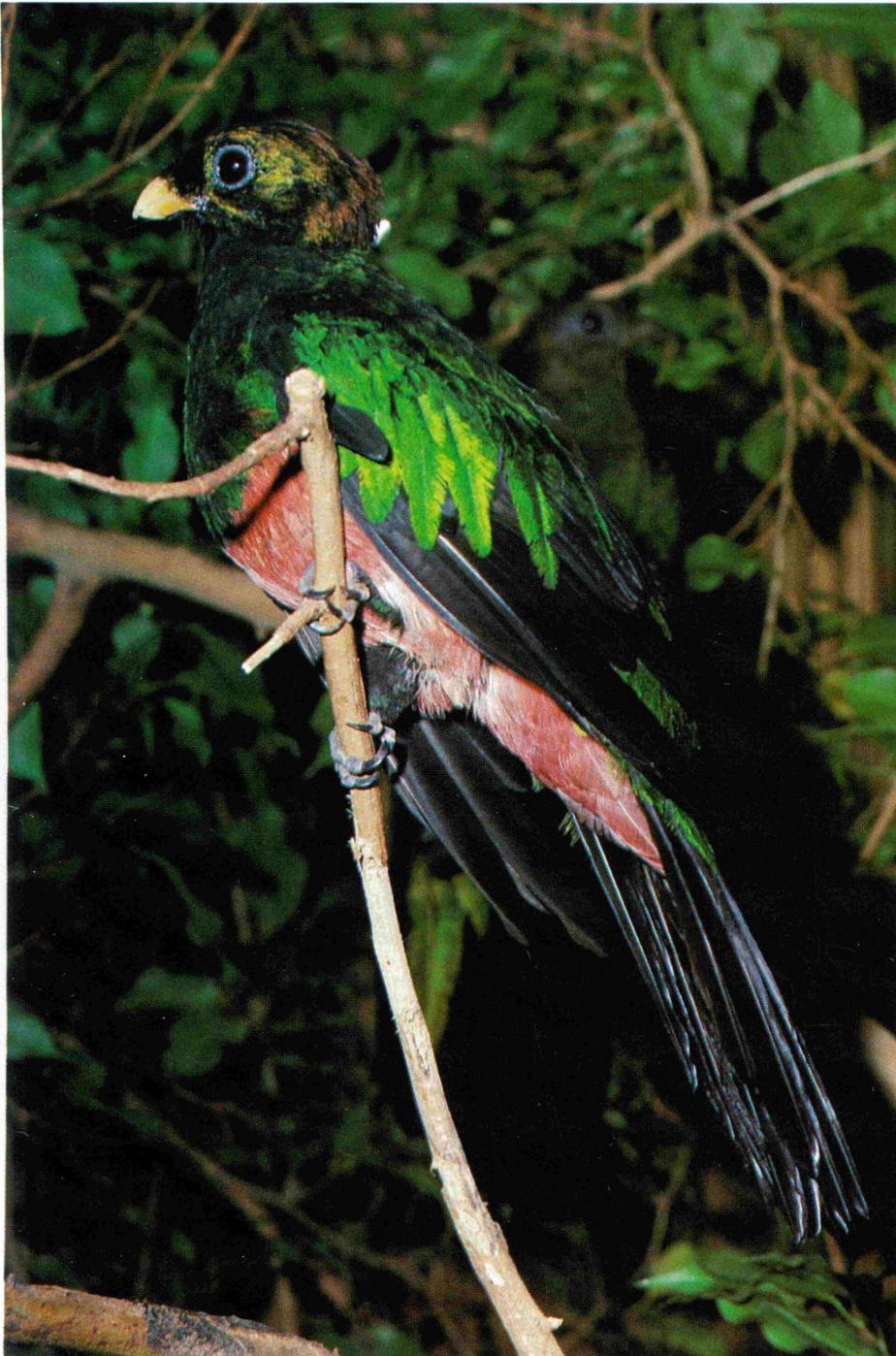


Breeding the Golden Headed Quetzal

by Robert J. Berry, Curator of Birds
Houston Zoological Gardens

Adult golden-headed quetzal.

Photo by R. Andrew Odum



Golden-headed quetzals (*Pharomacrus auriceps*) are strikingly beautiful members of the Trogon family. They inhabit humid cloud forests of the sub-tropical portions of the Andes range in Venezuela, Colombia, Ecuador, Peru and northern Bolivia. (This is a colder, wetter environment than the habitat of their more familiar and glamorous relative, the resplendent quetzal (*Pharomacrus mocinno*.) All quetzals are arboreal and according to published reports, their diet in the wild consists mainly of small avocado-like fruits, lizards and insects. Nests are located in rotten tree cavities and the birds themselves are rather secretive and sedentary. The average length of *P. auriceps* is 35 cm. Females are somewhat duller versions of the males, lacking extensive iridescent coloration on their heads, and having less elaborate development of the rump and tail feathers. In addition, the beak coloration is dark brown in females and juveniles and bright golden yellow in adult males. The Trogon family consists of eight genera and 34 species (20 New-World, 11 Asian and three African). The quetzals comprise the neo-tropical genus *Pharomacrus*. As with all other members of this unique family, with the exception of a few individuals, quetzals have generally proven difficult to establish and maintain in captivity. As a result, they are seldom available and few specimens have been exhibited in zoos or maintained in private collections. We were, therefore, not surprised when a review of the literature indicated that of the 34 trogon species, only one successful breeding has been reported in captivity: the resplendent quetzal in a private collection in Costa Rica in 1941 (Delacour, 1943).

Of all loosely defined grouping of bizarre and unusual birds known as soft-bills, my personal interest has always focused on four distinct families: touracos (*Musophagidae*), birds of paradise (*Paradisaeidae*), cocks of the rock (*Cotingidae*), and trogons (*Trogonidae*).

Earlier in my zoo career, I was fortunate to have the opportunity to work with and successfully breed representatives from all of these groups with the exception of the trogons. I was, therefore, quite excited when in December of 1981, we were able to acquire a single female of *P. auriceps* for the zoo's collection from Hendee Zoological in Chicago. We were assured at the time the female was purchased that a male would be available in the near future. We were hopeful, and even somewhat optimistic, that we could breed this

Continued on page 26

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species provided, of course, that we could keep them alive.

Upon her arrival, the female quickly proved that quetzals are, indeed, delicate and tedious birds to maintain. The zoo quarantine period was difficult for both this female and her keepers. The diet instructions received from Hendee consisted of: cubed whole wheat bread, puffed rice cereal, chopped banana, avocado, soaked dog chow and a vitamin/mineral supplement. These were the only items they had been able to persuade her to eat. We soon learned, to our dismay, that these were eaten none too well.

This particular specimen was unbelievably sedentary. In fact, I often wondered, when I observed her through the window of the quarantine ward, if she was indeed alive or whether her keepers, in fear of my not uncommon fits of rage, had taken her carcass to a taxidermist and were simply moving her realistically-stuffed body from perch to perch in a daily basis. As the Houston Zoo had previously received a degree of notoriety in the press for exhibiting fake coral snakes my suspicions in this direction were not totally unfounded.

In March of 1982, a juvenile male was received from Hendee. This bird was placed in our quarantine building in a flight adjacent to the female. By then, with our now somewhat vast experience associated with the stresses and traumas of trogan husbandry, the male's conditioning and quarantine were relatively uneventful. This was perhaps due to the fact that he was a younger bird and seemed to adapt more easily to his captive environment. He accepted a broader range of diet items, occasionally flew around his cage, and even more amazingly, often vocalized. His animation did little, however, to stimulate the female, and I continued to think she might actually be a realistically mounted taxidermy specimen. Both birds completed their quarantine in mid-April and were subsequently transferred to the Tropical Bird House.

During their quarantine we noticed that the female's left eye was becoming cloudy and obviously she could not see well. Examination revealed that a cataract had developed. Due to her visual impairment, the decision was made not to release the pair into our large, mixed species, walk-through aviary as was originally intended. (This proved to be a prudent decision as by spring of the following year, the female was totally blind in her left eye.)

The pair was, ultimately, placed in a 3m x 3m x 2.7m high glass-fronted,

planted exhibit. The back wall of this exhibit was wire and looked out into the walk-through aviary. The exhibit contained a small pool with running water, a skylight and supplemental fluorescent lighting. After trying several wooden nest boxes and fiberglass simulated logs, in which the pair showed little interest, a natural palm log with a hollow core was installed. The 1.8m tall log was mounted vertically with the base resting on the floor of the exhibit. The hollow core was filled with leaves, pine needles and bark mulch to within one cm of the entrance hole and a perch was attached just below the exterior opening. The top was covered with a removable lid.

Through a slow and tedious process of coaxing, the diet now accepted by the pair consisted of ZuPreem Bird of Prey Diet, avocado, grapes, raisins, soaked dog chow/cat chow mix, bananas, papaya/cantelope mix and tomatoes. Although mealworms and crickets were offered regularly, few were eaten. Chopped pinkies were also fed but seldom touched. Moths and other flying insects were totally ignored. We became concerned that if the quetzals nested, providing the right nestling food would be a difficult problem. Most field observations indicate that chicks are reared on only live foods up to ten days of age. We, therefore, persisted in trying to find other foods that would be accepted, but to no avail.

The pair appeared to adapt well to their exhibit. Their plumage became brighter after each molt and the male's tail feathers lengthened. The two birds, however, were never observed sitting together, allo-preening or otherwise sharing an interest in each other or their nesting site. I still wondered whether the female's body cavity was stuffed with cotton balls or excelsior.

In early April 1985, the male was noticed pulling at fibers around the entrance to the nest log and he gradually began entering and removing materials from the cavity. The female showed no interest in this cavity until July of 1985 when she was also observed pulling at the loose fibers around the nest hole. I was finally convinced after three and a half years that she was actually a real living bird. On 15 August, 1985 the female began entering the log for brief periods while the male perched at the entrance. By 12 September, the female was remaining in the log for longer periods of time. When the nest was opened for inspection, we discovered that all of the material had been removed from the cavity right

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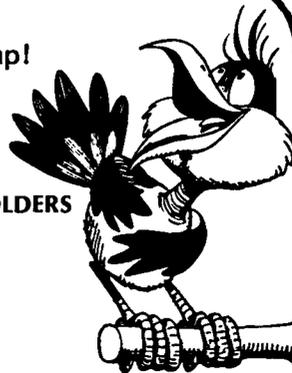
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down to the ground level.

We did not wish to disturb the pair's efforts, but knowing that if eggs were laid and hatched, we would never be able to reach the eggs or chicks due to the depth of the cavity, we debated whether to repack the hollow. On 16 September, the log was refilled. This time the lower half was packed with dried leaves and the top half with clean pine shavings. The male almost immediately began removing the shavings and by the following day he had excavated to a depth of 20.3 cm. Thereafter digging slowed. On 26 September, the male was seen dropping a leaf from the hole to the outside which meant he was down to the leaf level. Three days later, both birds were seen removing leaves. Excavation continued until the cavity eventually reached a depth of 45.7 cm below the nest. A keeper's arm could barely reach the nest from the removable top of the log.



Photo by Andrew Odum

The first chick was found cold and dehydrated at twelve days of age and was removed for hand rearing.

Photo by Andrew Odum



With medical treatment and a lot of TLC the chick showed dramatic improvement by the following week.



Photo by C. Plasse

Iridescent coloration was apparent by day 29.

On the morning of 5 October, the male was noticed to be staying inside the nest. That afternoon, when he left the nest to feed, a quick inspection was made before the female could enter the log. A single pale blue egg was observed. Another inspection four days later revealed a second egg had been laid. At this point, the birds were left strictly alone other than to be fed and watered, and a bamboo screen was erected across the outside of their exhibit glass to provide the pair with a greater sense of security.

Both parents shared incubation duties. The female was generally in the nest early in the morning when keepers

arrived and then again later in the day just before keepers left. The male sat during the day with occasional periods during mid-day when both birds were out together.

On 25 October, the first egg hatched. The second egg hatched the following day. The incubation period was, therefore, estimated at 17-20 days.

The day the first chick hatched, both parents were inside the nest together from early morning to mid-afternoon when the male came out to feed. The female was not seen at all that day.

Foods taken by the parents changed slightly at this time and in order of preference were: avocado, dog chow,

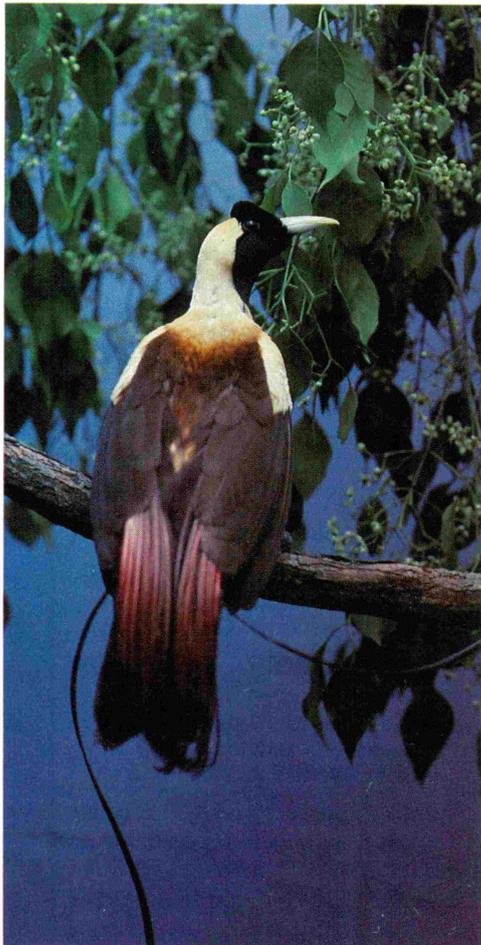


Photo by C. Plasse

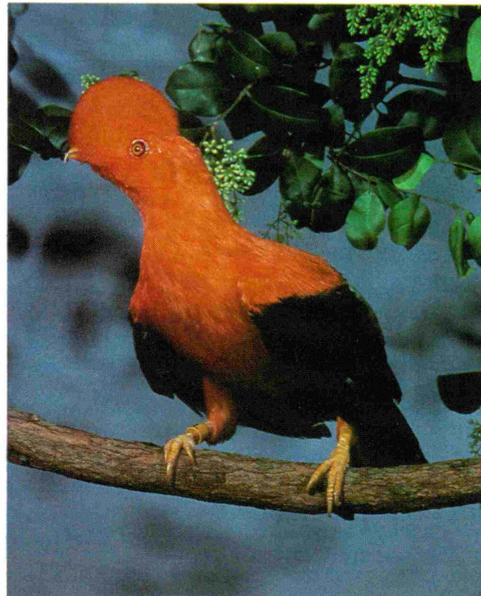
The chick was almost 3 months of age before it was to be totally independent.



Thirteen species of touracos (Musophagidae) are being bred in the zoo's collection. Several species are now into second and third generation.



The red bird of paradise (Paradisaea rubra), in 1978.



The scarlet cock of the rock (Rupicola peruviana), in 1979.

grapes, pinkies (only sporadically), and ZuPreem Bird of Prey Diet (occasionally).

More mealworms were consumed than normal but not in the number one would expect for birds feeding newly hatched chicks. Other live food in the form of crickets, spiders, and wax-worms were totally ignored.

On 27 October, both chicks appeared

Continued on page 30

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to be healthy; their eyes dark and closed; and their skin a bright, rosy pink. Their length was estimated at 8 to 10 cm from beak to rump. By 30 Octo-

ber, banana, apple and a little more bird of prey diet were being consumed. The chicks appeared to be doing well; both were plump and feather tracts were appearing. Satisfied that they were progressing normally, the nest was checked less frequently.

On 5 November, six days later, we were shocked to discover that one of the chicks was missing from the nest. The carcass was never found. The following day the female was seen entering the nest after having bathed. She did not exit the log to feed from early morning, nor did the male enter; obviously the chick was not being fed. Routine attempts to get the female off the nest failed. Tapping the nest log gently at the base finally brought her to the entrance hole. After four or five minutes she flew out. The remaining chick was found to be cold, dehydrated and very thin. No apparent growth had occurred in seven days.

The chick was immediately removed and transferred to a heated brooder. Weight was recorded at only 26 grams. Due to the chick's weakened and debilitated condition the nestling was taken to my home for around-the-clock inten-

sive care and hand rearing. Although the chick constantly vocalized, there was little or no feeding response. Initial feedings were of soaked cat/dog chow hydrated with 5% dextrose at hourly intervals. Smaller additions of papaya, avocado and peeled grapes were made. Often the chick had to be force fed as a normal response still could not be elicited. The chick frequently stayed in a head-down, arched-back position, often pushing backwards and flipping over. I had little hope that the chick would survive. If so, I knew it would be an uphill struggle. I was not disappointed. Hand-rearing is often a rewarding experience but not with a chick that refused to gape or beg for food, and not when most feedings were forced, spit out or regurgitated.

On day 15, mucous was noticed accumulating in the chick's oral cavity. Culture results revealed *Enterobacter cloacae*, *Proteus mirabilis* and *E. coli*. Treatment was begun and consisted of .15cc chloromycetin and .25cc 5% dextrose administered daily by gavage. The mucous accumulation continued for about 5 days making feeding difficult. This condition cleared up just in time

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for a new problem to appear. The chick, whose eyes had opened on day 17, suddenly kept its left eye closed for two days, and upon reopening of the eye, the pupil was cloudy. This cloudiness persisted almost until the bird was independent.

In my fatigued state, and as the chick was presumed to be a female, I began to wonder whether "cataract development in the left eye" might be some subtle form of sexual dimorphism as no medical reason for this condition could be determined. For some time afterward we feared that the bird would be blind in that eye. Today, however, there seems to be no visual impairment, and a short term dietary deficiency due to the bird's initial weakened condition is believed to have been the primary cause.

Feather development appeared to proceed normally although there was depigmentation in areas of the developing primaries. Iridescent coloration was apparent by day 29. By day 33, the bird was approaching the size of the adults. On day 34, the youngster began perching on its food bowl. The chick was returned to the zoo and a gradual weaning process was begun. It was not until age 3½ months (mid-February) that we were confident that the chick was consuming enough food by itself to be independent.

In April of 1986, a second clutch of two eggs was laid and two chicks hatched in early May. Efforts were again made to allow the parents to rear their young. Both chicks appeared to be developing normally when on day 12, one of the chicks appeared to have heavy bruising on the cranium and back. Both chicks were immediately pulled for hand-rearing. The bruised chick deteriorated rapidly and expired the following day. Post-mortem revealed an enlarged heart and liver believed associated with protein deficiency. With a fortified diet, the remaining chick developed normally and reached full independence at seven weeks of age and is currently housed with its older sibling.

In August of 1986, the pair produced their third clutch which consisted of only a single egg. This egg hatched on 7 September 1986 and efforts were again made to have the parents rear their offspring to fledging. Unfortunately, it became necessary to pull this chick for hand rearing on day 14. The youngster has now reached independence and is believed to be a female. Hopefully through a continuing process of trial and error, we will ultimately be able to locate some suitable form of live food

that the adults will readily accept.

Our initial efforts with this species have been very challenging and rewarding. The first two offspring are a male and a female and we are currently negotiating to acquire an adult female from a European collection and an adult male from Canada in order to expand our work with these intriguing birds. At least we now know they will breed in captivity.

What led to our success?

A "little" avicultural experience, a lot of luck, a significant degree of effort, a modicum of intuition and an infinite amount of patience.

Luck — because the female's visual impairment caused us to place the pair in an individual exhibit rather than introducing them into our mixed species walk-through aviary as was originally intended. Unbelievably shy and nervous birds, I now sincerely doubt that this pair would have adapted to a mixed species environment to the point that they would have attempted to nest. They appear totally intimidated by any other bird larger than a finch that approaches them.

Effort — because these birds did not adapt easily to captivity and great care had to be devoted to their conditioning and acclimation. Diets had to be closely monitored and any changes that were necessary in their environment had to be done gradually over a period of time.

Intuition — because development of an insight into their behavioral needs was critical to their maintenance and breeding. For example, providing a nesting site that they would accept was mainly a matter of trial and error. Realizing that their beaks were not strong and adapted for digging, providing a type of fill for the nesting cavity that they could easily excavate was more a matter of intuition. The excavation of the nest site appears to be a critical phase of their courtship and pairing.

Patience — because we worked with these birds for almost three and a half years before we were able to bring them into breeding condition.

The real success of this project, however, is due to efforts of the conscientious and talented keeper and support staff working with me. It is through their diligence, dedication and commitment that our avian breeding programs in Houston have met with a significant degree of success and achievement.

REFERENCES

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