

BATHING BEHAVIOR OF LAND BIRDS

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APPARENTLY the bathing behavior of land birds has not been investigated systematically. Most papers about it are limited to describing occasional observations of bathing birds (Poznanin, 1957; Strautman, 1958) and bathing techniques of birds (Simmons, 1964). I have carried out field studies on this little known aspect of bird behavior in various parts of the United States and Canada in all seasons of the year. Recording the bathing of birds on motion picture and still film facilitated the study of the sequence of bathing motions and the positions of body parts and feather movements.

I watched and photographed bathing birds from various types of blinds, most often a blind camouflaged with brush to make it appear to be an integral part of the surrounding area. I gained information on how the type of water basin and surroundings in various biotic areas influence variations in bathing behavior in the following main locations:

1. Source of Oxon Run on the outskirts of the District of Columbia, including 250 acres of brushy bottom land with stream, water puddles, and several springs surrounded by denuded upland hills with scattered trees and shrubs.
2. A branch of Port Severn Lake with streams and springs in Central Ontario, Canada, and about 5 square miles of rocky surface covered with deciduous trees and shrubs.
3. Old abandoned farmstead in Brookhaven, Long Island, New York, with fallow fields, old orchard, and large park with three overgrown mud ponds.
4. New artificial pond in a glade of mixed deciduous and coniferous forest at the Cedarville State Park in southern Maryland. In the first year the surrounding area was denuded of brush; in the second year and later the dense shrubbery and grass planted to attract birds began to fill the 1-acre glade.

The source of Oxon Run was investigated from 1960 to 1965, mostly on weekends; the Cedarville tract from 1966 to the present time, on weekends and sometimes in late afternoons of weekdays. The Port Severn Lake shore and Brookhaven mud ponds were studied for 2- or 3-week periods each year, usually in August or September. I kept track, as much as possible, of the numbers of individual birds of every species that I saw bathing. The changes caused by migration and other factors were also recorded in a notebook where I entered data on bathing and weather conditions.

BATHING MANNERS, METHODS, AND TECHNIQUES

To distinguish the various aspects of bathing behavior, it is necessary to define the terms used to denote them—namely, the manners, methods, techniques, duration, and frequency of bathing.

The first three terms denote concepts that partly overlap one another. Generally “manner” implies individual bearing or behavior. Here it is used to denote a distinctive external way of bathing as the eye sees it, whereas the term “technique” emphasizes the complex system of bathing motions, i.e. the sequence and combinations of motions that are so rapid, fleeting, and overlapping that the eye can only perceive or glimpse them superficially.

The term “method” denotes the general character of bathing procedure, which includes the visible bearing, i.e. manners, and the complex techniques employed. The terms “duration” and “frequency” of bathing are self-evident, the former denoting the length of bathing expressed in seconds or minutes, the latter denoting the number of times per hour or day the act of bathing is performed.

Special methods are needed to cleanse both skin and feathers. Basically the cleansing action involves extremely rapid and well-coordinated operation of feather tracts or pterylae and movements of the body and its parts. In this connection it is useful to recall that feathers grow in tracts that cover only about 30 per cent of the body of land birds; between these tracts are bare spaces (apteria). Bathing birds open and close certain feather tracts to expose the bare spaces momentarily to the water, which is then entrapped and squeezed through the feathers.

In order to make the flow of water efficient, the movement of the feather tracts is combined with other movements in the following sequence: (1) Fluffing the feathers, combined with flicking the wings, (2) ducking the head and forebody under water, (3) rolling the head and body in water, and (4) lifting the forebody out of the water, combined with the lowering of the rearbody. Then follows a pause and the whole cycle is repeated.

In this general pattern of bathing four major methods can be distinguished: The bird (1) stands in water on its feet while bathing, (2) bathes in flight with a dive, (3) moves about in water when bathing, and (4) bathes in drizzling rain, dew, or wet foliage.

Method 1.—Most passerines and other birds that have relatively strong feet and short, broad, and pliable wings bathe standing on their feet in the water.

These birds usually wade into water and select a depth best suited for them, usually from 1 to 3 inches. They then fluff the feathers to expose the apteria to the water. This fluffing is often accompanied or followed by an extremely rapid flicking of the wings in and out of the water, raising wavelets and splashing water droplets around the body. Immediately the head and forebody are ducked under the water and rolled vigorously from side to side so that the amplitude of the movement reaches about 360 degrees in the neck and 180 degrees in the body, that is, each roll of the head brings the lower mandible upward, while the flanks alternately point upward and downward. These movements are often out of phase; when the upper mandible points upward, the body may be in normal or slightly inclined position.

As the forebody emerges, the wings, neck, and tail form a scoop over the back, and the feather tracts begin to open and close. During this phase the bare spaces are now opened, now closed so that the water is forced into the apteria, then squeezed through the feather tracts, rinsing the skin and bases of the feathers (Figure 1). This phase is usually combined with a flicking of the wings against the water surface in asymmetrical

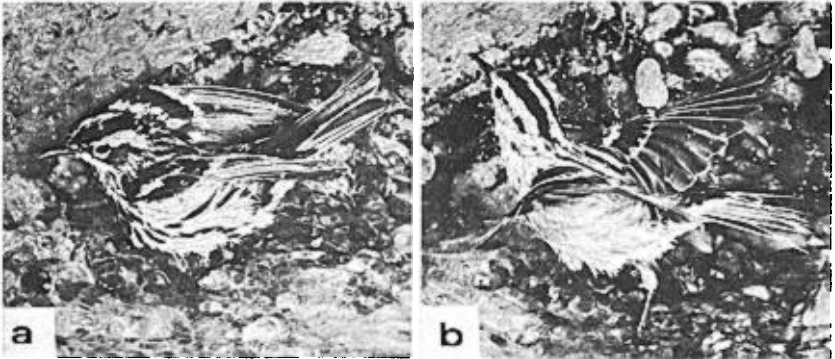


Figure 1. A Black-and-White Warbler combines Methods 1 and 3 in bathing. It stands in water for a few seconds, flicks the surface with wings (a), submerges and rolls its body momentarily, and is out for a few seconds to vibrate the wet feathers (b). Sometimes it combines the emergence with a leap onto the bank.

and transverse motions that send the water in spurts alternately over one side and then the other.

The cycle is then repeated. The intensity and amplitude of movements increase with each submergence; that is, the submergence becomes deeper, the rolling of body and flicking of wings more energetic—until the bird may welter in water, becoming



Figure 2. Birds sometimes bathe so enthusiastically the body becomes a mass of disheveled watersoaked feathers as this Tufted Titmouse is doing.



Figure 3. After a shallow dive into the water, a female Indigo Bunting returns to her perch a few feet above the surface, shaking off excess water during the rapid upswing.

a mass of disheveled feathers. This "ecstatic" or "purgatorial" stage is practiced by jays, mockingbirds, robins, thrushes, the Tufted Titmouse (*Parus bicolor*) (Figure 2), and other species, usually on hot summer days, probably for its refreshing effects.

Method 2.—Aerial birds such as swallows and swifts bathe on the wing, dropping repeatedly into water. Their legs are too short and weak and their wings too long and pointed to allow them to roll the body and vibrate the feather tracts while standing in water. They dive into water during flight and submerge the body for an instant, just deep enough to raise a spray of water and scoop it over the back. The raised tail brakes the velocity of flight, catches the flying water, and helps break it up into tiny bubbles as the feathers vibrate in the air.

Flycatchers that combine aerial and arboreal habits in foraging use a very similar method, again specifically adapted to their way of life. They dive from their perch and return to it or to another perch after each dive to vibrate their wet feathers. The distance from the perch to water may vary from several to 50 or more feet. As a rule the diving distance is greater at larger bodies of water.

Vireos may combine both methods so far discussed. Like flycatchers, they dive from a perch and return to it, but the distance is very small, from a few inches to a few feet. In shallow streams a vireo may stand for a second or two in water, make a short dip and roll, and then return to the perch to continue vibrating the feathers before making another dive. This pattern is sometimes practiced by buntings when bathing in shallow and brushy water puddles (Figure 3).

Method 3.—Some active and lively birds such as Yellowthroats (*Geothlypis trichas*), Carolina Chickadees (*Parus carolinensis*), wrens, and sometimes buntings, and even water thrushes perform quick and lively darts or leaps into water. After a brief submergence, rolling of the body and flicking of the wings, the bird retires to the bank

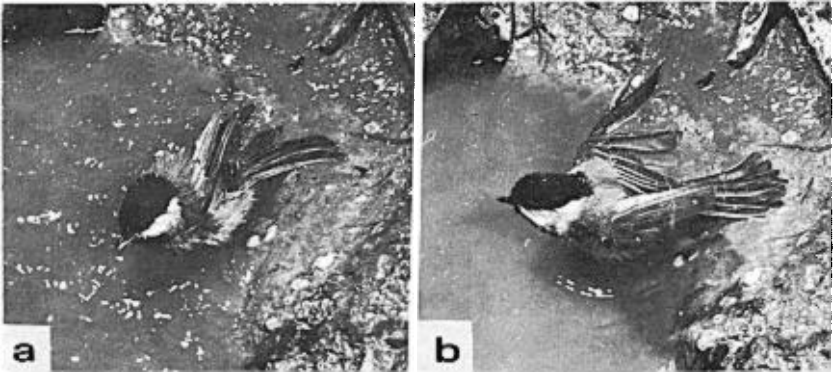


Figure 4. The Carolina Chickadee wets its feathers and sprays water over its back by rolling the body (a) and flicking its wing at the water's edge (b) during the in-out mode of bathing.

or alights on a branch or root to vibrate the wet feathers and return for another dip or plunge into water (Figure 4).

According to Simmons (1964) the Old World babblers (*Timaliinae*) perform a similar in-out bathing in standing water.

Method 4.—The White-breasted Nuthatch (*Sitta carolinensis*) and most of the woodpeckers expose their feathers to drizzling rain. This type of bathing is natural for these birds because their short and weak legs are not suited for movements on the ground.

Dew and rain-soaked foliage is used for wetting feathers by the Wren-tit (*Chamaea fasciata*), hornbills (Bucerotidae), Budgerigar (*Melopsittacus undulatus*), and several other Old World birds that forage in the branches of trees (Simmons, 1964).

MODIFICATIONS OF BATHING METHODS

The four major methods of bathing, which are dictated mainly by the anatomical structure and habits of the birds, may be further modified by several local environmental conditions. Clear water bubbling over pebbles may induce a chickadee, titmouse, bunting, or even a sparrow to perform lively and playful leaps into shallow water or on a narrow beach.

One cool spring evening I watched a male Indigo Bunting (*Passerina cyanea*) make dives into water from the branches of a fallen tree. On examining the spot, it appeared that the water flowing around the branches of the fallen tree formed tiny bubbling eddies. Several days later a female Indigo Bunting performed lively darts into the water at the same spot after I had removed some of the branches of the fallen tree to expose a spot to take photographs. The darts were later combined with leaps and dives from an overhanging branch (Figure 3). The same beach was also used by a Robin (*Turdus migratorius*) for playful darts before bathing.

Sometimes appropriate external conditions may induce a bird to adopt

bathing methods that its species seldom practices. For several years I noted that the Flickers (*Colaptes auratus*) on the old Long Island farmstead bathe in the mudponds by using partly submerged logs and sticks as supports. In contrast, the Flickers in the Oxon Run tract and Cedarville Forest bathe in rain. Only once did I see a Flicker bathe in a shallow stream, and its actions were clumsy. The body rolling was slow, superficial, and somewhat out of phase with the flicking of wings. The bird often had to interrupt its bathing to restore its body balance.

I once witnessed an apparent incident of imitation in a shallow water puddle on the rocky shore of Port Severn Lake. Two young Goldfinches (*Spinus tristis*) seemed to imitate the dives of a Red-eyed Vireo (*Vireo olivaceus*). As could be expected, the diving of the Goldfinches, which normally practice Method 1, was clumsy and inefficient. These birds concluded their bathing using their regular method.

Another important factor that affects the bathing manners of birds is their level of fear or anxiety in a particular environment. When a bird performs rolling motions in water, its vision and hearing are obstructed by the splashing water. In addition, water-soaked feathers hamper movements and prevent immediate escape. Thus special bathing techniques may be employed when a bird suspects the presence of danger or bathes in an open location or an artificial bath near homes. In such cases the submergence of the body is relatively shallow and the rolling phase is brief and of shorter amplitude. Sometimes only the head is rolled, while the body remains in a normal position, ready to leave the water at any moment. In addition, the pauses are longer than usual. There is much listening, wing flicking in the air, or even mock submergences.

Although the modifications of bathing manners and techniques are quite diverse, no matter what method or modification the birds use, bathing is always followed by preening and oiling of the feathers.

FREQUENCY AND DURATION OF BATHING

The duration and frequency of bathing depend mainly on weather conditions and the season of the year. In summer and in warm sunny weather the birds bathe more often and for longer periods than in winter and cold or rainy weather. On a sunny summer day, for example, a Carolina Chickadee or Tufted Titmouse may bathe five or more times a day, while on a cold and windy winter day they may not bathe at all. Usually when the air temperature is near 0°F or lower, the birds either abstain from bathing or bathe only several times a week. In such cases the bathing occurs as a rule on sunny, wind-protected slopes where the ice or snow is likely to melt on sunny afternoons. In areas without water, bathing is of course impossible.

Generally birds that use Method 3 bathe more often and for shorter periods than birds that use Method 1. In cold weather, Method 1 is modified; submergence is shallower and rolling is briefer, so that Method 1 becomes similar to Method 3.

Birds that use Method 2 bathe less often than other birds. The Eastern Phoebes (*Sayornis phoebe*) and Wood Peewees (*Contopus virens*) that perched watching for insects near the Cedarville pond bathed only once or twice a day in summer. In the autumn of 1967, two phoebes remained in the area until 2 January 1968. When snow blanketed the area, they often caught water insects from the surface of the pond at the mouth of the brook or other ice-free patches. These birds continued to bathe, but I never saw them do so more than once or twice a week. I noted similar rates on Long Island.

The bathing frequency of birds that use Method 4, i.e. the exposure of feathers to rain, dew, and wet foliage, is difficult to assess. Those that use rain or rain-soaked foliage do so irregularly, depending upon weather conditions, while those that use dew can do so only in the morning or evening.

Birds that use any of the first three methods usually start bathing a few hours after sunrise and may continue until they retire for the night. Birds that retire after sundown may end the day with a late bath. I have seen Wood Thrushes bathe in the twilight. The preferred time for bathing is the afternoon.

LOCAL BATHING HABITS

I have noted that bathing frequency varies from one habitat to another. The Brookhaven farmstead with its mud ponds seemed an ideal bathing place for birds. In the summer the average number of birds bathing in these Brookhaven mud ponds was four times greater than the number of birds bathing in the Cedarville pond.

Differences of this sort are undoubtedly related to the extent of protective plant cover and the availability of other water sources in the respective area. The Cedarville pond is a new pond constructed in 1966 in a clearing made for an orchard; whereas the Brookhaven ponds are surrounded by dense brush and are gradually being overgrown with grasses and shrubs. In addition, the mud ponds are the only water sources in the area. Birds growing up in this area establish the habit of bathing in stagnant water. In contrast, the Cedarville pond area is intersected by a small brook meandering through dense brush. So the birds have established a habit of bathing in the brook. And when in long dry periods it runs dry, the birds either discontinue bathing or bathe in the pond sporadically.

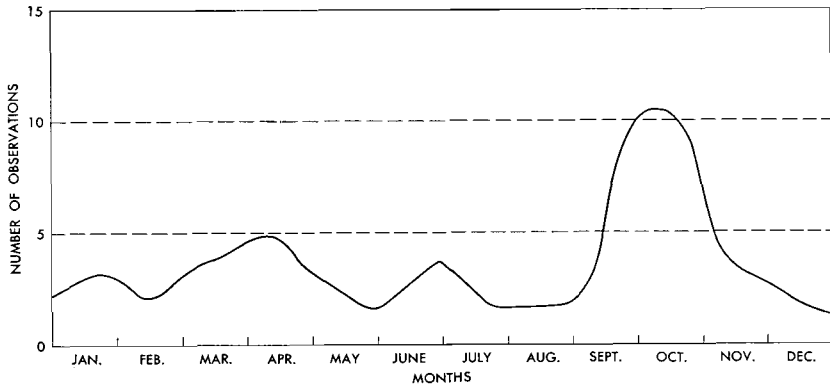


Figure 5. Bathing frequency of Tufted Titmice observed at the Cedarville pond in 1967.

Poznanin (1957) makes a similar observation. He writes that in the dry summer of 1953, 20 small water containers made of wood were maintained in the Central Black Soil Sanctuary of Ukraine. But the birds did not use the water, though it was changed twice weekly. Instead they bathed in a small stagnant mud puddle in a thicket nearby.

These observations show that the availability of water, its type, and surroundings contribute considerably to the development of local bathing habits. It is interesting that these habits are most clearly pronounced in permanent residents, notably in birds with restricted territory, such as tits, Carolina Wrens (*Thryothorus ludovicianus*), and Cardinals (*Richmondia cardinalis*). In Cedarville they adhere more consistently to the brook than the transient birds despite the fact that the feeding station which they use throughout the year keeps them near a pond.

The bathing frequencies of Tufted Titmice in the Cedarville pond in 1967 are shown in Figure 5. These data show that the Tufted Titmice used the pond only sporadically when the brook was dry and the water in pond was not too hot. Considering the number of the Tufted Titmice that inhabit the area and frequent the feeder (5–8), the use of the pond for bathing was limited indeed. The Carolina Chickadee, Cardinal, and Carolina Wren appeared to be still more conservative toward bathing in the pond than the Tufted Titmouse.

By contrast, the winter visitors and transients usually bathed in the pond when foraging near it. Many times I have seen an entire flock of Slate-colored Juncos (*Junco hiemalis*) take time from feeding to bathe in the pond. The bathing habits of summer residents are in this respect similar to those of winter residents. This seems natural because they are not confined to one specific location throughout the year. Their habitats

and bathing sites are changed at regular intervals, and they are more adaptable in their bathing habits. However, this adaptability varies from species to species, depending upon their ecological plasticity. This interesting but little known aspect of bird behavior calls for further study.

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