

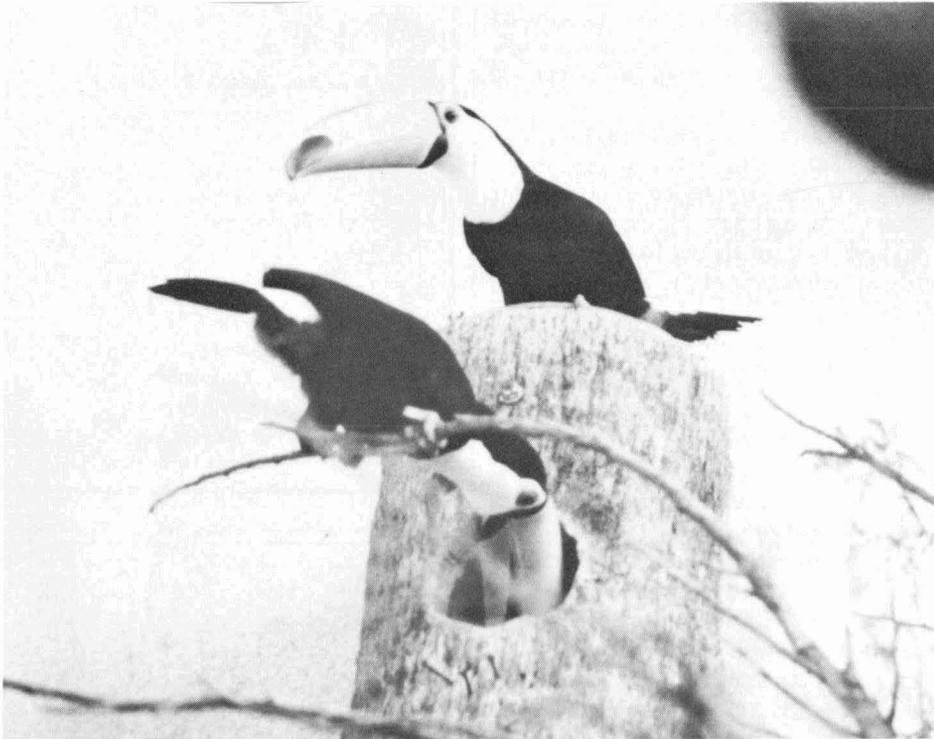
BREEDING the TOCO TOUCAN

Ramphastos toco

RIVERBANKS ZOOLOGICAL PARK

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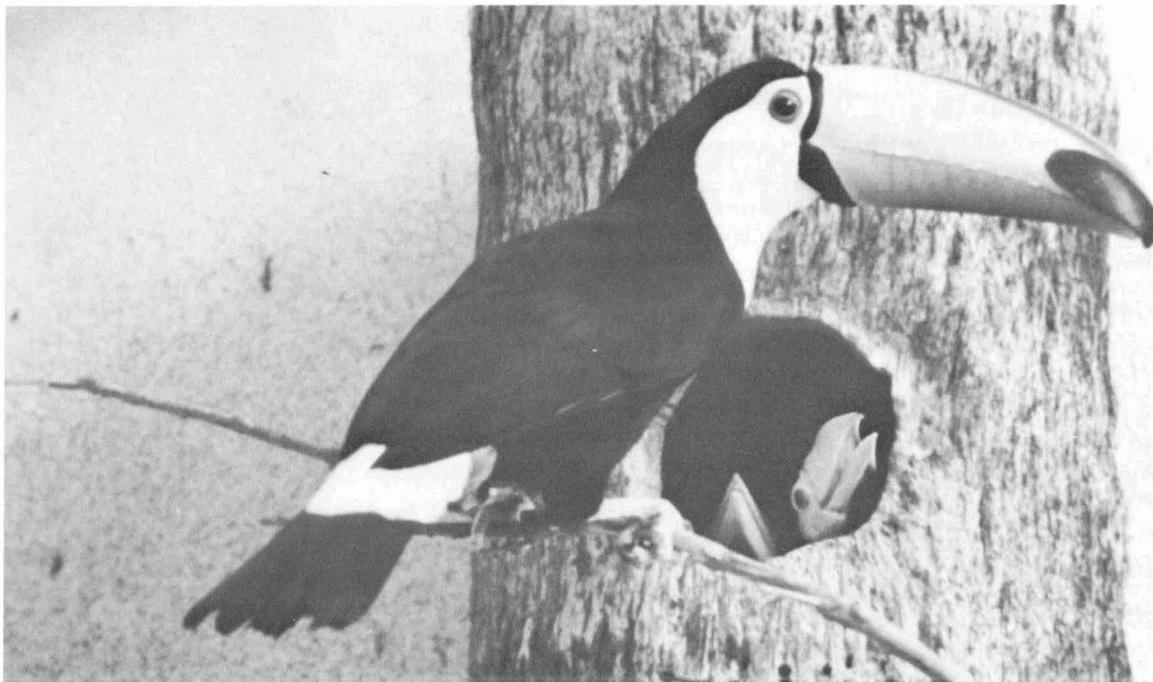
Adults feeding young. Approximately 2 weeks after hatch.



In April of 1974 Riverbanks Zoological Park acquired four Toco toucans—two from a bird dealer in Florida and two from a bird dealer in New Jersey; the sexes were unknown. After a routine quarantine period, all four were placed in an outdoor exhibit on the southern side of the bird-house. The enclosure was shared with a pair of Crested seriemas. Exhibit dimensions were roughly 10m wide x 3m deep x 5m high. Plant material used was entirely evergreen shrubs, and ample perching was provided by suspending heavy vines across heart cedar snags buried in the ground. The front of the exhibit was covered with 1" x 2" welded wire fabric. Through a doorway at one end, access was provided to a "winter quarters" room measuring approximately 3m x 2m x 5m. This room was heated by electric cables buried in the concrete floor and perching consisted simply of two heavy dowels. Diet for the toucans consisted of diced fresh fruit, soaked raisins, and grapes coated with insectile mix and topped with bits of Zupreme Bird of Prey diet.

The toucans and seriemas coexisted well, showing very little interaction. No breeding behavior or pair bonding was noted in the toucans for the rest of 1974. In the spring of 1975 the seriemas did show an inclination to nest, and a platform was provided in the winter quarters room. By chance, a discarded "grandfather clock" type nest box was used to raise the plat-

Male preparing to feed chicks. Age approximately 35 days.



photos by Robert E. Seibels



Young Toco toucan shortly after fledging. Age 45 days.



Male feeding chicks. Age approximately 35 days.

form off of the floor some 2 meters. The seriemas did in fact build a nest on this platform and subsequently laid a series of infertile eggs during the summer of 1975. The toucans still showed no breeding behavior until late October of 1975, when some aggression was noted towards one individual. By 1 November it was obvious that three of the four birds were openly antagonistic towards the fourth, and this bird was permanently removed from the exhibit. In December 1975 a Palmetto log (sabol palmetto) was mounted on the wall of the main exhibit opposite the winter quarters room door. An entrance hole was chiseled through the hard outer crust, but the pulpy interior of the log was left intact.

During the winter of 1976 the three remaining toucans continued to interact on an apparently equal basis. On 15 March one individual was seen excavating the nest log, and for the next several days all three toucans were observed daily working at the entrance. On the basis of mandible size it appeared now that we had one female and two males. By the end of March a true pair bond began to evolve between the female and the Alpha male. These two assumed all the excavation chores and defended the nest log area whenever the Beta male approached. Outside of the immediate nest area the Beta male was rarely attacked, and actually was involved in mu-

tual preening with both of the pair. By 8 April the log had been excavated to the point that either bird could fit its entire body into the opening and disappear completely from view. Now an unexpected behavior began to occur—the female was repeatedly seen entering and emerging from the grandfather clock nest box. At the same time excavation of the log continued and on 20 April both the Alpha male and the female showed aggression towards the keeper servicing the exhibit. On 30 April pieces of egg shell were found on the main exhibit floor, but at this time the source was indefinite because the seriemas were once again nesting. On 4 May a broken egg was found inside the grandfather clock nest box, thus confirming our suspicions that the female toucan was in fact producing the eggs.

On the same date the Alpha male and female became very aggressive toward the Beta male, necessitating his permanent removal from the exhibit. During the next several days the pair of toucans continued to work on the next log, but the female continued to spend periods of time in the box. On 14 May a third egg was discovered in the box intact, and the female appeared to be incubating, at least sporadically. Unfortunately, on 19 May the egg was broken. To our knowledge no more eggs were laid in 1976, although the pair

continued to frequent the nest log and box, and occasionally showed aggression towards the keeper.

On 27 March, 1977, an attempted copulation was observed, and increased activity was noted around both the log and the box in the days following. By 28 April the pair was spending a majority of the day hammering on the inside of the log, and occasionally removing beakfuls of pulpy shavings. On 29 April the male was seen emerging from and re-entering the log several times during the morning. The female was not observed, and we assumed that she was inside the log. About mid-afternoon, both birds emerged, the male subsequently chasing the female over the entire exhibit in a highly agitated and aggressive manner. At this point we placed a ladder against the log and inspected the interior; much to our surprise there were three warm eggs at the base of the log, a full arm's length from the entrance hole. The ladder was hastily removed and the male broke off his pursuit, as both birds returned to the log. Keeper entry into the exhibit was now reduced to a minimum. For the next several days the male and female seemed to share incubation duties about equally.

On the morning of 13 May the male was once again observed vigorously chasing the female about the exhibit as he had done on 29 April. Following several mid-air collisions precipitated by him, the female retired to the shelter of the box and the male returned to the nest log. Later that same day both were seen together briefly, with no sign of aggression from the male.

On the morning of 14 May a pipped eggshell was found on the ground under the log entrance indicating an incubation period of approximately 18 days. The chopped fruit diet was immediately supplemented with several high protein items, including day-old mice (pinkies), soaked Gaines Dog Meal, crickets with legs removed and extra Zupreme Bird of Prey diet. By the afternoon the adults had begun to feed the young. Surprisingly, they spurned the pinkies and other items in favor of the crickets, consuming the latter in ever increasing numbers. On 20 May a closed circuit T.V. camera and video-tape recorder were installed to monitor and record significant aspects of the feeding process. The female by now had assumed perhaps 80 percent of the feeding chores, and had begun to supplement the chicks' diet with raisins and small pieces of diced fruit. The male rarely assisted in the feeding at this stage. Instead, he spent much of his time in agitated flight back and forth across the top of the exhibit, all the while making loud "racking" vocalizations. He frequently attacked the female and forced

her to seek shelter in the box. On 21 May she appeared to have a small cut over one eye, and there was some concern as to whether the young were being properly fed. Over the next several weeks the male continued to harrass his mate, but at the same time began to assume more of the feeding duties. On 22 May, 8 days after hatching, loud multiple vocalizations were detected coming from the nest log during feeding, and cricket consumption began to fall off from a high of 400 a day as more and more fruit began to be fed by the adults. On 30 May the male was seen feeding a quantity of Zupreme to the young, and on 7 June two stubby, pale grey beaks were observed briefly in the entrance hole. By 20 June one of the juveniles was perched in the entrance hole for about half the day, and on the morning of 26 June, at 43 days, the first bird fledged. Another juvenile quickly took its position in the opening of the log, and by the next morning two more young toucans had fledged, for a total of three. At this point the male ceased harrassing the female for the most part and she again assumed her share of the feeding duties. On 30 June the number of crickets offered was reduced to 100 a day as the adults continued to feed larger and larger quantities of the normal diet. on 10 July, at 57 days, one of the juveniles was observed eating several pieces of Zupreme from the food pan on its own. On the following day all three were seen eating from the pan. By this time they able to fly about the exhibit with ease although landings were sometimes rather clumsy. On 22 July the crickets were discontinued, as

they were no longer being consumed in significant numbers.

The three juveniles were allowed to remain in the exhibit with the adults throughout the fall of 1977. On 7 December they were caught up and banded. Although the adults had shown no aggression towards them up to this point, it was decided to remove them from the exhibit to avoid any possibility of injury should the pair go to nest again prematurely. At approximately seven months of age the young were slightly smaller than the adults, and their yellow and orange mandible coloration was somewhat paler; otherwise, they were indistinguishable.

The spring of 1978 resulted in another successful nesting by the breeding pair. The nest log had been left undisturbed since the prior year and only a small amount of additional hollowing out was observed. No attempt was made to count the eggs or otherwise inspect the nest log during the incubation. On 5 May, nine days earlier than in 1977, a pipped eggshell was again found on the exhibit floor.

The feeding routine assumed the same general pattern as in 1977, although it became obvious that overall consumption was considerably higher than before (cricket consumption at one point reached 600 per day). Once again the male exhibited periods of intense aggression towards the female and she was forced to take refuge in the grandfather clock box or the dense shrubbery. On 17 June the first juvenile fledged, again at exactly 43 days. By 22 June there were four fledglings, all apparently in good condition, although the

last to emerge was considerably smaller than the other three. By late summer all four were virtually the same size. On 5 September they were removed from the exhibit following several displays of aggression by the adult male.

Many factors have contributed to our success in breeding the Toco toucan. Among the most important, I feel, are the following:

1. Number of individuals in original group — unless one is very lucky indeed, his chances of obtaining a **compatible** breeding pair from fewer than four individuals are slim.
2. Proper nest facility — Ramphastids have nested successfully in everything from plywood boxes to apple tree trunks and various types of palm logs. In all these nestings there seems to be one common element — there is inevitably some “hollowing out” of the enclosure prior to laying, suggesting that this behavior is critical to a successful pair bond.
3. “Safe” or sheltered area for the female — it appears that there may be natural cycles which affect both the incubation and feeding behavior of the adults. Responding to such a phenomenon the male, for instance, might assume all the incubation or feeding duties for several hours or even days. During this period the mere sight of the female results in aggressive pursuit by the male. the grandfather clock box in our case, provided the female with a place to escape the attacks of her mate during cycles in which he was “on duty” so to speak. There is little doubt that he would have inflicted serious injury upon her had she not been able to escape from him.
4. Proper diet — as noted, a variety of high protein items were offered to our toucans during the nesting period. This particular pair preferred crickets to all other offerings: however, another pair which nested at Jacksonville Zoo fed large numbers of day-old mice in addition to crickets. It would seem safe to say that the larger the variety of high-protein items made available, at least initially, the better.

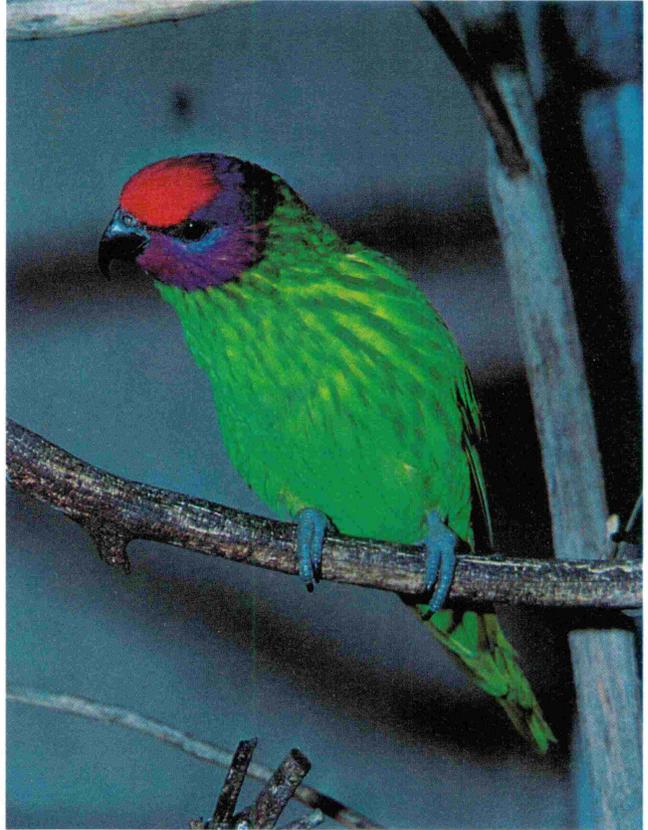
Juvenile Toco toucan. Age approximately 90 days.



In closing, I would like to express my thanks to Rick Rundel, former bird curator at Los Angeles Zoo, who had had many helpful suggestions along the way; Ron Johnson, Zoologist at Minnesota Zoological Gardens and former bird curator at Jacksonville Zoological Park, and finally the keeper staff and art department at Riverbanks Park, without whose efforts this breeding and subsequent article certainly would not have been possible ■



Blue Crowned Lory (Vini australis)



Goldie's Lorikeet (Trichoglossus goldiei)

Yellow Backed Lory



Yellow Backed Lory

