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VIBRATORY BEHAVIOR OF THE SOUND GENERATING STRUCTURES IN THE BIRD SYRINX. O.N. Larsen[1]* and F. Goller[2]. [1]CSC, Odense University, DK-5230 Odense, DENMARK and [2]School of Medicine, Indiana University, Bloomington, IN 47405, USA.

Recent endoscopic studies of the bird syrinx during phonation suggest that sound is generated by vibrating membrane folds or labia (Goller and Larsen, J. exp. Biol., 200, 2165-2176, 1997; Goller and Larsen, Proc. Natl. Acad. Sci., 94,14787-14791, 1997) and not by a whistle mechanism (Nottebohm, J. comp. Physiol., 108, 157-170, 1976; Gaunt et al., Auk, 99, 474-494, 1982). However, because of low temporal video resolution, vibratory behavior of the sound source could not be studied in detail. In pigeons, cockatiels and Indian hill mynahs representing three different bird orders, we have now recorded brain stimulation-induced vocalizations simultaneously with a microphone and a vibration detector, which received input from a fiber optic inserted into the trachea and pointed at the syringeal sound source. In all three species the vibration detector recorded frequencies that match exactly those present in the microphone recordings. In hill mynahs and cockatiels, but not in pigeons, energy distribution across the harmonic structure of the vocalization is similar to that recorded with the optical detector, even in cases when the second harmonic contains more energy than the fundamental. This provides strong evidence that vibrating structures generate the vocalizations and thus does not support the whistle hypothesis. It also shows that emphasis on higher harmonics does not necessarily result from upper vocal tract filtering. (Supported by DNRF, NIH, and NSF)