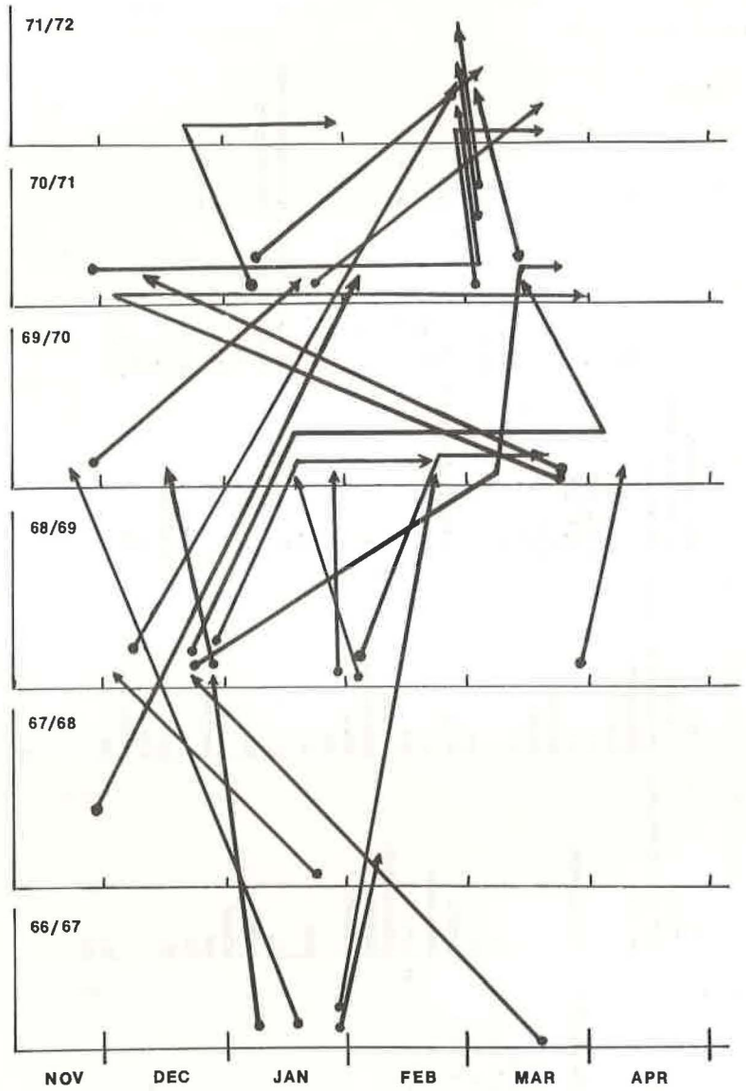
Figure 3: Returning Myrtle Warblers. The origin of the arrows indicates the date of banding, their tip the last recapture. Recaptures in between are shown by changes in direction of an arrow "shaft".



2606 Mission Road, Tallahassee, Florida 32304

PREDATION OF BLACK-CAPPED CHICKADEE IN WINTER

By Earle and Fern Bennett

With oak leaves still falling we usually have the first Sharp-shinned Hawks *(Accipiter striatus)* and Northern Shrikes *(Lanius excubitor)* about our feeders and very frequently throughout the winter months, yet with these predatory birds the number of Black-capped Chickadees *(Parus atricapillus)* remain quite stable (resident) but during migratory periods there is the normal increase of transients.

A study was commenced exploring whether the Northern Shrike under favorable conditions (*i.e.* with chickadees coming and going at feeders) was indeed the bloodthirsty bird so frequently described in literature; a partial bird of prey that killed more than he consumed and if so, how many chickadees were attacked during his stay. We would also observe the Sharp-shinned Hawks attacks on this species.

It occurred to us an exact count of predation was impossible for though both birds of prey sat in the open quite commonly some twelve and fifteen meters away, there were more visits when they remained hidden from view, but we followed a program of daily watch at varying hours of the day. Prevailing winds and temperatures were recorded as the study commenced. Each Black-capped Chickadee had a differing color combination on the left leg, and when resident flocks, usually in numbers of three to six birds appeared with unbanded members or migrating birds appeared without identification we trapped and color-banded. With carefully prepared records of resident, returns and migrants this gave us numbers of losses. A Chickadee was considered a migrant during the four winter months if he returned to feeders after an absence of twenty-five days or more, then he was listed as a return.

Our feeding station is located at the bottom of Brimstone Hill on the Pond Road approximately five miles from the city of Gardiner, Maine. The study area covered approximately 50 acres. The habitat to the north is partially overgrown fields of alder bordered by aspen, with a small stand of fir, pine, balsam and mixed deciduous vegetation. To the east one crosses the Pond Road entering woodland of pine, ash, beech, many gray and white birches on a sloping ridge. There are mature oaks a quarter mile in and a steep ledge drops to a variety of bush, mature aspen, pine, beech and balsam to the Cobbossee Stream. Directly across from our home both east and south are small fields backed by pine, a brush area with numerous hawthorn, wild apple, alder, aspen divided by two ravines with great willows, elms, thick underbrush common to this habitat and this also has gray birches throughout as it reaches the stream.

To the west we have an alder run with rivulets throughout, two constant springs and a sizeable flowage that joins Cobbossee Stream. Larch, willow, elm, maple are sparse but gray birches are numerous and on the edge of this lowland, second growth pines are evident. Wild apple, pin cherry along with great maples move back towards our home and a large clump of cedars. Rockwalls surround the north, west and northeast lawn with chokeberry, shadbush, arrowwood, elderberry, nannyberry, and viburnum giving protection to our birds. Alder pin cherry, aspen and scattered pine follow a small field on our southwest side that reaches the highway edge where chickadees move across the road as they also do to the northeast to reach the feeding station.

Our position of observation surveys north, west, northwest and northeast. Satellite type feeders and suet hang from a cord tied to supports on our home and a cedar branch some twelve meters away. Another cord spans two windows holding a suet mixture and feeder, all directly in line with our vision. The differing color combinations on the left leg give instant identification as they leave the cedars to feed. There is a graveled area ten by ten kept clear of snow where mixed wild seed is abundant at all times for small ground feeding birds. Further back of the cedars is a brush area cleared for Blue Jays *(Cyanocitta cristata)*, Evening Grosbeaks *(Hesperiphona vespertina)* and other species consuming sunflower and fine corn.

It became apparent after the first winter that only the four winter months were ideal for observation. At that time the two predators are almost entirely dependent, in Maine, on birds for survival. Quite simply, the first year records were a beginning while the latter two are illustrated in graph, starting 1 December 1970 through 31 March 1971 and 1 December 1971 through 31 March 1972. Commending in September of the last two years we have, in the interest of accuracy, checked almost daily for brief sessions returning birds and on the first day of December spent eight hours examining those presently feeding. Thus chickadees that may have previously appeared in our records as unknown losses will now be listed as returns or migrants.

Research in each four month period was conducted for at least one or two hours, six days a week at varying hours of the day and from six to eight hours one day a week. Sex determination was from weight and wing measure; 63 mm., 11 gr, and under were considered females; 66 mm, 12.5 grms were listed as males (De Kiriline Lawrence, 1958). In fall wing measure was quite reliable. There were many birds of undetermined sex, although vocal notes, behavior in spring and the feeding male at the nest sight aided in a few instances. Mist nets were used until mid and infrequently late November, but our preference was for Potter traps hung from the cord or tree-

branch. Unbanded chickadees were easily trapped when food was withheld, thus most birds were colorbanded. We failed to colorband 25 chickadees in the spring of 1970, when we were banding all species during a heavy migration. These birds were given the federal band and if retrapped at a later date color combinations were attached.

Shrikes were observed about the feeders on 46 days and the Sharp-shinned Hawks 17 days in the first period. (Unidentified birds of prey, 5 days). There were five unknown losses. The second four months period, Shrikes were present 8 days and Sharp-shinned Hawks 38 days. (Unidentified birds of prey 3 days) There were nine unknown losses. Either of the two predators were present on days other than those appearing in the graph was evidenced by behavior of other species, but we have considered only those days when known birds of prey were observed with the naked eye.

The most surprising and certainly interesting result of our study was that not a single Black-capped Chickadee was taken in our observation during the study by either the Northern Shrike or Sharp-shinned Hawk! This is not to say those birds appearing in the graph as unknown losses were not attacked by birds of prey "out of view", however, our presence at the window did not deter attacks on other species. Unmolested, both birds of prey were reasonably comfortable while we recorded data. Most attacks were on ground feeding species. Tree Sparrows *(Spizella arborea)* are with us in numbers from October through April as in an ever increasing number of English Sparrows *(Passer domesticus)*. Contrary to Bent's mention that many English Sparrows are attacked by the Northern Shrike, none in this study period were, in our view.

The first winter (not in graph) we banded a sizeable number of Tree Sparrows and a few were attacked by Shrikes before we could get to the traps. Birds were killed through the wire, and we must add, a second, possibly a third bird would also be trapped. By the time we reached the area the Shrike in frustration had attempted to attack the second trapped bird, while the first, and this we emphasize, was still fluttering about, but the Shrike could not strike or throttle it in a normal attack. This unnatural barrier and behavior, coupled with the Shrike's hunger seemed to confound him. He was reluctant to fly off even as we ran forward. The first bird attacked might be nearly dead and a second, perhaps a third frightened but usually unharmed. We would leave the dying bird just inside the trap and in short order the Shrike would return for his kill. He would not repeat this performance again and again once he had his kill. On many occasions when not trapping and numerous birds of various species were available, especially during snowstorms, a Shrike might sit quietly preening in the cedars till hunger so dictated they would then attack a bird and fly directly to our back

alder patch. They did not attack repeatedly throughout the three years in our view except when unable to reach a trapped bird, and others were thrashing fearfully in another unit. They apparently attack for survival only. We did not find evidence after numerous excursions on snowshoes and on foot over crust through the area of victims hung from hawthorn, tree crotch or other. Overkill was not evident, yet this could conceivably escape our careful scrutiny. Our evidence of his kill was greater and perhaps some lesser primary feathers, many body feathers, usually in a concealed spot, on hard pack snow or crust, or lightly covered crust. Under small pines and interestingly always adjacent to hawthorn. We were not able to watch the Shrike consume his victim, for on approach he would fly, taking his prey with him. How he would consume his prey in soft deep fresh snow we could not say. We took note they would usually appear between 7:30 A.M. and 9:00 A.M. and if unsuccessful might return again and again. If successful before arrival they might sit about in the cedars or perch in pines close by or move out, returning to attack again by one-thirty or two, and remain till near darkness if their hunger was unsatisfied by a kill.

Birds instinctively sensed when the moment was at hand to take flight or hide. This partial bird of prey when hunting tried repeatedly to flush birds in the open from conifers or victimize them amid deciduous, bush, but when the moment of attack came, it was rare a chickadee was in the open. There is often a faint discordant sound given by the Shrike as he leaves a perch to attack.

During migratory months the Slate-colored Junco *(Junco hyemalis)*, Song Sparrow *(Melospiza melodia)* were often attacked, but the Tree Sparrow is by far the most victimized at our station. No Pine Siskins *Spinus pinus)*, Common Goldfinch *(Spinus tristis)* or Evening Grosbeaks were taken in view, nor the Common Redpoll *(Acanthis flammea)* during the hours of observation.

The Black-capped Chickadee eluded Shrikes by flitting about the outer lacy branched cedars or in utter silence and immobility. Most mature Chickadees would not move from this protection and those who left, often the newly banded or migrating birds driven in fear flew upwards, zigzagging to near conifers, noticably not downward to bushes. The resident birds seemed doubly safeguarded by their familiarity with the area. One particular revealing instance was during inclement weather when birds of prey were about. In rain, especially heavy rain and sleet with gale winds most resident birds fed at the feeders less frequently, not at somewhat regular intervals. Their plumage was dry or nearly so, while transients were often drenched and in wet heavy snow occasionally balls of snow clung to tail feathers slowing their flight. Tree cavities and choice sheltered areas were used by residents while transients apparently failed to consistently find similar shelter. Extreme temperature fluctuations noticeably governed losses, but to date through our records we are not satisfied as to whether such losses are due mainly to birds of prey, migration or weak birds that succumb to natural forces or in fact a combination of all three.

Tree Sparrows, Song Sparrows and Slate-colored Juncos were the species observed attacked by Shrikes though infrequently they pursued Downy Woodpeckers *Dendrocopus pebescenes)* without apparent fruition. Blue Jays on the whole were alarmed by Shrikes, cautious, but not fearful to any great degree. If the Shrike made a successful attack on a small species they would set up a bedlam of sound. Factually on one occasion I observed several Blue Jays mob a lone Shrike, driving him by sheer numbers from the apple tree. On one other occasion I observed a lone Blue Jay fly at a Shrike, the crest high and strike with his bill, but whether he struck the body in his frontal attack I could not see. The Shrike promptly flew off. The Blue Jays apparently lack the intense fear because of their overwhelming numbers and size.

The Sharp-shinned Hawks were observed in successful attacks on the Hairy Woodpecker *(Dendrocopus villosus)*, Downy Woodpecker, Blue Jay, Slate-colored Junco, Song Sparrow, and Tree Sparrow. When this hawk appeared most species would take flight, plunge for cover or remain frozen; though we have observed Blue Jays in flight to the feeding area, drop down unknowingly in the same deciduous trees where the Sharp-shinned was perched. They would keep to the rear of the Accipiter, but if unfortunately one dropped in the forefront, on seeing his peril would fearfully plunge for the cedars. In this type situation, the hawk did not make a sharp up and over attack to those remaining at the rear. A mature hawk especially seems to attack after careful calculation and not from a sudden seemingly advantageous circumstance. The Black-capped Chickadee has on many occasions flitted about the Sharp-shinned Hawks, dee-deeing within three and four feet in the apple tree with it's countless sucker branches for protection one might assume. Not one time, and we repeat with emphasis, not once in the three years of observation has this predator moved to attack!

Glover Allen's montion of Thayer's belief light and shade plus the victim's and pursuer's protective color markings seem to favor the chickadee in their zig zagging upward and through conifer branches when escaping the Shrike. With the Sharp-shinned, chickadees were often perched in the open, on the cord, a feeder or a branch but they appeared to escape the sharp eye of the hawk in near immobility or lack of pronounced coloration. Possibly the hawk waited for larger prey that was always about.

During this study, 14 Black-capped Chickadees are listed under unknown losses, with 109 appearances of either Northern Shrikes or Sharp-shinned Hawks or both. Known losses were three.

One by auto, one old bird by fear it would seem after trapping, and one sustained a wing injury, lived two months while we attempted to heal it, then died. Not counting unidentified birds of prey, it would be sheer folly stating all unknown losses resulted from the presence of predators identified, for one must consider migration of those that do not return, death by natural causes, those struck by automobiles but unfound victims of other mammals. In supposition, if we considered all were taken by birds of prey, 12.8% of the accipiters' and shrikes' attacks were successful, which is a compatatively small percentage.

When this study commenced in earnest we prepared ourselves for a goodly number of attacks on the Black-capped chickadee during observations but none was made by the Sharp shinned in our view. It is possible the Hawks made no attacks on this species because of the considerable supply or larger and more easily taken supply of other birds. The Shrikes pursued, but in our observations all attempts were fruitless. Overkills were not found or made by Shrikes though there was ample supply. We did not after countless investigations in winter, and in spring before leaves formed, find evidence of this. His attacks were made, we believe, for survival only.

Our special thanks to Mr. Christopher Packard, Audubon Naturalist Council, Maine Nature, Brunswick, Maine, without whose kindness this study could not have been made.

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RFD #1-A, Gardiner, Maine 04345

(Graphs follow on next page, Ed.)

DEC.'70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Birds of Prey*	SS	SS	SS		SS	SS	SH	SH		SH	SH	SH	SH	SH	SH
Returns	9			1	1		1	1							
Unknown Loss		1													
Known Loss															
Migrant Banded	2														
No.Birds	11	10		11	12		13	14							

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Birds of Prey*	SH	SH	SH	SH	SH	SH	UH SH	SH	SH	SH	SH	SH	SH		SH	SS
Returns																
Unknown Loss																
Known Loss																
Migrant Banded																
No.Birds																14

JAN.'71	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Birds of Prey*	UH SH		SH							UH		SS		SH	
Returns															
Unknown Loss															
Known Loss															
Migrant Banded													5		
No.Birds	14												19		

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Birds of Prey*	SH	SH				SH	SS		UH SH						UH	
Returns									1							
Unknown Loss									1							
Known Loss																
Migrant Banded																1
No.Birds									19							20

*Legend: SH - Northern Shrike
SS - Sharp-shinned Hawk
UH - Unidentified Hawk

FEB.'71	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Birds of Prey*	SH	SH	SH				SH							SH	
Returns							1								
Unknown Loss							1								
Known Loss															
Migrant													1		
Banded						2	4								
No.Birds	20					22	26						25		
MAR.'71															
Birds of Prey*			SS		SS		SS	SS	SS	SH SS					SH
Returns															
Unknown Loss			1												
Known Loss															
Migrant	1	1													
Banded															
No.Birds	24	23	22												
DEC.'71															
Birds of Prey*		SH				SH			SH			SH		SH	SH
Returns	33														
Unknown Loss		2	1		2					1					
Known Loss															
Migrant		1		1						1				1	
Banded	1														
No.Birds	34	31	30	29	27					25				24	
JAN'72															
*	SS	SS	SS	SS		UH	UH				UH				
Returns											2				
Unk.Loss															
Known L.														1	
Migrant					1									1	
Banded										1					
No.Birds	23				22					23	25		23		
FEB'72															
*	SS	SS	SS	SS	SS	SS									
Returns												1	3	1	
Unk.Loss															
Known L.															
Migrant								1							1
Banded															
No.Birds	24							23				24	27		27
MAR'72															
*	SS						SS	SS	SS		SS	SS	SS	SS	SS
Returns	1														
Unk. Loss															
Known L.								1							
Migrant															
Banded												4			
No.Birds	33							32				36			

FEB.'71	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Birds of Prey*				SH	SH	SH										
Returns																
Unknown Loss																
Known Loss																
Migrant							1									
Banded							1									
No.Birds							25						25			
MAR.'71																
Birds of Prey*				SS		SH	SH	SH	SH	SH	SH	SH	SS	SH		SS
Returns												1				
Unknown Loss							1									
Known Loss																
Migrant										1						
Banded																
No.Birds							21			20		21				21
Birds of Prey*		SH		SH										SS		
Returns																
Unknown Loss																(DEC'71)
Known Loss																
Migrant		1														
Banded																
No.Birds		23														23
JAN'72																
*															SS	SS
Returns																
Unk.Loss		1														
Known L.																1
Migrant																
Banded					3											
No.Birds		22			25											24
FEB'72					2											
*	SS				SS		SS			SS	SS	SS	SS			
Returns	2									1						
Unk.Loss											1					
Known L.																
Migrant																
Banded	3															
No.Birds	32									33	32		32			
MAR'72																
*	SS	SS		SS	SS	SS	SS	SS		SS			SS			
Returns													1			
Unk.Loss						1										
Known L																
Migrant							1									
Banded																
No.Birds							35	34					35			35