Apart from speech, the most remarkable vocalizations in the animal kingdom come from songbirds, and it turns out that speech shows evolutionary convergence with bird songs. The ancestors of both songbirds and human speakers made the standard emotional noises common to many species with lungs and a throat, forcing air through the windpipe like a bellows pushing air through an organ. But both speech and songs require more precise control than lungpower allows by itself.

In humans, the key vocal organ is the larynx, or voice box. It is part of the standard mammalian throat, but humans have many more muscles and nerves that enable precise shaping and timing of the sounds we make. Songbirds have an analogous organ called the syrinx, which is controlled by precise timing in the brain and delicate muscles that alter the pitch and loudness of the sound emerging from the bird (see the June 2010 issue of PLoS ONE for the article by Riede, Fisher, and Goller).

Like the sounds of a particular human language, birdsongs are learned. Most songbirds raised apart from their fellows will make songs, but they do not sound like other songs. Young birds must learn and practice their songs. Learning implies there are cultural influences along with genetic ones, leaving us to wonder if the lark that Juliet mentions to Romeo sounded the same as a modern-day lark. A bird of the American Northeast, the Chestnut-sided warbler (Dendroica pensylvanica), was studied in the wild for 19 years and found to show some change over time.

The male warblers sing a variety of songs (median six) that can be sorted into two types: Those that end with a loud burst are used to attract mates, whereas songs that appear in male-male conflict have no such burst. Songs used in mate attraction were virtually unchanged during 19 years, but the conflict songs changed steadily and rapidly (see the August 2010 issue of American Naturalist for the article by Byers, Belinsky, and Bentley). The difference seems to be that mate-attraction songs do best when they allow for no ambiguity or uncertainty as to species and readiness to mate, whereas conflict songs are not so critical to survival and seem to drift without much governance. However, they do not drift so far that they change song category, suggesting there are constraints that keep song functions distinct. It is always clear whether a singing warbler is looking for a female or for a fight.

Perhaps most astonishing is the similarity in the way birds and humans learn to make their sounds. Behaviorally, birds learn to sing by listening to older birds of the same species and repeating what they hear. At first their imitations are poor, but with repeated practice their skills improve until they sound like other members of their species. This process implies that birds are able to remember what the song should sound like and compare their own output with that memory. A similar process is observed in humans as their children come closer to making adult speech sounds.

Human speech–motor control has been shown to depend on the FOXP2 gene, a highly conserved gene common to much of the vertebrate world. It appears to have mutated twice in the past 6 million (or so) years since our last common ancestor with chimpanzees, whereas in the preceding 70 million years the gene underwent (at most) one mutation. So imagine the world’s surprise when it was found that birdsong also rests on FOXP2. It appears to be crucial to building a circuit in the bird brain that is central to song learning (see the November 2010 issue of Nature Reviews Neuroscience for the article by Bolhuis, Okanoya, and Scharff).

The primary difference between speech and birdsong is that speech has function and meaning, whereas birdsongs have function alone. Thus, bird brains have a number of specialized areas devoted to song alone, but speech production is tangled with the sensorimotor neurons that point attention to different meanings. Even so, both birds and humans have brain areas specialized for learning to make the sounds. When humans started talking, their ape ancestry had little to contribute beyond a general intelligence. Homo did better by converging with songbird tricks.

Edmund Blair Bolles ([www.babelsdawn.com](http://www.babelsdawn.com)) is a freelance writer whose book, Babel’s Dawn: A Natural History of the Origins of Speech (Counterpoint Press, forthcoming), will be published in the fall.

doi:10.1525/bio.2011.61.3.15