

## Will Bruce Greek Music

In my presentation, I will discuss early Greek music theory and its influence upon our modern western scale system. Early Greek music is associated with a vocal tradition in which the singer would improvise to the accompaniment of a lyre. The tuning of the 4 lyre strings determined the mood of the piece to be sung, much as in Indian classical music. A Dorian mode, considered 'virile and bellicose' would be used for the singing of epic. Other modes had different emotional and ethical associations: the Phrygian mode was 'agitated and Bacchic'; the Lydian 'intimate and lascivious' [Plat. Resp. 398e]. Terpander added a second tetrachord and musicians began tuning their lyres so that the top note of one lyre would be one whole tone lower than the bottom tone of the other lyre. I noticed that both lyres being tuned to Dorian modes would produce our modern major scale and a Phrygian upon a Lydian would produce a minor scale. In the course of my presentation, I will demonstrate the sounds of these modes and scales on my keyboard.

The experiments with pitch in the tuning of the lyre ignited some of music's first scientific research. Pythagoras was the first to see a relation between the ratios of string length and pitch. For instance, a 2:3 ratio produces a perfect fifth (do-so). Pythagoras developed a system based on whole number ratios for most of the intervals we use in modern music. By tuning the first circle of fifths, he produced an entire chromatic scale. This tuning however didn't allow key modulation. The problem became known as the 'Pythagorean comma' and was still contended with in Baroque times. Certain keys were considered theoretical and untunable. Musicians developed various ways of tuning which 'spread out' the comma over several intervals to allow key modulation. No one was as successful in doing this as J.S. Bach. His *wohltemperirt* (well-tempered) system consisted of 7 perfect fifths and 5 *tempered* fifths. This system allowed comfortable modulation into all keys, each of which would have its own unique 'color' dependant on the variable position of the tempered tones in the scales. We now use 'equal temperament' which divides the comma into 12 equal steps. This makes all intervals equally out-of-tune so that the only pure interval is the octave. As Aristoxenus (Book II, 55) had theorized, our ears adapt to tonality and accept tone ratios as harmonious due to repeated exposure to them.

In my presentation, I will also demonstrate the 'perfect' ratios of Pythagoras and Bach versus the equally tempered intervals of a modern keyboard with a monochord I made out of a two-by-four.