THE INFLUENCE OF A HAWK'S APPETITE ON MOBBING

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Falconers who watch closely the appetites of their hawks to determine whether or not birds are "sharp set" (hungry) enough to fly at game are often amused by paintings of hawks with feathers and attitude of the body showing repose bordering upon somnolence but with talons "fiercely" clutching prey. If a competent falconer can detect at a glance a raptor's mood—to hunt or not to hunt—it seems probable that prey species can do the same as well or better.

To test the influence of a hawk's appetite on the mobbing reaction of small birds, I conducted a series of experiments with a tame male Red-tailed Hawk (*Buteo jamaicensis*), which was taken on May 27, 1956, when almost ready to leave the nest and which was trained to fly to the fist. Twenty-six testing stations were set up near Plainfield, Wisconsin. Two five-minute tests were run at each station: one with the hawk well fed and the other with him "sharp set." For each test the hawk was tethered to a perch three to five feet in height and reactions of prey species were watched from a convenient distance. Station 1 was in the woods and the remainder of the stations were in open country but near brush, woods or marshes. After every five to eight tests the hawk was rested, thus four groups of tests were run in pairs (fed and "sharp set") until all 26 stations had been covered.

The behavior of the hawk during tests seemed rather similar whether "sharp set" or well fed. He remained in motion most of the time, either moving his head, shifting position, plucking at his feet or jesses, or occasionally sunning with outspread wings, but he did not often attempt to leave the perch. His few attempts to leave seemed to be for the purpose of seeking another perch rather than for taking off after prey.

When well fed, the hawk was mobbed at eight of the 26 stations; when "sharp set," he was mobbed at 14 of these same stations. See table 1.

Table 1

Summary of Mobbing

Date	Stations								
Well Fed									
Aug. 2	1–7	mob	.....	.....	mob	.....	.....	.....	
Aug. 4	8–13	.....	.....	mob	mob	mob	.....		
Aug. 9	14–18	.....	.....	.....	.....	.....			
Aug. 13	19–26	mob	.....	mob	.....	.....	.....	mob	.....
Sharp Set									
Aug. 3	1–7	mob	mob	.....	mob	crowd	mob	.....	
Aug. 5	8–13*	.....	.....	mob	mob	.....	.....		
Aug. 9	14–18	.....	mob	.....	crowd	.....			
Aug. 11	19–26	mob	.....	.....	mob	.....	crowd	crowd	crowd

* On August 5, I apparently misjudged the condition of my hawk. Immediately after the last test he refused to fly to the fist, took off, and disappeared until August 9 when I caught him again. This behavior indicates that he was not very "sharp set" which may account for the paucity of reactions on this day.

Mobbing was of two types: (1) one or two birds of the same species got excited or (2) a mixed crowd showed agitation. Altmann (Condor, 58, 1956:241–253) made a similar observation. When fed, the hawk never drew a crowd, but when "sharp set," he was mobbed by aggregations at five stations. Aggregations were hard to count but consisted of about 10 to 40 individuals. Details are summarized as follows:

Hawk well fed.—Species which initiated mobbing: Ruby-throated Hummingbird (*Archilochus colubris*) buzzed around head; Black-capped Chickadee (*Parus atricapillus*), called "chickadee"; Scarlet Tanager (*Piranga erythromelas*) sang; warblers (Parulidae) scolded; Catbird (*Dumetella carolinensis*) gave mews; English Sparrow (*Passer domesticus*) chirped and circled; Eastern Kingbird (*Tyrannus tyrannus*) dove and hit head.

Hawk sharp set.—Species which initiated mobbing: Robin (*Turdus migratorius*) scolded; Indigo Bunting (*Passerina cyanea*) gave chips; Downy Woodpecker (*Dendrocopos pubescens*) repeated alarm notes; American Goldfinches (*Spinus tristis*) uttered jay-like cries from nearby bush; Ruby-throated Hummingbird, Catbird, Scarlet Tanager, warblers, and English Sparrows.

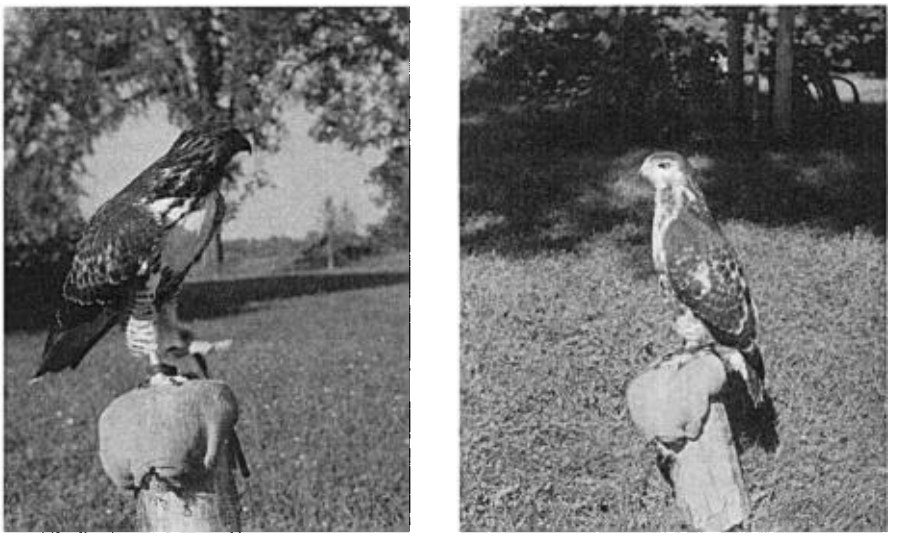

Fig. 1. Tame Red-tailed Hawk, showing different attitudes related to hunger. Left, well fed; right, hungry or "sharp set."

Stations where the Black-capped Chickadee, Scarlet Tanager, and Catbird reacted were revisited, following the usual procedure, but without the hawk, because at these particular stations I was in doubt as to whether or not I had induced the mobbing. In no case did the prey species react to me alone.

Species which mobbed after another species had started mobbing (this occurred only when the hawk was "sharp set") were: Song Sparrow (*Melospiza melodia*), House Wren (*Troglodytes aëdon*), vireos (Vireonidae), Eastern Kingbird, warblers, English Sparrow, Indigo Bunting, and Red-headed Woodpecker (*Melanerpes erythrocephalus*).

It is quite plain that the presence of a hawk does not guarantee a mobbing reaction. At ten stations the hawk was not mobbed in the course of the two test runs. Birds observed at this time in the near vicinity were as follows: Blue Jay (*Cyanocitta cristata*), Song Sparrow, Catbird, and Cedar Waxwing (*Bombycilla cedrorum*), at one station each; Eastern Kingbirds at three stations and American Goldfinches at five with the hawk well fed; Eastern Kingbird, Mourning Dove (*Zenaidura macroura*), and Song Sparrow at one station each, and American Goldfinches at five stations with the hawk "sharp set."

Beginning in early July, I flew the hawk outdoors nearly every other day. He was trained to come to my fist for food when I whistled, although the sight of the glove was sometimes enough to bring him in. At first I only attempted short flights of about 20 yards from one person to another, but progressively I permitted him more freedom and not infrequently left him at liberty for hours at a time. These flights were not counted

as they were not part of the experiment proper but were merely to keep the bird in top notch condition. They did, however, give me an opportunity to observe mobbing under more natural circumstances.

It seemed clear that the hawk elicited far less mobbing when he was tethered to relatively low perches in the course of the tests than when he was on the high perches he selected when "sharp set." Whenever he disappeared while I was flying him "sharp set," I could find him again within a few minutes by listening for the mobbing and scanning conspicuous perches nearby. When he escaped well fed, I heard no mobbing and he was not to be found on his usual high perches. Under these circumstances I was able to find him only once before he returned of his own accord with an appetite sufficient to bring him to my fist. Upon this occasion he was sitting near the center of a large tree and there was no mobbing. While flying at about treetop height or lower, he was invariably mobbed whether "sharp set" or fed. When he was soaring high, I saw no mobsters.

The appearance of a hawk that is well fed in contrast to "sharp set" needs further analysis. Tentatively, I suggest that when in the well fed condition the head and eyes appear rounder. A healthy hawk standing on one foot with the other foot tucked up under his feathers is not inclined to hunt. In a "sharp set" Red-tail, the top of the head often appears flattened with the hind neck feathers erected, the wings tend to be held higher, the superciliary stripes seem straighter and seem to form overhanging ledges; slight head motions forward often indicate a readiness to hunt. It might be stated at this point that young Cooper Hawks (*Accipiter cooperii*), when they are not quite fully feathered, appear to show considerably more expanse of white down when hungry. This may have survival value in that it could lead the parents to feed the hungriest and most conspicuous youngster first. It may be that a study of feather positions in young, incompletely feathered hawks, fed and unfed, might facilitate recognition of the presumably more subtle differences in older hawks.

Conditioned mobbing was a curious by-product of this study. The robins present in the locality where I always flew my hawk, having heard me whistle him in to my fist repeatedly early in the summer, apparently came to associate my whistle with the arrival of a hawk. I noticed this first on August 6 when my hawk had disappeared for a time. Thereafter the robins mobbed consistently whenever I whistled, even though no hawk was coming. Robins tested with the same whistle at five other localities gave no response.

In the course of the tests the fed hawk was mobbed by 12 individuals. "Sharp set," he was mobbed by about 100. The crowds attracted when he was "sharp set" are probably attributable to more persistent initial mobbing which attracted other birds to mob rather than to his "sharp set" appearance *per se*. The conditioned robins, responding to my whistle with no hawk present, sometimes drew a crowd.

SUMMARY

A male Red-tailed Hawk attracted more mobbing when "sharp set" (hungry) than when well fed. When fed, it was mobbed at eight of 26 test stations and attracted no aggregations. When "sharp set," it was mobbed at 14 of the same stations and attracted aggregations at five of these. At ten of the 26 stations it was not mobbed.

The hawk was mobbed more consistently at the high perches he selected for himself when "sharp set" than at the perches three to five feet high to which he was tethered at test stations.

He was mobbed most consistently when flying low, but he was never mobbed when soaring.

Conditioned mobbing was observed.

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