

The Celebration of **BIRDS**

*Keynote address presented at the 2008
AFA Convention in St. Louis, MO,
by Dr. Walter Frey*

WELCOME TO THE AFA 2008 CONFERENCE! We gather in St. Louis to celebrate those marvelous, magical creatures we call birds.

Whether we keep birds as pets, breed them or admire them in the wild, they are our passion and, if we are honest, our great obsession. Now, all you cockatoo people, don't raise your crests; you Amazoniacs, no fanned tails please; you lory folk, no pinpoint pupils and you toucan people, stop playing with that ball. Everyone, just sit back, relax and let's talk about birds.

What is a bird? A simple answer is a warm-blooded animal that has feathers and lays hard-shelled eggs (at least we hope they are hard shelled, from the breeder's perspective). Going a bit deeper we find that most birds have modifications that enable them to fly. Their lungs are connected to air sacs that greatly enhance their capacity to extract oxygen from every breath. Their bones are honeycombed and much lighter than solid mammalian bones. They have no teeth but rather a very hard horny, but lightweight, bill (beak?). Most birds have a specially modified esophagus, or crop, to help store and digest food. To lighten the load on females, only one ovary is present and eggs are laid and incubated outside of the body, an adaptation that ties birds forever to the land to nest.

Birds occur on all continents. We find penguins on Antarctica, cockatoos in Australia, pheasants in Asia, capercaillie in Europe, turacos in Africa, the Hoatzin in South America and prairie chicken in North America. Even though it is not a continent, the Arctic has Snowy Owls. All together, there are between 8500 and 8700 species of birds, unevenly distributed over the globe. Tropical rain forests have a super abundance of species while temperate zones just get an elegant sufficiency of species. Few species occupy the open ocean where albatrosses glide over the waves and few species live in the desert like the roadrunner or the Budgerigar. There is even a hummingbird, the Chimborazo Star, that lives above the tree line on a volcano in Ecuador. All flying birds

occupy the air for some period of time, none more than the swiftlets who sail for months (nine or more between nesting) at a time in the air. Bar-headed Geese have been observed flying over Mount Everest, honking as they flew, while penguins have been recorded at 1700 feet beneath the ocean. Running birds such as ostriches, emus and rheas prefer open grassland or savannas.

Birds come in all sizes; at least they used to. In the "good old days" when I was young (several hundred years ago), there were giant Moas in New Zealand, 10 foot tall weighing half a ton. The biggest bird alive today is the ostrich at about eight feet tall and 300 pounds, which makes a pretty good-sized drumstick to chew on. Of course, that is way too big to fly. At 35 pounds, swans are some of the heaviest birds to fly and need long runways for take off and landing. Andean Condors need broad, nine to ten foot wing spreads to maintain their soaring flight. At the other extreme, the Bee Hummingbird of Cuba is only two inches from beak to tail and one inch of that is beak and tail. Considering Psittacines, size varies from the giant Hyacinth Macaw at almost three feet long to tiny pygmy parrots less than three inches long.

Let us now consider several special features of birds: feathers, wings, beaks, feet, voice (song or noise) box. Feathers are intricate structures that allow the infinite color variety of birds, and since bird's vision extends into the UV range, even more colorful than we can see. Feathers exhibit color through refraction and reflection of the underlying structure as in the iridescent throat patch of Ruby-throated Hummingbird or the blue of Spix's Macaw. Feathers may also contain melanin substances that give them color. Turacos have a curious water-soluble chemical called Turacin for color and red parrots have their very own newly discovered, chemical, polyenal lipochrome, to make them red. Feathers cover most parts of birds other than their feet, with an occasional bald headed species like the picathartes of Africa or King Vultures of Central and South America. Some feathers provide insulation—think of the proverbial Eider down. Some feathers make the body sleek and aerodynamic, such as the outside body feathers of

finches, for example. Specialized feathers, primaries and secondaries, in the wing allow controlled flight. There are other feathers which, when they break down, make the powder-down of cockatoo fame which covers all surfaces in a Cockatoophile's home with a distinguished patina. There are even some feathers that are poisonous as in the Hooded Piyohui and the Blue-capped Ifrata of New Guinea.

What would the display of the lyrebird be without special tail plumes? The magnificent displays of the birds of paradise, the radiant tail of the peacock, the flash of the cock-of-the-rock, the nuptial splendor of the Wood Duck and Mandarin, the waves of the ostrich plumes, all owe their effect to specialized feathers. Why, even the Audubon Society owes its existence to the show stopping plumes of the Snowy Egret. Other birds have lesser differences between male and female plumage and some are monomorphic. Many parrots, swans and geese for example are monomorphic, a fact that slowed successful reproduction in aviculture for centuries and has us singing the praises of DNA and surgical sexing available now.

There are distinct disadvantages to the birds thus advertising their presence; for example, becoming fast food for a passing predator. But, Dear Reader, consider we are talking here about males and what is a greater chance of dying to the male when the best display gets the most females. Females of these, and indeed of most species, tend to be more camouflage colored. The better to sit on a nest unnoticed or get food for the young without becoming food. The young of most species have duller colored or even more cryptically marked feathers than the adults. Some camouflage color may not be obvious as such. The green and yellow of a Double Yellow-headed Amazon or the brilliant white of a cockatoo may be obvious in a house, but the same bird sitting in the branches of a tree becomes nearly invisible, as many of us have experienced with an unfortunate escapee.

Feathers and specialized forelimbs (wings) make flight possible. Starting with gliding flight, albatrosses can maintain this flight for months at a time. They don't even need energy to hold their wings out straight—a special bony locking mechanism accomplishes that. Of course, when an albatross "goes to the store

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for food for the kids”, it may be a thousand mile round trip.

Another very energy efficient flight is soaring, as practiced most notably by vultures, birds of prey and migrating storks. What all these have in common is their start in thermal updrafts where rafts of birds are seen circling with expanded wings in ever-rising circles until they reach the top of the thermal. From there, they glide in a slow descent to the next thermal, covering vast distances with minimal energy.

More energy using is “flapping” flight, where the bird moves its wings up and down with the special breast muscles attached to the oversized sternum. By the way, breast muscle is red meat; only in non-exercised chickens is it white meat. Most flying birds use this mode of flying most of the time. Penguins also use this flight pattern as they swim (“fly”) under water. Calling it flapping is an insult to the elegant, sometimes speedy, sometimes languorous up and down movement of the wings.

One of my most memorable experiences with bird flight was watching a pair of Yellow-tailed Black Cockatoos coming in at about 30 feet over a friend’s house. They flew effortlessly, more like moths than birds, and landed in a group of Cassurina trees for their evening snack. Another very graceful group of fliers is the owls, which add a further feature

to flapping and gliding flight—silence—due to small fringes on their flight feathers. Wing shape, rapier like for high speed, rounded and broad for slower sustained flight and greater maneuverability, determines flight ability.

The most energy intensive flight is the hovering flight of the hummingbird. It is extraordinarily maneuverable and allows for up, down, forward, even backward flight. Because of the amount of energy needed it imposes a size limit on the various hummingbird species only exceeded by the Giant Hummingbird of Ecuador. It also demands high energy fuel provided by sugary nectar. The metabolism of hummingbirds is so fast that they would starve to death over the long hours of the night if they did not slow their heartbeat and go into torpor, a mini hibernation, every night.

A special type of flight is the dive of the Peregrine Falcon, which can reach speeds of up to 200 miles per hour. Dives of other birds of prey produce pressure of up to 400 pounds per square inch on each talon, killing most prey on impact.

Since birds have no useable forelimbs for grasping or holding food, they have instead specialized beaks and feet and what a variety there is. Consider the amazing pelican. Its beak can hold more than its belly can. A Kiwi’s beak is long and very sensitive to touch so that it can

detect worms under leaves and in the ground. The beaks of Brush Turkeys are highly sensitive to temperature and allow them to maintain incubation temperature in the mound within a quarter of degree. Pine Grosbeaks have such specialized beaks to extract seeds from pinecones that they can’t even pick up seeds from the ground. Many finches have generalized, conical beaks that are good for picking up small seeds or insects in season, with further processing in the crop. For extra hard seeds and nuts, parrots have the beaks to crack and tongues to manipulate and hold in place. The lorries, of course, have less strong beaks, sharper maybe, and paired with brush tongues for nectar and pollen feeding. Not as strong does not mean that your fingers won’t bleed if a lorry decides to sample your flesh.

No listing of beaks would be complete without toucans. They have the largest beak in proportion to body size—ideal for grasping fruits, baby birds or ping-pong balls. There are beaks as sharp as spears in the herons and uneven upper and lower mandibles for flying low over the water while skimming for food as the skimmers do. The fierce beaks of birds of prey are built for cutting and tearing meat. The many shapes and lengths of slender bills of hummingbirds are adapted to a variety of flowers, many flowers pollinated by only one species of hummingbird.

Legs and feet show many adaptations for avian existence. Consider the long, two toed, legs of the ostrich, ideal for running. The shorter, stouter legs of the cassowary with its three-inch long killer claw are ideal for defense. The legs of Secretary Birds are covered with tough scales to prevent snakes, their prey, from poisoning them while they stomp them to death. Perching birds have toes that lock on to the perch for safe sleeping over night. Swimming birds like ducks have webbed feet for paddles. Wading birds have long legs to stand in shallow water, while jacanas have shorter legs but long toes to walk on lily pads. Among birds of prey, the three to four inch talons of the Harpy and Philippine Monkey-eating Eagle are the longest for killing. For holding their prey, their toes lock when the talons strike, making escape unlikely. Finally, there are the weak and almost useless feet of the swiftlets, good only for hanging on their nest.

Bird sounds are another area of great interest. Who has not enjoyed the evening chorus of the African Grey Parrot or the melodious notes of a mockingbird on a moonlit night? How different that sweet sound is to human ears compared to the raucous calls of macaws. No wonder we teach our parrots to talk, sing and whistle. The bugle of a Saurus Crane or



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the “HELP” call of a peacock can be heard for a mile. Geese use their honks to stay in contact with each other. Bellbirds and riflebirds have loud calls that carry for long distances in the forest. Then there are lyrebirds who not only copy the songs of all the other birds but even copy human sounds such as sirens and chainsaws.

There are so many more interesting aspects of birds to celebrate. Nests, simple to architectural wonders, in remarkable locations, sometimes in association with termites (Golden-shouldered Parakeet), wasps (oropendulas eagles and hammerkops). Bird migration is unbelievably complex. Why migrate? How do they find a particular site? Is it inherited, perhaps like the cuckoo or learned as it is possibly with crane? Bird intelligence and tool use would be a great topic for another full talk. Books are written about all of these topics and some are listed in the bibliography. For today, this will have to be enough. I would like to end with a poem, at right, found on the Internet.



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By Mary Zoll

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an umbrella cockatoo six months old and
unimaginably white

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this is a staggering white
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feathered
phenomenal
multitudes of living white

the working
interconnected white
of her main flight feathers

the soft stunning white
of the silken down
on her chest

the personal white under her wings
where she invites scratching
occasionally
the fluffy puffed-cloud
almost frivolous white
of her ruff

the delicate white of the miniature cheek
feathers
she angles forward
to close off the sides of her beak

the glowing white
of the expanding sideburns and crown
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