

the third bird on 18 April 1960 at Pensacola (Weston 1965).

V. o. flavovirides breeds from the Rio Grande delta southward to Panama (Oberholser 1974) occasionally wandering into California, New Mexico and Arizona. Aside from the four Florida records, the only spring occurrence of *flavoviridis* in North America east of Texas was a bird collected on 18 May 1883 at Godbout, Quebec (AOU 1957). The presence of the Hypoluxo Island bird so late in May and so far south or east of any previously known occurrence is as puzzling as the Quebec record.

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Continued scolding by parent birds after nest predation by crows.—Several hypotheses have been offered as to the function of predator mobbing by breeding birds. Curio (1975) considered that its main function is to cause the young to remain still and less obvious while the adults distract the predator. Hinde (1954), Kruuk (1976), and Skutch (1976) suggested that mobbing may be an expression of curiosity or be an attempt to obtain or convey to young information about the predator. Bourne (1977) and Fry (1977) hypothesized mobbing may be a "hue and cry" attempt to enlist aid from a predator of the marauder in discouraging the nest predator. The duration of adult birds' mobbing activities has seldom been recorded because the human observer is usually attracted to the site by the sounds of mobbing when the event is well in progress and leaves shortly after the predator does (Pettingill 1976, Bourne 1977, Lohrer 1980, Webber 1980). Only infrequently have there been records of scolding by defending birds after the predator leaves, an after-stimulus response (Taylor 1972, Best 1974, Curio 1975, Pettingill 1976, Finch 1981). Quite often an author has merely stated that the adult birds scolded (Best 1974, Pettingill 1976, Finch 1981).

In this paper I present observations of nest predation on Northern Mockingbirds (*Mimus polyglottus*) by a Fish Crow (*Corvus ossifragus*) and on Blue Jays (*Cyanocitta cristata*) by a Common Crow (*Corvus brachyrhynchos*) accompanied by prolonged after-stimulus responses, and I suggest possible functions of after-stimulus response.

At 1447 on 1 May 1983, I was attracted to loud mobbing noises in the vicinity of a Northern Mockingbird's nest in a yard in Tampa, Hillsborough County, Florida. The nest contained four two-day old nestlings. Less than two

minutes earlier I had noted an adult brooding on the nest, but saw no predators in the area. A Fish Crow was standing on the nest branch in the 6 m oak (*Quercus* sp.) while three mockingbirds and four Blue Jays flew at it scolding loudly. The crow then removed two young from the nest. As the crow hopped to the periphery of the tree, a Blue Jay pecked it strongly on the back of the head. Six of the mobbing birds chased the crow closely about 75 m as it flew from the area. All birds but the crow returned to the nest after the chase.

Individual mobbing birds stayed within 3 m of the nest tree gradually reducing the intensity of scolding and leaving the area 10-14 min following the crow's departure. The adult mockingbirds scolded me 30 min after the incident when I stepped out of the house to examine the nest at a distance of 30 m with a binocular. At 1900 that evening the nest was empty and no adult birds were present.

A second instance of after-stimulus response occurred on 11 April 1984. At 1832 I observed three Blue Jays scolding and attacking a Common Crow about 2 m below the top of a 20 m white pine (*Pinus strobus*) in Westerleigh, Staten Island, New York. A jay struck the crow on the back, the crow dropped something, fell about 1 m, recovered and flew out of the tree to the south. As the crow flew, two or three neighboring jays began to scold but did not chase the crow. The crow flew to an undetermined destination and did not return.

The jays of both groups scolded intensely, 7-12 calls per 10 sec, for 3 1/3 min. The rate of scolding tapered off to 0-5 calls per 10 sec over the next 4 min. The jays that had attacked the crow alternated scolding with the jays to the south, which had no interaction with the crow that I observed. By 1840 the birds had ceased scolding. At 1915 the jays were resting for the night as the sky was overcast, and it had become quite dark.

Below the tree in which the crow had been attacked, I located a freshly broken, yolk-stained Blue Jay egg but could not determine the stage of incubation. Two newly fledged jays were observed in the same tree 16 May 1984, presumably from this nest.

Many have noted the apparent ineffectiveness of mobbing and attack by adult birds on marauding birds (Taylor 1972, Pettingill 1976, Finch 1981, Shedd 1982), mammals (Hemmetzinen 1971, Kruuk 1976, Pettingill 1976), and snakes (Best 1974, Pettingill 1976, Bourne 1977, Lohrer 1980, Webber 1980, Finch 1981). Predators usually remove all young or eggs from nests at one time or by rapidly returning unless interrupted or thwarted (Taylor 1972, Best 1974, Pettingill 1976, Bourne 1977, Lohrer 1980). The Fish Crow reported here was seen to remove only two mockingbird nestlings, but two others were removed within 3 1/2 hr after I stopped watching the nest.

Sometimes mobbing has been shown to be effective in preventing nest predation (Nolan 1959, Taylor 1972, Smith and Holland 1974, Pettingill 1976, Webber 1980). The effectiveness is enhanced by circumstances such as inclement weather (Taylor 1972), the onset of darkness (this paper), human interference (Best 1974, Bourne 1977, Webber 1980), and possibly predators of the nest predator (Bourne 1977, Fry 1977). It is often the case, however, the nest may be emptied at some later date (Best 1974, Pettingill 1976, Webber 1980, Finch 1981).

Curio's review (1975) considered after-stimulus response an "inertial neural overflow response", a decremting neuronal triggering of motor function that continues after the stimulus is removed, but he did not examine its

function as he did for mobbing (Curio 1978). Some functions of after-stimulus scolding may be: 1) to convey to a returning predator that there are adult birds prepared to defend the nest or young and 2) to maintain a heightened state of vigilance on the chance the predator should return. A negative feature of after-stimulus scolding is the possible attraction of other predators to the nest site.

Pettingill (1976), Lohrer (1980), and Finch (1981) noted snakes often wait several hours or days before returning to partially emptied nests. Adult birds do not continue to scold after these predators leave, but quickly resume care of the eggs or young. I have observed (unpubl. data) if a potential predator moves through a nesting bird's territory but does not disturb the nest, the birds usually mob intensely during the predator's stay, but either do not show any after-stimulus response ($n=30$) or exhibit a short after-stimulus response lasting less than 30 sec ($n=12$). After-stimulus response, possibly as an inertial overflow activity (*sensu* Curio 1975), would serve little purpose in these circumstances.

When confronted with an avian or mammalian predator that could return to the nest quickly, birds might profitably prolong a mobbing response after the predator leaves if there is a probability of preventing the predator's return. In the case of the Common Crow reported here, the Blue Jay's mobbing and attack apparently caused the crow to be unsuccessful in obtaining prey at the first visit. The after-stimulus scolding that followed may have further reinforced the crow's lack of success and deterred it from making a second attempt on this nest.

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Adult Bald Eagle killed by another eagle.—At about 0730 on 19 December 1983, Assistant Park Manager Greg Toppin observed an adult Bald Eagle (*Haliaeetus leucocephalus*) lying on its side next to the main drive within Jonathan Dickinson State Park, Martin County, Florida. Another adult Bald Eagle was standing on top of it, and a third adult was perched in a nearby tree. As Toppin approached to get a closer look, he observed that the eagle was tearing feathers from the head of the bird on the ground. The bird on top then flew off and an examination found that the bird on the ground was freshly dead. It had a large flesh wound along one side of the head and blood and feathers were scattered around the body. A careful inspection of the site revealed no marks to indicate that the dead eagle might have been struck by a vehicle and no road kills were found that might have attracted it to this location.

The bird was transported to Lake Worth for a preliminary examination by Greg Harrison, a veterinarian experienced with birds of prey. Dr. Harrison found the bird to be an adult female in excellent condition with multiple chest wounds, which could have been caused by talons, severe damage to the head, and wounds along the neck. An x-ray showed that the skull was fractured, but no other bones broken. There was no evidence that the bird had been shot.

The carcass was then shipped to the National Wildlife Laboratory in Madison, Wisconsin, where it underwent more thorough examination. This detailed necropsy concluded that death was due to trauma, wounds received from other eagles. Multiple puncture wounds were found on the upper breast. The breast and abdomen had been denuded of feathers. The head had large puncture wounds at the ramus of the temporal mandibular joint. The left occipital area also had a large puncture wound, and there were multiple hemorrhagic spots and puncture wounds along the back of the neck. The left posterior and superior portion of the head was also denuded of feathers. Internal examination disclosed no significant damage to the cardiovascular and respiratory systems. The largest ovarian follicle measured about 10 cm in diameter.

As the dead bird was found approximately two and a half kilometers from an active bald eagle nest within the park, there was concern that it might be