The acoustics of the Taylor Room at the Finger Lakes Boating Museum

By Peter Hutchings

We use the word acoustics when we talk about how a room sounds. Our ears quickly tell us when a space has good or bad acoustics. Why is this?

As boaters we have observed wave action against sea walls as ingoing waves are reflected off and return to create a chop with the incoming waves. Imagine this in three dimensions and that is similar to the movement of sound waves.

At 680 feet per second the echo in the length of the Taylor Room is about three quarters of a second, optimal reverberation. Now visualize the sound wave action around the curved walls and ceiling. Sounds skewing over the curve are easily heard across the room. Louder sound waves are caroming off the walls and floor much like an infinite number of balls on an imaginary three-dimensional pool table.

The rough rock surface modulates these waves due to the size of the stones (texture) projecting from the surface, which break up the waves into finer ripples. Through this cloud of sound the waves moving over the rooms length interact and are modulated thereby producing a more balanced and integrated overall sound. This process amplifies and enriches the sound quality.

For those of us who have been in the room when a group of people is talking we know the cacophony is almost unbearable. Yet with music we are amazed at how rich, clear and present all the sounds are.

Why is this? Tonal (harmonic) music is based on scales and chords that are directly related to overtones. All pitches have a predominant fundamental pitch that we hear but within the fundamental are other higher pitches that actually form chords. It is the creation of these chords that makes music pleasing to us physically and which help determine the shape and structure of a musical composition.

When these overtones are complementary (harmonically consonant) the sound is pleasing. If there are many different fundamental pitches then the result is cacophony (dissonance) that is painful to the ears. Indeed this is exactly what occurs when many different people are simultaneously speaking. Their fundamental pitches are different and they create waves of clashing overtones.

All of the musicians who have performed in the Taylor Room have been impressed. When they are playing well together the overtones are synergistic and the beauty is enhanced. Equally true however is that out of tune playing is also magnified. Fortunately, for most musicians who have practiced to develop our highest skill levels we have fewer out of tune notes and get to enjoy the positive aspects of the unique Taylor Room.