Answer #303

The answer for part (a) is: the tone will cease, as can be observed in an mpeg video by clicking your mouse on the video below.

This is because the source for the tone consists of random noise generated by convection currents in the tube, caused by the nichrome coil. When the tube is oriented horizontally strong convection currents are precluded, so no strong noise source is available. When the tube is returned to its vertical orientation the tone sounds once again, because the convection currents can recur, as long as the nichrome coil remains sufficiently hot. Any time the tone sounds it will be at the same frequency, because the length of the tube does not change.

In practice, this tube must be turned slightly more than horizontally before its convection currents are totally eliminated and the sound ceases. When returning the tube to its upright position, a temporary very slight increase in the frequency can be heard by the astute observer. This is as yet unexplained.

A smaller version of this demonstration will be found in our demonstration library as H3-16: SINGING PIPES. See this demonstration for the same experiment done in this Question on a smaller scale. Also, the frequency does not go up.

Question of the Week

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For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.