

## Björn Merker: neuroscientist/zoömusicologist



Björn Merker recording Siamangs (black gibbons) in Aceh, located on the northern tip of the island of Sumatra in Indonesia.

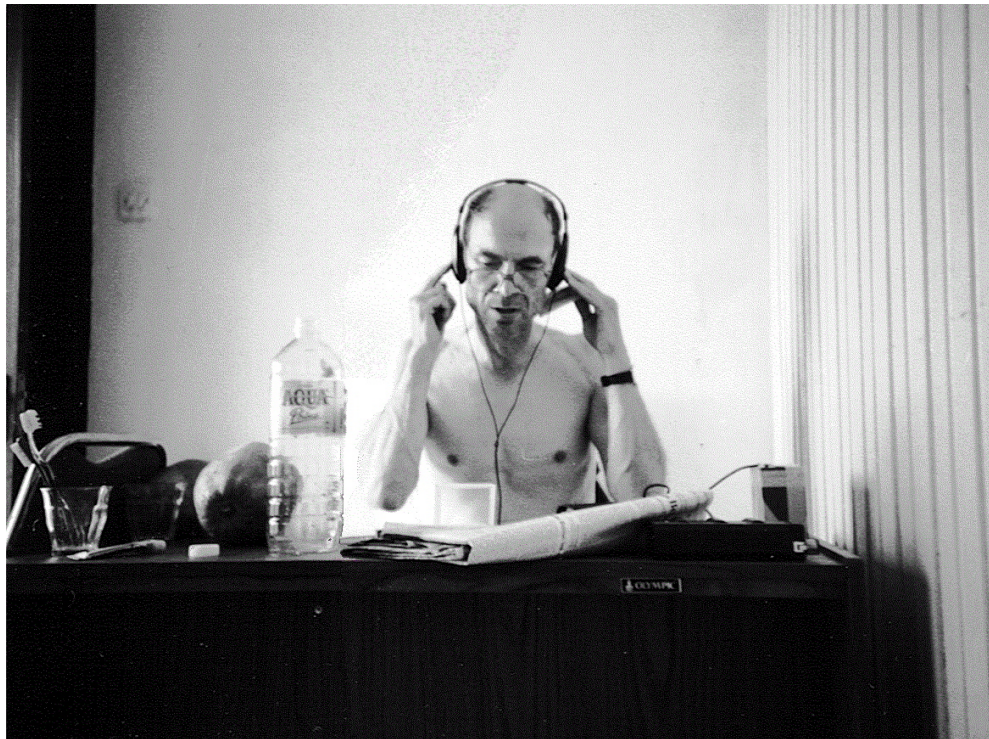
**Björn writes:** I am a neuroscientist by training, and first stumbled upon the notion that animal song might hold a key to crucial human capacities in Fernando Nottebohm's chapter in the Lenneberg and Lenneberg volume *Foundations of Language Development* of 1975. There he outlined the highly specialized mechanism of vocal learning possessed by those birds that learn their song and those that mimic other species. For most members of the animal kingdom, innate calls, which can be quite elaborately organized (as they are in gibbons, for example), suffice for all their diverse communicative needs. They can even be modified by learning in various ways without for that reason exemplifying the very special ability technically called vocal production learning. The latter is

added over and above a species' innate vocal capacities to allow its members to shape their vocal output to match with their voice auditory patterns they are exposed to by ear alone. This enables them to faithfully reproduce heard sound patterns vocally through a process that involves auditory feedback of the animal's own voice.

This capacity is also a crucial component of language learning in humans, since no one is born with the various complex sound combinations that make up the words and phrases of our language. We pick them up by ear from the speaking environment in the course of infancy and beyond. Today we know that humans are the only primate in possession of this specialized vocal learning ability called vocal production learning. There are a few mammals who possess it as well, singing cetaceans among them, but generally mammals, and all non-human primates, rely on innate calls alone even when they sing, as do gibbons.

This was not so clear when Nottebohm wrote his chapter for the Lenneberg book, and in passing he mentioned that the complex duet singing of Siamangs ought to be examined for evidence of vocal learning. I had never heard of singing apes, and was electrified. Irrespective of whether Siamang song would turn out to involve vocal learning or not (it does not), it struck me that singing members of the ape family (there are about a dozen species of gibbons, to which the Siamang belongs) might have something to tell us about the motivational and evolutionary underpinnings of human song and music.

This led me to study gibbon song in zoo environments (where they sing just like in the wild), and eventually to field trips to the rain forests of South-East Asia, the natural habitat of gibbons. Their elaborate song bouts are innate. In fact, as befits a higher primate, they sport some of the most elaborate innate call productions of the animal kingdom, but without the capacity for vocal production learning. Thus, no gibbon has ever pronounced a human word, nor imitated a cat, while I have heard mynah birds both imitate gibbon song (in the wild) and pronounce the Arabic greeting "As-Salaamu Alaykum" with such perfect diction that I spun around to reciprocate the greeting, only to find a bird in a cage to be my interlocutor.



Björn Merker in Aceh.

Thus, the case of vocal production learning teaches us an important lesson for the application of the comparative method to shed light on our own biological nature. To learn about our capacity for vocal production learning, crucial for both the songs we sing and the words we speak, we must go beyond the primates to birds, cetaceans, and other animals that possess it, to see what we can glean from their life circumstances about the kinds of selection pressures that equip animals with this comparatively rare behavioral capacity and the elaborate neural machinery that supports it.

An approach that limits the search space for evolutionary insight into human traits to other primates accords a privileged status to homology over analogy in evolutionary analysis, while the comparative method shown no preference for one over the other. We simply cannot count on finding every human characteristic of interest instantiated in other primates, as the case of vocal production learning plainly shows. So we must cast a wide net, and zoomusicology is part of that endeavor.

See audio extracts on “Zoömusicologists” page for Merker’s recording of a Kloss gibbon female great call circa February 1997, South Pagai Island, Mentawai Archipelago, west of Sumatra (a 24-hour sea journey in a fishing boat through

repeated tropical storms). The Kloss gibbon is endemic to Mentawai Archipelago, which was not connected to land even in the Ice Ages. The males sing before sunrise, while the females sing after sunrise. The singing is innate (not learned).



Björn Merker recording Siamangs in Aceh with a 90cm parabola.

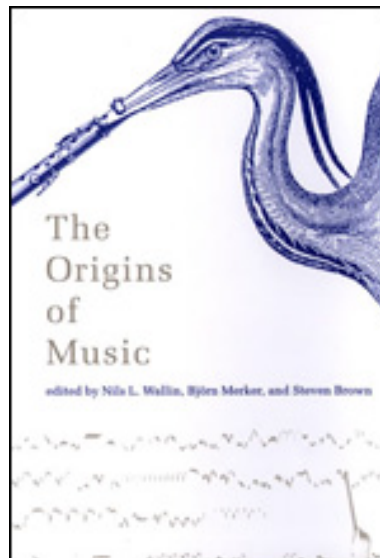
**Björn writes:** Some experiences etch themselves so sharply on our memory that they form islands of clarity in our recollection. For me such an occasion occurred one night many years ago in California, when sleeplessly I lay listening to the rapturous strains of a mockingbird singing from an invisible location high in one of the tall trees dotting the suburban neighborhood. I did not suffer from insomnia; it was the exquisite artistry of the singer that kept me awake. As I followed his intricately woven melodies I found myself drawn into an unexpected aesthetic environment: in order to follow the patterns that issued from his syrinx (the sound-producing part of the throat of birds), I had to draw on my experience of Indian Classical Music and jazz, because the bird had me convinced that I was being treated to an ad lib performance of the most breath-taking improvisational acrobatics. I groaned and I cheered as one improbable variation after another tumbled into my mind through the open window by

which I lay listening, and finally I fell asleep with thanks on my lips to the artist who had just entertained me with an unforgettable performance.

Today I know that the bird was not improvising in the sense of making things up on the spot. Rather he was drawing on a huge cycle of memorized songs numbering in the hundreds through which he worked his way, not necessarily consecutively, but by skipping and jumping. In the short run nothing repeats, hence the impression of a feat of extended improvisation. The point of my recollection is this: it was in musical terms that this bird's performance impressed me, and I do not mean metaphorically, in the sense in which we might speak of the sound of water and wind as music, but literally. To follow his melodic lines constituted a challenge of the kind I am confronted with in listening to demanding music, and the effort was esthetically rewarding in the same human, musical terms. I am of course not alone in having been thus impressed by avian song: not only modern composers such as François-Bernard Mâche, who coined the term *zoomusicology*, have drawn inspiration from and used bird song in their compositions: Mozart, for one, is said to have done so. Whence this connection? Is it only a matter of an idiosyncratic response akin to reverie triggered by an unusually elaborate twitter, or might there actually be a deeper connection between human music and animal song? Excerpted from: "Tuning in to a common beat," © BBC WILDLIFE Magazine, January 2000.



Björn Merker recording Siamangs in Aceh with handheld parabolas.



### **Selected Publications**

- Merker, Björn and Cathleen Cox. 1999. Development of the female great call in *Hylobates gabriellae*: A case study. *Folia Primatologica*, 70: 96-106.
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- Merker, Björn. 2006. "Layered constraints on the multiple creativities of music." In *Musical Creativity: Multidisciplinary Research in Theory and Practice*, eds. Irene Deliege and Geraint Wiggins. Hove, UK: Psychology Press. 25-41.
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