

## BIRD VOCALISATION

The avian vocal organ is called the syrinx; it is a bony structure at the bottom of the trachea (unlike the larynx at the top of the mammalian trachea). The syrinx and sometimes a surrounding air sac resonate to sound waves that are made by membranes past which the bird forces air. The bird controls the pitch by changing the tension on the membranes and controls both pitch and volume by changing the force of exhalation. It can control the two sides of the trachea independently, which is how some species can produce two notes at once.

The distinction between songs and calls is based upon complexity, length, and context. Songs are longer and more complex and are associated with courtship and mating, while calls tend to serve such functions as alarms or keeping members of a flock in contact.

Most song is emitted by male rather than female birds. Song is usually delivered from prominent perches although some species may sing when flying. Some groups are nearly voiceless, producing only percussive and rhythmic sounds, such as the storks, which clatter their bills. In some South American Manakins the males have evolved several mechanisms for mechanical sound production, including wing stridulation not unlike that found in some insects.

Scientists hypothesise that bird song has evolved through sexual selection, and experiments suggest that the quality of bird song may be a good indicator of fitness. Experiments also suggest that parasites and diseases may directly affect song characteristics such as song rate, which thereby act as reliable indicators of health. The song repertoire also appears to indicate fitness in some species. The ability of male birds to hold and advertise territories using song also demonstrates their fitness.

Communication through bird calls can be between individuals of the same species or even across species. Birds communicate alarm through vocalisations and movements that are specific to the threat, and bird alarms can be understood by other animal species, including other birds, in order to identify and protect against the specific threat. Mobbing calls are used to recruit individuals in an area where an Owl or other predator may be present. These calls are characterized by wide frequency spectra, sharp onset and termination, and repetitiveness which are common across species and are believed to be helpful to other potential "mobbers" by being easy to locate. The alarm calls of most species, on the other hand, are characteristically high-pitched making the caller difficult to locate.

Many birds engage in duet calls. In some cases the duets are so perfectly timed as to appear almost as one call. This kind of calling is termed

antiphonal duetting. Such duetting is noted in a wide range of families including Quail, Bushshrikes, Babblers such as the Scimitar Babblers, some Owls and Parrots. In territorial songbirds, birds are more likely to counter-sing when they have been aroused by simulated intrusion into their territory.

Individual birds may be sensitive enough to identify each other through their calls. Many birds that nest in colonies can locate their chicks by their calls. Calls are sometimes distinctive enough for individual identification even by human ecological researchers.

Some birds are excellent vocal mimics. In some tropical species, mimics such as the Drongos may have a role in the formation of mixed-species foraging flocks. Vocal mimicry can include other species or even man-made sounds. Many hypotheses have been made on the functions of vocal mimicry, including suggestions that they may be involved in sexual selection by acting as an indicator of fitness and protect against predation, but strong support is lacking for any function. Many birds, and especially those that nest in cavities, are known to produce a snake-like hissing sound that may help deter predators at close range.

Some cave-dwelling species, including Oilbird and Swiftlets, use audible sound to echolocate in the darkness of caves.

The language of the birds has long been a topic for anecdote and speculation. That calls have meanings that are interpreted by their listeners has been well demonstrated. Domestic chickens have distinctive alarm calls for aerial and ground predators, and they respond to these alarm calls appropriately. However a language has, in addition to words, structures and rules. Studies to demonstrate the existence of language have been difficult due to the range of possible interpretations. Research on Parrots by Irene Pepperberg is claimed to demonstrate the innate ability for grammatical structures, including the existence of concepts such as nouns, adjectives and verbs. Studies on Starling vocalisations have also suggested that they may have self-similar repeating structures.

Bird vocalisation has been divided into five different classes, sometimes called "voices," each of which communicates different information. Song has already been discussed above. Companion calling is a short vocalization made between mates, parent and young, or members of a flock to maintain contact when out of visual range. Juvenile begging is a strident, loud vocalization often made by young to a parent when begging for food. Some species aggression can consist of loud, alarmed-sounding vocalizations or energetic song, and may be heard when members of the same species behave aggressively toward each other. Alarm calls may be

heard when birds are startled, frightened, or terrified for their lives, and can take many forms. Mobbing is one example of alarm, while a high-pitched alarm call is another.

Of the five bird voices, four communicate the message that the bird feels safe. Birds that engage in song, companion calling, juvenile begging, and same species aggression all display what has been called "baseline" behaviour, *ie.* a relaxed state free of the fear of predation. Alarm calls communicate the presence of a predator, or a circumstance that the bird may see as predatory, such as a human hiker. Alarm calls have distinct sounds and shapes, each of which is specific to the source of the disturbance. For example, Ravens mobbing a Hawk or Owl in a tree will clump around the predator in a loose ball, calling and diving. If the Ravens rise off the tree and fly higher, the predator was a Hawk and has flown up to escape, as is typical of Hawks. If the Ravens drop out of the tree and fly low and away, the predator was an Owl and has dropped low off its perch to escape, as is typical of Owls.

The songs of different birds species vary, and are more or less characteristic of the species. Species vary greatly in the complexity of their songs and in the number of distinct kinds of song they sing (up to 3000 in case of the Brown Thrasher); in some species, individuals vary in the same way. In a few species such as Starlings and Mockingbirds, songs imbed arbitrary elements learned in the individual's lifetime, a form of mimicry. As early as 1773 it was established that birds learnt calls and cross-fostering experiments were able to force a Linnet, *Acanthis cannabina*, to learn the song of a Skylark, *Alauda arvensis*. In many species it appears that although the basic song is the same for all members of the species, young birds learn some details of their songs from their fathers, and these variations build up over generations to form dialects. In some species such as Zebra Finches, song learning is limited to the first year; these species are termed 'age-limited' or 'close-ended' learners. Other species such as Canaries can develop new songs as mature adults; these are termed 'open-ended' learners.

Bird calls of have been described using words or nonsense syllables, common English terms include words such as "quack", "chirp" and "chirrup". These are subject to imagination and vary greatly; a well-known example is the White-throated Sparrow's song, given in Canada as "O sweet Canada Canada Canada" and in New England as "Old Sam Peabody Peabody Peabody". Grammatically correct phrases have also been used to illustrate bird vocalisation. For example, the Barred Owl produces a sound which some describe as "Who cooks for you? Who cooks for you all?" with the emphasis placed on "you".

Reference: Wikipedia