

Interlude. Conceptualising the Spiral: Humans Intersecting with Harmonic Space

(an introduction to a new pedagogical pathway)



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"I can't say I do the mathematical form because of mathematics. Mathematics, yes, because of one point of view. But that's not the whole story. The mathematical form is beautiful because it's so objective! It is not beautiful because it is made by a person, or looked at by a person. It is outside of the particular."

– Ruth Vollmer, in an interview with Susan Carol Larsen (New York, 1973)

When I first discovered Erv Wilson's 1965 "The Harmonic Series as a Logarithmic Spiral" (see below), I immediately resonated with its gestalt imaging. It was congruent with my own early visualisations of numbering. Numbers were large-scale points in space shooting upwards in (at first) a seemingly straight line. As the numbers increased, curves began to form and return and return in a cyclical manner. This applied to all conceptualising around time and space for me, including the calendar and seasons. If I were to step back and objectively see the total shape it would be a spiral, or many spirals intersecting together. This is why, when I first confronted standardised Western music harmonic theory, I found the x, y concept of $x = \text{time}$ and $y = \text{harmony}$ to be incongruent with my inner being. It wasn't until much later that I was able to access this initial inner logic in a theoretical manner, and to understand that the image was a universal one.

As Ruth Vollmer indicates, humans do not create mathematical forms; these simply exist around us and within us. The inner ear, the cochlea, which transforms sound into neural pathways, is a spiral. Just like the snail's shell and the unfurling fern and the way in which a storm moves. This image is both material and accessibly immaterial for all humans in the world, regardless of any theoretical, cultural, or historical identities any individual person might possess.

The spiral, like most elemental mathematical forms, is not something that any one human can claim as their own. It is a collective shape, containing variability as well as sameness; an imprinted, flexible patterning. How we might perceive it, or individually draw it, might vary to a degree, but the elemental nature of its form remains for all.

I am only at the beginning stages of applying the spiral as a pedagogical tool with others. I do not wish, at this moment in time, to define its theoretical possibility. However, I have already noticed its positive results in action. I have observed its usefulness as a demystifying agent. Taking something too abstract for many (such as rational intonation)

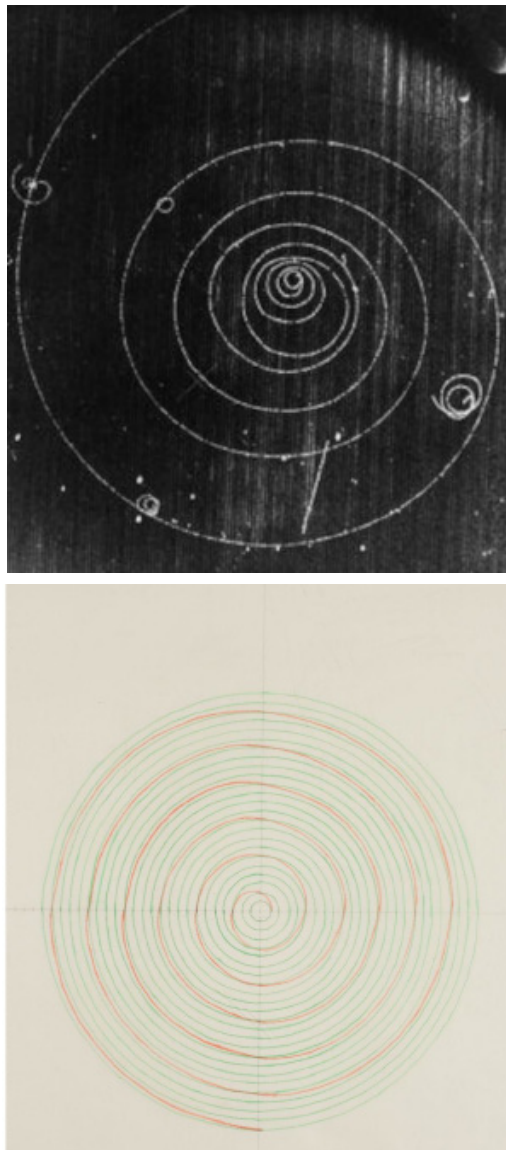


Figure 1: *Top:* A138/0059 Spiral track of electron in magnetic field, bubble chamber at the Lawrence Berkeley National Laboratory, California (Science Photo Library). *Bottom:* Ruth Vollmer, *Archimedean Spiral*, 1973 (detail).

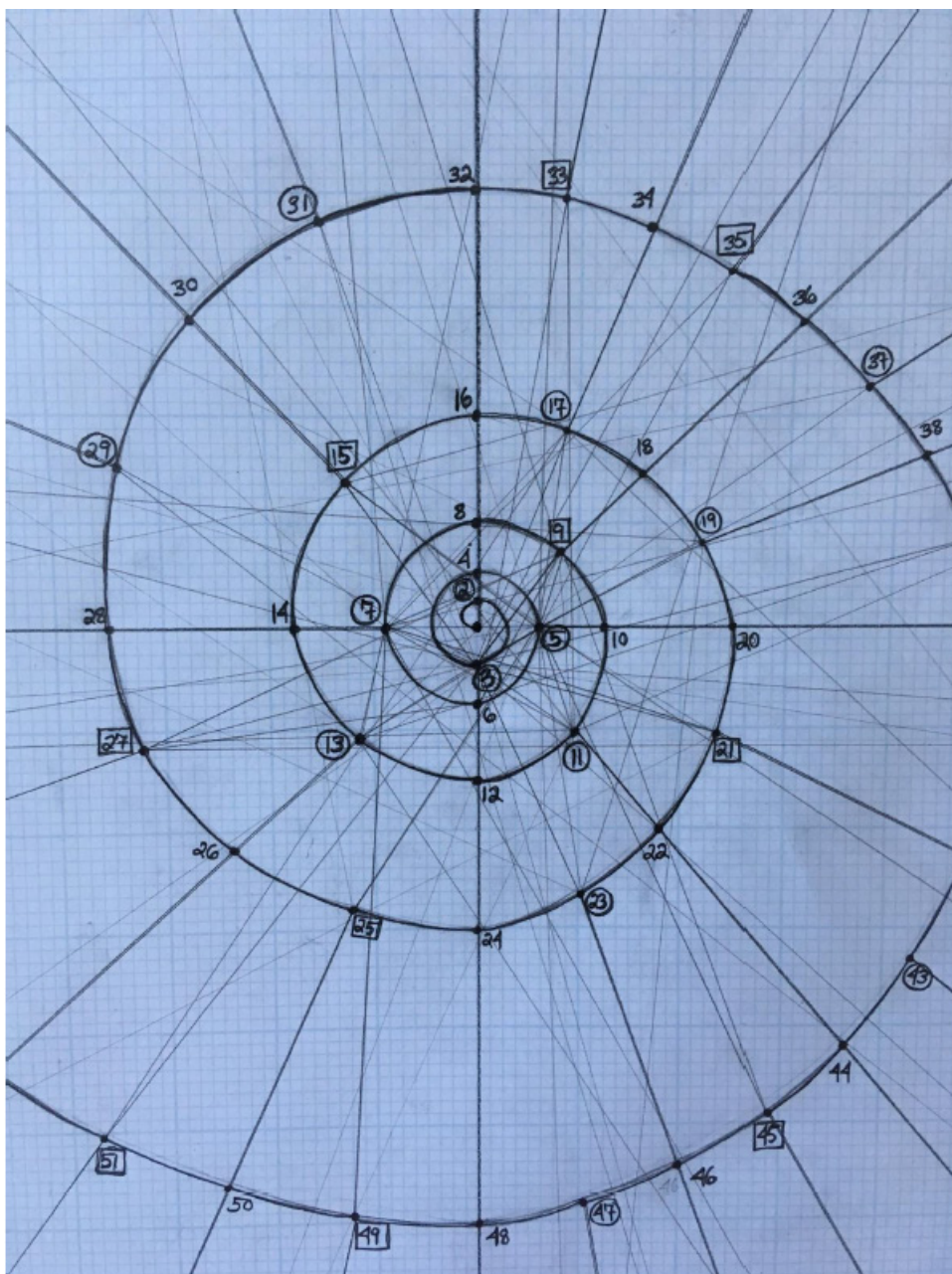


Figure 2: Lamb's variation of the 1965 Wilson Logarithmic Spiral being put to pedagogical use, in 2019.

and allowing it to appear in materiality and physicality with a familiar, universal shape is something I find incredibly useful. It is an active shape.

Each point in the spiral indicates a partial (as tone) in the harmonic series, which even in the most complex of harmonies everything can at some instance be reduced to. Using the harmonic series itself as a logical harmonic mapping, the numbers themselves are potential sounding tones interacting together, and upon each complete rotation a tone returns to its octave equivalent. I indicate each generating point by means of either a circle or a square around the number. A circle indicates a prime, a square a composite. The thin lines within connect the composite numbers to earlier primes, to show that, although they are generators, they can also simplify in relation to earlier points/tones.

The generator points (odd numbers) are the initiators of the spokes that move outwards infinitely and collect at their cyclical meeting points. Laura Steenberge once defined these points along the spokes as *focal points*, where in practice one could situate the numbers upwards or downwards as needed while remaining at frequency, depending on the neighbouring relationships musicians are wishing to sound together at any given moment in time. One can instantly draw the reduced connection in their minds by tracing the spokes back inwardly, while searching for more complex tonal interactions outwardly.

The spiral suggests astronomical space, space that is multidimensional and greater than our individual selves. I believe there is great potential in its conceptualisation of harmonic space in practice. The mathematical shape itself is beyond human, an ideal shape. When we attempt to sound the resonating points within it collectively, we are attempting the mathematical shape and can only get closer, but never exact. The closer we get, the closer our minds can complete the total shape inwardly.