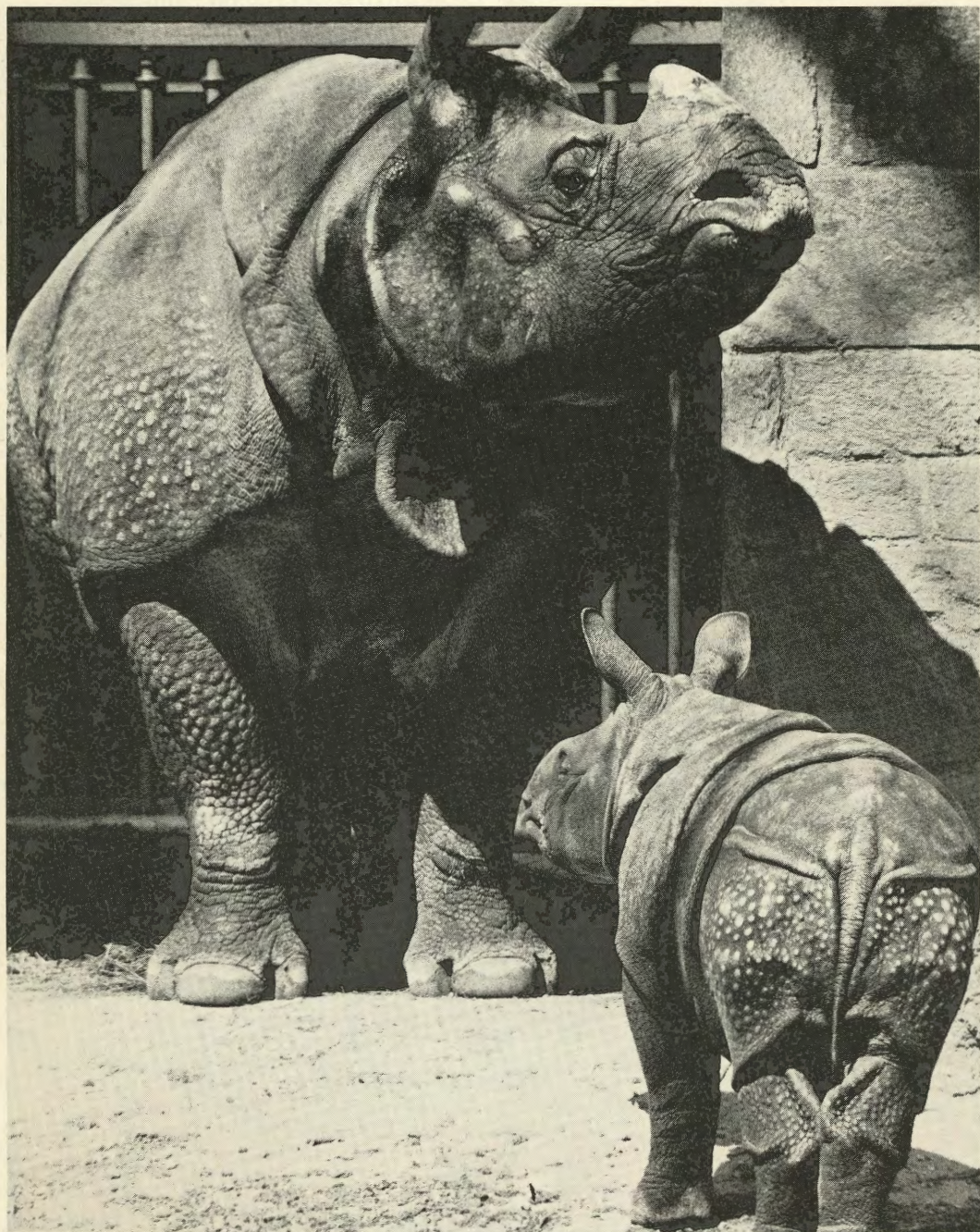


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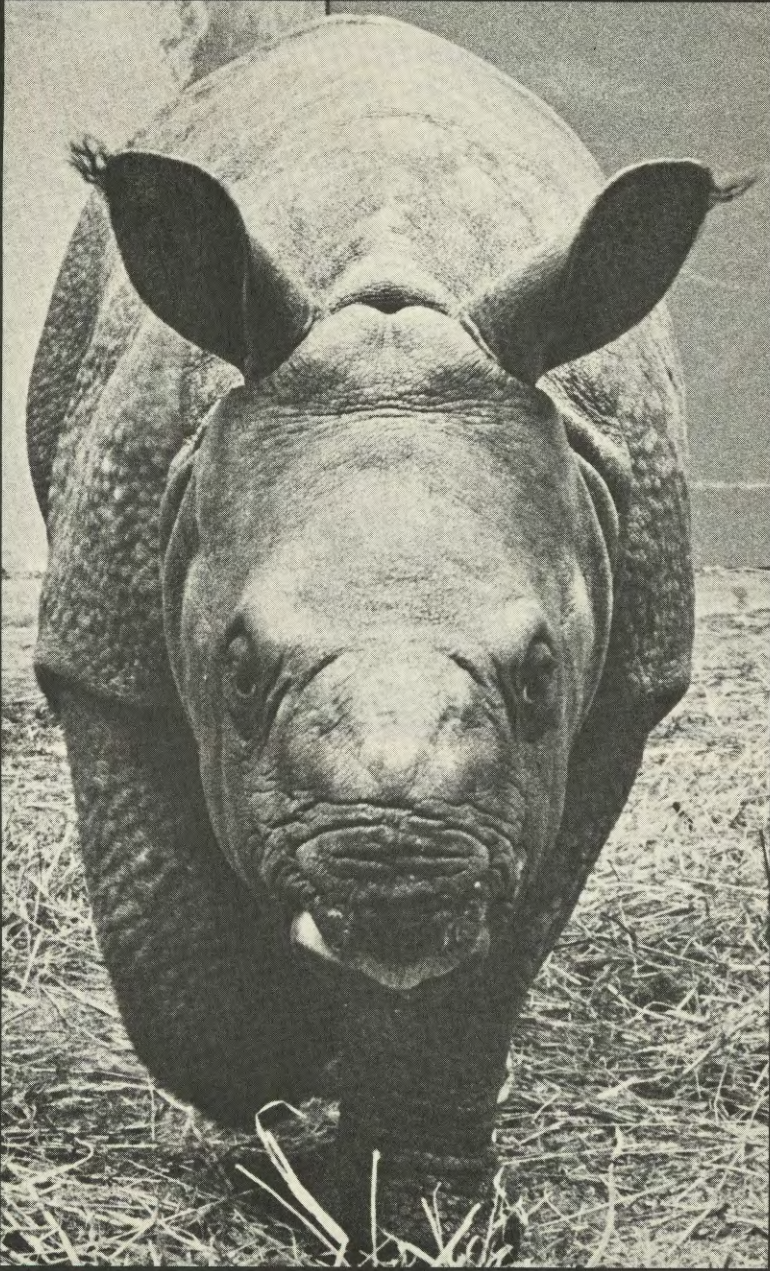
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The Birth of an Indian

Rhinoceros



The Zoo's newborn Indian rhinoceros with his mother at the age of about two months when he weighed 260 pounds—more than twice his birth weight.

On January 30th, a male Indian rhinoceros (*Rhinoceros unicornis*) was born at the National Zoo's Elephant House (*number 11 on map*)—the first live birth of this rare and endangered species in the Western Hemisphere and one of only about 20 births to have taken place in the world's zoos. In the wild there are less than 1,000 Indian rhinoceroses still living in a few scattered reserves in India and Nepal. The species' range was once much larger; as recently as the Middle Ages it was widely distributed in the northern half of the Indian subcontinent and ranged as far east as Indochina. Its gradual extermination was due to increased human settlement and cultivation of the alluvial plains that were its preferred habitat and to the hunting of rhinos for the use of various parts of their bodies—particularly the horn—in magic and folk medicine.

The National Zoo's adult male Indian rhinoceros ("Tarun") is 15 years old and has been here since May of 1960; the female ("Rajkumari") is ten years old and was received

in December 1963. Female Indian rhinoceroses first enter breeding condition at the age of about five years; consequently the Zoo's female was first placed with the male at that age in July, 1968, but no breeding took place. There is an annual breeding season in the female Indian rhinoceros, during which she comes into estrus approximately every 46 to 48 days, with each estrus period lasting about 24 hours. It was found that Rajkumari's breeding season occurred in late summer and early fall each year; and so, in subsequent years, she was placed with the male during her apparent periods of estrus at this time of year. Finally, on September 30th, 1972, a mating occurred that seemed to have been successful, the male remaining mounted for an hour and ten minutes.

This mating pattern resembled that observed in other successful captive breedings of Indian rhinoceroses; and when the female's next scheduled estrus did not occur, it was considered a good indication that she was indeed pregnant. Very gradually over the next year the fetus increased in size, and by the fall

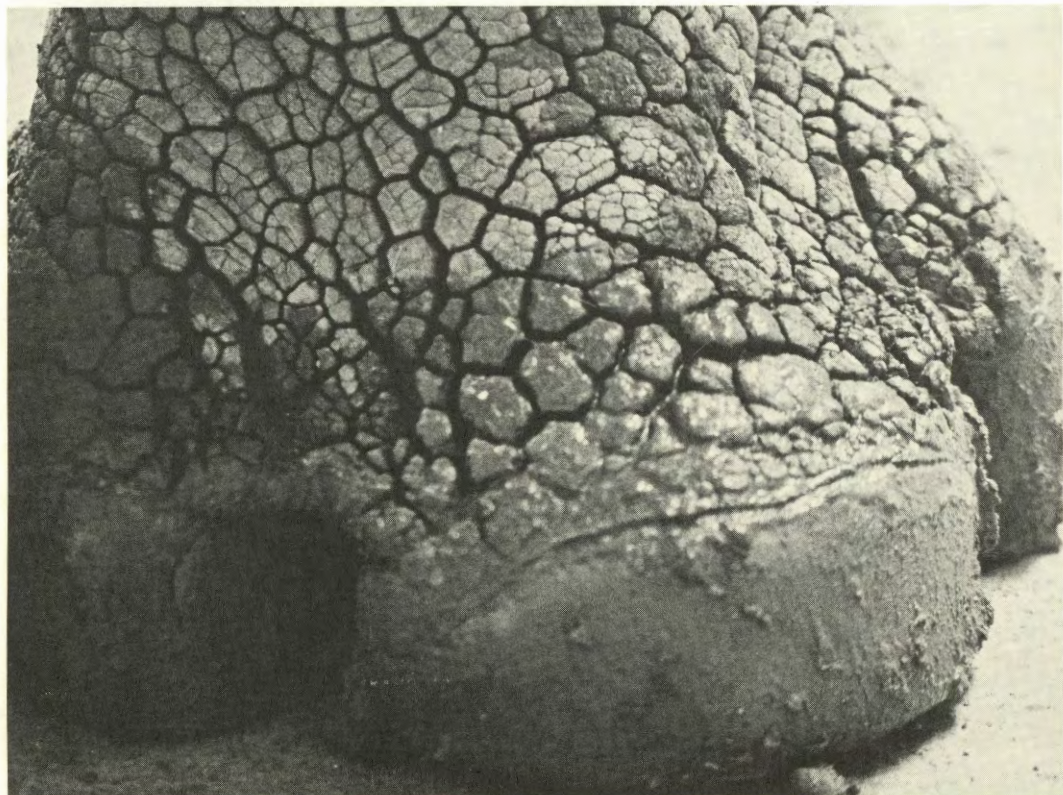
of 1973 Rajkumari's pregnancy was obvious. The gestation period of the Indian rhinoceros had been measured, in the case of other captive animals, at between 462 and 489 days; so, as the latter part of January, 1974, approached, Zoo officials began to expect the birth was imminent. A Friends of the National Zoo "preg-watch" was organized to keep watch on Rajkumari after Zoo hours and to summon the veterinarian and other relevant personnel in the event of a birth.

In fact, as it turned out, the birth took place during Zoo working hours. But observers in the early morning of January 30th were already able to observe and record marked changes in the female's behavior that suggested that she might well give birth that day; consequently the Elephant House was kept closed to the public on the 30th. From midnight until 6:30 a.m. Rajkumari had been extremely restless. She would lie down and then rise to her feet immediately. She whistled frequently, another

sign of an excited state; this vocalization of the Indian rhinoceros occurs only rarely, the circumstances under which it is most commonly observed being when the female is in estrus. Later in the morning, she could be seen running around her cage and lashing her tail.

At approximately 2:00 p.m. Rajkumari lay down and rolled over, almost onto her back; then she stood up again, and delivery immediately began. The calf's front hoofs, ivory in color, could be seen through the pink birth membrane, protruding from the mother's vulva. After several minutes, during which Zoo officials watched anxiously through peep-holes cut in the black canvass that covered the front of her cage, the mother lay down on her right side, then rose again, and then again lay down, this time on her left side. At this point the birth membrane was broken. The female stood up again, moved in a half circle, then circled around fully, lashing her tail; and

The Indian rhinoceros has three toes on each foot, and each toe bears a hoof. These toes are descended from the second, third, and fourth of the five toes the ancestors of all mammals had.



when she stopped the calf was dropped to the straw-covered floor of the cage. The birth apparently took place with head and forelegs emerging first, and the mother gave a short, soft whistle as it was happening. The entire process of delivery had lasted only about 20 minutes.

The calf lay on its side, its chest heaving, and the mother sniffed it before lying down beside it. It was observed that the newborn was a male, and the announcement was made soon afterwards that he would be named "Patrick" in honor of the United States ambassador to India, Daniel Patrick Moynihan. It was about an hour and a half after the birth that Patrick first stood up. As he lay, his mother would occasionally nibble at his hoofs, perhaps in an effort to stir him up. She also occasionally felt the infant's head and feet with her sensitive hooked upper lip.

The mother showed an interesting behavior pattern during this time—the exaggerated curl of the upper lip known by the German word *Flehmen*. In *Flehmen*—which appears in a number of other hoofed mammals besides the Indian rhinoceros—the animal is bringing scent to an organ in the roof of the mouth known as Jacobson's organ. Jacobson's organ is an organ of smell, supplementary to the ordinary channels of smell in the nose and presumably more sensitive, at least to certain types of odor. Adult male Indian rhinoceroses use *Flehmen* to bring to Jacobson's organ the scent of the female's urine when she is in estrus; evidently Jacobson's organ is sensitive to the particular chemical composition the female's urine assumes when she is in estrus. Rajkumari was perhaps using the same organ to familiarize herself with her offspring's scent, which may be important for the mother's recognition of her offspring in the evidently rather nearsighted rhinoceros.

Before standing up for the first time, Patrick occasionally made struggling movements; when he finally did stand, his mother was also standing and he attempted to locate her teats. He kept circling behind her, so that she had to block him with one of her hind legs to prevent his going behind her. Apparently, while the infant had an innate tendency to circle around towards his mother's rear, he had no innate knowledge of the exact location of the udder. When he did locate the

udder, smell may have been the most important sense in leading him to it.

The baby rhinoceros had a smooth, flat oval area on his head where his horn would later grow. The horn of the rhinoceros is made entirely of keratinous material—one of the group of allied substances that constitute the claws, hoofs, nails, and hair of mammals, as well as the feathers of birds and the scales of reptiles. Unlike the horns of cattle, antelope, and their relatives, which consist of a keratinous sheath covering a bony core, the horn of the rhinoceros contains no bone and consists entirely of keratin. All keratinous substances are non-living but are produced from the living matter of the animal's skin; and, as Patrick's horn grows keratin will be produced by his skin and added to it.

Patrick was weighed on the second day of his life, and the 125 pounds at which he registered then was believed to be close to his birth weight; birth weights of other young of this species have varied between about 75 and 150 pounds. By the time he was one day old he was already running playfully around his cage. Like other young Indian rhinoceroses, Patrick gained weight rapidly. In the first week of life he gained an average of 5.3 pounds per day and had attained a weight of 162 pounds by the end of that period. When next weighed, on February 15th, Patrick weighed 196 pounds; and he weighed 261 pounds on March 1st, having thus already more than doubled his weight in the first month of his life. As an adult he may weigh more than two tons.

Young Indian rhinoceroses nurse until the age of about sixteen months, although gradually learning to eat solid food during that time. In the wild it is believed that Indian rhinoceroses maintain small matriarchal groups, each consisting of an old breeding female, several of his previous offspring, and, if these are females, perhaps their offspring. How long a male calf stays with such a group is not known, but it is certain that by the time he reaches sexual maturity at the age of nine years he is solitary. In captivity, however, a male offspring could not be kept with his mother anywhere near such a long time, and he would most likely be separated from her shortly after weaning.

Exactly what is in store for Patrick in the future is uncertain. Obviously the first priority will be to pair him up with a female Indian rhinoceros for breeding as soon as he is

sexually mature. This may mean that he will be sent to another zoo, at least for a time. Another factor that may eventually influence Patrick's future is the National Zoo's recent acquisition of the use of an off-exhibit breeding farm. A former U.S. Department of Agriculture research station located near Front

Royal, Virginia, the farm will hopefully in the future provide facilities for breeding rare species in numbers greater than are allowed for by the limited space available in a city zoo; and it is possible that sometime in the future the Indian rhinoceros may be among the species bred there.

The area on Patrick's head where his single horn is beginning to grow.

