

SHORT COMMUNICATIONS

THE APPARENT USE OF ROCKS BY A RAVEN IN NEST DEFENSE

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While conducting a study on raptor populations in Wheeler County, Oregon in 1973, on 7 May, John Barss and I witnessed an incident involving the use of rocks by a pair of Common Ravens (*Corvus corax*). In the early afternoon we were searching a cliff for a raven nest and observed two ravens individually enter and leave a vertical crack on a 20 m cliff. This crack extended the height of the cliff, and the birds entered it about 13 m above the base. The opening was approximately 2.5 m wide at the cliff face and 3 to 5 m deep.

When we approached the base of the opening, both ravens silently departed. Because Bowles and Decker (*Condor* 32:192–201, 1930) reported that ravens are "usually wild" after the nest has been discovered, it is possible that these birds had not noticed our presence. The nest contained 6 young. Although the young were fully feathered, the wing and tail feathers had not completed their growth. The nestlings demonstrated no fear towards us and dozed much of the ten minutes we spent taking notes and collecting pellets. We started our descent and were 4 and 6 m below the nest when both ravens staged an extremely vociferous attack approaching within 3 m of us. The two birds then took up positions on the cliff top 13 m above us, still calling loudly. One bird stationed itself at the top of the opening.

As soon as we resumed our descent, a rock the size of a golf ball fell past my face and landed next to my feet. We assumed that it had accidentally been kicked loose by the raven. However, when we looked up, we both saw a raven with a rock in its beak perched at the top of the opening on the opposite side. With a slight flip of its head the raven tossed the rock down and across the opening towards us.

From what shelter we could find, we watched the raven toss 6 more rocks from its position at the cliff top. One of these rocks struck me on the lower leg. The largest rock was 8 cm in diameter and 2.5 cm thick, and marks on it showed that it had been partially buried.

When we returned later that day to photograph this behavior, the ravens immediately flew at us and called. Again, one stationed itself in the same place at the top of the opening, but apparently no more rocks were available as only grit was thrown. The bird hopped about the cliff top with its wings partially extended and eventually dropped to a perch below the cliff edge closer to us. It appeared that the bird was searching for more loose rocks as it pried at the cliff at each perch. The raven eventually moved some distance away, still calling loudly. Assuming that no more loose rocks were available, we placed many rocks at the original perch and elsewhere on the cliff edge. On succeeding visits defensive behavior diminished and rock throwing was never repeated. On the last visit before the young fledged, the parents just perched together some distance down the cliff. They neither attacked nor called at us as they had earlier.

Except for the rock throwing behavior, nest defense was similar to that reported by Bowles and Decker (1930) and Harlow (*Auk* 39:399–410, 1922) including the aggressive vocal attack by both birds and the eventual perching together some distance away. Nine other raven nests, 7 of which were cliff nests, were visited during 1973 and 1974. The birds did not throw rocks at us at these nests, but none of the sites offered both loose rocks above the nest and a place from which they could be thrown. The nest site on the cliff face where we were pelted with rocks in 1973 was not occupied in 1974.

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FOOD AND FORAGING ECOLOGY OF THE AMERICAN KESTREL IN JAMAICA

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The American Kestrel (*Falco sparverius*) in the western hemisphere ranges from northern Alaska to southern Argentina and in the West Indies from the Bahamas to Aruba. Although the kestrel has been investigated in the northern part of its range (Bent 1938, Willoughby and Cade 1964, Heintzelman 1964, Smith et al. 1972, and others), no detailed information is available on its biology in the southern part

of its range. To my knowledge the only references concerning the food habits of this species in southern latitudes are Greer and Bullock (1966) who examined the stomach contents of Chilean birds of prey, and Jenkins (1969) who observed the food habits of wintering kestrels in Costa Rica.

The present study was conducted in Jamaica during the summer and winter of 1969, spring and summer of 1970, and summers of 1971 and 1972. My objectives were to obtain information on the food, foraging ecology, and home range of this species in a tropical insular environment. In Jamaica, kestrels are fairly common and widely distributed, occurring in open and semi-open habitats and recorded from sea level to at least 1300 m. I saw kestrels in cultivated areas, coconut and citrus groves, wooded pas-