

Music without Borders

When birds trill and whales woo-oo, we call it singing. Are we serious?

By SUSAN MILIUS



The yellow warbler, other song birds, and whales are among the few vertebrates known to learn songs. A few others, such as gibbons, inherit their distinctive tunes.

Luis Baptista—presumably—is not making this up. Especially not in a symposium at the annual meeting of the American Association for the Advancement of Science.

Still, the overflow crowd bursts out in giddy, slightly incredulous laughter.

Baptista, curator of ornithology and mammalogy at the California Academy of Sciences in San Francisco, has played a tape including one of the most recognizable phrases in Western music: “Ba-ba-ba baaahm.” Baptista has primed his audience on what to listen for, but still a high-pitched version of the opening of Beethoven’s Fifth Symphony rings out unmistakably.

Not. The notes come from a white-breasted wood wren in Mexico, Baptista tells the audience.

The bird and Beethoven sound astonishingly similar and represent one of the many convergences Baptista has found between music and birdsongs. At the February meeting in Washington, D.C., he described birds conforming to musical scales, improvising sonatas, even rewriting Mozart.

Common word choice tells the story, he argues. Frogs croak, dogs bark, wolves howl—but, Baptista notes, birds “sing.” Such a happy overlap with music holds great promise for introducing people to the marvels of species diversity, Baptista urges.

Other researchers wring more significance from the convergences. Pioneering animal communications researcher Peter Marler of the University of California, Davis holds that for insights into the origins of music, the vocal behavior of birds will prove to be as profitable to study as that of monkeys and apes.

This attention to animal music arises with growing interest in a broader area called biomusicology. Biologists are collaborating with musicologists to ask what music is and how it evolved. The mix has raised far more questions than it has answered, but it’s attracting new fans to composers with feathers, fur, and some really loud noises.

Think twice, though, before saying something crass like “animal noises” around pianist Patricia Gray of the National Musical Arts program. “We say ‘musical sounds,’” Gray responds firmly.

Gray, who lives in Greensboro, N.C., has formed a coalition of about a dozen scientists and musicians under the auspices of the National Academy of Sciences. Through concerts and seminars, this BioMusic Project is “exploring the musical sounds of all species,” she says.

So, does Gray accept a sparrow twitter as equivalent to her own keyboard artistry? “Why not?” she wants to know. “Why is it we go to other species with preconceptions of what our music means?”

Gray takes only the briefest pause before diving in to answer the blunt question, What is music?

When she was a college student, she recalls, composers were exploding conventions governing the sounds that could go into a musical piece. Compositions featured dissonances, fragments of speech, random noises, even John Cage’s 4 minutes, 33 seconds of silence. The silent piece, 4’33”, “was performed,” Gray says, dodging the question of whether she, too, thinks silence is music. Out of this meltdown of musical tradition, Gray emerged with a spare definition. “Music is sound and time,” she says. “Sound and time.”

Gray’s definition easily finds musicality in chirps, hoots, buzzes, and the myriad other acoustic phenomena of the living world. As a starting place for less liberal ears, however, she recommends avian music.

That works for music psychologist Diana Deutsch of the University of California, San Diego in La Jolla. She divides human sound communications into three loose groups: speech, music, and paralinguistic utterances such as laughs, screams, and groans. She likens the shrieks, yelps, and howls of many animals to that last category. However, “when we come to birdsong, with its elaborate hierarchical patterning, it seems that music provides a better analogy,” Deutsch says.

Marler agrees that the majority of animal sounds will turn out to be “entirely emotional,” although some communicate information about the outside world (SN: 9/12/98, p. 174). But he thinks that studies of whales and birds can contribute to the understanding of the origins of music.

Birds have earned the respect of some of the world’s greatest musicians, Baptista says.

Mozart selected a starling as a pet and musical companion. The bird was an excellent choice, Baptista explains. Starlings pass down musical traditions, older males to younger males and older females to younger females. These birds mimic skillfully and abundantly—frogs, goats, and whistling shepherds.

Baptista cites a study of 80 wild starlings in France that turned up 105 imitations of other species. For starlings, music brings rewards. Females favor males that sing longer, more com-

plex songs.

Mozart seems to have admired his avian companion's musical skills. One of his notebooks records a passage from the last movement of the Piano Concerto in G Major and the same passage as the starling revised it. The bird imitated it closely but changed the sharps to flats. "*Das war schön*"—That was beautiful!—reads the comment in Mozart's hand.

When the starling died, Mozart held graveside ceremonies, singing hymns and reciting a poem he'd written for the fallen songster. Baptista agrees with two other ornithologists who have argued that Mozart's next composition, an odd sextet for strings and two horns, known as "A Musical Joke," shows starling style. Mozart wrote it only 8 days after the death of his bird, and it includes such starlinglike bits as intertwined tunes, off-key recapitulations, and an abrupt ending.

Also, Baptista suggests new evidence for the starling's influence. He points out that starlings have the two-part syrinx, or voice organ, typical of songbirds and can belt out two songs at the same time. Baptista has even documented a starling simultaneously mimicking two birds—a grey fantail and a kelp gull—with the two sides of its syrinx. So, the final cadence of the sextet, essentially written in two keys played simultaneously, might honor the starling singing in two voices.

Mozart wasn't the only composer moved by birdsongs. Beethoven may have been such a fan that he plagiarized a motif from a contemporary feathered composer. Baptista plays the suspicious phrases, which form the lilting opening to the rondo of Beethoven's "Violin Concerto in D, Opus 61." A birder noted in 1953 that a European blackbird, a relative of U.S. robins, had come up with the same theme. Almost 30 years later, another sharp listener reported the same blackbird song. Both he and Baptista noted that generations of blackbirds seem to have preserved that tune, so perhaps it dated back to a time when Beethoven himself heard and borrowed it.

At least some of the enthusiasm for bird music comes from the sounds themselves, which lie so close to counterparts in the music of people. From ornithology recordings, Baptista conjures much of an orchestra. For oboe, for example, he selects the Australian diamond firetail finch, and for flute, he picks the long whistles of the white-bellied green imperial pigeon and the descending run of short notes uttered by the strawberry finch. He elects as bassoonist the common potoo, with a call that reminds him of the beginning of Mozart's clarinet quintet, albeit slightly off-key. He even finds an avian tuba: a western crowned pigeon of New Guinea booming out its courtship song.

Ornithologists have noted birdsongs pitched to the same musical scales used by people, Baptista points out. Wood thrushes can conform to the familiar Western diatonic scale; canyon wrens come close to the more complex chromatic scale, and hermit thrushes sing with the pentatonic scale of traditional Asian music.

Baptista can also summon from birds the rhythm and volume modulations that human composers employ: an accelerando in the wood warbler's windup, a swelling crescendo from the Heuglin's robin-chat, a fading diminuendo from the Swainson's thrush, and so on. Such musical phenomena as the borrowing of melodies, singing in duets or duels, and passing down traditions through families from generation to generation also show up in birds, Baptista reports.

Some species even compose in sonata form. A song sparrow, for example, belts out one of its themes, equivalent to a sonata's opening exposition, then fiddles with it a bit here and there much the way a nonfeathered composer develops a theme. The sparrow eventually burles the original theme again, a version of a sonata's final recapitulation.

The similarity between bird and human sonatas is more than coincidence, Baptista argues. He recalls midcentury American aesthetician Charles Hartshorne proposing, "What stimulates animal organisms is change; what deadens response is sameness." This maxim governs people, too, Baptista says, and a composer's variations on a theme catch the attention through novelty.

However, unrelieved novelty eventually exhausts the perceiver, and a reference to the familiar relieves the fatigue. Birds and people share these reactions, Baptista argues, so he's not surprised that they also share composition strategies.

Humpback whales, too, are "inveterate composers," says Roger Payne of the Ocean Alliance in Lincoln, Mass., after 3 decades of oceanic listening. The most musicianlike of the whales, male humpbacks sing while cruising around their summer breeding grounds or migrating. The loud, wavering songs string together several repeated phrases or themes, and one whale's session of song after song can stretch more than 24 hours.

Males change their songs as the months pass. All the males in the same ocean sing basically the same tunes, even though the current hit takes some time to travel. "There seems to be no limit to what they can come up with. It's just that they get there by modifying existing sounds rather than by creating them *de novo*, as is our habit," Payne observes.

Whatever the process, humpbacks sing in patterns that Payne calls "strikingly similar" to human musical traditions. He detects rhythms, phrases that last just a few seconds, song lengths ranging between those of human ballads and symphonic movements, and percussive elements as an occasional emphasis in longer strains of pure tones. Even though a whale can woo-oo over at least seven octaves, Payne finds that it combines notes that have wavelength relationships familiar to people's ears.

Most surprising, says Payne, is the discovery that humpbacks use rhymes. "When someone speaks in a language you don't understand, you still know when they are reciting poetry," he argues. Among whales, a particular sound repeats at relatively regular intervals.

These rhymes may be for whales just what moon, spoon, and June do for human crooners, suggest Linda Guinee and Katy Payne of Cornell University. For a long concert during breeding season, the rhymes may help the performer remember what comes next. When Guinee and Payne checked for rhymes in simple and elaborate humpback songs, the complex ones were much more likely to rhyme.

Although primates are closer to Pavarotti than a whale is, they aren't particularly musical, notes Thomas Geissmann of the Institute of Zoology in Hannover, Germany. In his work on evolution, he accepts as a song a string of notes, usually of more than one type, that form a recognizable pattern in time. Some 26, or 11 percent, of primate species sing by this definition, he reports in *The Origins of Music* (2000, N.L. Wallin *et al.*, eds., MIT Press). The chanteurs include some of the indris, tarsiers, titis, and gibbons. The behavior seems to have evolved independently four times within primates, he says.

Scientists who have focused their careers on animal communications vary widely in their opinions on the parallels between twitters and tunes.

Eugene Morton, an ornithologist at the Smithsonian Institution in Washington, D.C., and a BioMusic member, applauds the project's efforts to tout the marvels of birdsongs as markers of biodiversity. However, he turns almost stern at the question of whether those sounds are really songs dressed up in feathers.

"Any analogy to human music is not interesting to me," Morton says. "It doesn't explain anything about how the world is, except how humans want to perceive it. Good on 'em, but I want to understand animals."

From a bird's perspective, he argues, song is either "territorial defense or mate attraction, but in both cases it's very-long-distance communication." His 1992 book *Animal Talk* (Random House) expounds the idea that vocal traditions constitute an avian broadcasting network, letting birds minimize the arduous work of flying about during interactions.

"That's where I think it differs from human music," he says. "Human music isn't particularly distance related."

Entomologist Thomas Eisner of Cornell University likewise draws a distinction between enjoying animal sounds and saying that animals make music.

He remembers Payne bringing him the first recording of humpback whale sounds. "He insisted that we both have a glass of wine before we listened to it," Eisner recalls. "We went to the studio, we put on earphones, and I was sent into outer space."

As an accomplished keyboard player, Eisner says, "If a whale calls me up tomorrow and wants to do an evening of sonatas, I would be the first to volunteer."

Do the whales, however, perceive their sounds as sweet music? "It's an untestable question in scientific terms," he says. "The sense of inner tranquility that I personally get out of listening to the Goldberg Variations I can't test for. I can't even test for it in another human being."

Nonetheless, lobster specialist Jelle Atema of Boston University, who has played flute to Eisner's accompaniment, acknowledges some similarities between human music and animal utterances. "Birds, too, learn their songs and use them to be known and attractive in their social environment," Atema explains. "Males sing. Other males hate them for it and try to sing louder, better, longer to impress the other sex."

"I bet that the effects of all these vocalizations are measurable in hormonal responses that alter the behavior of the listener," Atema says. "And here we may be similar to animals. Galina Vishnevskaya need only sing one note, and she pierces my heart."

Psychologist Carol Krumhansl of Cornell University suggests looking for similarities in perceptions of sound sequences. Her work with music, such as the strings of syllables known as yoiks in Finland, has suggested regularities in the way people learn what to expect next in a melody. She raises the question of whether other species have similar expectations.

In the end, speculating about animal sounds and their effects may tell us mostly about ourselves, says Atema. "All we can do scientifically is to measure our noises, catalog them, analyze their components and structure, and then do the same for animal noises," he says. "Splitters' will then decide that humans are demonstrably different from animals and thus animals do not have music. 'Lumpers' will see many similarities and conclude from the same data that we all have a lot of music in common."

In all the theorizing over the nature of music, Baptista urges listeners to remember the plight of the musicians. A quail species that Beethoven, Schubert, and Haydn all echoed in their compositions has disappeared in parts of Europe, he laments. The Socorro mockingbirds, which sing in counterpoint, are losing habitat to sheep.

Beyond all the acoustical analysis, Baptista says, "part of the magic of a bird's song is found in the miracle of the bird itself." □