

The Journal of Experimental Biology 203, 935-940 (2000)**Head-Bobbing In Pigeons: How Stable Is The Hold Phase?***Nikolaus F. Troje and Barrie J. Frost**Department of Psychology, Queen's University, Kingston, Ontario, Canada*

The head movement of a walking pigeon *Columba livia* is characterized by two alternating phases, a thrust phase and a hold phase. While the head is rapidly thrust forward during the thrust phase, it has been shown repeatedly that it remains virtually motionless with respect to translation along a horizontal axis (roll axis) during the hold phase. It has been shown that the stabilization during the hold phase is under visual control. This has led to the view that the pigeons' head-bobbing is an optokinetic response to stabilize the retinal image during the hold phase. However, it has never been shown explicitly that the head is really held stable in space with respect to other translatory or rotatory dimensions. Using videography, we show here that this is in fact the case: except for a small but systematic slip that presumably serves as an error signal for retinal image stabilization, the head of the pigeon remains locked in space not only with respect to the horizontal (roll) axis but also with respect to vertical translation (along the yaw axis) and with respect to rotation around the pitch and yaw axes.