

## **From My Notebooks, 1975-81**

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*Proposition IX: To explain why an open string when sounded makes many sounds at once. Proposition XV: To determine whether it is possible to touch the strings of an instrument or their keys so fast that the ear cannot discern whether the sound is composed of different sounds, or if it is unique and continuous.*

- Marin Mersenne, Harmonie Universelle, 1637

My work in image and sound synthesis in the early seventies initiated an interest in the interactions of waveform signal events and their hearing in the audio range, as sound, on acoustic instruments and finally, as music. Having neither a traditional music training or childhood indoctrination in this or that cultural scale or system I have found it convenient to apply my background in experimenting with electronic sound and image to composition with acoustic instruments: utilizing a tuning system derived from the harmonic series in lieu of traditional musical content.

The revolution in music language description of the last twenty years has evolved through the construction and re-thinking of music making tools and the resultant intimacy which has been re-established with acoustic dynamics and properties of sound. I have begun to see the development of western music resulting in an aberration. The relative standardization and specialization in notation, instrumental construction and tuning is a situation heretofore unparalleled in the incredibly diverse music cultures of the world.

Equal Temperament and the gradual shift towards atonality represent a gradual disregard of the basic acoustic model. Technical improvements to satisfy the needs of chromaticism and loudness have distanced the modern music maker and listener from the basic acoustic model.

Acoustic knowledge is now passed on by instrument builders and physics departments of universities. Whereas a music maker might at one time have taken upon himself the responsibility of instrument construction or the supervision thereof, as well as the adaptation and selection of a tuning system, the music maker today farms out these responsibilities.

Our language of sound description determines what we listen for. It is not the capabilities of sound generators and display systems themselves that have revolutionized our musical culture but rather a redefining of music as sound, based on the language of sound description found in the basic acoustic model. The psychodynamic filter of culture is lifted from our perceptive apparatus.

It was not until the appearance of a string instrument (probably a form of music bow) that man had an experimental gauge capable of providing both an empirical and theoretical knowledge of sound. The transverse vibration of a string (as opposed to the longitudinal vibration of air columns in pipes, for example) presents a simple acoustic situation with observable and controllable parameters. The relationship of pitch to tuning is easily perceived and correlations between experience and mathematics are easily deduced. It is no accident that string instruments and their mathematical-mystical associations play a large part in the two great ancient cultural

spheres - China and Greece. Their appearance as a measure or reference at very early historical stages indicates their origin and importance in tribal cultures.

Simplest Acoustic Situation thus described: the One String Zither Attributes:

1. Two dimensional: length and thickness
2. Graphic Display: laid fiat
3. you know where you are: the only sounds you can make are harmonics or in dividing the one string: there is nowhere else to go

We can learn to hear and to develop a sensitivity to harmonic relationships of frequency. We can experience interactions of the most minuscule acoustic events. We can start by stripping away the extemporaneous aspects of music: all the elements of culturally learned musical organization. Slowly we can build a music where we can rationalize the basic acoustic situation: from the primary moment: the excitation of a sound generating source. We can take a string and divide it softly with our fingers: we hear the harmonic overtone of that nodal point. As we increase the pressure we divide the string into two independent vibrating bodies. Each step alters the situation and defines new acoustic possibilities: what shape of a resonator, what kind of resonating material and thickness, the thickness and length of the wire, how and with what we excite the string, where we excite it: It is an open field of decisions as we expand to blow into pipes without finger holes, and so on.

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