

- SMITH, D. G., C. R. WILSON, AND H. H. FROST. 1972. The biology of the American Kestrel in central Utah. *Southwest. Nat.* 17:73-83.
- TORDOFF, H. A. 1955. Food-storing in the Sparrow Hawk. *Wilson Bull.* 67:139-140.
- TURNER, F. B., AND C. S. GIST. 1970. Observations of lizards and tree frogs in an irradiated Puerto Rican forest. In H. T. Odum and R. F. Pigeon [eds.], *A tropical rain forest*. Nat. Tech. Info. Serv., Springfield, Va.
- VOOUS, K. H. 1955. The birds of the Netherlands Antilles. The Hague-Curacao.
- WETMORE, A. 1916. The birds of Vieques Islands, Puerto Rico, *Auk* 33:403-419.
- WETMORE, A. 1927. The birds of Puerto Rico and the Virgin Islands. N. Y. Acad. Sci., Scientific Survey. Puerto Rico and the Virgin Islands 9: 245-571.
- WETMORE, A., AND B. H. SWALES. 1931. The birds of Haiti and the Dominican Republic. *Bull. U. S. Natl. Mus.* No. 155.
- WILLOUGHBY, E. J., AND T. J. CADE. 1964. Breeding behavior of the American Kestrel (Sparrow Hawk). *The Living Bird* 3:75-96.

Department of Environmental Population and Organismic Biology, University of Colorado, Boulder, CO 80302. Accepted for publication 13 August 1975.

RAPTOR MORTALITY DUE TO DROWNING IN A LIVESTOCK WATERING TANK

TIMOTHY H. CRAIG
AND
LEON R. POWERS

On 9 July, 1974 in Oneida County, S.E. Idaho, we discovered the partially decomposed remains of seven American Kestrels (*Falco sparverius*), and two unidentified passerines at the bottom of an empty livestock watering tank. The tank was circular, 4.9 m in diameter, 0.5 m deep and constructed of corrugated steel with a cement bottom. We assumed that the birds drowned after entering the tank for unknown reasons.

Two similar tanks in other parts of the region were later investigated and found to contain small avian remains in one, while a White-footed Deer Mouse (*Peromyscus maniculatus*) and Western Meadowlark (*Sturnella neglecta*) were in the other. Portions of Black-tailed Jackrabbits (*Lepus californicus*) were found in both of these tanks, their condition suggesting that they had been eaten by raptors. In addition, we found castings of Burrowing Owls (*Speotyto cunicularia*) at two of the three watering tanks.

Anderson (*Auk* 81:332-352, 1964) noted that a Prairie Falcon (*Falco mexicanus*) drowned in a stock tank. The bird was an adult female, nesting approximately 500 m from the stock tank in which it died, in the spring of 1961 (Anderson, pers. comm.). We have found no other references to this type of mortality in the literature. Our observations extend Anderson's record to another species of raptor and

suggest that additional raptor species as well as smaller bird and mammal species may suffer similar deaths.

Perhaps raptors enter stock tanks for any of several reasons. Tanks may serve as a perch, as is evidenced by the presence of probable prey remains and castings in them. The raptor may enter the water to retrieve dropped prey items and then be unable to extricate itself. The water itself may be an attraction to the raptor. Lastly, and perhaps most logically, the raptor may be drawn to the tank by the presence of potential prey species which themselves have been attracted and trapped by the water. Thrashing movements of a trapped and drowning animal probably would trigger intense investigative and hunting behavior by raptors as well as other predators. Young inexperienced raptors, newly fledged from nests near stock tanks would be most vulnerable.

During the spring, summer, and fall when livestock are pastured in the vicinity, the tanks usually contain water. One rancher stated that he drained his tanks when they were not in use to prevent hawks from drowning in them, an occurrence he had seen several times (Elison, pers. comm.).

Drowning in livestock watering tanks may be significant due to the widespread use of such tanks throughout the arid and semi-arid western United States. This cause of death could be reduced simply by floating a large block of wood in the tank; this could facilitate escape from the water for trapped animals.

Department of Biology, Idaho State University, Pocatello, Idaho 83209. Address of second author: Department of Biology, Northwest Nazarene College, Nampa, Idaho 83651. Accepted for publication 13 August 1975.

THE EVOLUTION OF COLOR DIFFERENCES BETWEEN NASHVILLE AND VIRGINIA'S WARBLERS

ALAN H. BRUSH
AND
NED K. JOHNSON

Within the parulid genus *Vermivora*, the Nashville Warbler (*V. ruficapilla*) and Virginia's Warbler (*V. virginiae*) are closely related (Griscom and Sprunt

1957, Mengel 1964, Lowery and Monroe 1968, Stein 1968). Mayr and Short (1970) regarded the two forms, plus the Colima Warbler (*V. crissalis*), as component species of a superspecies, while Phillips et al. (1964) treated all three as conspecific, based on vocalizations and behavior. Although standard references (e.g., A.O.U. 1957) imply that *V. ruficapilla* and *virginiae* are locally sympatric during the breeding season in northern Utah and southern Idaho, and therefore have proved their biologic species status, a review of verifiable breeding distributional records demonstrates that the two forms are strongly allopatric (Johnson 1976). Thus, continued main-