan Africa are secondary forest and forest-edge species. Elephants, the giant bulldozers, no doubt have done much to create the patchiness that distinguishes African from South American forests.

The extent to which elephants create or simply expand forest gaps is not yet clear. At low densities they are unlikely to have much influence in gap formation. At high densities elephants have a profound influence in creating secondary forests such as Aberdares, Lake Manyara and Rubondo. However, most of these cases

reflect compressed elephant populations which, as in overpopulated savanna parks, reduce the variety of plant species. Nevertheless, elephants have a pervasive influence throughout the central African forest and probably play an important role in the formation and maintenance of their patchy nature.

Primatologist Kortlandt holds a similar view. He speculates that the monotonous architecture and species-poor forests of central Congo Basin reflects 'the absence of rejuvenation owing to the extermination of elephants'. By implication, the elimination of elephants in the rich African forests will lead to faunal impoverishment.

## Conclusions

Elephants play a previously overlooked keystone role in African savannas, and almost certainly tropical forests too. To some extent their diversifying role has been obscured by a preoccupation with over-browsing in national parks, where elephant populations have been compressed by human activity. The evidence at hand suggests that elephants diversify savanna and forest ecosystems when free to move. Unfortunately, heavy poaching and harassment is producing a split distribution of high and low densities over much of Africa as herds crowd into protected areas and abandon nonprotected lands.

Elephants also stem bush invasion in savanna ecosystems and dry forests over much of Africa, thereby creating a more productive mix of grazing and browsing animals. Subsistence herders and commercial ranchers also benefit when elephants reduce bush-lands, expand grasslands and eliminate tsetse fly. The ecologically diversifying role of elephants in the savanna,



**COMPARISON OF ESTIMATED AFRICAN  
ELEPHANT POPULATION SIZES BETWEEN 1979  
AND 1989 BY COUNTRY WITHIN REGION**

Country by Region	1979 <sup>1</sup>	1989 <sup>2</sup>
<u>Central Africa</u>		
Cameroun	16,200	21,200
Central African Republic	63,000	19,000
Chad	15,000	3,100
Congo	10,800	70,000
Equatorial Guinea	1,300	500
Gabon	13,400	76,000
Zaire	377,700	85,000
Subtotal	497,400	274,800
<u>Eastern Africa</u>		
Ethiopia	900	6,650
Kenya	65,000	19,000
Rwanda	150	70
Somalia	24,300	6,000
Sudan	134,000	40,000
Tanzania	316,300	80,000
Uganda	6,000	3,000
Subtotal	546,650	154,720
<u>Southern Africa</u>		
Angola	12,400	12,400
Botswana	20,000	51,000
Malawi	4,500	2,400
Mozambique	54,800	18,600
Namibia	2,700	5,000
South Africa	7,800	8,200
Zambia	150,000	41,000
Zimbabwe	30,000	43,000
Subtotal	282,200	181,600
<u>West Africa</u>		
Benin	900	2,100
Burkina Faso	1,700	3,900
Ghana	3,500	1,100
Guinea Bissau	-	20
Guinea	300	300
Ivory Coast	4,000	3,300
Liberia	900	650
Mali	1,000	600
Mauritania	160	20
Niger	1,500	800
Nigeria	2,300	3,100
Senegal	450	50
Sierra Leone	300	250
Togo	80	100
Subtotal	17,090	16,290
TOTAL	1,343,340	627,410

coupled with their economic importance is reason to encourage their range expansion beyond protected areas. This would avoid the loss of biological diversity due to over-compression within protected areas and enhance it outside in areas where livestock grazing encourages bush encroachment.

Seen in larger context, the implications of losing elephants may be far-reaching in the long run. Janzen and Martin in 1982 suggested that the mega-faunal extinctions in the late Pleistocene resulted in a loss of dispersal agents for a number of tree species in the Central American dry forest, leading to habitat impoverishment. Janzen made a similar case for the drier rangelands of Central America and the Southwest United States, where plants resilient to browsing by smaller herbivores have proliferated since the extinction of the mega-fauna.

We can expect the loss of elephants in Africa to have equally wide ranging consequences. Owen-Smith has advanced the "keystone herbivore hypothesis" to account for the cascade of extinctions among smaller mammals during the Pleistocene, which saw 50% of the mammalian genera disappear. In noting that all species larger than 1,000 kg disappeared in the Americas, Europe and Australia between 25,000 and 10,000 years ago, he suggests that hunting, while a good explanation of the mega-mammal extinctions, fails to explain the simultaneous loss of 41% of the meso-mammals (between 5 and 100 kg) and 2% of micro-mammals (less than 5 kg) that were not obvious prey of early human hunters. He suggests instead that the extermination of the mega-mammals led to a domino effect as vegetation closed up and eliminated the habitat of smaller mammals. He cites Hluhluwe Game Reserve in South Africa as a modern analog. There, since the elimination of elephants a century ago, the local extinction of three grazers and the sharp reduction of several others, such as waterbuck and wildebeest, to vulnerable levels has coincided with the invasion of woody vegetation.

In conclusion, the case studies and the ecological and palaeoecological literature suggest that the extermination of the African elephant will reduce biological diversity and increase extinction rates over much of Africa. Lose our keystone species and we will lose a great deal more in the process.

Sources: 1. Iain Douglas-Hamilton (1979)  
2. Ivory Trade Review Group Report (1989)



# Monitor

## Forest Elephant Surveys in Central Africa

A reconnaissance survey of the forests of Cameroun, Central African Republic, Congo and Zaire was made between January 1989 and June 1989. The purpose was to obtain preliminary information on the status of forest dwelling elephants. The survey was financed by the EEC through the EEC/WWF African Elephant Programme. The project was carried out by a team of ten biologists and wildlife officers, comprised of seven different nationalities, and organized by WCI.

In this report the results of the reconnaissance survey have been combined with those from previous work in Gabon and Equatorial Guinea to provide a comprehensive picture of the status of elephants in the central African region.

There are still some forests with a high density of elephants but, with the exception of Gabon, numbers are falling.

In Zaire, elephants have suffered heavy poaching for 25 years, even in the National Parks of Salonga and Maiko situated in the remotest forests. The size distribution of exported tusks suggest that the situation is as bad, if not worse, than in Tanzania where elephant numbers have halved in ten years. If the present trend continues, few forest elephants will remain in Zaire by the turn of the century.

Central African Republic has already lost three quarters of its savanna elephants. Many forest elephants are still found in the Bangassou and Bayanga areas, but are threatened by poaching. In Cameroun, elephants have largely disappeared from south-central forests where human population density is high. Many elephants remain in the west, around Korup and the sparsely populated forests of the south-east, but they are imperilled by illegal hunting.

Poaching pressure appears greater in Congo than Cameroun, although there are still some remote parts of the northern forests of Congo with many elephants. As logging companies move into these areas their roads will provide easy access for ivory poachers and numbers will then fall rapidly.

Equatorial Guinea contains elephants in its southern half; there is some poaching.

The biggest undisturbed population of forest elephants is found in Gabon. There are vast areas of uninhabited forest and large-scale organized poaching has not yet started. However as elephant numbers diminish in neighbouring countries, poachers and ivory traders will turn their attention to Gabon.

Throughout the central African region, government officials, some very highly placed, are involved in ivory poaching and trafficking.

Automatic weapons are commonly used by ivory poachers. They are a threat not only to elephants but to national security. Some extrapolations were made using the data collected during the reconnaissance survey and by making many assumptions. These are not population estimates, but calculations based on the best data presently available and must be viewed with caution. The computations suggest a total population of perhaps 225,000 forest elephants in central Africa. About one third are in Gabon and not yet seriously threatened by ivory poaching; about one third are in Cameroun, Congo and CAR and are rapidly declining; the remainder are in Zaire and are swiftly disappearing.

### EXTRAPOLATED NUMBERS OF ELEPHANTS IN THE FORESTS OF CENTRAL AFRICA

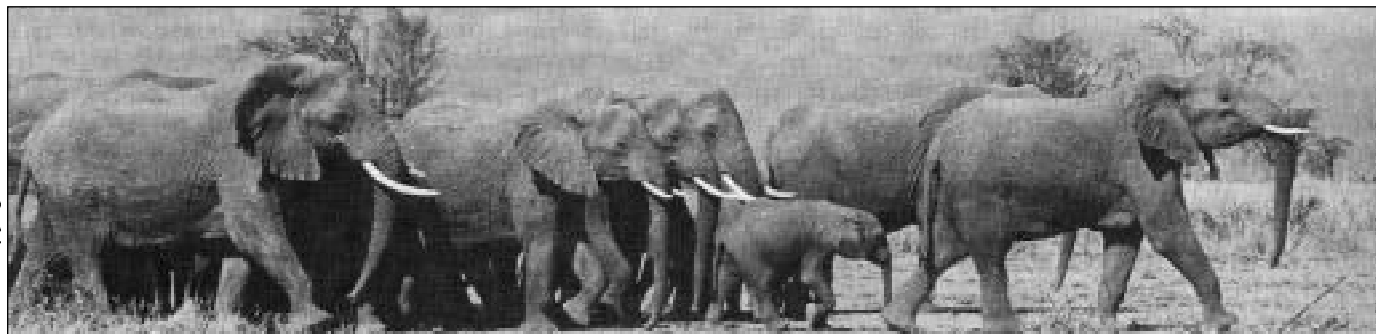
Country	Area of forest (sq. km.)	No. of elephants in forest
Cameroun	179,200	19,700
C.A.R.	35,900	6,400
Congo	213,400	24,900
Equatorial Guinea	12,950	1,800
Gabon	205,000	88,000
Zaire	1,056,000	84,500

**Note:** These are not population estimates but extrapolations based on limited data.

Report to EEC/WWF African Elephant Programme on behalf of the Wildlife Conservation International team, June 1989.

**R.F.W. Barnes**

Department of Applied Biology, Downing Street, University of Cambridge.



*Elephants on the move*



---

# Namibia Dehorns Damaraland Rhinos to Thwart Poachers

The Namibian Directorate of Nature Conservation (NDNC) decided to dehorn black rhinos that roam the remote, parched, red-gravel desert region known as Damaraland. The dehorning, which Mr. Brian Jones, a NDNC official, describes as “drastic”, was done to discourage poachers who early this year killed five of the 100 or so Damaraland rhinos and 11 in Etosha National Park.” “There seems to be a new wave of poaching and we decided, because of the desperate situation, that this action had to be taken” Mr Jones added.

In addition to concern about poaching simply for money, conservationists said dehorning was also prompted by fear that, as Namibia gains independence from South Africa, white farmers resentful of black majority government would leave the country and poach rhinos as a last defiant gesture. But Blythe Loutit, founder of Save the Rhino Trust in Namibia, describes dehorning as a last resort after her organization failed to raise funds to hire more guards and to purchase a new plane for anti-poaching activities.

Dehorning has been widely debated and this is the first time it has been used as a measure to protect rhinos. Can a rhino without horns live as a rhino? The horns are used in courtship and for defence. Unlike the social elephant, a species in which the young enjoy the protection of all the adults in the family group, the solitary rhino has only its horn to shield a calf from predators; the black rhino uses its horn to pull or break branches to gain access to browse and also to clear a way through thick bush.

Except in Damaraland black rhinos live in thick bush-land. In that kind of vegetation a poacher is unlikely to be able to see the whole animal and one would not expect him to waste time, or risk entering a thicket, to check whether the quarry has horns or not. One may argue that, being a desert, Damaraland allows the poacher to see easily that a rhino has no horn. But Damaraland has riverbeds, conical hills, rocky outcrops, gulleys, etc.

It is no wonder then that, in order to increase the chances of success of dehorning, Namibian authorities have tried to create the impression that all the 100 or so rhinos were dealt with. The number of rhinos that were operated on has not been disclosed officially, but conservationists involved said that about 12 animals had been dehorned. The sawn-off horns have been cached in an undisclosed place for fear of theft.

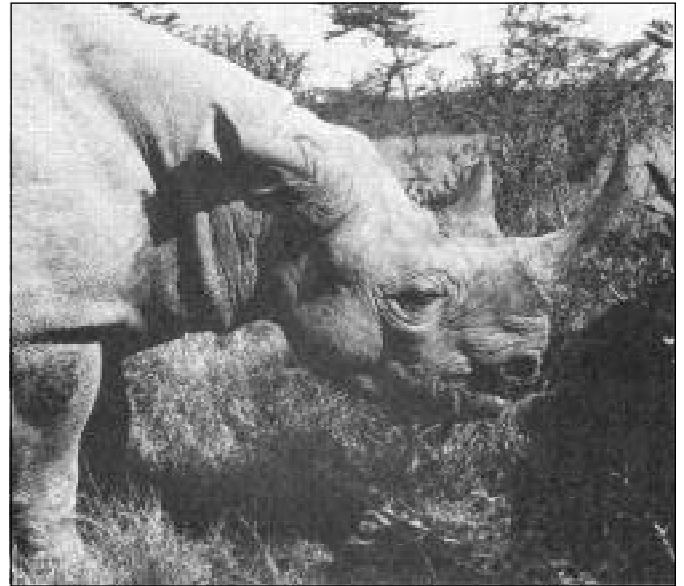
There is also the problem of horn regrowth. The need to remove newly grown horn every two or three years would mean repeatedly subjecting the rhinos to all the hazards of the operation. Besides that, it could lead to a race with poachers to see who removes the horn first.

Another facet which has been ignored is that rhinos' hide, bones and nails also can be sold. Presently their value is minimal compared to that of the horn but can we be sure the poacher will not kill rhinos to get these other products?

Blythe Loutit is confident that the hornless rhinos will fare well. But Brian Jones says “We are going to have to monitor, to see what effects there are on their social life”.

Information and ideas from the monitoring of the dehorned rhinos should be made available to facilitate future active rhino management in other parts of Africa.

New York Times      C.G. Gakahu



*Black rhino browsing*

Copyright Esmond Bradley Martin

## Dehorning Rhinos in Damaraland - A Controversial Issue

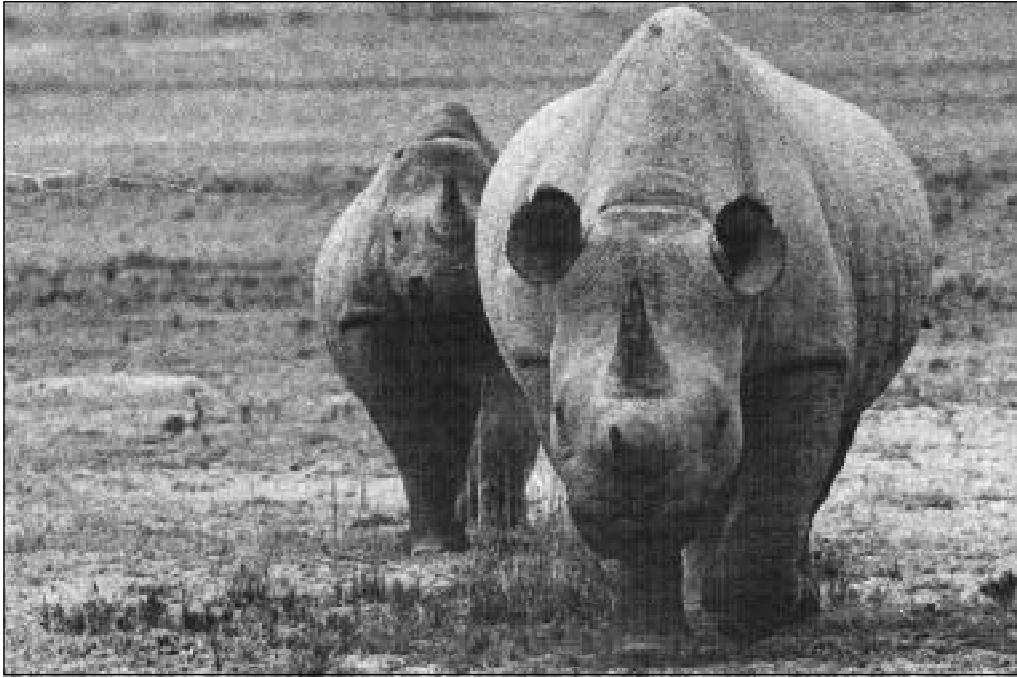
Earlier this year poachers killed five of the rare desert black rhinos in Damaraland. After much discussion and deliberation we decided to undertake the drastic step of dehorning some rhinos, not as an experiment, but as an urgent necessity. We believe they have more chances of survival without their horns than with them - until we obtain enough funds to have an effective anti-poaching operation.

The first rhino dehorned was Tammy, a pregnant cow; she has been re-sighted a number of times and her behaviour is normal. Another cow, Petra, also dehorned, has a small calf known as Little Richard; they have been seen again three times and are doing very well. A cow and a bull, Hilda and Zak, together for the last three weeks, had their horns removed, and are still with each other. The project will continue along with careful monitoring.

Dehorning causes no pain because no nerves or blood vessels are cut. The horns take a long time to grow back, and, hopefully, this period will provide opportunity to raise the funds to pay for men on the ground and buy the radios and aircraft which we so desperately need.

---





*Black rhino with calf*

## Aberdare Rhino Sanctuary

This is one of the five rhino sanctuaries proposed by the Government of Kenya to be fenced and given special protection and management. The government requested the Rhino Ark to act as co-ordinator of this project and we are pleased to be able to report that the clearing of the fence line around the Salient of the Aberdare National Park is now complete and that fencing has commenced.

The Rhino Ark, established some 18 months ago as a project of the David Sheldrick

We have been monitoring rhinos in Damaraland for nearly ten years, and believe that we know enough of their habits to warrant the results of removing their horns. For example, past observations on rhinos in this arid habitat show the chance of harm from a confrontation is very slim; we have only one report of two young bulls sparring with horn clashes, and no intensive fighting or maiming has yet been recorded. Thus, if a dehorned rhino meets a horned one it is probable that the encounter will prove innocuous and, in any case, such an encounter is most unlikely as great care is taken that an entire group, with very limited interaction with other animals, be dehorned. Predators are few in Damaraland, and we hope that sheer bulk and the offensive attitude of, and noise made by, a rhino under attack would act as defence enough.

Concerning feeding habits, the vegetation in Damaraland is unusually short and within reach of rhinos at about shoulder height or less. In times of drought, it may be desirable to break branches, but short vegetation is always available.

Tourists have arrived already to see the dehorned rhinos; filmmakers can still take their pictures and, in fact, convey more effectively the desperate situation of the rhino by showing a dehorned animal. Rhino hide is worth little in comparison with the horn and certainly poachers, bearing in mind that the fines for poaching are extremely high, would not risk killing a hornless rhino for the skin alone.

If poachers cannot be prevented from killing for rhino horn, we believe that dehorning the animals, wherever and whenever necessary, will give a better chance of survival to the rhino.

Excerpts from Blythe Loutit's Save the Rhino Trust Fund Newsletter, June 1989, number 53. **Lucy Vigne**

Wildlife Trust, was only able to do this due to the encouraging financial assistance to the Project from various persons and companies in and outside Kenya as well as from major conservation organizations throughout the world. The major Conservation Donors have been WCI through the New York Zoological Society, WWF, the Eden Trust, Care for the Wild, United States AID and Friends of Africa in the United States. The pledges and donations to date are KShs. 6,000,000 (US\$ 300,000) and will be sufficient for the first phase which is a distance of 37 km around the Salient in which is located Treetops and The Ark, famous for their night game viewing facilities. The ambition is to fence the entire Aberdare National Park, a distance of some 220 km, and to enable us to assist the Kenya Government in realizing this many more funds are needed.

The establishment of a rhino sanctuary automatically protects elephants and any other wildlife and ecosystems which are included within the sanctuary.

The President of Kenya is determined to save the country's natural heritage for the benefit of future generations. The recent burning of millions of shillings worth of ivory which would have generated a vast amount of much needed foreign exchange is an example of their determination to rid the world of ivory and thus eliminate the selfish desires of poachers and their masters.

**C.G.K. Kuhle**