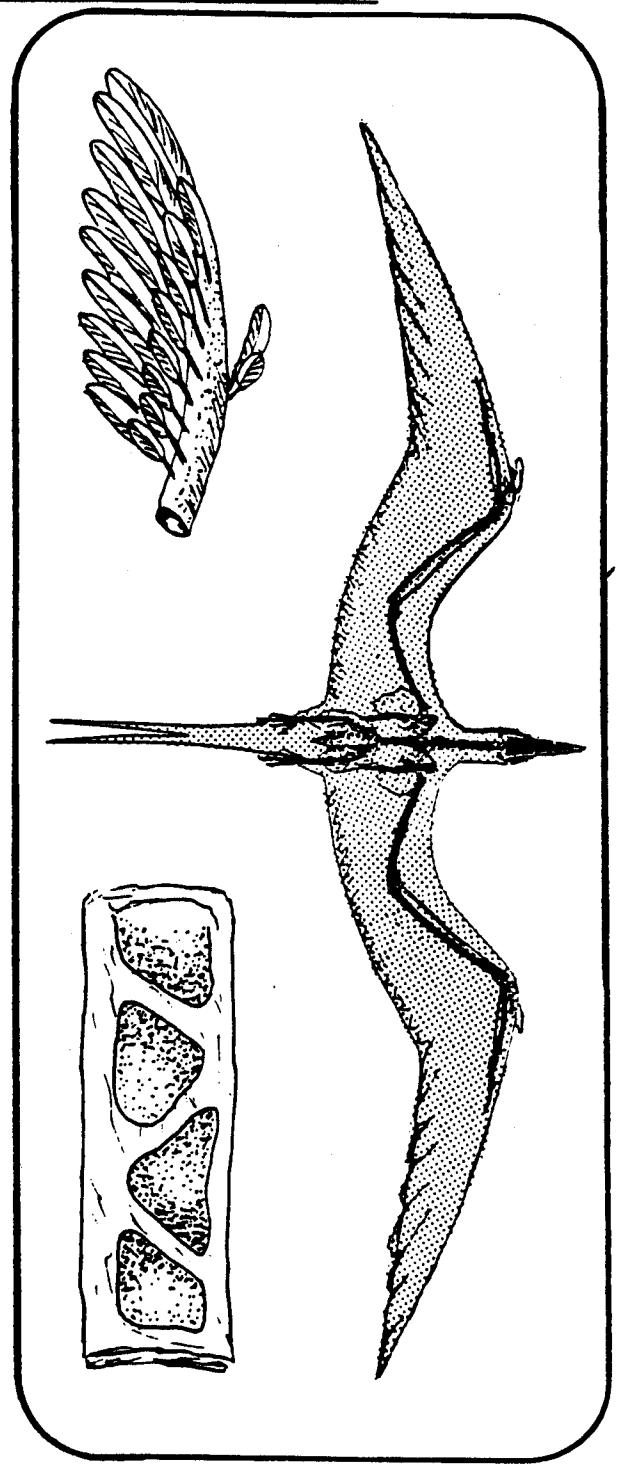
Birds Fly, Why Can't I?



How often have you looked up into the sky as a hawk soared by, and asked, "Why can't I fly, like that guy"?

The bird, as a flying machine, is the most successful adaptation among all vertebrate animals. We mammals have only 15,000 species, birds have 25,000.

The pioneers of man-made flight studied birds as they wrestled with the problem of getting, first a kite to soar, and then later a machine to fly.

They knew success depended on two factors, little weight and great power. Birds have achieved both in their two-million year journey through time.

Their secret lay in this aerodynamic design. First, their body is light weight and extremely strong. Second, their wing tips propel them forward and can vary their position of attacking the oncoming air.

A bird's hollow bones have struts inside that resemble the Warren truss, a beam used by engineers to support heavy weights. Their pelvis is fused to the sacrum, making a strong hollow tube. All builders know a pipe is stronger than a solid pole of the same diameter.

The frigate bird with a wing span of seven feet, has a skeleton that weighs four ounces. This is less than all its feathers piled together in one heap.

Internally, a bird carries no excess baggage. He has no large intestine or urinary bladder to store wastes. This is why he splatters your windshield as he flies overhead. A land animal would leave a trail behind, and become easy prey for a hunter if he was missing these organs.

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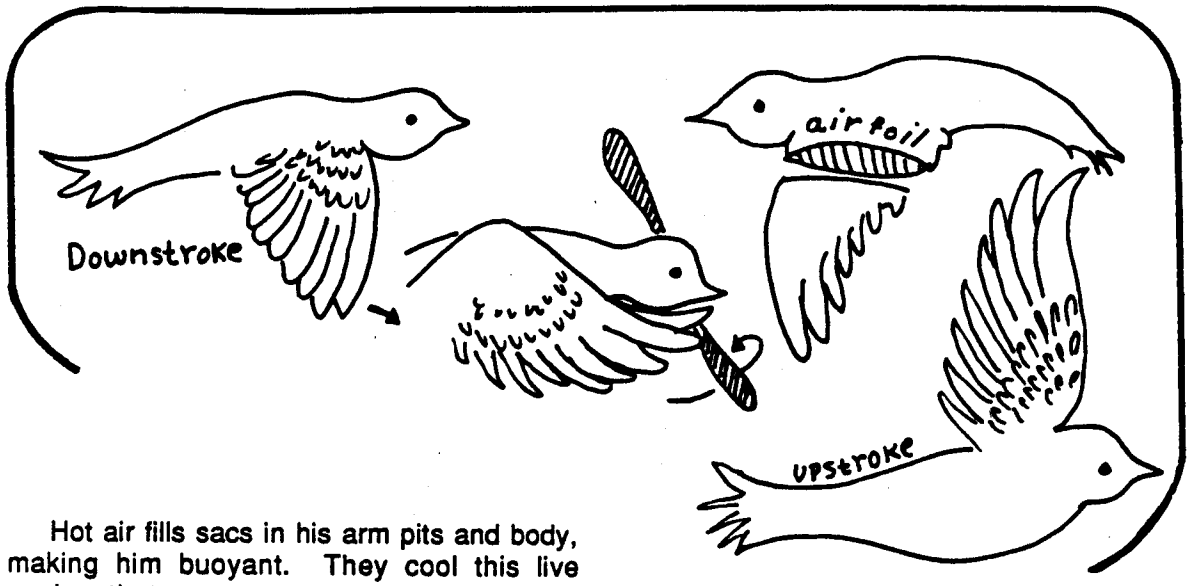

Hot air fills sacs in his arm pits and body, making him buoyant. They cool this live engine that cannot evaporate perspiration. The pump of his body is an efficient four chambered heart which beats 135 times per minute in a pigeon, and 615 times in a hummingbird. Our heart beats only 72 times per minute.

Fuel-wise, he uses only high test quality food. No junk foods, heavy fats or bales of grass. He eats seeds and nuts which are pure protein, or berries for quick energy sugar. The golden plover fattens up on bayberries in Labrador all fall, then flies nonstop to South America 2,400 miles. For our modern pilots, this would be equivalent to flying 1,000 pound plane 20 miles on a pint of gas. It can't be done.

Early men, like Leonardo da Vinci, tried to build a flying model with the flapping wings of a bird. It was not until very recently that special photography allowed scientists to unravel their secret of propulsion.

Wing tip feathers act as a propeller of an airplane. On the down stroke, the two tip feathers rotate and pull the air backward like an oar pulls water. On the upstroke, he opens his feathers allowing the wind to slip through and prevent drag (air resistance). It is not coincidental that canoeists call this action of their paddles FEATHERING.

His thumb feather, the AULA, controls the flow of air over his cambered wing. The wing near the body is thick and curved. He created Bernoulli's law of lift, not discovered by man until 1700.

Variations in wing design allow birds to explore many different habitats. This increases their ability to survive changes in food or climate. Long distance gliders, like hawks, plovers and the frigate, have a wing ratio of about EIGHT. Their wing span of four feet=48 inches, divided by an average wind width of six inches equals 8. Even higher ratios of 10 or 30 in man made gliders allow birds and man to soar without power.

Water birds need no runway to become airborn. They take off on a 45° angle like a catapult aircraft at sea. The hummingbird can hover as well as our helicopters, and a cormorant uses swept-back wings to dive into the water for a fish dinner.

Now in 1989, we have a machine that can take off vertically and fly forward because, like a bird, it too can rotate its propellers. Boeing Aircraft calls it THE OSPREY.

Information from Vertabrate Adaptations, Scientific American, W. H. Freeman and Co. 1952