the Great Indian Hornbill
a breeding attempt
(Buceros bicornis)

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The Great Indian Hornbill is one of the most impressive members of the hornbill family. There are two sub-species found in South and South-east Asia. The nominate form *Buceros bicornis bicornis* is found in West India, from the Himalayas to Indochina and Malaysia. The sub-species, *Buceros bicornis cavastus* is distributed in South-west India. This latter sub-species differs from the nominate race by its larger size. There are several differences between male and female. The iris of the male is red, while that of the female is white. Males are usually larger than females, particularly as to bill size.

Although a number of breeding reports have been published (Bohmke, 1987, Choy, 1980, Golding and Williams, 1986, Healy, Preuss and Preuss, 1973, Robiller and Trochisch, 1989, Seisun and de Ruiter, 1989 and van der Sluis, 1983) breeding this species in captivity is still a rare event. Threats in the wild urge that a healthy captive population be established. There are already several established regional breeding programs in Europe and an international studbook exists for the species. This record system is maintained by Bruce Bohmke. The pair of birds maintained at Gettorf is registered in both the European and the International studbooks.

Threats

In earlier days, catching Great Indian Hornbills for the animal trade was the greatest threat to the species. When the females were sealed in their cavity nests, they were victims for the local bird catchers. One may conclude that may also be one reason females outnumber males in captivity.

Since 1992 the Great Indian Hornbill has been on the CITES Appendix I list. Although some birds are still taken from the wild illegally, the animal trade is no longer seen to be a serious threat to the maintenance of the species. Far more alarming is the rapid destruction of tropical rain forests by logging. Destruction of the bird's natural environment will make it impossible for these birds (as well as many thousands of other animals and plant-species) to survive.

Hornbills at Gettorf

Located in the northernmost part of Germany is the Animals Park of Gettorf. This park has a large collection of hornbills. It contains 11 species, four of which have made several breeding attempts. Only two of the breeding attempts were successful. The Trumpeter Hornbills *Bycanistes bucinator* have raised six young successfully, over a three year period.

The Red-billed Hornbills *Tockus erythrorhynchus* raised two young in 1992 (de Ruiter 1993). The Wreathed Hornbills *Aceros undulatus* have made four breeding attempts. In each instance only one infertile egg was found (de Ruiter). The fourth species, the Great Indian Hornbill laid twice. One egg each time. The rest of the article will deal with this species.

Feeding

As written in a previous article, things essential to successful breeding are: a harmonious pair, optimal housing, and the right nest box. The right food (diet) is also very important for successful breeding of hornbills. At Gettorf, most hornbill species (except the Ground Hornbills and the Red-billed Hornbills) are fed the same food (diet). Half of the food is made up of fruit. When possible the birds are fed at least five varieties of fruit each day. Seasonal availability of fruit is a major factor. Among fruits provided are: apples, bananas, pineapple, kiwis, melons (three different kinds), mangos, papayas, a variety of berries, cherries, tomatoes, cooked rice, cooked potatoes and soaked raisins.

About a quarter of the diet is soaked dog-pellets (Peca Bello). The dog pellets are placed in water in the afternoon and are fed the following morning. The last quarter of the diet contains our own insectivorous mixture. Live food such as meal worms and crickets are fed occasionally, particularly when young are in the next. A vitamin powder (Vitazon) and a calcium powder (Vitakalk) are given on the food twice a week.

History

When I arrived at Gettorf in 1989, one female was kept in the collection. It is a wild caught bird, which was brought to Germany in 1972. We know she is at least 21 years old. In 1989 we succeeded in obtaining a wild-caught male from another zoo. This bird was quarantined for six weeks and when we determined the bird was healthy he was placed in an aviary directly next to the female.

The birds were separated from each other by wire-mesh. The male was quite arrogant, but the female immediately made some contact attempts. Within two days the female was observed trying to feed the male through the wire. After the birds had been next to each other for 10 days, we decided to open the door between the two enclosures and it was the female tried to make contact. The birds were under observation during the time together.

At night the birds were returned to their own aviary space and the connecting door was closed. After 10 days, since there was no aggression demonstrated by the male, the door was left open day and night.

In December 1989, four new breeding enclosures were built for the hornbills and the pair was moved to one of these. We installed a small pool, some living plants (which were destroyed by the birds within two months) and an enormous nest-hole. A small fence was placed at the rear. This blended with the heating pipes, which were provided for visitors comfort.

Breeding Attempts

Although this pair of birds did very well in the new enclosure, it wasn't until 1991 that breeding behavior was

observed. The male had started to feed the female and both birds inspected the nesting-hole. The male and female occasionally entered the nest-hole. Regardless, something didn't please the female for she laid her first egg on the floor, behind the fence. She incubated the egg for about three weeks and then left the egg. Within seconds the male was seen to fly over to the egg and eat it.

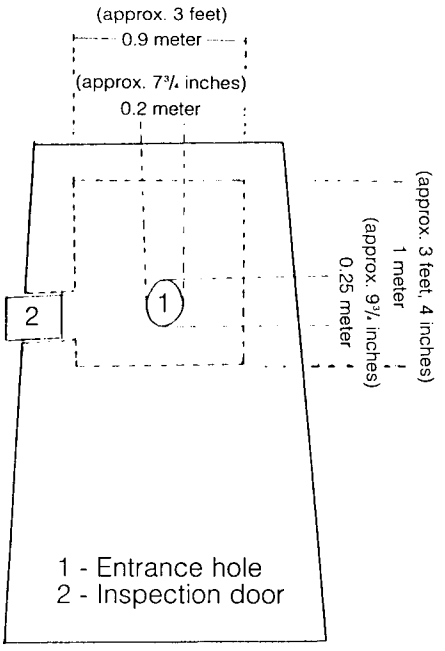
In 1992 we had high hopes. The first thing we saw when we entered the Tropical Hall in which the breeding aviary is located, were the two Great Indian Hornbills copulating. One copulation was seen every day but on some days as many as 12 copulations were seen. After three weeks, no further copulations were seen and no other breeding behavior was observed.

By the end of 1992, five more hornbill breeding enclosures were constructed. We placed the pair of Great Indian Hornbills in this new enclosure. The new enclosure was larger than the first one and we thought a new nest-box would improve our chances of a successful breeding. The new enclosure was planted and this time the hornbills didn't destroy the greenery. Water was provided in a bowl, placed the floor but we never saw the birds drink.

By the end of February 1993 the female was regularly seen in the nest. In March both the male and female started to "mud-up" the entrance with claws, feces and food. The male assisted the female in getting mudding materials. The female was in the hole and carried out the main job of mudding. By March 13 only a small slit was left open and the female wasn't able to leave the nest.

The male was a good provider. He took good care of the female, bringing a steady supply of food to the nest. The male had always been quite aggressive and by this time it had become almost impossible to enter the aviary.

On April 12 the female started to hammer against the control door and after a short time managed to open it. She stayed in the nest, so we closed the door without any difficulties. Two days later the door was open again. While closing the door the second



time, the female moved a little (in the nest) and I could clearly see one egg. On April 20 the control-door was again open and the female had left the nest cavity. We immediately checked the nest. There was no sign of an egg and there was no young bird. It is suspected the egg was infertile and the female had eaten it.

Discussion

We searched for the reason(s) for our misfortune. Firstly, was it because the control-door was too easily opened? We decided to close the nest door completely so it will be impossible to open.

Secondly, we will supply an extra portion of vitamin E so the chances for fertile eggs developing will improve. Our female is at least 21 years old. It may be a bird that age is too old for breeding. Despite these problems and questions, we will try to again achieve successful breeding of this most interesting species.

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