


Umbrellas and Moluccans, though the cuddliest of the larger species, are loud enough that no one in an apartment or townhouse should consider owning one. The quietest of the cockatoos that we raise is the Citron, which is small and is a good talker.

Cockatoos are not famous for their talking ability. I have been amazed to find that all my babies talk. Now as adults, many of the babies that I have raised and kept over the years talk so much and so clearly that they frequently are mistaken for people having a conversation. They seem to know not only what to say, but what inflection to put in their voice to get their point across. "Punkin," of course, is totally unusual in the way he enunciates his words by moving both mandibles when he speaks, and he speaks in complete sentences.

There are several other potential problems of cockatoo ownership. Some cockatoos are more "needy" than others, meaning that they require *lots* of attention. A cockatoo that gets constant attention and then suddenly gets none may become a problem bird. The result could be a plucking bird, a screaming bird, or a depressed bird. This can happen with any bird, but seems more common in cockatoos because they get so much cuddling and seem to crave it.

Cockatoos are considered "Old World" birds, as are Eclectus and the African parrots. "Old World" birds kept in warmer climates such as southern Florida, USA, tend to be susceptible to a terrible disease called sarcocystis, which is a parasite carried by opossums and spread by roaches. It is not contagious from bird to bird — only from roaches excreting opossum feces. Cockatoos do not show any signs that they are infected until 15 minutes before they die, when they become crippled. This occurs more in birds kept outside and on porches, but contaminated feed can come from anywhere.

There is no pet that is perfect in every way. However, the possible negative aspects of cockatoo ownership are far outweighed by the many positive aspects. I hope that everyone will have the pleasure of meeting a cockatoo at some time in their life. Only then, in my opinion, will they truly have lived and been loved. 

## ZOO BIRD PROFILES

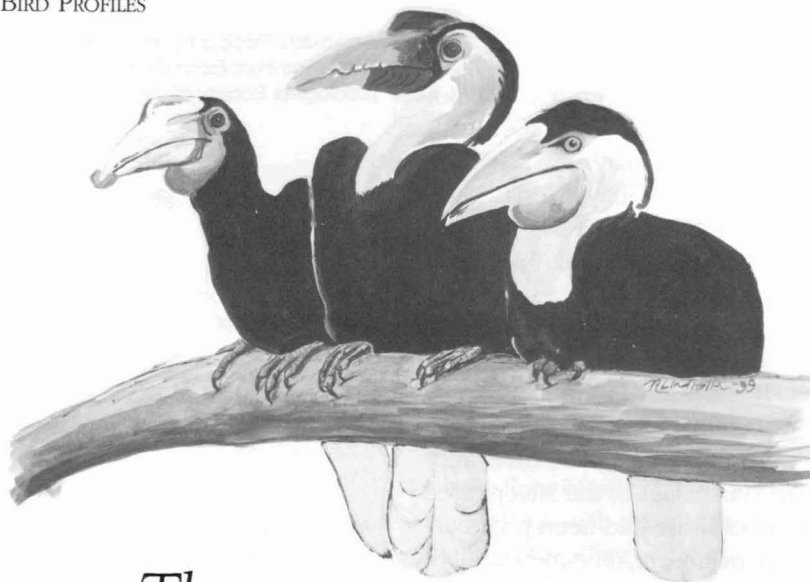


Illustration by Natalie Lindholm

# The Wrinkled Hornbill

*Aceros corrugatus*

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**I**n many ways, the world is a much smaller place than it once was, as far as zoo aviculturists are concerned. Curators in the 1960s had access to seemingly endless quantities of birds from India, Thailand, Angola, Mexico, Costa Rica, Ecuador, and other countries which now prohibit commercial export. Such species as quetzals, cocks-of-the-rock, umbrellabirds, bell-birds, mountain toucans, Rainbow Buntings, sylphs, sunangels, fishing owls, serpent eagles, and falconets, once widespread, are now seen in only one or two U.S. collections, or not at all.

On the other hand, there are many birds, undreamed of in American zoos in the 1960s and '70s now found in growing numbers of institutions. Some, such as the present assortment of fruit doves and bee-eaters are the results of improved understanding of husbandry. Politics has also played a role—the establishment of trade between the U.S. and the People's Republic of China has had a definite effect on zoo aviculture. Another factor has been an evolution within the foreign bird trade, an increased sophisti-

cation and broadening of scope among the dealers and collectors operating in the handful of countries yet allowing commercial export.

Nowhere has this been as apparent as in the Republic of Indonesia. During the 1960s and most of the 1970s, only a small fraction of that country's incomparably diverse avifauna appeared on the market. The riches of Irian Jaya were largely restricted to species from the West Papuan Islands — primarily cassowaries, crowned pigeons, and occasional birds of paradise, all now prohibited, as well as various lorries. Aside from lorikeets and cockatoos, practically nothing was seen from Sulawesi. And despite its close proximity to Java, the seat of Indonesian administrative offices, Sumatra was almost entirely unrepresented.

By the end of the 1980s things had changed dramatically. American Zoos held an array of taxa endemic to Mainland New Guinea and Sulawesi. Green-naped Pheasant Pigeons, Goldie's Lorikeets, Sulawesi Ground Doves, Red-knobbed Hornbills, King Mynahs, and Grosbeak Starlings can be

seen across the U.S., and all have been propagated. Sumatra is now likewise rather well represented. Its fauna is closely linked to the Asian mainland, and many of its birds are shared with the Malay Peninsula (from which commercial shipments have long been banned).

Among Sumatran birds acquired and bred by U.S. Zoos in the last decade have been Crestless Fire-backed Pheasants, Pink-necked Fruit Doves, Rhinoceros Hornbills, Gaudy and Fire-tufted Barbets, Lesser Green Broadbills, and the distinctive red-throated subspecies of the Silver-eared Mesia. All of these had been previously scarce, or absent, in American aviculture for years.

Among these Sumatran importations was a large and spectacular bird which appears to have never been previously kept in North America. The Wrinkled Hornbill *Aceros corrugatus* was formerly found throughout the southern Malay Peninsula, and the islands of Sumatra and Borneo. It appears to have disappeared from Singapore more than 50 years ago, is considered close to extinction in the small portion of Thailand from which it is known, and is rare in Peninsular Malaysia.

For the time being however, it remains "fairly common" in Borneo and Sumatra (Kemp, 1995). It is classified as vulnerable by BirdLife International and the International Union for the Conservation of Nature (Collar, et al, 1994). It is threatened chiefly by habitat destruction, as it is dependent on lowland tropical forests, which are of course being extensively logged through most of its range. It will breed in selectively logged forest (Kemp, 1995).

Prior to the Sumatran exports, the only captive record of which I am aware is for the London Zoo where this species was maintained some time previous to 1927 (Low, 1929). When this species became commercially available in the 1980s, it was in some numbers, and several institutions acquired some in short order.

The first successful captive breeding took place at the Audubon Park Zoo in New Orleans, Louisiana, in 1988, from a pair, believed to be two years old, acquired in early 1987. This breeding,

TABLE I.

**Asian and Pacific Island Hornbill Species Hatched in U.S. Zoos from 1959 through 1996.**  
(Compiled from Records of Birds bred in Captivity in the *International Zoo Yearbook*, Vol.'s 1-36 (Zoological Society of London, 1960-98) ).

	Years bred	Institutions	Hatched (Juvenile mortalities)
Tarictic Hornbill ( <i>Penelopides</i> sp.)	1974-76	1	6(3)
Luzon Tarictic Hornbill ( <i>Penelopides manillae</i> )	1981-82, 1986-90	1	28(16)
Samar Tarictic Hornbill ( <i>Penelopides samarensis</i> )	1993	1	1
Sulawesi Hornbill ( <i>Penelopides exarhatus</i> )	1993-94, 1996	2	9(3)
White-crowned Hornbill ( <i>Aceros comatus</i> )	1994	1	1
Wrinkled Hornbill ( <i>Aceros corrugatus</i> )	1988-96	5	39(20)
Wriathed Hornbill ( <i>Aceros leucocephalus</i> )	1992-94	2	5(3)
Red-knobbed Hornbill ( <i>Aceros cassidix</i> )	1991-96	3	18(13)
Wreathed Hornbill ( <i>Aceros undulatus</i> )	1977, 1979-84, 1991, 1993-96	3	14(2)
Papuan Hornbill ( <i>Aceros plicatus</i> )	1994-96	3	8
Oriental Pied Hornbill ( <i>Anthraceroceros albirostris</i> )	1972-75, 1981-94, 1996	6	55(4)
Rhinoceros Hornbill ( <i>Buceros rhinoceros</i> )	1985-96	5	28(12)
Great Hornbill ( <i>Buceros bicornis</i> )	1979, 1986-95	7	20(4)

and several subsequent breedings at Audubon, are discussed in great detail in Volume 31 of the *International Zoo Yearbook* (Sigler & Myers, 1992). In addition, Peter Shannon (1993) published further details of double clutching there.

Somewhat unusually, there are highly detailed published accounts of captive propagation of Wrinkled Hornbills in three other institutions, all in the venerable *Avicultural Magazine*. Rosemary Low (1994), with her familiar insight and style, documents a complicated 1993 breeding season at Palmitos Park, on the Spanish - administered island of Gran Canaria, resulting in a fully reared chick, followed by two further unsuccessful clutches. Wilkinson et al (1996) present five seasons of varyingly successful nesting

attempts at the Chester Zoo, in England, by a pair confiscated by "Her Majesty's Customs & Excise," in 1986. Summers (1997) provides a transcription of his notes from a successful partial hand-rearing at Paultons Park, in Hampshire, England.

It is rather ironic that a hornbill that appears never to have been imported to the United States before the 1980s, has now become the second-most frequently bred Asian hornbill in American zoos (Table I.), being exceeded only by the Oriental Pied Hornbill *Anthraceroceros albirostris* (which is the first Hornbill species bred in the Western Hemisphere, at Honolulu Zoo, in 1953). This is especially so, considering that the Great Hornbill *Buceros bicornis*, and the Wrinkled's close relative, the Malay

TABLE II.

**Wrinkled Hornbills (*Aceros corrugatus*) Hatched in Zoos and Bird Parks through 1996.**  
(Compiled from Records of Birds Bred in Captivity in the *International Zoo Yearbook*, Vol.'s 1-36 (1960-1998)).

	<u>Years bred</u>	<u>Hatched (Juvenile mortalities)</u>
<b>North America</b>		
Miami Metrozoo	1988-90	4(3)
Audubon Park Zoo, New Orleans	1988-94, 1996	20 (14)
St. Catherine's Wildlife Conservation Center (Wildlife Conservation Society)	1993, 1995	4
San Diego Wild Animal Park	1994-96	8(3)
Honolulu Zoo	1996	3
<b>Europe</b>		
Chester Zoo (U.K.)	1991-93, 1995-96	11(4)
Vogelpark Walsrode (Germany)	1992-94	8*
Palmitos Park (Gran Canaria, Spain)	1993	1
Zoo de la Palmyre (Royan, France)	1995	1
Mieski Ogród Zoologiczny (Wrocław, Poland)	1995-96	2(2)
Burger's Zoo (Arnhem, Netherlands)	1996	1
<b>Asia</b>		
Zoo Negara (Kuala Lumpur, Malaysia)	1991, 1993, 1995	5(3)
Jurong Birdpark (Singapore)	1995	2

\*At least one captive-bred parent.

Wreathed Hornbill *Aceros undulatus* have been hatched far less frequently. Both were exported in great numbers from Thailand in the 1950s and '60s to many U.S. zoos, the Great Hornbill being, in fact, by far the most frequently seen hornbill on exhibit then.

The Great Hornbill is still, tenuously, the most well represented Asian hornbill in American zoos, but the 52 specimens listed by ISIS as being distributed among 23 U.S. collections as of 31 December, 1998, are a progressively aging population, with the majority over 20 years of age, and none hatched since 1995. The 44 Wrinkled Hornbills that ISIS indicates were held among 16 U.S. zoos at the same time, have much better demographics. Since the period covered by the *International Zoo Yearbook* (Table

II.), successes have continued. In 1997 the San Diego Zoo and Wild Animal Park (where breeding commenced in 1994) each raised four. 1997 was also the year that the Fort Worth Zoological Park hatched its first chick, which did not survive. In 1998, the Honolulu Zoo raised two and Fort Worth reared one.

#### **Fort Worth Zoo's Wrinkled Hornbills**

The Fort Worth success is particularly welcome, as that wild-caught pair, presumed to have been imported around 1990 and purchased from a private aviculturist 25 April 1996, do not appear to have previously produced viable chicks, and therefore fell into the category of "unrepresented founders."

The Fort Worth Zoological Park has

always exhibited them in an outdoor planted aviary 25 ft long X 20 ft wide X 8 ft high (with a pool). For more than a year, a breeding pair of Ringed Teal *Callonetta leucophrys* shared the aviary without incident. Because the female had arrived at the zoo with a mild form of iron storage disorder, no attempt was made to breed these birds in 1996.

#### **Nesting and Egg-laying**

Copulation was first observed on 22 April, 1997. On 1 May, the male was seen investigating a hollow tree-trunk. On 8 May, a whiskey barrel was placed on the floor of one of this exhibit's winter shelters, with the intention of eventually suspending it from the ceiling. However, the barrel was still on the floor of the shelter when the female began going in and out of it 16 July 1997, one day after the male was observed feeding the first piece of that morning's diet to the female.

On 19 July, the female commenced plastering a layer of fine-grained feces around the barrel's entrance-hole. That same day, the male gave her five pieces of food in succession, while she sat inside. Until 29 July, though, the female did not consistently remain in the barrel. Feces application did not occur on the 20th and 21st of July, but when it began again, "Red Apple Jungle" pellets from the diet were incorporated as well. This continued for the next several days. The female would position a piece of "RAJ," then tamp it into the fecal paste by rapid sideways hammering with the closed beak. On 28 July, all the accumulated paste was gone from the barrel entrance, and the female did not enter at all that day.

On 29 July, 1997, the female spent the entire day in the nest. Fecal tamping was very vigorous. As no great progress was noted in the formation of the seal (as the barrier around a hornbill's nest entrance is formally referred) a large rubber pan full of dirt was placed in front of the barrel 30 July, and elevated on a platform on the 31st. The next day, the female was seen "mudding" with the dirt, but no noticeable accumulation resulted. Despite never being able to construct anything more than a minimal seal, the female ceased leaving the nest at all 3 August.

## Aggression

On the morning of 9 August, the pair of Ringed Teal which had uneventfully shared the aviary for more than a year, were noted missing. Most oddly, the eight eggs the female teal had been sitting on tightly were abandoned. During a baffled search by two persons, the female hornbill never left her barrel. Mindful of Audubon Park's discovery of slaughtered Mockingbirds, Blue Jays, and Starlings stuffed in the nest barrel (Sigler & Myers, 1992), I did investigate, and discovered two hornbill eggs, but no duck remains. (The female hornbill still did not come out).

The female teal was never seen again, but the male was shortly discovered in a nearby waterfowl pond, recaptured, and returned to the aviary. He did not remain there long, however. The male Wrinkled Hornbill at once began following him closely, with a degree of interest we had never seen before. As it happened, we found a suspicious looking cut on the Teal's back when he was again caught up to be placed elsewhere. It is surmised that the

ducks managed to escape their enclosure through a very narrow space at the bottom of the mesh that divides the stream which runs from one aviary to another. Since Ringed Teal have a well established reputation for generally never diving below the water's surface (Lindholm, 1991), this was entirely unexpected. As was subsequently confirmed, the male hornbill had undergone an abrupt transition to predatory behavior, as a result of his mate's egg-laying. While one might have thought medium-sized aquatic birds an entirely unlikely potential prey item, it must be concluded that during the breeding season Wrinkled Hornbill pairs cannot be safely kept with anything else.

The female hornbill continued to sit well, despite the absence of a seal, until the morning of 12 August, 1997, when she was discovered out in the aviary. It appears a large branch had fallen down in the night. Three eggs were discovered in the barrel, arranged alongside the edge of the floor in a line. When it was obvious the female would not return, they were removed and placed in a Grumbach incubator. Though at least two were fertile, development did not proceed much further.

### *Moving the Nest Barrel*

The following day, the barrel was cleaned and suspended from the ceiling of the shelter with four chains. Following recommendations from Mark Myers, of the Audubon Park Zoo, the barrel was partially filled with a mixture of potting soil (the kind without vermiculite), pine shavings, and sphagnum moss. The insecticide powder Sevin-Dust was stirred into this.

### *Feeding and "Mudding"*

Over the next several days, the male was seen feeding fruit to the female. On 26 August she responded to his offerings with a high-pitched parrot-like screech while accepting them. By 2 P.M. that day, she was sitting in the barrel for the first time since she had abandoned her eggs. Fifty minutes later she was noticed "mudding" the entrance. By the next day, the encrustation of dirt and feces had accumulated to a third of an inch in depth, and some of the provided substrate had

been thrown out onto the floor. For the next two days, the female continued "mudding" but came and went from the barrel.

At this point the diet consisted of "Red Apple Jungle" Pellets, with cubed apple, banana, and sweet potato, fed twice-daily. By 27 August all the fruit was gone less than three hours after feeding, while a substantial amount of "RAJ" remained. On 28 August the amounts of all fruits were increased. The male fed all the apple to the female 10 minutes after the diet was placed, and only then proceeded to other items. Crickets and giant mealworms were also provided regularly.

### *Sealed In*

On 29 August, 1997, the female did not leave the nest at all. By 11 A.M., she stopped mudding. She had transformed the barrel entrance from an oval to a nearly perfect rectangle, rendering her exit impossible. She continued tamping at the seal for several more days, until it was only wide enough to extend the end of her beak. On 3 September "pinky" mice, as well as blueberries and sliced grapes (both previously absent for fear of Iron-storage problems) were added. While the female's reaction to "pinkies," crickets and giant mealworms was rather minimal, and grapes did not appear to be accepted, thawed blueberries were at once consumed greedily. By 10 September we recorded that all blueberries and grapes were fed by the male right away, then apples followed. On 26 September diets were provided three times a day, and the fruit was coated with a mixture of calcium powder and finely-ground "RAJ." Food consumption had definitely risen. The female grunted continuously while being fed.

A nest inspection 27 September revealed only one egg. On 3 October I was alarmed to see the female holding something large and floppy in her beak. A closer look through the slit revealed the object to be a large Gulf Coast Toad *Bufo valliceps*. With some effort I managed to snag one of its legs through the narrow aperture and eventually yank it out. Its head was quite crushed. The female showed no effects of toad poisoning.

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### **Chicks—For Awhile**

A 6 October a loud whistling peeping was heard - first evidence of a chick. On 7 October the vocalizations consisted of an insistent five-syllable, whine-like peep (sort of a "Wee-wee-wee-wee-wee"). By this time, following the experience of Audubon Park (Sigler & Myers, 1992), previously frozen anole lizards and tree frogs (from a commercial source) were provided, but never taken with enthusiasm. There was some consumption of "pinky" mice and giant mealworms. Up to this point, there was some doubt as to whether the female defecated outside the nest, but that question was settled 13 October, when I saw the female's white tail angled towards the slit, followed by an explosive ejection of feces onto the floor of the shelter.

The young bird's vocalizations had been growing progressively louder and vigorous, to the point where we wondered if there might not be a second chick. On 15 October, nothing was heard. On the morning of 16 October, the left half of the nest seal was gone. The female did not behave abnormally, but by 9:30 A.M., the seal had entirely disappeared. The female stayed in the nest, even after an investigation with a flashlight revealed no sign of chicks, but shells from two eggs. By noon, however, she was out, and did not return.

The apparent cannibalism of the chick or chicks may have been a result of increasingly cold evenings. By 18 October a marked decrease in food consumption was noted. Grapes and blueberries were removed from the diet 29 October. No further nesting attempts were made in 1997. From 15 November, through the 12 March, 1998, the pair were confined to a shelter (without a barrel), due to bad weather, for varying lengths of time.

### **Try Try Again**

In 1998, copulation was observed 25 February, and the female was seen investigating the barrel 1 March, but nothing in particular resulted for the next two months. In mid-May, the female began accepting large amounts of food from the male (earlier, he would avidly follow here about with proffered pieces, to no avail). Grapes and blueberries were restored to the

diet 30 May. On 3 June, some substrate was thrown out of the barrel. The next morning the male gave the female four whole grapes in succession (the first presented in the beak, the others coughed up), along with a blueberry. He then immediately returned to the feeding shelter for more. At 4 P.M. that evening, the female was inside the barrel, tapping at the entrance for the first time that year. Attempts at "mudding" did not appear to be successful, so water was added to the soil/shavings/sphagnum mix.

By 20 June, 1998, the female was being fed inside the barrel, but the "mudding" was still not holding so further water was added while she was out. At 8:30 A.M., on the morning of 23 June, some accumulation was noted around the entrance. By half-past-noon, the female was unable to leave the nest. The male was feeding her continuously. The next day, the sides of the seal were perfectly straight up and down, and the female could only stick the tip of her beak out. (I saw the male feed nine grapes in a row that

day). On 25 June, no eggs were seen, when I peered through the slit with a flashlight. That day, the total amount of fruit provided was increased. On 10 July, a fiber-optic probe investigation revealed one egg.

On 30 July, 1998, at 8:15 AM, chick vocalizations were heard. They were in response to the male rattling his beak on the seal while feeding the female. I found I could prompt the same five-syllable squeaks by tapping on the seal with my fingers. That day, feedings were increased to three-a-day, the fruit was again dusted with the powdered "RAJ" and calcium mixture, and dead "pinkies," anoles, and treefrogs were added to the daily diet. By 4 August it appeared that none of this vertebrate food seemed to have been eaten.

On the other hand, the male hornbill made it quite clear he wanted something meaty to feed his offspring. On 5 August, I watched him vigorously chase a cardinal that had flown into the aviary. He almost caught it. Shortly after I watched a Carolina Wren simi-



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larly narrowly avoid disaster. On 8 August a Gulf Toad's skin, neatly devoid of flesh, was discovered dropped on the floor beneath the barrel. Otherwise, the male seemed to be concentrating his efforts on feeding grapes (now provided sliced).

Concerned by the obvious need for some kind of vertebrate food, Fort Worth's Lead Bird Keeper Brad Hazelton suggested living "fuzzy" mice, still with their eyes shut. As soon as I placed two of them in the aviary 11 August, the male flew down. He quite delicately picked one up, held it for a moment, then proceeded to pulverize it by manipulating it up and down his beak. He promptly fed it to the female then repeated this performance with the other one. Two "fuzzies" were henceforth provided daily, until 18 August, when the number was increase to six, and the rodent age category to "hopper." (By then, the bird department, which had been "borrowing" from our Herpetarium colleagues, was maintaining several lactating females with their broods in a 10 gallon aquarium.)

### A Look at the Chick

The first close observation of this chick was made 11 August, with a fiber optic probe, while the female was distracted through a small hole in the side of the barrel (normally plugged). By then the chick appeared to be about six to eight inches long. It was totally naked and pink, and quite blind. The head was rather flat and spade shaped, the beak a broad triangle not clearly differentiated from the rest of the skull. A second look on 28 August revealed excellent progress. The chick's eyes (described in my notes as small, black, and beady) were open, pin feathers were appearing on its wings, and its beak was discrete, small and yellowish. The skin was now purplish. Altogether this chick presented the appearance of being "puffy" — reminding me somewhat of the "Michelin Man" or the "Pillsbury Doughboy." This was due in part to the subcutaneous inflatable air sacks (Sigler & Myers, 1992), typical in chicks of this species and its relatives, which caused some concerned discussion in

zoo avicultural circles until it was discovered to be quite normal.

By 1 September 1998, the chick could be seen, moving, through the seal slit, without artificial light. Once the adult female had received food from the male, chick feeding was a prolonged procedure. The chick's gular sack would often completely hide its lower mandible while it was beak fed. On 2 September it was seen peering out through the slit for the first time. On 10 September I noted that its beak was now large. From 22 September it was frequently sticking its beak out through the slit, often at the same time as its mother. On 24 September, I could see its neck was now long, and covered with yellow pinfeathers. The chick was fully feathered by 8 October, and it was beginning to develop the typical tooth-like serrations on the edges of its upper mandible. At the same time, its father was beginning to lose interest in live mice. On 13 October, he killed them, but did not, as previously, take them at once to the female. He did continue to feed some mice, on and off. The chick was still noisy when its mother fed it in turn. Now it sounded like a loud farmyard chick.

### Fledging

The Fort Worth Zoo bird staff had been hoping to capture the emergence of the chick on video tape, and, after 17 October, when the female's beak appeared to be caked with a similar material to the seal, a camera was set up for lengthy periods. It would happen, however, that the camera was off the morning of 21 October. Both chick and mother had left the barrel before 8 A.M., and no trace of the seal remained around the barrel entrance (There had been no hint of damage to it the night before).

I found the young bird perched in the shelter near the barrel. It did not seem at all afraid of me. As a precaution, the water in the pool in the aviary had been lowered to a safe level, and the juvenile, in its explorations, did get in the water, but it soon found its bearings. We were concerned when that night the temperature dropped to around 50°F, but that presented no problems either. When I first saw the juvenile around 8 A.M., its neck and

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throat-pouch were the same shade of off-white, but by noon the pouch had become rosy, and progressed to a pinkish orange by 24 October. Its eyes were a beautiful shade of pearly gray.

From 27 October, the shade of yellow typical of a male Wrinkled Hornbill began to appear on the juvenile's head and neck feathers, beginning behind the eyes, and in tinges along the neck. This color is the product of preen-gland oils (Kemp, 1995), a feature which some hornbills share with such a diversity of unrelated birds as White Pelicans and the Crested Ibis. We could not guess the sex of this young bird at that point, since, excepting the very distinctive *A. comatus*, all members of the genus *Aceros* leave the nest in male colors, the females acquiring their black head and neck plumage sometime later (Kemp, 1995).

By 2 December, however, the beginnings of the first "wrinkle" on the lower mandible were apparent, making possible the identification of this bird's sex, since the "wrinkles" are found only in males. By 10 December, the bases of both of the juvenile's mandibles were distinctly reddish, again confirming its maleness. He was still loudly begging for food from both parents, though he appeared to be spending the most time

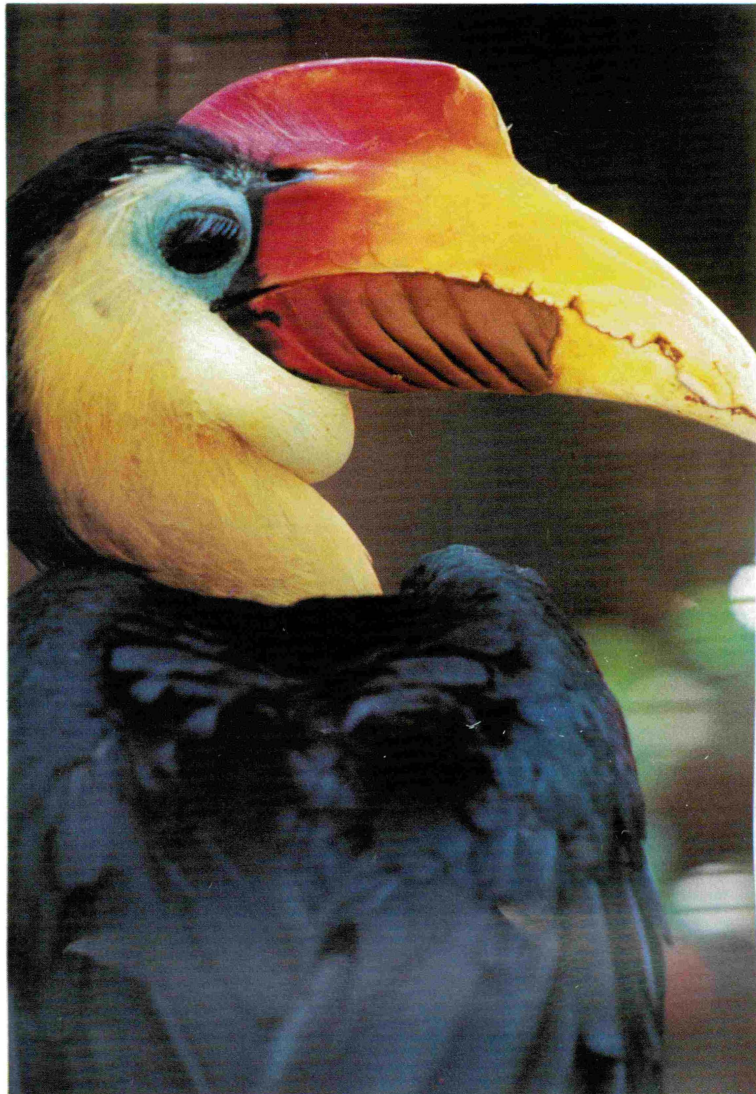


Photo copyrighted by Bill Johnson

Fort Worth Zoo's male Wrinkled Hornbill, illustrating perfectly the inspiration for this species' common name.

Photo by Christopher Brown & Josef Lindholm.



The Fort Worth Zoo's Wrinkled Hornbills nest in a whisky barrel suspended in this limestone shelter at one end of their exhibit.

with the male. When severe weather mandated confining the hornbills over night in a winter shelter December 21, all three birds were locked up together without trouble. On 25 December, 1998, my last day with the Fort Worth Zoo, I observed that his culmen was developing a rough-looking ridge, the start of a casque.

### ***Independence and Another Clutch***

On 16 March, 1999, the adult male was seen harassing his offspring, and the young bird was removed from the aviary. Beginning 15 May, the female began spending hours each day in the barrel. She ceased leaving it after 1 June. My most recent update, from Donna Lukacz, who succeeded me as "Bird Row" keeper, is that, beginning July 8, at least one chick's vocalizations were heard daily.

As one would expect, the Coraciiformes Taxon Advisory Group



of the American Zoo and Aquarium Association has designated the Wrinkled Hornbill as a species to establish in North America, and a Studbook for it, and other members of the genus *Aceros* is being maintained by Eric Kowalczyk of the Woodland Park Zoo, Seattle. Since the Wild Bird Conservation Act became effective in 1993, it has been illegal to commercially import Asian Hornbills into the United States, as all were by then listed on one or another of the appendices of the Convention for International Trade in Endangered Species. (*Aceros corugatus* was placed on Appendix II in 1992). However, consortium importations among zoos and serious breeders are allowed for. It is to be expected that the European and Asian collections propagating this species (Table II). will be interested in exchanging bloodlines in the near future. At the same time, there remain a number of Wrinkled Hornbills in private hands in the U.S. A crucial question is how well captive-hatched specimens will breed. Of all the hatchings listed by the International Zoo Yearbook (Table II), only one, at the great Walsrode Bird Park, in Germany, in 1993, is indicated to have a captive-bred parent (Zoological Society of

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*A nice hornbill family — parents and young. All young Wrinkled Hornbills emerge from the nest with the pale head neck and throat-pouch of the adult male. Female's do not assume the black head and neck and blue throat-pouch for several months.*

London, 1995).

There is some cause for concern that captive bred specimens may display behavioral abnormalities. While the wild-caught male at Fort Worth Zoo has never been aggressive to keepers, I have been given to understand that a New Orleans bred male at Disney's recently closed Discovery Island Zoological Park was inclined towards making things unpleasant for anyone entering its exhibit, though apparently not abusing its mate. At any rate, an increasing number of captive-bred pairs are being set up across the country, so we may at least hope that this magnificent hornbill, declining in the wild, will be firmly established in aviculture.

#### Acknowledgments

I am most grateful to Bill Johnson for all his time and expense photographically documenting the Fort Worth Zoo's hornbill family. I am also very grateful to Donna Lukacs, "Bird Row" Keeper, Brad Hazelton, Bird Supervisor, Christopher Brown, Curator of Birds, and other friends and former colleagues at Fort Worth, for all their efforts and encouragement, and for providing updates on the hornbills since I left.

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#### Endnote

Lindholm's current position is Keeper/Aviary, Disney's Animal Kingdom in Florida.



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# 1999 AFA Super 25 Drawing

Winners names were drawn over the Labor Day weekend at Birdeez Nutrition Center/Bird House in Chandler Arizona. The AFA staff was assisted by shop owners, Robert and Anna Medina, Andy and Martina Guzman, and their customers. Lucky winners may have already been notified by phone, but all will be formally notified by certified mail by September 15, 1999.

Winners	Items	Donated by
1. Linda Brandt, OH	Macaw Cage, powder coated	Animal Environments
2. Claudia Slone, AZ	Amazon Cage, powder coated	Animal Environments
3. M. Bereza, MD	Cage with lift-off play top 24 x 22 x 30"	Avian Adventures
4. Kathy Rakestraw, GA	Blue & Gold Macaw baby	Benny & Nancy Gallaway
5. Daniel Shearing, UK	Original painting, Bali Mynahs	Beth and Dwight Greenberg
6. Parrot Chest, OK	Austral Conure and cage	Bill Richardson
7. Keith Christian, CA	Pro-V Brooder 24 x 16 x 16"	Blue Skies Aviary
8. Troy Hensley, GA	Octagon 20 Incubator	Brinsea Incubators
9. Helen Kemp, CO	\$500 in Savings Bonds	Colorado State Delegates
10. Jeremiah Wright, NM	Encyclopedia of Lories, signed/no.	Dick Schroeder
11. Kathy McAuliffe, WA	Bird play stand, stainless steel	FeatherHeads
12. Pat Ashmore, TX	Framed print of Scarlet Macaw	Gamini Ratnavira/Hidden Art Forest Gallery
13. Andrea Medrano, CA	\$300 gift certificate for products	Kellogg's
14. Felix Marcial, WA	\$300 Internet gift certificate	Kookaburra Pet Shop
15. B. & D. Greenberg, FL	Original painting, Touraco	Lyrae Perry
16. Theresa Albertson, WA	African Congo Grey Parrot, baby	Macaws and More
17. Karen Campos, CO	\$500 gift certificate for acrylic toys	Perches by Bear
18. Laura Barwick, NC	\$500 gift certificate for wooden toys	Presents for Polly
19. Vanessa Johnson, TX	Gift certificate for 600 lbs. of product	Pretty Bird International, Inc.
20. Mike Boger, AZ	Parrot cage, model #152	Prevue Pet Products
21. Liz Hilden, PA	Trip for two to Tambopata, Peru	Rainforest Expeditions
22. Shelly Nice, CA	Lesser Sulphur-crested Cockatoo, baby	Robert Harrison/Albuquerque Aviaries
23. Jean Thorpe, FL	14K gold 1/3 oz. coin/Bahama Amazon Parrot,'75	Rolf C. Hagen (USA) Inc.
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