Micropolyphony & Net Structures in the music of Gyorgy Ligeti, 1950s-1960s
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Micropolyphony (MPY) is a compositional technique coined and invented by Gyorgy Ligeti which involves creating a dense system of blurring individual voices and phrases through precise variation amongst a parallel, continually expanding harmonic structure. It concerns and suggests 2 major antithetical forces at work: the audible result of this compositional technique ("the outer)", what is heard of the arrangement of voices [unity], and the inaudible ("internal), the actual structure underneath, the rules governing the movement {complexity} ("behind the scenes"). As Ligeti stated, "polyphony is written. Harmony is heard"- a very important distinction. Some of this paper will reflect on paradoxes, origins, intentions, net structures, science, and a basic analysis of the function of MPY and how Ligeti came to pioneer the term.

Gyorgy Ligeti spent some time as a student and early on in his career as a composer working with mediums of early electronic music based around tape manipulation of recorded sounds and granular synthesis. By the 50s, he was already experimenting with what he called "timbre of motion," modifications to conventional sounds to modify their inherent structures (attack, decay, resonance, etc.) in order to achieve unnatural textures. He began to manipulate these recordings by stacking textures, as much of an aesthetic choice as a procedural one. These experiments with technology, he felt, deserved to be applied to his instrumental music. In order to do this, he would have to defy the conventional techniques and functions of his orchestration. Thus, he began working on his newly envisioned soundscapes. He arranged the instruments of the orchestra in Apparitions ('59) and Atmospheres ('61) within a complex polyphonic structure. Similar to his work in electronic music where he would stack dense layers of sound recordings to achieve a sort of cloud mass effect, the instruments of the orchestra undergo a "melting of succession" as the separate layers lose their individual identities in favor of a unified body. As a reaction to the european serialism of the 50s, Ligeti started to reduce his consideration of pitch class and strict intervallic control to distinguishing high and low registers, shaping the bandwidth and density of those regions like a sonic architect. Gradually, Ligeti continued refining and stripping away more traditional compositional elements. Rhythm and phrasing, in their classical sense, became obscured and buried amongst similarly obscured material, making up a collage of MPY. When MPY was first introduced in Apparitions it was, although prominent and effective, not the main focus and therefore a passing texture. Ligeti notes that after his experiences with electronic music, he began to shape its effect in relation to his desire to achieve static musical states. While in "the first movement the sound spaces were still static and aligned as successive blocks while, in the second movement, for the first time, the destabilization of those blocks appeared as well as textures modifications and the micropolyphony," This initiated further exploration of MPY, as Ligeti sought to dissolve "distinctions he had created between 'states,' 'events,' and 'metamorphoses,'" in order to create a more fluid but perceptually fractured presence of time. This is revolutionary! It seems like, at this point, Ligeti was throwing out fundamental concepts and traditional tools of European composition, but as he was expelling these roots, he began to return to them, namely through his visionary use of canons and imitative counterpoint. In my view, this mergence of past and

future create, as intended and experienced in listening to these pieces, creates an illusory time existence, with an intensity of movement, accelerated (combined) into one being.

In applying the tools of counterpoint to his MPY, he created a subcategory, *microcanon,* "to designate textures formed from a pitch succession set canonically in many voices at short time intervals, and *pattern-meccanico* (a subcategory of *meccanico*) for textures in which several linear strands, each constructed from small groups of pitches repeated mechanically, are overlaid to create a contrapuntal texture." It was in the 60s with compositions like Lux Aeterna ('66), Ramifications ('68-'69) and Lontano ('67) where Ligeti fully embraced MPY as a primary structural feature. In these pieces, Ligeti provides an important textual instruction to the performers throughout: "all entries very gentle" {from lux aeterna}, basically communicating that attacks should be imperceptible, a significant contribution to the cloud-like ensemble effect. While MPY would provide this effect as a contrasting texture within a piece, these pieces, especially Lux Aeterna, are consumed within this cloud, and all of the constant harmonic expansion and movement exists underneath this cloud, where the changes occur but are not immediately distinguishable or perceived. The justification for the suffix ("micro") as it were, is that through using MPY, "the texture gets so dense that the parts can not be perceptible anymore on their own individuality and we can apprehend the whole only as a 'whole', from a higher perception level." Thus, the listener perceives these pieces not linearly, following a series of musical events in time and space, but in a region suspended, evolving in a cloud. This cloud represents an environment where "harmonies do not change suddenly, but merge into one another," an effect heavily that fractures the normative function of the intervallic content. "Constellations of pitches" gradually form and expand, creating a unique way to experience and digest harmony.

MPY is the broader analytical explanation of the compositional style that influenced many of Ligeti's pieces in the 60's and 70's, but the term net structure, which often times exists within the micropolyphony technique, serves "to refer to the feeling Ligeti had about the texture of the pieces." This feeling originates in a dream, a sensation so ingrained in his being that he decided to translate it into a direct aesthetic force in his music. This dream occurred in his childhood, and Ligeti recalls the environment, his room where he entered attempting to reach his crib, but was unable to do so because of a dense series of spider webs. These heavily entangled webs trapped him along with several other doomed insects and his now rotten belongings. Like a victim of quicksand, he slowly realized that his and the other insects' efforts to break free only strengthened the web's grip on them, and he experienced "the hopelessness of elapsing time and the irretrievability of the past," an utterly oppressive and unfortunate circumstance. Ligeti states that the memories of these haunting dreams directly provided inspiration for his work in the late 50s, namely Apparitions, whose "sonic structures recall the network of the dream, and the course of the form as a whole corresponds to the process of transformation to which the web was subjected." This goes to show that although the dreams provided the structure for some musical interpretation, it didn't "serve as their content". The effect of the dream, as is common in compositional practice, underwent many re-shapings and manipulations, as well as layerings of textures until the technique of the web fully supported not only his feeling about the dreams but his feelings about how they should be reflected in his

musical environment. The musical material is transferred from an abstract concept or an image to an acoustic sensation. HIs approach to this music, although largely reliant on the orchestrational technique, also involves more sensory elements that instinctively presented themselves as a response to the images and imagined material of his dreams. He reveals that "the concept of 'time' for (him) is foggy white, flowing slowly and uninterruptedly from left to right, producing as it does so a very soft, 'hhhh'-like noise. This example alone provides some insight into a few concepts recognizable in a piece like Lux Aeterna: 1) The image of a *foggy white*, transient substance "*flowing slowly*" is extremely appropriate and logically deductible to most who have encountered the soundscape of the piece, 2) the body of sound is as *uninterrupted* as voices, limited in their ability to sustain, can achieve, 3) the foggy white substance moving through space "*producing*" a *"hhhh-like noise,"* represents the almost white noise effect of all of the syllables and textures combining together. The materials were collected in this way, and re-interpreted, layered and collaged together by Ligeti. Rarely are there moments where there aren't several elements happening at once, colliding, creating a webwork. Sometimes, however, the network is thinner and therefore more perceptible in a way, although the sense of resonant textures remain. I'm thinking of the beginning of Apparitions, where two basses play low sustained pitches at the same time and same dynamic, but a semitone apart. This soft and static environment is actually interrupted only by the oscillations created by the semitone interval. While this doesn't equate to the density and blurred nature of the larger sections of MPY, the effect of the environment that is both static and interfered is rather haunting.

I have already presented an important dichotomy, alternatively a paradox, that polyphony is written, and harmony is heard. I will now present a variation of that. Ligeti often refers to destabilization of structures with the intention of creating a unifying body of sound. By obscuring and abstracting the perceptible movement of music, you achieve what could *sounds* to the listener as a more stable, consistent wave of sound, a static state. The staggered, but gentle, separate voices represent this destabilization. Instead of repeating a chord with many voices again and again to convey a stable, recurring musical event, Ligeti decides to achieve that stability through masking the source of those voices, or parts. While they often are used synonymously, it is useful to separate them in order to create a fluidity of definitions according to the context. Of course, Ligeti's micropolyphony is vastly more difficult to recognize audibly than it is to analyze, so one should be able to convey that "at a given moment a single part may project two or more real voices, or two or more parts may contribute to a single voice." It is often stated by human physiology researchers that a human brain can only accurately follow two simultaneous independent musical voices (parts). That means every piece of music with more than two parts will be somewhat reduced in our perception to a two part structure by merging some voices together. Parts bearing the closest semblance to each other will be merged into one to form a two-note homophonic structure which then can be easily followed. This is an important scientific contribution to the aesthetic of the blurred orchestration.

MPY, while incorporating older methods that date back centuries like canons and counterpoint, is basically accelerated in Ligeti's application, to the point where it clearly points to the future, his idea of static states in music. While this direction, the decision Ligeti made to incorporate MPY as a big part of his music was his alternative to the techniques of European serialists, his music too contains rigid structures. Where the serialists depended on numbers, he

had created a functional and very logical system to express his feeling as best as he could achieve. That's why this is all very important. Ligeti happened to invent strikingly effective compositional techniques that clearly sound interesting and unique, but all as a consequence of him requiring those tools to express his vision. He was able to throw out several conventions and replace it with techniques that demand fairly distant and maximal capabilities of the instruments he used. MPY, if accelerated further in theory, may begin to resemble white noise, a rapid combination of frequencies and vibrations, a level of static barely unattainable for the acoustic instruments of the orchestra. However, this point serves to prove that Ligeti's music, and his micropolyphony, were pointing towards a very interesting future.