DIGEST®

Would you like to take a science vacation? The airborne boat, a Hovercraft, on this month's cover, was the transportation for one exciting trip described in this issue. Another trip is being planned to Timbuktu, and you could be one of the passengers. Read about these exciting scientific adventures and how you can take part. The story begins on page 8.

NOVEMBER • 1971 Vol. 70, No. 5

CONTENTS

DEPARTMENTS

SUBSCRIPTION PRICES U.S.A. and Possessions, $5.00 for one year; $9.00 for two years; $13.00 for three years. Canada, add 75¢ for each year. All other countries, add $1.00 for each year. Special Teachers' and Students' rates available through SCIENCE DIGEST School Plan. 25¢ a copy, minimum order 10 copies per month. Write to: SCIENCE DIGEST School Dept., at address below. Subscription Service: Mail all subscription orders, changes of address, correspondence concerning subscriptions, and Postmaster notices of undeliverable copies to SCIENCE DIGEST, Box No. 654, New York, N.Y. 10019. Please enclose your latest address label for quickest service when writing about your subscription.—Second-class postage paid at New York, N. Y., and at additional mailing offices. Microfilmed copies of SCIENCE DIGEST are available through University Microfilms Library Services, Xerox Corp., Ann Arbor, Mich. 48106. SCIENCE DIGEST is indexed in READERS' GUIDE TO PERIODICAL LITERATURE and CURRENT CONTENTS under Education. Articles are indexed in SCIENCE DIGEST for six-month periods every January and July. Printed in the U.S.A. Contributions must be accompanied by a self-addressed and stamped envelope.

They're out to

SAVE THE BLACK RHINO

by George Frame

A MOTHER RHINO AND CALF puffed and snorted furiously as they thundered across the plain within Ngorongoro Crater. Herds of wildebeest and gazelle hurried to get out of their way. Barely three yards behind the rhinos, a Land Rover bounced in hot pursuit. Game biologist John Goddard leaned out of the window and took careful aim at the adult with a Cap-chur gun. As the 10-cc syringe sped home, penetrating her rump, the 2,500-pound rhino reacted not at all.

"It's a hit," I shouted. "It injected!"

The rhinos continued to gallop at nearly 30 mph; it would be 10 minutes before the drug had a noticeable effect. John quickly loaded another syringe into his rifle and aimed carefully at the calf, which followed closely behind its mother.

"You got it, John! Driver, *endesha pole pole.*" These were the much awaited words, signifying that both mother and calf had received their carefully measured proportions of anesthetic. We now had a few minutes to catch our breath and hastily make notes while the Tanzanian driver, Stephen Ngereza, followed the two rhinos.

Darting and tagging are an impor-

tant part of John Goddard's ecological and ethological studies of the black rhinoceros (*Diceros bicornis* L.) in East Africa. The metal ear-tags provide permanent identifying marks.

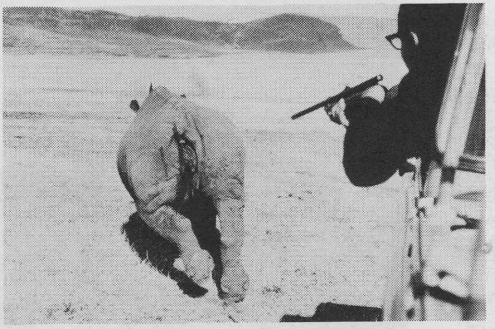
Black rhinos are reputed to be the most aggressive of the five living rhino species. The individuals in our study areas seldom let us forget this reputation, so we have to resort to immobilizing several of them to get data.

When a rhino is immobilized, we can take its body measurements, record the physiological response to the anesthetic, and collect parasitic ticks from the folds of its skin. We can pry open the drugged rhino's mouth to look at its teeth, to try to get an idea of its age. The information will help us develop a better understanding of whether rhino populations are stable, increasing or decreasing. Knowledge of the rhinos' well being under various conditions is essential in planning and managing reserves to ensure the survival of the species.

For centuries the three Asian species and two African species of rhinoceroses have been ruthlessly hunted, usually for their horns. Unlike horns of other animals, rhinoceros horns are entirely an outgrowth of the skin. They consist of a keratinous, or horny, fibrous substance, which is chemically identical to the fingernails and hair of man.

There is a widespread belief throughout Asia today that rhino horns have aphrodisiac value. This, coupled with the belief that various parts of the rhinoceros are useful for curing specific ills, has taken a heavy toll of the three Asian rhino species. Their future is very bleak.

The white rhinoceros and the black rhinoceros of Africa are endangered, too. As the rhinos of Asia become more scarce, the horn hunters attack the relatively more plentiful supply in Africa. Fortunately, the African rhinos are still numerous and if protective measures are taken now they may survive. Studies such as ours, hopefully, will lead to the development of sound management programs.



A researcher takes careful aim at a fleeing rhinoceros as he shoots it with a syringe filled with anesthetic. It takes a 2500-pound rhino about 10 minutes to react to the shot.

For months I had assisted John Goddard in his rhino study at Ngorongoro caldera and in the alternate study area at Oldupai (sometimes spelled "Olduvai") Gorge, 30 miles west of the caldera. Both are in Tanzania.

Comparison of rhinoceros data from the forest and open-grassland/seasonal-marsh habitats of Ngorongoro with the dry-thornbush habitat of Oldupai would provide valuable insight into the needs and preferences of the black rhinoceros. But to accomplish a study such as this, it is imperative to be able to recognize every rhino as an individual.

Binoculars and a camera are essential tools. Normally, one approaches to within 20 to 40 yards of an individual rhino, either on foot or in a Land Rover. At this distance we clearly can see the minutest details,

The rhino is turned over and prepared for tagging and recording information about his size, response to anesthetic, teeth, skin. Studies may preserve vanishing species.

even the hair distribution on the animal's ears.

In thick bush the best method for identifying a rhino is to climb a tree and call with a mewing sound, like that made by rhino calves. The rhino will often walk right up to the tree.

Photographs and detailed written descriptions of every rhinoceros that we observed were used to compile an identification book for all the rhinos in both study areas. Key criteria in identifying an individual rhino are geographical location, sex, horn shape, torn ears, hair fringe of the ears, tail tassel and body scars. In several difficult cases we compared the facial wrinkles. Ear tags provide a long-term check on identification.

The adult black rhinoceros is essentially a solitary animal. Males are normally seen alone, and the female, too, prefers seclusion with her calf.

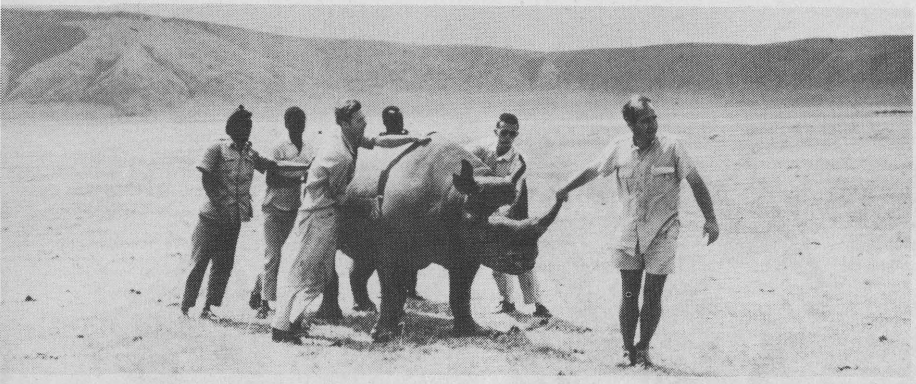
However, an immature rhino, which is driven away when its mother has a new calf, seeks the companionship of another rhino. Often it will attach itself to another immature rhino, or to an adult female.

"The largest group of rhinoceroses

that I have seen together consisted of 13 animals," John Goddard reported, "but the group disbanded after two hours into solitary animals and groups of two and three. But I saw this large a group only once in my three years of daily observations."

The peak activity periods for rhinos are the hour beginning at dawn and the hour at dusk. At these times nearly all the rhinos we observed were actively feeding or walking.

Around midday most rhinos are asleep in the shade of a tree or else in a dust bowl in the hot sun. Their daytime slumbers are sometimes interrupted for a snack or two on the



nearest appetizing vegetation.

Our nighttime observations suggest that most of the population is active through the hours of darkness, though they do sleep part of the night. We always used a Land Rover at night; it would have been dangerous for a person to wander about rhino country in the darkness.

Different rhinos had different reactions to the vehicle's headlights. On the plains to the west of Oldupai Gorge I came across a mother and calf lying down. They were startled, and immediately arose. In confusion, both spun around several times with great agility. I kept the Land Rover in gear, ready to speed away if they decided to charge. The mother jabbed the air with her horn. Finally, after eight or 10 seconds of indecisive action, they ran off together away from the light.

Rhinos within Ngorongoro Crater seldom were frightened by headlights. Often they showed no reaction other than slight annoyance.

The black rhinoceros is mainly a browser, and has a strong upper lip to accommodate this feeding. I have watched a rhinoceros use its curved anterior horn to reach up and break off a four-inch thick branch of *Euphorbia* by pulling downward on it. The animal repeated this behavior several times. I suspect that rhinos with missing or broken anterior horns may have broken their horns on branches while feeding, rather than while fighting as is believed.

In Oldupai Gorge I frequently resorted to climbing high into the branches of these flat-topped trees. One reason was to get a better view of the rhinos feeding in the thick vegetation of the gorge.

The other reason was that I was chased there. Stalking a 2,500-pound rhino in thick bush is a challenging and nerve-wracking experience. One must be silent and stay downwind, listening for the chewing sound as the rhino masticates coarse acacia.

Sometimes my best efforts ended in failure. Then, I found myself running furiously for the nearest thorn tree, with a snorting *"faru mkali"* rhino in hot pursuit. I look back upon such experiences with fond memories, now that the thorn scratches have healed.

Rhinos travel well-worn paths. These trails and the regularity of daily activities are the main reasons that rhinos are so vulnerable to poachers. It matters not whether the weapon is a gun, spear, poison arrow or snare. The poacher, by knowing the hours of rhino activity and by using rhino trails, is assured success. He kills the animal, chops off the horns with his panga (heavy bush knife), and leaves the carcass for

The team of researchers in East Africa lead a subdued black rhinoceros, the most aggressive of the species, toward the work area where ear-tags will identify the animal.

whatever may come along.

Predators sometimes attack rhinos, but these occurrences are rare.

In one instance, a male lion attacked an 11-month old calf. Felicia, the calf's mother, has a beautiful, straight horn that points forward like a saber. Felicia saw the approaching lion and prepared for the attack, while her calf snuggled closely against her. But then the calf panicked, and ran away with the lion in close pursuit.

Felicia trotted after the lion, who promptly diverted his attack from the calf to the mother. His jaws closed on Felicia's hind leg, and he clawed at her thigh. She whirled around with incredible agility, using her horn to stab the attacker in the ribs, neck and jaw, killing him instantly.

Lerai Forest covers one square mile of the floor within Ngorongoro Crater. Tall majestic acacia trees with dense bushy undergrowth ensure the availability of food throughout the year. The result is an extremely high density of 23 rhinos per square mile.

There are few water holes at Oldupai Gorge and palatable vegetation is less abundant. Consequently, the average home range of a single rhino covers about 12 square miles.

The grasslands within the caldera of Ngorongoro are intermediate in that they have less available food and water than the forest, but not nearly so little as exists at the gorge. The average home range in the grasslands is six square miles. This is only half as large as at Oldupai, but considerably greater than for the forest.

Individual home ranges are well defined, but overlap considerably—even among adult males. Rhinos sharing common parts of their range frequently come into contact with each other during their daily activities. Usually they are not aggressive, but confrontations do occur. One confrontation between two adult male rhinos remains particularly vivid to me. Horace is a docile old fellow whose home range contains grassland and swamp on the Crater floor. One day a strange male came down from the Crater wall and entered Horace's territory. Horace responded by attacking the intruder with hideous snorts and groans.

Both animals stood facing each other. Heads were lowered, ears flattened and tails raised. The intruder did not respond to Horace's noises, but silently stood his ground. Anterior horns were mere inches from each other; both jabbed and clubbed at the sides of each other's head. But actual physical contact seldom occurred. As usually happens, the intruder made a sudden retreat, closely pursued by Horace, the successful defender.

The black rhino's hearing ability is quite keen—so is its sense of smell. But rhino eyesight is notoriously poor. This became all too obvious to me one day on the dry, sandy windswept plains around Oldupai Gorge. After spotting two feeding rhinos with binoculars from two or three miles away, the driver and I approached very slowly in the Land Rover from downwind. As we moved closer, to within 150 yards, I left the vehicle and began to creep ahead on foot. Cautiously, I moved forward, a few steps at a time. When I found myself within 10 yards of the nearer rhino, I decided that that was close enough. Perhaps I was pushing my luck a bit

too far. Despite my complete visibility, both rhinos were totally unaware of my presence. The strong, gusty, noisy wind prevented them from hearing or smelling me. After one hour of observing their feeding behavior, I slowly backed away.

At Ngorongoro and Oldupai an average of four years is required for each adult female to recruit one calf into the population.

Sexual maturity is reached close to the fifth or sixth year, and a black rhino may live for 30 to 40 years. The population of black rhinos in Ngorongoro is at least 110, and we have identified 74 at Oldupai.

In the caldera, about seven calves are born per year, and at Oldupai Gorge only five calves appear yearly. Considering the occasional predation by hyenas or lions, and the usual population loss from old age, there is very little "margin of safety" remaining. Rhino populations can be exterminated by merely removing a relatively small percentage each year.

A baby rhinoceros, whose life span is 30 to 40 years, is guided toward the research area for identification and examination.

The white rhinoceros of Africa is much rarer. Poaching was once considered rampant in the Congo, where as many as 80 percent to 90 percent of the white rhinos were estimated to have been killed during the six long years of political instability. In spite of this their plight is not nearly so serious as that of the three Asian species: The Indian rhino is estimated to number about 700 individuals, and Sumatran rhinos may not number more than 180. The nearly extinct Javan rhino is known to exist only in Indonesia. Approximately 25 of this species are believed to remain.

In Vietnam the few remaining rhinoceroses are being exposed by the jungle defoliation program of the U.S. Army. Rhinos deprived of cover are very quickly eliminated, as are many other forms of wildlife. Saigon traders in recent years spoke of being able to sell a large horn for the equivalent of $2,000 (U.S.).

The future for the rhino is dim indeed, except in the few African countries such as the Republic of the Congo, Uganda, Tanzania, Kenya, Zambia, and southern Africa, where the governments are taking steps to ensure their preservation. These governments, and those of us who are studying the rhinoceros, agree that only in national parks like Tsavo and conservation areas like Ngorongoro Crater does the rhino have a chance for survival. ■