

Euphony

by Kevin Halpin

Music is effortless to enjoy and commonplace in everyone's lives. The scientific understanding of music however is long in its history, complex in its detail and significant for how it expresses cultural history as much as it does the laws of nature. The physics of harmony was quantified in the 6th century BC. In that quantification the Pythagorean comma was discovered, a contradiction in the physics of a vibrating string which remains unsolved to this day. Few people will ever have heard of the Pythagorean comma or equal temperament. But it is equal temperament which keeps the comma under control so that music as varied as Mozart, Jazz, The Beatles or the music from *The Lord of the Rings* is possible. They are all using the same system of keys tuned the same way.

Euphony identifies the cause of the comma, presents its solution, and explains how tuning ratios have confused our understanding of harmonic ratios. Along the way the spectrum of light is discovered to be consistent with the solution for the comma, and biological and atomic phenomena are found to exhibit the same principles as are manifested through music. Pi, the Fibonacci sequence and the Golden Ratio are all part of our story in music as much as they are the story of the natural world.