Brown-headed Cowbird: agent of extermination?

by Harold Mayfield

Hooded Warbler feeding a young cowbird. Photo by Alvin F. Saffran.

WHEN A BEGINNING birdwatcher finds a cowbird egg or large voracious young in the nest of a small songbird, he invariably reacts with indignation, if not with violence. But the more sophisticated naturalist reassures himself, pointing out that there should be no cause for alarm, that nature’s ways are sometimes incertaint but these birds would not be here if they couldn’t live together.

The prevailing mood among naturalists is that wild creatures are usually secure among themselves. The obvious dangers are often inconsequential, and apparent enemies may actually be friends in disguise. This sense of dynamic equilibrium is embodied in the familiar phrase “balance of nature.” Also serious students of biology have acquired a deep distrust of sentimentality, and the prevailing view may have an element of backlash against maudlin superficiality.

The customary reassurances have much truth in them. But they are not the whole truth. Relationships in nature are often complex — sometimes so complex we do not claim to understand them fully — but everything is not going well with every living creature. In nature there are losers as well as winners. At any moment we are likely to be looking at a select group of survivors. What about those that fell by the wayside?

Extinction also is a reality of nature. Naturalists are acutely aware of the intrusion of man, and these are often so gross as to make us forgetful of changing stresses buried deeper in the fabric of nature. Change is inevitable, some changes are abrupt and dramatic. Those wrought by man are almost instantaneous in nature’s scale of time, but so are those caused
in natural cataclysms — volcanoes, forest fires, hurricanes. Others proceed by almost imperceptible slowness — climatic shifts, the advance and retreat of glaciers, rising and falling of ocean levels, movements of the earth's crust, and adaptations evolution in plants and animals. All of these shifts, fast or slow, upset old equilibriums and bring new gains with new winners and new losers. One paleontologist says no animal species has lived completely in the same geological period. Every species has evolved into another or it has died.

The scientist knows about dinosaurs. He knows they flourished in a different climate from that of today. Presumably they could not cope with the changing of their environment. But the exact mechanisms that forced them out are not known. Perhaps their species, like man's, has a fixed supply, but also perhaps they were too slow in adapting to the up-and-coming mass of mammals. Man had nothing to do with it. He wasn't there.

How the cowbird operates

The cowbird is unique among "predatory" agents in America. It is a social parasite, building no nest of its own but using the nests of other birds, usually smaller species, for the deposit of eggs, their incubation, and the care of its young. Many hosts are unaware they have a stranger in their midst, and they rear the cowbird as their own until it achieves independence and joins its own kind.

The host suffers at every stage of this process. First, the cowbird removes about as many eggs from nests as it lays, usually leaving the total, number size unchanged. This tends to mask the story of the new egg and to keep the host from abandoning the nest as might be its normal reaction. These acts normally take place during the host's several days of egg-sitting, when the nest is least threatened near all the time.

Next, the host suffers from reduced hatching success of its own eggs. Where the cowbird egg is larger, it has more than its share of the heat from the breast of the host; and where the cowbird egg hatches first, as it usually does, the host tends to start incubating even though its own eggs are still unhatched.

Finally, the cowbird nestling, arriving first and being larger than the host nestling, when they appear, tramples them and remains more than its share of the food brought by adults. The cowbird hatches after about twelve days of incubation and thus gets one to four days' head start over most nestlings. Hence the young warbler weighing less than two grams often arrives in a nest already occupied by a cowbird weighing more than ten grams. In this unequal struggle, the warbler often does not last through the first day.

Damage done by the cowbird

The harm to the nest invaded is undeniable, but the ultimate harm to the host species may be negligible. If only a few nests are bothered, the losses may be easily supported by the reproductive capacity of the species. Some birds are much less injured than others. Large birds suffer less than small ones. Some birds have effective defenses. The classic defense is desertion of the nest; many, particularly the ground-nesting sparrows that have had long experience with the cowbird in the Midwest, usually abandon a nest when an egg is removed or added by any other agent. Then they nest in another location, repeating this again and again if necessary, until unmolested. The Yellow Warbler is famous for a variant of desertion; it sometimes builds a new floor over a clutch containing a foreign egg, and lays a new set in the same cup. The
Gray Catbird, whose deep-green egg contrasts sharply with the pale speckled egg of the cowbird, promptly throws out the offending object.

If a host species has no adequate defense of its own, the harm it suffers depends on the number of cowbirds present. The more cowbirds, the more nests that will be entered, and the more nests that will receive two or more eggs each. This last factor is particularly significant, because one cowbird nestling may do only moderate damage while two cowbird nestlings may be fatal to all other young in the nest. So the harm rises more sharply than does the density of the cowbirds.

With one host or with a group of receptive hosts in an area, the probability that a nest will get cowbird attention and the probability it will get one, two, three, or more cowbird eggs can be predicted from just two facts: the number of cowbird eggs laid and the number of nests available. The cowbird distributes its eggs with the impartiality of a roulette wheel.

In her classic study of the Song Sparrow in Ohio, Margaret Nice found, with less than half

its nests parasitized, the sparrows suffered about 50 per cent loss of production of young, but her amount is less than the fact that the samples are somewhat more heavily parasitized than others reported. The damage from each cowbird egg was higher in the nests studied by Erwin E. Klaas in Illinois. He found that one cowbird egg crowded the other occupants of the nest since it hatches about three or four days ahead of the phoebe. Yet the phoebe keeps its progeny alive through the winter, raising two clutches, the second coming late enough to escape most of the cowbird interference. With about one-fourth of all phoebe nests entered, the total loss to the phoebe was nearly one-fourth of their potential yield.

On the other hand, in the Kirtland's Warbler's territory, the cowbirds caused 40 per cent loss with 15 per cent of nests parasitized for many years, and many years ago expressed concern about the warbler's ability to sustain this. A 40 per cent loss might not seem prohibitive since 90 per cent of young are destined to be lost in the first year of life. But it becomes ominous when it comes from a single unmitigated cause at the union, and all the usual causes of death are superimposed upon it. It is hard to find other examples in nature where so large a threat is taken regularly by one agent.

The cowbird's insidious effect

But worse was to come. My analysis revealed conditions mainly in the 1940s and 1950s, it is now that the cowbird population has increased, and consequently, the cowbird's effect on the Kirtland's Warbler has increased as well. In the 1940s and 1950s, the Kirtland's Warbler's population was significantly lower than it is now, and the cowbird's effect on the warbler was not as significant. However, as the cowbird population has increased, so has its effect on the Kirtland's Warbler.

In fact, the cowbird's effect on the Kirtland's Warbler is so significant that it is estimated that the cowbird is responsible for the decline of the Kirtland's Warbler. The cowbird's insidious effect is a result of its ability to parasitize the nests of the Kirtland's Warbler. When the cowbird parasitizes a nest, it lays its egg in the nest of the Kirtland's Warbler, and the young cowbird takes over the resources of the warbler's nest, preventing the warbler's young from hatching and growing.

The cowbird's effect on the Kirtland's Warbler is particularly insidious because it is unrelenting. Even though the Kirtland's Warbler is a long-lived bird, it can endure many years like this one. The cowbird's effect on a vulnerable host is particularly insidious because it is unrelenting even though the host may be vanishing. Many natural hazards ease up when the threatened creature becomes scarce. Competition within species for food, shelter, and space relaxes when the population declines. Similarly, the classic pattern of predation is density dependent; that is, predators concentrate on a certain prey when it is abundant and turn elsewhere when it becomes scarce. Every trout fisherman knows this fact when he selects his lure to match the kind of food the trout are seeking that day.

The cowbird is not deterred by the scarcity of one host. It may be dependent on the totality of its hosts, but it is not steered away from the rarest of them. The very last nest of a vanishing species is just as likely to be used as one among many.

In the early 1940s, I helped in a Breeding Bird Census on the best of Kirtland's Warbler habitat. We censused the same tract thoroughly in three consecutive years. Here Kirtland's Warblers comprised just 10 per cent of the potential cowbird hosts, and the number of female cowbirds approximately matched the numbers of pairs of warblers. These would be sufficient to provide eggs for all the available Kirtland's nests at least twice times over. A cowbird female lays twelve eggs per season, a very conservative estimate. So obviously the cowbird is visiting many other kinds of nests.

In any cowbird's specialization on one nest, as the European Cuckoo does, we have not discovered it. A female cowbird trying to lay all her eggs in Kirtland's Warbler nests would surely have an impossible task keeping a large enough area under surveillance to find enough nests at the right stage at the right time.

Recent surveys of the cowbird

In 1966, the small mammalian population was reduced in the area. This was due to the presence of a rattlesnake. The cowbird population has not increased in the area. The cowbird's effect on the Kirtland's Warbler has not decreased in the area.

Originally the cowbird was native to the grasslands of the midcontinent. There it followed the bison and other grazing animals, eating the insects stirred up in their wake. It preferred nesting season hot coniferous or deciduous stands of complete open plains, but regions where trees rose above the grasses and provided elevated perches. The human settler created exactly these conditions. He made openings in the forest and he planted trees in the plains. His livestock took the place of the bison, and the bird got its name from its habit of frequenting cowpens.

The cowbird seems to have been missing from eastern North America since the colonists arrived. It was not listed in the definitive tenth edition of Linnaeus' "Systema Naturae" in 1758, although the other common blackbirds, the Red-wing and Common Grackle, were included. Peter Kalm, who visited New York, Pennsylvania, and Ontario in 1747-50, gave a detailed account of mixed flocks of blackbirds in grain fields, but did not mention the cowbird.

Already much of the eastern seaboard had been under cultivation for a century, and even earlier there had been extensive clearings in the

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cattle range throughout the 1700s. Herds beat wide paths through the tall grasses of the valley floors, and the herdsmen improved the grazing with fire and ax. Gateways through the forest were first opened in the southern Appalachians.

Mark Catesby met a “cowpen bird” between 1722 and 1725 in the Carolinas, but the fact that he pictured a female rather than the more striking male and the fact that no one else mentioned it for many years thereafter suggests it was just beginning to cross the mountains. However, by 1790, it was common as far north as Pennsylvania and New York. Heavily forested states west of the mountains, Ohio and Michigan, did not get cowbirds until about 1850, and the bird did not reach the pine-nut woods of northern Michigan until about 1880; after the regions to the south had been cleared and the northwoods had been opened by the lumberman and the marginal farmer who supplied him with hay and vegetables.

The early progress of the cowbird into the East has been chronicled only by scattered milestones, but the creeping advance of the bird is now being followed minutely. It is probably encouraged both by changed land use and the shifting outward of the cowbird’s own population explosion. Throughout the last century observers in nearly every part of the Northeast — Ontario, Quebec, northern Michigan and western Pennsylvania — have commented on the “recent increase” of the cowbird in their areas.

eastern forest — variously called “meadows,” “prairies,” and “swains” — maintained by flooding or by fires set deliberately by the Indians. Some of this land was doubtless suitable to the cowbird, but a continuous pitch had not yet been opened for the bird from its heartland. This was probably provided first by the herdsmen who preceded the farmers in the tide of Europeans westward. In the occupation of America, the hunters, trappers, and traders came first and left their mark in trading posts. Next came the herdsmen who are almost forgotten by history because they left so few traces. Moving far ahead of the permanent settlers, they wandered the free range and produced the only crop that could walk itself to market from the far frontier.

The free range in Virginia in the late 1600s lay at the outskirts of the tidewater communities. Soon it was on the Piedmont, and by 1750 officers of Braddock’s army noted the “cowpen men” beyond the Cumberland gap. Shortly thereafter, droves of swine, sheep, and cattle were moving through Kentucky. The southern Appalachians remained largely free

If Kirtland’s Warblers were unprotected

WHAT HAS BEEN the effect of the cowbird in new regions it has entered?

Again the best evidence is available for the Kirtland’s Warbler. Between 1961 and 1971 the entire population of this bird declined from about 500 pairs to 700 pairs — a 60 per cent drop. A dangerously low production of young in this period had already been noted, and the cowbird had been identified as the principal culprit. This diagnosis was confirmed in 1972 and thereafter, when control of cowbirds was instituted and the warbler responded by producing more fledglings per pair than ever before reported for a member of this family. When protected from cowbirds, the Kirtland’s Warbler has produced more than four young per pair of adults each year. This laid to rest any doubts about the fecundity of the nesting birds.

Walkinshaw’s recent studies of protected nests indicate that the previous damage from cowbirds was even greater than we thought. Protected warblers lay more eggs, produce
more second broods, and bring off more young that pairs supposedly unmolested in previous years. We had assumed that a nest without cowbird eggs was untouched, but now we know the cowbird removes some eggs from nests; it does not use subsequently. Also we suspect that warblers rearing cowbirds are less likely to nest a second time in the season, perhaps, because of the prolonged burden of rearing more precarious fledglings.

It is rare for men to witness the vanishing of a species at close range. Usually the realization comes only after the event. But here it almost happened. How close it was is shown by a protection from observer present during the event and observed present mortality between nest and seasons. These calculations lead to the initial conclusion that the present population of Kirkland's Warbler would be down to about 20 pairs now and at nearly 200 in the production of young had not been diminished through predation.

What other birds are prime targets?

WE HAVE NO conclusive evidence of many damage to other species by the cowbird, but there is enough circumstantial evidence to warn us. When predation occurs the exact facts are usually unclear and the reasons unknown. Some kind of normal change can usually be found in those days before. It is often assumed that the cowbird are a prime agent of death, but this could not be proved unless someone were doing an intensive, long-range study of the nest at a crucial time. The facts are obscure and there are few observed by people who remove cowbird eggs from nests they find.

Local damage can be ignored if the losses are made up each year by recruitment from other areas where the same species is highly successful. An example was provided in a study of the Red-eyed Vireo in northern Michigan by William E. Southern. He studied the vireo over a three-year period at the University of Michigan Biological Station on Douglas Lake. Out of 104 nests, 75 (72%) received one or more cowbird eggs. These vireos fledged less than one young per pair per year. This is not enough to sustain the population in the face of any reasonable estimate of mortality for a small migratory bird. Southern concluded the vireo was the prime target of cowbirds there, and said, “The cowbird plays a critical role in the nesting success of the Red-eyed Vireo in the Douglas Lake region.” But he was saved from undue alarm because there were plenty of vireos each year nevertheless.

This circumstance is readily explained by the undisturbed production of vireos elsewhere. Less than 300 miles away at almost the same latitude but in northern Ontario, Louise d'Iberville Lawson had just completed a study of the Red-eyed Vireo and found no cowbird eggs at all in the nests. Her region is not broken wilderness, but the approaches south of it are more heavily forested than Michigan, and the cowbird, although present, was scarce. From areas like this we would expect surprises that could replenish localities where the bird is suffering real damage.

How much pressure from the cowbird can a small host stand? Obviously this will vary in species, and any answer at present would be speculative. The most vulnerable boundary would be those already stressed by marginal habitat and barely holding on. Here a small increase in mortality at the nest could tip the scales. Populations of small birds that normally cling on even without a clear event are likely to be deteriorating, and these might include particularly some of the warblers, vireos, and flycatchers in our open woodlands. For some of these it would become unhealthy if the rate of parasitism were above 50 per cent.

Yet I would not want to offer any one figure. For each situation there is probably an absolute maximum above which the status of the population deteriorates rapidly. At 50 per cent of nests parasitized, I believe the Kirkland’s Warbler was close to the brink. But at a similar rate, the Ovenbird in southern Michigan was not in danger in the opinion of Harry W. Hamm, who studied that bird. Yet these, the Kirkland’s and the Ovenbird, are among the least of the warblers, and we would expect smaller members of the family to suffer more damage at the same rates of parasitism.

Indeed, something is happening in many small birds around us. In my area on northwestern Ohio the Yellow-throated Warbler nests fairly commonly along the larger streams among the swamps and cottonwoods (remember the Swea more Warbler?) until about 1900. I have always been intrigued by the disappearance of this warbler, because of all the forest types in this area, the least disturbed has been that of the fowl pasture and stream banks, where the swamp and cottonwood still grow to their greatest size. Also I have read with interest that the Cerulean Warbler was the most abundant member of this family next to the Yellow Warbler before the turn of the century. And I remember groups of Cerulean Warblers in areas of the county parks 25 years ago from which they have vanished today. Why? The glib answer is “lack of habitat,” but one would be hard put to describe major changes in wilderness parks. Perhaps a general reduction in woodland elsewhere must be considered. But I am also suggesting the cowbird.
be considered. It was on the scene of the crime and increasing steadily in the same period.

In Northwestern Ohio, Louis W. Campell has kept meticulous records of birds in the area for more than 50 years. He has taken a particular interest in the birds of the Oak Openings Park, a tract of more than 4000 acres, where there has been no cutting, draining, or burning, although inevitable changes have occurred through the maturing of the forest and the encroachment of trees into open spaces. He has recorded consistent and severe declines in a number of species that nested here regularly in some numbers forty or fifty years ago. These include the Yellow-throated and Warning Vireos and the following warblers: Black-and-white, Golden-winged, Cerulean, Common Yellowthroat, Yellow-breasted Chat, and American Redstart. In speculating about declines in this varied group, he wondered if the local changes were a part of a continental deterioration in conditions resulting from pesticides, herbicides, and a myriad of human disturbances.

I point out that an agency capable of damaging such birds was present and increasing in the same period of time.

Other birds that might be vulnerable are the small flycatchers, particularly the Traill’s and Acadian. Walkinshaw’s studies in Michigan showed that the entire clutches of these species are wiped out by the presence of one cowbird egg. In his sample the parasitism rate for the Acadian was 24 per cent and the loss rate about the same. This is damage the bird may be able to survive, but losses much higher than this would be alarming.

It may be that I take too gloomy a view of the cowbird effects — except in the case of the Kirland’s Warbler where the proof is conclusive. It may be that other species have defenses that we do not yet appreciate or there are limitations on cowbird density that prevent it from exceeding critical numbers almost everywhere. But lacking such assurance, I cannot escape the conclusion that the cowbird in some places can become a menace to some small nesting songbirds.