observed was not known, but from their casual attitude one suspects that they may not yet have had eggs or young, in spite of the late date.

The flight behavior observed in *B. albonotatus* occurred over the Gila Valley on 13 February 1960, just north of Redrock in Grant County. Three adults were involved, and when first seen they were circling about 200 yards to the north of me and perhaps 300 yards above the valley. My attention was attracted by several screams from the birds, but mainly they were silent. Initially, the three were soaring in large circles, with two birds somewhat higher than the third. Suddenly, one of the higher birds stooped at the lower one, which just at the moment of contact turned on its back and locked feet with the first. With wings over the back, the two then tumbled in somersault fashion for a distance of perhaps 100 yards, at which point they released and flapped back up to nearly their original positions. From there they gradually circled northward and disappeared together, in the same direction as the other bird, which had disappeared earlier and without becoming involved in the tumbling interaction.

The significance of the above behavior is unclear, as tumbling flights of this kind have been observed in aggressive as well as in courtship situations (Brown and Amadon, op. cit.). February is unusually early for this species to appear in New Mexico, so that activity associated with breeding would also seem premature. On the other hand, courtship flight is known to occur in *B. jamaicensis* throughout the year, and possibly was also involved here. Regardless of its exact function, this appears to be the first report of this type of behavior in *B. albonotatus*.

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A COURTSHIP FLIGHT OF THE SWAINSON'S HAWK

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Although the Swainson's Hawk (*Buteo swainsoni*) is a common breeding species on the prairies of the western United States, its courtship display has never, to my knowledge, been described. Swainson's Hawks are relatively tame and confiding and are not usually considered strong, aggressive fliers like some of its congenors. Nevertheless, their courtship display is vigorous and acrobatic.

On 24 April 1971, I observed a courtship flight of this species. Both birds of a pair soared separately for several minutes within a half-mile of a tree containing a nest. The paths of the birds roughly described quarter-mile circles at increasing altitudes to about 300 ft. The birds did not beat their wings for minutes at a time. Then one (I assume the male) soared to a position directly over the nest at that altitude, set its wings in a slightly bent attitude, and glided in a direct path away from the nest. It lost about 200 ft of altitude in about three-quarters of a mile and again began a leisurely circling soar as described above.

Once, when one of the birds, again presumably the male, was over the nest, it began a rapid, flapping flight, followed by closure of its wings and a 20–30-ft dive. After the dive, the bird continued the vigorous, flapping flight in a circular path (perhaps 25 ft in diameter), climbed sharply a few feet, stalled, and dove again. This occurred twice in rapid succession and led to a 15-ft nearly vertical climb to another stall. During this climb, even the axis of the bird's body was nearly vertical. The climb was launched from horizontal flight in a tight circle, not as the follow-through of a dive.

This rather acrobatic maneuver and stall was followed by a long dive which described a parabolic path, at the bottom of which the bird lit very gently on the edge of the nest. Between the beginning of the rapid, flapping flight and arrival at the nest, 55 sec elapsed. Within another 20 sec, the female lit about 5 ft from the nest. The display did not lead to copulation. To the contrary, no posturing, vocalization, or other courtship behavior followed. The male flew off shortly. The female hopped to the nest before she too flew off. They began soaring again and escorted a third *Buteo* (species unknown) across their territory and out of sight without direct conflict with it. A similar flight (which did not end at the nest) was observed on 3 May 1972, and John W. Stoddart (pers. comm.) and I have observed parts of the sequence as described on several other occasions.

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INCREASED MORTALITY OF COOPER'S HAWKS ACCUSTOMED TO MAN

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In the course of a 1969–72 study of the nesting biology of accipiters in the southwestern United States, we banded 235 nestling Cooper's Hawks (*Accipiter cooperii*), a total which does not include banded nestlings known to have died before independence. The banded nestlings have produced a pattern of recovery which strongly suggests that familiarity with man renders a hawk more likely to die from predation by man, especially shooting.

Of the 235 Cooper's Hawks, 33 from 12 nests had frequent exposure to man either in the form of handling for weighing and measuring every 2 or 3 days (25 birds), in the form of intensive study from blinds (26 birds), or both (18 birds). The nests that did not have frequent exposure to man were generally visited only once or twice to check contents, and again on banding day. A few were visited on banding day only. Of the 33 birds with frequent exposure to man, 4 (all from different nests) were recovered as a result of predation by man within a year of banding (3 cases of shooting, 1 of a bird killed in a building). Two were recovered at 2 months of age, 50 km from the sites of banding; one aged 7 months, 1130 km away; and one aged 10 months, 1050 km away. Only one of the 202 birds from 70 nests with little exposure to man was recovered within a year of banding; it was found dead from unknown

causes 6 months after banding 20 km from the site of banding. Another bird from the group with little exposure to man was found dead from unknown causes 2 years and 9 months after banding, 65 km from where it was banded. These represent all recoveries to date.

A 2 × 2 contingency table test for independence (Snedecor, 1956. Statistical Methods, Fifth Edition, The Iowa State University Press, Ames, Iowa) shows that the fractions of banded young recovered for the group with and the group without frequent exposure to man are significantly different ($P < 0.005$). This is true regardless of (1) whether we compare all recoveries or only recoveries known to have been caused by human predation, (2) whether we compare recoveries overall or recoveries within a year of banding (a fairer comparison), or (3) whether we compare rates on the basis of total numbers of nestlings or on the basis of total numbers of nests represented. Further, it is interesting to note that all four recoveries in the group familiar with man were of birds subjected to both repeated handling and observation from blinds. Although 22% of the birds receiving both forms of taming are known to have been lost due to man's activities within a year of banding, the actual percentage was likely to have been higher since the figures are not adjusted for reporting rates for birds lost due to man.

To our knowledge none of the chicks we have ranked as unfamiliar with man had frequent contact with humans, although most nests were located within 200 m of trails or roads. The 26 birds observed from blinds saw us climb into and out of the blinds from as few as four times total to as often as several times per week. The blinds were located level with the nests in adjacent trees and were at distances of from 4 to 10 m. Once in the blinds, we were generally out of sight of the birds at the nests. However, at one of the nests from which a young bird was later recovered, the adult female became so tame that we often raised the sides of the blind for ventilation and thus were in full view of the young.

The young birds under observation from blinds, or subjected to repeated handling, never became so tame that they would not give strong defense displays when we approached the nests. After they had fledged, we followed some of them for data on achievement of independence. When fully capable of flight but still dependent on their parents for food, they were consistently more approachable than fledglings unfamiliar with man; however, they consistently flew off when we approached closer than about 8 m.

It has been suggested that falconers might help threatened raptor populations, e.g., the Peregrine Falcon (*Falco peregrinus*) in the continental United States, by taking birds into captivity for at least the first year of life when most mortality of wild raptors occurs (Beebe and Webster, North American falconry and hunting hawks, World Press, Inc., Denver, 1964: 6; Cade, Raptor Res. News 5:83, 1971). The birds would learn to hunt in relative security and allegedly would suffer less attrition in the first year than wild birds. When they later escaped or were released, they would enter into the breeding population as competent hunters carrying lower pesticide loads than they would if they had remained in the wild from the start.

The hypothesis that such captive treatment might help wild raptor populations has not been tested critically and is hard to test because of the difficulties in obtaining unbiased data on (1) survival of raptors in captivity and in the wild; (2) rates of release or escape of captives to the wild; and (3) survival and reproductive success in the wild of released or escaped captives. With regard to survival of released or escaped captives, our data strongly suggest that partial taming of young raptors may significantly increase mortality in the wild, and it is important to note that the partial taming received by the birds we studied is not equivalent to the degree of taming regularly produced by falconry. Birds held for falconry are taught to associate food and hunting success with the presence of man and they generally overcome their fear of man within a matter of days or weeks. Even if some tameness is lost upon reverting to the wild, these birds can be expected to be highly vulnerable to shooting. Formerly captive raptors (wearing jesses) that we have encountered in the field have been decidedly tamer than the partially tamed Cooper's Hawks of our study. That other aspects of captive treatment might compensate for increased mortality due to tameness has yet to be demonstrated.

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NESTING SUCCESS OF THE CACTUS WREN IN RELATION TO NEST ORIENTATION

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The breeding success of birds has been the subject of many recent studies (see Ricklefs, Smithsonian Contrib. Zool. 9:1, 1969, for review). Success has been related to nest type, season, food abundance, and other factors but few studies have shown success to be related to nest placement (Ricklefs, op. cit.).

This study considers nesting success in relation to nest orientation in the Cactus Wren (*Campylorhynchus brunneicapillus*), a common resident of the desert regions of the United States and México. This species builds an enclosed retort-shaped nest with the entrance to one side and placed in cholla cacti (*Opuntia* spp.) or spinescent shrubs. Nest-entrance orientation is season-specific; early nests are oriented away from the prevailing winds and late nests are oriented into the winds (Ricklefs and Hainsworth, Condor 71:32, 1969).

METHODS

Studies of orientation and success were conducted in Pima County, Arizona, in 1970 and 1971. Nest-entrance orientation was measured with a compass and corrected to true direction. Many nests were inspected periodically to determine the fate of eggs and nestlings. Orientation data were treated statistically with the methods outlined in Batschelet (AIBS Monograph: 1, 1965). Success data were treated with chi-square analyses; significance is at the 0.05 level.