

## **Birds are the True Masters**

**by Dr Robert Casteels**

I enjoy the sound of birds, frogs and insects. I am content to stroll quietly in nature, initially without concern for ornithological identification. I can relate to stories related by bird enthusiasts about birds singing in a particular musical key or developing elaborate structural patterns. I am overwhelmed by the melodic complexity and avoidance of rigid numerical repetition in bird songs. In short, all that surpasses what my trained ear as a professional musician can grasp. My interest was spurred by an interesting article (Lin, 2006) published in Nature Watch given to me by a fellow Nature Society member. Two years later, this journey led to the creation of an original music composition based on the songs of some birds resident in this region.

**“Birds are creatures who not only sing at their business, but whose business it is to sing”, wrote Kirkegaard. Why, when, for whom and how do birds sing? How do they learn?**

The short answer is that the scientific community has not yet been able to come up with factual answers applicable to all bird species. Avian diversity is far richer in the tropics than in the temperate zones, yet most research has taken place in the temperate regions. The study of bird song is more intimidating than ever. I attempt here to highlight 10 points for which there is experimental evidence.

1. Birds have a rather poorly developed olfactory system. They depend heavily on sound which travels in all directions and over long distances, making it a more effective means of communication than visual signals especially in darkness and poor light. However, there are factors, such as humidity, temperature and landscape, that affect the quality of sound transmission.
2. The syrinx, the equivalent of the human larynx, is the sound-producing organ in birds. Located at the bronchial junction, the syrinx has two potential sound sources, one in each bronchus. Hence, the two sides of a bird's syrinx can operate independently. Therefore, it is possible for a bird to repeat a sound at such high speeds of that we humans seemingly hear one constant pitch instead of a series of short sounds interrupted by interval of about 10 milliseconds. In mammals, it is clear that the sound is produced during exhalation, akin to how sound is produced by a wind instrument. However, in birds, ornithologists disagree as to how and when sound is produced, whether it is during exhalation or inhalation.
3. Unhatched eggs can already vocalize, but the song learning process takes place at different times for different species - some bird species learn as juveniles while others learn as juveniles and young adults. There is a great difficulty in determining exactly how much song learning and song recognition is innate as opposed to learnt from what the young bird hears. Bird songs and human music resemble each other acoustically. Just as babbling human babies, young birds go through a period of so called subsong or whisper song, which is quiet and variable. Gradually the song crystallizes into the full song typical of adults of the species. Some birds reared in acoustic isolation produce

aberrant songs, some do not. After a critical time window for song learning, some species will no longer enlarge its repertoire. On the other hand, males of other species do update their song repertoire from year to year, possibly to rival new males.

4. Huge variations exist between species in the variety and size of their repertoire as well as the way this repertoire is used. Most birds sing more than one version of their principal species' song while others do not have such variations. These geographical variations are known by ornithologists as dialects. Some species develop intricate songs, others do not. A complex song individualizes its singer, to its advantage versus a potential mate, but also at the same time to its disadvantage versus a possible predator.

5. In most species, only the male sings. Experimental evidence has shown that variations in testosterone levels have an effect upon chicks' vocalizations, and in turn, the songs they sing. Males do not necessarily learn the songs of their natal area. Males proclaim and defend their territory by counter-singing against rival males, which stimulates the females for sexual display and readiness. The rate of male songs peaks with the fertile periods of the females. In a Darwinian logic, female birds may be selecting males on the basis of the amount and complexity of the songs males sing as a guarantee of excellent genes. Females do not necessarily prefer to mate with males singing the same dialect as their fathers. The better a male sings in quantity and quality, the less he spends time feeding. Consequently, he must be an efficient feeder holding a territory of good feeding quality.

6. In a few species, females also sing. Females sing within the mated pair in situations such as when other females appear, or to trick the male into returning by giving the impression that a rival male is trespassing on his territory. Some pairs of male and female sing elaborate antiphonal duets, alternating different notes. Sometimes the duet is so tight that the song sounds like a single call.

7. There are annual song-cycles and daily song-cycles. Some species sing up to 22,200 songs during a single day. The dawn chorus, which refers to the marked increase of singing during dawn, is still not fully explained. Some species sing their last song of the day in about the reverse order of their first song of that day. The song production peaks in the morning, decreases and reaches a minimum after midday, increases again towards the evening.

8. Most species of birds learn only the song of their own species and seem to be attracted by the song of their own species. The songs that are attractive to human ears are not necessarily those birds use for wooing. Mimicry is rare, except when imitating competing species or predators, so that the singer's territory appears to be dangerous and well defended.

9. Parent-offspring recognition works even in a crowded restricted space such as on a small isolated island. Many species have two clearly different alarm calls, one for a flying predator and another for a predator on the ground or perched in a tree. Defending food always corresponds to the lowest-pitched of all the sounds a species makes.

10. Insects, amphibia, birds and mammals have developed a language of sound to a high degree of sophistication. Singing is expensive in terms of energy and must therefore be utilitarian and functional. However, nothing prevents us to accept that a relaxed and satiated bird may at times emit songs for sheer pleasure.

### **European art music composers and birds**

Man's appreciation of bird-songs has far preceded his scientific interest. Virtually every composer who has been inspired by bird songs has taken one of three different approaches, the first of which is the anthropomorphic approach where composers associate human feelings to bird calls. Clément Janequin, a 16<sup>th</sup> c. French composer, wrote a six-minute vocal piece without any instruments entitled *Le Chant des Oyseaux*, that consists mostly of aviary onomatopoeia. Syllables imitate the sound of bird sounds that it aims to portray. The vocal virtuosity is daunting for the singers. 470 years later, the piece's hilarious effect and puns still brings audience to infectious laughter.

Until the 18<sup>th</sup> c., the cuckoo bird referred to the one cuckolding as opposed to the one cuckolded, because the cuckoo bird lays his eggs in other species' nests. The dove represents love and peace. The nightingale's song is seen as one of pure unmixed joy, also representing nostalgia. Mozart bought a starling which had been taught to sing. Allow me to fly over masterpieces by J.S. Bach, Vivaldi's *Four Seasons*, Haydn in his oratorio *The Seasons*, Mozart, Beethoven in his *Pastoral Symphony*, Tchaikovsky etc.

The second approach is the ornithological approach of Olivier Messiaen, a 20<sup>th</sup> c. French composer who called himself an ornithologist. He travelled extensively all over the world with a tape recorder, notating as closely as possible bird calls which he then assigned to instruments. His music is technically complex. Since his 1953 orchestral work entitled *Réveil des Oiseaux* inspired by the so-called aviary dawn chorus, consisting exclusively of 38 bird songs in 20 minutes, nearly every piece Messiaen composed for the next 50 years included bird calls. His *Catalogue des Oiseaux* is a series of 13 piano pieces entirely based on bird calls. In his five-hour long opera *Saint Francis of Assisi* first performed in 1983, the entire sixth scene consists of uninterrupted 30 minutes of bird calls. In 1924 the Italian composer Ottorino Respighi was the first composer to include pre-recorded bird songs in his *Pines of Rome*. (So did the English band Pink Floyd in their 1969 song *Grantchester Meadows*).

Finally, composers concerned about the degradation of planet Earth have adopted an ecological approach. In 1972, the Finnish composer Einojuhani Rautavaara composed a Concerto for Birds and Orchestra entitled *Cantus Articus*. The sound of the full orchestra is mixed with pre-recorded calls of bog birds in spring, the shore lark and migrating swans.

### **Birds Songs**

On 5 December 2009, the Minister for National Development, Mr Mah Bow Tan, graced as Guest-of-Honour a concert for the grand finale of Singapore Botanic Gardens' (SBG) 150<sup>th</sup> Anniversary. On the Shaw Foundation Symphony Stage of Palm Valley, a group

of Singapore's best jazzmen performed Maurice Ravel's 1914 *Trois Beaux Oiseaux du Paradis*, Jimi Hendrickx's 1967 *Little Wings*, Paul McCatney's 1968 *Blackbird*, George Shearing's 1952 *Lullaby of Birdland* (that refers to jazz legend Charlie "Bird" Parker), as well as Manning Sherwin's and Eric Maschwitz's 1940 song *Nightingale Sang in Berkeley Square*.

In addition the group premiered my new piece entitled *Bird Songs*. In 2003 for the official launch of the Garden City Fund at the Istana, I had recorded nature sounds from Singapore parks and woven them into a composition for percussion and piano. For this SBG outdoor celebration in 2009, I opted for 4 wind instruments, 4 electric string instruments, 4 voices, keyboard and vibraphone. Overwhelmed by the beauty of the bird calls, I decided against transcribing them for instruments or transforming them through audio manipulation. I also abandoned the idea of bringing caged birds on stage and using the recordings I made in the mountains of Northern Thailand and Laos, because I was often not able to identify the recorded bird with accuracy. With the gracious permission of Nature Society (Singapore) and Mr Sutari Supari, I selected ten bird calls (Supari 2003) on the basis of their esthetic beauty and contrasting variety. I then had the chosen tracks filtered from background noises and wind, and submitted them for sonogram analyses. A sonograph plots the sound frequency in kilohertz against time in seconds. This scientific information helped me in the composition of the interaction between the instrumental sounds and bird sounds. The inclusion of the sonograms in the full score should guide conductors for future performances.

My entire composition (Casteels 2009) is a journey from artificial imitation to forceful imprisonment to endangered freedom. The first three minutes of the composition may sound like a senseless chaos: put aside ten minutes of your time and keep listening till the end. In the beginning, all instruments are competing with their different respective songs. Four singers sing the binomial names and improvise in the manner of jazz scat on avian onomatopoeic syllables. The pre-recorded tape plays in succession, mechanical bird sounds that are MIDI cloned sounds (at 0:24), an ear shattering crowd of *mata puteh* recorded in the void deck of Block 440 Ang Mo Kio Avenue 10 (at 1:06), where aviculturalists and bird-fanciers show off their countersinging birds and elaborate cages every Sunday morning, and a dawn choruses recorded in HDB estates (at 2:14). In reality, this first part of the composition is far from chaotic. Just as in a crowded bird colony, parents are able to locate each other, recognize a neighbor from a complete stranger and identify their own young among thousands of others all packed together, every single pitch and rhythm in the beginning of this composition is explainable. At 3.02, all instruments converge towards a single note that signals the beginning of the second part of the piece. From this point, instrumentalists will dialogue with the following ten birds which are resident in the Republic of Singapore: the Yellow-vented Bulbul (at 3:22), the Spotted Wood-owl (at 3:22), the Common Iora (at 4:36), the Rufus-tailed Tailorbird (at 5:03), the Hill Myna (at 5:34), the Drongo Cuckoo (at 6:18), the Asian Fairy Bluebird (at 6:39), the Straw-headed Bulbul (at 7:18), the Striped Tit-babbler (at 7:46), and the Malaysian-eared Nightjar (at 8:22). It is a Nature Watch article (Lin, 2006) about the Yellow-vented Bulbul that piqued my curiosity. Hartshorne (Hartshorne, 1992) calls the Hill Myna (quote) "the world's most gifted non singing chatterer" because "(t)he Hill Myna's greater precision in its duplication is to be credited to its superior muscular

equipment". Finally, the sound of the human instruments gently wafts away in a gracious bow to a chorus of the *Paradisaea apoda* (at 9:00), also known as the Greater Bird of Paradise. This species was named by 18<sup>th</sup> c. Swedish botanist, Carl Linnaeus. Paradise referred then to New Guinea. *Paradisea* referred to the belief that this bird never alighted. *Apoda* was a neologism from Ancient Greek that means without legs, because Europeans only ever saw the magnificent long tail feathers. Thousands of massacred birds had their feet chopped off before being shipped to satisfy a high demand in European millinery. Like any other citizen, contemporary artists also inherited the earth as a magnificent environment. Progress has enabled many of us to appreciate the beauty of nature at our planetary level, yet the same progress is destroying much of that beauty. In composing and performing *Bird Songs*, I humbly endeavoured to share my wonder for nature's magnificence, my sense of responsibility on how to pass the legacy to future generations, and *hic et nunc*, spread the word about Singapore's Nature Society.

### **Birds are the True Masters**

Harsthorne (Hartshorne 1992) coined the word 'ornithomorphism' or the bird's judgment of human music as opposed to anthropomorphism. What did the original inhabitants of the Botanic Gardens, that is, the birds, make of my music? I wonder. In 1892, the then famous 51-year-old Czech composer Antonin Dvořák accepted a lucrative academic position in New York city. However, disliking the urban and socialite environment, Dvořák spent time in the country side of Iowa that reminded him of his native Bohemia. There he is said to have been irritated by the incessant call of a scarlet tanager (quote: "that damned bird") and to have exclaimed: (quote) "Birds are the true masters". In all humility, I concur.

### **Recommended specialised literature**

For a truly extraordinary account of a lifetime devoted to personal bird watching: Dee 2009. *Running Sky* consists of 12 riveting essays, one for each month.

For a window on the world of rigorous scientific research, its baffling research methods that include field recording and observation, submitting birds to various stages of surgical deafening and alterations to their syrinxes, analyzing birds' response to loudspeakers, hand rearing and various phases of acoustical isolation: Kroodsma and Miller, 1996.

For the classic text books of English speaking academic literature: Armstrong 1963, Catchpole 1995 and Thorpe 1961. William Thorpe (1902 – 1986) was arguably Britain's most famous ethologist and ornithologist.

For truly original thoughts on the aesthetic aspects: Hartshorne 1992 as well as chapter 15 entitled *Aspects of the evolution of man's appreciation of bird song* by Armstrong E.A. in Hinde 1969: 343-365 and chapter 16 *The aesthetic content of bird song* by Hall-Craggs J. in Hinde 1969: 367-381.

To take with you on your desert island: three recommended recordings of art music compositions that focus on bird songs and calls:

Clément Janequin, *Le Chant des Oyseaux*, by the Ensemble Clément Janequin/ cd published by Harmonia Mundi.

Olivier Messiaen, *Le Réveil des Oiseaux*, Cleveland Orchestra conducted by Pierre Boulez/ cd published by Deutsche Gramophon or Orchestra National de France conducted by Kent Nagano/ cd published by Erato.

Einojuhani Rautavaara, *Cantus Arcticus*, Royal Scottish National Orchestra conducted by Hannu Lintu/ cd published by Naxos.

## References

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Casteels, R. 2009. Score of *Bird Songs* [www.robertcasteels.com](http://www.robertcasteels.com). To listen to the music, click on compositions, click on title Bird Song, click on play. To view the entire conductor's full score: click on compositions, click on title Bird Song, click on download score.

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