

BREEDING THE AFRICAN JAÇANA *Actophilornis africanus* AT DISNEY'S ANIMAL KINGDOM

by Susan Congdon and Bill Zima

Introduction

The African Jaçana *Actophilornis africanus*, with its striking blue frontal shield and long toes which allow it to walk easily across lily-pads, is a fascinating bird to display. It is also of great interest from the natural history point of view on account of its unusual mating behaviour. One female may mate with up to 10 different males in a season (Tarboton, 1995), identifying this species as being polyandrous. Polyandry has been documented in fewer than 50 avian taxa. The greatest challenge in keeping African Jaçanas is breeding and rearing the young successfully. Few collections have had luck hand raising jaçana chicks and even fewer have had the parents raise them successfully. At Disney's Animal Kingdom here in Florida we have raised by hand four African Jaçanas in our nursery.

Habitat and feeding

The African Jaçanas are among the inhabitants of the large free-flight walk-through African aviary described earlier (P. 56) by Greg Bockheim. There are 11 feeding stations throughout the aviary, six on the lower level and five on the upper level. Two of the bowls contain carnivore diet mixed with Mazuri flamingo pellets. The waterfowl bowl has Mazuri waterfowl pellets, small bird breeder and lettuce mixed together. The mixed species bowl has chopped mixed fruit, soaked Mazuri parrot breeder and small bird breeder, lettuce, carrots, seeds and Quicko insectivore diet. The jaçanas have been seen eating at all the feeding stations. Insects are also dispersed throughout the day to all the birds. There has been very little if any interspecific aggression between the jaçanas and other birds.

Breeding

There are three wild caught African Jaçanas in the aviary. The male was purchased from North Carolina Zoological Park and the two females came from Disney's Discovery Island. The male was released in the aviary on January 29th, 1998 after two months of quarantine and acclimation to the aviary. The females were released together on February 6th, 1998.

The first sign of breeding was seen on September 15th, 1998, when the male jaçana began displaying to both females. He threw his head back two or three times then stretched his neck out and began calling. Both females seemed uninterested and the male ceased after a minute. Early September has been recorded as the beginning of the breeding season for jaçanas in the

wild (Postage, 1982). On September 29th, however, it was discovered that the male had moulted his primaries and tail feathers. The breeding female did not moult until October 15th, nearly four weeks after the male had begun moulting. The non-breeding female did not moult at this time. With jaçanas in the wild, the non-breeding females moult first. This should have led to the male to begin displaying to the other female (Tarboton, 1992). On October 9th the male was seen displaying to an unidentified female. He shuffled his feet and danced around her. It was not until October 27th though that we witnessed the 'wing salute' to the breeding female. The male repeated this several times throughout the day. The following day, the male and the breeding female chased the non-breeding female away from the pond area. By December 13th the non-breeding female was moulting.

On December 16th, 1998, the male and breeding female performed the typical mating ritual of jaçanas. The female stretched out her neck with her head held low while at the same time keeping her tail pointed upwards. The male mounted her and attempted to copulate unsuccessfully for three seconds. The male then crouched beneath the female and began lightly pressing his head on her breast, cloaca and under her wings. The male then flew off without attempting to copulate again. Later in the day the breeding female called to the male and the ritual started again. This time they copulated for 18 seconds, with the male moving from the right side to the left side of the female's tail. They continued the mating ritual for the following week, copulating both successfully and at times unsuccessfully.

The first egg was discovered on December 23rd. We had not provided any floating vegetation, and hoped they would lay their eggs on the island under the cover of the rice grass and safe from predators. They, however, chose to lay by the edge of the first catch pool for the waterfall. The nest was poorly assembled. The female had gathered what little vegetation that was in the immediate area and stomped it down. This was the same spot where the pair copulated most frequently. In the wild the male and female African Jaçana copulate on a lily-pad or other floating vegetation on which they plan to nest. It is said this is to test whether it is strong enough to support the weight of the eggs and the chicks. If the nest sinks during mating, they will choose a new nest site (Tarboton, 1992). The female laid an egg each morning for the next three days. The typical clutch size in the wild is three to five eggs, with four being most common (Tarboton, 1992). On the morning of December 29th, there were only two eggs remaining in the nest. The nest and water were checked for any sign of disturbance, but nothing was found. The two eggs that remained were taken to the nursery to be artificially incubated. Two dummy eggs made of wood were put in their place in the nest. The following morning though both had disappeared without trace. The two eggs in the nursery were candled after four days and found to be infertile.

The last nest was so poorly constructed that each time the male left the nest the eggs rolled away a short distance. More vegetation was placed in the nest area and shaped so there would be a cup for the eggs to rest in. The male and female both flew to the area and picked at the new vegetation for about 12 minutes, before flying to the rice grass area. The jaçanas started showing signs of interest again on December 31st, when the male flew to the nest site and began calling. The female responded by flying from the lower pond to the nest and stretching out her neck and keeping her head low. They copulated for 13 seconds. The male then tapped his head on the female's breast and flew off. The female stayed and patted down the vegetation in the nest area. An egg was found in the nest two days later but it quickly disappeared. Another was laid the following morning. It was removed by the keepers and replaced with a dummy egg. This vanished four hours later. The female called to the male about 3.00pm and the male responded by circling her and lightly pressing his head against her underside. No attempt was made to copulate. They repeated this behaviour three times in 15 minutes. The next morning the female laid an egg in the rice grass area. It was later found submerged in the water and removed by the keeper and taken away in the hope that it could be artificially incubated.

The jaçanas spent the next week moving back and forth from the rice grass to the side of the waterfall. They spent time copulating, fixing the nest and going through the mating ritual. On January 13th, 1999 the female laid another egg on the side of the waterfall. Once again, because of our fear of losing another egg, we removed it and took it to be artificially incubated. The following day she did not lay an egg on the nest as expected. Instead a second nest site was discovered. This was on the upper story about 10ft (approx. 3m) from the closest water source. The nest consisted of an old palm frond and other leaves. It was another poorly constructed nest with no visible structure or cover.

The decision was made to leave the egg and monitor the nest to see what happened. We initially thought that the Black Crakes *Amaurornis flavirostris* were predated the eggs. Tarboton (1992) assumed that predation was the leading cause of the low hatching success rate of African Jaçanas' eggs even though no eggs had been seen being predated. In the wild, male jaçanas chase Black Crakes from their territory but ignore White-backed Ducks *Thalassornis leuconotus* (Postage, 1982). Both these species are housed in the aviary with the jaçanas and similar behaviour has been observed. Anytime Black Crakes approach the nest site, the jaçanas chase them away, whereas the White-backed Ducks are tolerated.

As most of the eggs were vanishing at night an infra-red camera and a time lapse video recorder were used to monitor the nest. This enabled us to record the female laying the next two eggs of her clutch. In the wild it was



Photo Susan Congdon

Jaçana chicks at three and five days old

noted that females laid their eggs between 6.07am and 7.55am (Tarboton, 1992). In the aviary at Disney's Animal Kingdom we found that our female laid her eggs between 7.15am and 8.10am. When laying the female squatted slightly and dropped the egg. She then spent five to 10 minutes arranging the nest before she left and the male appeared. The male normally sat on the nest for only one to two minutes before he would fly off.

The morning of January 18th, 1999 brought further frustration. One of the eggs had been cracked open and the other two had been scattered. The two good eggs were removed and taken to be incubated and replaced with one of the infertile eggs. The male inspected the nest after about an hour. He then smashed the infertile egg with his beak and flew off. The Black Crakes began eating the contents of the egg. We immediately examined the video tape to see what had happened. We found that the male hardly sat on the nest during the night. He was typically on the nest for less than five minutes before he would fly off and not return for some time. At approximately 20 minutes past midnight a rat could be seen eating the egg.

The pair began mating again the next day at the upper nest site. This continued for the next four days. On January 25th, 1999 the male called to

the female from the earlier nest site on the side of the waterfall. The following day an egg was found on this lower nest site. This was interesting because wild jaçanas are said to rarely re-use their nesting platforms (Tarboton, 1992). The egg was removed and taken away to be incubated. The female laid daily and ended with a clutch of three eggs. The male and female jaçanas were seen copulating in the rice grass on the afternoon the third egg was laid. They spent the next two weeks chasing the non-breeding female from the pond area and towards the densely planted area.

On February 17th, 1999 the pair again showed signs of mating. The female lowered her head and then the male did the same. They stayed for a few moments and then the male flew off. This behaviour continued for a few more days until on February 20th, the pair were seen copulating at the original nest site next to the waterfall pool. On February 25th an egg was laid at this earlier nest site. The female continued laying until the clutch contained four eggs.

A review of the time lapse video showed the male was sitting tighter on this clutch than on the earlier ones. With the male sitting tighter we were optimistic he would deter other birds from predating the eggs. Then on the night of March 2nd, at 10.30pm, an automatic sprinkler head popped up 2in (5cm) from the nest, startling the male and causing the eggs to be scattered. The male did not return until 7.00am the following morning. On March 4th we went with the horticulture team to cap the sprinkler system so this would not happen again. When we arrived at the nest site the male was not there, but immediately came and watched while we worked. He did not vocalize or show any aggression. However, he unfortunately never again returned to this nest area. We had suspected this might happen, but a study in Africa encouraged us to think differently. Of 99 nests checked, not a single male abandoned the nest due to human disturbance (Tarboton, 1992); even after the males were trapped, checked and weighed. In our case, one egg was missing when the sprinkler was capped. The other three were left in the nest in the hope that the male would return. At 5.45pm two Black Crakes were caught on film eating two of the remaining three eggs. The fourth was removed and taken to be incubated.

The male began moulting on March 15th, 1999 and the breeding pair was seen copulating for the last time on April 13th. An egg was found the morning of April 19th but vanished quickly. It was the female's nineteenth and final egg of the season that had lasted from mid-December until mid-April 1999.

Using time lapse and infra-red video, we have been able to evaluate some of the challenges facing the jaçanas when attempting to successfully incubate their eggs. Some we had anticipated, and some we had not. We knew that rats and other predators were likely to be a problem. Similarly,

we feared the crakes might be a problem as they also breed in the pond area. We had not, however, anticipated the sprinkler popping up and scaring the male off the nest. Water lilies have now been planted in and around the rice grass island in an attempt to encourage the jaçanas to use these during the coming breeding season.

Hand rearing

The jaçana eggs were incubated in the DAK nursery at 99.9°F (37.7° C) and hatched after 22 and 23 days of incubation. The eggs hatched on January 18th, February 5th, 19th and 20th. Each weighed about 5g. Three other eggs hatched but the chicks did not survive past the seventh day. One had the umbilicus wrapped around its left leg and had to be assisted in hatching. It showed some interest in food but died on the first day. Another had to be euthanized due to a slipped tendon on the second day. The third died on the seventh day possibly due to a yolk sac infection.

The chicks were raised primarily on a diet of small crickets, live brine shrimps, minced newborn mice and finely crushed Mazuri gamebird starter. Mealworms were added to the diet on the eighth day. Crickets and live brine shrimps were the initial food preference of all four chicks. Later, the preference changed to crickets and gamebird starter. The chicks were initially fed crickets every hour, later switching to every two hours. The crickets fed to the chicks were not dusted with vitamins or minerals but instead fed Mazuri cricket food for 24-48 hours.

No attempt was made to isolate the chicks from the sight or sound of humans. A puppet was used briefly (three to five days) for feeding all except for the first chick. It was made from large forceps, gauze and medical tape. Coloured pencils and markers were used to colour the puppet to look like an adult. The puppet was introduced to the second chick a week after hatching. The following two chicks were fed using the puppet from hatching and were much more receptive to it. Although the chicks were attracted to the puppet, it is too early to determine whether this impacted upon the chicks' development.

They were housed in a brooder until the 15th-20th day at 98°F (36.7°C) and this was then decreased as needed. They were later placed in 3ft x 3ft x 18in (91.5cm x 91.5cm x 46cm) and 4ft x 4ft x 30in (approx. 1.2m x 1.2m x 76cm) Plexiglas (perspex)-sided open brooders with radiant heat. Both had towels and rubber matting for substrate. Artificial grass was placed in a corner at first and then all around as they became acclimated. A feather duster was placed in the corner of both brooders. Initially the chicks spent a majority of their sleeping time under the dusters. A mirror was used with the first chick after the 19th day, the second inconsistently after the second day, and from hatching with the third and fourth chicks. The second chick



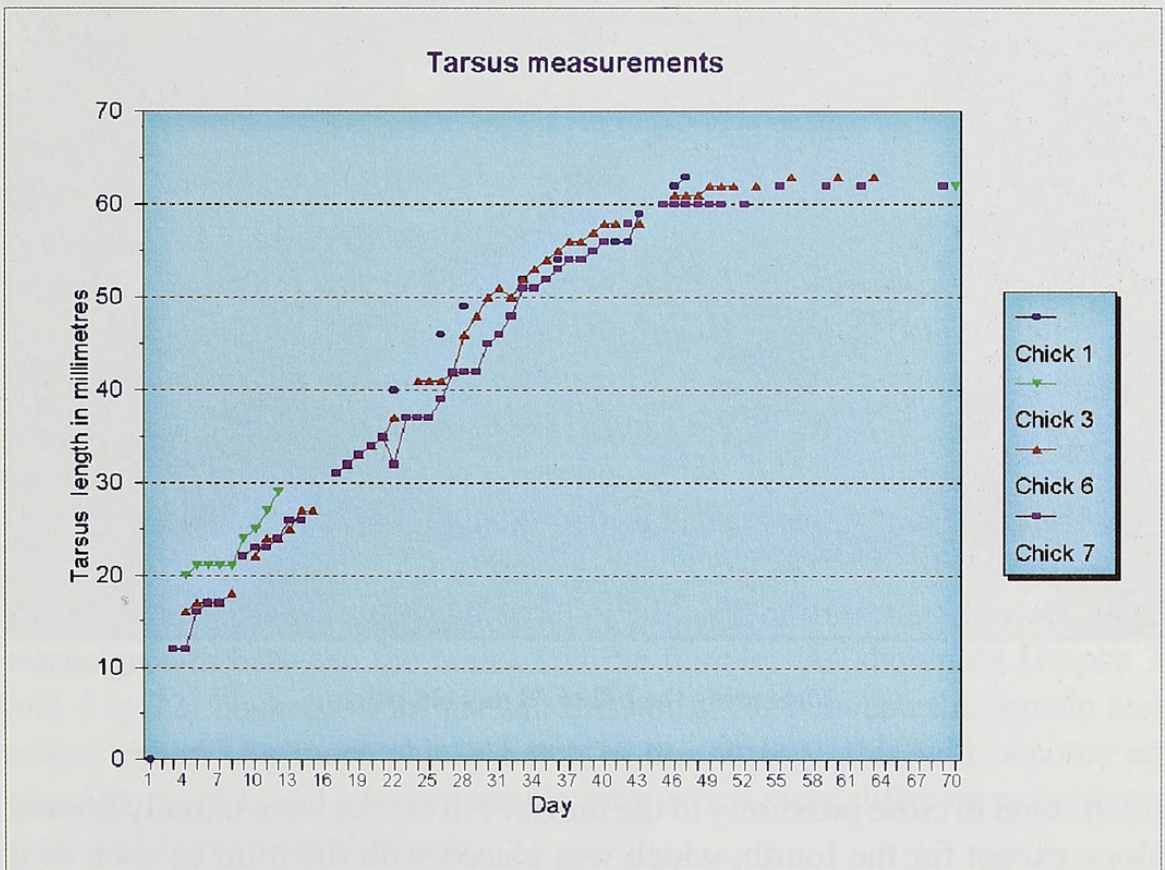
Photo Susan Congdon

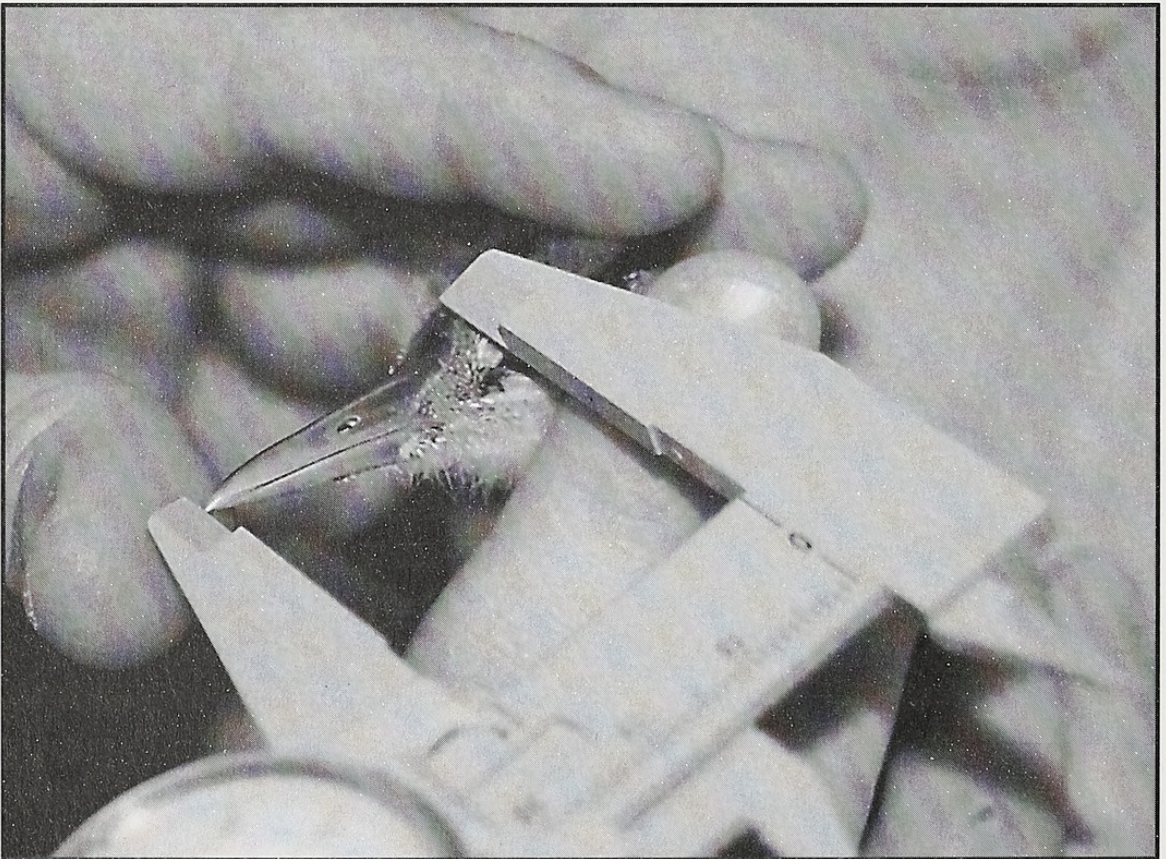
Jaçana chicks at three and five days old being fed using puppet



Photo Susan Congdon

Jaçana chick at 19 days old



*Photo Susan Congdon***Measuring the tarsus of 30 day old chick***Photo Susan Congdon***Measuring the bill of 30 day old chick**

often stood in close proximity to the mirror. All chicks were initially housed alone except for the fourth, which was placed with the third as soon as it was dry. The first two chicks were introduced when the first chick was 30 days old and the second chick was 17 days old. A physical barrier was used

initially as a precaution due to the larger size of the older chick. Though the younger chick was much smaller, a second food source had to be added due to displacement of the older, larger chick.

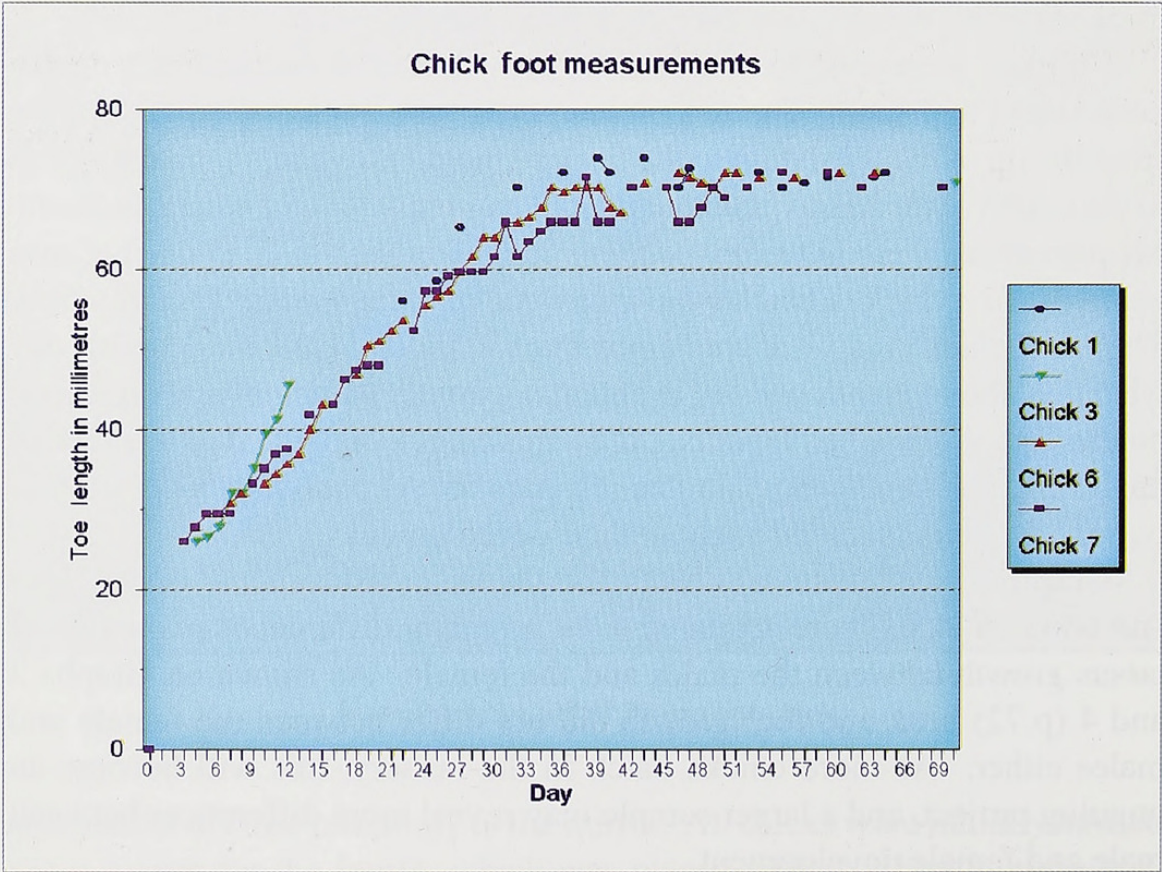
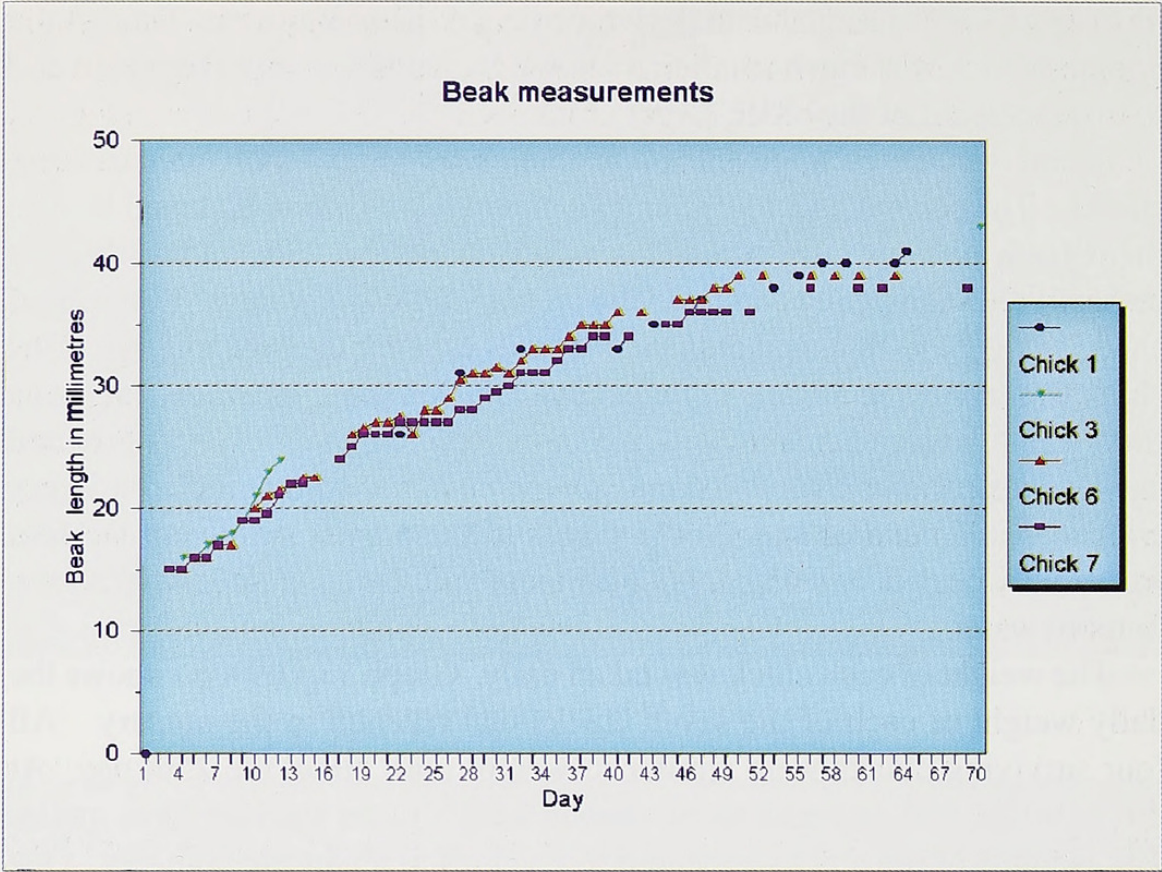
There were some minor health problems associated with the surviving chicks. The second and fourth chicks had to have their toes taped to stop them from turning outwards. This occurred on the 29th and 18th days respectively. The taping corrected the problem within five days. The second chick's Oright leg deviated at the ankle joint causing the bird to limp. This chick was housed in a small brooder until the 15th day. After this chick was moved to a larger enclosure and had more exercise the problem corrected itself. Subsequently, the third and fourth chicks were moved to a larger enclosure at an earlier age. Some cracks in the plantar surface of the foot were easily healed by using A & D ointment and allowing the chicks access to more water.

The weight of each chick was taken daily. Graph 1 (p.69 top) shows the daily weight of each of the seven chicks that hatched in the nursery. All four surviving chicks were similar in weight until about the 25th day. At this point the female began to increase in weight faster than the three males. The weights of the chicks appeared to level off at about the 60th day. One chick, now known to be the female, levelled off at 180g while the three males levelled off at 110g-120g. It appears, therefore, that they may be able to be sexed by weight, however, they were karyotyped to confirm this.

Calipers were used to measure the growth rate of each chick's tarsus, beak/shield and toes. The toe measurement was obtained by measuring from the tip of the third digit to the back of the surface pad, then adding this to the length of the hallux. Neither toenail was included in the measurement. Measurements were not taken of the first chick until the 22nd day because being the first chick to hatch we wanted to assess the rearing difficulty first. The third chick was measured from the fourth day until the seventh day when the above mentioned leg problem occurred. Measurements resumed on the 70th day but had levelled off by this time. The 70th day is included on the graph for a male/female size comparison. Measurements of the other two chicks were taken throughout their development.

Graph 2 (p.69 bottom) charts the tarsus measurements of the four surviving chicks. There appeared to be no major differences in the rate of tarsus growth between the males and the female. As shown on Graphs 3 and 4 (p.72) beak and foot growth did not differ between the female and males either. As more chicks hatch in the nursery, this will become an ongoing project, and a larger sample may reveal more differences between male and female development.

The chicks were on view to guests (or visitors) for much of their development, and due to their unusual appearance they were a huge hit. At the time of writing, all four are cohabiting in a small aviary with a pool,



sand-box, plants and banana leaves. On the first day there was slight aggression from the second chick, which because of its weight we suspected was the only female, and this was confirmed later. This aggression has not been seen much since. The chicks spend most of their time in the large pool.

Acknowledgments

This paper was only made possible due to the diligent efforts of the Africa aviary team and the nursery staff at Disney's Animal Kingdom: Shannon Mezzell, Lyn Heller, Jeff Ignaut, Greg Bockheim, Susan Stevens, Lynne Silkman, Lynne Sutcliffe, Allison Keeley, Jody Daugherty, Greg Bruehler and Trisha Olow. The Disney's Animal Kingdom's bird department management team of Grenville Roles, Chelle Plasse and Scott Barton and Nursery Manager Suzie Kasielke contributed beneficial insights.

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DR LUIS FELIPE BAPTISTA

Dr Luis Felipe Baptista died on June 12th while tending the garden of his home at Sebastopol, California. He was 59. He last wrote in the magazine in 1994 (Vol. 100, No. 4, pp183-188) on Aviculture's Contribution to Science and Conservation. An Obituary by Ian Hinze will appear in the next issue.

CHESTER ZOO BIRD REVIEW 1999

by Roger Wilkinson

The highlight of 1999 was the arrival of a pair of Red Birds of Paradise *Paradisea rubra* received on loan from the New York Zoological Society, the Bronx/Wildlife Conservation Park, New York. Two of the Chester Zoo senior bird staff went to the Bronx where they spent time working with the birds before returning to Chester accompanying the Red Birds of Paradise. These birds which were bred at New York in 1998 are currently held in our purpose built off-show bird of paradise breeding area and will be transferred to the on-show breeding aviaries in the new 'Islands in Danger' exhibit when it is ready.

Two White-eared Catbirds *Ailuroedus buccoides* bred at Stuttgart Zoo have also recently been received at Chester and will also be gracing one of the 'Islands in Danger' aviaries. Another aviary is planned to hold New Guinea Blue-crowned Pigeons *Goura cristata*, Duyvenbode's Lories *Chalcopsitta duivenbodei* and Stella's Lorikeets *Charmosyna papou*. This exhibit will also house a pair of St. Lucia Amazon Parrots *Amazona versicolor*, to be received on loan from Jersey Zoo, and includes a spectacular enclosure for Komodo Dragons *Varanus komodensis*.

Another important species received into the collection in 1999 was the Vietnamese Pheasant *Lophura hatinhensis*. A pair of these endangered pheasants were received on loan from the World Pheasant Association, the male having been bred at Antwerp Zoo and the female at the Old House Bird Gardens, nr. Reading, England.

Mountain Peacock Pheasants *Polyplectron inopinatum* were especially productive in 1999. After a barren year in 1998 when no eggs were laid, this year the female laid nine eggs. Despite our best efforts to screen the area where she made her scrape with planting, she chose not to incubate any of these eggs and we were obliged to remove them for artificial incubation. Six chicks were hatched of which four were reared successfully. Other pheasants bred in 1999 included Malay Crested Fireback *L. erythrophthalma erythrophthalma*, Satyr Tragopan *Tragopan satyra* and Golden Pheasants *Chrysolophus picta*. One Blyth's Tragopan *T. blythii* was hatched from five fertile eggs but it died shortly after hatching. This repeated the problems we have had previously with embryo and chick viability in these pheasants and may perhaps in part be explained by inbreeding depression in this stock. However, we would be pleased to hear from anybody who has had experience in improving egg viability through nutritional or incubation management. Four Common Peafowl *Pavo cristatus* were reared and although two Green Peafowl *P. muticus* were hatched neither was reared. Five Roulroul Partridges

Rollulus roulroul were reared including four that were parent-reared. Two Red-legged Partridges *Alectoris rufa* were reared from eggs laid in 'Europe on the Edge'. Chinese Painted Quail *Excalfactoria chinensis* hatched but failed to rear two chicks in the 'Finch Flight'.

As in 1998 we followed the EEP (European Endangered Species Breeding Programme) Humboldt Penguin *Sphenicus humboldti* coordinator's request and bred only from genetically under-represented birds. Four penguin chicks were hatched of which two were reared successfully. Waldrapp Ibis *Geronticus eremita* successfully reared eight chicks. There are now over 700 Waldrapps in zoos and bird gardens in Europe and this is another species which we now have to actively manage to control breeding in our collections. How different this situation is to that only 10 years ago when we were hand-rearing Waldrapp to maintain our breeding colony. In contrast to the now productive Waldrapps, the Little Egrets *Egretta garzetta* sharing their enclosure failed to rear any of the chicks they hatched. The European Spoonbills *Platalea leucorodia*, also in 'Europe on the Edge', laid for the first time. The eggs were left with the parents but although the eggs were fertile they failed to hatch. Also for the first time at Chester two pairs of Dalmatian Pelicans *Pelecanus crispus* built nests. One of the female pelicans laid and incubated an egg but as with the spoonbills this fertile egg failed to hatch.

Caribbean Flamingos *Phoenicopterus ruber ruber* bred particularly well in 1999 with a total of eight birds reared. Chilean Flamingos *P. chilensis* laid later in the year and unusually in 1999 with only two chicks reared were less successful than their Caribbean cousins. From 1990 to the end of 1999 the Chilean Flamingo flock increased in size through breeding from 28 to 48 birds and the Caribbean flock from 40 to 59 birds. Careful egg management is practised by the flamingo keeping staff. Eggs are removed as they are laid and replaced with dummy wooden eggs. Because of the loss of eggs and dummies by being knocked off the nest by other flamingos, each wooden egg has a thick nail hammered into it so it can be spiked into the nest. Despite the parents being unable to turn these dummies they are accepted by them and maintain the birds' incubation behaviour until their own egg is returned before internal pip. This also permits many other management options. For example, if their own egg proves to be infertile the dummy may be removed thereby encouraging the pair to relay or the fertile egg from another pair may be fostered to them.

The flamingo nests are mapped and regular observations made of incubating birds so that parentage of all eggs on nests can be recorded. Eggs are numbered and marked with a pencil. Careful egg and nest records ensure the parentage of eggs and chicks can be recorded. Shortly after hatching each chick is pinioned and a web tag attached to the web of skin between



Photo Roger Wilkinson

Male Superb Fruit Dove



Photo Roger Wilkinson

Superb Fruit Dove fledgling

the toes. These web tags are numbered so that later in the year when the young flamingos are caught up for ringing (we use Darvic leg bands above the 'knee') the ring details can be recorded for each youngster along with parentage and individual history. Only occasionally are eggs discovered on the ground between nests for which the parentage cannot be determined.

Waterfowl bred included two Black-necked Swans *C. melanocoryphus*, two Cuban Whistling Ducks *Dendrocygna arborea*, a Ross's Snow Goose *Anser rossii*, 13 Marbled Teal *Marmaronetta angustirostris*, eight Northern Shovelers *Anas clypeata*, three Ferruginous Ducks *Aythya nyroca*, eight Carolina Wood Ducks *Aix sponsa*, three Mandarin Ducks *A. galericulata*



Photo Roger Wilkinson

Wrinkled Hornbill

and three Smew *Mergus albellus*. However, 1999 was a very disappointing year for crane breeding with chicks hatched but not reared from Red-crowned Cranes *Grus japonensis* and West African Crowned Cranes *Balearica pavonina pavonina*.

A Superb Fruit Dove *Ptilinopus superbus*, a Jambu Fruit Dove *P. jambu* and three Golden Heart Pigeons *Gallicolumba rufigula* were successfully parent reared. The latter are particular favourites of mine and it was a pleasure to breed from them. A Pink Pigeon *Nesoenas mayeri* was foster reared by Java Doves *Streptopelia risoria* dom. One Mindanao Bleeding Heart Pigeon *G. criniger* was hatched but this was not reared and a Nicobar Pigeon *Caloenas nicobarica* which was hand-reared died before it became independent. Crested Bronzewing Pigeons *Ocyphaps lophotes* and Common Bronzewing Pigeons *Phaps chalcoptera* also hatched chicks and Speckled Pigeons *Columba guinea*, Rock Doves *C. livia* and Diamond Doves *Geopelia cuneata* were reared. A Tawny Frogmouth *Podargus strigoides* was reared as were two Spectacled Owls *Pulsatrix perspicillata*, three Snowy Owls *Nyctea scandiaca* and a Barn Owl *Tyto alba*. Because of reduced demand for Snowy Owls we had planned not to breed this species in 1999. Once eggs were laid these were removed and replaced by dummies. However the female laid further eggs adding to the dummy clutch and these went undetected and hatched.

Highlights in the Parrot Section included the successful parent rearing of three Mount Apo Lorikeets *Trichoglossus johnstoniae*, a Yellow-backed Chattering Lory *Lorius garrulus flavopalliatu*s and a Duyvenbode's Lory *Chalcopsitta duivenbodei*. The Greater Vasa *Coracopsis vasa* laid four

eggs but because of lack of interest in this species from other zoo collections we removed and discarded two of the four eggs. The remaining two eggs hatched under the parents and both chicks were reared. Because they are already well represented with many youngsters in the managed EEP/ESB populations we decided not to breed the Green-cheeked Amazons *Amazona viridigenalis*, Red-fronted Macaws *Ara rubrogenys* and Blue-eyed Cockatoos *Cacatua ophthalmica* in 1999. Sadly the Red-fronted Macaws were lost late in the year following the use of levamisole as a worming agent. I would strongly caution against the use of this anthelmintic by injection in this species. A Red-tailed Amazon *A. brasiliensis* was hatched but failed to survive and later in the year we were saddened by the death of the breeding female. A new female bred in 1998 at the Tropical Bird Gardens, Rode, was located and this has joined the widowed male at Chester as part of the managed EEP breeding programme. Other parrots bred included three Cuban Amazons *A. leucocephala*, one Thick-billed Parrot *Rhynchopsitta pachyrhyncha*, three Slender-billed Conures *Enicognathus leptorhynchus* and a Golden-capped Conure *Aratinga auricapilla*.

Chester Zoo had its first success breeding Wrinkled Hornbills *Aceros corrugatus* in 1995 when a brood of four chicks was successfully parent-reared. Both parents were confiscated birds received on loan from HM Customs & Excise in December 1986. They first attempted to breed in 1990 and in 1991, 1992 and 1993 hatched but did not rear chicks. The success of 1995 was followed by a further successful breeding in 1996 but on that occasion only one chick was reared. Wrinkled Hornbills are threatened in the wild and since 1997 have been the subject of an EEP. All five Wrinkled Hornbills were lent to other EEP participants; one female to Aalborg, Denmark, two females to the Tropical Bird Gardens, Rode, UK, one female to Upie, France and a male to Paignton, Devon, UK.

In 1997 the Wrinkled Hornbill pair again attempted to breed but lost both youngsters, one of which survived to over nine weeks old. The pair then made a second nesting attempt but the female emerged from her last attempt in very poor physical condition and died shortly afterwards from what the post mortem indicated to be chronic liver disease. Evidence of haemochromatosis (iron storage disease) was looked for but not found and the aetiology of the liver disease remains unknown. In December 1998 we were pleased to receive an adult female on loan from Antwerp Zoo. The female was quarantined before being introduced to our male. Our male was extremely attentive trying to feed her immediately but she wanted only to hide from him and initially appeared very unrelaxed in his company. After several unsuccessful attempts at introducing these birds the female was again introduced to the male on February 8th 1999, and only 10 days later was seen being fed by the male at which time she began mudding-up the nest-box entrance. She remained in the nest-box from February 1999 and emerged

110 days later with two strong chicks, a third equally healthy chick fledging three days later. As with a number of other Asiatic hornbills both sexes of juveniles resemble the male on fledging. With almost twice as many females as males in the EEP population we hoped that our previous imbalance of sexes would be reversed but they proved to be two females and one male. The male has since been transferred to the Tropical Bird Gardens, Rode, where it is now paired to a female that was bred at Paultons Park, Ower, Romsey. The two 1999-bred female Wrinkled Hornbills have been sent to Heidelberg Zoo where a group of this species is being assembled to facilitate natural partner choice in the expectation that this may increase the number of pairs breeding successfully.

Lilac-breasted Rollers *Coracias caudata* successfully reared three chicks in their aviary in the Tropical Realm but the pair of Green Wood Hoopoes *Phoeniculus purpureus* made no breeding attempts following the transfer of their previous year's offspring to Paradise Park, Hayle. Perhaps as co-operative breeders in the wild the wood hoopoes would have been more inclined to breed had the family group remained intact. The Laughing Kookaburras *Dacelo novaeguineae* reared a single chick and the Blue-winged Kookaburras *D. leachii* made their first breeding attempt after six years in the collection. The female Blue-winged Kookaburra laid a clutch of two eggs but these proved infertile. Three Violaceous Turacos *Musophaga violaceous*, four Schalow's Touracos *Tauraco schalowi*, a Red-crested Touraco *T. erythrolophus* and four White-cheeked Touracos *T. leucotis* were bred.

New arrivals were a pair of Magpie Robins *Copsychus saularis* and two Pope Cardinals *Paroaria dominicana* bred at London Zoo. These were initially housed in the free flight area of the Tropical Realm but the Magpie Robins proved to be such accomplished escape artists that they are now confined to barracks in one of the aviaries in this building. Birds bred in the Tropical Realm in 1999 included Emerald Starling *Lamprolornis iris*, Scissor-billed Starling *Scissirostrum dubium*, White-rumped Shama *C. malabaricus*, Red-billed Leiothrix *Leiothrix lutea* and Silver-beaked Tanager *Rhamphocelus carbo*. Two Bali Starlings *Leucopsar rothschildi* were hand-reared. Yellow-throated Laughing Thrushes *Garrulax galbanus* and Red-winged Laughing Thrushes *G. formosus* hatched chicks in the free flight area of the Tropical Realm but these were left with the parents and none were reared successfully. Food competition and disturbance in this mixed species area may have contributed to these nest failures and some chicks may be taken for hand-rearing in the future.

A total of nearly 200 birds, of 62 species, was reared in 1999.

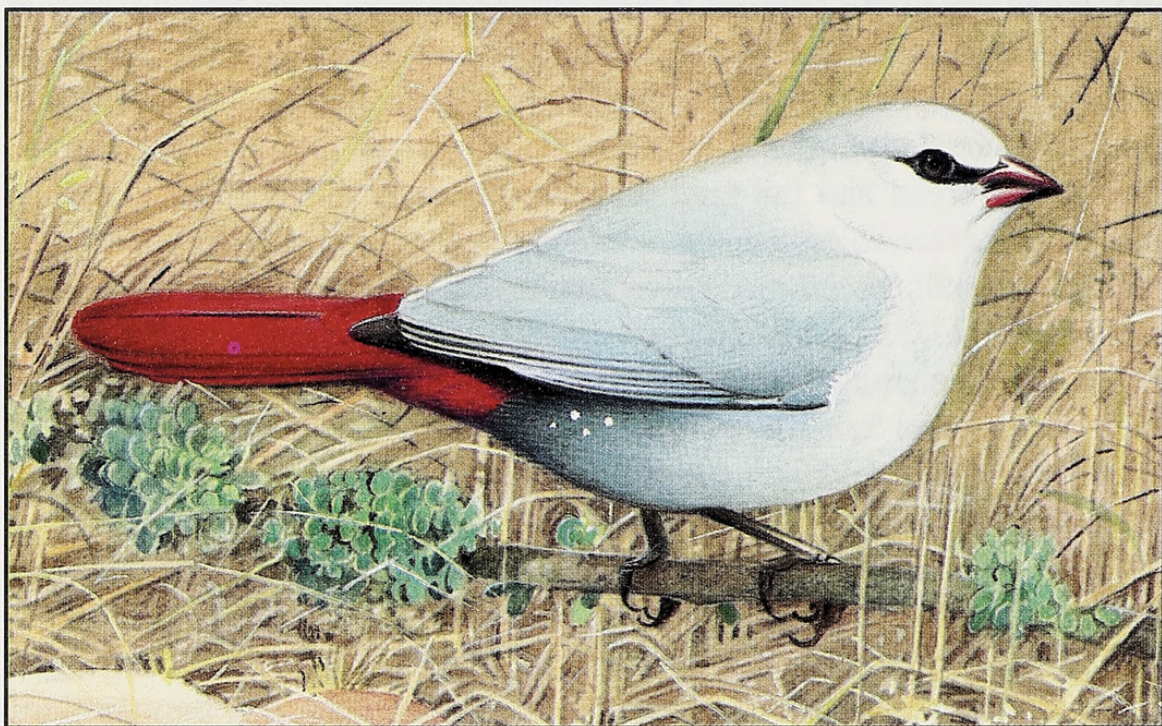
Dr. Roger Wilkinson is now General Curator: Higher Vertebrates and Research Co-ordinator at Chester Zoo, Upton, Chester CH2 1LH, England.

WAXBILLS AND THEIR ALLIES: THE LAVENDER WAXBILL

by Ian Hinze

Genus *Estrilda* - the typical, swee and lavender waxbills

All the species that are thought of as typical or 'true' waxbills are included in this genus, which is a remarkably homogeneous group. It includes the Common, Black-rumped and Orange-cheeked Waxbills *Estrilda astrild*, *E. troglodytes* & *E. melpoda*, which have been imported into Europe for centuries and those sealing wax-like red bills gave rise to their English name.



Lavender Waxbill

Most possess finely barred plumage and are endowed with tremendous agility, being able to feed by clinging to growing grasses, hold their food under one foot and manipulate nesting material. Their nests tend to be fairly large structures with a tubular entrance and, usually, a cock-nest on top or alongside. The swee and lavender waxbills diverge slightly from the norm in some respects and the latter are believed to be a link between the typical waxbills and the firefinches *Lagonosticta* spp.

Lavender Waxbill *Estrilda caerulescens*

Other names; Lavender Finch, Red-tailed Waxbill, Red-tailed Lavender Waxbill



Congdon, Susan and Zima, Bill. 2000. "Breeding The African Jaqana Actophilornis Africanus At Disney's Animal Kingdom." *The Avicultural magazine* 106(2), 62–80.

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