

# Winging It

*The female cowbird performs  
as a silent  
singing teacher*

By CAROL ERON

Usually, when birds sing to each other, both teacher and student participate, making it difficult for observers to determine who is doing what. Now evidence of a teaching role by the female in song development comes from studies of that odd couple, the male and female cowbird.

Like most songbirds, he does all the singing and she does none — an observation that led scientists to believe the males learned their courtship songs from other males. The discovery of a female role took researchers Meredith J. West and Andrew P. King by surprise. For 15 years, West and King have raised and studied cowbirds, a classic species for nature-nurture studies because cowbirds are raised by birds of other species, owing to the female's habit of laying her eggs in other birds' nests. But only recently did King and West discover the relationship between the listener and the song.

Unlike some researchers, West and King do not raise birds in isolation, because such birds quickly become "socially pathological," West says. Therefore, in order to raise acoustically deprived birds for studies of learning capacity, they paired young male cowbirds from North Carolina with songless female cowbirds from Texas. Yet the North Carolina cowbirds learned the distinctly different songs of Texas cowbirds.

"These males had completely overhauled their repertoires," West told SCIENCE NEWS, recalling the original work. "That didn't make any sense. But it got us onto the females."

West and King realized that in some silent, unknown way, the female must teach the male which songs to sing. To discover the female's role, they captured young, wild males — just out of the nest and thus with little if any song experience — and paired them with females. Then they played a standard repertoire of cowbird songs to them for three months, during autumn, so the males would learn the songs. West, a psychologist at the University of North Carolina in Chapel Hill, and her husband, King, a psychologist at Duke University in Durham, N.C., had previously shown that these songs elicited copulatory behavior in females during the breeding season.

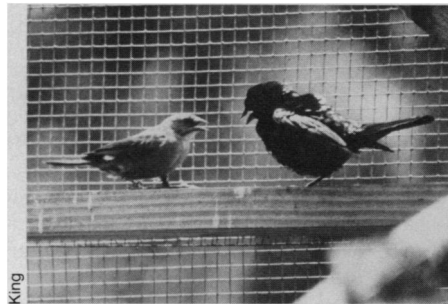
Then, in early spring, King and West made synchronized audio and video recordings of the males singing — to identify the song types in their final repertoire. In 88 hours during March and early April,

they recorded more than 18,000 songs among eight pairs of cowbirds. The taping continued into May, when the birds came into breeding condition. Next, West and King analyzed the tapes to determine the frequency of every song and the females' reactions. Most of the songs — 94 percent — seemed to leave the females indifferent. "I mainly felt sorry for the poor males, who were trying so hard to please," West says.

But when the females did respond, the researchers witnessed a "striking display" — a flashing wing stroke, up and away from the body. The wing stroke takes only a few milliseconds during the male's 1-second song. "It was called to our attention by the alert behavior of the males, who frequently interrupted the pace of their singing after a wing stroke to approach and inspect the subsequent behavior of the female," she and King explained in a letter in the July 21 NATURE.

In the second part of their study, a year after discovering the females' wing stroke behavior, they played back five songs to which the females had wing-stroked, plus those that preceded and followed the five songs, to six females from the first experiment. They also included two additional females that had been housed with males under the same conditions as the birds in the first experiment. In every case, the wing-stroke songs drew the greatest response from the females. The researchers also examined the males' song sequences and found that while they sang four to seven different song types before the wing-stroke song, afterward they sang no new song types (in four of five cases) and they sang the "hit song" much more often.

The cowbirds' hit song, which lasts about a second, is often transcribed as *burble burble tse* or *glug glug tse*. The first part of the song, as West describes it, has a "very liquid quality, almost as if the bird had water in its mouth, and the last part is a whistle, a very pure tone." Each male comes up with his own distinctive version of this basic song and about five subtle variations. Although some people dislike the cowbirds' songs, West finds the "liquid syllables" very attractive, and agrees with Crawford H. Greenewalt, author of *Bird Song: Acoustics and Physiology* (Smithsonian, 1969), that the cowbird is the "undisputed winner in the avian decathlon of vocalization." The song is "incredible in terms of the articu-



A male cowbird (right) bows and sings his love song to an attentive female.

lation necessary to produce it," she says, noting that a cowbird can modulate from 500 hertz to 12,000 — nearly four octaves — in 1 second to build its contrapuntal harmonies.

The experiments have created a controversy because they represent the first evidence of a female tutorial role in song development, according to West and King, and because they demonstrate the role of visual stimulation in song learning — "a process that has until now been assumed to be affected only by auditory information."

The approving wing stroke is also a rare example of positive social behavior among animals. "There are lots of examples of aggressive, punitive behavior in animals," West says. "But outside of parental behavior we don't have many examples of approval, except in primates — the kind of approval humans give by, say, a pat on the back or a smile."

Among the implications for human learning, West sees a parallel between the female cowbird's tutorial role and human babies teaching adults how to communicate with them. In a study of infants that is now nearing completion, West finds that 6-month-olds pay most attention (judged by videotaped eye movements) to the soft, melodious talk she calls "motherese." In contrast, she finds that 18-month-olds pay most attention to "teaching talk." The children under study, including a group of 1-year-olds, pay least attention to adult talk. Thus, babies "teach us how to talk to them," West says. "I think babies teach us as the female cowbird teaches the male, by nonverbal means."

Communication using several senses can be important for impaired children, according to D. Kimbrough Oller of the University of Miami in Coral Gables, Fla.,

# YANGTZE

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who says the work of West and King "offers us a new interpretation for our work on human infants. It supports the idea that a completely deaf child can make it through the early stages of speech development with encouragement." Specifically, totally deaf children with no residual hearing may be "shaped" in making sounds they never heard, Oller told SCIENCE NEWS, just as the female cowbird shapes the male in singing songs it has never heard.

From an evolutionary perspective, the finding that female cowbirds can shape the songs of males is an example of "female selection being a factor in the evolution of male traits," suggests Myron C. Baker, a behavioral ecologist at Colorado State University in Fort Collins. In other words, if females choose males with certain traits, those traits may become more prevalent in the population.

West expresses the idea slightly differently. This intricate teaching role, she says, "is probably the female's way of screening a good mate. The females need ways to find males with the best genes or those that are most 'socially fit.'" By homogenizing the songs of her suitors, she enhances her chances of being able to compare them. But males play an important part too, West adds, in that it takes more than a good teacher for learning to take place; the student must be receptive "and astute enough to respond." □

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