Pythagoras and the Blacksmith Shop

Pythagoras was something of a saint—he was a philosopher, mathematician, teacher, and musician, who lived on the Isle of Crete in about 600 B.C.   Everybody who ever took junior high school geometry knows about the Pythagorean theorem, the formula for figuring out the area of a triangle. When I was in junior high, I did a report on Pythagoras, for math class. The report presented his idea that the structure of the entire universe could be explained in terms of numbers, and that the divine proportions of existence could be translated into musical terms; that the music of the spheres, the celestial harmony of the relationship of all things to the great ONE thing, could be reduced to little tunes I could play on the piano, one simple tune for each planet. The apocryphal story told below, in its traditional form, is almost certainly <u>not</u> true, but all musicians know it, so it should be included in my collection.

One day Pythagoras was walking on the edge of town and happened to pass a blacksmith's shop. (This is the first problem with the story, because I do not know that they actually had blacksmith shops in 600 B.C., but oh well.) Suddenly he heard these beautiful sounds drifting out of the shop. As he approached, the sounds intensified into a ravishing harmony. He became enthralled with the event, and had to look and see who was making this heavenly music. He trembled as he pried open the door—he expected to see a band of angels in there playing hosannas to God.

What he saw, was a number of grimy, soot-aproned blacksmiths banging on anvils with hammers. Why does this sound so great? Where is the cosmic sense underlying this seemingly random situation?

Pythagoras looked carefully at the scene, and noticed something: he noticed that the anvils the blacksmiths were banging on were sized in an arithmetic proportion to each other—that is:

1.) there was a great big anvil (the guy was making wagon wheels with   that one),

2.) then one <u>half</u> the size of the big one (for swords),

3.) then one a <u>third</u> the size (silverware),

4.) then an itty bitty one a <u>quarter</u> the size (for nails).

When these great blocks of iron vibrated together, they made a beautiful harmony. Again, from whence came the beauty of this coincidence?

Pythagoras thought about it some more, and discovered that any vibrating body, whether it be a block of iron, a string, or a column of air (like a flute), vibrates not only as a whole, but also in parts—again, in an arithmetic progression: 1/1, 1/2, 1/3, 1/4, 1/5, and so on, theoretically into infinity. These proportional divisions of the string are the primal basis of every harmonic system of every musical culture in the world; every musical chord that has ever been created by man, is based on this arithmetic progression.   Perhaps this is because, when our bodies vibrate sympathetically with these proportional emanations, we understand intuitively some essential truth about the structure of the universe, and of ourselves. Many modern-day physicists have commented upon this essential character of cosmic structure—an alternating sequence of levels, subsumed under the umbrella of higher meta-levels, under meta-levels, under meta-levels. The math supporting this theorising is deep, and complicated, but no one has surpassed Pythagoras's simple insight from 600 B.C., that the world is numbers, and that music is a simple progression of relationships radiating outward from a fundamental tone in the series 1,2,3,4,5, . . .