

island and wetlands on the adjacent mainland. Numerous aerial pursuit flights were observed, but these intraspecific conflicts did not prevent the establishment of a high nest density, nor interfere with an apparently high hatching success. Lone and grouped drakes utilized waiting sites on waters surrounding the island while hens were laying or incubating. Several males were observed waiting for hens on land in close proximity to nests. On 27 May 1967 about 30 drakes were observed loafing together on an exposed, elevated site in the 9-acre flat. Many of the nesting hens in surrounding cover were in mid to late stages of incubation during this period.

The wind-swept, open water lake surrounding the island provided poor brood rearing habitat. Apparently, most hens moved their broods about 450 yards to the southeast shore where a large permanent marsh was located. We observed several newly hatched Mallard broods on this marsh on 27 May 1967.

Other ground nests found on the 9-acre flat included Mourning Doves (*Zenaidura macroura*), and one Ring-necked Pheasant (*Phasianus colchicus*). One Mourning Dove ground nest in nettles was located within 3 feet of an active Mallard nest.

The island was purchased by the South Dakota Department of Game, Fish and Parks in February 1944. During the mid-1950's adjacent landowners complained of the noxious weeds on the island, since they felt it to be a seed source that contaminated their fields. Consequently, the Department sprayed and cultivated the 9-acre flat for two consecutive years. This disturbance may have been responsible for increases in nettles since the mid-1950's.

This extremely high nest density contrasts with the usual widely-dispersed nest placement of Mallards in other portions of the prairie pothole habitat in North America. Such a concentration of nesting Mallards is probably a result of high nesting success and a high rate of migrational homing of both adult and first-year nesting hens. This high island nesting density of Mallards is similar to that described by Duebbert (Wilson Bull., 78:12-25, 1966) for Gadwall (*Anas strepera*) nesting mainly in nettles on an island at Lower Souris National Wildlife Refuge, North Dakota. Boyd and Campbell (The Wildfowl Trust, 18th Ann. Rept. 36-42, 1967) reported finding 268 Mallard nests on an 105-acre island in central Scotland in 1966.

We wish to thank Harold F. Duebbert for his suggestions and helpful criticism of the manuscript.—ROD C. DREWEN AND LARRY F. FREDRICKSON, *South Dakota Department of Game, Fish and Parks, Aberdeen, South Dakota (RCD) and Brookings, South Dakota (LFF), 17 March 1969.*

Courtship display observed between two species of buteos.—The following details of courtship behavior between two species of *Buteo* were recorded by Frank Kish, Associate Curator at the Topeka Zoo.

The two flight cages for raptors at the Topeka Zoo are made of two regulation baseball backstops which have been joined together. The interior of each has several perches and two shelter boxes $2\frac{1}{2} \times 2 \times 2$ feet which are open in front and have no bottom. A perch is located within each box. In the cage concerned in the observations, one of these boxes is located beneath an oak tree growing outside of the enclosure. The tree would make the box more desirable as a nest site offering "concealment" and protection from the elements. On 2 January 1968 two adult Red-tailed Hawks (*Buteo jamaicensis*), a male and a female, one adult male Swainson's Hawk (*Buteo swainsoni*), and an adult male Harlan's Hawk (*Buteo harlani*) were in this enclosure. The male Red-tail had suffered a broken wing and could not fly at all well. Both Redtails were

local birds (northeastern Kansas) and the Swainson's Hawk and Harlan's Hawk had been shipped from Calgary, Alberta, Canada. All of these birds lived in harmony together. In mid-January, courtship displays between the female Redtail and the male Swainson's Hawk began and lasted approximately one month.

The female Redtail's displays consisted of inviting the male Swainson's by calling and wing-flapping, to the shelter box which seemingly she had come to regard as a nest. The male Swainson's responded by flying over and landing on the box beside her. The female tried to solicit the male by spreading the feathers covering the cloaca and by lifting her tail. This type of display occurred quite frequently and was more intensive in the morning. No food begging, courtship feeding, or nest building was seen. The male responded only by perching next to the female and no copulation was ever observed.

On 26 January 1968, several weeks after the commencement of the female Redtail's displays, a new healthy male Redtail was introduced into the enclosure. This bird had been hand-raised from a day-old nestling and subsequently trained to the glove after the manner of falconers. The bird, thus raised and tamed was more easily intimidated by other birds. The female Redtail attacked the new male so frequently that he was removed on the following day.

It is highly unlikely that such courtship behavior would occur in nature because of the abundant choice of mates of their own species presumably available to free-ranging birds. A. P. Gray (Bird hybrids, A check list with bibliography, Commonwealth Agricultural Bureau, Farnham Royal, Bucks, England, 1958) indicates that definite, proven hybrids between hawks in general and Buteos in particular are rare and that no cases of hybridization between *B. jamaicensis* and *B. swainsoni* are known.

We would like to thank Gary K. Clarke, Director of the Topeka Zoo, for permission to publish this material, and Robert M. Mengel, of the University of Kansas Museum of Natural History, for critically reading this paper.—BRUCE R. WOLHUTER, *University of Kansas Museum of Natural History, Lawrence, Kansas* AND FRANK KISH, *Topeka Zoological Park, 632 Gage Boulevard, Topeka, Kansas, 29 November 1968.*

Food habits of wintering Sparrow Hawks in Costa Rica.—Sparrow Hawks (*Falco sparverius*) begin arriving in Costa Rica from the north in August or September. Some remain there for the winter, occupying the more open habitats, often those under cultivation or cleared for pasture. They depart for the north about April of the following spring. My observations show that during this period they are solitary, apparently territorial and, once in possession of a sufficiently food-rich territory, absolutely sedentary. I recorded several wintering individuals which could invariably be found on their territories and in the vicinity of a few favored perches throughout their stay.

A male bird which arrived on the grounds of the Inter-American Institute of Agricultural Sciences near Turrialba about mid-October, 1967, disappeared on 29 March, 1968. It took up residence in an area about 400 m in diameter which it never left. Usually it could be found along some electric power lines which crossed the area, either perched on the wires or on the tops of the poles. The area was bisected by a paved road parallel to the power lines. One side of the road was occupied by hedged lawns and a short-grass horse pasture; and on the other side was a wet pasture with rank grass, scattered trees, and overgrown fencerows.

The hawk hunted primarily on the lawns and horse pasture, where it generally dropped directly onto its prey from a perch. When it hunted over the high grass, it frequently hovered on the wing after the kestrel fashion. I recorded 97 successful prey captures