GUERRERO: Conception and Process of a Surface

In the Winter of 2017 I began using the music computation software produced by IRCAM called OpenMusic. This program allowed me to realize many of my musical ideas that I had yet to crystallize and using it was a major stepping stone in the development of my music, but I felt that OM had some significant drawbacks for the workflow I was hoping to develop. This potential weakness led me to look into other software and in the Summer of 2018 I began to study the Abjad Application Programming Interface for Formalized Score Control in the Python programming language developed by my friend and mentor Trevor Bača.

There appear to be two fundamental principles held by most dedicated users of Abjad, including myself. The first principle is that of *Score Control*. This notion is based upon the idea that the act of composing for acoustic instruments requires a relay of some form of instruction from the composer to the interpreter. In most cases, the medium of transference is that of music notation in the traditional Western style. *Score Control* is the principle that the act of composition is concerned with the manipulation of elements on a page that represent an action to be achieved by the interpreter, not an abstract description of what sounds may result. In this case the score is a deliberate set of instructions intended to affect the mode of performance, thus the clarity, precision, and purity of this document is held as a significant priority. Composing with Abjad can be seen as a kind of sorcery by which numbers and data are transformed into a score to be interpreted by a performer. This transmogrification of information into sound is a musical alchemy. In fact, the idea of numeric transmogrification is built into the name of the software itself. In this case, Abjad refers to the Abjad numeral system whereby letters assigned a numeric value can be used to encode dates and other numerological symbology into words and phrases.

The second principle that is shared by many composers who use Abjad is the idea of *Composition as Software Design*. This principle describes the kind of workflow used when working with Abjad. Composers may use Abjad in different ways, but with *Composition as Software Design* the composer is no longer just a user of a software, but a software developer in their own right. Each composition crystalizes in the way a programmer writes software. Various reservoirs of material and processes are defined and called at specific times throughout the composition process to be assembled into a final score. The composer also does not rely only on the built-in tools of Abjad for their music, but write their own software to produce notation in very personal ways. An added benefit of this methodology is that it is common for software developers to house their code in online repositories such as GitHub. These repositories allow for the perusal not only of source code, but also a history of the changes to each file as the project develops. Because of this, a full history of my works composed in Abjad can be found in my repositories at https://github.com/GregoryREvans. A final concern of this principle is that of the user interface. If composing music with Abjad is akin to software design, then the resulting score is the Graphic User Interface of the program. Interpretation of the score is method by which the user is able to interact with the software. As a software developer would take great care to ensure that the GUI of a program is pristine, so do many Abjad composers.

GUERRERO is a composition for twenty-one saxophones ranging from Contrabass to Sopranino which was composed for the Frost Saxophone Ensemble. Although *GUERRERO* was neither my first completed composition with Abjad nor the first I conceptualized, it began as a folder of some of the earliest experiments that I used to explore my own idiosyncratic workflow with Abjad. At the time, I had been studying the music of Francisco Guerrero Marín, a Spanish composer whose music is not well known in the United States. Specifically, I was studying his

work *Rhea* for twelve saxophones. Guerrero's music tended to be post-serial in construction, relying on many serial procedures for the organization of harmonic material with the added concern of combinatorics in many parameters of sound. While his early works are primarily concerned with combinatorial manipulation, his late work is often based on musical mappings of fractal models. While I have found no analyses of his work in English, my study of *Rhea* leads me to believe that it is both a combinatorial work and a fractal work. Because I had the power of the Python programming language at my disposal for musical purposes, I decided to experiment with combinatorics, fractal models, and cycles in my own piece for twelve saxophones as an homage to Guerrero.

Before I began serious work on the piece, I asked Joey Speranzo, the conductor of the Frost Saxophone Ensemble, if there would be any possibility for a reading session of the piece once I completed it. We later agreed to instead premiere the piece on of one of the ensemble's concerts. During the composition process, the number of performers in the ensemble steadily grew from twelve to twenty-one. Since much of my combinatorial planning relied heavily on the number twelve, the manipulation of combinatorics was abandoned as a primary feature in this piece, but fractals and cycles remained.

An extra-musical inspiration is also present in *GUERRERO*. I was interested in the physics of light and I was reading a number of books on astronomy at the time and I was interested in writing a piece of music that has a constant such as light that is warped, absorbed, perturbed, reflected, and refracted. This established the foundation of pitch material in this work. At first, I experimented with using a pure harmonic spectrum as the fundamental timbre of this piece. I also looked into harmonies derived from ring modulation, but in the end, I favored a harmony formed from a twelve-tone row of fixed register by voicing it across the entire

ensemble. I chose this because I was interested in an auditory affect that felt less weighted to a tonic or fundamental, but felt more evenly distributed in density. This chord no longer functioned as a tone-row but as a harmony-timbre from which all other material is in some way derived. The chord in question is Link Chord #23. The Link chords are a set of all-interval, twelve-note chords with a contiguous statement of the all-trichord hexachord somewhere within it originally calculated by music theorist John F. Link. Initially, I intended to treat the all-trichord hexachord within my sonority combinatorially, but as stated previously, this was abandoned.

In line with the analogy of musical material behaving like light, I wanted to explore auditory mirages. I wanted to move smoothly between a number of musical textures in a way that was difficult to notice but also progressed the piece in a satisfying way. I started with the global form of the piece, constructing a pattern of segments and what kind of material should develop within them. After this, I organized a more local pattern of timespans during which the material would be performed. Each of these timespans were tagged with the name of a music generator I had written and Abjad populated these timespans with material created by my generators.

I chose to gradually move from a very ambiguous state to something with more clarity and back toward ambiguity, but not all the way back to the original state. The piece opens with an ascending quarter-tone scale performed as a glissando. The octave is never reached because the scale begins anew once it arrives one quarter step away from the octave. The orchestration of this passage is meant to reference a Shepard tone, an auditory illusion of infinite motion. This is the point of greatest ambiguity in *GUERRERO*. No satisfying harmonic consistency is established and the orchestration potentially gives the illusion of endless motion. The cascading rhythms of this passage are created from two taleas, which are cyclic rhythm patterns that

develop independently of harmonic material originating in music of the middle ages. The first talea is a pattern of $\frac{1}{16}, \frac{1}{16}, \frac{1}{16}, \frac{5}{16}, \frac{3}{16}, \frac{2}{16}, \frac{4}{16}$, and the second talea is a pattern of $\frac{4}{8}, \frac{3}{8}, -\frac{1}{8}, \frac{2}{8}$ where negative fractions represent a duration that is always written as a rest. A cycle of tuplet brackets is applied to each timespan containing rhythmic material in a way that redundant tuplets are removed. The tuplet bracket cycle applied to the first talea is 0, 1, -1, where 0 represents no change in prolation, 1 represents an augmentation, and -1 represents a diminution. The fraction of the bracket is calculated based on the duration of timespan, but they are written as pure prolations, thus a tuplet that could be written as 9:6 is written in a reduced form of 3:2. The tuplet bracket cycle applied to the second talea is -1, 0, -1, 1, 0. The quarter-tone scale is applied to all rhythms in both taleas, but each talea also has unique dynamic trajectories. The first trajectory is a sudden swell from mezzo piano to fortissimo and the second trajectory is a smooth crescendo from mezzo forte to forte. Originally, every note that is part of the first talea was given a tenuto marking and the second talea has a cycle of articulations applied to it, but in the final edition of the piece, only the second articulation cycle is present. This cycle is one tenuto followed by four notes without articulations. This kind of process is idiomatic of each section of *GUERRERO.* A rhythmic process is paired with a pitch process, dynamic trajectory, and articulation pattern. These units alternate and interrupt each other. Each section was composed in isolation, so these processes remain restricted to their respective segment. Section H reiterates the Shepard tone theme, this time with slower rhythms and a significant element of noise.

In the following section, section A, the fundamental harmony begins to crystallize, albeit in a highly distorted form. I originally planned to emphasize a specific note in a given instrumental part. While this is not the case in the final version of the piece, there is still a shadow of that original design. The instruments that play a note of the all-trichord hexachord

when the fundamental harmony is voiced across the ensemble are given multiphonics to perform. These multiphonics and their fingerings were taken from the Baerenreiter book *Die Spieltechnik des Saxophons*. I originally approximated the sounding pitches of the multiphonics to quarter-tones, but eventually I settled on an eighth-tone approximation. These specific multiphonics were chosen because they contained literal pitches from the fundamental harmony and therefore contained members of the all-trichord hexachord within Link chord #23 or contained pitches that were a close approximation to these pitches. Some also contain extraneous pitches. The rhythmic material of this passage began as a sustained note for the duration of each timespan, but evolved into taleas of long durations. The passage gradually increases in rhythmic density while clarifying the harmony by reducing the number of multiphonics played.

In Section B, the harmony has almost settled into a recognizable form. The pitches are derived from a musical mapping of *Brownian Motion* with each step scaled to a quarter-tone. Brownian Motion, sometimes graphed in the form of a *Random Walk,* is a description of a chaotic system where particles move in seemingly unpredictable ways, but when statistically analyzed form a normal distribution, which is one of the most common distributions found in nature. The shape of these walks is governed by the fact that a physical system is presupposed. Particles cannot teleport from one location to the next. They must first pass through spaces adjacent to their previous position. These random walk mappings begin and center around chord tones, but are erratic such that the harmony is still unclear. Section G is a return to this material where random walks begin and center around chord tones. This time, the glissandi are scaled to half-tones rather than quarter-tones. This is intended to emphasize the chord tones by sitting in a twelve-note chromatic space rather than the distorted twenty-four not chromatic scale.

Section C acts a quick transition between the texture of sections B and D. Section C increases the density of material and introduces the air tones that become prominent later in the piece. It includes multiphonics, but there are many statements of pure chord tones.

Section D is emphasized by a focus on a continuum of pitch and noise. While every pitch in this section is present in the fundamental harmony, the clarity of its statement is hindered and absorbed by the surrounding noise. The tempo is much faster in this passage, creating a cloud of sound.

Section E has the most prominent statement of the fundamental harmony. Brownian models are mapped to pitches in the chord and some dyads are isolated as trills. This is the most rhythmically dense passage of the piece, but the harmony is clearest. This process is continued through Section F although the texture is much thinner. The non-chord tones are derived from the multiphonics and threaten to overcome the stability of the fundamental harmony.

Section I is slow and returns to only chord tones.

Section J returns to the texture of Section C. This transitional character transform from a bridge into a climax with the piece suddenly halting its trajectory.