

The young nurse for about two years at the mother's two nipples and usually remain with her for three and a half years. If one captures a nursing young rhinoceros, it will become as tame as a domestic animal. In most cases, eight to ten months will pass until the female becomes pregnant again. In Amboseli Park, the first calf stayed with its mother for two and three quarters of a year, the following one three years, and after five years she gave birth to the third one. Black rhinoceros are sexually mature at the age of approximately seven years.

Previously, when a zoological garden kept rhinoceros, they were mostly great Indian rhinoceros. Unfortunately, the great Indian rhinos are now almost extinct, and only a very few may be given to qualified zoos. The first black rhinoceros came to Germany in 1903 to the Berlin Zoo. Now black rhinoceros are the most frequently kept species of rhinoceros in zoos. In 1966, thirty-two of them were kept in zoos in the United States.

The animals usually become very tame in captivity; it is even possible to ride on some adult females' backs. They like being caressed with the palm of the hand over their closed eyes. Probably due to a lack of anything to do, they often rub their horns against concrete walls and iron fences, which reduces them to short stubs. Therefore, a trunk of soft pine wood should be placed in a rhinoceros pen where the animals may rub and polish their horns. They cannot cross a ditch of 1.75 meters in diameter at the upper rim and 1.20 meters of height at the outer wall, even though the inner wall of the ditch is inclined upwards towards the animals. How long they live we only know from zoological gardens. In Brookfield Zoo of Chicago, the breeding pair which came there on May 19, 1935, is still alive (1967). The two animals, who must be by now approximately thirty-three or thirty-four years old, do not show any symptoms of old age. Presumably, rhinoceros may reach an age of about fifty years.

A most impressive animal, which today is found only in a few savannah regions in Africa, is the SQUARE-LIPPED RHINOCEROS (*Ceratotherium simum*; Color plate, p. 37). It is the largest species of rhinoceros. The HRL is 3.6-4 m, the BH (shoulder) is 1.6-2 m, and the weight is approximately 3 tons (in one case approx. 5 t.). There are two horns. A strong shoulder lump, which consists of muscles and epidermal tissues, is not supported by the skeleton. It has wide, almost square-shaped lips that characterize it as a herbivore. Incisors are present only in the embryonic stage; later there are only high crowned premolars and molars: $\frac{(1) \cdot 0 \cdot 3 \cdot 3}{(1) \cdot 0 \cdot 3 \cdot 3}$. The gestation period is seventeen to eighteen months; one young is born. There are two subspecies: 1. SOUTHERN SQUARE-LIPPED RHINOCEROS (*Ceratotherium simum simum*). 2. NORTHERN SQUARE-LIPPED RHINOCEROS (\diamond *Ceratotherium simum cottoni*).

In place of the lacking incisors, the square-lipped rhinoceros has a

The square-lipped
rhinoceros
by H. G. Klös

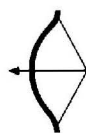




Fig. 2-7.
Former and present distribution of the two subspecies of the square-lipped rhinoceros:
1. Northern square-lipped rhinoceros (*Ceratotherium simum cottoni*); 2. Southern square-lipped rhinoceros (*Ceratotherium simum simum*). Only in the areas marked with black triangles do square-lipped rhinoceros still exist.

hard, horny edge on the lower lip that facilitates grazing. A too rapid abrasion of the molars by the hard grass which contains silicic acid is prevented, or at least slowed down, by a specific course of development of the teeth. The ridges on the surface of the teeth are especially high and the intermediate space is filled with dentine. Due to this construction, the tooth has achieved extraordinary durability. According to Player and Feely, the square-lipped rhinoceros in Zululand prefer specific grasses like *Urochloa*, *Panicum*, and *Digitaria*.

As in the black rhinoceros, the best developed of the senses is the olfactory. Hearing and vision are rather poor. According to Dieter Backhaus, square-lipped rhinoceros are able to recognize a person, approaching slowly in a favorable wind direction, only at a distance of approximately thirty to thirty-five meters. I found the same to be true in the Umfolozi Preserve. Since square-lipped rhinoceros are much more placid and less aggressive than the black rhinoceros, I could frequently observe them quite easily from a very close distance before they would raise their huge heads, uneasily turn their large ears in all directions, and finally trot away with their tails curled upward. Only once when they were greatly terrified did I see them pull their tails between their hind legs. The light trot of the square-lipped rhinoceros does increase to a considerable speed in situations of danger. Player and Feely report as follows: "The normal type of fast locomotion is an extremely rapid and graceful trot which was measured at a speed of 29 km/hr from a vehicle. When galloping short distances they may attain a speed of 40 km/hr."

The bare skin of the square-lipped rhinoceros, which has only a few bristles at the ear rims and a tail of a dull slate color, is only slightly different from the black rhinoceros. The common name "white rhinoceros" for the square-lipped rhinoceros, therefore, is as confusing as the name "black rhinoceros" is for the other African species. The name probably came from an error in translation; the Boer word *wijde* (wide) was changed, due to a misunderstanding, into the English word white. Furthermore, after the animals have wallowed in the mud, the hot African sun dries it quickly into a crust which covers the body like another skin. Depending upon the soil, these mud crusts are different colors. Therefore it is possible that the name "white rhinoceros" originally was given to animals which had wallowed in a light clay and therefore appeared to be "white."

Like in the black rhinoceros, the anterior horn of the square-lipped rhinoceros may reach a considerable length, while the second horn always remains shorter and bulkier. So far, the record measurement of an anterior horn in the Southern race was, according to Maberly, 1.58 meters. The females' anterior horns often are longer and thinner than those of the males. H. Lang thinks that the frontal horns serve, so to speak, as a bumper: "The horns are carried closely to the ground to

clear the way for the short, column-shaped front legs and the barrel-shaped body. When the animal moves slowly or is grazing, he is constantly nodding his head. It is this abrasion which is the natural cause for the smooth surface of the horns, the flattening of the frontal parts, the wearing out immediately above the base and rear edge of the anterior horn, as well as the frequently found spatula-shape of the second horn. It is not due to the friction during digging and honing against stones." The nose horns, which are rather loosely attached to the skin, represent the weak point in the construction of rhinoceros. The horns, especially long ones, are easily torn off if force is applied. The female square-lipped rhinoceros Kuababa of the Berlin Zoo lost her anterior horn in May, 1963, when she was captured in the Umfolozi Conservation Area. By July, a small elevation became visible on the nose, and in December the length of the horn had reached thirteen centimeters. The new anterior horn kept growing at an average rate of half a centimeter per month. In March, 1967, it had attained a length of 34.5 cm. The behavior of the Northern subspecies has been described in 1959 by Backhaus, and that of the Southern subspecies by Player and Feely in 1960.

In contrast to the black rhinoceros, the square-lipped rhinos are quite sociable animals. One encounters them in smaller groups of sometimes up to eighteen animals, and often an adult bull is with the group. Frequently there are several mothers, each with a small and a subadult calf among them. However, the females with calves will tolerate a bull's presence only until he attempts to mount. As soon as he does this, they will reject him in bitter fights which can result in the death of the bull. The bull, however, will not tolerate a calf very close to him. Therefore, a young accompanied by a female in heat is continuously in danger of being killed by the furious bull. If such a group is alarmed, all animals stand in a circle with their behinds together so that the heads, armed with horns, point outward in all directions.

The individual home ranges are marked with urine by the bulls. The animal sprays the urine backwards with explosive force in two or three jets so that the bushes or grass in the area are covered with small white drops. A strange crescent-shaped drag-spoor described by Hediger in 1915 and by Backhaus in 1959 may also be a part of the marking behavior. Furthermore, the sometimes very high dung heaps, which are frequently found along the various paths of the square-lipped rhinoceros, are quite conspicuous. Apparently, the sight of such a dung heap irresistably stimulates the square-lipped rhinoceros to defecate. After defecation, the animal makes scratching movements with the hind legs.

The daily activities of the square-lipped rhinoceros seem to depend to a great extent on the weather. In the hot sun these savannah animals

The square-lipped rhinoceros live gregariously

retreat into the shade, reappearing only at dawn in the open pastures. They also seek shelter in the bushes from rain or when it is cool. A long period of the day is spent grazing by the rhinos; frequently they graze the whole night long. Like all species of rhinoceros they need wallows for their well-being. Frequently, they first drink at the wallows and then they spend a long time, sometimes even during the night, resting in the mud. Player describes the frequently visited wallows in the Umfolozi Preserve where turtles await the arrival of the rhinoceros, eager to take off their ticks; this agrees with the observations of the black rhinoceros. During the winter, the square-lipped rhinoceros likes to take a sand bath, which takes the place of the summer mud wallow.

Reproduction

So far there is very little known about the reproduction of the square-lipped rhinoceros. There are hardly any observations from the wild. In captivity, only one birth is known. In June 1967, a female square-lipped rhinoceros, which was pregnant when captured, gave birth to a calf in the zoo at Pretoria (South Africa). According to Owen Smith, these large rhinos are fully grown at the age of seven to ten years. While the mating season is usually from July until September, females in heat have been observed at other times of the year. Then the males have bitter fights which may end with the death of one of the opponents. Foster observed a pregnant female rhinoceros over an extended period of time in the Umfolozi Preserve. She could be distinguished by her conspicuous horn, and he estimated her gestation period to be eighteen months (547 days). Usually one young is born, although according to Maberly, there have also been twins. Twenty-four hours after birth the young is able to follow the mother around. It seems to maintain no fixed position with respect to her as it follows its mother, except when it is in danger. Then it is always ahead of the mother, apparently guided by her horn and mouth. At the age of one week, it begins to eat grass, although it usually continues to nurse for another year. Probably an adult square-lipped rhinoceros female may give birth to a calf every two and a half to three and a half years.

Former distribution and extermination

Formerly, square-lipped rhinoceros occurred in many parts of Africa. Their former range can be reconstructed only with difficulty from the cave drawings and reports of the first European settlers, hunters, and explorers. The most Northern subspecies lived in the area from Southwestern Sudan through Uganda of the Central African Republic. The habitat of the Southern subspecies reached from the Orange River in the South up to the Zambesi in the North, and from the coast of the Indian Ocean in the East to the Damara country and the Kalahari Desert in the West. In 1785 the great French naturalist Buffon thought that the rhinoceros feared neither "the steel nor the fire of the hunter." But in the nineteenth century, when the days of the European hunters in Africa began, it was shown how inappropriate

Buffon's remarks were. It is shocking to read the contemporary reports on the deaths of the southern square-lipped rhinoceros. For example, Charles J. Anderson wrote in 1858: "In South Africa a large number of rhinoceros are being killed every year. One may get a good idea of the quantity when one hears that Oswell and Vardon killed no less than eighty-nine of them during one year. During my sojourn, I myself killed almost one third of this number."

By 1892, only seventy-five years after its first discovery by the explorer Burchell, the southern square-lipped rhinoceros was considered to be extinct. Fortunately, this was incorrect since a small number of the gray giants had survived in Natal in the valley of the Umfolozi River. It is to the great merit of the South African government that it made this last refuge of the square-lipped rhinoceros into a preserve as early as 1897.

At about the same time, in 1900, Major Gibbons discovered near Lado at the Upper Nile that, besides the moribund southern square-lipped rhinoceros, there existed another northern subspecies. In the Umfolozi Preserve, the population increased steadily owing to the excellent protection it received. In 1930, according to official estimates, there had been only thirty animals, but by 1966 their number had increased to nine hundred and fifty. In contrast, the population of the northern subspecies did not show such an even increase because their habitat covers several African nations. The population in the Central African Republic consists, at most, of ten animals. In the Congo in 1963 about one thousand square-lipped rhinoceros still lived; according to Curry Lindahl, only about one hundred have survived the revolution and the following civil war. In 1928 in Uganda, there were about one hundred thirty square-lipped rhinoceros. Their number increased to three hundred animals in 1951, but in 1962 it was down to only eighty head. The estimates for the Sudan diverge greatly; some informants speak of only a few hundred, while others talk about two thousand. In this case, the second number seems more probable because of the strict laws for their protection.

The Umfolozi Preserve in Natal is two hundred and eighty-eight square kilometers in size, with hilly savannahs between the White and the Black Umfolozi Rivers. During the last few years, the number of square-lipped rhinoceros has increased to such an extent that this preserve has become overpopulated. This increased the danger of epidemics, and the pasture became more and more scarce. Therefore, it was decided to give some of the animals to other preserves and national parks as well as to zoological gardens under scientific supervision. With "Action White Rhinoceros," another interesting chapter began in the exciting history of the square-lipped rhinoceros.

With the development of the capture gun, the catching of large mammals has become easier and less cruel to the animals. Pre-

The discovery of the northern subspecies

In the Umfolozi Preserve

Rhinoceros being resettled

viously, large mammals were captured at great cost in pits or with ropes, causing many casualties; today many of them are shot with a specially constructed gun loaded with an injection-cartridge. The cartridge, when it hits the animal's body, discharges the drug and thus anesthetizes the animal. Of course, the anesthetic in use has to meet certain standards and must be safe within a wide limit. Often it is difficult to estimate the correct weight of an animal in the wild. Therefore, a drug is needed which is equally effective with animals of different weights. The effect should be immediate, before the animal can retreat into the dense brush after being shot with the dart. Furthermore, one must be able to give an antidote afterwards which neutralizes the drug's effect. However, the animal should also be able to recover without an antidote, in case it cannot be found. The answer to all these questions is a compound developed by A. M. Harthoorn which has been tested with good results on the square-lipped rhinoceros of the Umfolozi Preserve.

In spite of all these techniques and precautions, the capturing of one of these collossi is still an adventure full of breath-taking suspense. Landrovers, trucks with boxes, and riding horses take off early in the morning for the capture. As soon as a suitable rhinoceros is tracked down in the yellow glow of the savannahs, the marksman approaches the unsuspecting animal step by step against the wind. Every cover is taken advantage of until the distance between the rhinoceros and the marksman is only a few meters. Then he fires the shot, and the animal immediately jumps onto its feet and takes off with incredible speed. Now the men must follow on their agile horses. There is no time left for reflection and cautious looking for trails. They break through brush, jump over ditches, and cause clouds of ants to pour down from the whistling acacias. Even though the horses eventually learn the hard way to avoid the holes of wart hogs, herds of cape buffalo, and thorn bush, often horse and rider still lose shreds of skin in this wild chase.

Finally, after eight or ten minutes, the anesthesia takes effect. The rhinoceros slows down, stands still, staggers, and then lies down. The riders inform their fellows with the truck. The truck comes and the transport box is unloaded. The motionless rhinoceros is given a small injection of the antidote into the vein of the ear. It arises as if on command and can then be led into the box. Ian Player, the supervisor of the Natal Game Reserves, reports: "In areas which the truck could not reach, a small dosage of the antidote was enough to make the animal move. Then it could be led to the truck. Once an adult rhinoceros was led in this manner over a distance of two miles, much to the surprise of the tourists and some native women." The procedures of capture were later modified. Now the marksman drives with the landrover right up to the rhinoceros. In Uganda even a helicopter was used for

the capture. Later, in the camp, the animals are carefully familiarized with the closeness of people and substitute foods. With this procedure, it has been possible since 1962 to send forty-two "white" rhinoceros to twenty-five different zoological gardens throughout the world. (The first square-lipped rhinoceros who were captured without capture guns were in the zoos of Pretoria, Antwerp, London, Washington, and St. Louis.) Furthermore, it was possible to transfer about one hundred and fifty square-lipped rhinoceros to several other protected areas in the South African Republic, Rhodesia, and Uganda. After this success, the square-lipped rhinoceros was removed from the list of species threatened with extinction in 1966.

With "Action White Rhinoceros," it became possible to bridge the time when, in C. Harris' words, "out of each bush looked the ugly head of such a creature" and the present where the square-lipped rhinoceros, after the most dire threat to its survival, has at last regained its foothold in Africa. We hope sincerely that the cruel decades of its extermination belong irrevocably to the past.

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