Swara

East AFRICAN WILDLIFE Society

Volume 2
Number 1

K.Shs: 12/-

Welcome to Nairobi Hilton

Almost as soon as you've checked in at the magnificent Hilton in the centre of Nairobi you can begin viewing game.

The Nairobi National Park is only minutes from the hotel and as you enter the park you will find the animal orphanage, which is a kind of hospital for sick animals and a home for neglected wildlife.

After viewing wild animals, it is a short ride back to the welcoming comfort of the Nairobi Hilton. The circular tower-block

construction of the hotel ensures that all rooms have panoramic views, and there is a heated pool and health club offering sauna and massage.

The Amboseli Grill Room offers superb cuisine in an East African setting, with music and dancing. The Tsavo Restaurant features local and international specialities. Easy relaxation is found in the Ivory Bar and at the Watamu Pool Terrace where long cool drinks and light snacks are served.

From the Nairobi Hilton, you might like to venture into big game country and visit the Hilton's two exciting game lodges.

Welcome to Taita Hills Lodge

Two hundred miles from Nairobi, at the gateway to Tsavo National Park, is the Taita Hills Lodge, known as a 'base lodge' – a departure point for excursions and safaris into the surrounding region – it lies amid game-filled virgin bush which offers some of Kenya's most exciting animal viewing.

At Taita Hills you will find the height of luxury in the heart of the bush. Spacious bedrooms with baths, one of East Africa's finest dining rooms complete with decorations inspired by the area's early explorers, a circular lounge with its three-storey-high open fireplace... play tennis, go camel trekking or simply laze by the pool with a 'sundowner' – East African for cocktail.

Nearby you can see traditional African dancing in an African village and buy locally made handicrafts. But Taita Hills is mainly for legendary excursions, and one trip that has to be made is the six miles to Salt Lick Lodge. Here, after a candle-lit dinner, you will want to stay up most of the night to see the wildlife.

Welcome to Salt Lick Lodge

Hilton's famous Salt Lick is like nothing you have ever experienced. In the style of an African village, it is a complex of towers roofed in typical African thatch, perched on stilts and connected by bridge-like walkways. Its name is taken from the natural salt lick which lies in front of it, and where the neighbourhood's game come to wallow, lick the salt and be viewed

by guests at the lodge.

During the day and especially at night, when the lick is floodlit, you can see a wonderful variety of animals. From the terrace, the cocktail lounge and even the restaurant which provides delicious cuisine, you can look down on elephant, buffalo, lion and other species.

The bedrooms are the most comfortable of any game-viewing lodge in the East African bush.

As well as excursions, safaris and game runs where you can see zebra, impala and giraffe, Salt Lick also affords thrilling game viewing from a special ground-level bunker reached by a tunnel from the lodge. Here, behind a safety window, you may photograph the animals and achieve a wonderful record of the most exciting adventure of your life!

Reservations: Nairobi Hilton Hotel Tel. 334000 Salt Lick and Taita Hills Lodges Tel. 334000 Or Mombasa Tel. 20741/312734.

NAIROBI HILTON & LODGES

East African Wild Life Society,
P.O. Box 20110, Nairobi, Kenya.
Tel: Nairobi, 27047
Offices and shop on the Mezzanine floor of the Nairobi Hilton.

The Society is a non-profit making organisation, founded in 1961.

The object of the Society is to protect wild life in all its forms.

Cover photograph:
Rare tree frog (Leptopelis vermiculatus) found only in Usambara and Uluguru forests, Tanzania. *Arne Schiøtz*

VOLUME 2 NUMBER 1

Swara

The Magazine of the East African Wild Life Society

Swara Magazine,
P.O. Box 20110, Nairobi, Kenya.

Swara is a bi-monthly magazine owned and published by the East African Wild Life Society.

Editors: Stephen Cobb (Forest section)
David Keith Jones

Advertising Sales:
Spacesellers,
P.O. Box 21241,
Nairobi, Kenya.
Tel: Nairobi 28952
Telex: INTAB 22546

Layout: Design & Techniques, Nairobi.

Colour separations:
Team Reproduction Ltd., Nairobi.

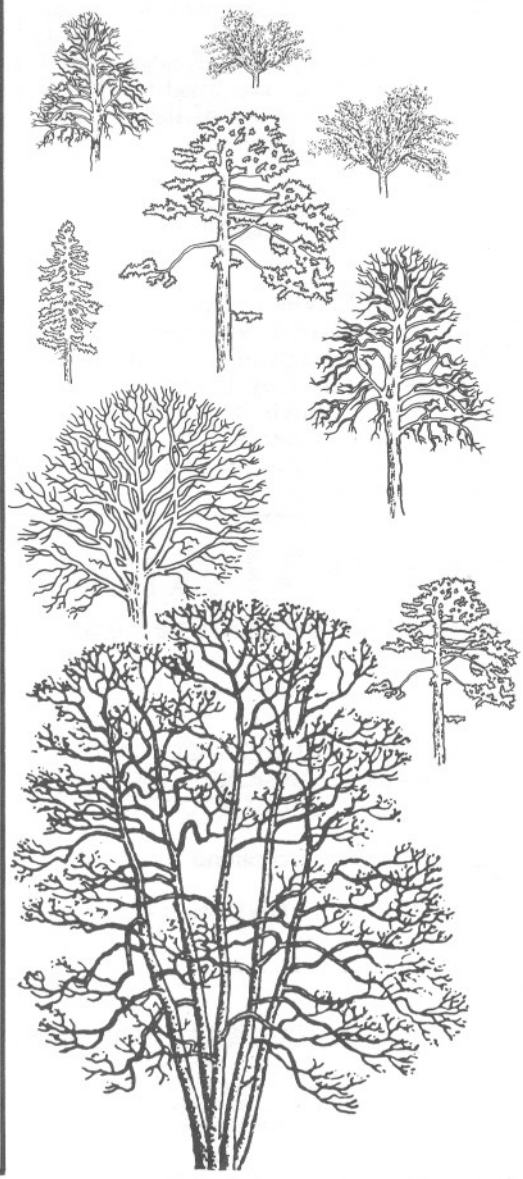
Typesetting:
Quality Typesetters Ltd., Nairobi.

Printed in Kenya:
International Aeradio (EA) Ltd., Nairobi.

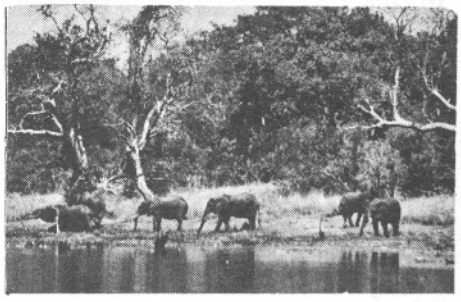
Tropical Forests—a treasure house under siege.

Tropical forests cover only one twentieth of the earth's land surface yet they contain over half the planet's species of animals and plants. What do we stand to lose as these forests disappear at a global rate of one acre every second?

In this issue SWARA examines the state of forest conservation in East Africa. In several articles by leading authorities and research scientists our forests are first placed in a global context and then individual forests within East Africa are examined.



Contents



Kibale: an inheritance still preserved.

The Uganda Government has recently created a Nature Reserve within Kibale. This may help ensure the survival of one of East Africa's richest remaining forests.

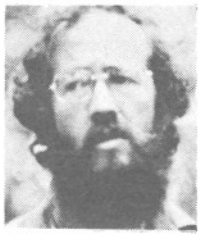
Toxic chemicals and African birds of prey.

In this restrained and factual article Laurence Frank explains how his results prove that danger levels have already been exceeded in many East African birds. Some ornithologists would go further and argue that we should be lobbying for controls on the use of chemicals now.

Authors' Profiles . . .

Dr Tom Struhsaker is an ecologist working for the New York Zoological Society. Based mainly in Kibale Forest, Uganda he travels widely through the tropics working on primate and forest conservation. Lysa Leland, his wife, is a gifted photographer.

Dr Fred Owino has recently been appointed Senior Lecturer in Nairobi University's new Forestry Department. Formerly in the Botany Department he has done research on tree breeding both in the U.S.A. and East Africa. He is Chairman of our Society's Forest Working Group.

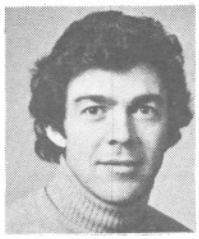


Dr Tony Diamond is a Senior Lecturer in the Zoology Department of Nairobi University. Primarily an ornithologist, he has been studying Kenyan forest birds and their conservation for 3 years. He is Secretary of the Society's Forest Working Group.

Simon Stuart, a research student from Cambridge University, lives at Amani studying the forest birds of Tanzania's Usambara Mountains. He has been partially funded by the East African Wildlife Society. Tessa van der Willigen, an undergraduate from Oxford, has her home in Dar es Salaam and took part in Stuart's recent expedition.

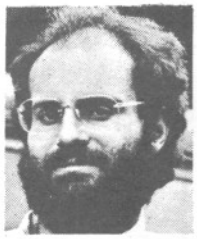
Christine and Vince Fayad from America are research associates of the National Museums of Kenya. Over the past two years they have been doing ecological research in the Nguruman Forest financed partially by themselves and partially by the East African Wild Life Society.

Dr Norman Myers, well known photographer and author of 'The Long African Day' is to publish another book, 'The Sinking Ark', in April this year. His new book deals with the overall problems of disappearing species and the decline of tropical forests. Dr Myers is presently an ecological consultant based in Nairobi.



Timothy Synnott was a District Forest Officer in Uganda from 1965 to 1970 and then spent 3 years studying forest ecology in Budongo Forest. From 1974 he worked on a rain-forest research project at the Commonwealth Forestry Institute, Oxford. He is presently contributing to a UNEP-UNESCO Project on Mount Kulal, Kenya.

Dr Arne Schiøtz is Director of the Danish National Aquarium in Copenhagen. He is a world authority on the amphibia of Africa and is especially interested in tree frogs which he has studied in Tanzania.



Laurence Frank is a graduate student from the University of California, Berkeley. He is currently studying hyaenas in the Masai Mara Game Reserve, Kenya. He previously studied the effect of pesticides on Rift Valley birds of prey.

Editorial & SOCIETY HIGHLIGHTS

The dilemma of trees

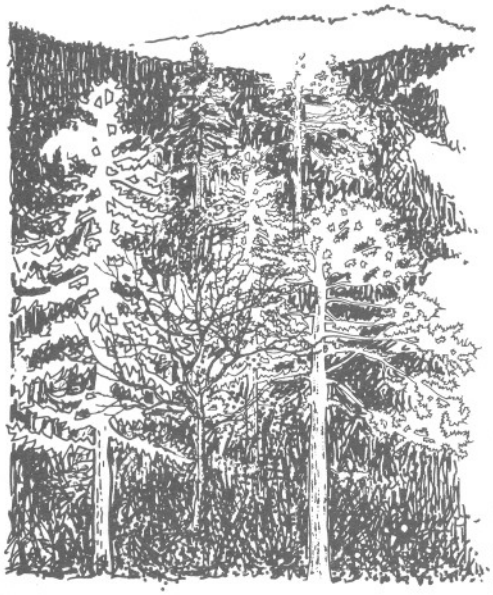
To cut or not to cut? If that were the only question, forest conservation might be a relatively straightforward issue. But of course there is an infinity of demands on tropical forests, mostly pointing in diametric conflict with one another. The infinity stems not least from the fact that, with barely an exception, East Africa's rain forests clothe the most productive land. There are many other things that can be done with that land, not all of them far-sighted. The potential consequences of destroying our forests are dire indeed. But so too are the consequences of not doing so. Two examples will illustrate this dilemma.

As I write this, I am drinking an excellent cup of black coffee. The majority of the coffee grown in Uganda, Kenya and Tanzania is planted on land that was previously covered in forest. The same could be said of tea. These two crops are currently the most important foreign exchange earners in the economies of all three countries. The people of East Africa have visibly benefitted from the substitution of two understory shrubs as monocultures in place of an infinitely complex assembly of species of animals and plants. How could one legitimately complain? Would you willingly forego your tea or coffee?

As you read this, you may notice that, for the first time, this part of the magazine is printed on matt paper. The colour pages continue on glossy Art paper, which is imported, at very great expense (both to the Society and to the country's foreign exchange reserves) from abroad. Spiralling costs force us to economise somewhere on the production of the magazine. Using locally made paper saves us around £500 per issue. A rational economy. But wait: the locally made paper is made at Webuye, in Western Kenya. As the article by Tony Diamond points out, the northern part of the North Nandi forest is being clear-felled to provide pulp for Webuye. North Nandi is one of Kenya's most precious forests and here we are, a conservation organisation, solemnly assisting in its decimation. We are caught, as so often happens in this world, in a tug-of-war between reality and idealism. Reality won.

I am an optimist and an idealist. On Mondays I am a realist. This issue of Swara is devised to have touch a of Friday and Saturday in it, as well as Monday. We cannot possibly hope to describe all the problems of forest conservation in East Africa in one short issue of the magazine. We hope instead to strike a balance between the wonder and fascination offered by the natural history of some of the animals and plants in East Africa's rain forests; and the agonising realities daily facing those forests.

Stephen Cobb,
February, 1979.



* Mr. Richard Leakey, Director of Kenya's National Museums, is well known for his outstanding work on the origin of man. Mr. Leakey is one of the Society's Chairmen and has kindly agreed to act as Honorary Executive Director of the Society for an interim period. This follows the close of Dr. Perez Olindo's term as Director of Conservation. Dr. Olindo's personal commitments, combined with the Society's financial difficulties in employing a person of his calibre on a full time basis, made this decision inevitable. This does however mean that Dr. Olindo rejoins the Council of the Society and members will be pleased to know that we shall continue to benefit from his expertise and personal concern for wildlife conservation.

* This issue of SWARA magazine represents a milestone in the East African Wild Life Society's history. At a recent Council Meeting, it was decided that the magazine would, in future, be published by the Society and so this is the first issues of what is now truly our own magazine. The decision was made for a number of reasons—not the least amongst them being the very late delivery of the second and third issues of SWARA by our previous publishers.

We feel our readers should know that the late delivery of recent issues has concerned the Board of Directors and Council of the Society at least as much as it has yourselves; now that the Society is publishing the magazine delivery dates will be more directly under our control and we certainly intend to overcome these problems in the future.

But more important we intend to produce a magazine which will be the most effective single factor in the Society's conservation activities. We believe that our offices are roughly in the centre of the most important wildlife area in Africa—possibly in the world. Here in East Africa we have a fund of talent working in research and conservation which is of international standard; this area also attracts photographers, film makers, reporters and writers of the highest calibre giving us a floating population of very able people. We hope to continue to tap all these sources—together with our own sometimes underestimated local wildlife lovers and workers—to bring you a magazine which will make you proud of being a member of our Society.

In this issue you will find that we have corrected some of the problems evident in the first few numbers of SWARA. We shall be delighted to have more of your ideas on how we can improve the magazine still further and we shall also be looking for well written articles and oustanding photographs on wildlife and conservation for publication.

If you feel you can help us, please write to The Editor, SWARA Magazine, P.O. Box 20110, Nairobi, Kenya.

* In December, Council decided that in future Swara Magazine would be published directly by the East African Wildlife Society and in January, after advertising and interviewing a number of applicants, Council appointed Mr. David Keith Jones as the new Editor of the Magazine to be fully effective from Volume 2 Number 2.

Dr. Harvey Croze replies to Drs. Laws and Watson.

Sir,

The "old ecologists", bless 'em, are fond of dwelling on the past, be it the quality of life in Kenya or the physiognomy of the vegetation. Yet, underlying Laws' apparently static perception of ecosystems, there is a suggestion he appreciates their dynamics. He stresses that droughts re-occur: of course they do, and have for millenia, and it is not surprising to find that plant and animal populations had developed mechanisms to cope with them, mechanisms of recovery. Of course, browse lasts longer than grass in the dry season; and of course, the dry season, particularly its length, is the critical thing (as it was in the early seventies' drought). With this much of Laws' ecology I agree. As a "new ecologist" I can hardly accept responsibility for what an "E.A. Reporter" said in 1968. However, with a touch of hindsight (as opposed to clairvoyance), and I hope, with a minimum of ecological myopia, I may be allowed to assess the Tsavo situation today and suggest an ecological interpretation of what is happening there.

I maintain that "destruction" in Tsavo has not occurred; that the changes that have occurred are acceptable; and that the management suggested by Laws and his team in the sixties was *not* the result of inferences drawn from ecological first principles and a semi-arid ecosystems data base. The suggested management was typical of a legacy of false reasoning spawned by Aldo Leopold from observations of what is probably a unique herd of red deer in North America. This herd, which appeared to over-eat its habitat, set the tone of uncritical large mammal population predictions for the next thirty years.

Where is the new information, Laws asks, which contributes to our understanding of Tsavo? Well, he has been away now at least a decade, and presumably has missed: Corfield's work on elephant mortality and vegetation structure; van Wyngaarten's work on soils and production; Dunne's on erosion processes; Western's on ecological and behavioural consequences of brain and body size; Cobb's on the Tsavo animal communities; Phillipson *et al.*'s on energetics and biomasses in semi-arid ecosystems; Sinclair's and mine on large mammal population responses to habitat conditions; the result of the IUCN Elephant Specialist Group surveys .... This list is not exhaustive. References supplied on request.

Some general conclusions are: Irreversible habitat destruction does not appear before homeostatic mechanisms begin to temper population growth; what looks to the unaided eye like habitat destruction is in fact reversion to an earlier stage of ecological succession, one which is usually characterised by higher diversity, higher rates of nutrient turnover, more grass and fewer trees; recovery of vegetation and animal populations after drought or starvation is astonishingly quick with no apparent long term reduction in ecosystem biomass, species abundance or species diversity.

Knowing all this now, it is absurd to persist in the argument that we should have shot elephants cleanly and economically to keep them from dying of starvation. There was no way of being reasonably sure of how many to shoot; and there would have been no way of measuring how many would have been "saved".

Admittedly many questions remain to be answered, but at least we can now reasonably doubt that bludgeon management is necessary to "save" either elephants or their habitats. Just look at Tsavo (to adopt Beard's and Laws' tactics of gesturing dramatically to the dead elephant or column of dust): the same amount of materials (minus the minerals exported as ivory) that were circulating in the Tsavo ecosystem a decade ago are still there today. Admittedly the materials are deployed in different proportions and in different forms in the plant and animal communities. We may not even see them. Herds of plains game will not replace the elephants in one or two seasons. But let the ecologist look at the spot where an elephant has died. The materials are there, in the soil, in micro-organisms, to be picked up if it rains by a lush regrowth of grass which can be used by other herbivores. . . That is what is known as ecology, old or new.

Turning to Watson's slick but "humbly" offered paeon to the art of Beard: even I acknowledge Beard's arty talent. But what Watson interprets as fine Swift-like satire, I view as being closer to self-indulgent necromancy. Indeed, Beard has a large audience; so do people who draw gasps by teetering on the rail of the Brooklyn Bridge. They, like Beard, are making a statement about the state of mankind. The perspective is compelling, as is any from which we question the meaning of life and the course of our existence by toying with the foil of death.

It is ridiculous to conclude from my review that I am "against" art, or motherhood (my mother wears tennis shoes); or that I am a reductionist who believes Science has all the Answers.

What I take exception to is this: Message disguised as metaphor; the blatant dishonesty of uncaptioned visual information, such as "the striking picture of bare earth and dead trees" which leads even people like Laws (who should remember better) to false conclusions about what Tsavo is like, about the density of elephant damage, about the generality of the ecological impact, etc., etc. Beard's highly questionable ecological inferences (for that is what they are despite the art of the matter) arise from ignorance and bear witness to a hopeless confusion between the metaphor and the meaning.

Harvey Croze

From Mr. Tony Irwin, Stevenage, England

Sir,

As editor of the last issue of the Society's magazine *Wild Life* in December 1961 and founder editor of its successor, *Africana*, in the spring of 1962, may I congratulate all concerned on the birth of *Swara*.

It was always our belief that both *Wild Life* and *Africana* were the Society's media but in fact the demands of the publishers to meet costs and encourage advertising lost us editorial control and copyright. Indeed we never owned our own publication, even our Christmas cards were not our own and our powers of veto strictly limited.

Although many have good reason to criticise the old order, if only for its naivety, the Society gained much goodwill and financial spin-off from *Africana* and it's good to see no hint of editorial sour grapes in the first issue of *Swara*.

Looking through old copies of *Wild Life*, from its inception in March, 1959 as Kenya's wildlife magazine encompassing the East African scene, leads me to suggest that *Swara* might produce an historical resumé of our Society's early efforts and successes before these get relegated to the WPB.

Continued

Please turn to p9

Letters

Those early issues speak of 'Tourism and our Heritage' and contain articles by such household names as Alan Morehead, Leslie Brown, George Schaller, Allan Root, Gerald Lathbury and Francis Darling. It is also interesting to note that poaching was as much an issue in those days as it has become today.

The loss of the name 'Africana' is of little import. When we thought it up, Africana meant 'Wildlife'; thus Africana meant animals; customs and artefacts were outside our responsibility.

Swara is the natural progression back to *Wildlife* and let's leave the artefacts to *Africana* with our good wishes.

The Old Order has much to be proud of for laying and broadcasting the foundations of the Society upon which the New Order may build. Pray that in its euphoria, the recently appointed Board of Directors will not allow power politics to creep into its deliberations at the expense of its Wildlife.

Tony Irwin.

From Ms. Mavis M. Heath, Kiambu, Kenya

Sir,

I wonder if your readers would be interested in the following observation of mine.

On Monday morning, 15th January, 1979 the gardener on Kacharoba Tea Estate, Kiambu, where I live, brought me a baby African Kite (Milvus migrans) which had just fallen out of the nest. It was fully feathered but obviously had had difficulty if flying. I put it carefully on the lawn in the shade and hoped after it had got over the shock of falling from the nest it would fly away. But it made no attempt to move. Two adult birds came to sit on the very tops of two different trees overlooking the garden and called intermittently to their offspring who did not respond in any way whatsoever. After an hour or so we decided the babe needed some water. I therefore brought it some in a thick plastic shallow bowl. At first he bit the edge of the bowl but when I tipped it up and the water came onto its beak the young kite swallowed thirstily.

My daughter and I both took turns to give the bird water at odd intervals throughout the day. The only sign of life it made was occasionally to stand erect and spend a penny shooting the water in a stream out backwards. We were worried as the sun began to set, what we would do with the bird at night; but the Kite solved the problem for us by suddenly taking wing almost at dusk, flying to a nearby tree and settling in a low branch. The adult birds called continuously from the topmost branch of the same tree. The next morning the immature bird had vanished and we hoped had joined its parents winging their way across the sky.

Mavis M. Heath.

From Mr S.P. Downey of Langata, Kenya.

Sir,

After reading J Kenyon's biased letter exaggerating the evils of wild life, I am left wondering why he farms in Kenya. Surely he would be happier in a country where the incidence of wild life is minimal?

I do not suggest that farmers in some areas have no case, especially crop farmers—but a little more tolerance than that expressed in the letter under discussion would help opposing views to become more reconciled.

Your correspondent makes no attempt to hide his anti-wild life sentiments. Wild animals, if we were to accept his opinion are not only the destroyers of grazing, but the cause of every ill. He even accuses giraffe of "eating their heads off", though as the rest of us know, giraffe are browsers, not grazers. Perhaps he has *trampling* of grazing in mind. If so, a walk behind his herds would show where most of the the blame for that lies.

In early years wild life played an important part in making Kenya known to the world, thereby assisting us towards the prosperity which our country now enjoys. Kenya's wild animals are part of her heritage and surely have a *right* to live. They are also an *asset* as is emphasised in a statement by the Minister wherein he mentions that they augment the economy to the tune of £50 million annually through tourists who come to see and enjoy them.

Your correspondent has suggested boosting the economy from the sale of animals killed. A trophy is only of interest to the owner, but a live animal can be of interest to thousands.

The Nanyuki district is one of the few areas left in Kenya with a fair abundance of wild life. I applaud those ranchers who not only tolerate animals on their land, but who also do all they can to preserve them as a permanent attraction. These people are proving that ranching together with wild life can be compatible, given tolerance and goodwill.

S.P. Downey.

From Mr. Ned St. John, Ohio, U.S.A.

Sir,

I would like to comment on "Operation Zebra" reported in the September-October issue of *Swara*. I also read the article by John Reader in *Smithsonian*. While I'm sure Messrs. Hunt and Goss have their hearts in the right place, they should remember to use their heads as well.

I cannot imagine two knowledgeable men who profess to love the wildlife of Kenya would even consider obviously pregnant females for capture. This seems to be a clear case of the cure being worse than the disease.

Ned St. John.

Toxic Chemicals and African Birds of Prey

Laurence G. Frank

In this restrained and factual article Laurence Frank explains how his results prove that danger levels have already been exceeded in many East African birds. Some ornithologists would go further and argue that we should be lobbying for controls on the use of chemicals now.

After the second world war some populations of predatory birds declined precipitously. In the best known cases the peregrine falcon disappeared completely from most of Western Europe and eastern North America whilst the breeding of the brown pelican virtually ceased in coastal California and Florida. Many other species which prey on birds or feed on fish also declined throughout the Northern Hemisphere.

In her famous book, 'Silent Spring', Rachel Carson was the first to publicise the possibility that man's use of artificial insecticides may be poisoning birds and other wildlife.

By the late sixties the evidence was incontestible: DDT, dieldrin and chemically similar compounds (Organochlorides or OCs) seriously interfere with egg laying and parental behaviour of birds, even at minute dosages. The most common OC-induced problem is egg-shell thinning and consequent egg breakage. This normally occurs amongst the long food chain predators who 'inherit' the full pesticide load of all the living creatures which have gone to make up their diet.

After a great deal of controversy the United States and many European countries banned the use of most organochlorides on their own lands. The chemical companies, however, were not prevented from manufacturing pesticides and exporting them to the rest of the world. After all, these compounds are extremely useful in the fight against agricultural pests and disease-bearing insects. They are cheaper than other less harmful chemicals and so are particularly attractive in developing countries.

Everyone who has been to East Africa is aware of the magnificent diversity and abundance of birds of prey in this part of the world—an hour's drive through the Rift Valley may produce more raptors than a day's drive through the American West, or a week's in Britain or Western Europe. I had been over-awed by the wealth of bird life when I came here as a tourist in 1967, and in 1971 I returned as a scientist, supported by a grant from the Thomas J. Watson Foundation of the United States, in an attempt to assess the threat of OCs to East African hawks, eagles, falcons and vultures. We knew that large amounts of DDT and dieldrin were being used in agriculture (cotton and coffee in particular are heavily treated) and in mosquito abatement programmes, whilst toxaphene is widely used in cattle dips.

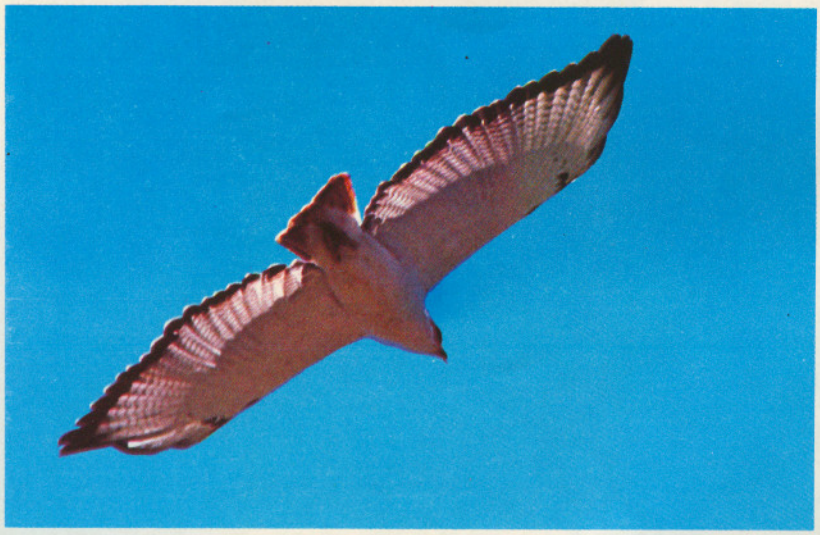
Previously there had been only two surveys of pesticides in the East African environment: both showed very low levels of contamination. The first, by two Swedish scientists, sampled a variety of birds in Tanzania, in an effort to discover if the decline in European migrant birds may have been caused by pesticides picked up whilst wintering in Africa. The second was by Kenya's John Hopcraft and Leslie Brown, in co-operation with Dr. J. Lincer of Cornell University. They sampled all trophic levels in Lakes Naivasha, Nakuru and Baringo, reasoning that, if there were pesticide problems in Kenya, they would surely show up in Nakuru and Naivasha. Both are basin lakes with no outlets, surrounded by agriculture. Any pesticides used locally would wash into the lakes and wind up in the fish-eating birds, as has happened so commonly in the Northern Hemisphere. Thus the finding of extremely low levels of both DDT and dieldrin, even in the eggs of pelicans and cormorants, was most encouraging. Since these pesticides were used in considerable quantities around the lakes, it seemed as if they were not getting into the lakes, presumably due to rapid decomposition or transfer into the atmosphere as a result of strong sunlight and high temperatures. (See "All's well (so far) at Lake Naivasha" by Leslie Brown, Africana Vol. 4 No.8, 1971). However, neither of these studies involved birds of prey, the ones I was most concerned about.

At the start of my research I had two main problems; first I had to obtain tissue samples from a wide variety of birds, particularly the most susceptible species such as falcons, hawks and fish-eagles. Secondly, I had to arrange for the analysis of these samples—a costly business for few laboratories are equipped for the sensitive techniques needed to detect the minute traces of pesticides involved (a count of 2 parts per million can be fatal).

During my study, John Hopcraft of the Nakuru Wildlife Trust, provided me with local lab facilities and half way through the field work I was joined by Rodney Jackson from Bodega Bay

This beautiful portrait of Pel's Fishing Owl by Rena Fennessy is one of the many lovely illustrations in 'Birds of the African Waterside' by Fennessy and Brown. (See Review on page 38.) Like all birds of prey in East Africa this bird must now be at some risk because of pesticides although fish eaters seem less threatened than meat eaters.

JOHN KARMALI F. R. P. S.



Spraying important cash crops like tea (and coffee) puts toxic chemicals into food chains which channel high concentrations into birds of prey.

STEPHEN COBB

JOHN KARMALI F. R. P. S.

Tawny Eagles (bottom left) often eat carrion—sometimes sharing a lion kill with vultures. This puts them at the end of a long food chain and so at high risk.

PETER DAVEY

Augur Buzzards (top and bottom right) are valuable birds for they feed almost entirely on rodents. If the rodents have previously eaten insects contaminated by pesticides the poisons will not merely be passed on but will be successively concentrated as they move down the food chain. Thus buzzards are more threatened than their prey.

Toxic Chemicals and African Birds of Prey

David Keith Jones

Fish Eagle

Institute of Pollution Ecology in California. The final analysis was carried out in England at Monks Wood Experimental Station—one of the world's finest laboratories for this kind of work.

I determined at the outset that I would not shoot birds to obtain the necessary tissue samples, though that would have been quick and simple. It seemed too contradictory to kill them to see if they might be endangered by man's pollution! Instead, I trapped birds alive and, through a recently developed technique, removed a sliver of breast muscle from the anaesthetised bird for analysis, after which the bird was released unharmed at the site of capture. As proof that the technique was indeed harmless many of the birds I sampled near Nakuru where I lived, I subsequently saw regularly at their old haunts, flying and hunting normally. John Cooper, an English vet at the Veterinary Research Laboratory in Kabete, gave me endless patient assistance and advice on the biopsy technique and bird anaesthesia; I in turn brought him many raptor road casualties for his own studies of raptor medicine and pathology. These traffic victims were another important source of data for me, as I could obtain from them samples of internal organs and brain as well as muscle.

As I was primarily interested in the influence of chemicals in agricultural areas, I concentrated my collecting efforts around Nakuru, Naivasha, Nairobi and Kitale. I didn't bother with European migrants as they may have picked up their pesticide loads in their summer quarters. I did however, sample birds in the Northern Frontier District, where no pesticides were being used, as a control against which to compare birds from agricultural areas.

Because of the negative results of the Brown and Hopcraft study, I really did not expect to find much OC contamination in most raptors; if anything, I though that perhaps vultures and tawny eagles might have had residues of toxaphene picked up while scavenging on carcases of cattle that had been dipped.

When the results of analysis were finally available, we had several surprises. First, we had the good news that no birds contained any toxaphene. The second surprise was more disturbing; raptors from agricultural areas did indeed contain DDT and dieldrin, sometimes in high concentrations.

Studies in North America have shown that DDT levels as low as 2ppm in eggs can reduce nesting success in falcons; levels of 20ppm are associated with declining populations. Dieldrin levels as low as 2ppm have been known to kill lanner falcons outright.

Here in Kenya all the bird-eaters which we sampled contained DDT (in concentrations from 1.53-31.2ppm) with one exception; the exception was a lanner falcon from the NFD. Two African goshawks, a species that feeds on other birds, were found dead near Nairobi with concentrations of dieldrin high enough to have killed them.

Although African fish eagles from Lakes Naivasha and Baringo were "clean" those from Lake Nakuru where they feed on flamingoes and other water birds, had up to 7ppm of both DDT and dieldrin.

As would be expected from their shorter food chain, rodent eaters like augur buzzards and owls had generally lower levels (0-2.7ppm of DDT and 0-3.9ppm of dieldrin); but the individual with the highest dose was a tawny eagle from Nakuru with 40ppm of DDT—perhaps picked up when it fed on rodents from a heavily treated field or a carcass deliberately laced with DDT to kill hyenas.

These results leave us with an academic puzzle and a deep concern.

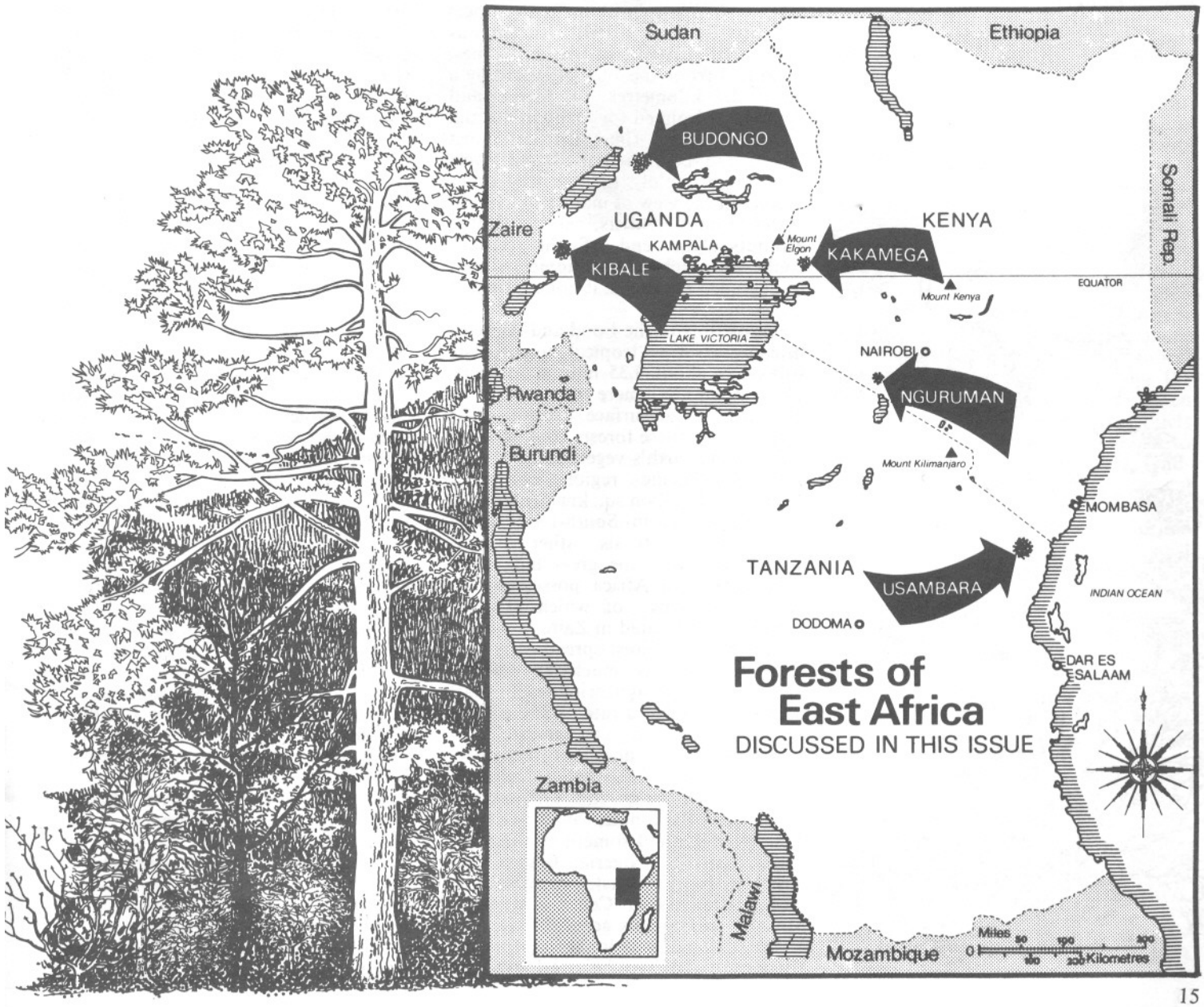
The puzzle is why are the Lakes so "clean" when terrestrial birds have highly dangerous concentrations of pesticide? After all, in Europe and North America, lakes and rivers tend to be more seriously affected by OCs than the neighbouring land; why should East Africa be so different? The answer probably lies in the mechanism suggested earlier—the high levels of temperatures and sunshine experienced in the tropics cause most pesticide molecules to end up in the atmosphere before reaching the lakes.

Clearly, we can already be sure that pesticides are a potential threat to African birdlife; levels in some species are high enough to interfere with reproduction and in some cases even high enough to cause lethal poisoning. We now need careful studies of nesting success in the most susceptible species, the bird-eating falcons and hawks, to determine if they are reproducing fast enough to maintain populations. The situation of forest hawks is particularly disturbing because they are threatened on two fronts: by pesticides in their food and by loss of habitat from rapid de-afforestation.

Since pesticide use has surely not declined since this study was made, another survey of this sort should be made to see if contamination levels today are the same or higher than they were in the early Seventies. Even better, would be a permanent monitoring programme covering susceptible species throughout East Africa, to detect long-term changes in pesticide levels, coupled with a programme to monitor actual breeding success and population levels. If further study proves that continued use of OCs poses a serious threat to local bird populations, legislation to curb their use should be considered. It would be tragic indeed if the lesson so bitterly learned in other parts of the world had to be repeated here, through the unnecessary decimation of East Africa's magnificent raptor fauna.

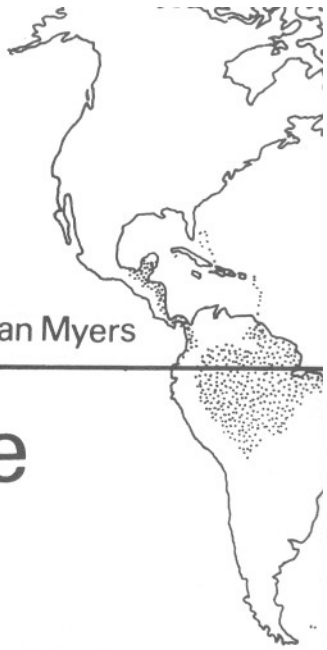
Forest Conservation

In this issue SWARA examines the state of forest conservation in East Africa. In several articles by leading authorities and research scientists our forests are first placed in a global context and then individual forests within East Africa are examined.



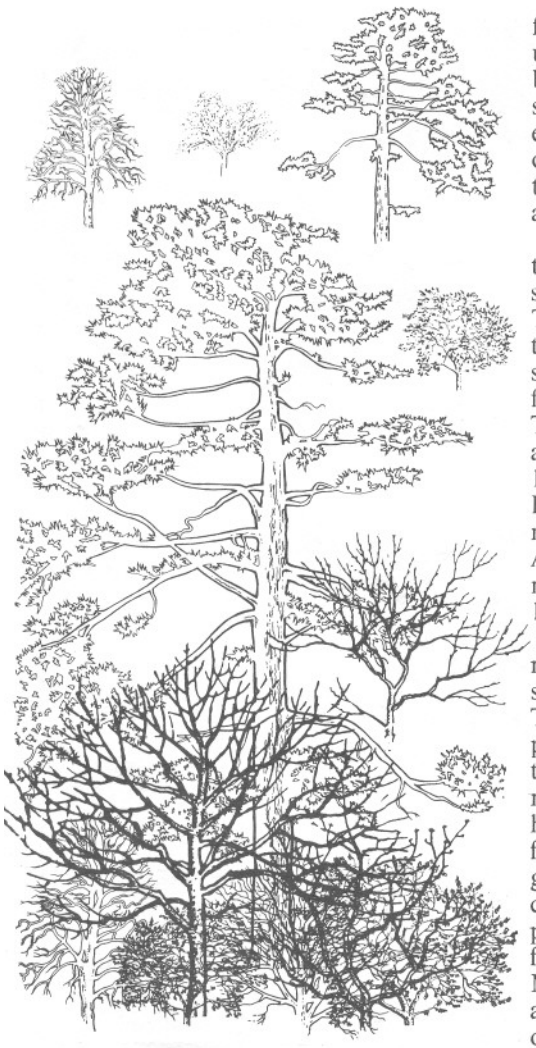
Tropical Forests

Dr. Norman Myers



A treasure house under siege

Tropical forests cover only one twentieth of the earth's land surface yet they contain over half the planet's species of animals and plants. What do we stand to lose as these forests disappear at a global rate of one acre every second?



Tropical moist forests constitute the richest biome (or ecological region) on earth. Their ecological diversity is legend. They could well harbour as many as half of the earth's 5-10 million species.

Yet this biome is less understood than any other on earth. Scientists are only just beginning to unravel some of its complexities. Of the myriad species living in these forests, probably only one sixth have yet been identified. We now know more about patches of the moon's surface than we do about many tracts of these forests. In 1972, a tribe was discovered in forests of the Philippines, separated from the outside world by a mere 25 kilometres of forest and apparently isolated for many millennia.

At the same time, tropical moist forests are being mis-used and over-used more rapidly than is any other biome. In the view of many observers—switched-on scientists, not "wildlife eco-nuts"—the end of the century could see much of the biome reduced to degraded remnants, if not eliminated altogether.

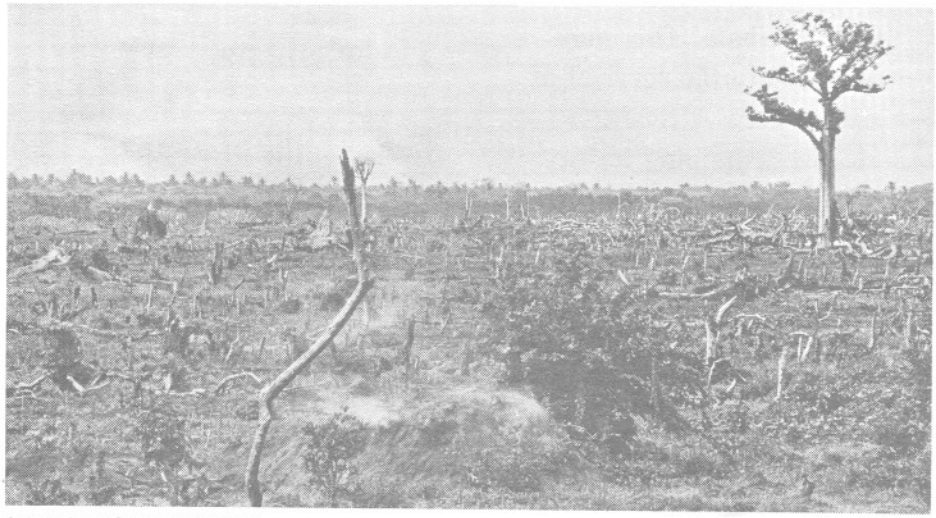
According to the Food and Agriculture Organisation, tropical moist forests still cover about 9.35 million sq. kms. This amounts to a mere one twentieth of the earth's land surface. Despite their small extent, these forests contain four-fifths of the earth's vegetation on land. The Asia/Pacific region comprises around 2.54 million sq. kms. (of which 1.87 million is in South-East Asia); Latin America totals rather over 5 million sq. kms., the great bulk of it Amazonia; and Africa possesses 1.75 million sq. kms., of which at least 1 million are located in Zaire.

Of the total forest spread, it is now reckoned that as much as 150,000 sq. kms. are disappearing each year. This works out at a rate of 25 hectares per minute. But an "average rate", for the entire biome does not really say much in terms of what is actually happening on the ground. The lowland forests of Philippines may well be gone by 1985; and something the same could apply to Nigeria, Ghana and possibly Ivory Coast; likewise the forest remnants in Central America. Most of Indonesia's accessible forests, allocated to multi-national timber corporations, could well be overlogged by the end of the century, or over-run by shifting cultivators. Much the same dismal prognosis holds good for parts of Colombia, Peru and extensive areas of eastern Amazonia in Brazil. In Central Africa, however, where low human densities and an abundance of mineral resources leave far less incentive to convert forests into cash, there could well be large expanses of little disturbed forest surviving by the end of the century; and, because of its remoteness, the same could apply to western Amazonia in Brazil. The overall outcome, then, is likely to be patchy.

This is not to say, of course, that maintenance of tropical moist forests should be considered an absolute end in itself. When these forests are exploited their products generate many benefits, such as foreign-exchange earnings, for the countries concerned—and they could do so on a sustainable-yield basis. Thus, a question of trade-offs arises: safeguarding of forests should be perceived within a context of overall development needs. The central issue is not "let's save forests, whatever the cost". Rather, we should ask whose needs are served by safe guarding forests, and at what cost to whose opportunities for a better life in other ways? In other words, should we seek to maintain forests as an objective in itself, or should we rather do what we can within a framework of trying to enhance long-term human welfare in all manner of ways?

It is not unrealistic to suppose that, within the foreseeable future, the fundamental modification of tropical moist forests could lead to the disappearance of as many as 1 million species. In fact, it is likely that, right now, at least 1 species is disappearing in these forests each day. Before many years go by, we could face a situation where one species becomes extinct each hour.

Extinction of a species represents an irreversible loss of a unique resource. This type of environmental impoverishment differs from other more common types such as pollution. When water-bodies are fouled or the atmosphere is



Arabuko-Sokoke Coast Forest Clearance

David Keith Jones

alongside other kinds of use such as timber exploitation. Throughout the world, people increasingly consume food, take medicines, and employ industrial materials that owe their production to genetic resources and other startpoint materials from animals and plants from tropical moist forests. Given the needs of the future, species can be reckoned among society's most valuable raw materials. Any reduction in the diversity of resources narrows society's scope to respond to new problems and opportunities. To the extent that we cannot be certain what needs may arise in the future, it makes sense to keep our options open. This conservation rationale applies to the earth's endowment of species more than to almost any other category of natural resources.

In fact, the problem of disappearing species could eventually be recognised treated as a garbage bin, we can, if we change our minds about the process, clean up the pollution. But when a species disappears, it is gone for good. And all too often, that could turn out to be for bad.

Species offer many utilitarian benefits of immediate use to mankind. These pragmatic purposes enable conservation of species to rank as a form of forest use that merits consideration as one of the great "sleeper-issues" of the late 20th century. It is difficult to visualise a challenge more profound in its implications, yet less appreciated by the general public, than that entailed in the wholesale elimination of species and their genetic resources.

Species are enormously valuable. For example, tropical moist forests contain many wild relatives of modern food crops. These crops, the refined products of genetic engineering, require constant "topping-up" with fresh germ plasm in order to resist new types of diseases and pests, environmental stresses, and the like, as well as to increase productivity and nutritive content. During this century genetic resources from the wild have saved a number of important crops including bananas, sugarcane, cocoa and coffee. To give an idea of economic values involved, groundnuts worldwide have suffered from leaf-spot disease—a problem that proved surmountable only through resistant varieties from wild forms found in the rainforests of Amazonia. The annual value of eliminating the disease is estimated, by the International Crop Research Institute for the Semi-Arid Tropics, at $500 million. Similar large-scale benefits could be documented for rubber, coconut and palm oil.

Tropical moist forests also constitute the earth's main repository of drug-yielding plants. At least 70 percent of all plants known to possess anti-cancer properties, 3,000 species in all, exist in the tropical moist forests. It is on these grounds that the U.S. National Cancer Institute believes that the wide spread elimination of tropical moist forests could represent a serious set back to the anti-cancer campaign.

In addition, tropical moist forests supply material for a category of drugs that is of growing importance—those that serve as contraceptives and abortifacients. The rhizomes of a climbing vine, the Mexican yam, yield virtually the world's entire supply of diosgenin, from which a variety of sex hormone combinations are prepared, including "the pill". By the mid-1970's, the world was using up to 180 tons of diosgenin per year; by 1985, the amounts could rise to as much as 500 tons and by 1995 to 3000 tons, if the contraceptive needs of all women at risk are to be met. Right now, 80 million pills are used each day. Current sales of Mexican yam materials for contraceptive pills amount to $7 million per year; when chemical compounds have been made up, the figure rises to $70 million, and when crosscounter sales for final products are totalled, the figure amounts to $700 million. In view of this end-product turnover in the commercial marketplace, and in view of the fact that the yam has not been persuaded to grow anywhere but in tropical moist forests, the Mexican government decided in 1974 to seize a larger part of the action through jacking up export prices. As a result, one kg. of diosgenin, that cost $11.25 in 1970, cost $152 in 1976.

A third category of products derives from tropical moist forests—specialist materials for industrial use. The range is wide. From South-East Asia's forests alone comes latex, gums, camphor, dammar, resins, dyes and ethereal oils.

One group of industrial products is especially important, oils and lubricants. Many forest plants bear oil-rich seeds, e.g. the Babassu palm, the Seje palm, several species of the *Caryocar* genus, and a number of other trees that grow wild in Amazonia. The Babassu's fruit contain up to 72 percent oil.

Tropical Forests

What would be the loss if East Africa's moist forests disappeared within the foreseeable future, as is predicted by many experienced observers?

Let us briefly consider the prospects for the Arabuko-Sokoke Forest between Mombasa and Malindi. A trifling fraction of what was once a forest extending for hundreds of kilometres along East Africa's coast, it has been reduced to 360 sq. kms. It is the only known home of the Scop's Owl, discovered as recently as 1964, with perhaps 2600-3000 individuals in a range of 1500 sq. kms. The Forest is also the sole home of the Sokoke Pipit and the Clarke's Weaver, whose numbers are unknown. In addition, the forest very likely contains a good number of endemic insects, plants, reptiles and other creatures. So significant to science is the Arabuko-Sokoke Forest that a number of scientists have proposed it for a Biosphere Reserve under the UNESCO plan for a global network of outstanding nature areas. The merit of this view could lie not only in the Arabuko-Sokoke's outstanding scientific value, but in its potential utilitarian benefits. In the Shimba Hills Forest, south of Mombasa, lives a shrub with materials of possible use for anti-cancer drugs. The vine-like *Maytenus buchananii* is considered to be among half a dozen plants that are leading contenders for an anti-cancer breakthrough. After 5 years of research, pharmacologists at the University of Virginia have isolated a compound, Maytansine, from the shrub, and checked its potential: prospects look promising. To produce just 1 gram of Maytansine requires more than 1 tonne (1 million grams) of shrub stems; 2 milligrams of the drug, enough for a single dose, appear as small specks of white powder.

The existence of this localised shrub, together with others that may survive precariously in the Arabuko-Sokoke Forest, raises a further broad issue. If Maytansine in fact offers potential against cancer, the benefits will accrue primarily to developed-world people. Citizens of Kenya, as of most tropical developing countries, generally do not live long enough to contract cancer and other "advanced world" diseases. So if Kenya takes steps to preserve the *Maytenus* shrub, together with other local plant species, it is in effect offering a "resource handout" to the rich nations—a form of foreign aid in reverse. Looking at the problem this way suggests that the developed world could well do much more than at present to assume its share of the expensive conservation campaign needed to safeguard the planet's spectrum of species, not least those found in tropical moist forests.

Kibale
An inheritance still preserved

Dr. Tom Struhsaker & Lysa Leland

The Uganda Government has recently created a Nature Reserve within Kibale. This may help ensure the survival of one of East Africa's richest remaining forests.

> "The forest is a peculiar organism of unlimited kindness and benevolence that makes no demands for its sustenance and extends generously the products of its life activity; it affords protection to all beings, offering shade even to the axeman who destroys it."
>
> Gautama Buddha

One of the greatest tragedies of our century is the irreversible decimation of the tropical rain forest. Pick any tropical country and the story is the same. Rapidly increasing human populations in these countries require more land for subsistence agriculture, more wood for fuel and more timber for construction. Insatiable escalating demands for timber by European countries, N. America, China, Japan and Australia lead to even more massive destruction of rain forests.

Uganda is no different from the majority of tropical countries in its problems of management and conservation of forests. Although not so poorly off as Kenya and Tanzania, it has less remaining natural forest than most countries straddling the Equator. Natural forests on public land are essentially gone, except for a few minute patches of a square kilometre or two, and these specks are destined for extinction in the next few years. Remnants of natural rain forest are now found almost exclusively in government forest reserves administered by the Uganda Forest Department. These reserves represent only about 8% of the country's total land surface and not all mature forest at that, for they include much grassland, swamp and scrub bush as well.

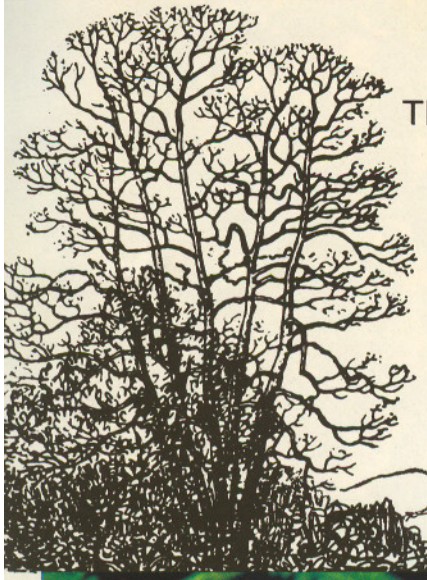
The majority of these reserves are not totally protected from human exploitation. In fact, most are managed to maximize timber production. These forests are selectively felled on a rotation basis with 70 to 80 years between each cycle. Commercially desirable trees of at least 40 cms. diameter are harvested and processed by the Uganda Wood Industries Corporation which is government owned. This rotation cycle presumably allows sufficient time for the remaining young trees to regenerate, grow and reproduce before the next felling. In some areas, even more tree cover has been removed with the poisoning of economically "undesirable" trees, in an attempt to reduce competition with the more desirable species. Ironically, many of the trees considered undesirable and destroyed in the past, have, in recent years been reclassified as valuable timber species.

Besides the legal selective exploitation carried out by the Forestry Department, these forest reserves are exposed to a variety of illegal violations, including: agricultural encroachment by squatters (for example, 187 km² of the southern third of the Kibale Forest is

Please turn to p 23

DAVID KEITH JONES

A Stream in the mountain forest on Kilimanjaro.



THE Forest....
Guardian of a Million Species

Top left: Mating stick insects.

Bottom left: Salimis temora, *a beautiful butterfly of Kibale forest.*

Key to the i

Bottom centre rig which in turn supp

Bottom centre left: (Leptopelis parkeri) *forest; never previou*

TOM STRUHSAKER

TOM STRUHSAKER

ARNE SCHIØTZ

ARNE SCHIØTZ

Top right: Minute tree-frog (Hyperolius) *from the Usambaras, not yet identified by scientists.*

ustrations . . .

Trees support fungi
t snails.

y red-eyed tree frogs
ating in the Usambara
photographed.

Centre right: Jameson's Wattle-eye, only found in Kenya in Kakamega and Nandi Forests.

Bottom right: Equatorial Akalat, another rare Kakamega bird.

TOM STRUHSAKER

ERIC HOSKING F.R.P.S.

ERIC HOSKING F.R.P.S.

FRANTS HARTMANN F.R.P.S.

Kibale

being consumed by encroachment); timber theft; illegal charcoal industries; and poaching of wild life, including antelopes, pigs, buffalo and elephant.

The intent of this article, however, is not to dwell on the obvious desecrations of the tropical rain forest in Uganda, but rather to describe a unique nature reserve which provides a glimmer of hope for the conservation of these forests.

This newly established nature reserve lies in the heart of the Kibale Forest of western Uganda near the legendary foothills of the Ruwenzoris, the Mountains of the Moon. Comprising 60 km². (or some 11% of the entire Kibale Forest Reserve), it is protected against all forms of human exploitation. Only 60% of the nature reserve is tall, mature forest, with the rest consisting of swamps, grassland and scrub bush. This vegetation mosaic results in a great variety of plant and animal species.

Kibale is a medium altitude forest (1,100-1,600 metres) and lies part way in its vegetation type, between lowland and montane rain forest. The largest trees attain heights of up to 45 metres and are often festooned with a variety of epiphytes, including beard lichens, elephant-ear ferns, horse-tongue ferns, mosses and orchids. More than 250 species of woody plants thrive in Kibale.

The climate on the Equator, at this altitude, is mild and pleasant. The forest canopy acts as a protective roof, maintaining a more stable temperature than in the surrounding open areas which are exposed to brilliant sunlight during the day, followed by the coolness of clear nights. The annual rainfall of Kibale is considerably lower than most tropical rain forests: only about 150 cms. per year as opposed to 250-500 cms. in the forests of, for instance, Cameroon. Although malaria is present, mosquitoes and other noxious, biting insects are relatively few. In other words, Kibale is a rather pleasant place in which to work.

The focus of our attention in the Kibale Forest where we have lived during the past 8½ years, has been the behaviour and ecology of primates. With eleven species, Kibale is one of the two richest forests for primates in East Africa and among the very richest in the entire world. (The other is Semliki, also in western Uganda).

A major advantage of studying primates in Kibale is that the indigenous people do not eat them. With few cultural exceptions, the habit of monkey and chimp-eating still persists across tropical Africa, from Senegal to the Semliki Forest and the Ruwenzori Mountains of western Uganda. Kibale is just to the east of this zone. Direct observation of free-living primates is virtually impossible if they are subjected to any kind of harassment. Thus, the traditional protection of primates from hunting, combined with the wide variety of species, makes the Kibale Forest an exceptional place for primate field studies.

Most of our time has concentrated on the race and endangered red colobus monkey, a species which is unable to live outside its natural forest habitat, even in captivity. The Kibale Forest is the last refuge for the only viable population remaining in Uganda. Fortunately, with the recent establishment of the nature reserve, the survival of this intriguing species seems reasonably assured.

Other primates in Kibale, which have been studied either by ourselves or colleagues, are the black and white colobus, the red-tailed monkey, the blue monkey, the grey-cheeked mangabey and the chimpanzee. The elusive l'Hoest's monkeys and wide-ranging olive baboons have not yet been studied, nor have the nocturnal prosimians: the potto and two species of bushbabies. All these species, except for the baboon, are exclusively forest-adapted and not found outside the rain forest.

In terms of conservation, some of the more important findings of our studies concern the adverse effects of selective timber felling on primate numbers. By removing trees for timber and poisoning "undesirable" species, many food sources for primates and other animals are removed as well. It is not surprising then, that such exploitation leads to a decline in numbers of primates, making this nature reserve all the more vital. Although the reserve on its own may be too small to maintain viable populations of mangabeys and chimpanzees which occur in naturally low densities, it is possible that populations of these two species will be sustained by movement of individuals back and forth between the nature reserve and the surrounding buffer zone of selectively exploited forest.

Naturally, a profusion of other mammals besides primates are also protected in this area. Among them are: antelopes, such as the red and blue duikers, with bushbuck and waterbuck more commonly found in the grassland areas; bushpigs and giant forest hogs, with an occasional warthog spotted in the grasslands; the rarely seen pangolins; otters, servals, genets, civets and five species of mongoose; and the more widely ranging elephant and buffalo which will at least find temporary refuge in the reserve. Very occasional sightings of the rare golden cat suggest that the reserve may assist the survival of this little known carnivore.

Red-tailed Monkey, Kibale Forest, Uganda.
TOM STRUHSAKER LYSA LELAND

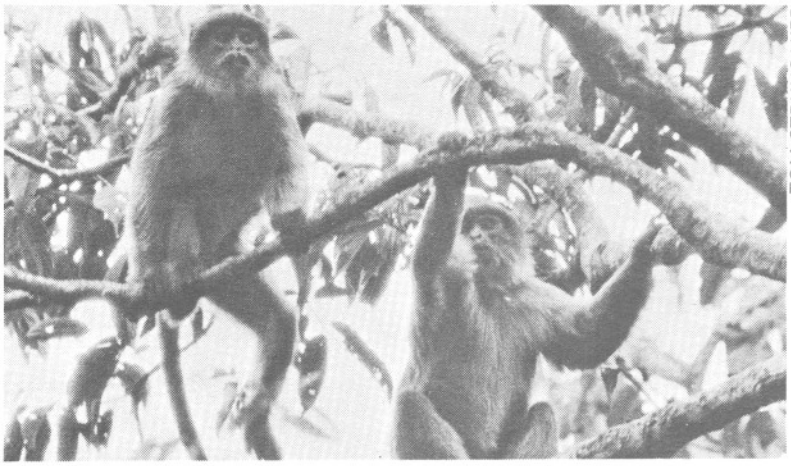
David Keith Jones

Bushbuck

No less than 276 species of birds are found in the Kibale Forest Reserve, including the giant blue turaco, the black-billed turaco, the grey parrot, the raucous black and white casqued hornbill and the awesome crowned hawk eagle which is the prime predator of monkeys. The nature reserve also constitutes an important reservoir of insects and reptiles. Butterflies, including the largest in Africa, the African Giant Swallowtail, are found in colourful profusion throughout most of the year, especially along forest trails. The enormous goliath beetle, as well as other innumerable, bizarre and fascinating insects are found in the area. Contrary to the usual concept of rain forests which conjure up visions of lethal snakes surreptitiously draped about all the vegetation, one rarely encounters them in Kibale, although mambas, cobras, vipers and pythons do occur there.

The Kibale Forest Nature Reserve acts not only as a rich biological refuge of indigenous plant and animal species, but as an essential and vital ecosystem serving mankind daily in a variety of ways. For instance, undisturbed rain forests function as watersheds (water catchments), protect the soil against erosion and flooding, enhance rainfall and stabilise the climate.

Furthermore, in a more subtle but no less vital role, protected areas act as reservoirs of genetic variability, plant seeds, pollinators and seed dispersal agents. The concept of a genetic bank or reservoir is one of the most important, yet least understood, functions of rain forests. By conserving large areas of undisturbed rain forest, we are conserving an enormous amount of genetic material in the form of thousands of different species, ranging from the soil microbes and insects to giant forest trees. Add to this the genetic diversity existing *within* the populations of each species in the forest—and you have a veritable fortune—a fortune which is usually unrealised, but which none the less leaves open a multitude of options for mankind's development and well-being, such as in medicines, pest control, fuel, industrial material and foods. Destroy this bank, and you destroy all the options it affords in the form of irreplaceable genetic variability.



TOM STRUHSAKER

Red Colobus Monkeys

The role of undisturbed rain forest as a reservoir of seeds is obvious, but, when compared with temperate forests, it is even more crucial because most tropical trees occur at very low densities. To quote A.P. Richards in *The Tropical Rain Forest* (1952): "In a European or North American forest the dominant trees belong to a few, or often only a single, species; in extreme cases the forest may consist of twenty to twenty-five species .... In the Tropical Rain Forest there are seldom less than forty species of trees over 4 in. (10 cm.) diameter per hectare and sometimes over a hundred species". It is not uncommon that some upper canopy tree species have only two or three adults per square kilometre. The importance of seed reserves becomes paramount when one realises that many of the forest plants do not reproduce every year—some produce seeds only once every ten years—or longer! Furthermore, seed destruction by insect and rodent predation takes an enormous toll and very few seeds from any one crop survive even to the juvenile stage, much less, become reproductively mature.

The principal means of pollination and seed dispersal in trees of the tropical forest also differs from that of the temperate forest. While the latter relies primarily on wind, the former relies on animals. Insects, birds and bats are the common pollinators (many of them tree-specific) of tropical rain forest trees, while monkeys, chimps, elephants, bats and birds are the chief agents for carrying off the seeds, often distributing them several kilometres from the parent tree. This is important not only for colonization, but also for survival: it has been shown that seeds falling in large numbers beneath the parent trees are usually destroyed by insects and rodents. Protected and undisturbed habitat will help ensure the survival of these animals which play such a necessary part in the forest ecosystem.

These reservoirs of seeds, pollinators and seed dispersal agents sustain not only the nature reserves, but can also enhance regeneration of surrounding areas, especially parts of the forest which have been selectively felled, and therefore may have lost these essential elements of regeneration. In other words, the reservoir feeds these vital elements into the exploited forest, thereby facilitating the slow and complex process of regrowing a new rain forest and permitting man to harvest yet another crop.

Undisturbed rain forest reserves also harbour and conserve organisms which can control insect pests and diseases harmful to plants utilised by *Homo sapiens*. For example, a study in Ghana suggests that populations of forest insects may be controlled by fungi (moulds). The relatively constant, cool and moist climate of the forest floor is conducive to the growth of fungi. These fungi produce spores which infect insects, ultimately leading to their death and preventing the build-up of any one insect species to the proportions of an outbreak. When the forest is disturbed through the removal of trees, the microclimate on the forest floor changes. Since there is less canopy cover, the temperature and humidity fluctuate more widely during the course of the day and thus adversely affect the growth of fungi. Consequently, without this natural population control, insect numbers increase and outbreaks occur, to the detriment of forest flora and even surrounding cropland. With more research it is expected that other examples of this kind of population control will be found. Disturb the delicate balance of the rain forest ecosystem, which has taken thousands of years to develop, and such options are lost.

What are the effects of man's destruction of the natural environment? The only way we can measure changes is to maintain relatively large, inviolate areas of natural habitat which will provide us with a scientific ruler or standard against which we can compare the effects of man's activities on the surrounding land. For example, what impact do tea estates or any other kind of agriculture have on the hydrology, soil conservation, pest populations and microclimate? Studies comparing forest nature reserves with nearby areas being exploited by man will allow an evaluation of his impact on the environment. Nature reserves will also allow options for reafforestation if these studies prove it to be necessary.

"But most of all, the jungle is a place of mystery and beauty. To visit the rain forest is to be overwhelmed by the variety and complexity of a unique living world of nature that has flourished for millions of years. Why save the jungle? Come with an observant eye and the question will answer itself". (P.W. Richards in *The Life of the Jungle*, 1970).

The importance of undisturbed reserves for rain forests as tourist attractions has not been adequately explored in Africa. Tourism in East Africa is usually equated with a 10 day wonder spin through the savannah parks, with the attempt to see as many of the "big five" as quickly as possible and to obtain a prize-winning photo of each, even at the expense of the animal's tranquility. Albert Einstein once said, "The most beautiful experience we can have, is the mysterious." Although he probably did not have rain forests in mind, there is certainly a strong appeal in that cool, dark and mercurial atmosphere where ears, at first, are usually more useful than eyes in detecting the presence of its inhabitants. A twig snapping, a rustle of leaves overhead, a shrill cry, a low grunt—yet the source is not seen. On foot, one becomes more acutely aware of one's surroundings than while cramped in a whining metal minibus. The rain forest *is* subtle, but within its 50 metre tall grandeur, to the tourist who has sufficient patience and a streak of the naturalist, there is infinite variety and attraction worth visiting again and again.

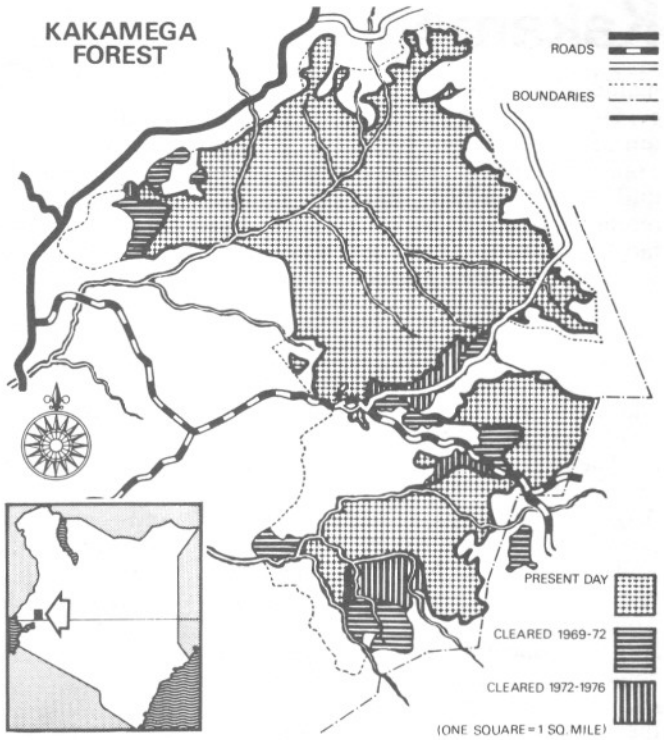
The Kibale Forest Nature Reserve thus provides a wide variety of services and has the potential to provide even more. As with all conservation areas, however, it is exposed to the omnipresent threats of destruction, especially in the form of poaching, timber theft and illegal agricultural encroachment. The immediate success of this nature reserve depends on the development of an efficient guard system and effective law enforcement. Its long-term survival rests with educating the populace about the many irreplaceable advantages of undisturbed forests.

The Uganda Forest Department is to be congratulated for establishing the Kibale Forest Nature Reserve and should be given every possible encouragement in maintaining the integrity of this unique biological treasure. It is hoped that this admirable example will be extended to all rain forest reserves in Uganda and that other African countries will follow suit by conserving large blocks of their undisturbed rain forests.

Kakamega

Is there a way to stop the rot?

In Kenya, as elsewhere, the boundaries of Forest Reserves may theoretically only be changed by law. But in practice the boundaries of the natural forests within the Reserves are being changed daily, by axes, pangas, bulldozers and matches.



Dr. Tony Diamond

A map of Africa shows the rain forests to be almost absent from Kenya and Tanzania. A more detailed map shows that there are small patches of forest dotted through these countries and also Uganda. Three of these are found close together in Western Kenya: Kakamega, North Nandi and South Nandi, until recently one continuous forest.

A map of suitably large scale would show us that all these three forests are gazetted Forest Reserves, and that they are of reasonably comforting size; Kakamega 238 square kilometres, South Nandi 200 square kilometres, and North Nandi 115 square kilometres; and Forest Department records, if not the map, would further reassure us that there were no less than three Nature Reserves in the Kakamega Forest and another in the North Nandi. We might reasonably infer that this precious resource, unique in Kenya, is therefore adequately protected against the ravages of man.

We would be wrong. Like the atlas that suggested lowland rain forest did not reach east to Kenya, the maps and records that show it to be not only there, but alive and well, are misleading. Maps delimit, and Forest Department files record, not the area of forest but that of gazetted Forest Reserve, which changes only by statute; the Reserve may remain intact in law and on the map while the forest within it is destroyed, and this is what is happening to these forests.

The value of Kakamega Forest to Kenya has been evident to many people for a long time. The Kakamega Forest Reserve covers about 238 square kilometres; if you ask the Forest Department the area of the Kakamega Forest, that is the figure they will give you. But aerial photographs say otherwise; those of 1969 show 140 square kilometres of indigenous forest within the Reserve, those of 1972 show 129 square kilometres, and my own aerial survey of the forest in November, 1976 found 115 square kilometres of indigenous forest. The forest therefore covers less than half the area suggested by official figures. This rate of clearance averages 3.6 square kilometres per year; if it were to continue at that rate, the remaining forest would be cleared by the year 2008. There are other ways of playing with these few figures, some of which suggest a faster rate of depletion, some slightly slower; but a projected lifetime for the forest of 30 years is surely alarming enough to prove the point that this forest is gravely threatened.

Kakamega Forest has received more publicity than either of the Nandi Forests; how do their depletion rates compare? Using remote sensing (satellite photography) it is possible to measure the rate of clear-felling in both these forests over a time-span similar to that available for Kakamega Forest. The Society's Forest Working Group figures (see p. 27) show the plight of these forests to be even more chilling than Kakamega; estimated 'total clearance' times of between 18 and 30 years. The figure for North Nandi, bad as it is, is a projection of past depletion rates and does not take into account the plan to clear-fell the northern one third of the forest for plantations to serve Webuye paper mill.


Stephen Cobb

Forest Clearance; Kakamega

So, the total area under indigenous forest in each Forest Reserve is declining fast; what of the Nature Reserves? Kakamega Forest has three; the Forest Station N.R. (3.1 square kilometres much of which is open grassland, not forest), Yala River (5.4 square kilometres) and (outside the Forest Reserve boundary) Kisere Forest (4.7 square kilometres). Their total area is less than one-tenth of the remaining area of actual indigenous forest, and less than one-twentieth of the total Forest Reserve area; far too small, certainly, to preserve viable populations of many of the species within them. The Kisere Reserve has not been reported on by any biologist; it and the nearby Mlaba Forest have both been wrongly reported as being 'long gone' by two of the reports on Kakamega Forest, though the main Kakamega-Eldoret road passes right through the Mlaba Forest. The Forest Station Reserve, though very close to the Forest Station, is not labelled or demarcated on the ground, and serves as a through-way for cattle being taken to graze in a grassy clearing that forms part of the Nature Reserve, and in which grazing is strictly, but ineffectively, prohibited. It is, however, reasonably well protected against cutting. The Yala River Nature Reserve is inaccessible except on foot at many times of the year, and has a well

Kakamega

maintained cut boundary, but has evidently received no effective protection at all; far from being the 'perfect example of primeval rain forest, tranquil and untouched' described in one recent report, it is actually one of the most disastrously exploited patches of forests it has been my sorrow to visit in Kenya, full of sawpits, monkey traps and snares, choked with the second growth indicative of recent heavy and exploitative felling. As a Nature Reserve it is a disaster, and is surely beyond redemption.

The Nature Reserve in the North Nandi Forest is very new, dating from August, 1978. It is a long thin strip, extending several kilometres north-south along the Nandi Escarpment, overlooking Kakamega Forest; cynics would say it covers the steepest ground (which it does) because the trees there could not be harvested economically. It includes mainly the western slope of the watershed here; the sources of several tributaries of the Yala River are outside it and therefore, are extremely vulnerable to the clear-felling (much of it for charcoal) that is proceeding apace in this forest.

Returning to Kakamega; how much of the forest outside the Nature Reserves is likely to remain intact? By 'intact' I mean here that the general structure and species composition of the forest is preserved; this could be the case even if selective harvesting of commercial trees were allowed, provied this was on a sustained-yield basis. Kakamega Forest is at present managed in four units, apart from the Nature Reserves: Firewood (3 square kilometres), chiefly planted *Eucalyptus sp.;* short rotation exotic softwood plantations (30 square kilometres); long rotation indigenous hardwood plantation (90 square kilometres); and the indigenous forest management unit (125 square kilometres), in which felling of mature, dead and dying trees would continue. The figure of 125 square kilometres to remain under indigenous forest, would be more encouraging if it did not exceed the total area under indigenous forest in 1976 (115 square kilometres). It would also be more encouraging if the selective felling that has been carried out to date had been done more carefully; as it is, for every tree harvested, several are left to rot on the ground, and substantial logging tracks criss-cross the areas exploited.

A new and disturbing development is the decision to plant up all the existing glades of natural grassland within the Forest Reserve with sugar cane, ostensibly to enrich the soil preparatory to planting valuable indigenous hardwoods there. In theory this should not effect standing indigenous forest, but in practice large all-weather roads are necessary to provide access and these are already being built or being driven through the forest itself. There are about 2800 hectares of glade within the Forest Reserve and large areas of these have already been alloted to prominent local figures for planting sugar. There is now a maize store and a farm manager's house inside the Forest Reserve.

It is sad to see the Forest Department bowing not only to the sugar fever that is sweeping Western Kenya but also to the political pressures that lead to a few people taking the fever deep into the heart of the Reserve. The Department intends, most laudably, to plant up all this land with indigenous hardwood after the cane has enriched the soil; but will every grower pack up and leave quietly after his licences expire, leaving his sugar mills to starve?

Why make so much fuss about these three forests? The chief reason is that Kakamega (and to a lesser extent, both Nandi forests) contain many species of both plants and animals that are west or central African in distribution and occur in Kenya *only* at Kakamega. The proportion of species of which this is true varies from group to group, but in those that have been studied (orchids, trees, amphibia, snakes, birds and mammals) between 10 and 20% of the species occurring in Kakamega forest, occur nowhere else in Kenya. The two Nandi forests being up to 1,000 ft. higher in altitude than Kakamega, they contain rather more montane species and fewer of those characteristic of the lowland forest that are found at Kakamega. In fact, the Kakamega-Nandi forest system forms a contuum between two distinct biogeographic regions; the Congo Forest and the East African Highland Forest regions. As such, the importance of these forests transcends even national standards; they are of enormous interest to the African continent as a whole, and it is future generations of Africans throughout the continent who will hold Kenya responsible for the loss of this priceless heritage.

Another crucial reason for conserving these particular forests is that they lie in one of the most densely populated areas of rural Kenya. Pressures on land are as high here as anywhere in the country; to clear these forests would create only a very few shambas, at the expense of destroying water catchments serving a much larger area and a possible source of future income from tourism and the enormous educational uses.

I have criticised the destruction of these forests, but I do not wish my criticisms also to be destructive. What can be done to remedy the situation? It is often said that the first step is to remove forests of such biological importance from the control of the Forest Department, but I would go further than this; it is the country's forest policy as a whole that needs to be changed. The Forest Department has a poor record in the biological conservation of forests, not because it is incompetent or corrupt, but because *conservation is not the job of the Forest Department.* Forest policy is set out in White Paper No. 85 of 1957 (A Forest Policy for Kenya) and in Sessional Paper No. 1 of 1968. Search these documents as you may, and you will not find any instructions to the Forest Department to undertake the conservation of forest as a habitat, or for any purpose other than either water and soil conservation ('protection' forests) or the propagation of commercially valuable timber species. It is therefore the forest policy of the country as a whole, and not the way that policy is carried out by the Forest Department, that is at fault and needs to be changed. This policy remains unchanged since colonial times and, since it deals with one of the nation's most precious and fastest dwindling natural resources, is long overdue for a fundamental overhaul. This can be done only by government at the highest level; if the figures for the rate of forest depletion in western Kenya are typical of the country as a whole, this needs to be given the highest possible priority if any forest at all is to be left to this generation's children. They may be lucky, for change could be on the way. At a meeting in late January, 1979, the Kakamega District Development Committee, evidently unhappy at the Government's policies for their local forest, appealed to the Central Government to ban the felling of trees in their district.

Sugar in the Forest — Stephen Cobb

Towards Forest Conservation

The EAWL Society's Forest Working Group

Fred Owino

The Forest Working Group is one of the many constructive ways in which the East African Wildlife Society endeavours to conserve wildlife and its habitat.

Kenya has less than 3% of its area covered in forests and most of this limited forest base is state-owned and state-managed. About 75% of Kenya's forests occur on the slopes of mountains and constitute catchment areas for the main rivers. The rest of the forests occur outside catchment areas but are vital to the ecological stability of the areas in which they occur. Faced with the facts (i) that only one-third of Kenya gets sufficient rainfall for viable agriculture (ii) that the population of Kenya is growing very rapidly and (iii) that some forests occupy high potential agricultural land, one easily appreciates the present intense farming pressures to eat into forest lands.

Two abatement options are apparent. The pressure from farmers could be halted by stricter governmental surveillance. While the Kenya Forest Department is doing what it can in this regard, it does not (and could not be expected to) have the manpower and the necessary machinery to completely police all the forests. Moreover, being a government department, there is a point at which it must be sensitive to political repercussions. An alternative way out is to create a forest conservation awareness among the populace. This is an option which is more permanent, minimizes political friction and will lead to the conservation of both government gazetted forests and the non-gazetted forests.

Forest conservation awareness can be instilled into people's minds by (i) capitalising on a few extreme cases (Kakamega is a good example) and then hammering the point home or (ii) mounting a continuing search for information and data on the status of Kenya's forest ecosystems and continually using the information obtained to press for the necessary precautionary measures. The latter approach appears more realistic. It is the approach adopted by the Forest Working Group of the East African Wildlife Society which has begun a pilot project in Kenya, prior it is hoped, to funding similar ones in adjacent countries.

Conservation oriented research on Kenyan forests should ideally be under taken by the Research Division of the Kenya Forest Department. However, it is recognised that the Research Division has its hands full with other pressing problems to do with re-afforestation and other matters. The Forest Working Group, through its activities, is determined to move in and fill this gap in forestry research. Our Forest Working Group comprises scientists of diverse specialisations and lovers of nature who not only recognise that something ought to be done urgently about the country's forests, but are prepared to do something about it. The unifying ideal among members of this group is the respect for the forest as a permanent and firmly structured ecosystem whose unwise use is biologically risky. In its activities, the Group is not antagonistic to the relevant government institutions like the Kenya Forest Department. Rather, it regards itself as a partner in research and policy development covering an area which has been neglected in the past.

As its action focus, the Forest Working Group has initiated a project, initially funded by the Society, with the following objectives: (a) to undertake a critical review of all forest communities present in Kenya, paying particular attention to their conservation status; (b) to establish monitoring programmes to follow changes in forest ecosystems in Kenya—using aerial and satellite photography and ground surveys; (c) to do intensive ecological surveys of those forest types most endangered at present; (d) to select and demarcate viable sample areas of plant community types and, if necessary, recommend the creation of new forest nature reserves and forest national parks, or new management of existing ones.

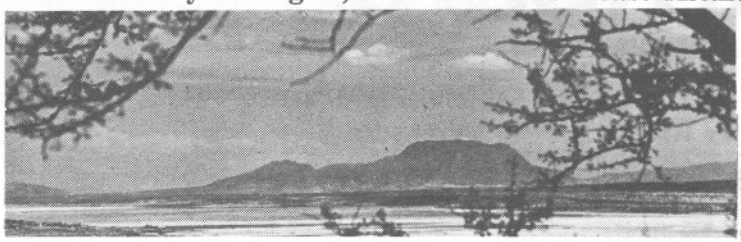
Several members of the Forest Working Group have contributed to this issue of Swara. Tony Diamond describes, in the previous article, the pressing problems facing Kakamega Forest, and makes some serious recommendations for alleviating them, while Christine and Vince Fayad describe Nguruman, a more tranquil spot. The activities of the Group were initiated by the energies of Tom Struksaker, from Uganda. We earnestly hope that the Group can help to improve the status of forest conservation throughout East Africa.

Nguruman

Where the axe has yet to fall

Christine & Vince Fayad

Rising 6000 feet above the hot dry basin of Lake Magadi towers the Nguruman Escarpment. The cool, misty forest that clothes it is one of Kenya's largest, least known and least disturbed forests.



David Keith-Jones

High on the western wall of the Kenya Rift Valley, on the crest of the Nguruman Escarpment, is a montane forest in a nearly natural state—perhaps the only such forest left in Kenya. The forest is neither national park nor nature reserve, yet it remains virtually wild. The Nguruman has, for many years, been held in trusteeship by the Maasai of Narok District, through the Narok County Council. Although use of the surrounding plains is quite intense, the Maasai seem to shun the forest. At the same time that it intimidates the forest seems to have some significance for the Maasai for they keep watch over the activities of any visitors to the forest, with the result that the forest is hardly disturbed by man.

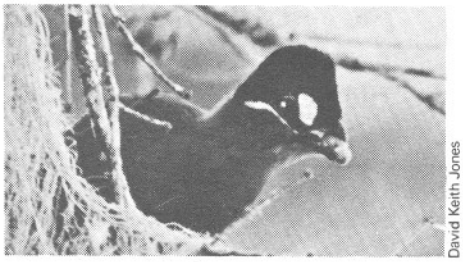
The trees of Nguruman forest are typical of a relatively dry climate, containing a mixture of species of both wet and dry situations. Thick mists and heavy dews are very common in the Nguruman, and undoubtedly contribute to the total moisture available to the plants. The abundance of ferns, orchids and lichen attests to the importance of air-borne moisture in the forest ecosystem.

The actual extent of the forest is approximately 395 square kilometres, but its distribution is patchy. The rugged terrain in part causes this. The valley bottoms are often swampy, while most of the ridges are open grassland, devoid of trees. The sides of the valleys are usually forested, depending upon the steepness of the slope, soil cover and exposure—whether the slope faces to the north, south, east or west.

Nguruman

Another factor in the patchiness of the forest is disturbance of the vegetation by animals. Enormous herds of buffalo, up to 250 in each, have been seen feeding amongst the undergrowth, trampling underfoot more vegetation than they consume. Elephant, too, are numerous, though more often heard than seen. In the wake of the paths of these large animals, three species of nettle, six of hibiscus and innumerable composites, as well as other shrubs, herbs and creepers grow up thickly, as if in retaliation for the destruction wrought by the great beasts. Treefall is quite common, although how much is due to animal activity and how much to over-maturity or mechanical defects of rooting is difficult to determine. Wherever a tree has fallen over in the forest or at its edge, thus creating an opening, a dense tangle of vegetation springs up.

The extensive thickets produced by large mammal activity are an important habitat for smaller mammals, such as the striped mongoose and many rodents and also for birds. The vast majority of birds in the Nguruman occur in the thicket at one time or another. Forest birds en route to the swamp for water often travel under the cover of the thicket between forest and swamp. There is also a group of birds which probably rely primarily on the thicket, from which base they make forays into



David Keith Jones

the other habitats. Many skulkers, like the Abyssinian Ground Thrush, keep to thick vegetation or deep shade. The large mammals therefore perform an important service in creating and maintaining the thicket vegetation.

Some of the smaller animals are more easily seen in the grasslands. Striped mongoose often parade through the grasslands, as do families of warthog, feeding as they go. Pairs and trios of Klipspringer can often be seen on the rocky outcrops. In addition to the small mammals, eland are common in the higher grasslands.

A few hundred feet below the dry grasslands lies the Emungurorkine swamp, with an entirely different set of grasses, as well as sedges, mat-forming herbs and orchids. Within the swamp there are several open ponds and at least one major spring, the source of the Oloibortoto River. From our camp on a hillside overlooking the swamp, other large animals are easily observed as they come to drink at the ponds. Defessa waterbuck are the most frequent visitors, followed by bushbuck, buffalo, Olive baboons, impala, warthogs and Bohor reedbuck, with occasional eland and Coke's hartebeest. The swamp also hosts a huge variety of birds.

Within the forest, the podo, cedar, olive and bersama trees host large populations of Black and White Colobus in their treetops, while fleeting glimpses of Giant Forest Hog are seen in the dense shade of the forest floor. The bird life of the forest is rich and varied. The crimson-winged Hartlaub's Turaco is conspicuous as it glides between the crowns of the tallest trees and utters its raucous call. Red-headed parrots, Narina's Trogon, Olive and Speckled Pigeons, Silver-cheeked and Crowned hornbills, Yellow White-eyes and many birds of prey can be seen and heard in the forest canopy. In the middle layers of the forest foliage are a totally different range of species, including the rare Cassin's Honey Guide, the Grey Cuckoo Shrike, Tambourine and Lemon Doves, Cinnamon-chested Bee-eater, White-starred Bush Robin Chat and Abyssinian Ground Thrush.

Much remains to be learned about the Nguruman ecosystem. From what is already known it is apparent that the Nguruman merits consideration as a protected natural area. There is an abundance of both large and small mammals and birds, in a wide variety of important habitats, in as natural a situation as any found in Kenya today.

The Usambaras

Once gone, lost forever

Compiled from reports by
Arne Schiøtz *Frogs*
Simon Stuart & Tessa van der Willigen *Birds*
Stephen Cobb *Symposium*

The Usambara Mountains lie just inland from Tanga on the Indian Ocean and just south of the Kenya border. They are the last in a line of isolated mountains that just out above the surrounding plains of northern Tanzania: Meru, Kilimanjaro, North Pave, South Pave then West and East Usambara. Stretching south and west from Usambara towards Malawi, are other even more isolated slabs of mountain: Uluguru, Nguru, Usungwe and Rungwe. Every one of these lonely islands is covered in forest. Because of their geological history, their position at the end of the line and the pattern, throughout East Africa, of a climate that has changed over the millennia, the Usambaras are strangely isolated, much more so than you would think by just looking at a map. This isolation has led to an exceedingly high incidence of endemic species (ones that are found there and nowhere else in the world). These include species of trees, shrubs, insects, frogs and mammals. Other groups, such as birds, include species found in only one other place. There is little doubt that the Usambara Mountains are the most important bank of unique genetic material to be found anywhere in the African continent.

In this article we look at some of the unique animals that are to be found in the Usambaras and end by describing an attempt that is being made to halt their accelerating march to extinction. The natural forests of the Usambaras have now more or less contracted to the forest reserve boundaries, and considerable timber exploitation is sometimes even permitted inside the reserves. So the conservation situation for these forests looks rather bleak. Four species of bird are particularly dependant upon the Usambara forests for their survival. One of these, the Dappled Mountain-robin, is a highly distinctive bird with heavy thrush-like blotches on its breast. It lives in dense vegetation near the forest floor, and on the forest floor itself. It occurs at a very low density, and its total population in the Usambaras (it occurs in the East only) may perhaps number around 200 individuals. It has been found 700 miles away in Northern Mozambique, on Namuli Mountain, but this is thought to be another tiny population. The Dappled Mountain-robin is certainly one of the least-known and most threatened birds in Africa.

Another species which is found in the East Usambaras and at one site in northern Mozambique, but nowhere else is the Long-billed Apalis. This is an extra-ordinary bird with no close relatives. The Long-billed Apalis is usually found in very dense vegetation around the forest edge; like the previous species it seems to be very rare, and its world population is unlikely to exceed a few hundred individuals.

The Usambara Alethe is a small forest thrush, dull brown in colour, with an orange spot between the base

STEPHEN COBB

Rising to only 3000 feet but close to the Indian Ocean the Usambara Mountains create frequent rain and support lush forest.

of the bill and the eye, and with long legs. It is entirely restricted to the West Usambaras, where it occurs above 5,500 ft. and, as far as can be told at the moment, only in heavily shaded forest with abundant leaf litter. This is another species with a world population unlikely to be more than a few hundred.

The last of these four particularly threatened endemics is the Usambara Weaver. This is a striking bird with a black back and wings, brown head, yellow spot above the bill, orange chest and yellow belly. It lives in the forest canopy where it works through the vegetation like a tit, commonly hanging upside down on lichen. Its main population is in the West Usambaras, probably in the Shume-Magamba and Shagayu Forest Reserves; a few records also come from the East Usambaras and the Uluguru Mountains, but the numbers in these areas are undoubtedly tiny. It is unlikely that as many as a thousand individuals of this species survive today.

Frogs cannot fly, of course, so you would expect them to be even more isolated than the birds. This is exactly the case. Of the fourteen species of forest frogs found in the Usambaras, four are endemic to this area, while the ten others can be found in the Ulugurus, Uzungwe or Rungwe Mountains, but nowhere else. It means that a whole fauna of frogs is confined to these minute forests. Compare this fauna with the frogs in the much larger rain forests of Uganda, where there is not a single endemic form. All the Uganda forest frogs can be found further west in Zaire. In fact the forested basement hills in Tanzania and especially the Usambaras are the greatest centres of endemism for frogs—as well as for other animal groups—in Africa.

Not only are the frog species not found elsewhere, but there are many unique adaptations in these mountains, for instance the behaviour of tadpoles of *Arthroleptides martiensseni* which, as soon as they have left the eggs, start jumping on wet rock surfaces far from free water using their long muscular tails.

Bufo brauni has a colour pattern resembling a dead leaf casting a black shadow on the forest floor. Even holes in the leaf are mimicked in the pattern. This makes the toads very difficult to see. A similar but quite unrelated species occurs in the forests of Central Africa. Another remarkably camouflaged frog is *Leptopelis uluguruensis*. In a resting position the limbs are close to the body, and the eyes are closed and sunk down in the mouth cavity. In this position the tree frog resembles a decaying leaf with a growth of fungus.

If the forests of Usambaras should disappear it will mean the disappearance of a whole frog fauna comparable in richness to that of the big Cameroun-Zaire-Uganda forest block.

Aware of the outstanding importance of the Usambaras to the conservation of Africa's genetic resources, the organisers of the Fourth East African Wildlife Symposium (Alan Rodgers and Dr. Kathy Bulstrode of Dar es Salaam University) made these mountains a focus of attention. The theme of the Symposium was the Conservation of Ecological Islands. The Symposium itself, held in Arusha, Tanzania, from 11th to 15th December, 1978, attracted 120 biologists and wildlife professionals from a dozen countries.

After three days of working sessions in Arusha, 30 of the Symposium delegates drove the 300 miles to Amani, in the Usambara Mountains, where a further three days were spent. Among the group were some of the world's greatest authorities on Africa's forests, mountain vegetation and also the animals within the forests.

It was concluded by the group (a report saying so has been written for a receptive Tanzanian Government—the Minister for Natural Resources and Tourism, Mr. Solomon ole Saibull, attended much of the Symposium) that the Usambaras are in an exceedingly tenuous position. It was also agreed that they probably constitute one of the major conservation problems in Africa. They are unique and irreplaceable; it should be realised now, before it is too late, that careless destruction of these forests will only serve to shock us into understanding an already unquestionable truth: that once gone, they will be lost forever.

STEPHEN COBB

LYSA LELAND

Some of the plants, animals, insects we stand to lose as forests disappear world-wide at an acre every second.

Top left: An epiphytic fern (Drynaria volkensi) *growing on a fallen tree. Usambara Mountains.*

Top right: This remarkably camouflaged caterpillar (family Nymphalidae) *protects itself from ants with bristly spines (they are not legs). Kibale Forest.*

OLE MARTIN

TOM STRUHSAKER

Centre left: This toad (Bufo browni) *disguises itself as a dead leaf, even to the extent of having 'holes' in its surface. Usambara Mountains.*

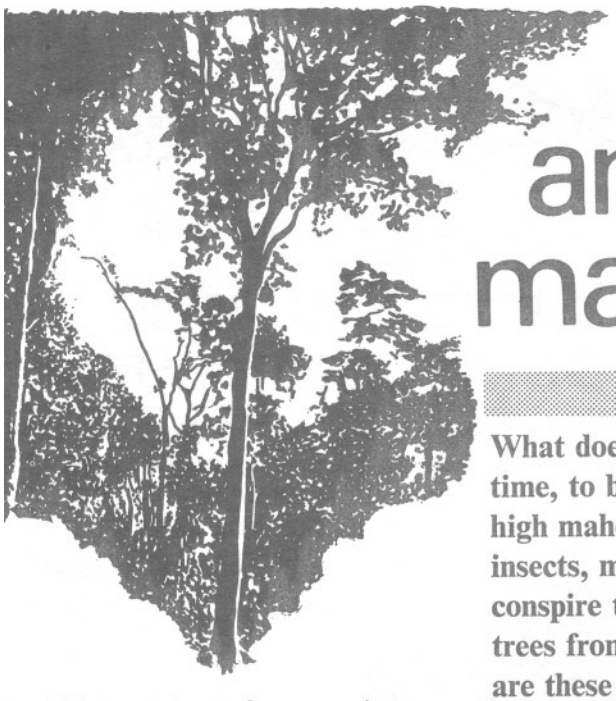
Above right: This blue caterpillar will turn into a moth of the family Limacodidae. *It protects itself with four poisonous spines. Kibale Forest.*

STEPHEN COBB

Bottom left: Even toadstools, growing among the decaying leaf litter, have a function and beauty of their own. Usambara Mountains.

At the beginning of this theme, Norman Myers pointed out what an enormous fraction of the world's species are to be found within the tropical forests. Our authors have presented a balance between the fascinating natural history of animals and plants within East Africa's forests and the appalling threats which they face. We do not believe that we have solved anything for the forests, but perhaps we have opened some eyes. Nor do we feel that the topic is exhausted: the range of natural history topics is as diverse as the myriad plants and animals in the forest; the conservation problems will continue to provide topics for discussion until there is no forest remaining.

Forthcoming issues of Swara will continue to give Forest Conservation the coverage that it deserves.



The ups and downs of a mahogany forest

Dr. Tim Synnott

What does it take, apart from time, to become a 50 metre high mahogany tree? Weather, insects, mice and men all conspire to prevent these mighty trees from growing up. How are these hazards overcome?

Africa can boast few more impressive sights than the giant trees of her rain forests. These trees, reaching 50 metres into the sky, seem as solid and permanent as the Egyptian pyramids. They seem so huge as to be impervious to the problems that affect the lives of smaller organisms below them. Yet the life-span of any of these forest giants is beset with hostilities from all quarters.

The challenges that face a tree population are many. Equally numerous are the ways that the trees have evolved to meet them. For example, there is an enormous variety of chemical defences and strategies for the production and dispersal of flowers, fruits and seeds among closely related leguminous trees. There is a corresponding diversity of beetles, each specially adapted to make use of one or two species. They give the impression of a constant tactical struggle, spread over an evolutionary timescale, in which the trees are continuously developing new chemicals and new strategies of seed production while the beetles adapt their biology to outwit the defences of each new tree variety. The status of all species—the rarest relict endemics, the most aggressive invasive colonisers and the giant emergents and strangling figs—depends on effective strategies which are always vulnerable to new competitors or changes in the environment. The famous mahoganies of Budongo Forest, Uganda, are a good example of an apparently successful but vulnerable and precarious population.

Budongo is relatively small and is surrounded by grassland. It is in a dynamic continuous process of ecological succession, from grassland, through young woodland to mahogany and thence finally to old Ironwood forest. At any one time, different parts of the forest are at different stages of the succession. The process lasts many centuries and encompasses a continual competitive struggle to survive, by all the species.

What are the hazards faced by the individual mahogany plants? As with other forms of life, their greatest dangers and highest mortality occur early in life. Suitable climatic conditions, not yet clearly understood, are required for abundant flowering; continued favourable weather, suitable for pollination and growth, are needed for abundant fruit production. Meanwhile, many animals, from the mahogany shoot-boring moth to chimpanzees, feed on the flowers and young fruits. Even before the ripe fruits open, many of the seeds may have been eaten by the moth larvae. Finally, during one of the dry seasons, the woody capsules open and the winged seeds flutter to the ground.

Even in a generally moist forest like Budongo, the ground is dry in some seasons, and the seeds cannot yet germinate. They must wait, perhaps for several weeks, while ants, insects and especially forest rodents like Climbing Wood Mice and Giant Rats eat all they can of the highly nutritious seeds, rich in fat. Nine seeds out of ten may be eaten within 6 weeks, some surviving protected by the dry season leaf-fall. Fortunately, the seeds retain their viability for several months, and germinate rapidly when sufficient rain falls; the best survivors may grow 10-15 cm. within two months, even in dense forest shade.

However, the rodents continue to take their toll of the soft young seedlings, and soon the forest antelopes, such as bushbuck and duiker, start to account for large numbers of the survivors. Within five years, as few as one in a thousand survive of all the possible offspring of any one season's seedfall. Many are already damaged. These seedlings can sustain only a minute height growth under full forest shade; even if they survive unbrowsed, most are doomed to premature death, probably hastened by a root or foliage fungus, unless a gap exists or develops above them. Those that survive the antelopes must survive browsing and horn-rubbing by buffaloes; and then breakage and a life-long risk of bark damage by elephants. Nevertheless, a healthy population of long-lived trees can be sustained by a single survivor per hectare every decade or two.

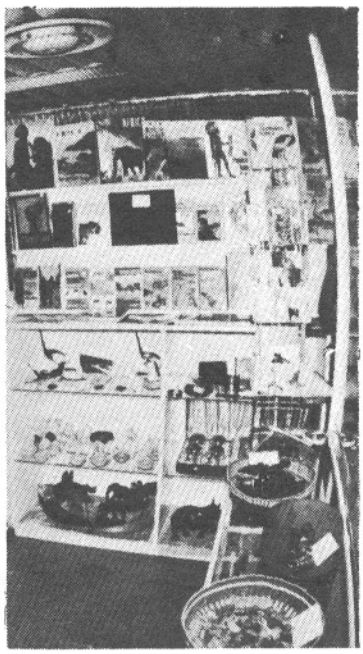
As if all these enemies were not enough, like other valuable and accessible forests, Budongo has been used to supply Uganda's timber requirements, and some exports, for many years. Sawmilling started in the 1920's followed by tree-planting operations. Budongo had a Working Plan by 1933, possibly the earliest in all tropical Africa and the plan has three times been revised. It regulates the rate of logging and prescribes techniques designed to ensure the continued regeneration of mahoganies and other timber trees and the sustained, long-term production of timber for the future, while at the same time maintaining a basically indigenous, if modified, forest community. These forestry operations have at various times included weeding, climber-cutting, line planting of valued trees, poisoning of unwanted trees and all the disturbance of logging and road-building.

The forest has been greatly changed since Kabalega and Baker struggled for authority in Bunyoro in the 1870's, and since Carl Akeley watched elephants there. The populations of all plants and animals have been affected; many have increased, many have declined, and some rare or undiscovered species may have now disappeared. However, most species survive and it seems that mahoganies, young and old, will continue to grow in Budongo, their future assured by their market value.

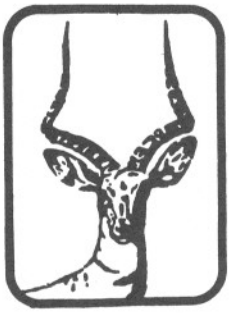
Join us at our Nairobi Hilton Gift Shop!

(We're on the First Floor, North)

There's a wealth of choice items on sale in the Society's Gift Shop and Art Gallery.
Everything from jewellery for the most sophisticated taste to the popular key rings, ties and decals; carvings, batiks and artifacts; prints paintings and sculptures by leading national and international artists; wildlife books, journals and magazines; Christmas cards and calendars.
Original paintings and reproductions by David Shepherd, Guy Coheleach, Ralph Thompson, Talbot Kelly, Iris Darnton, Joy Adamson, Rena Fennessy, Bob Kuhn, Philip Lasz, Kim Brooks etc. Send for brochure/s on Christmas Cards Calendars; Prints; David Shepherd prints; and gift items for sale.



If you can't make it, why not just drop us a line? .....



The EAST AFRICAN
WILDLIFE SOCIETY
P.O. Box 20110,
Nairobi, KENYA

west africa and kenya 79

Africa is now closer than ever

West Africa, only 6½ hours from New York and 7½ hours from Toronto, has history, culture, and superb beaches comparable to any found in Hawaii and the Caribbean and the price is right!!

WEST AFRICA & KENYA 79

- Senegal and The Gambia Tour – 8 days
- Senegal/Niokolo Koba Wildlife Safari – 8 days
- West Africa Adventure – 15 days
- West Africa "On Safari" Special – 15 days
- Camel Safari – 15 days
- Senegal, The Gambia and Morocco Tour – 15 or 20 days
- West Africa Extravaganza – 22 days
- West and East Africa Encounter – 22 days
- Traditional Medicine Tour – 23 days

KENYA/ZAMBIA 79

- Kenya Luxury Safari – 16 days
- Kenya Air Safari – 15 days
- Kenya/Zambia Nature Safari – 22 days
- Kenya/Zambia Adventure Safari – 22 days

- Kenya/Seychelles/Tanzania/Zanzibar – 23 days
- Kenya Luxury Tented Safari – 21 days
- Egypt: A Timeless Land – 17 days
- Red Sea Scuba Diving Tour (Port Sudan) – 2 or 3 weeks
- Zambia/Tanzania/Zanzibar Tour – 19 days

- East African Wildlife Society Safaris – 23 days Kenya/Seychelles/Tanzania
  Membership limited to 20 persons – Fully escorted – Guest lecturers – $100 donation per person participating to the Society.

east african travel consultants inc.
33 bloor st.east, suite 206, toronto, ontario M4W-3H1
tel (416)967-0067 Cables: 'Safaris' Telex: 06-23827

HORIZONS

Compiled by Clare Shorter

KENYA

Equipment comprising part of the World Bank loan to Kenya to combat poaching, arrived in December, 1978: 32 vehicles and 3 aeroplanes fitted with radios should make a real difference to the anti-poaching programme. Two Landrovers, also for use in anti-poaching, have been received from the World Wildlife Fund.

Some successes in the anti-poaching campaign.

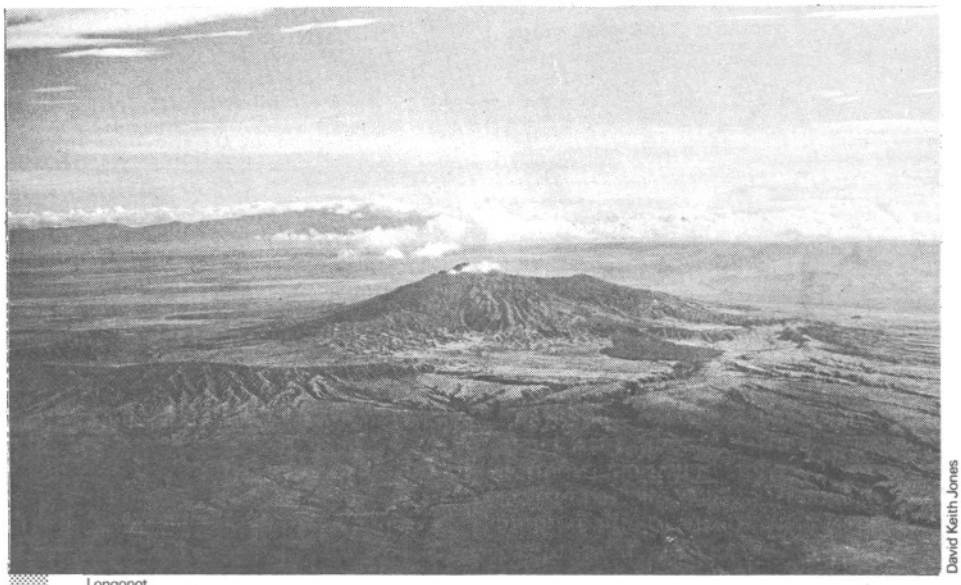
The progress the Kenyan Government has made in combating poaching was the subject of a considerable amount of correspondence in the press, towards the end of 1978. Discussion centred around the amount of poaching taking place, the level of arrests and types of convictions. A second topic which aroused concern was the continuation of the illegal trophy trade and the involvement of tourists.

Almost daily newspaper reports of incidences of poaching or trading of wildlife products, arrests and court cases, are proof of the action being taken by the Government to stop these illegal activities, which threaten Kenya's wildlife. Evidence of the Ministry of Tourism and Wildlife's success is the 507 elephant tusks (complete and pieces of tusk), 36 rifles and 425 bullets recovered, and 116 people arrested for poaching, between February and October, 1978. These frequently quoted figures do not include arrests made in November and December, some of which were considerable, such as: 27 people, a total of 443 elephant tusks and 6 rhino horns. These figures also illustrate the larger scale of some poaching operations, against which the wildlife authorities are fighting. Unfortunately, the well equipped and organised poachers are not always those who are arrested in possession of wildlife trophies.

The Society congratulates the Government on the establishment of the 4 Anti-Poaching Units, created in 1978, and hopes that they will continue to make a marked impact on reducing poaching during 1979. The Unit based at Garissa has arrested many poachers (often Somalis) in the Tsavo National Park and the coastal area. The determination of the Ministry officials to stop poaching is often reaffirmed, and the dedication of the field staff is tested under severe conditions. Sadly, one game ranger was killed by poachers in Tsavo, last November.

Inconsistent and lenient convictions given to poachers and traders of wildlife products have been reported in recent months. One man found in possession of 47 elephant tusks (representing 24 dead elephants) was fined only Shs: 8,000/-, yet the ivory was said to be worth Shs: 64,000/-! In contrast, another man, arrested with one civet skin and one bushbuck skin was sentenced to prison for one year. Mandatory prison sentences, or at least statutory fines, considerably larger than the value of confiscated trophies, feel are necessary to deter offenders we from repeating their crime. The high fines which some offenders pay immediately, suggest that poaching is still a profitable business. For instance, a schoolboy arrested for possessing 9 leopard skins, valued at Shs: 54,000/-, managed to pay a Shs: 30,000/- fine!

Tourists are not always aware that it is illegal to buy wildlife products in Kenya, whichever country the articles are said to come from. Various incidences of tourists found in possesion of ivory or animal skins have resulted in tour operators being requested to inform their clients about this law. However, visitors to Kenya are often approached by traders, in streets and shops, to buy ivory or elephant hair bracelets and are sometimes told that these goods are from Tanzania, where limited hunting is now legal again. Fortunately, some some tourists are helping to protect Kenya's wildlife by refusing to buy these goods. One couple recently wrote to the press to complain of being offered lions' claws and ivory. Perhaps it would be a good idea to make the law forbidding trade in wildlife articles more widely known to tourists, in order to enlist their support in protecting Kenya's rich wildlife heritage.



David Keith Jones

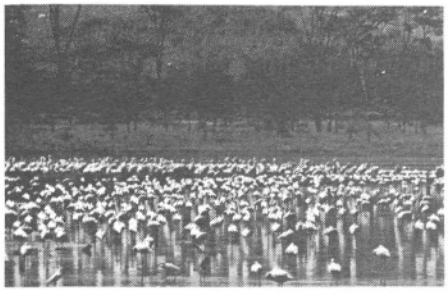
Longonot

New National Park near Lake Naivasha?

The Ministry of Tourism and Wildlife is still negotiating to acquire land for a proposed Hell's Gate/ Longonot National Park, to the south of Lake Naivasha. Hell's Gate is a gorge system with cliffs up to nearly 500ft. and steam jets. Longonot is the volcanic crater, familiar to travellers in the Rift Valley. Zebra, kongoni, lion, giraffe, Thomson's gazelle, Verreaux's eagle and lammergeyer all live in this area of the proposed park.

KENYA

New facilities in the Lake Nakuru National Park.

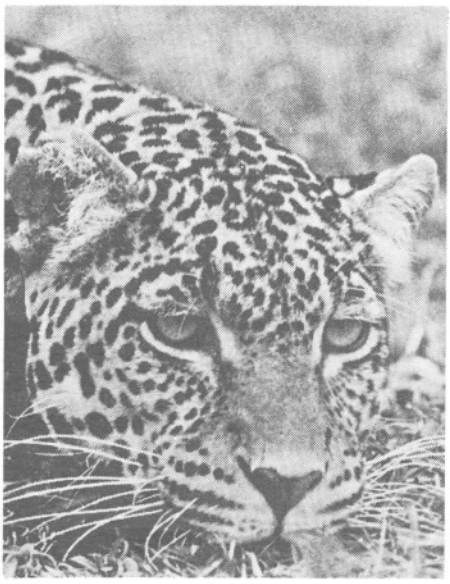


David Keith Jones

Lion Camp, situated on the slopes of the hills bordering the eastern shore of Lake Nakuru, is now open. This is a 'tented camp' offering most of the facilities of a normal lodge, but with canvas walls to each bedroom! The view over the lake is superb and one can enjoy a gentle breeze whilst watching the wildlife below—through binoculars.

Exciting episode in the Masai Mara Game Reserve.

A family, returning from an exhausting game viewing holiday, recently witnessed a fascinating wildlife drama—without moving from their room in Keekorok Lodge, Masai Mara Game Reserve. Late in the afternoon a cheetah killed a young impala in a herd grazing close to the room. The noise attracted spotted hyenas, one of whom robbed the cheetah of its meal and ran away, closely followed by jackals who hoped to share in the remains.



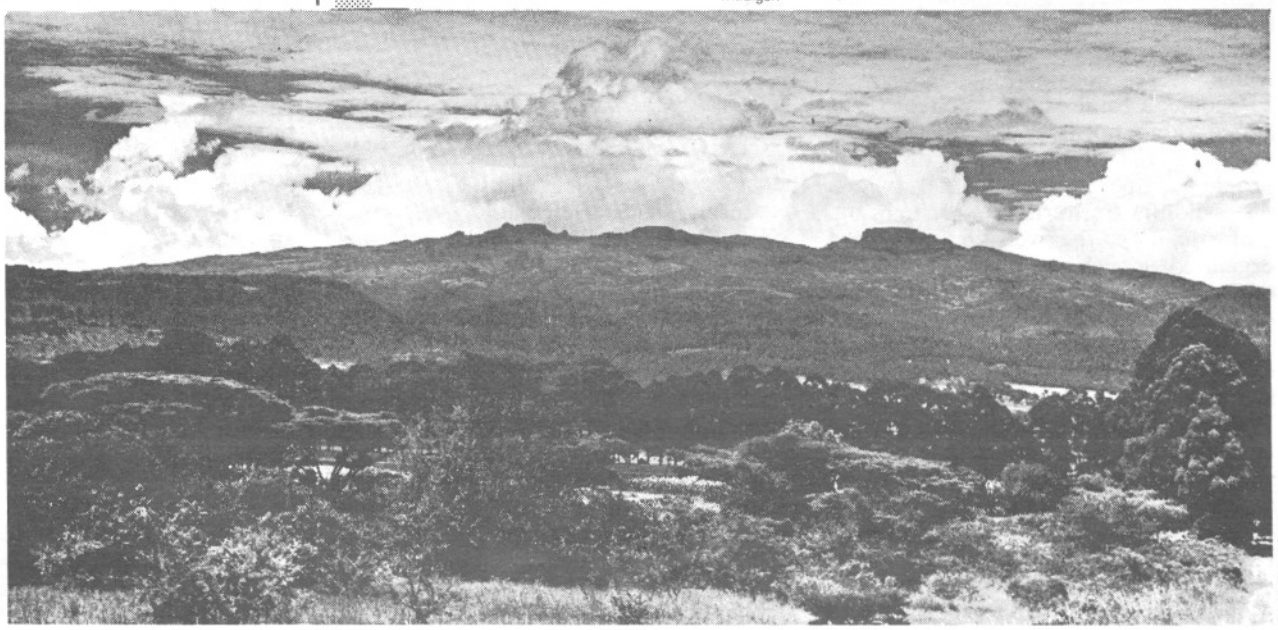
David Keith Jones

Leopards: inconsistencies in the status of these cats.

Kenya ratified the Convention on International Trade in Endangered Species of Wild Fauna and Flora in December, 1978, and continues to support the IUCN convention on endangered species. The Wildlife Conservation and Management Department urges the IUCN to maintain the cheetah on the list. It also urges the US Fish and Wildlife Service to continue the ban on importing leopard skins into the USA, although the WCMD has, itself, just removed the leopard from the list of endangered species in Kenya! It is hoped that Kenya will be able to participate in the second CITES meeting, to be held in Costa Rica in March. By this time USF & WS will have prepared its position on the removal or maintenance of the leopard on the endangered species list in the USA.

Improvements in Mount Elgon National Park.

A 200 acre farm has been acquired to form a corridor to connect Mount Elgon Lodge to Mount Elgon National Park. The purpose of this is to encourage elephants (and other animals?) to visit the Kenya Tourist Development Corporation-owned lodge, for the benefit of tourists staying there. A deep ditch is to be dug along the boundaries of the corridor to prevent wild animals from entering the nearby farms. (KNA).

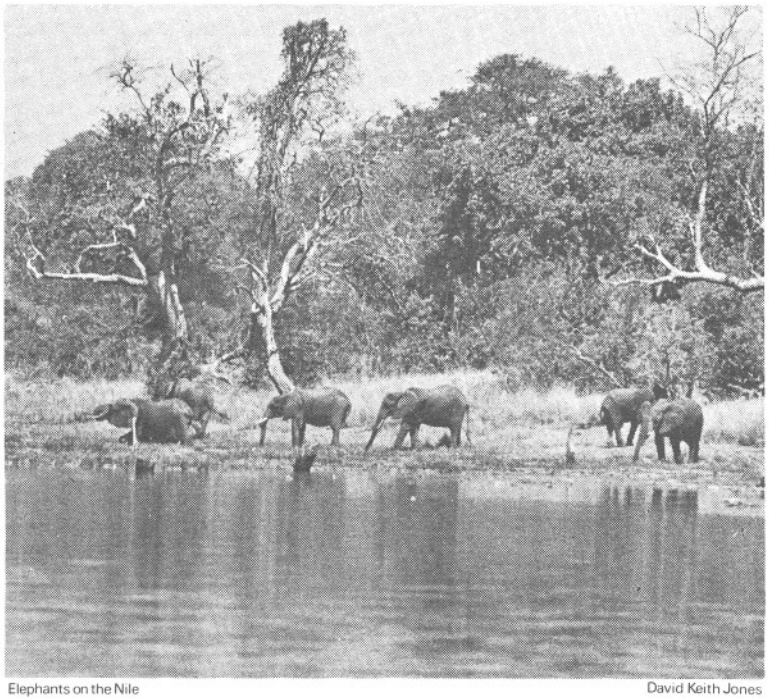


Mt Elgon

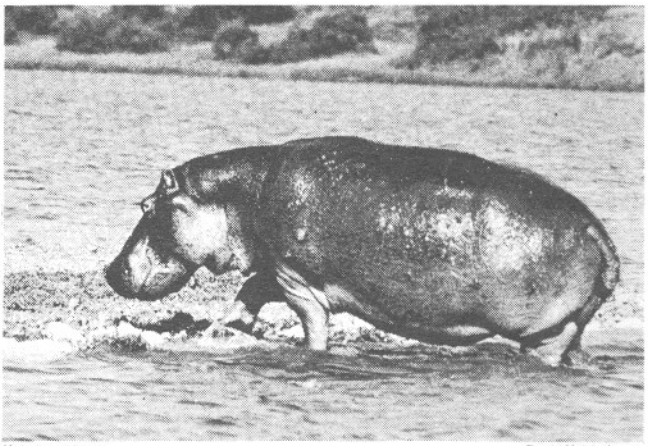
David Keith Jones

Continued

UGANDA



Elephants on the Nile — David Keith Jones



Kabalega Hippo — David Keith Jones

Some progress in anti-poaching.

One of the biggest white rhinos in Kabalega Falls National Park, Uganda, was poached in September last year—by a game ranger who unfortunately managed to escape! However, white rhino are commonly seen in the Pakuba area and black rhino are to be seen in the Nyamsika area, but less frequently.

Strong anti-poaching measures are continuing under the leadership of Game Warden Paul Ssali. According to the monthly report, more rangers were posted to the areas where white and black rhino, elephant and leopard were at particular risk from poachers in September, 1978. More frequent patrols by road and air were carried out in Pakuba, Kibaa, Tangi Gate, Wairingo Gate and Buligi ranger post areas. A recently arrived aeroplane, donated to the park by the Frankfurt Zoological Society, was particularly useful in locating poachers' hideouts and guiding ground patrols to them.

As a result, only 7 animals, namely: 2 elephants, 2 hippo, 1 hyena, 1 buffalo and 1 warthog were known to be poached, in addition to the rhino. Nineteen poachers were caught, at least another 32 succeeded in evading capture, and footprints, sounds of gunshots and empty hideouts indicated activities of more poachers.

During September there were fewer visitors than in May—only 587, of which one third were children. At present there is no Education Warden at the park and the museum needs improvement. Despite this, three educational parties from a primary school, a police school and a ranch visited Kabalega Falls.

A number of visitors were lucky enough to see a pride of 18 lions at Pakuba. Few sightings of leopard were made, due to the long grass, althqugh they were occasionally seen in the late evening. Elephants were observed in herds of at least 40 animals, mainly in Buligi, Tangi and along the Mobutu Nile track. Large numbers of Jackson's hartebeest were expected to calve during November, judging by their fat condition.

Many young hippos and crocodile were to be viewed along the Victoria Nile, and particularly near the Falls. Henry, the hippo who resides at the jetty, was renamed "Baba Jetty" by the rangers, in honour of his recent parenthood.

Strange weather in East Africa.

Normally the two driest months of the year, January and February, have this year brought widespread rain throughout Kenya and northern Tanzania. Game country which would normally be burnt brown in late February is currently lush and green. Hopefully, this will help the success of many species although it does mean that animals disperse over wide areas outside the National Parks and Game Reserves. Kenya's Meteorological Department reports that exceptionally high pressure over Mozambique and Madagascar, an eastward displacement of the seasonal anticyclones which would normally be centred over Arabia and a deep layer of unstable westerly winds have combined to produce continuous unsettled weather.

Whatever the reasons, there has been more mud and high grass than usual recently; nevertheless, visitors continue to be thrilled and excited by what they have seen in our Parks and Reserves.

HORIZONS

Concluded

TANZANIA

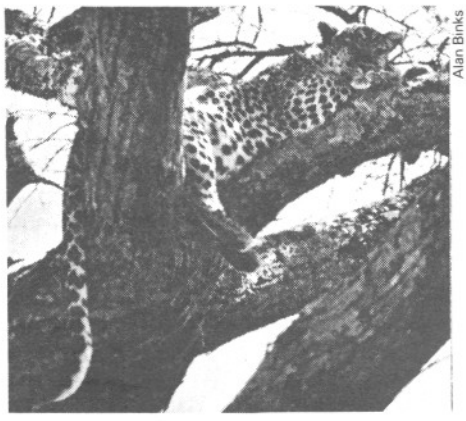
$14,000,000 Tourism Boost

Tanzania has recently received a $14 million loan from the International Development Association, to boost tourist facilities.

The 'Northern Circuit' is now experiencing a long-awaited tourist boom with all major hotels and lodges doing brisk business from Europe and the United States. The standards of accommodation, food and service offered are excellent, apart from occasional shortages of bottled gas which are not surprising considering the situation in Iran. Menus are carefully thought out and of good variety.

Wildlife continues to be spectacular everywhere. In Lake Manyara, although rhinos are already scarce, the huge elephant population is easily seen, but is rapidly destroying the beautiful Acacia woodlands. Lions in trees are still a regular attraction. In Ngorongoro, heavy rains have produced the most exquisite green, water-logged grasslands, resplendent with herds of zebra and wildebeest, and thousands of migratory ducks, geese and other birds. In the Serengeti, the wildebeest, numbering now about 1.6 million began their annual calving in February on the short grass plains, prior to migrating west and north later in the year. By July or August they will have left the Serengeti and reached the Masai Mara Game Reserve in southern Kenya, crossing the border with greater ease than the tourists who come to observe them! Cheetah are now numerous in Serengeti and leopards are regularly seen and photographed around Seronera.

From further south in Tanzania, the warden of Ruaha National Park,



Alan Binks

David Keith Jones

Isaac Muro, has some useful advice to pass on about protecting trees from elephant damage. Mr. Muro had the unfortunate experience of losing the Morning Glories he had carefully planted around his house, to an elephant with a taste for the unusual. After smearing elephant dung over the remaining plants, Isaac observed the returning elephant reach out his trunk to the flowers, smell the dung, and withdraw. Apparently the elephant has not visited the garden again. As a result, the Warden suggests that it may be possible to protect trees from elephant damage by simply smearing them with the appropriate dung occasionally. The alternative is wire netting which is not only expensive, but causes hazards to the monkeys and lizards who also use the tree trunks. Swara hopes to hear further information from Mr. Muro.

The 1977-1978 newsletter of the College of African Wildlife Management, at Mweka in Tanzania, reports the graduation of 46 students at the end of a two year Certificate of Wildlife Management course. This covered theory and practical experience of every aspect of wildlife management, varying from taxonomy, to how to deal with a dangerous wild animal, in addition to routine range management and road construction, etc. . . 29 diploma students entered their first year and will graduate in June, 1979. The students are often serving game wardens and come from mainly East Africa and also 7 Western and Central-Southern African countries. During the year the College assessed the achievements of past students in order to improve the curriculum. A number of post-graduates continue their training at Mweka and courses are also arranged for agriculture, forestry and veterinary students.

Africa continues to lose her migrant birds.

An appeal has been received from Penrhos Nature Reserve, U.K. to call the attention of EAWLS members to the annual massacres of migrating birds in Mediterranean countries, particularly Cyprus, France, Italy and Malta. Skylarks, finches, buntings, thrushes, warblers, wheaters, robins, chats, turtledoves and birds of prey are killed in their thousands and millions by shooting, netting and sticky lime. This slaughter of migrant birds affects Africa's avifauna as well as Europe's for many of these birds are winter visitors to our continent. For details, write to 'Stop the Massacre Fund', International Council for Bird Preservation, Panda House, 29, Grenville St., London EC1N 8AX, U.K.

Ghana: few elephants left.

There are only 3,460 forest elephants left in Ghana, according to a recent IUCN/WWF/NYZS status report (Project No. 1389). They survive in small relict populations in forest reserves in Western, Brong-Ahafo and Ashanti regions and Mole National Park, in the north. The status of these elephants is critical, even in National Parks, due to hunting, for meat, and encroachment on their habitat by the felling of valuable trees and expanding areas of agriculture, in a country with a rapidly increasing population.

New Tourist Offices for Kenya.

During 1979, Kenya Tourist Offices will open in Japan and Canada, as previously reported. An office in Brussels, Belgium is also under consideration.

Society sponsors wildlife tour to China.

Anyone interested in a Spring, 1980 three week wildlife oriented tour to the People's Republic of China should contact the Society's Chief American Representative, Mr. Keith Tucker, P.O. Box 82002, San Diego, CA 92138, U.S.A.

The itinerary is expected to include 3 days each in Hong Kong, Canton and Shanghai; 4 days in Peking and hopefully, 3 days in the interior on a Panda oriented visit. Zoos and conservation efforts by the Government and Universities will be a feature of the tour.

Safari World

AROUND and ABOUT
The WILDLIFE CLUBS

RECENT ACTIVITIES AT THE WCK HEADQUARTERS

Written for: *SWARA* Magazine
By: Nathaniel arap Chumo
WCK National Organiser

KNA

Hon. Clement Lubembe presents a shield and some trophies to Sheanna Hettiaratchi of Loreto Convent Msongara. She won first prize for the Essay Competition.

Winners of 1978 National Essay and Art Competitions received their prizes from Hon. Clement Lubembe, Kenya's Assistant Minister for Tourism and Wildlife on 2nd February, 1979. The presentation ceremony took place at TILLMIAP, National Museums and was attended by students and Associate members as well as WCK Council members.

The theme of the Essay Competition was "Why Have all the Animals Gone" and the winner was a 14 year-old girl Sheanna Hettiaratchi of Loreto Convent, Msongari. In the Art Competition James M. Kangethe of St. Teresa's Boys' High School, Nairobi won the first prize. There were 240 art and 350 essay entries.

The purpose of conducting these competitions is to encourage creativity among the students and to enable them to sustain their interest in wildlife conservation. It is also a way of documenting some aspects of our culture vis-avis wildlife.

Since 1973 when National Essay and Art Competitions began WCK Headquarters have had good collection of stories and art work about wildlife from the students. Some of the stories and artwork have been put together into a book. This book entitled "How the Zebra Got Its Spripes" is now on sale in the leading bookshops and at the WCK Headquarters. The royalties from the sale of the book will be used to finance some of the WCK programmes.

Mr. Lubembe called on Wildlife Clubs members to make frequent visits to National Parks and Reserves so that they can learn more about wildlife. He said that his Ministry would quadruple assistance to the Clubs so that our youth can know and be proud of our National Heritage.

Commenting on WCK campaigns against destruction of wildlife habitats, particularly forests, Mr. Lubembe hailed Kakamega District Development Committee for passing a resolution that indigenous forest trees should be preserved. He concluded by saying that ¾ of Kakamega Forest is in my constituency and as such I shall fully support anyone who campaigns for the forest's complete preservation.

Earlier on the Minister had been shown specimens of rare animals collected by National Museum Mammalogist, Mr. Issa Agundey during a recent scientific expedition to Kakamega and Nandi Forests. The specimens included:

Giant squirrel—a typical equatorial African species, not found East of the Rift Valley.

Brushtailed porcupine—Last recorded in 1932. It is endangered because of habitat destruction.

Tree Pangolin, *Potto*, *Flying squirrels*, *Hammerhead Fruit bat* and *Potamogale* (*Otter Shrew*).

In February, WCK National Organiser, Mr. Nathaniel arap Chumo visited 12 Wildlife Clubs in Western Kenya. He spent 3 hours with each Club surveying Club projects (e.g. fish pond, bird feeders, club 'museums', nature trails etc.), practical demonstrations (e.g. collecting tracks of small birds or animals on sooted cards), and show wildlife films to Club members or to the entire school body. 3,700 people watched the wildlife films.

Upcountry school visits is an ongoing programme project which is highly successful. Last year WCK Education Officer visited 246 schools, reaching about 28,000 people. Such visits greatly boost Club morale and increase participation in nationally organised WCK activities.

Mika Mukoko, WCK Deputy National Organiser went to Southern Sudan at the invitation of Sudan's Department of Wildlife.

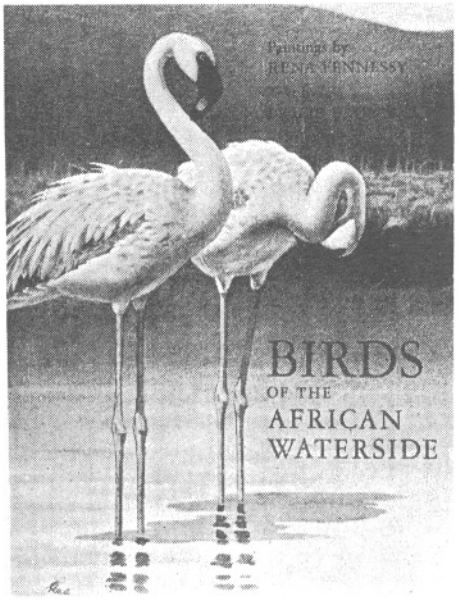
He spent two weeks helping Sudanese Government officials initiate a Wildlife Education Programme based on the WCK model. He says that, although Tourism industry is not as developed as in Kenya, an outstanding varieties of wildlife are found in the National Parks. His trip was sponsored by East African Wild Life Society.

In its eleventh year, WCK Association has 680 Wildlife Clubs in secondary school and technical schools, colleges and universities throughout the country. As of February, 1979 there is a total membership of about 30,000 students whom in their individual Clubs and/or communities carry out the objectives of the Wildlife Clubs:

"To spread interest and knowledge about wildlife and environment among the people of Kenya;
To create awareness of the great economic, cultural and aesthetic values of natural resources; and
To develop a better understanding of the need to conserve natural resources for the benefit of the Nation and its people."

More on page 40

Book Reviews



Birds of the African Waterside, Paintings by *Rena Fennessey*, text by *Leslie Brown*, 1979. London: Collins. Pp 112, size 10 × 14 in. (255 × 355 mm.), actual painting size 8¼ × 11 in. (210 × 280 mm.), with 24 colour plates and numerous black and white illustrations. U.K. price £12.0.

(See illustration on page 11; Ed.)

My definition of a 'coffee-table book' is one which will not fit an average-sized bookcase; but my dictionary describes it as one that is suitable for a coffee-table and designed more for display than for reading. This may well explain why the term has acquired a somewhat derogatory sense in recent years. So if one accepts the dictionary definition, to call this a coffee-table book would be doing it serious injustice. The text and the illustrations complement each other and one's appreciation of the latter is heightened by reading what Leslie Brown has to say about the birds depicted.

The book starts with a longish introduction by the author in which he talks, often nostalgically, of the rivers, lakes and floodplains he has visited in Africa in the past years. As he says, 'Water is life; without it none can exist. Waterless places are called deserts because they are deserted.' And so this chapter sets the scene for what follows.

Each colour illustration is accompanied by the author's detailed text written in his usual lucid fashion and with facility based on tremendous knowledge acquired over many years of devoted study. It is often anecdotal, light in touch and exactly right for a publication of this nature. Yet the reader can be sure of its scientific accuracy.

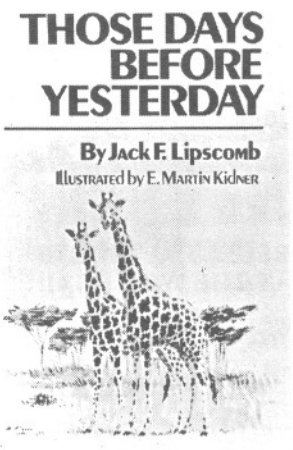
But having said all this, it would not be unfair to state that the prospective buyer will be initially attracted by Rena Fennessey's outstanding illustrations. The eye-catching cover, with its two Lesser Flamingo (reproduced inside the book as well, but somewhat smaller and therefore without the same impact), is only a foretaste of the pleasure to come. So let us turn the pages of the book.

The title-page in effect becomes a double-page spread with the artist's charming black and white pastel of a number of water birds forming a frame for the title. And perhaps this is an appropriate place to mention that to this reader at any rate, the black and white illustrations are as important a part of the design and layout of the book, as the colour plates are a climax to each chapter. Detailed information is conveyed not only of the bird's significant structure, but frequently of its habitat and environment. These delicate black and white drawings generally appear as chapter headings and in the margins surrounding the text, and have a fascination of their own. The head of a Water Thicknee, the nest of the Hadada Ibis, the mountain stream in Chapter 2 (alas, I cannot give you the pages, they are not numbered), the Hammerkop on the back of a semi-submerged hippo, the African Skimmer's head showing the longer lower mandible, the elongated toes of the foot of the Jacana, the African Darter in flight and the beak of a Saddle-billed Stork are only some examples. My favourite black and white drawing is that of the line of safari ants marching inexorably along the bottom of the pages in Chapter 3. And my least favourite? The Lesser Flamingo in Chapter 9.

Now to the colour plates. The general impression is that of the work of a mature artist which has lost a little in reproduction compared to the originals. I can only refer to a few of the plates which appeal to me—and you will have to buy your own copy of the book if you wish to share my pleasure in the rest. The Mountain Wagtail on a stone in a gentle stream with little waterfalls (you can almost hear the tinkling waters), the Shining Blue Kingfisher perched on a branch against circular ripples (what beautiful birds), the Hadada Ibis (the artist was lucky to see such brilliant bluey-green irridescence on the wings), the Hammerkop painted against the light giving it a lovely luminous quality, the flight of the Crowned Cranes (note how the blurred outer wing feathers give an impression of movement), the pair of green and brown Pygmy Geese floating on lighter green limpid water surrounded by a few pale brown dry leaves, also floating (a perfect composition), the contrast between the delicate lines of the Cormorants and Darter, and the solid dead tree-trunk (this was my favourite when I saw the originals) and finally the Blue Fairy Flycatcher, aptly fairy-like with its spreading tail (how thrilled we were when we first saw it flitting about amongst the trees in Nandi). It is unfortunate that the plate of the Three-banded Plover has been transposed with that of the Collared Pratincole; surely a serious oversight on the part of the publisher.

This is a book to buy and possess so that you can return to it time and again to savour the rewarding illustrations and the felicitous text. Although about 1½ in. smaller all round, the price does not compare unfavourably with that of the first volume in the series 'Birds of the African Bush', bearing in mind the present day increase in cost of producing such a work.

John Karmali.



Those Days Before Yesterday.
J. F. Lipscomb.
Vantage Press, New York, US $5.95

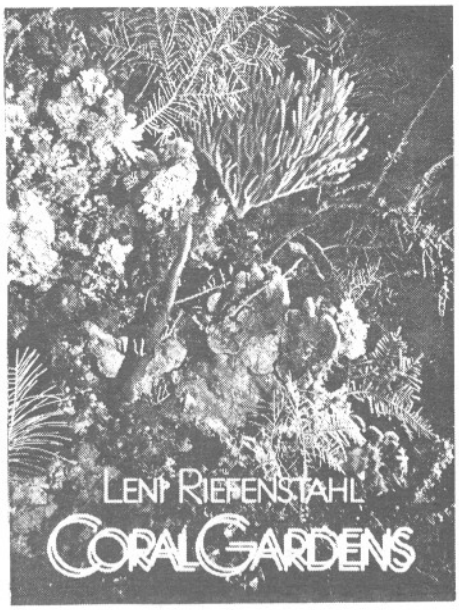
This is a delightful little book about the author's experiences as a young man in Kenya between 50 and 60 years ago.

Safaris with donkeys and three Kikuyus; travelling in Masailand in 1924; traditional African methods of hunting; lions, rhinos and elephants are all amongst the writer's interesting reminiscences. The book is illustrated with a series of black and white sketches by E. Martin Kidner some of which are effective, others less so.

Lipscomb is strong on describing the landscape of Kenya as he saw it half a century ago. Would the book had been longer!

Hard back; 8¼" x 5½"; 73 pages.

Coral Gardens. *Leni Riefenstahl.*
Collins, London, £15.00 sterling.



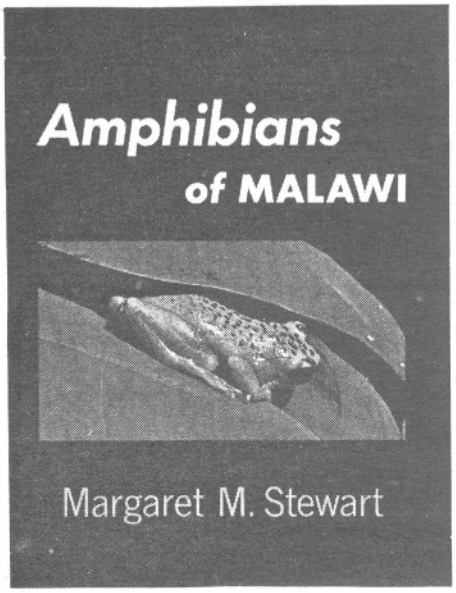
This book contains 96 beautifully reproduced underwater photographs, all in full colour. If these photographs had been taken by an expert diver in the prime of life the book would already have been an outstanding achievement; that they were, in fact, taken by an elderly lady who had her first diving lesson at the age of 71 is nothing less than astonishing.

Using first class equipment and sophisticated lighting techniques Leni Riefenstahl has produced a volume of photographs which are a feast of colour and design.

Coral Gardens is in the same format and style as her previous books *The Last of the Nuba* and *People of Kau.*

Most of the pictures in *Coral Gardens* were taken in the Caribbean, some in the Red Sea. Thirteen of the plates are from Turtle Bay on the Kenya coast and seven from Mafia Island off Tanzania.

Hard back; 12½″ x 9½″; 233 pages.



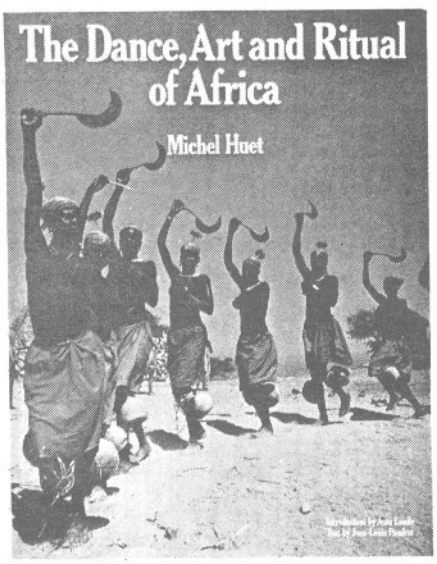
Amphibians of Malawi.
Margaret M. Stewart.
State University of New York Press, US $7.50

Dr. Stewart, who is Professor of Biology at New York State University, writes in her preface that this book 'is intended primarily to provide a means of identification for the novice, the layman or the student; for them it may be an introduction to the world of Amphibia. It may also be of service to herpetologists.'

The book is very systematically laid out, well indexed, and illustrated with numerous excellently clear line drawings and twenty rather disappointing full colour photographs.

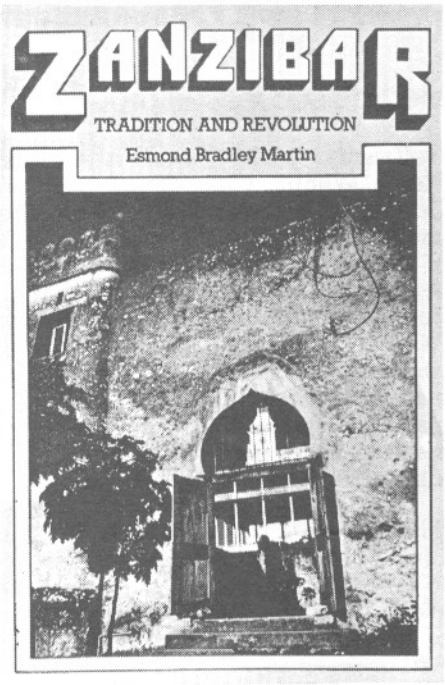
Hard back; 10¼″ x 8¼″; 163 pages.

The Dance, Art and Ritual of Africa.
Michael Huet.
Collins, London, £17.00 sterling.



This is a beautifully produced, large format book of outstanding photographs in both colour and black and white. Huet's photography is first class and many of his subjects are stunning. The regions covered are the Guinea Coast, Western Sudan and Equatorial Africa. The book has been beautifully printed in Switzerland.

Hard back; 12½″ x 9½″; 241 pages.



Zanzibar; Tradition and Revolution.
Esmond Bradley Martin.
Hamish Hamilton, London £5.95 sterling.

Dr. Martin gives a clear and objective account of his own personal experiences of living in Zanzibar during the mid-1970's—a cautionary tale indeed for would be revolutionaries. He also gives us a well documented history of Zanzibar both prior to, during and after the revolution.

There are chapters on Muslim celebrations and festivities, Pemba Island and the future of Zanzibar and Pemba.

A chapter on 'A Wild Pig Hunt' gives a useful insight into the present status of wildlife on Zanzibar, in particular Kirk's red colobus. Clearly, from Dr. Martin's account, the theoretical protection of Zanzibar's Johani Forest is very ineffective. What remains of Zanzibar's wildlife must now be in a perilous situation.

Some of Dr. Martin's figures make interesting, albeit appalling, reading to lovers of wildlife; 488,600 lbs weight of ivory exported from Zanzibar in 1859!

The book is illustrated with over 40 black and white photographs, some of them historic, several old drawings and a number of maps. There is a comprehensive bibliography and a thorough index.

Hard back; 9½″ x 6¼″; 149 pages.

Safari World Concluded

Merlin's successful project

Twenty young members of the Merlin Wildlife Club, formed only in October of last year and accepted into late membership of the Wildlife Clubs of Kenya in November, have raised over Shs: 1,000/- for the World Wildlife Fund in support of their selected project "Save the Cheetah". Their contribution which they aim to be only the first of many, has been raised by the Club's members in three fund-raising activities; a sponsored run-swim-walk sports day, a film show and a disco.

Their cheque was handed over at the beginning of February by the Club's young Chairman Julian Horsley to visiting International Trustee of the World Wildlife Fund and Chairman of the UK World Wildlife Fund, Sir Arthur Norman, who presented Julian Horsley with a personal gift of Shs:100/- towards the Merlin Wildlife Club's next WWF collection. Mr. Paul Spence, Treasurer of WWF Kenya, on behalf of Mr. Jack Block, Chairman, presented a complimentary voucher for a free night of game viewing at world-famous Treetops.

L to R: Mrs Carol Day, teacher-inaugurator of the Club; Sir Arthur Norman; Julian Horsley; Mr Paul Spence & Mr Michael Mann, Principal.

The Norfolk Hotel's most unusual visitor in this, its 75th anniversary year (1904-1979) was Rosy, a magnificent crowned eagle, pictured with his rehabilitator/handler Simon Thomsett when they broke their road journey from Mweiga to the Veterinary Clinic at Kabete in February with a rest in the tranquil gardens of the hotel, where Rosy was given the full v.i.p. treatment.

Although the Norfolk Hotel's new aviaries for their indigenous birds are nearing completion, Rosy is not destined for a life of captivity. Found last year with a broken wing, he has been nursed back to fine condition at the Aberdare Country Club, Mweiga, also noted for its aviaries. Simon Thomsett is training Rosy for rehabilitation into his natural element, including hunting his own prey. Rosy has recently been starring in a BBC documentary currently being filmed in Kenya.

Simon Thomsett with Rosy at the Norfolk

To: The EAST AFRICAN WILDLIFE SOCIETY
P.O. Box 20110, Nairobi, KENYA

Please enrol me as a new member of the Society, and send me six issues of SWARA, your Wildlife magazine.

I wish to join in the following category:

FEES ⇨ ⇨	K.SHS.	or	US$	
		Tick as appropriate		
Annual E.A. Resident	60/-	☐		
Annual E.A. Junior (under 25)	30/-	☐		
Annual Ordinary Overseas	120/-	☐	15.00	☐
Annual Family	160/-	☐	20.00	☐
Annual Corporate	1000/-	☐	125.00	☐

Note: UK Members convert to K.Shs at prevailing rate

I enclose Cheque/P.O./Cash in the sum of

or Please Charge DINERS CLUB ○ BARCLAYCARD ○
AMERICAN EXPRESS ○ VISA ○

Card No..... Expiry date.....

NAME (Block Caps).....

ADDRESS .....

.....

Signature ..... Date .....

Cheques drawn on Tanzanian & Ugandan Banks accepted at prevailing rate

Join the East African Wild Life Society and receive six copies of SWARA Magazine every year....

As a member you will also help us to achieve our aim to conserve wild life.

To date this Society has disbursed over $ 800 000 toward conservation.

Here are some of the projects we supported in 1978...

	US$
Anti poaching in Kenya...	8600
Anti poaching in Tsavo...	3300
Rain forest conservation in Uganda...	2800
Forest Survey in Tanzania... ...	1500
Elephant study in Tanzania... ...	1200

With your subscription to help us we can be even more effective in our efforts to preserve East Africa's fabulous wild life.

The EAST AFRICAN WILDLIFE SOCIETY
P.O. Box 20110, Nairobi, KENYA

The way to look at the Range Rover

Once you get a car that's big enough, tough enough, and comfortable enough to go anywhere, you feel you've got to go. After all, the Range Rover is a unique car. In every sense. And you feel as much at home stepping out in evening dress to attend an important function as you would in a safari suit in the Aberdares. We really mean it when we say you can take this car anywhere. The Range Rover is made for long safaris. It simply eats up the miles. And it's 19 gallon fuel tank allows for long gaps between refuelling. And when you hit the really rough stuff the four-wheel drive takes you over treacherous country safely and surely. And when the going gets worse you simply switch from high to low gearing. (This astonishing car has 8 forward gears). The soft, well sprung suspension absorbs every bump. And with such high ground clearance there's no worry about rocks and ditches or mud. If you have air-conditioning installed the Range Rover becomes so cool, relaxing and remarkably comfortable. Well worth it here especially during the hot seasons. It just adds to the joy of driving a big powerful car which is so easy to drive. And the Range Rover can carry 5 people in comfort with 750 lbs of luggage or 2 people and 1200 lbs. There's also an automatic ride-level device on the rear suspension. So whatever you are carrying, you do just that. The Servo-assisted brakes are an absolute joy. If you have to slam them on hard you'll stop with immediate ease. All in all, it would be difficult to find fault with this unique car which can open up the whole of the country for you.

we will gladly give you a test drive

Range Rover

The Cooper Motor CMC Corporation (K) Ltd

Conveniently situated, away from the noise and bustle, but only a mile from the city centre.
Nairobi is famed for its gardens, and the Fairview has five beautiful acres of them.
The accommodation is first class, with a telephone in every bedroom. A perfect family hotel with a delightful children's playground.

FAIRVIEW HOTEL

THE COUNTRY HOTEL IN TOWN

BISHOPS ROAD.
P.O. BOX 40842 NAIROBI.
TELEPHONE
331277, 331278, 331279
AND 27844.
TELEGRAMS. "FAIRVIEW"
NAIROBI KENYA.

Creatives