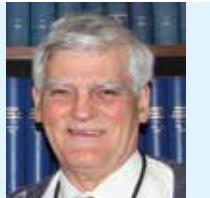


A song of note.

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How marvellous to be woken in the morning with bird song, and the first to greet the sun in Johannesburg is the Cape Robin (*Cossypha caffra*) with its lilting whistle, perhaps not as versatile as the Chorister (*Cossypha dichroa*), nor indeed the Whitethroated Robin (*Cossypha humeralis*), but nevertheless a welcome melody at the break of day. Endeavours to reproduce the whistle of the Cape Robin result in a mixed reaction, it is quite possible to discern incredulity in the quizzical gaze the bird directs at this impudent and inept mimic, and then the feeble attempt to match the genius of birdsong is tossed aside with an outpouring of magnificent calls.

I am sure that has been the experience of all fortunate enough to reside in leafy gardens in Johannesburg!

Why is it that the human larynx, capable of such versatile accomplishments as the top C, the marvellous contralto, the rumble of the lower bass, the wondrous tenors, the capacity to shout from hilltop to hilltop, ranging to the merest whisper, how then that the birds outdo us in ability to sing?

In a word, it is the SYRINX (Greek for Pan pipes), birds have this vocal organ located at the base of the trachea, just above the bronchial openings. That immediately offers an advantage for the bird may use one, the other, or both bronchi. The openings may be unilaterally controlled and altered and some birds are so expert that they can in this way produce two notes at the same time! A trick called lateralisation. But the main anatomical feature contributing to song are the membranes surrounding the syrinx. The bird uses these flexible membranes in a manner similar to the human vocal chords. The tensions and shape of the membranes, termed *membrana tympaniformis*, are altered by a series of associated muscles. In the true artistes of bird song there may be five to nine sets of muscles controlling the membranes. At the other end of the scale, ostriches and vultures have no syringeal muscles at all. They have no need to exchange vocal information about food sources, hence their limited production of sound, lacking a syrinx altogether, vultures hiss.

Pursuing the analogy further, humans produce sounds of varying amplitude and frequencies in the larynx by vibrations of the vocal chords. The sounds are modulated above by the pharynx and by changing configurations of the mouth and lips. In birds the cavities above the syrinx are no less effective in final modulation, movements of the neck, the tongue, the beaks and the trachea all contribute to the eventual note. The vocal chords are relatively paltry when compared with the more extensive—and more variable- avian *membrana tympaniformis*.

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Observe that no mention has yet been made of the teeth, which in humans play an influential role in articulation. Try the S sound without teeth, as we all have seen, or more accurately, heard! But birds have no teeth, and how did that happen, recognising that their ancestors, the Dinosaurs, or, as opinion has been expressed, the Archosaurs, most certainly had teeth, some terribly impressive!

Accepting that avian song is not limited by a lack of a dentition, explore now why indeed teeth have been lost. A postulate has been that the presence of a heavy dentition in the head of a flying creature may have caused unwieldy aerodynamics. Not so, more recent opinion holds, it is because birds tend to swallow their food whole, and the anatomy of the hyoid structures has been adapted to accommodate the demands of ingesting larger items. Or, if you can swallow large items there is no need to reduce the bolus by chewing! The hyoid apparatus in mammals is attached to the skull, in birds it is not, allowing greater flexibility of the structures, and an enlarged glottis to accommodate a whole meal. No need for teeth, and the song has not been affected, not with nine sets of syringeal muscles to ensure wonderful vibrations of the air coming through two bronchi!

Humans have limited pharyngeal openings, and they have teeth. And there certainly have been times when those teeth have contributed directly to songs, but songs of agony, especially when a root canal is infected and swollen and, sore, very sore! Recent issues of the Journal have included papers on Endodontics and this issue actually carries two articles dealing with different aspects of the discipline. It is indicative of the advances made in this demanding treatment modality that explicit research is being carried out and that there is genuine excitement at the enhanced opportunities to resolve challenging problems. The papers present an unusual divergence, for most positive clinical excellence is evident, vide the new material Biodentine and the efficacy of treatment of a double rooted canine, whilst a very practical problem is unveiled in the inefficiency of much of the commonly practised cleansing of endodontic files. How punctilious is the discipline in meticulously investigating every aspect, positive or critical. That that example is carried through in all aspects of Dentistry will have been evidenced by the papers presented at the 2018 Congress of the Dental Association of South Africa. Progress can be made only if the errors as well as the successes are recognised. We can then, despite the limitations of our vocal chords, sing the praises of our profession!

Bibliography

1. Homberger DG. The avian tongue and larynx- multiple functions in nutrition and vocalisation. <https://www.internationalornithology.org/proceedings/Proc22%/20109C/Symposium/SO2/SO2.3.htm>
2. Kovalchik K. Why do some birds sing while others caw? <http://mentalfloss.com/article/50788/whyodo-some-birdssing-while-others-caw>