

A NEW THEORY OF THE ORIGIN OF BIRD FLIGHT - SUMMARY

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1. THE CLUE

Frame-by-frame slow motion video clips exhibit evidence which shows that in the immediate takeoff behavior in eagles and herons there are simultaneous wing-and-leg rotations, and this demonstrates the presence of a built-in co-rotational coordination of front and hind limb actions.

2. THE PROBLEM

This action is, of course, what all previous ground-up cursorial-based theories have recognized and utilized (though only in connection with running, jumping, and most recently with vertical plane running (WAIR). Nevertheless, a truly convincing, unbroken chronology of flight evolution could not be laid out because the search entered a cul-de-sac.

3. THE SOLUTION

There are two reasons for this failure: (a) looking for a secondary **arm** flap movement to **assist** primary leg movement, and (b) looking for an answer in **locomotory** action.

Removing these restrictions allows us to consider of a hind-leg action which is not locomotive but is relatively stationary, namely: striking with the **hind-claw**, a behavior ubiquitous in avian aggression and one of high fitness selective value.

As categorically shown by data and analysis in this manuscript, unified arm-leg coaction is a physiologically **built-in** mechanism in (relevant) vertebrates, and demonstratively, even in humans, and therefore locomotion is not necessary to generate simultaneous action of forelimbs and hind limbs. The sizable video and photographic data offered clearly illustrates that striking with hind claws is in all instances accompanied by rapid and powerful wing flaps. (We may confidently challenge anyone to show cases where this is not true). The manuscript offers (on CD) slow-motion analysis of these actions that most definitely enables seeing what normally is too rapid to observe. Seeing this action, it is hard to imagine how such commonly found behavior could have been missed.

Thus, if small bipedal, running carnivorous dinosaurs utilized (and even have, as it is so well documented, specialized in) hind-claw aggression, and if both flying and flightless birds nearly universally engage in this behavior, then **lift**, without running or jumping was potentially present in the protobird, and only required the appearance of feathered flight surfaces on the arms. A concise evolution and chronology of flight origins can thus be described. Above all, this theory is **uniformitarian**: the source of flight is observable in current bird behavior.

4. ADDITIONAL MATERIALS INCLUDE:

An entirely new, never described systematization of built-in vertebrate limb coordination, detailed through a full survey and systematization of coordinated limb action in all five vertebrate classes and their subdivisions.

An analysis that explains how WAIR is an automatic CR arm-leg coaction.

The physical mechanics of the flight stroke, and its presence in humans.

A discussion of the Glide theories of bird flight which brings to light a so-far not recognized major error in their argument involving thermoregulation. This section is based on a detailed survey of all gliding animals.