Figure 1: Any brief-duration sound, such as a clap (left), repeated periodically with a sufficiently brief interval (right, grey), sounds like a pure tone to our ear. The black curve on the right shows the approximate total amplitude as a function of time, which can be seen to be approximately sinusoidal (a perfect sine wave would be a pure note).

It is this tone which sounds to us like a quack. In fact, the echoes will not return with exactly equal spacing in time; the actual spacing of the returned claps can be found by applying Pythagoras's theorem to find the distance to each step. This is shown in Fig. 2. For practical purposes, however, they form a close enough approximation to a pure tone as to be indistinguishable by ear.

Figure 2: The Mound gets its quack from the fact that each step returns a separate echo. The time $t_n$ taken for the $n^{th}$ step's echo to return is given by $2l_n/c$, where $l_n$ is the direct distance to step $n$, and $c$=330ms$^{-1}$ is the speed of sound in air. This can be found using Pythagoras's theorem. Call the step width $w$ (30cm) and height $h$ (16cm), and label $L$ the (variable) distance to the bottom step (which we'll number $n$


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