Sunbathing by Black and Turkey Vultures and a Great White Heron

William E. Davis, Jr. and Jerome A. Jackson

Sunbathing, or sunning, occurs commonly in a diversity of birds. Recognition of the sunbathing phenomenon dates back at least to Audubon (1831) who wrote: "The Heron when warming itself in the sun will sometimes drop its wings several inches as if they were dislocated." A list of birds observed sunbathing (Simmons 1986) includes more than 200 species from thirty-one nonpasserine and twenty-four passerine families. As might be expected from such an array of birds, sunning postures are diverse. Spread-wing postures are common among raptors. Delta-wing postures (where partially opened wings droop with wing tips touching, forming an inverted delta shape) are common among herons. Small songbirds often lie prostrate with wings spread and feathers ruffled, or may raise one or both wings, holding it or them extended like a flag. Simmons (1986) associates increasing intensity levels of sunning with several distinct postures: simple sunning, wings-down, lateral, raised-wing, and spread-wing — categories that only begin to suggest the continuum of postures adopted by sunning birds.

Why do birds sunbathe and perform the often elaborate contortions involved? The answers to this question are nearly as diverse as the birds that perform them. Some birds, such as cormorants and anhingas, may sunbathe to dry wet feathers. Both New World vultures (now known to be related to storks) and Old World vultures (related to hawks and eagles) often expose spread wings to the morning sun. Some have suggested that this warms the bird after a cold night, but we suggest that it may also serve to dry the dew-dampened feathers of the birds. These birds typically roost in the open, and even a thin layer of moisture on the feathers would increase wing loading and hence decrease the bird's flight efficiency.

Other, sometimes more complicated reasons for sunning have been proposed. It has been suggested that sunning may facilitate the bird's production of vitamin D, which is needed for calcium metabolism. Precursor molecules of vitamin D originate in the preen gland, and are spread onto feathers during preening. The evidence against this mechanism for producing vitamin D appears to be greater than the evidence in its favor (Kennedy 1968), but the case is still open. In a review of the literature, Kennedy (1969) enumerated other possible reasons. Is there pleasure associated with sunbathing? Does the sunlight increase the activity of ectoparasites and thus make it easier for the bird to find and remove them? Does sunbathing increase preen gland secretion and thus aid in feather care? What is the possible connection between molting and sunning?

There is strong evidence that in some situations the sunning posture may result in heat loss — a rather counterintuitive suggestion — but a plausible one for birds that typically live in open habitats. Extension of the wings results in increasing surface area through which excess body heat can be lost by convection (Arad et al. 1989,

Eliassen 1963). Hauser (1957) classified this as compulsory sunbathing to contrast it to the voluntary sunbathing associated with sunning for warming or other reasons. Large raptors and other large birds often assume a spread-wing posture facing the sun when they are experiencing heat stress and are panting to aid in cooling (Cade 1973).

Figure 1. Immature Turkey Vulture, photograph by WED

Clearly, sunbathing is performed by birds under a wide variety of circumstances and stimuli, and hence is a complex phenomenon that may have a variety of functions. What follows is a description of four instances of sunbathing by birds — two that William Davis (WED) recorded in Florida, one that Jerome Jackson (JAJ) recorded in Mississippi, and another that he recorded in Florida. Three involved warming, and the other probable heat loss.

Turkey Vulture (*Cathartes aura*). In March 1996, near Monroe Station in the Florida everglades, WED photographed a Turkey Vulture in full spread-wing posture, including a fully fanned tail (Figure 1). It was midmorning, and the sun was full on the vulture's back. In March 1998, JAJ observed an adult Turkey Vulture from 8:00 a.m. to 10:00 a.m. as it sunned atop a dead stub in Everglades National Park, Florida. During this time the bird held the full spread-wing posture with its back to the sun, but gradually rotated its body to follow the rising sun, maximizing the exposure of back and wings to the sun.

Black Vulture (*Coragyps atratus*). In April 1978, at Noxubee National Wildlife Refuge in east Mississippi, JAJ photographed several Black Vultures that were sunning and preening as they faced into the early morning sun. The bird shown in Figure 2 displays a typical partially opened wing posture with neck, back, and wing covert feathers raised as the bird preens scapular feathers. Some individuals drop their wings even more, such that they approach the delta wing posture.

Typically, Black and Turkey vultures roost until midmorning, when the thermals provide better lift, and sunbathe for several minutes before departing (Rabenold 1983). Full spread-wing and delta-wing postures for the Black Vulture have been previously reported (Kushlan 1973), although it was not specified whether the vultures were facing or presenting their backs to the sun. Kushlan stated that the sunning postures were assumed soon after the sun first shone on the birds in early morning, and suggested that the function of the sunning was heat acquisition. Heath (1962) reported that for fifteen to thirty minutes prior to morning flight a Turkey Vulture typically perches with its back to the sun, with back feathers raised. He also suggested that such behavior may supplement metabolic heat to raise the bird's body

temperature from its nocturnal low.

Houston (1980) suggested that in large, soaring birds sunning might function to hasten feather recovery after deformation caused by flight. The Old World vultures he observed in Africa did not sunbathe in early morning, but rather sunbathed during periods of full sun following their arrival at a food source. He experimentally showed that deformed feathers recovered more rapidly in sun than in shade. Our observations reported here, and those of Kushlan, were made in the morning before extensive soaring had occurred; thus Houston's explanation seems unlikely in these particular cases.

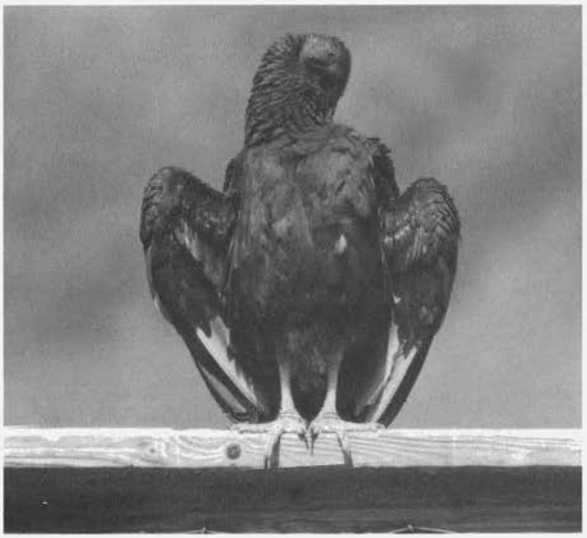

Figure 2. Black Vulture, photograph by JAJ

Black and Turkey vultures often face the sun in delta-wing postures, but the thermal impact of this behavior on a bird is not certain. The Black Vultures in Mississippi were not under thermal stress. It was early and the morning was cool. Thus the function of the behavior was not likely to cool off, and might have been to warm up. Under different circumstances such a posture could serve to dissipate excess body heat or to raise body temperature (Kirk and Mossman 1998), but as discussed below, other functions may be involved. The time of day and back-to-sun posture suggest that the Turkey Vulture WED observed was sunbathing to gain heat from the morning sun.

Great White Heron (*Ardea herodias occidentalis*). In June 1998, WED photographed a Great White Heron sunbathing on Key Largo, Florida (Figures 3 and 4). The bird was facing the sun and was in a typical delta-wing posture, with the ventral surfaces of the wings held approximately perpendicular to the sun. Delta-wing sunning has been frequently reported in the blue-morph Great Blue Heron (e.g., Butler 1992), and several photographs of birds in this posture are printed in Allen (1991), although the sunning behavior is not identified in the photograph captions. We have found no reference to sunning by Great White Herons (white-morph Great Blue Herons). A chick of the closely related Grey Heron (*A. cinerea*) of Europe sunning with a delta-wing posture is illustrated by Milstein et al. (1970), suggesting that the behavior is innate or develops early in life. Milstein et al. also report that gular-fluttering, a cooling mechanism, is sometimes associated with sunbathing in both chicks and adults, suggesting that the sunbathing might lead to heat stress or be a cooling mechanism associated with heat stress as previously described. Butler (1992)

Figure 3. Great White Heron, photograph by WED

sums up our knowledge of sunning in the Great Blue Heron: "Droops and exposes inside of wings on sunny days [delta-wing posture], perhaps to radiate body heat on warm days and absorb solar radiation on cool days."

Kahl (1971) reports wing-spreading in thirteen species of storks, many of which adopt the delta-wing posture. Kahl further suggests that wing-spreading helps to reduce hyperthermia by exposing the thinly feathered underwings to convection cooling when air temperature is below body temperature. However, in these cases he suggests that the birds hold the back to the sun and often pant (a cooling mechanism). Further, when storks face the sun in delta-wing posture, it is generally early morning or late afternoon, and he concludes that they are *warming* in the sun.

So why was this Great White Heron sunbathing? It was late morning, hot and humid, and under full sun. The bird was preening and it was not panting. We do not believe the delta posture of herons is purely a response to thermal stress. If this heron had been truly under thermal stress, it could have stood in water or sought shade. It did not; it stood in the morning sun, preening its feathers (Figure 3). Postures and behaviors of birds change with increasing thermal stress (e.g., Schardien and Jackson 1979) from a normal posture to partially extended extremities, to extended extremities with raised contour feathers, to extended extremities with raised contour feathers and panting or urihidration

Figure 4. Great White Heron, photograph by WED

(excreting on the legs as in storks and New World vultures). By dropping its wings, the bird increased its exposed surface area and thus probably increased loss of body heat through convective cooling. Furthermore, the white color of the wing linings would reflect rather than absorb heat. The underwing coverts of this bird were not raised, however, but rather were flat against the skin, which should retard heat loss. Thus, we conclude that the bird, although probably losing heat, was not under thermal stress, and the sunning behavior may have had other functions.

To understand why any of these birds were sunning, or why they display the delta or any other sunning posture, we may need to look beyond thermal relationships. Others (e.g., Hauser 1957) have suggested that exposure of ectoparasites to the sun might increase their activity and hence the ability of the bird to detect and remove them. We suggest that exposure of the underside of the wings to full sun would also change the microclimate provided by the feathers of the underwing for ectoparasites. Feather moisture would likely be decreased, and feather surface temperatures increased. Adult ectoparasites might easily evade such a change by moving, but eggs of ectoparasites laid in such a previously protective environment might be killed. Studies of the behavioral ecology, habitat preferences, and physiological limits of avian ectoparasites might provide answers to the more enigmatic aspects of sunning behavior. Clearly, the evidence in storks, herons, and in vultures and raptors suggests that sunning postures may have multiple functions depending on environmental conditions and the physiological state of the bird.

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U.S. Fish and Wildlife Service Names New Manager for Parker River National Wildlife Refuge . . .

Janet Kennedy, an outdoor recreation planner and refuge manager with eleven years of experience on national wildlife refuges in Massachusetts, has been named manager for the Parker River National Wildlife Refuge at Newburyport, Massachusetts, according to Ronald E. Lambertson, Northeast Regional Director for the U.S. Fish and Wildlife Service. For the past year, Kennedy has directed the planning and design for a new visitor center at the Parker River refuge. The new center, expected to open in late 2002, will house administrative offices, maintenance operations, and a visitor center. The visitor center will include educational and interpretive displays, an auditorium, and a multipurpose room suitable for environmental education activities. Office space for staff of Sandy Point State Reservation is also planned.

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