THE WILD REALM:

Animals of East Africa

By Louis S. B. Leakey
Foreword by Leonard Carmichael, *Vice President for Research and Exploration, National Geographic Society*

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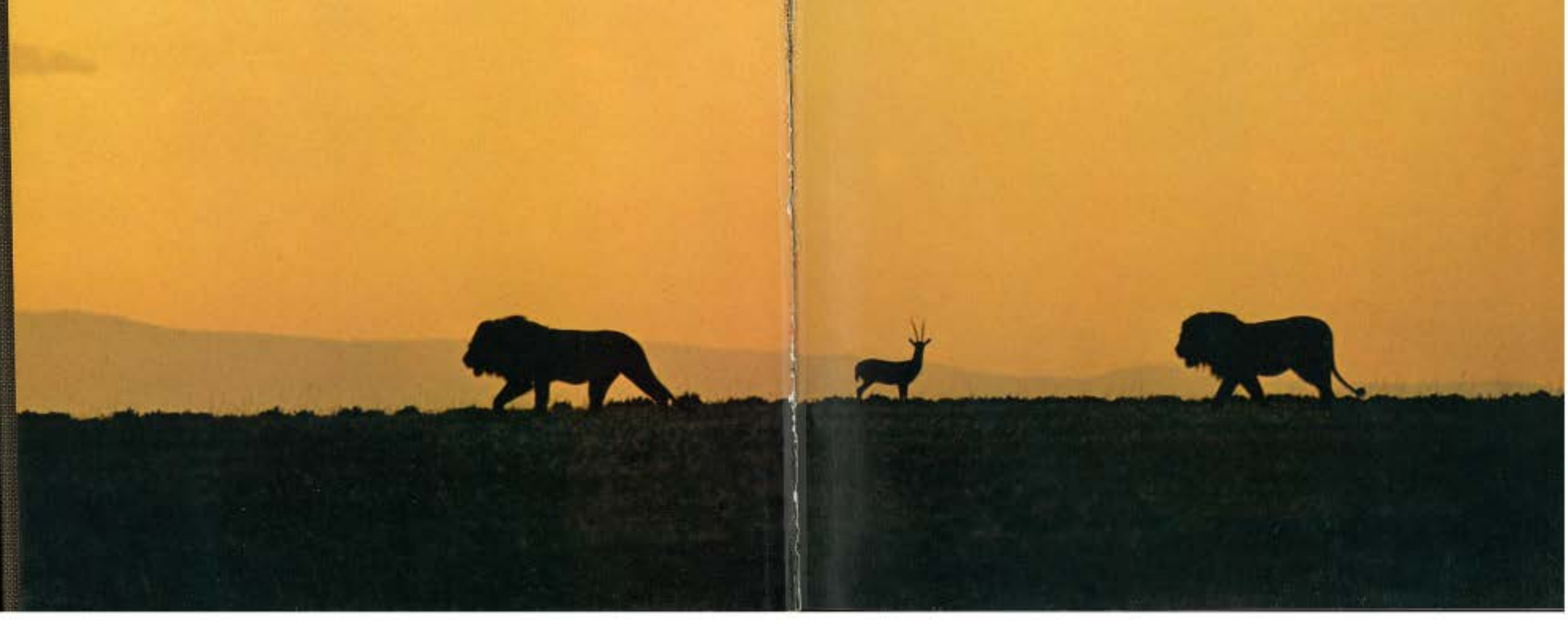

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By LOUIS S. B. LEAKEY

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Balancing easily on her hind legs, a slender gerenuk stands 7 feet tall to browse. Overleaf: Lions stride past a watchful Thomson's gazelle at dawn on Tanzania's Serengeti Plain. Page 1: Stealthy black leopard snarls menacingly.

B. P. KRAL (RIGHT); GEORGE B. SCHALLER, NEW YORK ZOOLOGICAL SOCIETY (OVERLEAF); DAVID R. BRIDGE, NATIONAL GEOGRAPHIC STAFF (PAGE ONE)

Foreword

Animals of East Africa is a remarkable book for three very good reasons. First, the animals it presents are as a group probably the most dramatically interesting of all the world's organisms. Second, the author, Dr. Louis Seymour Bazett Leakey, is one of the renowned scientists of our age. Third, the many new pictures in this volume are especially fine—both the splendid photographs and the paintings that show fossil African animals as they almost certainly looked when they roamed its plains and forests eons ago. These paintings are by Mr. Jay H. Matternes—a gifted artist and a scientific student of fossil animals. It is not an exaggeration to call him the modern Audubon of prehistoric mammals.

Dr. Leakey is world-famous as an anthropologist, paleontologist, and student of man's prehistory. He is also—and this is by no means characteristic of all zoologists—a lifelong lover of animals.

His unique boyhood fostered this love. His father, the late Harry Leakey, and his mother were among the first Anglican missionaries in East Africa. Young Louis spent many hours with boys of the Kikuyu tribe, and he studied the ways of game with a Dorobo hunter. The Kikuyu's language was his language, their intuitive knowledge of animals was his knowledge. Even today, he has told me, he often thinks not in English but in Kikuyu as he watches the great animals of his land.

After undergraduate days at Cambridge University in England, the author went on to become a Fellow of St. John's College and to earn his Ph.D. Back in East Africa, he took up the quest he has pursued unflaggingly: the search for very early man and his long-vanished world. In this, as everyone knows, he and his family and associates have made discoveries of profound importance.

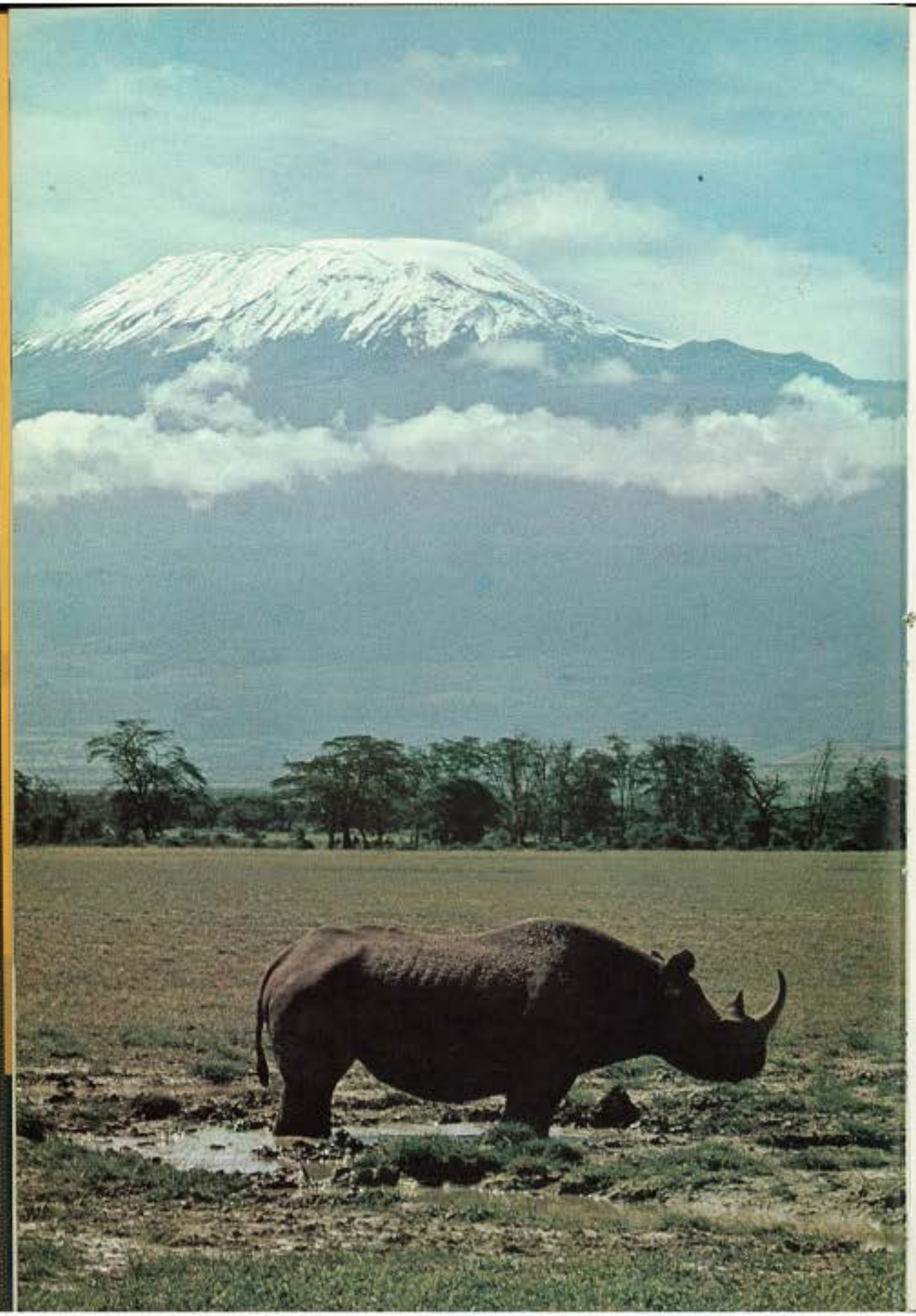
Whenever scientists explore wholly new fields, novel facts appear that call established theories into question and emerging concepts give new significance to accepted data. In such periods of debate we see science at its most exciting, and this book appears at such a time.

How animals behave in their natural habitats is the subject of ethology. Today many trained observers of this school are reporting in a new way the lives of Africa's wonderful animals and bringing us new insight into their patterns of behavior. Thus Dr. Leakey's account, drawing on years of field experience, is of special interest.

Even more is this true of his contributions to our knowledge of our own ancestors and all the hominids of the past—our kindred now extinct. In this field our views are changing with dramatic speed; but it is certain that Dr. Leakey's discoveries, and his interpretations, will always be a noteworthy chapter in the story of man before written history. He never forgets that man became man in a world of animals.

Thus his understanding of man and of animals has an added dimension. His scientific mind sees animals through trained Dorobo eyes. Therefore anyone who reads this book and looks at its unrivaled illustrations will gain a very special kind of understanding of the balanced and interrelated life patterns of the mammals of East Africa—and how Dr. Leakey and other conservationists are fighting to save this unique and truly arch-royal part of the world's endangered animal kingdom.

LEONARD CARMICHAEL
Vice President for Research and Exploration, National Geographic Society



Cloud-wreathed Kilimanjaro, highest of Africa's mountains at 19,340 feet, looms beyond a black rhinoceros in Kenya's Masai Amboseli Game Reserve. The rhino, often needing several square miles to supply its food requirements, might well symbolize the major concern of Africa's conservationists: preserving the enormous areas required by many wild creatures, in the face of man's increasing demand for more land.

1

The Richest Garden

As a boy roaming the bush country around my home in Kenya, I took wild animals very much for granted. They were simply part of the natural surroundings. Leopards were common, though rarely seen because they kept a wary distance from man. These powerful cats preyed on wild pigs and small antelopes and also raided the flocks of Kikuyu tribesmen to carry away sheep and goats. I can't remember that as children my two older sisters, my younger brother, and I were ever warned against the leopards—or any other dangerous animal. The accepted view was that if you left them alone, they would leave you alone.

Once we had two playful leopard cubs brought to us. They had been taken from their lair by a Kikuyu boy while the mother was away. Despite our bitter disappointment, Father would not allow us to keep them. Such pets, when grown, could turn dangerous. We regularly reared baby duiker and occasionally brown, soft-eyed bushbuck which we found abandoned or which Kikuyu herdboys found and brought to us.

We always, in fact, had a variety of wild animals as pets as well as several dogs and many cats. Through the years we had a number of monkeys, one a black-and-white colobus that looked like a tiny wizened old man. Our changing menagerie included hares, serval cats, and small wide-eyed galagos, or bushbabies. There were also some semi-tame genets, small nocturnal predators that adopted us, more or less.

Largely because of my close association with wild animals, I developed a lifelong interest in them. But there was also another reason. I was the son of missionary parents working with the Kikuyu tribe, and so I learned to speak Kikuyu as fluently as English and heard many times the people's folktales and stories, many of them about animals.

During my childhood, I spent countless hours with Kikuyu friends. Often in early evening I would sit with other boys in the compound outside one of the elders' huts and listen to tales of tribal raids, traditional history, and the coming of the white man. The animal fables, which I enjoyed most, were chiefly recounted by married women with prodigious memories. A tale I vividly recall tells of a race between a hare and a chameleon for the hand of a beautiful maiden. The first to sit on a stool placed at the finish line would be the winner. The chameleon, hopelessly outclassed, knew he had to outwit his rival. As the race began he grabbed tightly on to the hare's tail and rode with him to the finish. When the hare spun around to sit, the chameleon, of course, was underneath, first to reach the stool and therefore winner of the maiden's hand.

The stories about animals seldom dealt with hunting or trapping; these tribesmen have long regarded virtually all wild animals as unclean and not fit for use as food. The only creatures exempt from this taboo were the buffalo, the large antelope called eland, and, for some mysterious reason, the ant-eating aardvark.

Since the tribe disdained hunting I learned the skills of stalking animals from an old man of the Dorobo people, Joshua Muhia, who lived among the Kikuyu. Joshua knew well the ways of wild animals, but his Kikuyu friends wanted no part of his lore. Even his own son, wishing to grow up a proper Kikuyu, shunned hunting and had little interest in what Joshua did. I, however, became a willing pupil.

From Joshua I learned to camouflage my human form with leaves and small branches; to approach a quarry diagonally, and very alertly,

and above all never to show my hands or arms. Most important, I learned patience, for it was necessary to get quite close to an animal if it was to be killed with the Dorobo's short-range weapons—the bow and arrow, thrusting spear, or club.

My friend and teacher also showed me how to make noose traps and how to capture a small antelope by building a low fence of branches around three sides of its lair while it was away feeding. Such a fence need only be strong enough to make the animal pause. It must not be so visible that the returning quarry will become suspicious. Once the animal has settled in and begun to relax, the hunter creeps close, then dashes in to grab it as it hesitates at the fence before trying to escape.

I once caught a duiker in this way, and I remember that at the moment I hurled myself upon the animal and realized I actually had it gripped tightly in my hands, I experienced the primitive hunter's thrill.

GUIDED BY JOSHUA, I learned to read the signs that in Africa can mean survival—a sudden stillness, the mark of a footprint scarcely visible in the grass, a torn leaf, a broken spider web, a rustle in the bushes. Many of the Dorobo's lessons have served me well to this day. I am often aware of the nearness of animals when others with me have noticed nothing at all. As a paleontologist, too, I have used much of what I learned when trying to interpret the possible ways Stone Age man hunted and trapped his prey.

I first became interested in Stone Age man at age 13, when I read a fascinating book by H. N. Hall called *Days Before History*. In it Hall told the story of the late Stone Age people of Britain, inspiring me to start an immediate search for stone implements in the area of my home. I soon found many flakes, scrapers, and other simple tools of obsidian and chert in washouts and along roads where the surface soil had been eroded or cut away. My Kikuyu friends laughed at me for suggesting that these flaked stones were the work of men long ago and insisted that they actually were *nyenji cia ngoma*—the discarded razors of the spirits of the sky. My parents, too, did not accept them as evidence of early man.

My deepening interest in prehistory eventually took me to Cambridge University in England, where I studied anthropology and archeology. I also took courses in zoology and paleontology, since it was essential that I be able to identify and interpret the fossil animal bones that I hoped to excavate, one day, in East Africa. This study greatly expanded my understanding of the animal kingdom, for I learned that zoologists in classifying animals compare them with fossils as well as with other living forms. Sometimes fossil studies reveal unsuspected relationships among living creatures and help determine whether an animal belongs to one genus or another.

Moreover, just as the study of fossils leads to a better understanding of living species, so does the study of the anatomy, behavior, and habitat of living forms help immensely in solving the mysteries of animal remains that have lain buried in the rocks for millions of years.

Overleaf: Burchell's zebras, ill at ease near tall reeds that may conceal lions, splash through a rainpool in the Amboseli Reserve. Known in Swahili as punda milia, *or striped donkey, this zebra stubbornly resists domestication.*

M. P. KAHL

Forbidding coast and rugged interior kept much of East Africa a blank on maps for centuries. Only within the past 100 years did European settlers move inland. By the end of 1968, Kenya, Tanzania, and Uganda had set aside some 70 game reserves, parks, and sanctuaries for the continent's incomparable wildlife.

MAP BY BOBBY R. CROCKETT, GEOGRAPHIC ART DIVISION

Sometimes I am asked to name my favorite among the animals—an impossible task. East Africa has a staggering array of creatures, each equally fascinating in its own way. This great wildlife population is, I believe, unmatched anywhere else on earth. Incredible in its complexity, it evolved on a continent that for millions of years provided optimum conditions for life somewhere on its surface, even when undergoing volcanic upheavals and climatic changes and alterations of sea level. Because there was always some optimum area the creatures of East Africa evolved with less natural disturbance than in many other places, and today enjoy an almost unbelievable variety of habitats.

Steamy mangrove swamps fringe parts of the Indian Ocean shore; tropical forests along permanent streams merge into the coastal plains. Expanses of hot, dry bushland, open grassland, and near-desert stretch steeply inland. From highland plateaus often covered in forest, magnificent mountains rise thousands of feet, with the highest, snow-mantled Kilimanjaro, attaining 19,340 feet. Volcanic eruptions raised Kilimanjaro, and many of the East African mountains; others, like those in the Ruwenzori range—the fabled Mountains of the Moon where some peaks reach above 16,000 feet—were thrust upward at a time when the Great Rift Valley was sinking.

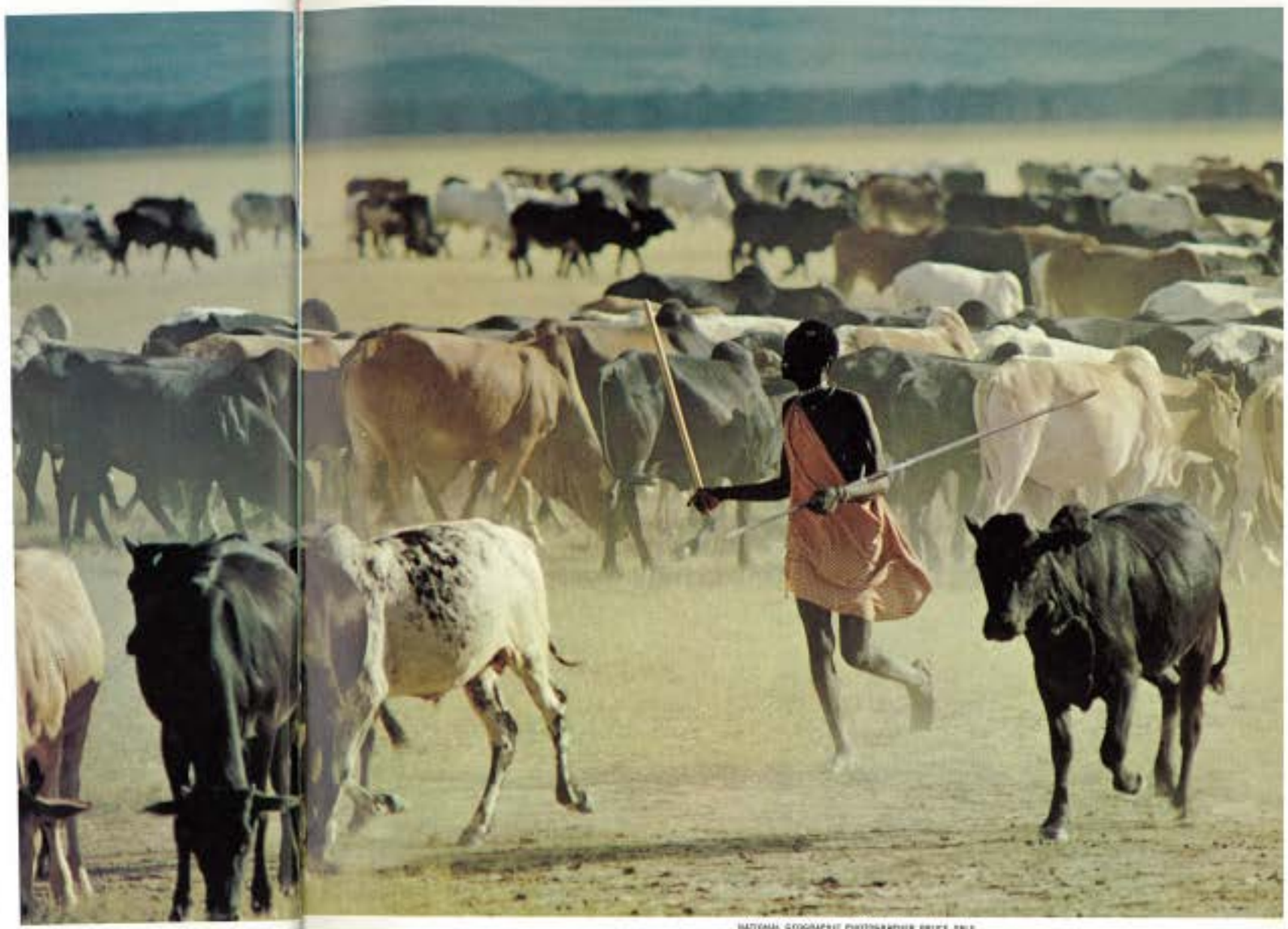
Bands of vegetation ring the mountains, changing as the elevation increases. On their flanks grow dense montane forests of juniper and cone-bearing *Podocarpus* trees, the haunt of elephants, bongo, and giant forest hogs. In the glades various grasses provide grazing for buffalo. Around 8,000 to 10,000 feet a zone of bamboo girdles many of the mountains. Finally, separating the bamboo zone from the barren slopes of the peaks, are the wind-scoured moorlands, where giant heath-trees, lichens, mosses, and groundsels shape a bizarre landscape.

In all this vast range, where food supply, climate, and shelter combine to create livable environments, numerous species occupy their own special place. While many may share the same habitat, and to some extent compete for food, no two species utilize the living area in exactly the same way. Zebra, wildebeest, hartebeest, and some species of gazelle, for example, grazing on a luxuriant pasture, might seem to the casual observer to be a random mixture eating the same food. Actually each species has its own preferred foods, either different plants, or different stages of growth of the same plants. Zebras move into the high grass, shortening the stems and trampling the growth. Wildebeest and hartebeest crop the grass still shorter. Tender new shoots then sprout, attracting the gazelles. In this way all the animals have a share of the same pastureland, but each uses it differently.

One sees large animals only in certain parts of East Africa—a fact that was also true during my boyhood, but for different reasons. In those days there was more game than now, much of it in areas nearly devoid of large animals today because man has taken over the land, but there were few roads and no cars, and thus game areas were hard to

Overleaf: Zebra and wildebeest, part of a vast migrating army of animals, pause to graze during their march across the Serengeti Plain, on Tanzania's central plateau. In the dry season, eastern park areas become devoid of big game as the animals move north and west to better water and forage.

M. P. KAHL

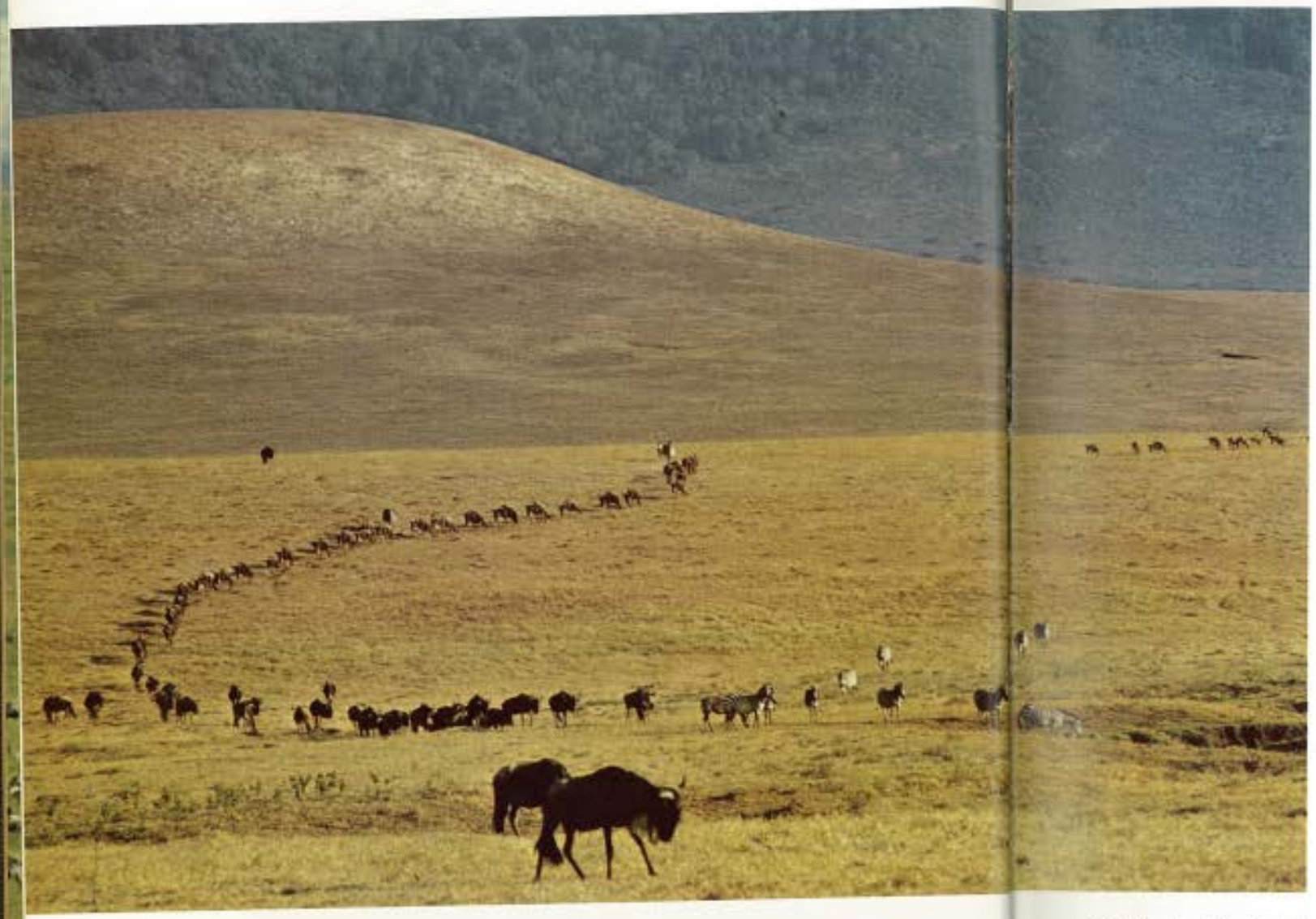


Masai tribesman, with spear and herding staff, rounds up strays on badly overgrazed pasture in Kenya. Cattle mean wealth to the Masai, who drink a mixture of blood and milk, but rarely kill the animals for meat. Increasing numbers of cattle often destroy the habitats of wild animals.

NATIONAL GEOGRAPHIC PHOTOGRAPHER BRUCE DALE

reach. It was only the determined hunters who set out to find big game, usually on horseback or on foot. Because of the hunters the animals had grown wary of man. Today, however, large animals amble about in protected parks easily accessible to visitors.

My mother, who lived in Kikuyu country more than half a century, never saw a live lion or an elephant or a rhinoceros, and only once did she see a leopard in the wild. In fact, she never saw buffalo or eland or many of the common animals. That is not really as surprising as it might seem. She lived most of her life in Africa on the mission station, and in the earlier days when she traveled she reclined in a hammock carried by two to four men along well-worn trails—hardly the conveyance from which to view big game!



H. G. BETTS (ABOVE); SARA CORR THOMPSON

Wildebeest in single file trail zebra toward water in Tanzania's Ngorongoro Crater, the 10-mile-wide caldera of an extinct volcano. Lions and other predators stalk such files continually. The lions opposite ignored the photographer as harmless but stared intently at two Masai —who consider spearing lions a mark of manhood.

It would have been possible, of course, in my childhood days to follow roundabout footpaths from my home at Kabete to the game-covered plains beyond what is now the Langata suburb of Nairobi, but it would have been unwise. The plains held not only game but also Masai warriors armed with spears, who might have mistaken the members of such a party for intruders or would-be stock raiders. Even without the risk of such an encounter, it would have taken most of a day for the return trip. Now I could drive from Kabete to Nairobi National Park in 20 minutes.

From time to time our whole family would make the trek from Kabete to the Church Missionary Society mission operated by my uncle and aunt in Nairobi, then a small town on the railroad. Not far from my uncle's we had to pass a large swamp, reputed to be the haunt of many lions. I never saw any of the great cats then, but I sometimes heard them roaring during the night. Today the lions are gone; the swamp, drained and built over, is the site of a road intersection near the University College of Nairobi and the famous Norfolk Hotel. The roars instead are man-made—traffic streaming on Uhuru Highway, along which I drive to reach my office at the Centre for Prehistory and Palaeontology. Planes from an airport a few miles away often fly overhead.

Although I had heard lions occasionally, I never saw one alive until 1929, when I was 26 years old. I was coming back to Kenya with my wife and two staff members by lorry from Johannesburg, South Africa, where we had attended a meeting of the British Association for the Advancement of Science. We had reached a point just 15 miles outside Nairobi—after a round trip of 5,000 miles over rough, often gullied tracks—and we hadn't seen a single lion. Then suddenly they were all around us. Four lionesses lay on the road about 60 yards ahead, and we counted eight cats on either side. We had kept a sharp watch for lions throughout our journey because we wanted to get some photographs of the animals. Our elation at seeing them, however, turned to uneasiness when the four lionesses on the road started toward us at a low crouch, their tails switching menacingly. The driver swerved from the road and speeded up to outdistance the cats as they bounded after us.

We used no film that day. I personally seldom take photos, but I believe that the camera is the only way to "shoot" game. Hunting with a gun never had much appeal for me. Father occasionally shot a duck, partridge, or pigeon for the pot, and for a few years I did some shooting too. After the age of about 20 I shot only for food or for the protection of life, and since the late 1930's I've not shot at all.

Through the years I've seen a gradual, but very significant, change for the better in hunting safaris. Today far fewer people hunt with guns, and more and more of them thrill to the difficult and sometimes dangerous sport of hunting with a camera. Of course hunting parties do still go out after big-game heads as trophies—but many safari organizers no longer accept clients who want to kill animals. Many, like my son Richard, advertise "photographic and viewing safaris only."

The experienced camera hunter works to get a picture that is not only good in quality but which also reveals something about his subject's behavior. He may, for example, catch sight of a giraffe in a head-down straddle-legged posture and assume it's at a water hole. As he stealthily

moves closer, however, he finds that the giraffe is not drinking, but eating saline earth to get the mineral it needs.

The animal must spread wide its forelegs and lower its head just as it does when drinking; but while it can suck water up its long neck, it cannot do the same thing with dry, salty earth. As the photographer records the giraffe's efforts he notices that the animal gets a cheek-bulging mouthful, then lifts its head to chew, soften, and gradually swallow the saline earth. The photographer has bagged a real trophy, and the stately giraffe is left unharmed, perhaps to be "shot" by other camera hunters before the day is out.

I'm sure that very few photographers realize how valuable their pictures might be as an aid in animal studies. In the mid-1960's zoologist J. B. Foster, now in Canada with the British Columbia Provincial Museum at Victoria, learned to recognize nearly 220 individual giraffes in the Nairobi National Park by studying the animals' skin patterns. Setting up a card file that included photographs of the left side of the neck and head of each giraffe, Dr. Foster was able to record the animals' activities. The skin patterns do not change markedly with age and are as distinctive as human fingerprints. Foster has recognized the same animal seen in photographs taken more than 20 years apart.

He says that since the Nairobi Park giraffes are frequently photographed, he could build up an unsurpassed record of the animals if every visitor who got a satisfactory picture of a giraffe in the park would supply him with a copy and a note of the date it was taken. Over the years such a file would yield invaluable data concerning the giraffe's life span and rate of growth, the incidence of births and deaths, and the relationships of herds and individuals. Such information is vital, for if we are to conserve wildlife, we must learn what conditions are best for the survival of each species.

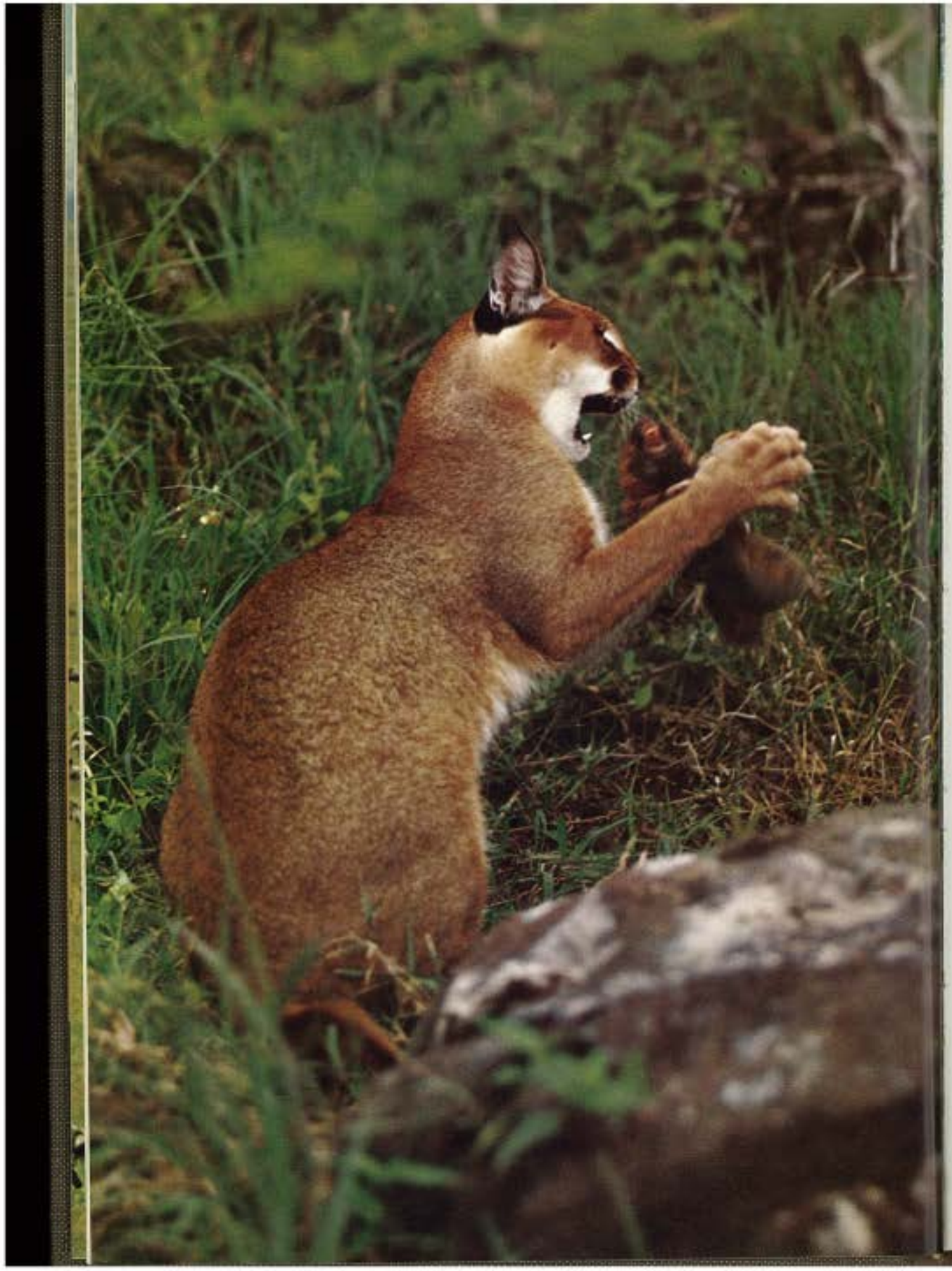
One of the rewards of repeated animal observation is that at any moment you may see a creature engaged in an activity you've never witnessed before and so learn a new facet of animal behavior. Such study is not only a task for the ethologist, or professional animal behaviorist, but also for any keen observer, who, even though he takes no photographs, can report what he has seen to park authorities.

In the past, game watching was not easy. Animals knew man only as a hunter and they fled at the sight or scent of him. Today, in the great national parks, many of the wild creatures virtually ignore cars, or simply express curiosity, for they have learned that people in cars are not a source of danger. Wildlife photographers and observers can get within a few yards of their subjects, near enough to take really beautiful pictures without telephoto lenses or other expensive equipment. In non-park areas, however, most animals still flee at the approach of a car. All too often it carries a hunter ready to jump out and kill.

Visitors to Africa's parks not only can venture among lions, elephants, rhinos, and a seemingly endless variety of antelopes but also can record their unforgettable experiences with motion-picture and still cameras. More and more visitors make careful notes of what they see, and some even take along tape recorders to capture the sounds of animals—the roars, grunts, and squeals, the barking call of an alarmed zebra herd on the move, or the noisy, croaking chorus of vultures feeding on carrion.

In nature's harsh but efficient system some must die that others may live. Above, a wildebeest tries vainly to protect her newborn calf from a hyena. Courageous and robust, wildebeest may even fight back when attacked by lions, but a successful defense is rare. An infant barely half an hour old (below left) struggles to rise; within minutes it began following the herd. Below, spotted hyenas devour a wildebeest calf.

BARON HUGO VAN LAWICK (TOP AND RIGHT); B. P. KAHL



Like a house cat, a caracal toys with his prey, a mole rat he pulled from the mouth of its burrow. This cat strikes so swiftly that it can kill several birds—such as doves and sandgrouse—before the flock gets off the ground, then leap into the air and grab still another. Caracals prowl largely at night, preying also on hares, rodents, and small antelopes.

ALAN ROOT

I can't overemphasize the importance of accurate animal observation. So much remains to be learned about African wildlife, despite the fact that the continent's remarkable creatures have long fascinated the curious. In the late 19th and early 20th century a number of hunters and game wardens described the animals they saw and conscientiously recorded individual examples of behavior and general data on distribution, habitat, and diet. But such scattered observations, helpful as they are, can give us only limited information.

FOR KNOWLEDGE in depth we need many more trained students of animal behavior dedicated to making long and exhaustive studies. The ethologist does much more than merely look at animals. He must rather live in very close association with them until they accept him, sometimes even allowing him close enough to touch them. Some animals, out of curiosity, have even ventured to touch or sniff at their observer!

While gaining his subjects' acceptance, the observer learns to recognize each individual by sight, as Dr. Foster did with the giraffes. This recognition is one of the most distinctive features of modern study. Only when the observer has achieved it can he begin to work out the size and stability of his study group, trace the interactions of individuals to determine which animals are dominant at any given time, and learn exactly what the animals eat and how they obtain their food.

A number of observers are now documenting the numerous variations of one behavior pattern shared by many creatures: territoriality. Although there are exceptions, individual males of many species lay claim to an area—whether on the ground, in the water, or among the branches of a tree—primarily for breeding purposes.

Each creature defines its borders in one or more ways—with noise, with urine and glandular secretions and dung heaps; the area becomes in a very real sense the creature's property. An owner exerts great energy and cunning to retain exclusive possession, to defend its holding against rivals within its own species.

A territorial male will normally fight more vigorously for his space than for his mates. The defender seems to have a psychological advantage, for usually he can drive away a challenger at the border of his territory with nothing more than posturings, violent gestures, and noises. Battles with invaders, although very serious, rarely end in death. If a creature is killed it is usually by misadventure.

Ornithologists first recognized the existence of territorial behavior in wild creatures. A century ago Bernard Altum of Germany set forth the theory that a male bird does not fight for females but for an area he has marked off as his own; his song expresses not joy but a warning against intrusion by others of his kind. An Englishman, H. Eliot Howard, in his book *Territory in Bird Life*, published in 1920, gave many examples to prove that Altum's territorial theory was indeed fact. Since that time numerous researchers, my friend Sir Julian Huxley and his colleague Ashley Montagu among them, have recorded the territorial

Overleaf: Rare white giraffe gallops with its herd across Tanzania's Rukwa Valley. Giraffes reach speeds of 30 miles an hour, but the measured rhythm of their legs makes them seem much slower, almost as if running in slow motion.

HELEN AND FRANS SCHREIDER, NATIONAL GEOGRAPHIC STAFF

behavior of many more birds. Ethologists have now shown that mammals exhibit such behavior as well.

An astonishing example of territoriality was reported by Dr. Helmut K. Buechner, now head of the Office of Ecology, Smithsonian Institution, Washington, D. C. For decades naturalists had believed that the Uganda kob, a golden-brown lyre-horned antelope with white eye rings, bred in harems with a buck shepherding as many as 30 does and their young. In March 1957 Buechner's wife alerted him to what she thought might be territorial behavior on the part of a kob herd in northwestern Uganda. Later, during concentrated studies, Buechner determined that the animals mated not in harems but at a number of special breeding arenas.

A TYPICAL ARENA, some 200 yards in diameter, held a cluster of 12 to 15 heavily trampled territories varying from 8 to 15 yards across. In each stood a single buck, one of the elite of the male kobs. It is to such arenas, Buechner discovered, that the females go for mating.

Since the kob follows no breeding season, males occupy the arenas the year around. A buck must defend his territory unceasingly, bluffing with lowered head and flattened ears, or ramming rivals with a clash of horns. So fierce is the competition, in fact, that some males hold their plots less than a day, others for no more than a week or two. When a champion falls he joins a bachelor herd for several weeks or months of recuperation, then returns in an attempt to regain his lost territory.

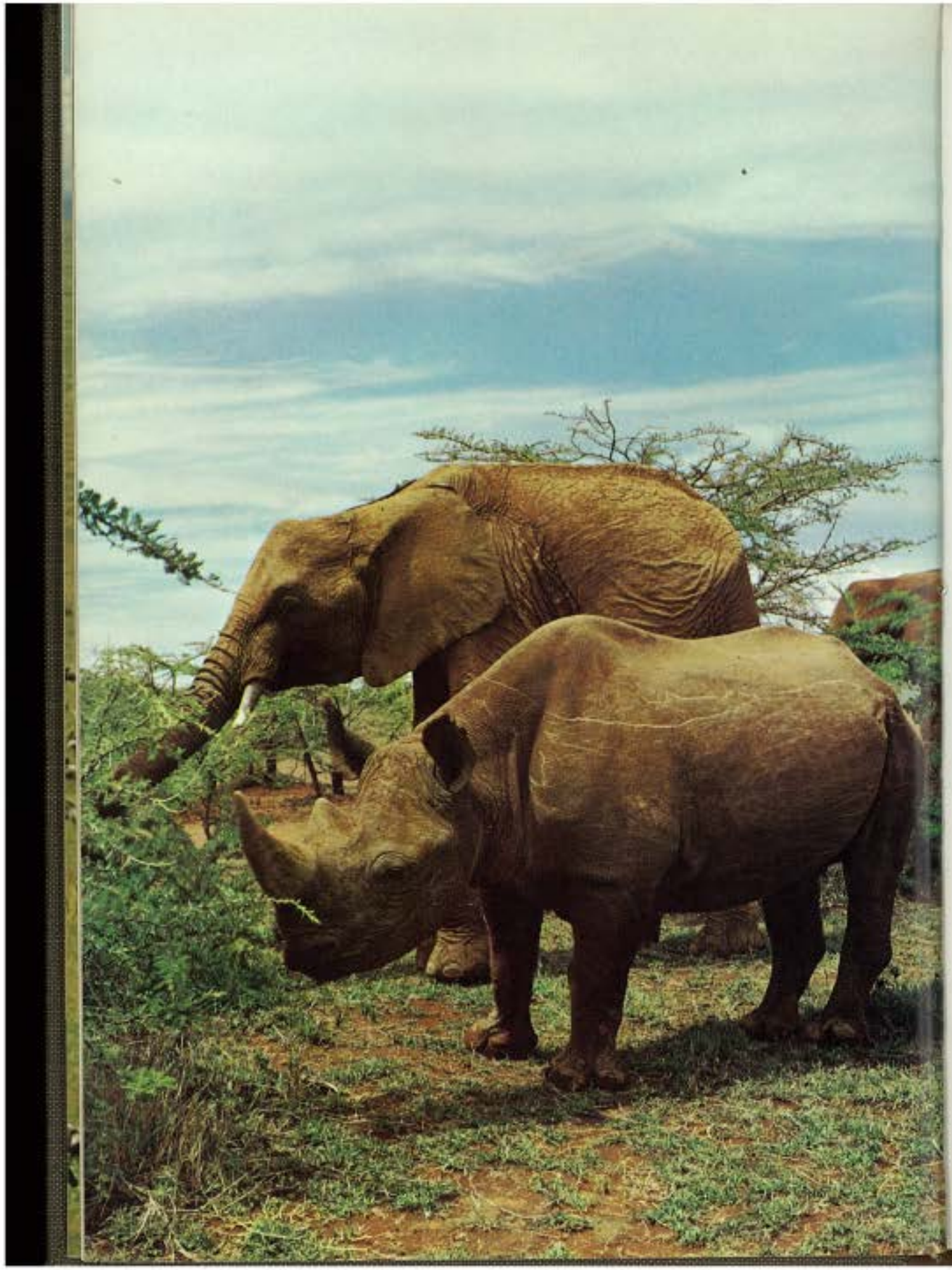
What then of the supposed harems that generations of naturalists thought were breeding groups? Buechner found that although most males outside the arenas live in bachelor herds, some stake out large single territories of their own between the breeding grounds. He reports that females and their young may join such a buck at intervals during the day, but although there is much ceremonial mating activity, few of the does ever permit a complete mating act. When the does wander away to an adjacent territory the buck remains behind, content to watch them go and unwilling to relinquish his own holding.

In recent years National Geographic Society grants have substantially furthered research in animal behavior. The Society has sponsored such projects as the remarkable chimpanzee studies of Baroness Jane van Lawick-Goodall, work among Africa's mountain gorillas by the courageous Dian Fossey, and the antelope studies of Richard D. Estes.

Because so much remains to be learned, it will be many years before we can really claim to know what we need to know about how animals behave in the wild. I hope that this book will help the reader see East Africa's animals as I see them. I hope, too, to pass along some of the understanding of animals that I have gained in a lifetime in Africa—through stalking game at Joshua's side, through work in vertebrate paleontology, and through long association with the national parks and wildlife groups of East Africa. And finally I hope to inspire inquiring minds to go out and discover much more for themselves.

Ringed horns of a male waterbuck sweep back and outward, the smooth tips curving forward. Never found far from water, these rough-coated antelope usually travel in small herds made up largely of cows and their young.

ALAN ROOT



Young elephant and black rhinoceros browse in protected thornbush country in Kenya. In the wild these juveniles would follow adults of their own species. Park wardens often rescue orphaned animals, keep them to maturity, then release them in a park or other refuge. The adult elephant, fearing no animal but man, normally tolerates rhinos but at times will drive them away and may even kill them.

2

Last of the Giants

Elephants and buffalo had crowded the water hole and salt lick at Treetops, the famous game watchers' hotel on the southern slopes of Kenya's Aberdare Range. Visitors sat wrapped in blankets against the late-afternoon chill as buffalo drank noisily or wallowed in mud and came out splotched and glistening. A herd of some 40 elephants, mostly cows and calves, had taken over the salty area. Now and then a baby crowded its mother's forequarters to nurse, its slender trunk curled above its head. Older animals squelched over the moist ground. At intervals one would drive back an intruding buffalo with irritable squeals. Suddenly one guest murmured, "*It's prehistoric.*" He was right.

Nearly everywhere in the world, until relatively recent times, giant animals roamed the countryside, hunted by Stone Age man. Some eight or ten thousand years ago on the American continent hunters used pitfalls and stone-tipped spears against the now-extinct mastodon. In Europe men of the Ice Age encountered the woolly mammoth and various kinds of rhinoceroses; during warmer interglacial periods, hippopotamuses flourished in the Thames and the Somme. In Asia, too, strange animals lived side by side with early man: elephants quite unlike those domesticated in India today, and huge hippos. Africa had its giants too; and here, to a greater degree than elsewhere, some of them have survived.

Of these, the elephant, *Loxodonta africana*, is without doubt the best known and probably the most interesting. He and his Asian cousin *(Elephas maximus)* are the sole survivors of the Proboscidea, a group that once thrived in most of the world, except Australia.

Njogu, as we call the African elephant in Kikuyu, survived by virtue of an extraordinary adaptability to climate, habitat, and food supply. South of the Sahara, elephants range almost anywhere—except where man has driven them out or exterminated them. They are equally at home in semidesert, in forests and open woodlands, and on grassy plains.

Their food varies accordingly. The trunk, a highly modified nasal organ that merges into the upper lip, combines the work of nose and hand, and enables elephants to feed on many types of vegetation. I have watched elephants grip short clumps of grass, pull them up by the roots, beat them against their forelegs or chests to shake off the earth, and consume the plants whole. They pick leaves and twigs from all sorts of bushes and trees, and gather nuts and fruit from many palms. Often they break off large tree branches, then yank off ragged strips of bark with their trunks. A single delicacy may keep them at one spot for some time. Recently I came across a bull standing alone about 100 yards from the Nairobi-Mombasa highway. After loosening the soil with his tusks, he was tugging up small bushes and then slowly chewing the roots. I watched for nearly half an hour before driving on. Next day I passed the area again. To my surprise, the bull was still there, pulling up and eating more of the same sort of roots.

The quantity of food consumed depends on the nature and richness of the items available but may easily amount to several hundred pounds daily for an adult. Elephants spend much of their time feeding, and will travel immense distances to satisfy their needs. If necessary, they will move 30 or 40 miles overnight. They also seem very clever at locating underground water in apparently dry streambeds. Using tusks and

forefeet, they dig until they can drink their fill. Under optimum conditions they will drink 35 to 50 gallons a day; they can do with less for a short period. Water left in these holes benefits other creatures.

Unfortunately elephants tend to be very destructive in their feeding habits. They push over a small tree and then eat only a few of its leaves. They break off branches and rip so much bark from a larger tree that it will die. They amble on and repeat the process, again and again. An area devastated by elephants may not recover for several years. This problem affects many East African parks, and specialists are carrying out intensive studies of the numbers and activities of these great creatures, trying to arrive at some solution. All of us who are concerned with the future of our parklands hope these studies will soon provide specific guidelines. Perhaps some elephants will have to be shot as a means of controlling their numbers within the parks, but I like to think that a better way can be found. Already, when herds migrate from protected areas, their numbers are sharply reduced by trophy hunters and poachers who kill the animals for ivory and meat as well as for the tail hairs, used in making bracelets worn as good-luck charms. The studies also should tell us more about elephant behavior, which varies from region to region, from herd to herd, and even from one individual to another.

BULL ELEPHANTS frequently go about in small groups, two or three or half a dozen together, while cows with young calves form family units of up to a dozen or so. Sometimes the family units congregate into large herds. Generally a few bulls accompany them. These herds deserve the greatest respect. I shall never forget the narrow escape I had with such a herd in 1924 on a British Museum expedition at Tendaguru Hill, then a remote spot in Tanganyika Territory. Shotgun in hand, I was trailing a covey of guinea fowl to get fresh meat for my men. The birds scuttled into thick bush, where I crawled slowly after them. A strange rumbling noise sounded, first on one side and then the other—I had crawled right in among the elephants! The nearest help was a mile away, but the best help isn't much in that kind of situation. My heart was beating very fast as I crawled away, as quietly and slowly as I could—if the cows had caught my scent they would almost certainly have charged and killed me.

According to an old, old story, elephants go off to a single remote spot when they sense death approaching. Visitors often ask me about this myth. I have never found any real basis for it, but I can think of two explanations. During the 19th century many Arab traders roamed East Africa in search of two things: ivory and slaves. Africans living near these trade routes would collect ivory and hide it in some thicket near their huts. I suspect that the first tale of an "elephant graveyard" arose when a white man found such a collection, misinterpreted it, and assumed that the tusks had survived while the bones had crumbled to dust. Moreover, at a few sites in East Africa poisonous gases sometimes

Elephants in Murchison Falls National Park, Uganda, browse as white cattle egrets wheel above. Two or three times a year dozens of small family units form such congregations for a couple of weeks; while together the animals become highly active and excitable. This herd, shown in part, numbered 500.

emerge from vents in volcanic rock. At certain times escaping gas will suffocate any creature that comes near one of these places, particularly if it is in a small valley or depression. I know a photographer who was making a picture of one of the dead elephants at such a spot, luckily from a safe distance. As he watched, a hyena approached another carcass. Suddenly the hyena collapsed before his eyes and lay motionless—and the photographer retreated.

IF THE ELEPHANT is the best known and most interesting of the surviving giants, the giraffe probably attracts the most attention and causes the most surprised comment. When you see a giraffe for the first time, moving slowly through thornbush toward open country or in silhouette on the skyline, you can scarcely believe your eyes. He is so tall, so much taller than you expect. On roads through a national park you can study this lovely animal from a few yards away. Apart from a swing of the tail, a flick of the ears, a slight movement of the great eyes or twitching of the nose, he will stand quite motionless for a time and watch your stationary car. He looks haughty, and slightly condescending.

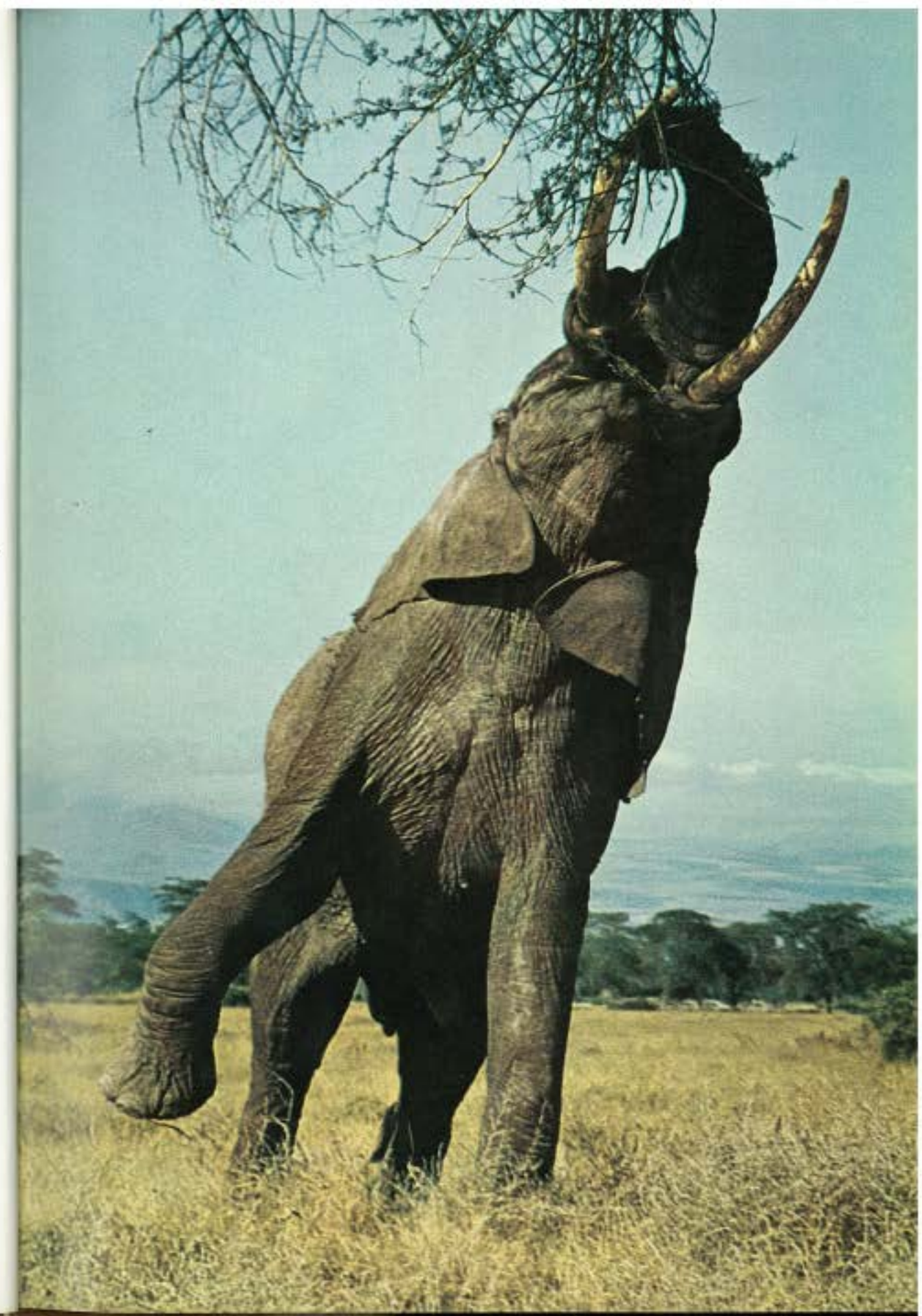
Then, quite calmly, he resumes his feeding or moves slowly away to join some companions a little farther off. Then you find that he is most surprisingly stately in his movements, when you would have expected ungainliness. The left legs come forward almost together, then the right; as the hoofs touch the ground the neck swings backward: a distinctive rhythm, like something in a dream. When giraffes break into a gallop, the long, powerful forelegs lunge forward, the legs stretch out, then bunch beneath the heavy body; the neck arches forward, then back. One does not expect to see such grace of movement, but one does.

As you watch a giraffe nibbling the top of a thorn tree, or bending his neck rather gawkily to reach a low bush, you may find it hard to believe that he has the same number of neck vertebrae as we have: seven. Each one is drawn out to a length of eight inches or more. This neck, together with the long legs, gives the animal his astonishing height.

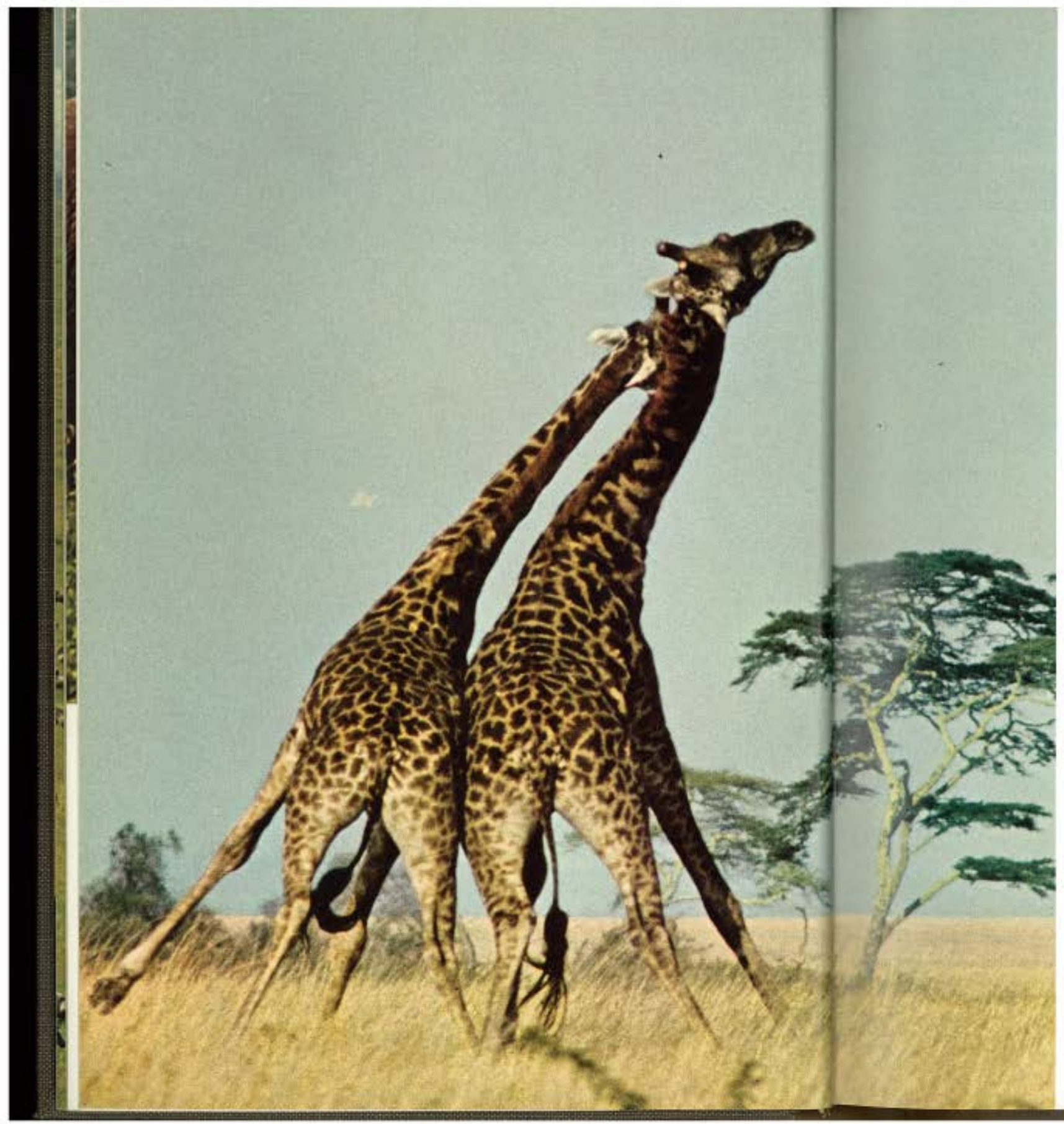
Standing normally, a giraffe cannot get his lips down to water level at a stream or pool. He must bend his foreknees or straddle his front legs wide into a most uncomfortable-looking position. He can then just get his lips to water. With a sucking movement he pulls the water uphill, up the throat of that long neck and down to the stomach.

He adopts the same posture to get saline earth, but after filling his cheeks to the bulging point he quickly stands up, head high, to masticate the earth and swallow it. Strangely enough, he seems unable to spit out his mouthful; if attacked or chased he may choke, and seems to fall into a panic. African poachers take advantage of this to attack with poisoned arrows (the sound of a gunshot might bring park guards converging on the spot). Giraffe hide makes a good shield, and tail hairs fetch good prices to make bracelets for the tourist trade. Game-department officers collect tails from giraffes killed accidentally—for example, by trains—for the bracelet-weavers. I hope that a nylon substitute may come into use and save many a giraffe from poachers.

During the past few years the giraffe populations in Kenya and Tanzania seem to have increased. Men seldom shoot them for sport now, and giraffes have very few enemies except man. Lions do kill



Lone tusker stretches high to wrench a tangled branch from an acacia tree. Elephants can lay waste an entire woodland with their destructive feeding habits. They will push over trees and often only sample choice foliage or strips of bark before ambling on to others.



young ones; sometimes they even attack adults, but this entails a struggle and the lion may come off the worse—a giraffe's kick is very dangerous. Although a female may defend her calf, the parental bond is remarkably loose in this species. Offspring begin browsing in their first month and are rarely observed to suckle after they start eating leaves. Young giraffes sometimes leave their mothers' herd to join another for a time.

Adult herd structure seems even more casual—perhaps because the animals can keep up visual contact for about a mile. At Olduvai Gorge, our famous prehistoric site in Tanzania, we know a herd whose home range lies to the north. Its number has seldom varied above six or below four over the years. A much bigger herd lives to the south. Both resort to the bottom of the gorge for water when there is any, avoiding the steeper slopes. Neither ventures often into the area of the other group.

UNTIL RECENTLY books on Africa have suggested that there are several species of giraffe in different areas, basing the distinction largely on skin color and pattern. Now it is more usual to regard all giraffes as members of one species and the variants as members of geographic races, or subspecies. I am not sure, however, that even these are valid geographic races, since you can find examples of more than one supposed "race" in the same herd. Attempts have also been made in the past to classify giraffes by the number of "horns" the males carry, but one big herd can contain males with varying numbers and types.

True horns consist of a bony outgrowth of the skull covered with a sheath of keratin. Giraffe "horns" are bony bosses, covered with skin and a tuft of hair, and are not really horns at all. They may represent relics of pedicels from which antlers grew ages before, since giraffes are fairly closely related to deer.

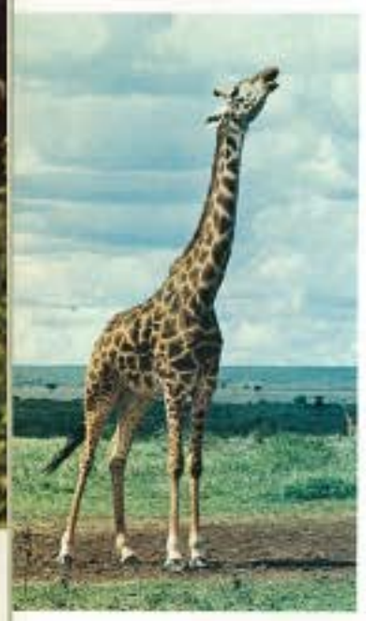
In prehistoric times of higher rainfall, giraffes roamed the Sahara, and artists painted them from life on rocky bluffs miles from any water or vegetation today. This great strange animal seems to have attracted more notice from East African prehistoric artists than any other animal except possibly the eland; it figures very prominently indeed in rock paintings with colors still vivid.

Unlike the other giants of Africa, the giraffe always appears clean and tidy because it never resorts to mud baths, while both the elephant and rhino love mud wallows and dust baths.

My first encounter with a rhinoceros took place when I was not yet 15. A Kikuyu friend, Gichuru, had agreed to teach me the tribal techniques and rituals of beekeeping, and we were going to check on some hives near the eastern slopes of the Ngong Hills, about eight miles from my home. As usual for such a walk, he had his two-edged sword in its sheath of wood and goat leather. We were following a narrow path through high grass and bush when we heard a crashing noise on our right in thick cover. Gichuru drew his sword, and we waited. A bush-pig? A bushbuck? Suddenly a rhino broke into view hardly four feet

Bull giraffes on the Serengeti shove with their hindquarters and swing their necks and heads like sledgehammers, landing blows sometimes audible half a mile away. The contest ends when one turns away. Giraffes inhabit much of the dry, lightly forested savanna of sub-Saharan Africa.

GEORGE B. SCHALLER, NEW YORK ZOOLOGICAL SOCIETY



Forelegs spread wide, a giraffe fills its mouth with saline earth to get the salt it needs. The animal leans down the same way to drink, sucking the water up its long throat, but when eating earth raises its head to chew and swallow.

BARON HUGO VAN LAWICK

away, and Gichuru hit it with the flat of his sword, hard, between eye and ear. The astonished animal made off in a hurry. At the time I thought we had been attacked, but looking back I think that the frightened creature simply rushed blindly toward an unrecognized sound.

This, of course, was the common "black rhino," *Diceros bicornis*. The "white rhino," *Ceratotherium simum*, has disappeared from East Africa except in northern Uganda. Their common names are most misleading, for both animals are gray—or soil-colored. Dutch colonists in South Africa called one rhino *wyd*, or wide, referring to its wide mouth and lips; this was corrupted in English to "white." I prefer to call this the "square-lipped rhino." Its square lips are particularly well adapted to grazing, although it can certainly browse to some extent. Standing five to six feet at the shoulder, with a massive hump at the nape, it will weigh more than two tons.

We know from subfossil bones that turn up in recent alluvial deposits, from prehistoric rock paintings, and from historical records that the square-lipped rhino was much more widespread during the past three to four thousand years until only a few centuries ago. Probably it has disappeared so rapidly because it is much more lethargic, mild-tempered, and easier to approach and kill than its smaller, prehensile-lipped cousin. In the 1890's my late uncle John Pigott shot one during an exploration trip up the Tana River; quite possibly, certainly unintentionally, he killed the last square-lipped rhino in Kenya.

Undoubtedly all the rhinos in Africa are in grave danger from poachers, because rhino horn commands a high price in the Far East, where it is rated as an aphrodisiac. Poachers consider the profit from one horn well worth the risk of a heavy fine or jail sentence or both. Traders from the coast pay the equivalent of $12 a pound, or sometimes more than $150 for a horn. Sold in powder form, such a horn eventually commands several thousand dollars in the Orient.

This "horn" is actually a dense mass of dermal filaments that grow from a bony base on the nasal bone, and I cannot help wondering whether science could not produce a substitute to capture the traffic and thus save the surviving rhinos from poachers.

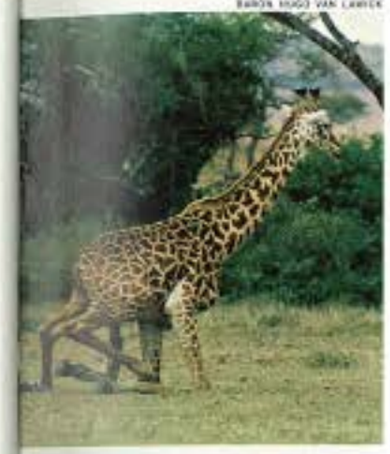
Both types of rhinoceros are true surviving giants, present about two million years ago at sites like Olduvai and the Omo Valley in Ethiopia. From our Fort Ternan diggings, near Lake Victoria, we believe we have traced the ancestry of the black rhino back twelve million years.

Black rhinos remain widespread today, although never very numerous except where closely protected. They show great adaptability to different altitudes and habitats. They range from the coastal plain through sere bush country right up to mountain forests. They feed in open moorland on the highest slopes and seem equally adapted to the arid regions of northern Kenya. I once found one many miles from any shade or any apparent source of water, near Mount Kulal, feeding off succulents and other juicy plants.

The black rhino's triangular muzzle and moderately prehensile upper lip equip him well for browsing, but—contrary to some old reports—he is perfectly able to graze as well. During the wet season I have seen two black rhinos reveling in lush clover on the caldera floor at Ngorongoro, and they were reported to have remained there for five days.

Dropping cumbrously, a giraffe wrestles his heavy frame to the ground to chew the cud and rest. When recumbent a giraffe usually holds its head high to watch for predators.

BARON HUGO VAN LAWICK



For more than a decade conservationists have warned that the black rhino is in grave danger of extinction. My family and I have shared this view. Olduvai Gorge always has some resident rhinos, and we had reckoned their number at 13 to 15. During a spate of poaching we were distressed to find the skeletons of a dozen rhinos killed for their horns in a single year. Thereafter for some time we hardly saw a rhino, and feared that our population had been nearly exterminated.

Then, in 1964, a Canadian scientist, John Goddard, arrived to make careful studies. He devised a method of recording every rhino he saw by photographs in profile and full face, noting the shape of horns, the scars on ears, and the wrinkles on snouts. He built up a dossier and succeeded in identifying each member of a population. His count proved that more than 70 rhinos lived in a study area of 170 square miles centered on the gorge. This shows how difficult it can be to estimate animal populations accurately; aerial surveys gave much lower figures.

Goddard found that rhinos keep to a small home range—about 11 square miles in dry thornbush at Olduvai, 6 in the grassland of Ngorongoro, about 1 square mile in its lush Lerai Forest. These ranges may overlap. Males typically greet females with a pattern of behavior that includes a loud puffing snort; females approach one another warily, exchange gentle nudges with the sides of the head or joust briefly with anterior horns, and then one walks away. Neighbors normally tolerate each other. But if a stranger intrudes, the resident may become aggressive, especially if both are males. The resident attacks, screaming loudly; the intruder defends itself in silence until, typically, it flees, hotly pursued.

The black rhino may charge a man without warning, and in new settlement areas men kill the animals off as a precaution. Contrary to what many people claim, the rhino is not especially inclined to attack at sight. It sometimes attacks for lack of sight, as I know from experience.

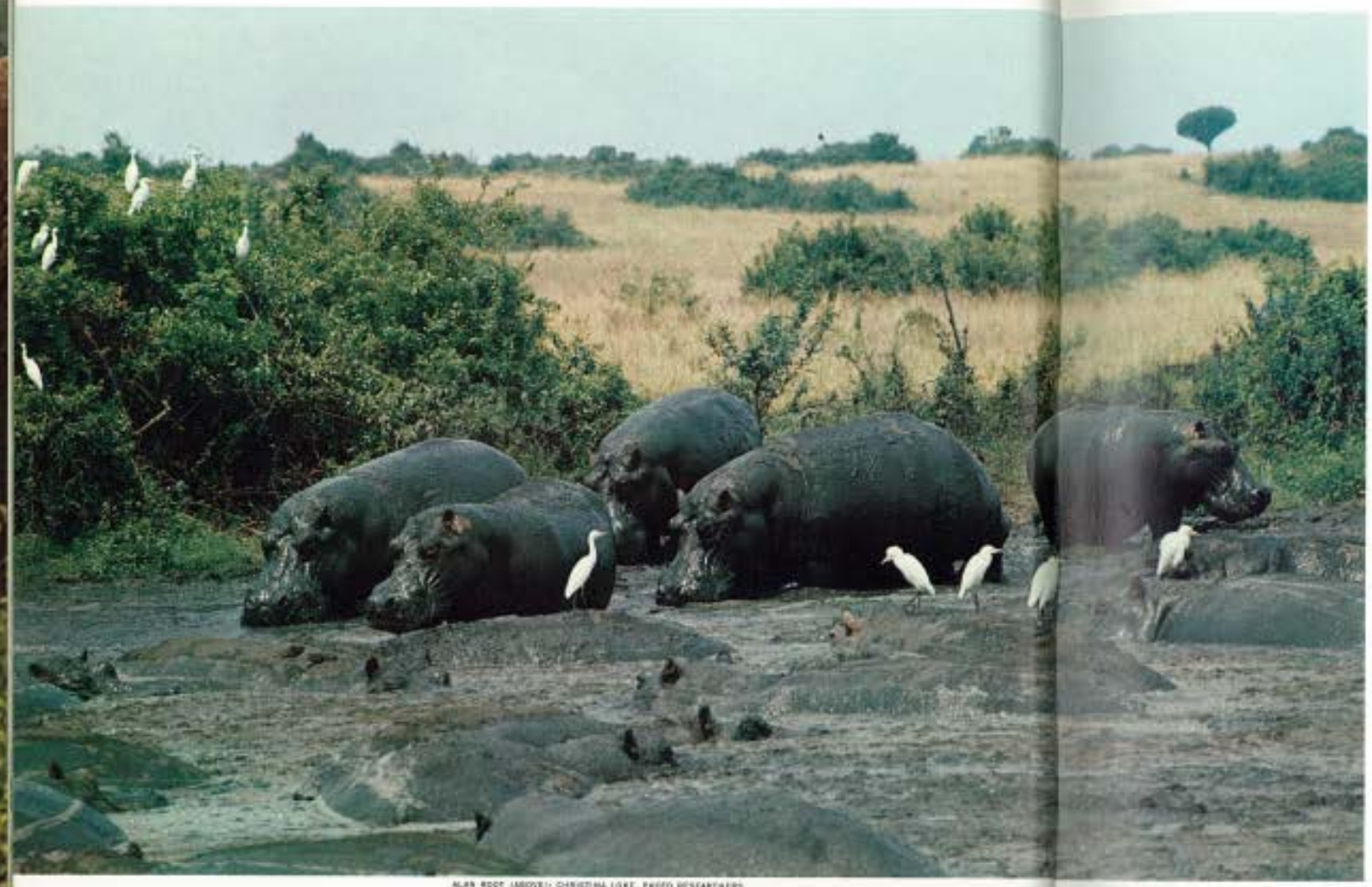
Once at Olduvai, I took a student up the side gorge, where we hoped to see rhinos. Suddenly I said, "Mind, look out, Jean—there's a rhino coming!" Perhaps he had heard the sound of our footsteps. From the way he was holding his head low and his tail high, I thought he was in an uncertain temper. I helped Jean scramble up a nearby rock, about 10 feet high with good steep sides. The rhino came trotting on toward us. Suddenly, about 15 feet away, his little piggy eyes seemed to see us, or perhaps he caught our scent. At any rate he apparently recognized us as humans, for he turned and bolted away as fast as he could go.

I feel nearly certain that men often misinterpret a rhino's investigation of noise as an "unprovoked charge." While our young rhino turned and ran, an older animal might have reason to dislike man and press home a charge. Once, in self-defense, I shot a rhino that charged me from thick bush at point-blank range; I found an old, suppurating wound in his shoulder, apparently from a soft-nosed bullet.

Rhinos can be dangerous when they have their young with them, for they try very hard to protect their offspring. Adults have few enemies,

Overleaf: Revealing large razor-sharp tusks, a hippopotamus yawns in a threat display to warn away trespassers. The hippo remains in or near water during the day; at night the huge mammal leaves its pond or river to feed, consuming as much as 200 pounds of grass, herbs, and leaves on a single foray.

JEN AND DES BARTLETT, FROM "NATURE'S PARADISE," HOUGHTON MIFFLIN CO.



ALAN ROOT (ABOVE); CHRISTINA LOKE, PHOTO RESEARCHERS

Blimp-like hippos laze in a muddy wallow in Queen Elizabeth National Park, Uganda, as cattle egrets search for insects stirred up by the animals. At left, hippos slash at each other in a fight that lasted for an hour and left one with deep, bleeding wounds.

but both lions and spotted hyenas may attack young ones. These predators are sufficiently quick of foot to run little risk that the parents will harm them. Nevertheless, Goddard saw a mother engage a rash young lion that charged her calf. The lion bit her leg and clawed her thigh, whereupon the rhino whirled and gored him twice in the ribs. She stabbed him in the neck as he rolled on the ground, and finished him off with a thrust at the base of the lower jaw.

In 1934 my wife Mary and I had a brush with rhinos while driving the rough earth track from Olduvai to Arusha in a small car. We saw a big bull rhino standing in the middle of the road ahead of us, so I stopped. We waited until he ambled off into the bush, and I started forward again, keeping an eye on the spot. We reached that point and saw not one adult but two, with a small calf. To my horror, both adults charged us. I accelerated to the best speed the car and the road would permit and started down the track at a dangerous pace. How far they followed I have no idea—both Mary and I had our eyes on the potholes and ruts ahead. Eventually, after breaking both back springs, we got away.

Although many and varied types of rhinos flourished in the past, and we know something about the ancestry of the African survivors, we know little, for certain, about the forebears of the strange animal that the ancient Greeks called *hippopotamus*, or "river horse." We do know that it is fairly closely related to the family of the pigs, and my colleague Shirley Coryndon is now studying fossils from early deposits in Kenya that may establish the true descent of the hippopotamus. The available specimens certainly suggest that at least some of the hippos of the past were every bit as much aquatic animals as the present-day species.

Except for occasional periods of sunbathing and drowsing on mudbanks or sandbars, or wallowing in mud, hippos spend the day in the water. Occasionally they submerge completely, rising every three to four minutes for breath. They may nibble a little on water plants in the shallows, but during the day they do not really engage in feeding. At night they move onto land and wander for several miles in search of grazing—perhaps 200 pounds of grass per adult.

Since the hippo spends the night away from the protection of the water, getting food to satisfy the needs of his huge body, he evidently does not lie down to rest or sleep. I doubt that anyone knows whether his daytime repose in the water is sleep or mere drowsing. One might wonder if he dozes during his brief periods under water. This raises a most interesting problem regarding sleep among wild animals and the extent of sleep—in the human sense, as distinct from rest and repose—that is necessary to various species.

Lions certainly sleep by day, mostly in "cat winks." They sprawl fully relaxed, with eyes closed, but they can spring into fully alert wakefulness in the twinkling of an eye. It is uncertain whether elephants in the wild regularly sleep by night, although in zoos and circuses they do so for several hours at a time. In the wild I have seen them resting by day, either just standing up or leaning against a large tree. Some observers

Overleaf: Herd of Cape buffalo stampedes through red oat grass in the Great Rift Valley. Normally peaceful grazers, these massive animals fight viciously when attacked by lion or man—their principal enemies.

HELEN AND FRANS LANTING, NATIONAL GEOGRAPHIC STAFF

have photographed them lying on their sides, eyes closed, trunks curled in a spiral—and have even heard them snoring. Giraffe and many of the antelopes spend the daylight hours either feeding or lying down chewing the cud and also, apparently, do the same throughout the night. They may put their heads down and shut their eyes for two to five minutes several times during the day and night, but I do not think they sleep deeply. Rhinos, on the other hand, do sleep, usually by day, lying on their stomachs with legs tucked under them, but I have also seen them flat out on their sides, sleeping so soundly that twice I have been deceived into thinking I had found a dead one!

What do these phenomena mean? Perhaps man and other animals that sleep deeply and at some length have developed the habit because they have little to fear during extended unconsciousness. Man can assure himself of a high degree of safety; lions and rhinos have no natural enemy except man. In contrast, creatures like giraffes and antelopes must stay ever on the alert for danger from predators. Also, it may be that their digestive systems require them to chew the cud almost continuously when they are not feeding. So perhaps the equivalent of sleep in many animals is rest and repose. Here, I feel, is a wonderful project for a study in depth. In the past decade we have learned a great deal about the complexities of human sleep. Now we need to know more about animal sleep and sleepless repose.

RESEARCH on hippopotamus behavior and ecology became an urgent matter for the Uganda parks authorities by 1956. In Queen Elizabeth National Park, the Kazinga Channel between Lakes Edward and George provides a permanent waterway, and here the hippo population increased excessively. Ranging farther and farther inland, the animals turned grassland into stretches of barren dust and mud. Planned culling of as many as 1,000 hippos a year seemed to bring the population in balance with food supply.

In other regions hippos may find their watery home drying up under especially severe drought conditions. Then, unless they can travel to some other lake or river, their skin blisters badly with sunburn, their food supply fails, and they perish in great numbers. I remember when the shallow waters of Lake Rukwa in southwestern Tanzania dried up, and hundreds of these poor creatures died. Perhaps this is nature's way of keeping down their numbers, for hippos run few risks except that of being shot for meat or a lion's attack on the young.

Female hippos use shallow water as a nursery for their young. At Mzima Springs in Tsavo National Park you can stand on a small pier to look down into the clear water at mothers and their little ones, as well as big adult males. Sometimes they rise quietly for air; mostly only the top of the head clears the surface, a rapid waggling of ears sends two small showers sparkling, and the animal slips under again in a circle of shimmering ripples. Sometimes they surge up noisily, grunting and yawning. One utters a loud *wonnk;* another answers from the bulrush clumps at the far end of the pool.

We tend to think of hippos as fat and cumbersome, with their stubby legs, low-slung bellies, and ungainliness on land. But much of their bulk is pure muscle, biologists have found, and they can outpace a man when

Cattle egret perches on the back of a Cape buffalo on the shore of Lake Manyara, Tanzania. When alarmed, egrets flap noisily away, alerting their hosts to possible danger. Shoulder-deep in mud, the buffalo at right escapes the heat by lounging in a wallow.

SIMON TREVOR, BRUCE COLEMAN, LTD. (ABOVE); F. TURNER REATER, N.G.

aroused. The transformation when they enter the water must be seen to be believed. They get about with a slow gliding movement so well coordinated it is almost a poem, and I find it close to impossible to bring myself away.

On the other hand, when you watch buffalo from a car in a national park, you recognize at once the familiar behavior of domestic cattle. They graze unconcernedly in herds of fifty or a hundred or even more, or lie peacefully in patches of shade to chew the cud. Indeed, it seems very odd to me that few serious attempts have been made to domesticate the African species. Its adaptability, from sea level to mountain forests, and its relative immunity to some of the cattle diseases would seem to make it an ideal animal for ranching. A good bull, standing 5 feet at the shoulder, may weigh more than a ton. Peoples like the Kikuyu, who regarded game animals as unfit for food and taboo, treated buffalo flesh as legitimate meat, on a par with beef. They tanned the skins, thick and tough but workable as elephant and rhino hide are not, for the best possible war shields. In my boyhood I learned the Kikuyu practice of trapping buffalo in deep game pits near a watering pool, a swamp, or a lakeshore. Although lions will attack a buffalo, they sometimes come off very badly when other members of the herd retaliate. I have seen at least one record of hyenas killing a young calf, but buffalo hold their own against most predators.

Hunters often call buffalo the most dangerous of all African big game. It is not an easy animal to kill outright. The massive horns protect the brain from front and side. A heart shot is difficult, and a shot through the lungs that will drop almost any other animal leaves a buffalo capable of doing a lot of damage before he succumbs. I believe, in fact, that a wounded buffalo is the most cunning and most dangerous of all the animals I know. As soon as you wound him, he is liable to be stalking you as much as you are stalking him. I have lost three friends killed when trying to follow up wounded bulls. Each had gone on alone—it is understood among hunters that you do not take anyone else into danger if you can avoid it. The buffalo—like the great predators, like the other surviving giants—commands man's respect.

Disturbed and puzzled, a black rhinoceros (opposite), purses the prehensile upper lip used in pulling leaves and twigs from low trees and bushes. At left, a white rhino, a larger, more placid beast, forages with a square lip adapted to grazing. White rhinos gather in family groups of up to seven members; black rhinos frequently lead solitary lives.

BARON HUGO VAN LAWICK (LEFT); M. P. KAHL