

# King Vulture

## reproduction and hand-rearing

(*Sarcoramphus papa*)

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### History

The Phoenix Zoo acquired their first King Vulture (*Sarcoramphus papa*) on December 29, 1962. This was shortly after our zoo first opened, and it came to us as a wild-caught adult. Thought to be a male, it was housed with various species of raptors and at times alone for 13 years. During this time, it revealed itself to be a female, as it laid an egg in June of 1975 and then two more in

April and May of 1976.

In April 1980, we received an adult unsexed bird from the Jacksonville Zoo. The pair was introduced together in a new outdoor aviary built for them. Constructed of telephone poles, steel cable and 1" x 2" welded wire, the aviary measures 20 feet square and 25 feet high with a large, dead tree in the center. Tropical plants and trees were planted in and around all four sides of the exhibit.

The September introduction of the two birds in this "neutral ground" flight cage went well with little negative interaction. Shortly after, the new bird was sexed and we learned that it, too, was a female. This was a disappointment, however, the two birds remained together until February 1981 when we sent the new bird to the Rio Grande Zoo in Albuquerque.

It wasn't long before we learned of another available, mature King. This one, known to be a male, was acquired from the Bronx Zoo in April 1981. The two were introduced without any problems and by June the male was observed regurgitating to the female, a form of courtship. They were already beginning to form a pair bond. The Bronx bird was a long-term captive of over 20 years like our female and this may have had a lot to do with their compatibility. February 1982 was the beginning of the Phoenix Zoo's continuous, successful King Vulture reproduction.

### Behavior and Reproduction

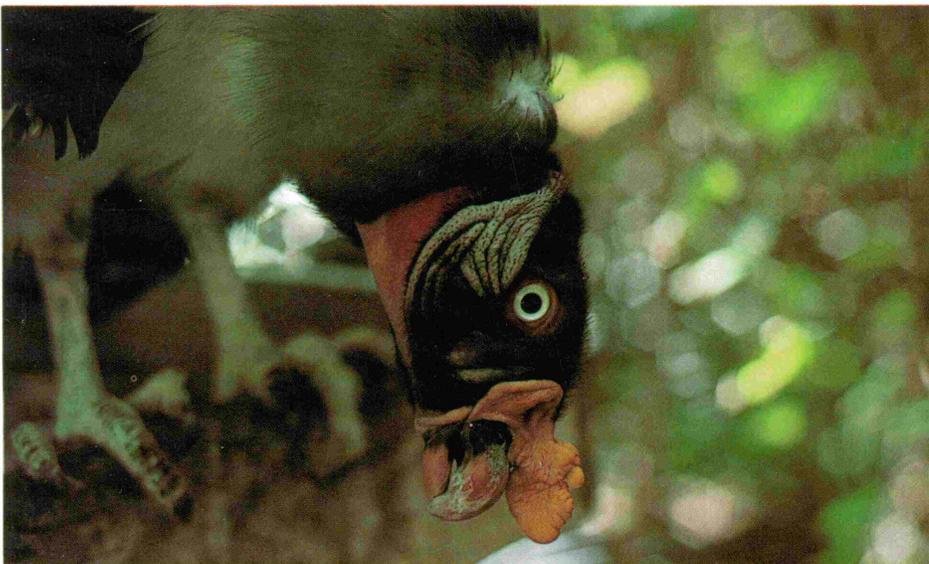
Our pair had a nest platform located eight feet off the ground which they never used. Each season they have consistently chosen to nest in the same northwest corner of the aviary on the ground. Occasionally, a few sticks are collected and dropped in the area of the nest depression. In time, the trees and shrubs planted in and around the exhibit have matured to provide shade and privacy. Additionally, we placed an open fronted plywood box over the nest site to provide more security during incubation, keeping the nest about 90% out of view from the public.

Throughout successive breeding seasons, we learned that although the birds diligently incubate their egg and fiercely guard the nest, we are unable to trust them with their own newly hatched young or pipping chicks. Chicks have been inadvertently killed or deliberately so, and then eaten. Through manipulation and intervention, we have tried to learn if one or both birds were responsible for this behavior and have concluded that either one, if given the opportunity, will grab the chick, whether together or separate. This surely seems odd, when one considers that the male defends the nest and helps the female incubate the egg through the 54-day incubation, only to kill the chick at the climax. In an effort to end this behavior, we have roped off the entire

Photos by Dick George, Phoenix, AZ



The adult King Vulture's head and neck are bare. Only as adults do they acquire their colorful neck. Both parents share in incubation.



exhibit, denying public access or viewing. We have increased and supplemented their diet to include whole animals such as rodents or chickens in addition to their commercially prepared "Bird of Prey" diet. None of our attempts to solve the problem made a difference.

We wanted our pair to raise their own chick, but each season their behavior has forced us to pull chicks or incubate the eggs in the incubator. By pulling the egg, we have learned that they will always double clutch; on two occasions they have triple clutched. This has made their nesting season in Phoenix last from December through June. As in the wild, each clutch has but one egg.

Pip to hatch takes three days. We have pulled eggs on day one, or pulled them halfway through incubation and replaced the real egg with a dummy egg. Then, when the chick has hatched, we have introduced it back to one or the other or both parents in a fluffed, dry condition and removed the false egg. Even lacking the wet, newly hatched appearance, the adults grabbed the chick and proceeded to try and kill it, at which point we quickly intervened to rescue it. Several chicks were almost lost in the re-introduction scenario. On three known occasions, when the latter was not pursued, chicks were killed, one in 1985 and two in 1987. On other occasions, chicks simply disappeared and were presumed to have been eaten, possibly by large



*The juvenile plumage is greyish-black, and assumes the adult appearance in the second year of life.*

gopher snakes which live on the grounds and can easily pass through 1" x 2" wire. We later realized that these chicks, too, were most likely victims of their own parents.

After all our efforts to achieve parent-raised chicks, it became obvious that to pursue this with our pair was pointless unless they could be relocated to an exhibit offering more privacy. We are able to double or triple our reproductive output by hand-rearing the young. Furthermore, King Vultures hand-raised in the early and mid 1980s are now becoming mature enough to breed in the various collections and institutions where they reside. It will be learned, if not already known, just how human

imprinting as juveniles affects their ability or desire to pair and bond with members of their own kind as adult birds.

#### **Hand-rearing**

The author and staff have hand-raised ten Kings as of 1990. Eggs were taken from the nest usually shortly after being laid. An incubator/hatcher unit was maintained at 98.5 to 100 degrees dry bulb, with a wet bulb reading of about 88 degrees. The eggs were manually turned five times a day. The chicks hatched on the third day after the initial first pip; one chick needing assistance took four days.

Looking through the feeding logs of chick #1 in 1983 and #2 in 1985, it is clear that during the first two weeks we were not comfortable feeding what we now know to be an appropriate diet of rodents. Chicks #1 and 2 received almost exclusively Gerber baby food strained beef for their first weeks. Calcium gluconate and multivitamins were supplemented. The baby beef was warmed to body temperature and fed with a small spoon that had its sides bent upward. This diet was readily taken, but not quite like what its natural mother may have regurgitated to it.

With chick #3 (hatched March 1986), it was learned that chicks can digest small bits of infant rodent as well as pieces of chopped, skinned, adult rodents on their first feedings, six to ten hours after they hatch. Presumably, a chick at this age is still deriving nourishment from its recently absorbed yolk. Chopped rodents and pinkies were fed either fresh or, if frozen, thawed and warmed in water, then fed from the



*Young King Vultures appear quite adorable with the fuzzy, white down, but they belong to the bird-of-prey family. They are fed meat products even when very young. In the wild, the young bird flies only after three months.*

Photos by Dick George, Phoenix, AZ

fingertips.

On the first day, the chicks were fed fresh vulture vomit which was acquired from a Ruppell's or Turkey Vulture (they were fed a rat, then a half hour later shown a net). This was to provide the bacteria and digestive enzymes thought to be necessary in the chick's new digestive system. Chicks are fed about once an hour from dawn until dusk. A feeding is presented only after the crop has emptied, to prevent it from being perpetually or overly extended and to be able to watch for impaction. Heart and liver from cows and chickens were also fed.

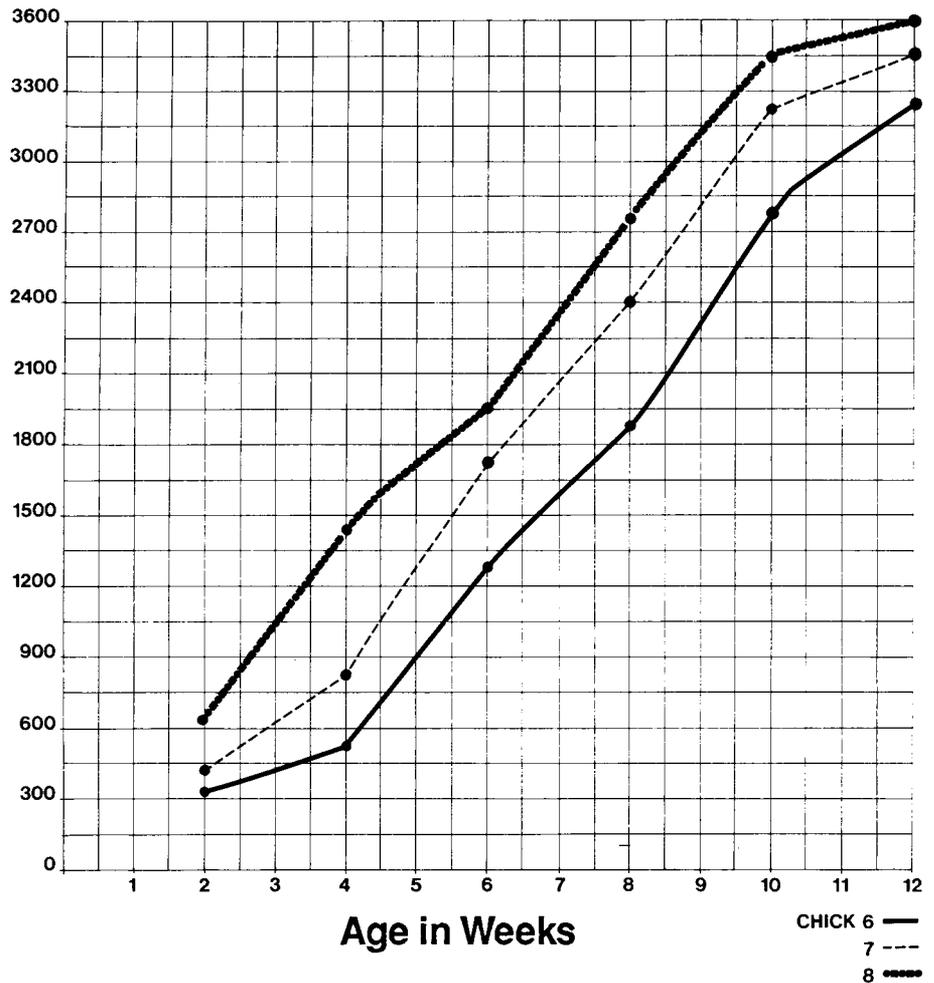
Also in 1986, after chick #3 in March, we were blessed with #4 in April and #5 in May. It was a long hand-rearing season in 1986! In 1987, two chicks were lost to the parents, so we did not raise any that year. Chick #6 hatched in March 1988 and the parents double-clutched to provide #7 in May. In May of 1989, chick #8 came into the world.

A daily feeding, weighing and observational log was maintained on chicks 1 through 8 on their first day through the age of two and one-half to three months. With an opportunity to look through the wealth of data accumulated in past logs, we have had a guideline and knowledge of what to expect during the rearing of the current vulture chick. Normal weight gain, the volume of daily dietary intake and behavioral and physical changes were all compared between the chicks of different years. It would not be useful to provide all of the data we gathered, but a summary of the more important elements will be provided.

The average weight of our chicks hours after hatching has been about 123 to 125 grams. The heaviest was 138 and the lightest 116.5 grams. These birds will often continue to beg for food beyond the carrying capacity of their crop. We have always chosen to have several small feedings (throughout the day) versus a few large feedings. However, the latter seems more likely to occur in nature with a natural parent.

Weight gain is rapid in these young birds and they are able to double their weight in two weeks. A two-week-old bird should weigh 300 to 400 grams as a minimum; one chicked weighed over 600 grams at 15 days old. A chart illustrating rapid weight gain in three of our chicks appears elsewhere in the text.

## Weight in Grams



At one month of age, they will again double, weighing over 800 grams. During a chick's first seven to ten days, about 15 to 20 grams of meat will be consumed each day, in our experience. As with their weight gain, the daily food intake will begin to double and triple in the following weeks. By 14 days of age, the young birds can consume and digest 60 to 80 grams of meat a day. The type of meat in the diet ultimately will decide how much the chicks will receive in a day when adhering to a schedule that offers food only when the crop is empty. The author has discovered that the chopped, skinless rodents or pinkies as well as organ meat will pass through the crop and into the stomach almost twice as fast as commercially prepared carnivore or bird of prey (BOP) diets. The latter is often fed to adult vultures. Although it is less expensive to feed, these commercial diets have ground up gristle and bone chips that remain in a young vulture's crop longer, thus limiting the number of feedings. A 40-pound case of BOP may cost about \$18 to \$20, while 40 pounds of mice or rats would be several times this cost, since

they are always sold per animal versus per pound. Young Kings prefer rodent meat and organs over the processed diet. They will take food morsels from a dish at three weeks of age, even earlier, and will pick rodent and organ meat out of the BOP diet. They always prefer to take food from the hand versus a dish and sometimes it becomes necessary to hand feed the ration that they voluntarily disregard. On occasion, we have offered smelt as a supplement to the diet, but never as a staple because of thiaminase. Our chicks preferred smelt over BOP but still preferred organ meat and rodents over smelt.

Just how much food intake is needed to raise a chick? Out of curiosity, I totaled the daily diet weights from one of the logs. From day one to age four months equaled a total consumption of 22,932 grams or about 50 pounds of meat.

The following observations have remained very similar between the eight chicks. A young chick should have the strength to hold its head up by the second day, and should be able to sit up on its haunches at about a week old. They will test their wobbly

legs at two to two and a half weeks and should be able to stand by three weeks. During their first few weeks, the toes are curled inwards towards the opposite foot. The toes gradually uncurl and are straight by the time they are standing. Walking has been achieved as soon as 17 days but generally occurs after three weeks of age.

The first thing one usually notices about these chicks is the stark contrast between the white, fluffy down covering the body and their black, skin-covered head. By two weeks of age, it is normal for this bare, facial skin to start peeling in sheets. As the chick grows in leaps and bounds, the facial skin will flake off several times.

At 40 to 44 days, the primary wing feathers, their first feathers, start to bud out. In seven weeks, the primaries are about two inches long and most of the secondaries just beginning to show. At two months of age, all the wing feathers should be fully erupted with the primaries at about three and one-half inches. Tail feathers first begin to appear at 70 to 73 days; the primaries are then eight inches long. As the chick continues to grow larger, its body will remain cov-

ered in white down with only the wing and tail feathers developing. By five months of age, much of the neck and other body feathers are in or starting to appear.

The feathers are black to dark brown in appearance. At four and five months of age, our chicks have shown the ability and desire to flap up the aviary wire and perch four to six feet off the ground on large, steady perches. They are first placed outdoors at about three months old. A six-month-old bird should be fully feathered and able to fly; they will still beg and accept food from the hand at this age, however. Down is still present beneath the wings and back feathers at six months.

We have never kept any of the King Vultures raised in the Phoenix Zoo beyond two years, so have not witnessed their molt to adult plumage. The gradual change to creamy white feathering, colorful facial flesh and white iris begins at three to four years of age and is not complete until the bird sexually matures at about five to seven years.

At the August 1989 American Federation of Aviculture annual

convention in Phoenix, I had a brief conversation with Jack Clinton-Eitniew, director of the Center for the Study of Tropical Birds, Inc., of San Antonio, Texas. Some of our first few vultures raised here were sent to the Detroit Zoo where they resided for several years. I learned that Mr. Eitniew acquired one of these birds and some unrelated others for research as well as a captive breeding program. He will have an opportunity to learn first-hand the effects of early imprinting and how it may or may not influence an f1 bird's ability to select a mate, bond and reproduce while still under the care and distraction of humans.

The important and well publicized California Condor recovery program underway at the San Diego and Los Angeles Zoos owe much of their success to the knowledge and techniques gained through the husbandry and breeding of Andean Condors and King Vultures. It is hoped that the data provided through this text will be useful to others engaged in the ongoing comparative analysis of data, and the pursuit of better husbandry to ensure these birds' survival. ●



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