

Spread-wing postures in Pelecaniformes, Ciconiiformes, and Falconiformes.

—A number of avian species exhibit similar spread-wing postures commonly described as “wing-drying” or “sunning.” Maintaining these postures for as long as many minutes, the birds expand their wings broadly with the large alar surfaces held generally more vertically than the antero-posterior axis of the trunk. This report presents a systematic survey of these postures and discusses some aspects of their function and evolutionary history.

Pelecaniformes.—Late in the afternoon of 25 January 1968 at Flamingo, Florida, I watched both Brown Pelicans (*Pelecanus occidentalis*) and White Pelicans (*P. erythrorhynchos*) assume spread-wing postures highly reminiscent of those I have observed in cormorants (*Phalacrocorax*) and Anhingas (*Anhinga*). The only prior comment on possibly similar behavior in pelicans I have found is Schaller's (1964) note for *P. erythrorhynchos* that “after a heavy rain, pelicans occasionally sat on their nests with wings partly opened and held away from the body.”

Spread-wing postures have often been mentioned and figured for cormorants (Phalacrocoracidae) including the flightless *Nannopterum harrisi* (photograph in Snow, 1966). Such behavior occurs even on foggy and rainy days, as reported for *Phalacrocorax carbo* by Townsend (in Bent, 1922: 241). A number of authors have commented that such periods of spread-wing posture are often preceded by vigorous flapping. A Double-crested Cormorant (*P. auritus*) that I watched at close range 22 January 1968 at Sanibel Island, Florida, moved its expanded wings slowly back and forth over an amplitude of a few inches at most; such restricted fanning movements have apparently not been previously noted.

Spread-wing behavior has been reported for the genus *Anhinga* throughout its range (cf. Lippens, 1938: Plate I). Figure 1, based on my kodachrome of 4 February 1967 at Paradise Key, Florida, illustrates this posture for an *A. anhinga* renewing its remiges. I know of no previous illustration of this posture in an apparently flightless Anhinga, although Owre (1967: 50–51) briefly describes this behavior.

Ciconiiformes.—Lippens (1938: 22 and Plate VI) photographed and reported a spread-wing posture in *Ibis ibis* like that of cormorants and Anhingas. I have located no other records for this order, but similar behavior may possibly be found in other species of Ciconiidae. In contrast, the herons (Ardeidae) have “sunbathing” postures in which the wings are held partly opened but in a drooping position (Meyerrieks, 1960).

Falconiformes.—Grossman and Hamlet (1964), after an extensive literature review, conclude (pp. 204, 338, 340) that “sunning” with outstretched wings is characteristic of all larger vultures, including species of both Old and New Worlds. On page 340 is a photograph of this behavior in *Pseudogyps africanus*.

Turkey Vultures (*Cathartes aura*) are commonly reported “sunning” with outstretched wings early in the morning, but this behavior may also occur at other times. I watched a single bird sitting spread-winged during a light afternoon rain 24 January 1968 south of Clewiston, Florida. According to Poulsen (1963), the cathartid *Vultur gryphus* in captivity adopts the spread-wing posture not only when “sunning” but also in drying after bathing, and is sometimes induced to do so by a brightened illumination without sunshine.

Smythies (1953: 388) and others note that Old World vultures (Aegypiinae) commonly spread their wings half-open to dry after a rain.

Functional aspects.—At least three hypotheses of the functional significance of spread-wing behavior are possible, but for no species is evidence of function complete.

Many authors have assumed that spread-wing postures of cormorants and Anhingas

have a role in wing-drying, and spread-wing postures may follow wetting also in *Ibis* (Lippens, 1938) and vultures. But if wing-drying is a function, the question remains why other birds, especially aquatic ones, fail to show similar behavior (cf. Townsend, in Bent, 1922: 241, on cormorants). One might speculate that vigorous flapping, as observed in many birds, would be the most efficient method of drying wings. Owre (1967: 61) suggests that a greater wettability of cormorant and Anhinga feathers is an adaptation for decreased buoyancy in underwater feeding. This possibility is strongly supported by the finding of Rijke (1968) that feathers from cormorants and Anhingas show a greater microscopic porosity than is found in equivalent feathers from ducks (Anatidae). The popular idea that inferior production of uropygial secretions is connected with spread-wing behavior apparently lacks direct support. Indeed, the studies of Rutschke (1960) indicate that the oil gland is only indirectly involved in the waterproofing, which depends primarily on feather microstructure.

A second hypothesis suggests the possibility that spread-wing postures are involved in thermoregulation. Heath (1962) found marked fluctuations in the temperature of Turkey Vultures. He proposes that early morning "sunning" may facilitate increasing the body temperature, but his suggestion lacks any direct observational or experimental support.

A third hypothesis discussed by a few authors (cf. Rijke, 1968) indicates that spread-wing behavior plays a role in balancing, but I have been unable to detect any signs of special problems of balance in spread-wing postures that I have observed.

Evolutionary aspects.—As the Pelecanidae, Phalacrocoracidae, and Anhingidae are relatively closely allied, homology of the spread-wing postures seems probable for these three families at least.

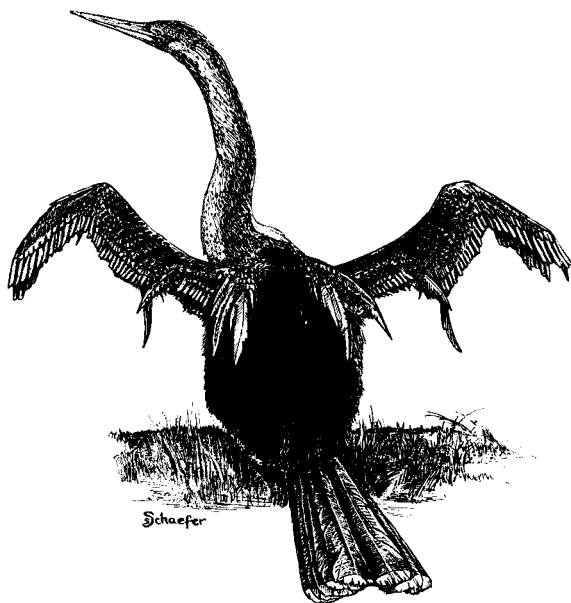


Figure 1. A spread-wing posture of a molting *A. anhinga* (from a photograph; see text).

In discussing the spread-wing postures of cormorants, Townsend (in Bent, 1922: 241) comments that he is "inclined to think that the habit is derived from the same ancestors that bequeathed it" to cathartid vultures. His evolutionary conclusion should perhaps not be lightly dismissed, for the possibility of a pelecaniform-cathartid relationship was also proposed by Jollie (1953) on the basis of unpublished anatomical evidence. Furthermore Ligon (1967) presents extensive data supporting the idea of relatively close affinity of storks (Ciconiidae) and New World vultures (Cathartidae). That spread-wing behavior occurs in both Old and New World vultures is particularly interesting as these groups are commonly thought to be only remotely related.

The evolutionary history of spread-wing behavior remains obscure in many respects. This peculiar behavioral character occurs in three orders that show enough similarities in other respects to suggest the possibility of the character having evolved only once. Under this interpretation, the apparent absence of spread-wing behavior in other families of the three orders might be due to one or a combination of the following: 1) a lack of pertinent observations, 2) secondary evolutionary loss or modification of spread-wing behavior, and 3) polyphyletic origin of one or more of the three orders.

Alternatively the spread-wing posture itself may conceivably have evolved more than once, for it is a rather simple behavioral trait as now understood. In an extreme hypothesis, if one assumes that Pelecaniformes, Ciconiidae, Cathartidae, and Aegypiinae are remotely related groups, then spread-wing postures might have evolved as many as four or more times independently.

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Mississippi Kites fledge three.—For 12 years Mississippi Kites have been coming to an area along the Rio Grande just west of El Paso, Texas. This is the most western extension of their range thus far reported. We have found a few nests, one of which in 1967 housed a brood of three, a rare occurrence. I can find no published report of another such nesting in Texas. Bent (U. S. Natl. Mus., Bull. 167, 1937) states that G. W. Stevens found but three sets of three eggs in 500 nests in Oklahoma, and that George M. Sutton found no set of three in 40 nests examined.

The El Paso nest was built in a cottonwood, one of a row standing at the edge of a cottonfield near Canutillo, Texas. Gertrude Rose and Ruby Allen watched an adult feeding a fledgling 26 and 30 July on a bough 30 feet above the road. Two fledglings were being fed there 5 and 6 August when Mrs. Rose, Mary Belle Keefer, and others visited the spot. A third young was heard calling within the tree somewhere, but it remained invisible. Glimpses of it and of a part of the nest were obtained 7 and 8 August when Miss Keefer, Lena McBee, and others took turns watching from a vantage point out in the field. The whitish downy-headed nestling rose on wobbly legs to be fed, then disappeared behind concealing mistletoe. Allen and McBee watched from the field 9 August and obtained a full view of the bird, which had left the nest and was settled upon a bough just above it. At intervals a parent kite appeared, circling high. Gradually the circle of flight was narrowed and its plane tilted until contact was made with the crying young. Throughout these observations watchers from the road kept the older two fledglings in view. Until 9 April they were found in the nest tree, usually near each other, but on this last day of our visits they were in a neighboring tree, still above the road. They received food from both parents, who usually approached them through the row of trees. They were fed mostly large and small insects, but once the older one received a tiny frog, which it dropped after trying unsuccessfully to tear the skin. The desiccated front half of a large frog was lying at the edge of the road.—LENA G. MCBEE, 2002 Westridge Road, Carlsbad, New Mexico 88220.

Dual calling by birds of paradise.—A recent article by Diamond and Terborgh (Auk, 85: 62-82, 1968) reports a number of cases of dual singing by New Guinea birds, but mentions no instance of its occurrence in the family Paradisaeidae. Therefore my observations of it in the Greater Bird of Paradise (*Paradisaea apoda*) may be of interest.

In 1909 W. Ingram (Avicult. Mag., 3: 142, 1911) introduced 48 *Paradisaea apoda* to Little Tobago, a 280-acre island in the southern West Indies. This subspecies, native to the Aru Islands off the coast of New Guinea, has survived on Little Tobago in small numbers to the present day. While studying this population from September 1965 to July 1966, I noted dual calling between male birds on 36 occasions. As I know of no records of dual calling by New Guinea populations of this species, it could be an artifact of the Little Tobago population's isolation. I have no tape