TABLE 1
FINDING A RECENTLY STOCKED FEEDER BY BLACK-CAPPED CHICKADEES

Outcome	Frequency
No chickadees came within 2 h	15
Chickadees came within 2 h	11
Did not call within 1 min of finding feeder	3
Did call within 1 min of finding feeder	8
Another individual came within 3 min of first call-recruitment	6
No recruitment	2

tageous for an individual chickadee to be in a flock for reasons not directly related to feeding efficiency, as the flock is an effective anti-predator strategy (Ficken and Witkin, Auk 94:156–157, 1977). Therefore, it may be beneficial to share food to keep other flock members alive. (2) Chickadees are monogamous and the mate is usually in the same winter flock. It may be advantageous to be altruistic toward the mate under some circumstances (Witkin and Ficken, Anim. Behav. 27:1275–1276, 1979). (3) The cost of vocalizing on finding food may be so small compared to the advantages of this vocalization in more common contexts that natural selection has not acted to silence chickadees that discover locally abundant food (W. J. Smith, pers. comm.). Hypotheses other than kin selection to explain apparent altruism need to be tested further for the chickadee as well as other social species.

I thank R. Ficken, J. Hailman, W. J. Smith, C. Weise and S. Witkin for their criticisms of the manuscript. R. Ficken, J. Ingold, M. Plonczynski, C. Weise and S. Witkin aided in obtaining the data, and C. Weise made available data on the color banded birds. Supported by NSF grant BMS 74–19474. Publ. No. 25 of The University of Wisconsin–Milwaukee Field Station.—MILLICENT S. FICKEN, *Dept. Zool., Univ. Wisconsin–Milwaukee, Milwaukee, Wisconsin 53211.* *Accepted 3 June 1980.*

Wilson Bull., 93(3), 1981, pp. 394–395

The sentinel crow as an extension of parental care.—In bands of feeding Common Crows (*Corvus brachyrhynchos*), some crows sit as sentinels and apparently warn feeding conspecifics of oncoming danger (Bent, U.S. Natl. Mus. Bull. 191, 1946). Other species as well make use of sentinels (Conner, Condor 77:517, 1975). Goodwin (Crows of the World, Cornell Univ. Press, Ithaca, New York, 1976) disagrees with the guardian function of the sentinel crows, citing personal contradictory observations of sentinel corvids fleeing an area before all of the feeding individuals are warned. A pair of nesting crows that we studied in the spring of 1978 may provide further insight into the actual function of the sentinel crow.

A pair of crows nested in one of a group of 14 spruce (*Picea* sp.) trees on the St. Bonaventure University campus, Cattaraugus Co., St. Bonaventure, New York. This pair was observed from hatching 4 May to fledging on 7 June. The family unit, recognizable because of aluminum leg bands on the young, was also observed in the vicinity from 7 June–7 July.

During the nesting stage, the crows were observed for 30 observation periods of 30 min each. Three main forms of antipredator behavior were observed: chasing, mobbing and nest guarding. During chasing 1 parent would fly at an intruder giving a low pitched call until the animal left the area. When the crow exhibited more intense mobbing behavior, it gave a

"rally call," and was joined by its mate and 4 other crows. The 6 crows made occasional passes at the intruder.

Guarding the nest is a less obvious form of antipredatory behavior, but is a precursor to chasing or mobbing. Guarding was not done from the nest itself but from the top of adjacent spruce trees and from deciduous trees 107 m away. Guard changes usually took place in the deciduous trees. Occasionally, the incoming crow went directly to the nest, but 82% of the time it stopped at the deciduous tree first (N = 90 of 110). The nest was only left unguarded for a mean of 1.04 times per 30 min of observation (N = 23 observations). These unguarded periods were usually brief, with a mean duration of 3.4 min (N = 24 unguarded periods observed).

After fledging, the family was seen 6 times in the adjacent woodlot between 7 June and 16 June. Since the young were not seen on the ground during this time, it was assumed that the young were still being fed by the parents. The young were not seen foraging in open fields until the first week in July. Good (Ph.D. thesis, Ohio State Univ., Columbus, Ohio, 1952) also found that fledglings do not alight in open fields until at least 2 weeks after fledging. On each occasion, when the family was seen in the woodlot, the authors were mobbed by the adults. On 2 occasions, 1 banded young tried to join in the mobbing. On both occasions, the adults began to vocalize at the young and half chased, half led the young into a tree. Once the young was concealed, the adults continued to mob the authors.

In the first week of July, the family unit under study was seen foraging in an open field adjacent to the woodlot. One adult was stationed in a nearby tree or on a fence post. The sentinel occasionally gave calls that were barely audible to an observer 100 m away. Louder calls led to the other adult joining its mate at the guard post while the 3 young continued to forage. Once when the family was approached, all 5 crows flew to the adjacent woodlot.

If these crows had not been banded and observed for the 2 months that preceded these last observations, they would have appeared as a band of feeding crows with 1 or 2 posted sentinels. Instead, we interpreted this group as a feeding family unit with 1 or 2 parents sitting on guard over the young. We feel that the sentinel is an extension of parental care originating from the guarding which occurs during nesting. The mobbing by nesting parents does not switch immediately into sentinel warning upon fledging. Instead, the parents go through a transition period in which intruders are still mobbed while the recent fledglings are being taught to flee from potential danger.

We think that sentinel crows are not altruistic, self-appointed guardians of the feeding flock. Instead, they are parent crows exhibiting antipredatory behavior as they guard their offspring. The contradictory observations by Goodwin (1976) mentioned above could be explained if the young of the fleeing sentinel were already out of danger, even if other crows were still feeding. Guarding by adults of a family would not preclude use of such sentinels by other crows, or even other species.—GLORIA M. D'AGOSTINO, LORRAINE E. GIOVINAZZO AND STEPHEN W. EATON, *Dept. Biol., St. Bonaventure Univ., St. Bonaventure, New York 14778.* *Accepted 2 June 1980.*

Wilson Bull., 93(3), 1981, pp. 395–397

Behavior of a male Least Bittern incubating after loss of mate.—On 30 June 1978, I found a 4-egg completed clutch of a Least Bittern (*Ixobrychus exilis*) in a solid stand of cattails (*Typha* sp.) at Ramsayville Marsh, 4 km east of Ottawa, Ontario. The nest was located about 65 m from shore and approximately 70 cm above the surface of water ca. 40 cm deep. The nest, typical for the species (see Weller, Wilson Bull. 73:11–35, 1961), was