FLOATING AND SWIMMING IN PASSERINES

Steven Speich and M. Allen Speich

A recent controversy induced us to submit our observations and experiments on the survival value and mode of swimming by small passerine birds. Scherner (1969) observed a Willow Warbler *(Phylloscopus trochilus)* spreading its wings and tail when floating in water and concluded that the behavior enabled the bird to stay afloat. However, Jackson (1970) questioned whether this behavior was not "... merely part of the swimming movement..." and correctly pointed out that air trapped in the feathers was sufficient to keep a bird afloat without the spreading of the wings and tail. Our observations of floating Cliff Swallows *(Petrochelidon pyrrhonota),* Barn Swallows *(Hirundo rustica),* and House Sparrows *(Passer domesticus)* suggest that even the passive spreading of the wings and tail aids in survival.

There are but a few examples in the literature of passerines using their wings for swimming. In addition to the Dipper *(Cinclus mexicanus),* which actively uses its wings in swimming under water and occasionally on the surface, the following passerines have been observed surface-swimming: Bank Swallow *(Riparia riparia;* Stoner, 1928 and 1936); Barn Swallow (Jackson, 1970); Catbird *(Dumetella carolinensis;* Petrides, 1942); Robin *(Turdus migratorius;* Broun, 1943); Willow Warbler (Scherner, 1969); House Sparrow (Hickling, 1950; Creutz, 1953); and European Tree Sparrow *(Passer montanus;* Hickling, 1950). Apparently all of the above passerines, possibly excluding the Dipper, employ what is described as the "butterfly" stroke (Jackson, 1970) to propel themselves across the water. This stroke in birds is analogous to the movements of the arms by man in performing the "butterfly."

We now add four more passerine species that swim using the "butterfly" stroke. B. Deuel (pers. comm.) observed in September 1969 at Malheur National Wildlife Refuge, Harney Co., Oregon, a Long-billed Marsh Wren *(Telmatodytes palustris)* that fell into the water. The floating bird immediately swam to shore and climbed onto a bank. The bird was picked up and placed on a branch, where it sat with its feathers fluffed for fifteen minutes before flying away. In July 1965 at the Desert National Wildlife Range, Clark Co., Nevada, Deuel (pers. comm.) saw a Tree Swallow *(Iridoprocne bicolor)* fall into the water while skimming the water surface and

then swim towards shore. On 27 April 1970 we startled a nestling Black Phoebe *(Sayornis nigricans)* in a highway culvert near Clarksville, El Dorado Co., California. It fluttered from its nest and landed six feet from shore in a stagnant pool, where it floated on outstretched wings for thirty seconds before swimming to shore. On approximately 25 occasions betwen 1967 and 1970 we observed individual Cliff Swallows that fell into water during both day and night banding operations at breeding colonies. These mishaps were mainly in concrete culverts beneath highways. The behavior of the adult birds in water varied. During nocturnal banding operations individual adults often floated with spread wings and tail for several minutes until retrieved by banders. However, some birds swam about erratically and then rested for short periods. During the day, downed birds generally tried to swim out of the culvert, using the "butterfly" stroke, to a nearby bank or emergent object. If the water was moving, the downed birds usually drifted passively out of the culvert and then swam to safety.

On the afternoon of 4 July 1970 we examined swallow nests under a wooden bridge near Minden, Douglas Co., Nevada. Irrigation water three to four feet deep in a canal fifteen feet wide flowed under the bridge. Our activities induced five full-sized nestling Barn Swallows to leave their nest prematurely. Four of them fell into the canal and floated 100 feet downstream before disappearing around a bend. The birds in the water arched and rotated their wings slightly forward and spread their flight feathers, holding their heads above water as they floated. At no time were they observed attempting to swim. On the morning of the following day we found that all five young had returned to their original nest; thus their swimming efforts were successful.

At dusk on 4 July 1970 we banded in a Cliff Swallow colony located in a concrete highway culvert in Hope Valley, Alpine Co., California. Nine adult birds accidentally fell into the four-inch-deep rapidly-flowing brook and were carried downstream. The birds hit the water with outstretched wings, and with wings and tail spread were carried through ripples and small falls to a sharp turn. There the birds climbed out onto a sandy bank and onto grass and immediately began preening. Never did they exhibit any detectable wing movements of the "butterfly" type nor loose their buoyant upright position in the water.

In order to study the swimming of passerines more closely, we undertook some simple tests with full grown House Sparrows. When

thrown into water, dry birds immediately swam as described above and were able to fly from the surface almost immediately. However, wetted individuals were unable to do so and swam actively about, resting intermittently on extended wings and tail. A bird that was previously completely soaked was unable to swim nearly as well as the drier birds. In resting, the wings of the soaked bird were only partially extended and hung beneath the surface of the water. With more than half of its trunk below the surface, the bird was unstable, tending to roll from side to side. Immediately after removal from the water, wetted birds were able to fly, but not with normal efficiency. The well-soaked individual could not fly when taken from the water, and it spent more than a half hour preening and drying before it flew.

Downed birds are occasionally taken by aquatic predators. During the summer of 1967 while we were banding Cliff Swallows in a colony near Clarksville, El Dorado Co., California, an adult bird fell into the pool at the colony entrance. The bird immediately swam toward shore but was captured by a Bullfrog *(Rana catesbeiana)* and killed. The Tree Swallow seen swimming by Deuel was also taken by a Bullfrog.

Since passerine birds landing on the surface of the water normally already have their wings open, the observed spread posture of downed birds is expected. The above observations suggest that the spreading of remiges and rectrices is not merely part of the swimming movement and that there is sufficient buoyancy in the feathers of a bird to keep it afloat without spreading. However, spreading reduces the extent of wetting of a downed individual, thus enabling a more rapid escape from the water with concomitantly increased chances of avoiding predation and difficulties in thermoregulation.

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Department of Biological Sciences, University of Arizona, Tucson, Arizona 85721, and Rehabilitation Center, University of Arizona, Tucson, Arizona 85721.