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UNIVERSITY OF CALIFORNIA, SAN DIEGO

Scene/Sense: Performative Energy and the Process of Tuning

A Thesis submitted in partial satisfaction of the requirements
for the degree Master of Arts

in

Music

by

Kevin Gray Flowers

Committee in charge:

Professor Chinary Ung, Chair
Professor John Fonville
Professor Lei Liang

2014

The Thesis of Kevin Gray Flowers is approved and it is acceptable in quality and form for publication on microfilm and electronically:

Chair

University of California, San Diego

2014

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ABSTRACT OF THE THESIS

Scene/Sense: Performative Energy and the Process of Tuning

by

Kevin Gray Flowers

Master of Arts in Music

University of California, San Diego, 2014

Professor Chinary Ung, Chair

This thesis describes the background, compositional method and final result of three chamber works composed during the 2012-2013 academic year. These three works - entitled *3 Songs*, *Fear of Patterns* and *scene/sense* – represent extensive research and practical experiment into the theories of Extended Just Intonation. In addition, this text gives insight into personal reactions and lessons learned along the way as the works cover much new ground in the field. While my method had no doubt been grounded in previously existing research and compositional/notational practices, the nature of my

artistic approach and experience working within the UCSD Music community have garnered unique insight.

Introduction

The three works submitted with this thesis illustrate how my research into sonic timbre evolved into a compositional style synthesizing rational tuning systems, formal structuralism and performative energy. Initially, I felt that a timbral emphasis meant that structure, metaphor and virtuosity should be suppressed. My focus instead would be directed toward the more immediate dimensions of instrumental color and precise intonation. The result was *3 Songs*, in which each movement was restricted to a single timbral atmosphere. While I feel that the piece was successful, I resolved that in my next work I would continue to explore harmonic relationships without sacrificing formal intricacy.

While composing *Fear of Patterns*, I found that timbre, gesture and form were not as isolated as I had originally believed. These dimensions could be seen as different manifestations of the same natural behaviors. As such, they could be merged together to create a music that was uniquely self-referential *and* deeply rooted in our shared phenomenological understanding. The piece was a breakthrough for me in that it combined the distinct timbres of complex intonation with the captivating power of instrumental virtuosity.

My next project expanded this harmonic and performative language to a larger scale. However, *scene/sense* became more than just the culmination of my recent research and revelations encountered in the process. The work incorporated many of the techniques I've found powerful since the earliest stages of my studies. My previous interest in overarching formal structuralism, ensemble density, and an idiosyncratic

approach to thematic cohesiveness were revisited to help make the complex work my most successful.

This thesis describes my compositional approach and practice as they related to these works. The text refers charts and preliminary sketches ("Figures" in this text) which will aid the reader in understanding not only my process but the final results. These can be found following the text of the thesis. In addition, many references to the scores themselves are made. These can be found in the second, third and fourth appendices of this thesis. Audio recordings of the three pieces are on file at the Mandeville Special Collections Library.

3 Songs for Soprano and Violin

3 Songs was the first work I completed as a Master's student at UCSD. The initial courses of the composition and performance programs are cross-listed which allows very close collaboration from the earliest stages of the process. I took this opportunity to begin exploring "just" intervals as the theory behind and practice of this material requires musicians of a very high caliber. Looking back now, it is clear that the work marked the beginning of an especially important stage in my compositional growth. It is not only the first in several works exploring tuning and instrumental technique as they relate to timbre, but builds on the techniques I explored as an undergraduate.

As the title suggests, the piece consists of three separate movements, each designed to contrast the other two. I had already written many multi-movement pieces and my hope in doing so had been that the contrasting nature of each part gave greater depth to the whole. In *3 Songs*, contrast was so important that it became my guiding principle. The first and third songs contain almost exclusively "just" intervals, while the second has no intonational instructions at all. The registral disposition of the two parts is markedly different in each, with parts crossing and in close position or separated by octaves. The first two are both in traditional meter and use standard violin tuning while the third is free of meter and requires the violinist to have a second violin prepared in extreme *scordatura*. Pleasantly, I found these contrasts not to be jarring, but gave the piece structural depth.

Compared to the music I would write soon after, *3 Songs* uses somewhat simple intervallic collections. Instead the piece focuses on the power of finely shifting instrumental timbres. The result is complexity on an almost latent level with the fleeting vocal motives and gestural nature of the violin part giving the surface a captivating – and at moments mechanized - quality.

Analysis by movement

1.

In the first song, nearly every pitch is given a notational qualification which indicates how it is to be tuned. These ratios are indicated with a system of "thin" and

"bold" arrows pointing up, down or in combination. I adopted and slightly modified this notational system from that used by Gyorgy Ligeti in his *Hamburg Concerto* for Horn and Chamber Orchestra published by Schott Music. The arrows indicate the relative distance of a given pitch from its nearest 12 tone equal tempered (12 TET) equivalent. (See Figure 1 for comparison to rational descriptions) While systems like those used by Ben Johnston are more explicit in indicating the ratio desired, I find that the arrow system can quickly be understood to signify the same things and prevents the staff from being cluttered with Arabic numerals.

The process of tuning just intervals involves the production and control of pitches as close to whole number ratios as possible. For example, an interval consisting of two frequencies sounding at *exactly* 300 and 200 cycles per second would be just as this simplifies to a 3/2 ratio. This interval would be a "just" perfect fifth. While not entirely understood by most musicians, just – sometimes referred to as "pure" - intervals have been used as far back as the ancient Greeks and Chinese (Partch 92). Often, string quartets and vocal ensembles tune these whole ratios without even thinking about them as the simpler proportions sound significantly more consonant to the ear than the complex ratios of 12TET. It is only when sounded in consort with instruments designed to play "equally tempered" pitches that the just intervals stand out.

In the first movement of *3 Songs*, tuned ratios range from 3/2 to 11/8 with a constant open D on the violin providing the harmonic center. The D is re-contextualized as the fundamental, the 3rd partial (G fundamental), the 5th partial (a fundamental of Bb flat ca. 13 cents sharp), and as the 7th partial (E fundamental ca. 31 cents sharp). Again, the reader is invited to refer to Figure 1 for illumination regarding the pitch material of

each part on the standard Gregorian staff. The movement can be divided into two parts with the violin's stopped note moving above the D in measure 32 being the dividing point. The intervals comprising the violin part are nearly symmetrical with the F 7th partial flat beginning in bar 44 being the exception. Much of my previous work contains these *slight* asymmetries.

While the moment to moment pitch material of the violin part is mostly static, the bowing provides a gestural phrasing that is both dynamic and performatively captivating. There are musical ramifications to the speed and frequency of bow changes but the lack of melody disassociates gesture from traditional notions of musical content. In performance this is particularly striking as the violinist is forced to move their body in conjunction with the bow to clearly articulate the rapidly shifting dynamic changes. The result resembles a kind of ritualistic dance between the performer and their instrument.

Throughout the work, the vocal part is wordless. The vowel and consonant sounds were specifically chosen in order to accentuate timbre, with no syntactical considerations made whatsoever. In the first song, no consonants are used and vowel sounds are linked to specific pitches (with some exceptions). The vowels begin to change as new pitches are introduced and move from pure to combinatorial (what linguists refer to as diphthongs). In Figure 2 – which gives a very clear breakdown of the International Phonetic Alphabet - the "purer" vowels are those on the left and right sides of the chart and are executed *exclusively* by accurate tongue or lip position. The middle row of vowels occur more often in Continental languages and have a much different effect on the music as their formants "filter" sound waves emitting from the singer which in turn

blend with the violin. In rehearsal it was observed that these formants amplified many more of the higher partials than the "purer" vowels.

My intention with the progression of vowel formants was to provide the music a subtle trajectory without obscuring the other elements of register and motive. When the violin's stopped note moves above the D in measure 32, the fact that the performer must play this pitch very high on the string instantly creates a different timbre. This however is quickly assimilated by the listener and their attention is drawn to other elements. What I found particularly successful is that as what appears to be a recapitulation is occurring, the new and more varied vocal sounds provide the listener with an almost unidentifiable variation. Both parts are higher and their character has shifted, creating a kind of understated drama to the end of the movement. As the first song comes to a close, the first 11th partial ratio appears. The G quarter-tone sharp in measure 48 comes as a pleasant surprise to the listener, giving them a quick glimpse of material to come.

2.

As stated above, there are no indications of just intervals in the second song. However, the fact that the violin part is played entirely in natural harmonics ensures that the part uses exclusively whole-number ratios. The same is not true of the vocal part, where the soprano is given only 12 TET pitches. In addition, the ranges are flipped from the previous movement with the vocal part lower than the violin. As a result, "difference" tones play a much greater role in this movement. Simply put, difference tones are psycho-

acoustic phenomena in which there is the perception of additional pitches to those being activated by a performer or performers. The frequency of these illusory pitches is *exactly* the difference between those sounding. However, these pitches are not detectable as on recording equipment.

While difference tones are theoretically always present, their energy is often not enough to make them clearly audible. In the second of my *3 Songs*, the combination of very high and timbrally bright harmonics in the violin with those mathematically less congruent and equally forceful from the soprano creates an acoustic environment rich in difference tones. The listener clearly perceives a sort of humming or buzzing in their inner ear, giving already active musical material an extra degree of intensity. It can be calculated what pitches will be heard but I felt satisfied to simply let the phenomenon occur as a given singer's interpretation of the vocal line would invariably lead to diverse results. What *can* be said is that since the vocal and violin lines consist of rationally more complex 12 TET relationships, the difference tones will likely not be particularly consonant.

Another important element of the second song is the role that gesture plays in the two parts. Not only is the violin part played exclusively in natural harmonics, but also always on two strings at the same time. These "double stops" require wide reaches of the performer but the results are very often unisons or major seconds, creating a visual disconnect between the effort being put forth by the performer and the sonic result.

As the violinist bows away at their harmonic double stops, the soprano's jagged, wide-ranging melody is markedly different from that of the first song's. In fact, the entire range of the first movement is spanned in the opening two notes of the second.

This large leap forces the singer to quickly move between vocal registers, much like the technique used in yodeling. The text also incorporates consonants which I use as percussive rearticulations giving subtle variation to the repetitive, twisting motives.

It was my hope that the somewhat agitated nature of the second song provide the audience with more questions than answers. The first movement, while active in some ways, had been eclipsed by the angular and noisy second. In a way, I wanted to give a new take on the tradition of a half cadence at the end of a middle movement. Mine was not so much predicated on the practices of tonal harmony but on the listener's perception of acoustic phenomena and processing of the material presented. This second movement was not a light *aria* or a vivacious *scherzo*, but an unmistakable complication of the overall musical narrative.

3.

If I was successful in building up a good amount of tension in the second movement, the nature of the third would be a kind of other-worldly relief. In it, musical time is discarded and the players are given flexible indications at coordination. The violinist plays a prepared violin which is restrung with 4 low G strings. All four are tuned to the A flat below Middle-C in order to facilitate natural harmonics. The violinist plays a circular bowing pattern moving from *sul tasto* to *sul ponticello* all while tapping the first and second strings with harmonic pressure. The resulting sound is a brilliantly colored, machine-like drone whose power drives the bulk of the movement. The soprano enters

higher than she has sung heretofore and the long vowels she sings are ethereal. Unlike the other movements, the parts are separated by over an octave, further adding to a sense of detachment. Motivic fragments from the first song reappear in this higher register and are stretched focusing the listener on the subtle changes in vowel formant. All the while, the violin hacks away noisily at their pulsing drone.

This space is finally broken by a shift to rapid string crossing in the violin and a long triple stop glissando. While these pitches are left un-tuned, many interesting and beautiful harmonies arise giving the simple soprano line very unique underpinnings. Unlike the other two songs, the third meanders, next moving to a space characterized by the rapid bow alternations by the violinist up and down the entire length of the fingerboard. The resulting sound is a combination of brushing and harmonic filter-sweeping. Motives from the first song appear again and the piece draws to a close on an extremely noisy recapitulation of the opening.

Even though the final movement has several allusions to the first two, its nature is so novel that I find it clears the auditory palate. I can't help but feel that the iconic violin drone and dream-like soprano lines pull the listener out of the auditory intimacy of the second song and make the first seem remote, almost forgotten. My aim was to create a piece in which contrasting musical content shaped a deep temporal dimensionality and I feel that in this piece I began to understand how to achieve this. The next two pieces I would write continued to push my conception of musical time, performative energy and instrumental timbre.

Fear of Patterns for Cello solo

Upon the completion and initial performance of *3 Songs* and finding that the performers - despite having little to no experience with just intonation - were able to quickly assimilate the new concepts, I was eager to push the possibilities of tuning. The feedback I received on the duo from faculty was encouraging but much of the criticism revolved around its static and academic nature. It became important for me to make a piece which did not rely so heavily on a relentless drone and over-subtlety. I wanted to write a piece in which I moved away from the assuredness of "safe" intervals and the perceived sterility of academia.

It was fortunate, then, that at that moment a good friend of mine gave me a copy of Harry Partch's *Genesis of a Music*. I already knew of Partch and the book and had heard the *Hitchhiker Transcriptions* among other works. However, I had been mystified by what I saw as a disconnect between the music's purported complexity and its wild, chaotic energy. Where I had been looking for a 43 note scale, I heard alien folk songs and *glissandi*. Upon reading the book, I was convinced about two things: one was that Partch was clearly incredibly smart and confident in his path in music; the other was that I did not share several of his opinions. That being said, *Genesis…* is an essential book for those who are interested in the history, theory and performance of alternatively tuned music and it forever changed my creative output. Here was a musician - writing in 1947 - dealing with many of the same performative problems I was just discovering. It appeared to me, though, that Partch's solution was to withdraw, make his own instruments and only work with those who wanted to make music on his terms. I felt that

the way forward for this type of music was to find common ground, which was clearly there. This led me to approach the amazing cellist Judith Hamman and ask if I could write a solo piece for her. She graciously agreed and I began my research.

I poured over the ratios which made up Partch's 43 note scale (see Figure 3) and determined that several of them were too difficult to tune by ear in performance. The difficulty of tuning these intervals came from the fact that one had to "hear" the note being tuned to as an already very remote partial. For example, one interval in the Partch scale is 40/27 requiring a performer to conceptualize a sounding pitch as a perfect fifth above the 7th partial of a fundamental - *neither* of which are sounding - and then accurately play a 5th partial of that (unsounded) fundamental. (That is, "Hear this as 3 of 7 of 4 and then play 5.") Quite simply, the note needed is too many steps away and is too close (21.5 cents) to a much stronger interval of 3/2 to be tuned in a timely fashion. Intervals like these are why many musicians interested in just intonation turn to specially designed or electronic instruments. I wanted to find a compromise which allowed me to write for standard instruments and the majority of educated, professional musicians.

I borrowed a cello and began testing my own abilities at tuning these intervals and after some practice felt confident in 28 of the original 43. I made my own chart and some small sketches then met with Judith to discuss not only each individual interval but the feasibility of moving between them. While I was fortunate to be able to work with someone with her musicianship for this early project, she also made clear what would and would not be possible for most players. After a few meetings, I felt I understood the issues at hand and set to work on the piece.

Fear of Patterns underwent more changes in content than any other piece I've written. I knew the pitches I wanted to use and that the performer would need certain things in order to accurately play them, but the number of ways in which they could be presented seemed overwhelming. After the experience of *3 Songs*, I felt that another immersive drone environment was not needed. However, having been so influenced by Partch I felt that a constant tonal center was still essential – especially for a single player. The solutions I found forced me out of my usual compositional tendencies and greatly expanded my understanding of how "just" music is really a reflection of larger scientific principles which govern the world around us.

Analysis of the work

Fear of Patterns consists of three distinct types of material. The first, which makes up the majority of the opening, is a sliding harmonic double stop in the highest register of the instrument played on the first and second or the second and third strings. The left hand position is designed to be ergonomic as the notes on the second string are higher than those on the first or third and are to be played by the middle finger. The shorter index and ring fingers play the third and first strings respectively, allowing the pitches to fall under the natural resting position of the hand. The player is asked to slide this hand position between the 10th and 17th harmonics of the second string and 9th and 16th of the first and third. These harmonics are located in the last two inches of the cello's strings, forcing the player to play *sul ponticello* throughout. The resulting sound is similar

to what George Crumb dubbed the "Seagull Effect" in *Vox Balaenae* but with some distinct differences:

- The partials on the part of the string closest to the bridge are much higher and are therefore much more "out of tune" from equal temperament

- The distances between partials are smaller than over the fingerboard, making the naturally occurring acceleration and deceleration much faster.

- In this piece, the player is always playing two strings at the same time – something virtually impossible with the artificial harmonic used in the Crumb. The result masks the clear "sweep" up the spectrum of each string and creates a unique tertiary sound.

This technique was not initially intended to be part of the piece but rather was discovered when I was trying to locate naturally occurring versions of the stopped notes I was trying to tune. Figure 4 instructs the cellist on where several natural harmonic "verifiers" occur on the instrument. What appealed to me beside the attractive superficial quality of the technique was that one could metaphorically say that a number of these notes would be "brought down" several octaves and become the stopped notes I had wanted to use all along. The quality of the acceleration and deceleration appealed to me as well, as its logarithmic nature seemed to contradict a constant *glissando* speed. That is, there was a second layer of rhythmic contour which could be activated without a

corresponding gesture by the performer. They would simply slide their fingers at a constant rate and the notes would speed up and slow down at a perfectly arithmetic rate.

Another interesting aspect of the harmonic material was revealed when I tried to play it on the low end of the strings; that is by the nut in the lower positions. The pitches did not speak at well and the open string tended to come out near the very first position. I saw a way of not only bridging the gap between materials but of exposing a kind of "natural echo." The acceleration and deceleration and some of the pitches were still present, but with much less stablity. I felt as though I had begun to let the instrument provide me with ideas.

The harmonics dominate roughly the first two minutes of the piece until a rapid chromatic figure in the tenor clef is introduced in the last system of the second page of the score (the piece is un-metered). The motive is accompanied the 2nd string open (D below middle C) and writhes around the octave above on pitches which are in fact just, but fleeting. Faint glimpses of discreet intervals gradually emerge in page 3 but are again brushed away by the agitated, winding motive. Most exciting for me was the ability to subtly expand the motive as the 28 pitch scale contains many "versions" of the same pitch class. Almost imperceptibly, the melody broadens and climbs up toward the G quarter-sharp above middle C. Those familiar with *3 Songs* might see the second motivic area in *Fear…*as a logical extension of the violin writing in the first *Song*. While this is true, the octave transposition of the stopped notes places them on the much brighter A string. This helps prevent the open string from dominating the texture while still allowing the performer to accurately tune.

Near the end of page 3 the melody dives down an octave and begins to circle the open D. Placing the motive down an octave could be seen as dangerous as acoustic beating is much more prominent in the lower registers. However I obscure much of this material with bow placement and dynamic. The result is a murmuring phrase intended to hint at the final section of the piece.

The climax of the second phrase section continues the expansion and elevation of the tenor range motive until it reaches several pitches just below the A above middle C. The melody reaches its highest point at an A quarter flat, an interval of 32/11 with the open D. This is very tricky to tune and engenders as much tension in the listener as in the performer. At this moment of acute acoustic tension, the music jumps down another octave to the lowest register of the cello. While the pitch material from the previous phrase is continued, its placement in the low register results in pronounced beating and a muddiness which renders it almost unrecognizable. While several pitches are used, the prevailing interval rests somewhere around a tri-tone and using subtle changes in frequency the music shifts to a 4/3 in G as a link to the final section of the piece. Here again, register and liminal shading of pitch are used as a sort of musical slight of hand, obscuring overly direct or clumsy transitions.

The final section of the piece was conceived as a drastic revision of the previous motives. There are 16 phrases, each consisting of 6 notes played on the low C string in addition to the 3rd string open (G). The tonality has shifted from D to G and the 28 pitch scale has been transposed as well. Every phrase is comprised of 3 descending *glissandi* to pitches lower than the initial note, then a slur back to a note near – but not as high as - the initial note and a final slide the lowest note in the phrase. This can be seen as

a translation of the winding tenor range melody heard earlier but with a mournful quality because of the *glissandi*. While the pitches themselves are low, the extreme *sul ponticello* placement of the bow excites many of the high partials creating a complex, fluctuating mass of frequencies.

As the title suggests, *Fear of Patterns* is very much concerned with the avoidance of linear progressions and development. The pace of the opening harmonics fluctuates wildly from long phrases and pauses in between to fast attacks and quick transitions. I made a "breakable rule" of following any high point with material that seemed to move away from climax, or rather avoiding it until *that* approach seemed predictable. While my method was very free, I chose to write using proportional notation in order to make my estimation of pacing much easier. I could simply look and see that the material was expanding or contracting.

In this final section I elected to get rid of proportional notation, instead making all of the phrases the same size and putting brackets underneath indicating how long (in seconds) each phrase should be. This facilitated the control of pacing in an even more direct way. I was also careful to not let dynamic shaping follow too closely the contraction of phrase length, creating an interesting effect where some of the fastest material was played in *decrescendo* or *vice versa*. Disassociating parameters as a way of creating new combinations became a focus of mine in this piece and I have continued to explore it in different ways in subsequent pieces.

The pitch material of the 16 phrases also began as a linear progression which expanded at a constant rate. I then shuffled them in such a way the overall descent from G to C is kept in tact but from phrase to phrase is obscured. See Figure 5 for my notes on

constructing this section. The piece ends with a short coda of a melody played natural harmonics on the 4th string with the 3rd string still accompanying. The harmonics are in the same register as the opening but are played on the one string omitted in that section.

In nearly all of *3 Songs*, the violinist plays some form of double stop. This is the case in *Fear of Patterns* as well and is an example of my experiment in making essentially arbitrary rules as a way of focusing my compositional decision making. While I believe it is important to allow a rule to be broken if it seems appropriate, I've found that giving certain dimensions pre-ordained outcomes encourages creativity in others. By making a given the symmetrical pitch material of the first of the *3 Songs*, I was forced (freed?) to focus on the subtle timbral shading of vowel formants. In *Fear*...I gave myself varying degrees of limitation in regards to pitch and pacing and found that they promoted imagination rather than stifled it.

The process of writing and coaching the performance of *Fear of Patterns* also showed how accessible the reduced version of the Partch scale really is. I immediately knew I wanted to make sections of the cello solo the basis of a new ensemble piece. While the work that became *scene/sense* was clearly built upon the pieces that preceded it, new ideas from film and other just intonation scholars united to make it the most complex and successful piece I've written.

scene/sense for ensemble

There are two juries for first year composition students at UCSD. The first is a kind of crash course with 10 weeks to conceive, experiment, and complete the piece. For the most part, the instrumentation of the first jury is given – or at least limited to the pool of incoming performers. This is not a disadvantage, as regular interaction with performers is an invaluable opportunity. The second jury is more freely organized with the composers given near free reign to pick ensemble size, duration and format. In addition, the composers are given two quarters to write, which after the manic nature of the first jury is a welcome change of pace. In order to take full advantage of their time, many composers begin focusing on the second jury piece as soon as the first is completed. I, however, began an independent project in order to better understand complex intonational relationships. The result of this research became *Fear of Patterns*. So I began the new quarter completing a solo cello piece which I knew would be the basis of my second jury, but unsure how to expand it.

I began to think of the piece as a kind of Chamber Concerto, with the cellist being featured and the ensemble elaborating on the tuning and energy of the solo part. I quickly realized that if I wrote for more strings I would run the risk of simply rewriting the first jury piece for a larger ensemble. I felt very – almost too – comfortable with the techniques and acoustic behavior of stringed instruments and came to the conclusion that an ensemble of wind instruments might be a good challenge. The orchestral strings have essentially unfettered access to any frequency in their range, while the behavior of wind instruments is much more complicated and – to me at the time – esoteric.

Also at this time I was studying with Professor John Fonville who has spent years playing and advocating for rationally tuned music. His Just Intonation ensemble

course at UCSD was incredibly illuminating for me in several ways. First, it provided me with a confidence in our innate ability to tune complex ratios by ear. In a way, you can *only* tune these intervals by ear which was a very uplifting idea to me. Second, I was able to analyze the incredibly ornate system of extended just intonation which he has honed over many quarters. One might call his method "group tuning" as it requires at least six players to function. Against a drone, a player will sound a base interval (e.g. 7/4) from whom another will tune a *simpler* ratio (e.g. 4/3 below). The method results in an interval of 21/16 from the drone and allows accurate intonation of a ratio which is difficult to tune unassisted. The process of continuously tuning "multiples" of a base ratio - or two simultaneous ratios – is continued many times over, resulting in very complex and beautiful harmonies. (See Fig. 6 for a score example from the course)

Many members of the UCSD graduate music community have participated in the Just Intonation ensemble, making the departmental pool of musicians uniquely suited for experiment. However, in order to facilitate accuracy, rhythm is omitted. The players were given as much time as needed and only after all players felt confident would the group progress to the next harmony. An initial arhythmic approach is of course essential for pedagogical reasons, but I saw that after only a small amount of rehearsal could players "find their note". I saw an opportunity to take the principle concept of tuning "chains" and adapt it for more traditional, contrapuntal writing.

My research over the first few months at UCSD had led me from the subtlety and purposeful simplicity of *3 Songs* to the complex relationships of Harry Partch and *Fear of Patterns*. In the process, I had rekindled an interest in virtuosity which was rooted in its relationship to the immediacy of active tuning and acoustic phenomena. This

gave me a sense of freedom to revisit other concepts I had sacrificed for the sake of timbre. I had experimented with formal structuralism in many of my earlier works and looked to masters like Stravinsky, Ravel and Bach for inspiration. I found their use of thematic unity, inventive use of instrumentation and sensitivity to large scale proportional balance extremely powerful and sought the same in my music. Over time, a fascination with timbre and more experimental music led me to other methods of musical construction.

In the end, it was in my fascination with film that I found a method for reintroducing formal significance to my music. I had been completely blown away by the level of temporal sophistication in films from directors of the so-called European "Art House" and American Independent movements. I found the unapologetic, radical and visionary experimentalism of Jean-Luc Godard's *Weekend* or *Tout va Bien* as potent as the austerity and precision Michelangelo Antonioni's *Red Desert* or Jean-Pierre Melville's final masterpiece *L'Argent*. I discovered even more experimental works like Chantal Akerman's mesmerizing *Jeanne Dielman, 23 Quai du Commerce, 1080 Bruxelles* which maintains a miraculous degree of tension despite a running time of 201 minutes and having almost no dialogue. These were clearly artists who understood time in much the same way as composers do and were not afraid to take risks.

I saw in many European films new ways of approaching time which were unshackled by traditional concepts of proportional balance. However, I also saw another vein in European and American independent filmmaking which recognized the power of the actor; that is, of character study. So called "Hollywood" films gave us the idea of the "star," in which identification and intimacy with the performer becomes larger-than-life,

even mythological. Independent and experimental filmmaker's recognized the power of character and created works based almost exclusively on it. The works of Robert Altman had a particular impact on me in this regard. Working with minimal scripting and allowing his actors to improvise, films like *3 Women*, *Nashville* and *Short Cuts* create captivating experiences in which plot is secondary to characterization and the interactions between performers.

I saw the filmic concepts of experimental scene pacing and characterization as a way of organizing the large scale structure and small scale instrumental writing of the work. I would create "scenes" of varying proportions in which members of the ensemble would be featured. I felt, however, that my instrumental characterization should be different from those used by composers such as Elliot Carter. Rather than give each instrument its own unique material or superficial character, I would allow character to be revealed by having the same material be "re-processed" through a given instrument. This allowed me to keep my preference for thematic constancy while exploring newer concerns of gestural energy and allowing instrumental phenomena to play an integral role in the composition process.

The metaphor of "scene" also seemed fruitful as a vehicle for intonational exploration. The various scenes would have similar harmonic structures which could be tuned relative to different "base" intervals. Harmonic "re-processing" would involve much the same conceptual process as the subtly expanding melody I used in *Fear of Patterns*. The piece would be a kind of narrative in which I could probe the interconnectivities between form, proportion, density, gesture, harmony, intonation, theme, and timbre.

Analysis of the piece

Early Stages

scene/sense is scored for two flutes (flute 1 doubling piccolo and flute 2 the alto flute), Bb clarinet (doubling bass clarinet), saxophone (doubling soprano and alto), horn in F, percussion (one player) and cello. The first step in my process was to make a graphic sketch (Fig. 7) outlining each "scene." For most of the sections I outlined the relative duration, ensemble density (how many playing), designated "soloist(s)," relative register, dynamic contour and base harmonic intonational ratio. I spent a good deal of time determining the nature of these dimensions with the hope that their contrasting nature and overall development would provide the depth so important to *3 Songs*. A decision not in the graph but clear in my mind from the beginning was that the cellist would be the "primary soloist." This meant that not only would they be given the only section with a true solo but the duration of that section would have much proportional weight. The cello solo was to be a "piece within a piece," with the formal complexity and technical demands of a solo piece.

As composition began, however, I made several modifications to my original plan. Most notable are the absence of a 7th section described in the sketch and an indication that the 6th section be tuned relative to the ratio involving the 11th partial. The final draft contains 6 sections, the last of which is an expansion upon the harmonic ratios used in the 1st section (mostly 7/6). I include the chart as a way of illustrating my process for the piece and how the modification of certain elements affected the work as a whole.

Sectional overview

The final proportion (somewhat approximated; in time and percentage of the whole), ensemble density, and "solo" instrument of each section are as follows: (This is intended to provide a better sense of the large structure as these sections are not indicated in the score)

1 – [Mss. 1-44] 3'16", 19%. Begins as a quintet of two flutes, clarinet, cello and percussion; joined in measure 24 by soprano sax and horn. The percussionist is the soloist, playing their unpitched instrumental group.

2 – [Mss. 45-69] 1'40", 9%. Duo of flute and alto flute; parts interact to become a "solo of two."

3 – [Mss. 70-89] 1'22", 8%. Tutti, no true soloist but winds and cello exchange small fragments of melody to create a composite motive.

4 – [Mss. 90-110] 2', 11%. Begins as trio of bass clarinet, horn and timpani; joined by cello in measure 96 by cello. Bass clarinet is considered soloist with mulitphonic passages.

5 – [Mss. 111-134 + Unmetered section] 4', 23%. Cello solo. Performances may fluctuate slightly as solo is not conducted and in passages unmetered.

6 – [Mss. 135-191] 5’23”, 30%. Tutti. Cello solo continues as ensemble enters. Cello part gradually evolves into bass line figures and “composite” motives are exchanged throughout winds. In measure 169, a snare figure enters paraphrasing the opening percussion solo.

The cinematically influenced intentional inequality of sectional duration is seen above. While the local level nature of material no doubt complicates the perception of musical time, a sharp contraction and expansion of proportion is clear. Broadly speaking, the progression of instrumental density is: Quintet/Tutti-Duo-Tutti-Trio/Quartet-Solo-Tutti. The timbral, registral and harmonic progressions will be described below.

Local level pacing

In *scene/sense*, I had the idea to segregate every phrase with short “interstitial” measures of alternating length. The idea arose when drafting the flute duo, which was the first section composed. The duo contains one measure phrases which are followed by short measures of silence. While these measures were originally intended to allow the players to breathe, I found the temporal effect very pleasing. As I continued to write, I found that I could *anticipate* the duration (short or long) of the next “interstitial” measure and create content which seemed to fit. In some of these measures, the music seems to regroup. In others, there are *crescendi* which act as “pick-ups” to the phrase to follow. While I have set limits on musical dimensions as a compositional method before,

this limit was the first to permeate the local level of an entire work. The only exception to this pattern is the measure of 3/4 with a fermata in measure 54.

In the first large section, the "interstitial" measures are of 2 and 3 beat duration. This is in conjunction the phrases themselves, which average about 10-14 beats. This gives the local level pacing a broader quality. I found that I could compound this sensation by creating content which was sparer, or could work against it by compressing phrases and the density of material.

The flute duo which comprises the second section marks the point at which the interstitial measures become 1 or 2 beats in length. This pattern continues until the end of the piece. As stated above, the duo's phrases are each one bar long with measures of rest breaking them up. However, the length of these measure long phrases expands and contracts between 4, 5, and 6 beats in length. By juxtaposing longer or shorter phrases with longer or shorter rests, the perception of time can be easily manipulated.

The thirds and fourth sections have phrase and interstitial measure durations which are nearly identical. However, the slightly faster tempo and much more active material in the third give the section a much livelier quality. Indeed, passages in the fourth section seem to be almost still. The cello solo continues the pattern with quarter and half rests used in the unmetered section. In the final section, the interstitial measures are used to create a nearly seamless transition from harmonic drone to extended harmonic progression (see full sectional description below for more detail).

Gesture, harmony and timbral quality by section

1.

The opening section is dominated by a highly gestural percussion feature and diads in the highest register of the whole piece in the flutes, clarinet and cello. The gestural nature of the percussion part comes from the fact that most of the instruments are imprecisely pitched and similar in timbre. The percussionist plays rapid, clicking phrases which very nearly repeat and accelerate by small increments. The part is oddly melodic, with small motivic cells separated by register.

There are essentially four levels to the percussion solo. The first is in the "very high" wood block, cowbell and tambourine written above the staff. The second level is played on the high, middle and low woodblocks. The third level is played mostly in ricochet on the bongos and gradually expands to include rolls on the two toms. A deadened kick drum is used as a way of facilitating rapid passages with the mallets. The register of the percussion part expands as "arpeggio" like figures create hocketed melodies between the different layers. In measure 25 the final layer of two almglocken appears, doubled by the horn giving the brass part a unique attack tone. In measure 37 a snare joins the "arpeggios" and the section builds to a climax before a great pause in measure 44.

Similar to the expansion of register in the percussion part, the winds and cello gradually fall in pitch. The flutes remain somewhat high throughout, creating harmonic disruption to the rationally tuned lower voices of clarinet, soprano sax, horn, and cello. The derivative harmonic ratio in this section is the 7/6 between the soprano sax and horn.

This minor third of G#/B is significantly "smaller" than that of equal temperament and has a melancholic quality. 7th partial relationships remain when, in bar 29, a tempered B is accompanied by a low A (8). The oscillation between harmonies containing two different "versions" of the pitch B gives a jarring but refreshing effect at each change in harmony. This also occurs in measure 32 when a triad built using 5th partial relationships above the horn's G# is "burred" with one built on the 7th partial. This moment is particularly striking and gives the impression of a *glissando* or "Doppler shift" even though no fluctuation of pitch occurs.

The three harmonic entities in the opening are mellow in timbre but somewhat high in pitch. The pitches fall right in the middle of treble clef. Even though this is accompanied by high flutes and clicking percussion sounds, logarithmic nature of sound prevents any "muddiness" and all of the sounds are clearly heard. That is, in this register cycles per second are faster and therefore farther apart. This is also why the beating and difference tones of the equal tempered flutes pitches are of less consequence. Beats in this register are much to fast and difference tones too low.

2.

While the gestural and energetic qualities of the flute duo are markedly different than the opening, the latter's pitch material picks up right where the former left off. The small minor third of G#/B is sustained, with key clicks paraphrasing the percussion solo. The flute duo is a synthesis of gestural and melodic writing as much of the piece's thematic material is introduced while - at the same time - special technical

effects are explored. In preparing this section I consulted Robert Dick's *The Other Flute* in which I came across a phenomenon he calls "microtonal segments." On the flute, certain pitches can be lowered in minute increments by depressing keys in addition to the standard fingering. The effect is of a controlled and graded glissando and was used extensively by Salvatore Sciarrino in his *Canzona di Ringraziamento* for flute solo (published by Ricordi). This technique is only possible on a limited number of pitches, providing me with an external compositional boundary. I saw this as an opportunity to let the physical attributes of the flute have a meaningful impact on the piece and chose this pitch material for motivic generation. (See Fig. 8 for the chart I used during composition)

In this section, I use the technique to "detune" certain pitches, approximating the just intervals usually tuned by changes in embouchure. Here is an example of instrumental "reprocessing" of material. Most of the sustained diads are tuned this way and, although they are not "just" in the strict sense, the intonation is very similar. The instrumental timbre was also darkened by using these alternate fingerings as well as the fact that one of the performers plays this section on an alto flute.

As stated above, much of the melodic material for the rest of the piece is introduced in the flute duo. This material is characterized by winding chromatic lines and occasional wide leaps. In *scene/sense* I tried to build on previous pieces which explicitly used vector based melodic development. Much of the melodic content in this work is intervalically consistent but I allowed variance either where intonational concerns superseded or where my ear felt a cell unsatisfactory. Further examples will track thematic development.

3.

The abrupt end of the first section is matched that of the second with the reintroduction of the ensemble in measure 70, marking the beginning of the third large section. While no one part can be considered the "soloist," the melodic writing is as active as anywhere in the piece. In an expansion of the almglocken strikes earlier, the percussionist ignites each phrase with three gongs. These gongs are prepared to sound at a B minor triad in first inversion tuned using the ratios 16/13 (F#/D) and 4/3 (B/F#). While the mood of a "minor key" is preserved from the 7/6 interval earlier, this harmony is much farther from temperament and as a result much more pointed in character.

There are five phrases triggered by the percussionist during which melodies pass through the ensemble and low horn notes serve to recontextualize the sustaining gongs. While the music is placed in a wider registral span than the first section, an oscillation between chords derived from different base ratios reprises the "jarring and refreshing" effect. (See Fig. 9 illustrating the opening of this section) As the section progresses, the just intervals are further modified by new equal tempered pitches and the first chord "progression" of the piece emerges.

While it is hard to describe in words the sensation of these different harmonic values, it can be say why it occurs. As stated earlier, when tuning a series of pitches from a given interval, one is adding *multiples* of that pitch to the space. In *scene/sense*, some pitches asked for are equal tempered which provides a kind of constant to the judge the different rational relationships by. Frequencies tuned from a 7th partial relationship will *interact* with a tempered note differently than those tuned from 13th partial. Opinions differ on the proper adjectives to use to describe these differences but what is more

important is that the listeners perceive them. For the piece to be successful, the different qualities of harmony should be perceived on a large scale as well; that is, *between* sections as well as within.

The third large section draws to a close with a downward shift in register. The chromatic melodic content is spread between parts, recalling the "blurring" effect heard earlier and paving the way for the very close harmonic relationships to follow. This third section is by far the shortest of those utilizing the entire ensemble. However, its rapid succession of material and contrapuntal texture magnify temporal perception. At this point, the music begins to broaden in pace and formal proportion. The fast transitions and active melodies are gone and the audience is submerged into murkier environments.

4.

The fourth section of the piece is characterized by an expansion of time and a compression of pitch. The plus and minus qualifications attached to the 12 TET pitches are indications to the performer to tune roughly 33 cents sharp or flat respectively. The goal is to have something approximating 36 tone equal temperament. In addition the range of the section is slightly more than a major third, meaning that there are roughly 15 of these "sixth-tones" possible. I had in mind the metaphor that the 12 TET octave could be "compressed" and that another section of the work could again be "reprocessed" through this new harmonic vocabulary. I chose to use the flute duo (section 2) and made a rough sketch approximating this translation (see Fig. 10). The result is similar to a Renaissance imitative opening, with the rest of the section working out an intervallic development in its own way. What is remarkable is that even though the contour of the

lines in significantly more finite, one is able to hear the motives clearly. It is indicative of our mind's keen ability to detect subtle shifts in pitch.

The timbral quality of this section is somewhat complicated. The bass clarinet usually has no difficulty playing in this register, but the several unusual fingerings required to play the sixth-tones darkens its color somewhat. The horn part is also somewhat shaded as they too must make technical concessions to achieve proper intonation. While working in consultation to the performer prior to the premier, we determined that a combination of pulling out the horn's crook on one side (Bb and not the F) allowed her to shift between a "standard" and "detuned." This concept is totally unique to the instrument and takes advantage of the fact that the horn is really two different instruments fused together. The timpani plays in *tremolo* throughout, attempting to keep the sound of the mallet attacks as quiet as possible. This is to not obscure the many acoustic beats which arise from the extreme proximity of the sixth-tones and register used. The result is a kind of humming which intensifies or subsides in direct accordance with the melodic changes of the instruments. The responsive nature of this acoustic phenomenon gives the impression of a fifth part and is integral to the timbre of the passage.

As the section progresses the cello enters on long sustained tones and the bass clarinet becomes more active. Gradually the clarinet's part becomes dominated by strings of multiphonics. I consulted the extensive catalog of multiphonics in Phillip Rehfeldt's *New Directions for Clarinet* to find fingerings in which the player simply had to lift or depress another key, changing the upper note of the diad while maintaining the lower (see

Fig. 11 for the full chart made and 12 for the reduced chart used in composing this passage).

In measure 99, the pace and motivic energy of the music increases which gives the beats less time to be heard. This clarifies the texture somewhat allowing the intricacies of the clarinet multiphonic timbre to be heard. In contrast to the other parts, the cello is still somewhat subdued. However, as the other parts begin to broaden once again the cellist's part becomes increasingly active. This contradiction in formal trajectory shifts the focus from the clarinet "soloist" to the cellist in a subtle way, making the transition to the larger cello solo almost seamless.

5.

The cello solo begins in measure 111 and the conductor ceases to lead. They and the six other members of the ensemble are now silent as the cellist continues a rough paraphrase of the previous section. Like *Fear of Patterns* and the first of the *3 Songs*, the cello solo in *scene/sense* contains an open D string throughout. The opening of the solo contains intervals very close the open string and as a result is very ambiguous. Gradually, a clearer harmony emerges and at the end of bar 118, the music shifts to a more gestural, improvisatory quality. This material is dominated by a mixture of resonant chords and flurries of chromatic runs. While some of the chromatic passages have roots in *Fear*... the dominance of harmonic progressions makes this solo markedly different. (See Fig. 13 for a chart elucidating the scale used as well as a description of the main harmonic collections)

The instrumental writing in the large middle section of the cello solo is extremely virtuosic and requires two staves to properly notate. In addition, there is a third stave on top of the other two indicating bow placement relative to the bridge and fingerboard. I spent a great deal of time making sure that the chords and melodic passages were feasible and despite the intimidating nature of the notation, much of the material is intentionally ergonomic. Much of the part requires the performer to hold a double stop and rapidly arpeggiate with the bow. These arpeggios are in succession with the winding chromatic figures, creating a kind of alternation of activity between the left and right hands. This doubles the impression of energy and is an effective synthesis of my harmonic and performative concerns.

There are eleven large phrases in the unmetered section of the cello solo. Each of these seeks to develop the harmonic, melodic and gestural elements and while they do not get longer in succession there is an overall accumulation of density into the 9th and 10th phrases. That being said, there is great deal of responsibility put on the performer to communicate the music to the audience on a local and large scale.

Meter returns in measure 119 and a coda comprised exclusively of arpeggios across all four strings. In a reference to the percussion solo at the beginning of the piece, the arpeggios speed up and slow down in closely graded increments. By using “tuplets” to indicate acceleration or deceleration, the music is imbued with a kind of detached, mechanized quality. This stands in stark contrast to the dynamic and soloistic material which immediately preceded it. This difference is somewhat bridged, however, by the fact that every chord which appeared in the unmetered section reappears in the coda. While not in the same order, many of the harmonies are now familiar and are given

greater meaning when reapproached in this way. The section builds a climax with cumbersome quadruple stop chords whose physical difficulty adds a visible tension to the harmonic and dynamic tension. The tension is broken when, in measure 135, the rest of the ensemble enters led by a forceful vibraphone attack.

6.

The final large ensemble section of the work commences with a return to the harmony of the opening, now an octave lower. With this, the cello solo seems to continue although the material has transformed somewhat. The sonorous, widely spanned chords are left behind and a chromatic figure surrounding the prevailing harmonic foundation of G# is played. The soprano sax and horn once again sound the 7/6 (B/G#) interval, which functions as a kind of resonance from the strong G#/D# strikes in the vibraphone. This metallic phrase initiation is intended to recall the almglocken and gongs of the first and third large sections. The progression of metallic percussion instruments becomes another thread throughout the work much like the development of harmonic diversity and motivic reprocessing. The metal instruments move from having very little resonance and inharmonic spectra to the sustained and pure tones of the vibraphone.

In contrast to the previous ensemble section of the piece (the third overall), the attacks in the percussion do not immediately ignite flurries of activity in the winds. Instead, the clarinet and alto flute simply provide additional resonance to the G# below middle C. This continues for several phrases and eventually the C flute joins doubling the closely related pitch of D#. The soprano sax gives the only hint at more complex harmonic color and gradually rises from *pianissimo* to a more assertive volume. The slow

formal pacing of this section stands in contrast to the cello's agitated material, creating a more protracted sense of anticipation as the familiar 7th partial harmonic material continues to rise.

In measure 154, the harmonic drone is finally broken; if for only one beat. I paid careful attention in this section to the durational proportion of each harmony. The next time this second chord appears, it is twice as long and the initial chord is shortened. Soon the second chord is sustained for nearly as long as the first and a third chord is hinted at. This progression fits well into the "interstitial" measure pattern used to segregate phrases throughout the piece. Here again, an arbitrary limit created a framework which I could easily and creatively exploit.

As the wind and percussion parts continue to become more complex, the cello's gradually assumes that of the bass line. Beginning in measure 159, the cello functions as an anchor for the burgeoning harmonic progression as it leads the introduction of each new chord. Much of the interior harmonic pitches are common to multiple chords creating a situation where the top and bottom registers are in counterpoint. The longstanding tradition of tenor and alto line "suspensions" was reappropriated as a way of facilitating intonation for the performers. The effect of traditional harmonic suspensions was heightened however by the fact the interior intervals were rationally tuned. As the cello moves from one 12 TET pitch to another, the frequency ratios and resulting timbre changed. While many of the interior notes can be tuned to each new bass line, several required the performer to verify the same pitch from a different source or to simply reproduce their pitch from memory. In practice, the performers had little problem with these challenges.

With the cello firmly planted in the role of bass and the high winds passing melodic fragments recalling the third section of the piece, the register widens and dynamic builds to a climax in measure 174. The cello has worked its way to the bottom of its register and flute 1 reaches a high F# - the highest pitch in the piece. After a short transitional chord the music moves into a new space for a coda. The cello plays aggressive double stops, anchoring a long harmonic progression accompanied by the rattling of a snare drum. The flutes unite to realize a simple theme; a reduction of the material they themselves introduced early. While the harmony is by far more complex and manifold than at any other point, the rhythmic simplicity of the parts and strophic nature of the melody give the impression of a mournful song. The music slows dramatically on a series of six pitch chords and the piece ends with a fermata on a soft, tranquil chord.

The piece as a whole is was an exercise in the degree to which musical dimensions should or should not be commensurate. The sections themselves are not uniform in duration or register, but are extremely consistent in motivic content. While the nature and intensity of musical material fluctuate wildly between sections, there is an overarching structure to local level phrase relationships which maintains a sense of cohesion. The intonational systems and nature of harmonic disposition vary throughout but all are implemented so as to give the impression of harmonic consistency. Melodic and harmonic “reprocessing” became a vehicle for the exploration of different – more theoretical – music making principles. In addition, the power of performative energy

saves the piece from becoming didactic and provides the audience with a human connection, enriching the sonic experience.

Appendix of Figures

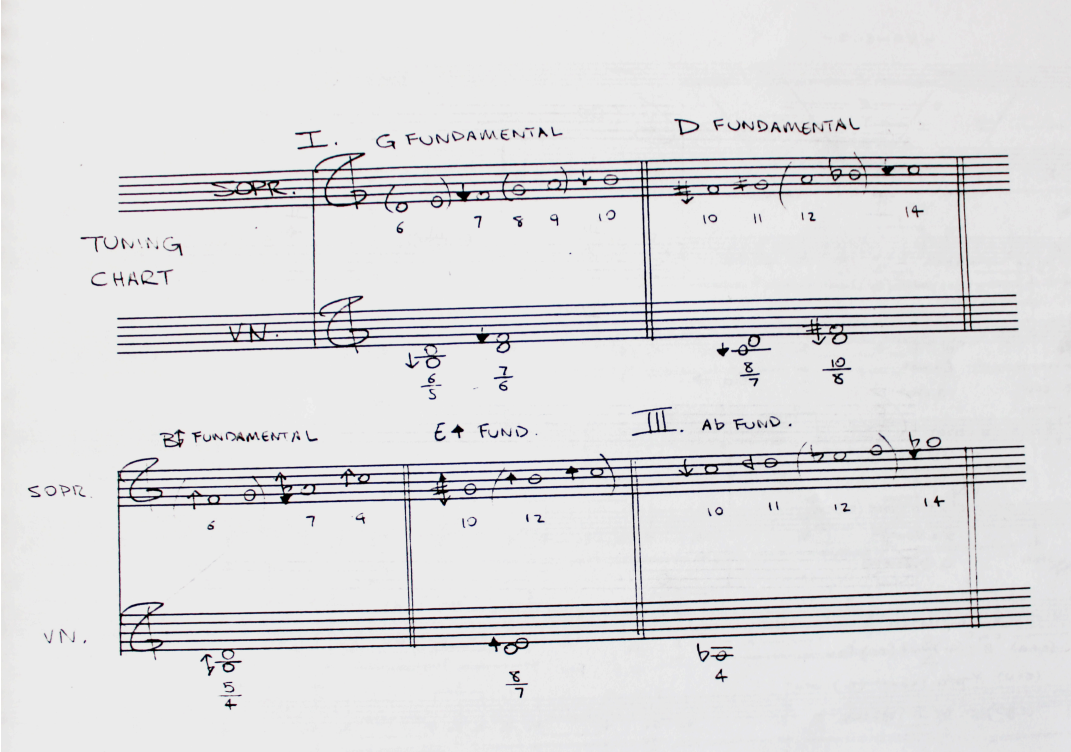


Figure 1. Tuning chart for Songs 1 and 3 of *3 Songs*.

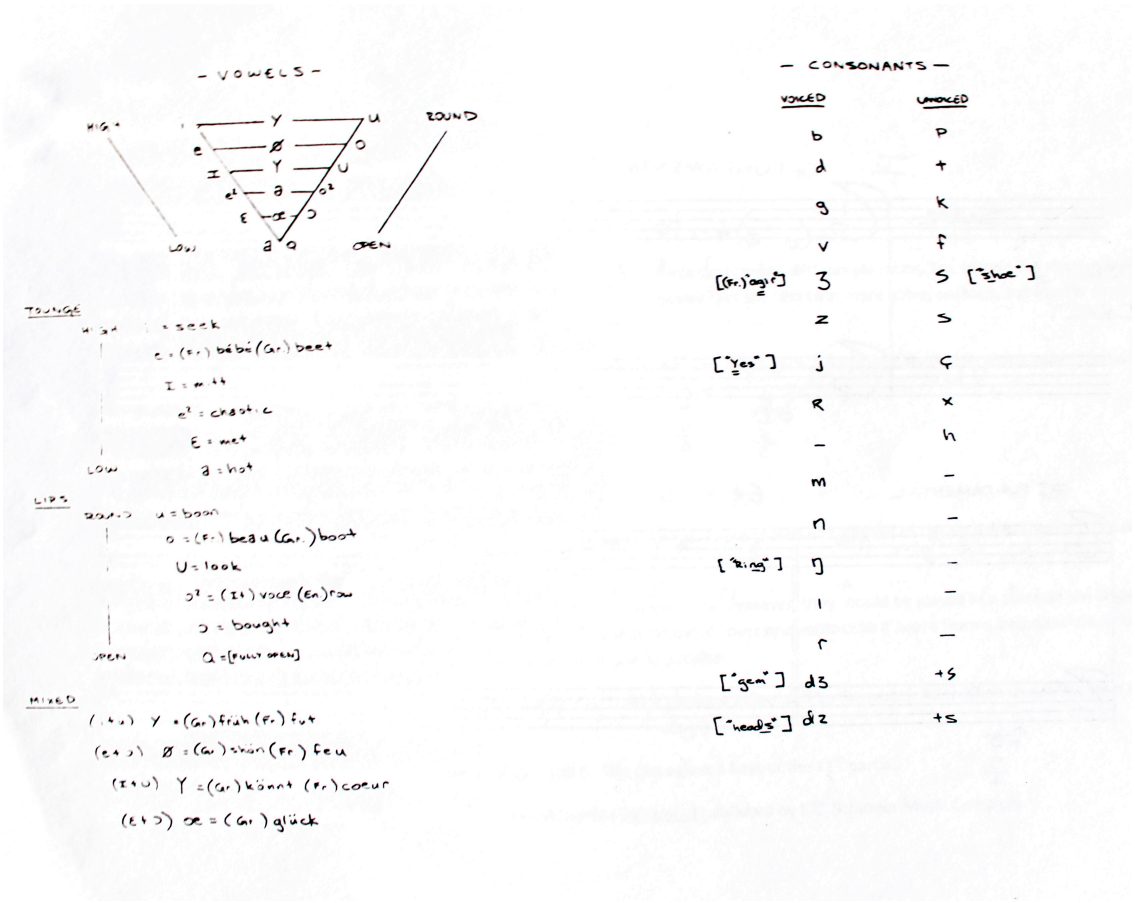
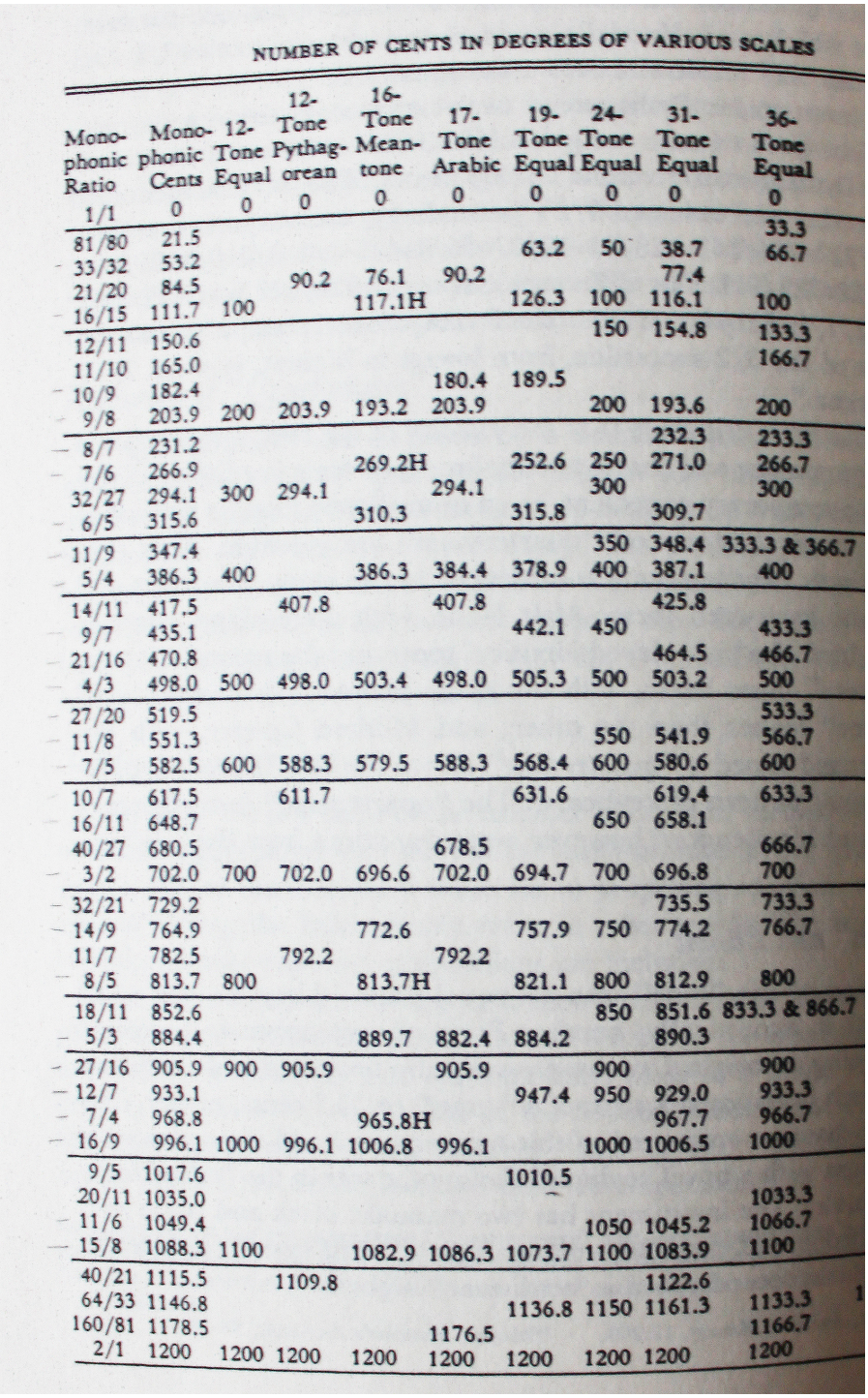


Figure 2. Vowel and consonant chart from *3 Songs*.



NUMBER OF CENTS IN DEGREES OF VARIOUS SCALES

Monophonic Ratio	Monophonic Cents	12-Tone Equal	12-Tone Pythagorean	16-Tone Meantone	17-Tone Arabic	19-Tone Equal	24-Tone Equal	31-Tone Equal	36-Tone Equal
1/1	0	0	0	0	0	0	0	0	0
81/80	21.5								33.3
33/32	53.2					63.2	50	38.7	66.7
21/20	84.5		90.2	76.1	90.2			77.4	
16/15	111.7	100		117.1H		126.3	100	116.1	100
12/11	150.6						150	154.8	133.3
11/10	165.0								166.7
10/9	182.4				180.4	189.5			
9/8	203.9	200	203.9	193.2	203.9		200	193.6	200
8/7	231.2							232.3	233.3
7/6	266.9			269.2H		252.6	250	271.0	266.7
32/27	294.1	300	294.1		294.1		300		300
6/5	315.6			310.3		315.8		309.7	
11/9	347.4						350	348.4	333.3 & 366.7
5/4	386.3	400		386.3	384.4	378.9	400	387.1	400
14/11	417.5		407.8		407.8			425.8	
9/7	435.1					442.1	450		433.3
21/16	470.8							464.5	466.7
4/3	498.0	500	498.0	503.4	498.0	505.3	500	503.2	500
27/20	519.5								533.3
11/8	551.3						550	541.9	566.7
7/5	582.5	600	588.3	579.5	588.3	568.4	600	580.6	600
10/7	617.5		611.7			631.6		619.4	633.3
16/11	648.7						650	658.1	
40/27	680.5				678.5				666.7
3/2	702.0	700	702.0	696.6	702.0	694.7	700	696.8	700
32/21	729.2							735.5	733.3
14/9	764.9			772.6		757.9	750	774.2	766.7
11/7	782.5		792.2		792.2				
8/5	813.7	800		813.7H		821.1	800	812.9	800
18/11	852.6						850	851.6	833.3 & 866.7
5/3	884.4			889.7	882.4	884.2		890.3	
27/16	905.9	900	905.9		905.9		900		900
12/7	933.1					947.4	950	929.0	933.3
7/4	968.8			965.8H				967.7	966.7
16/9	996.1	1000	996.1	1006.8	996.1		1000	1006.5	1000
9/5	1017.6					1010.5			
20/11	1035.0								1033.3
11/6	1049.4						1050	1045.2	1066.7
15/8	1088.3	1100		1082.9	1086.3	1073.7	1100	1083.9	1100
40/21	1115.5		1109.8					1122.6	
64/33	1146.8					1136.8	1150	1161.3	1133.3
160/81	1178.5				1176.5				1166.7
2/1	1200	1200	1200	1200	1200	1200	1200	1200	1200

Figure 3. Diagram from Harry Partch's *Genesis of a Music*. The ratios on the far left are his 43 tone scale.

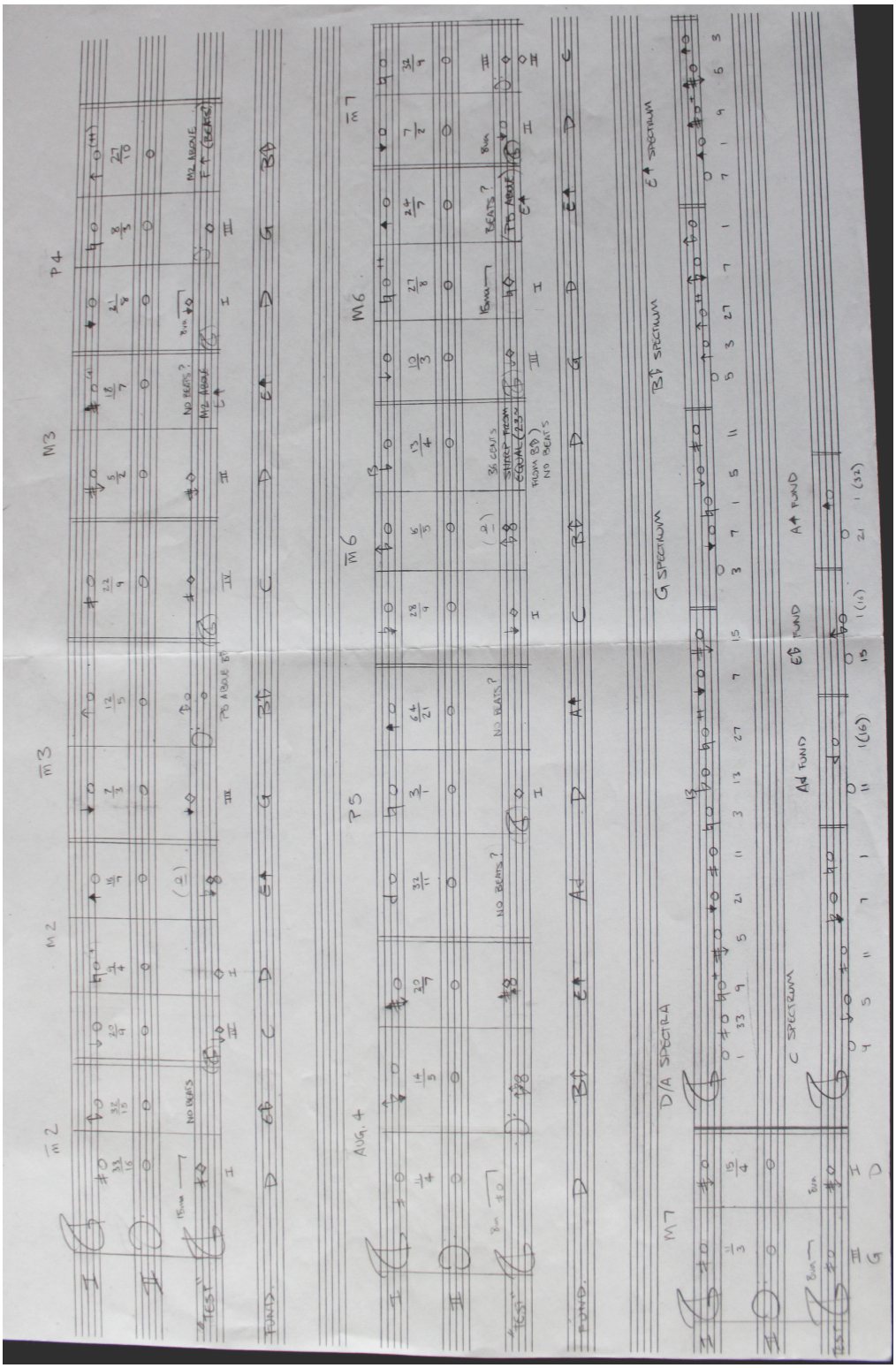


Figure 4. Tuning chart for *Fear of Patterns* with ratios and "verifying" natural harmonics.

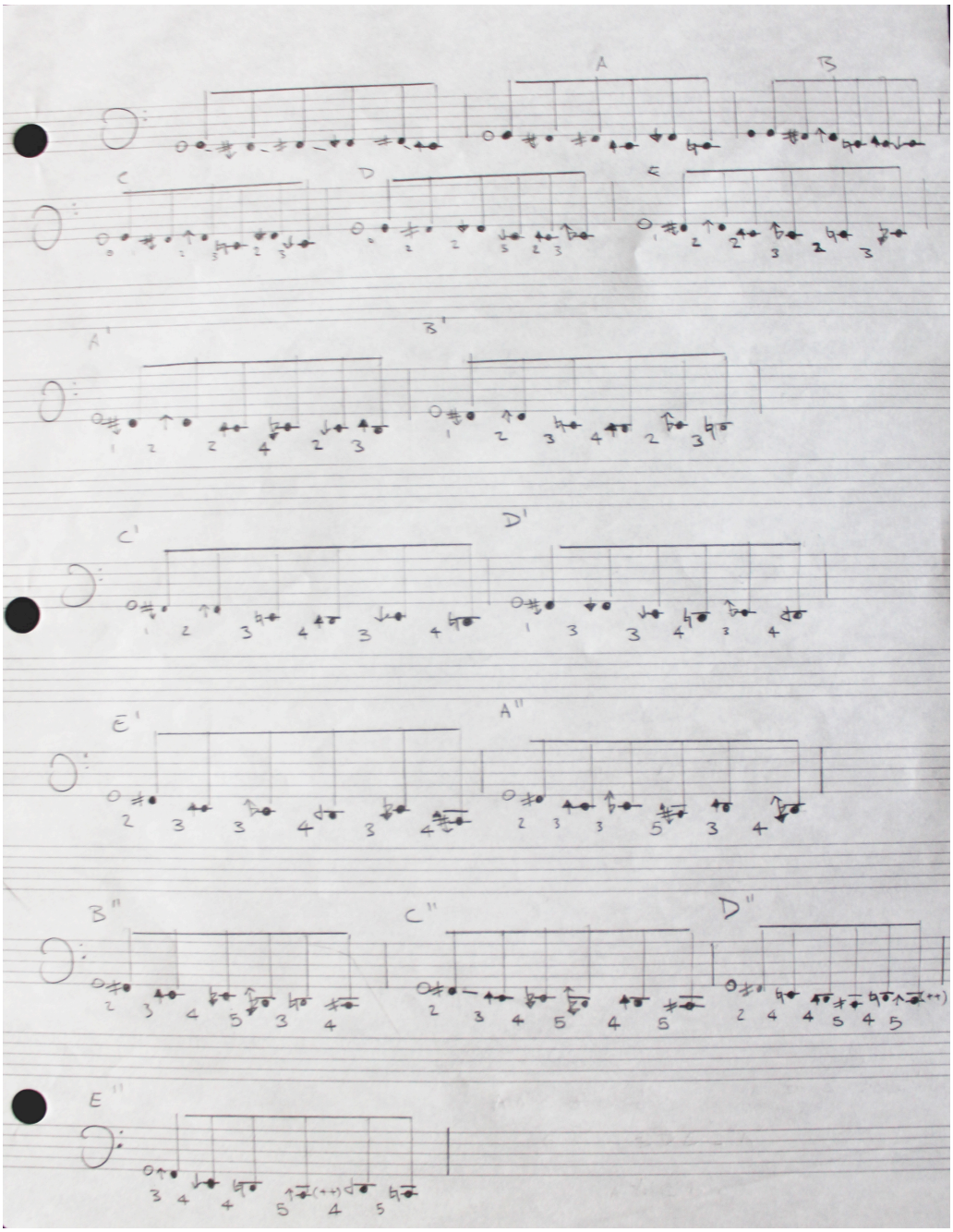


Figure 5. Sketch of “expanding” melodic material which in its preliminary linear, “un-shuffled” version.

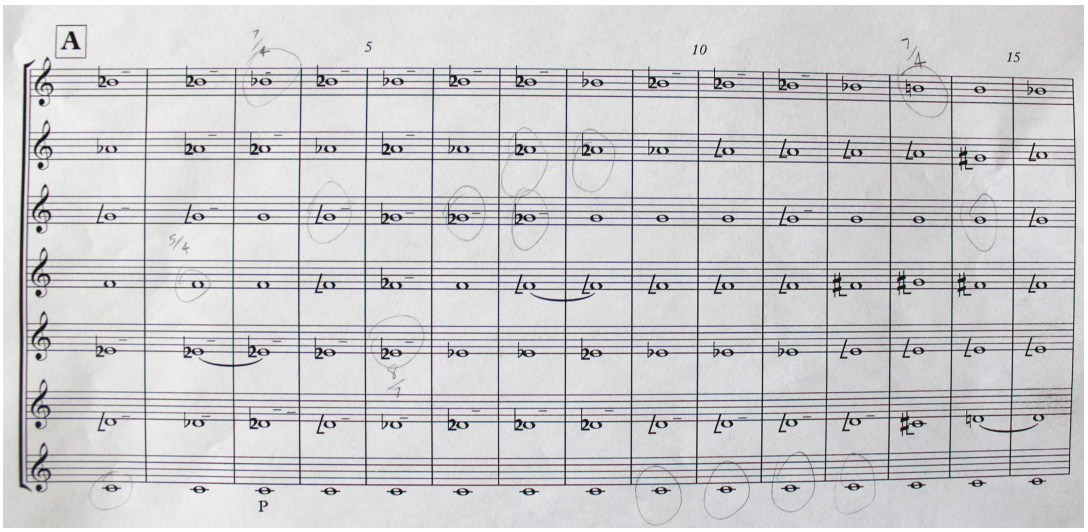


Figure 6. First page of the Untonal score for Prof. John Fonville's Extended Just Intonation Ensemble Course. The low C is played by an electronic drone and six players are designated a single line.

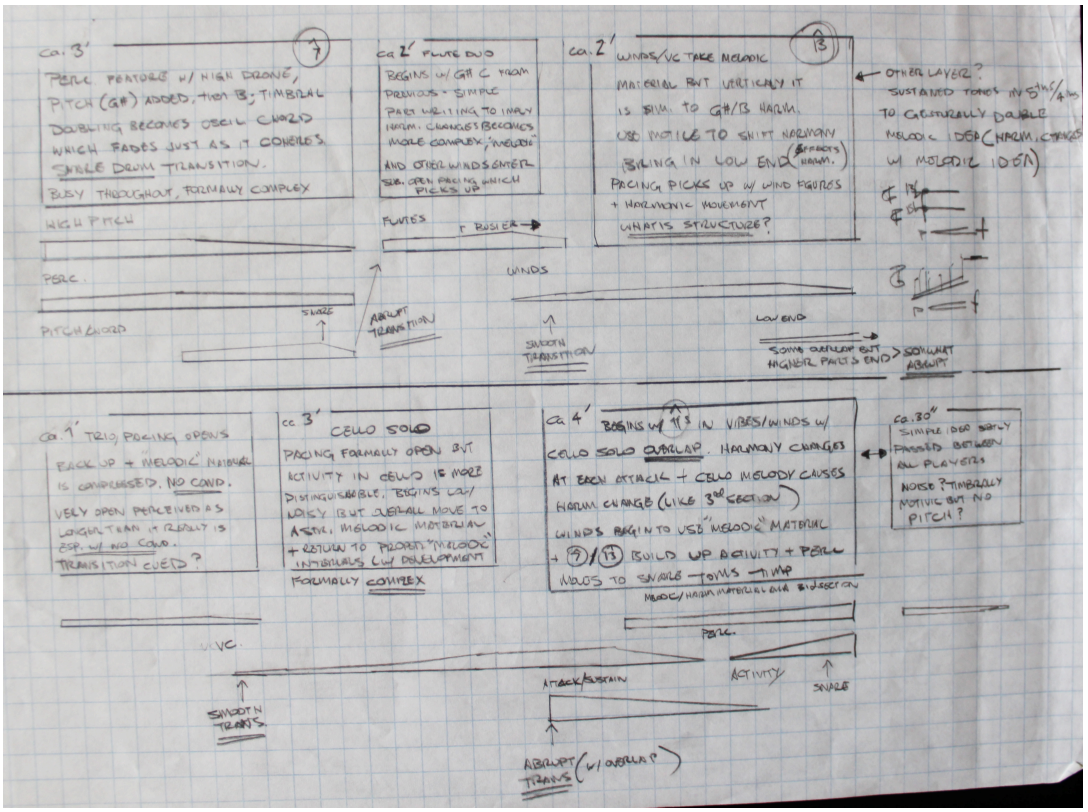


Figure 7. Preliminary chart outlining formal structure of *scene/sense*.

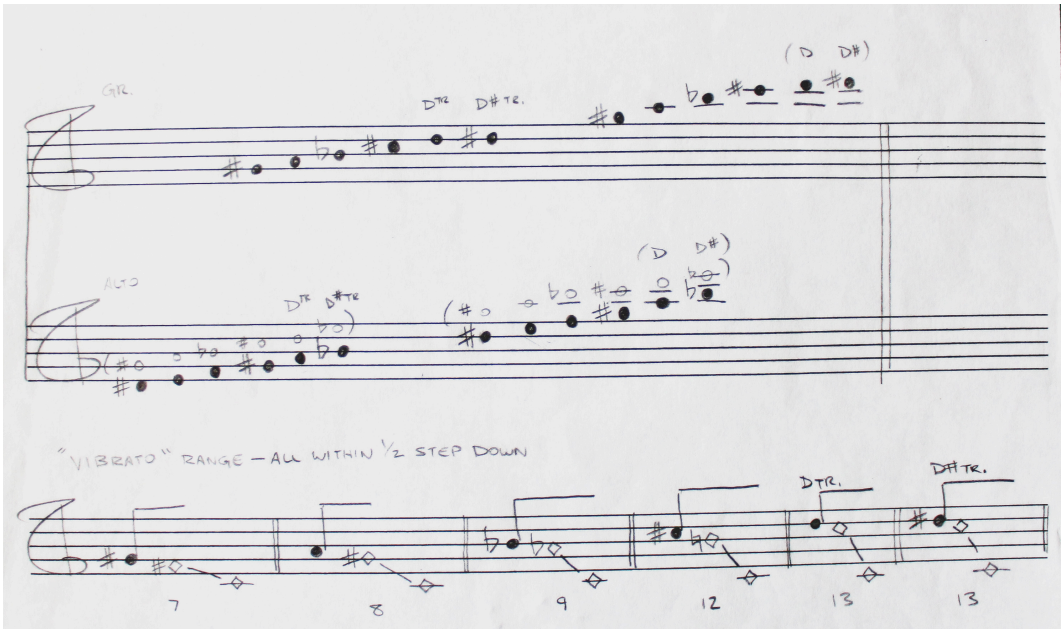


Figure 8. Chart illustrating the possible "Microtonal Segment" pitches for C and Alto flutes.

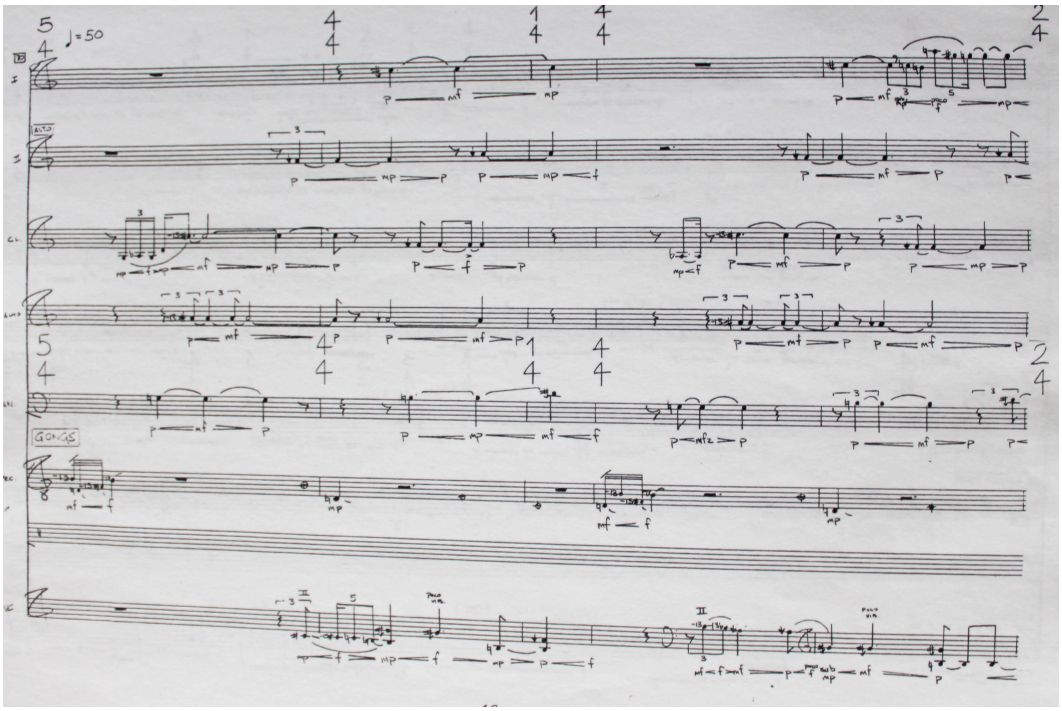


Figure 9. Measures 70-74 of *scene/sense* showing the combination of several tuning relationships.

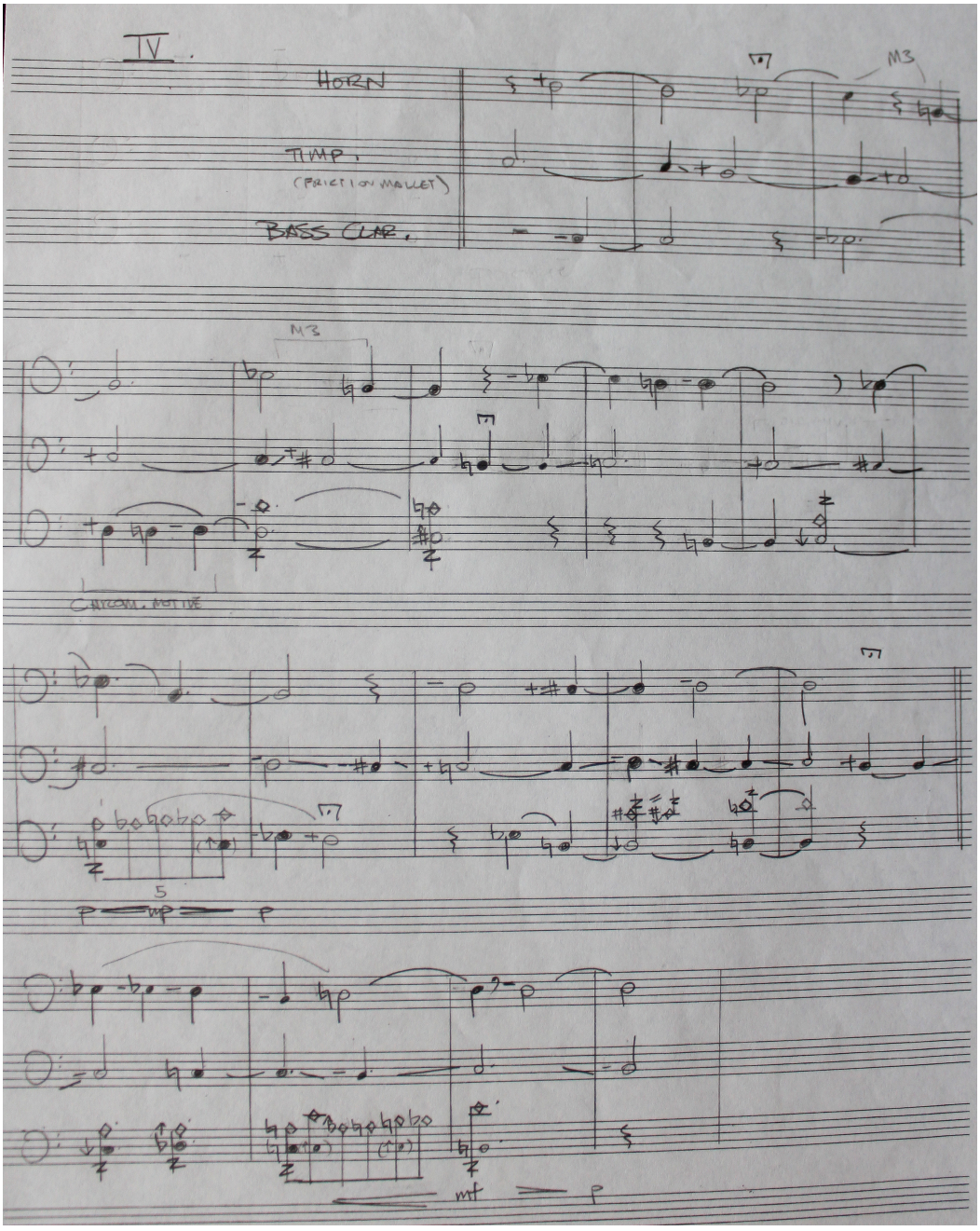


Figure 10. Preliminary sketch of 4th section of *scene/sense* in which the Flute Duo is paraphrased in "sixth tones."

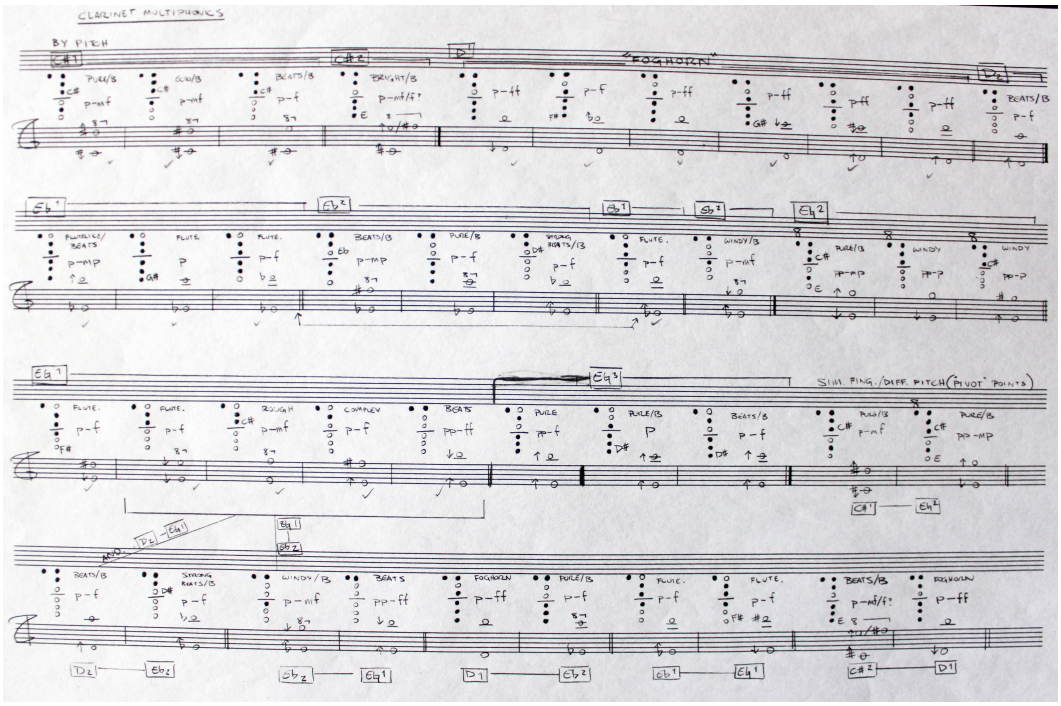


Figure 11. Chart derived from Rehfeldt's *New Directions for Clarinet*.

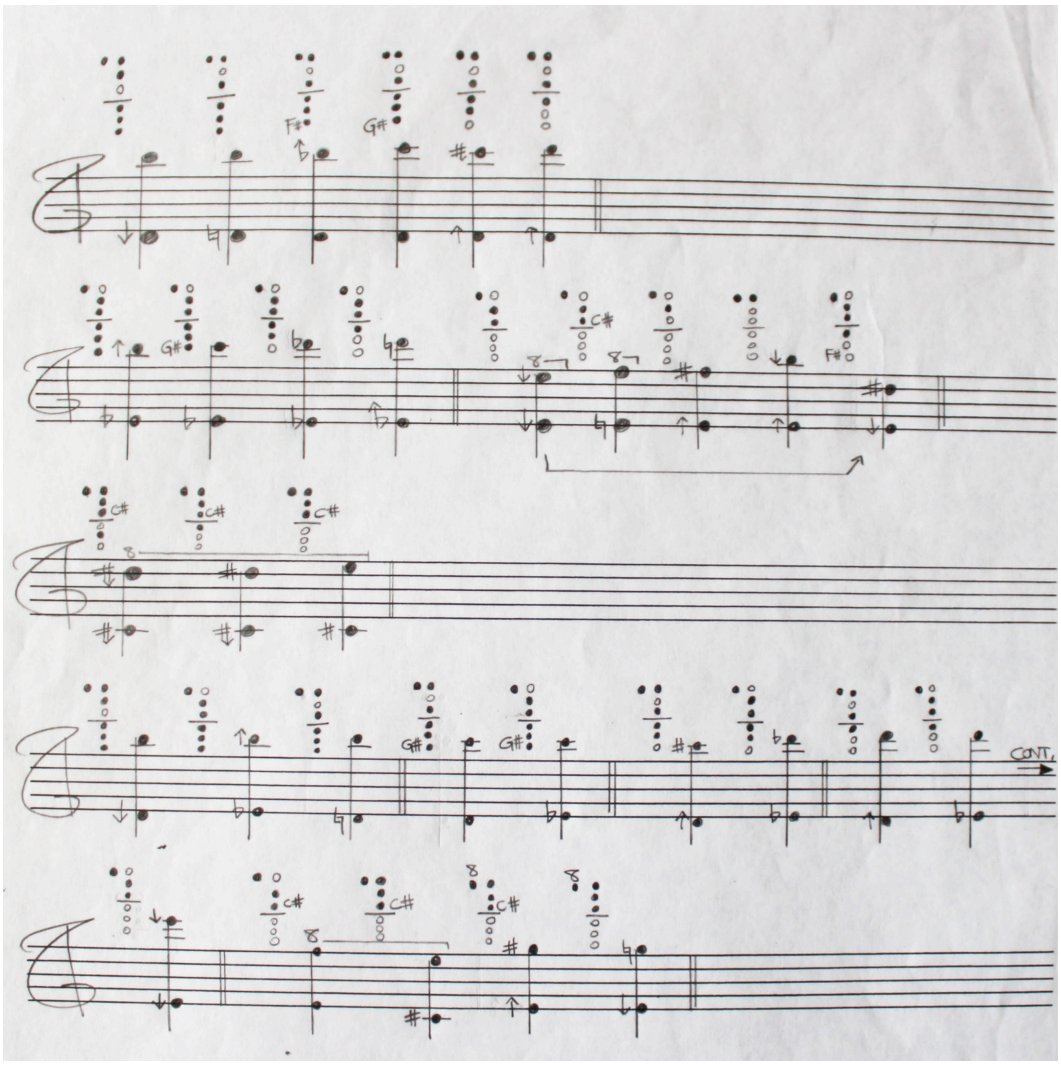


Figure 12. Smaller chart used in *scene/sense* taken from chart in previous figure.

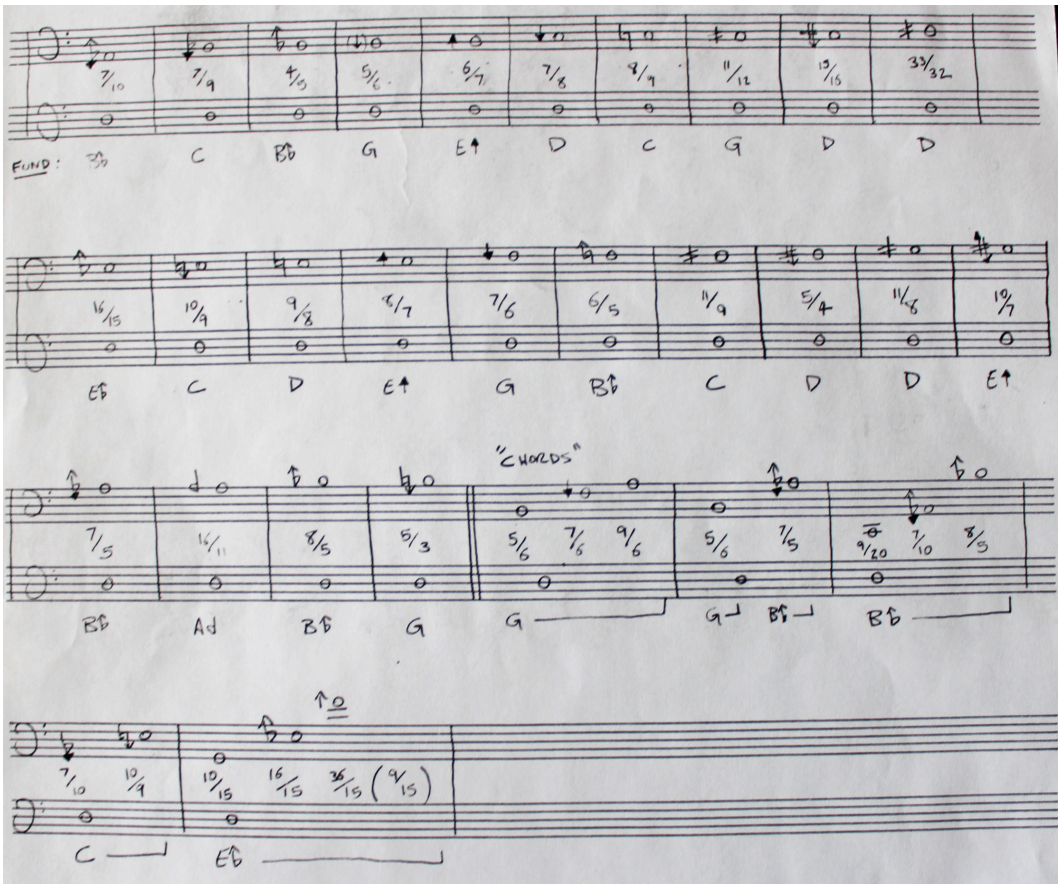


Figure 13. Chart of ratios and harmonies used in the cello solo of *scene/sense.*

Appendix of Scores

3 Songs (2012)

for Soprano and Violin

by

Kevin Flowers

3 Songs

for Soprano and Violin

dur. 12 mins. ca.

These 3 songs are an attempt to merge my interest in 3 different musical concepts: timbre, motive and pacing. The first song is predominantly concerned with timbre and how the tuning of harmony *creates* timbre. The motives introduced in the 1st song are developed in the 2nd with the soprano asked to jump throughout her vocal registers. The violin harmonics (in conjunction with the voice) in the 2nd song also create their own timbral environment because of the strong presence of difference tones. The slightly more irregular pacing of the 2nd song contrasts with the almost relentless pacing of the 1st. This "opening up" of the phrasing is continued in the 3rd song, where the voice pops in and out almost unpredictably. Motives from both the 1st and 2nd song reappear in the third, but there is a lack of registral and directional consistency in the melody which I hope creates and sense of abstraction. The timbral qualities of the 3rd song are also interesting as the "just" tuned intervals from the 1st song are placed an octave apart from the Ab drone. This raises the difference tone so that it is *between* the violin and soprano parts. (For example: the difference tone between the 14th and 4th partials is the 10th partial, whereas the difference tone between the 7th and 4th partials is the 3rd partial.)

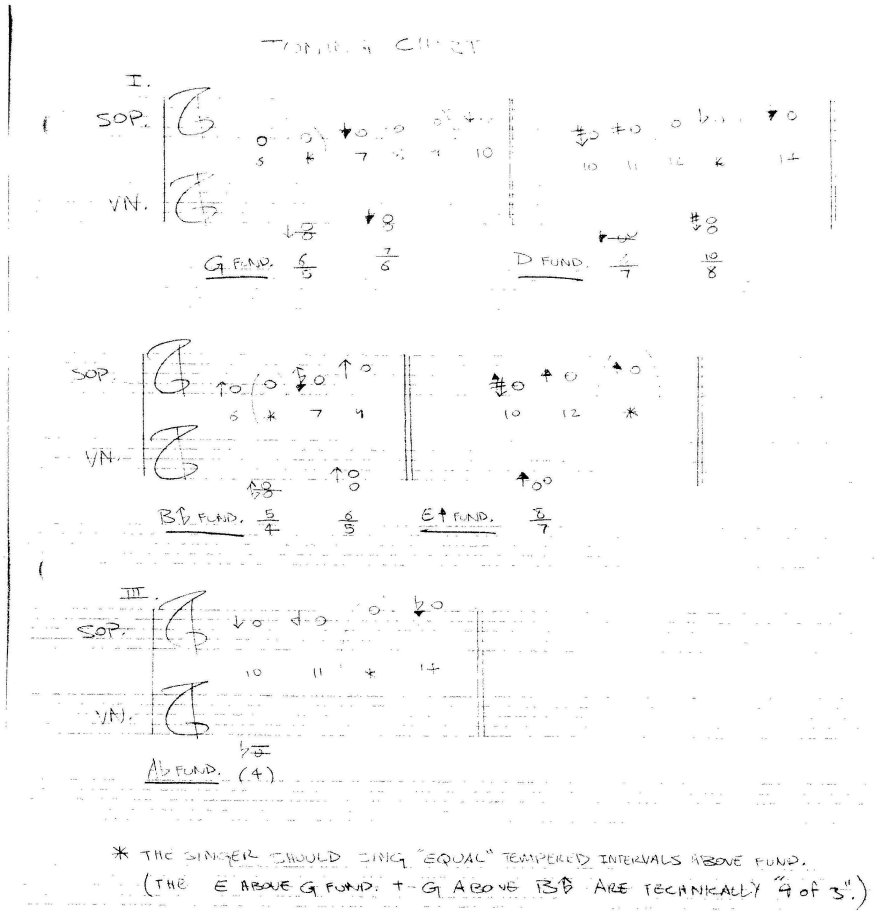
Performance Notes

The soprano should sing *non vibrato* and with non-operatic tone.

The violinist should also play *non vibrato*.

The first two movements should be interpreted very agogically; that is, with phrasing influenced by the meter. All rhythms should be articulated very clearly.

A certain amount of *tempo rubato* is encouraged to facilitate the clarity of phrases.

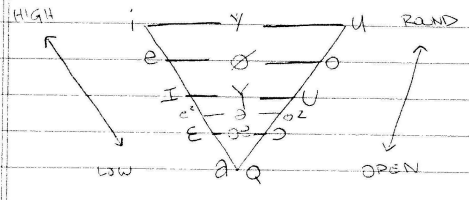


VOWELS

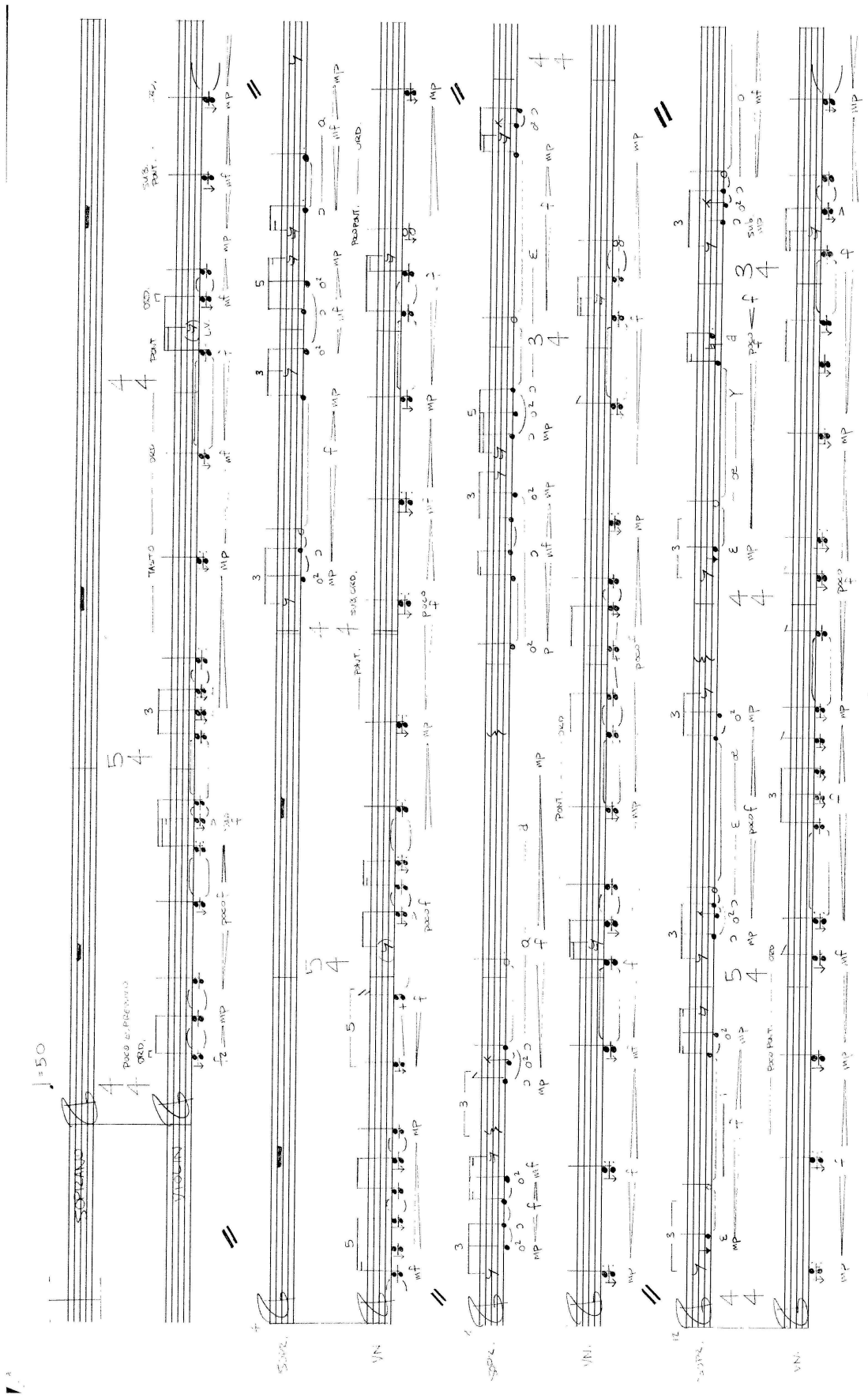
TONGUE = HIGH | i seek
e (Fr) bébé (Gr) Beet
I = mitt
e^2 = chaotic day (Irish Accent)
ɛ = met
LOW | a = hot

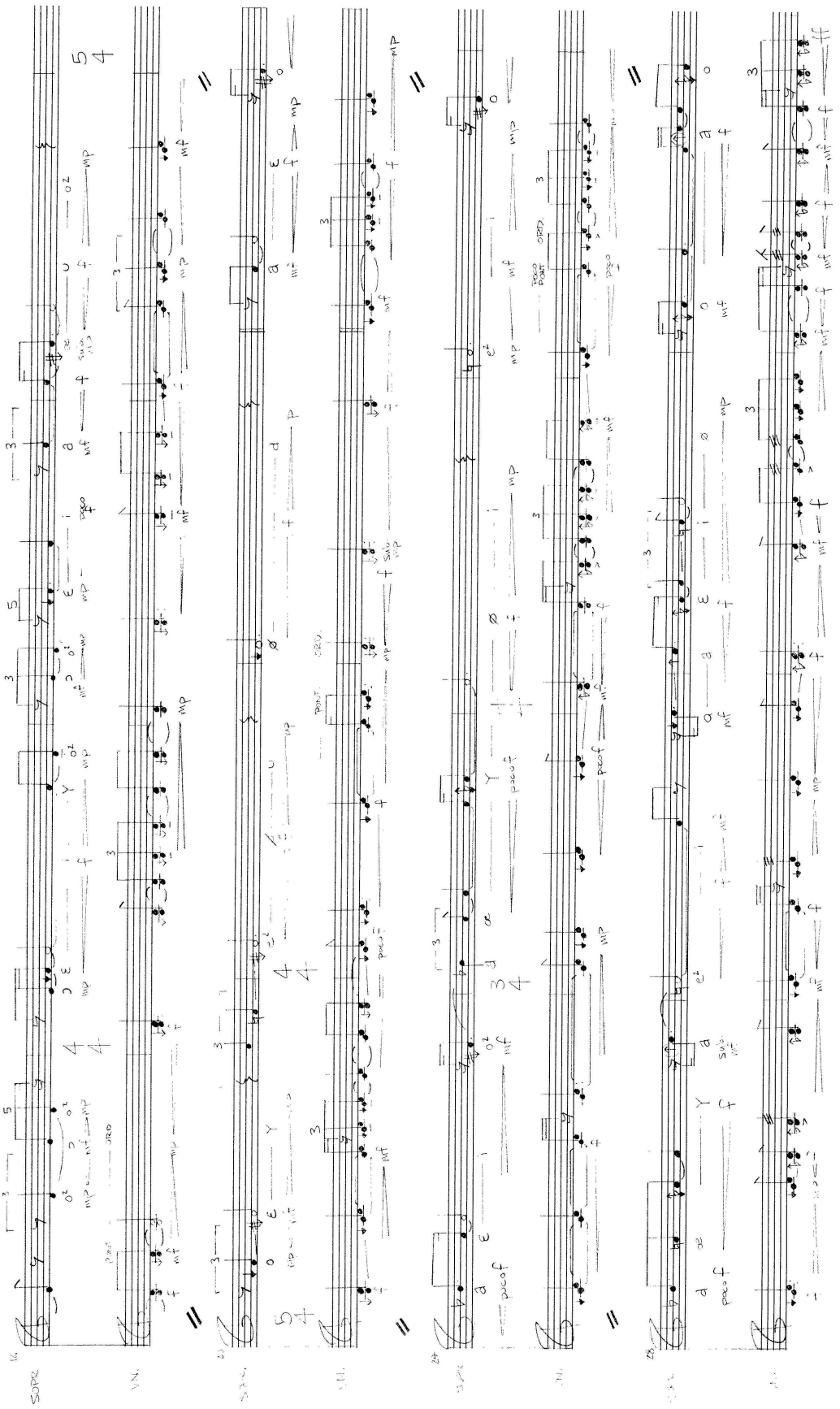
LIP = ROUND | u = boon
o = (Fr) beau (Gr) Boot
U = look
o^2 = (It) voce (En) rowing
ɔ = bought
OPEN | ɑ = FULLY OPEN

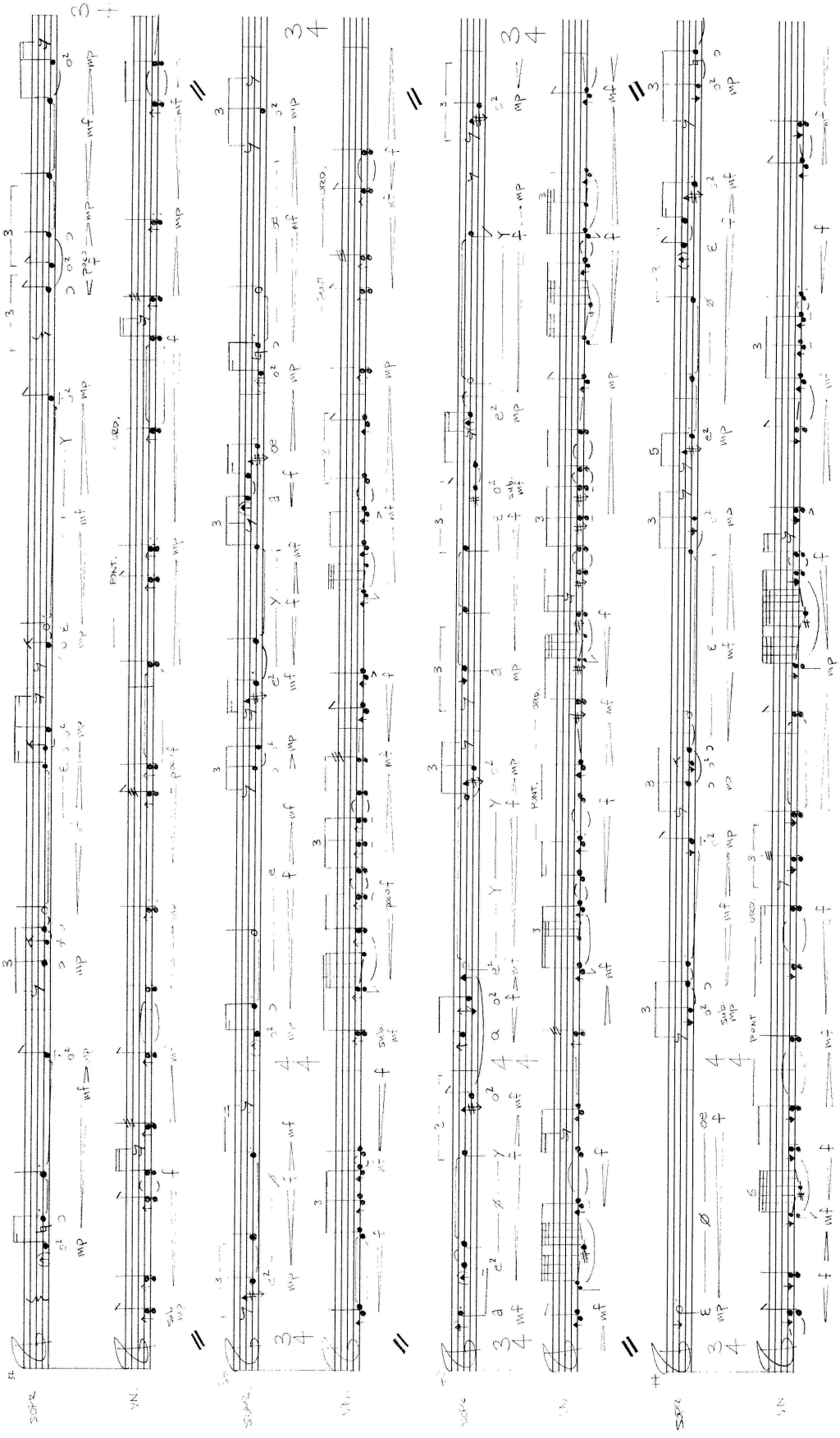
MIXED = (i + u =) y = (Gr.) früh (Fr.) fut
(e + o =) ø = (Gr.) schön (Fr.) feu
(I + U =) Y = (Gr.) könnt (Fr.) coeur
(ɛ + ɔ =) œ = (Gr.) Glück

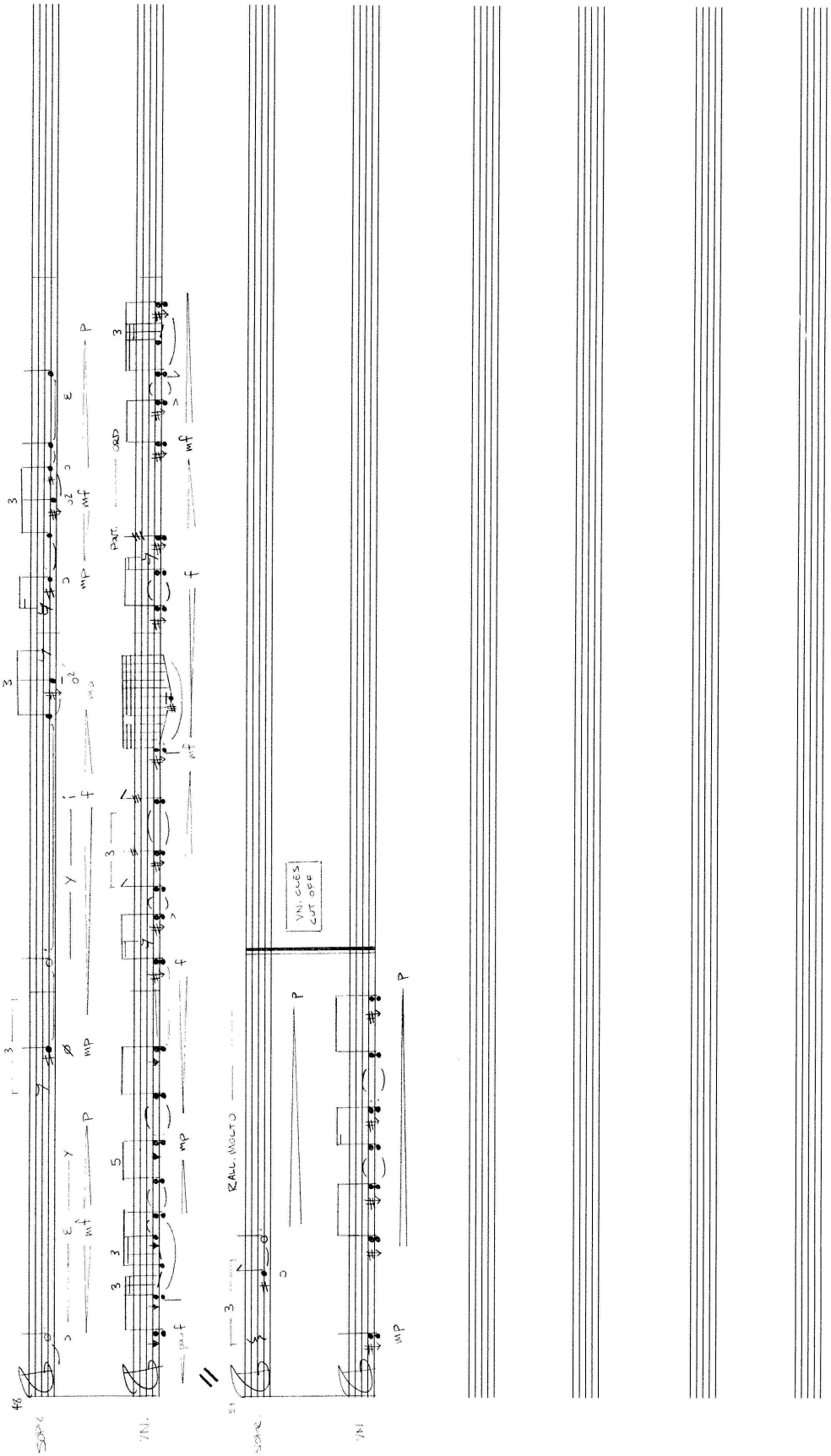


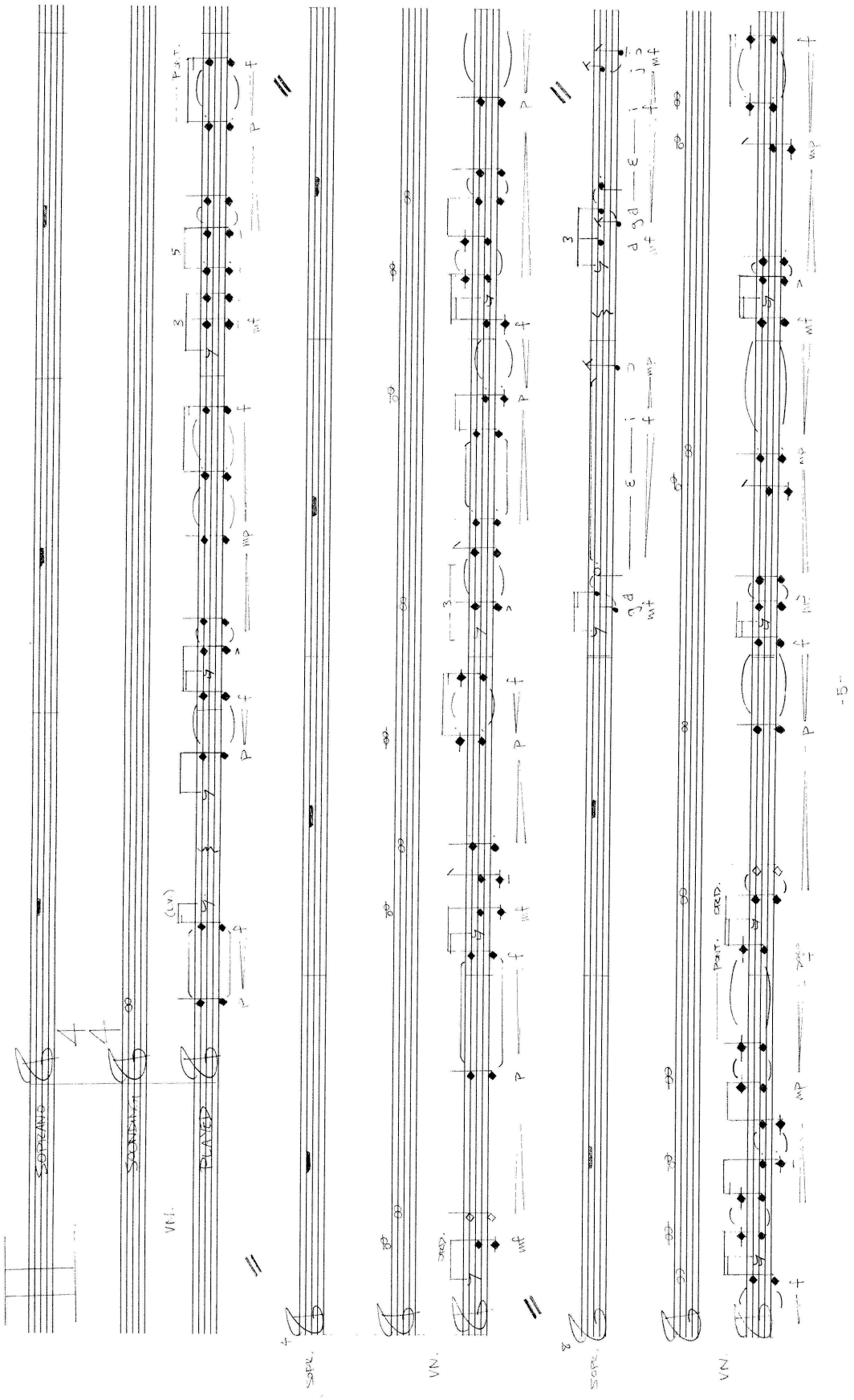
	b	LIPS	p	PLOSIVES
	d	TONGUE/TEETH	t	
	g	TONGUE/ROOF OF MOUTH	k	
	v	TEETH/LIP	f	FRICATIVES
[agir FR]	ʒ	TEETH/BREATH	ʃ [shoe]	
	z	TONGUE/TEETH	s	
"YES"	j	TONGUE/ROOF	ç [ich]	
[PARISIAN R]	R	TONGUE/THROAT	x [loch]	
	—	THROAT/BREATH	h	
	m	LIPS	–	NASALS
	n	TONGUE/TEETH	–	
[danke] [ring]	ŋ	TONGUE/ROOF	–	
	l	TONGUE (VARIES)	–	LATERAL + TRILLED
	r	TONGUE (FLIPPED)	–	
[gem]	ʤ	TEETH/BREATH	+ ʃ [choose]	AFFRICATES
[heads]	ʤ z	TEETH/TONGUE/BREATH	+ s [eats]	

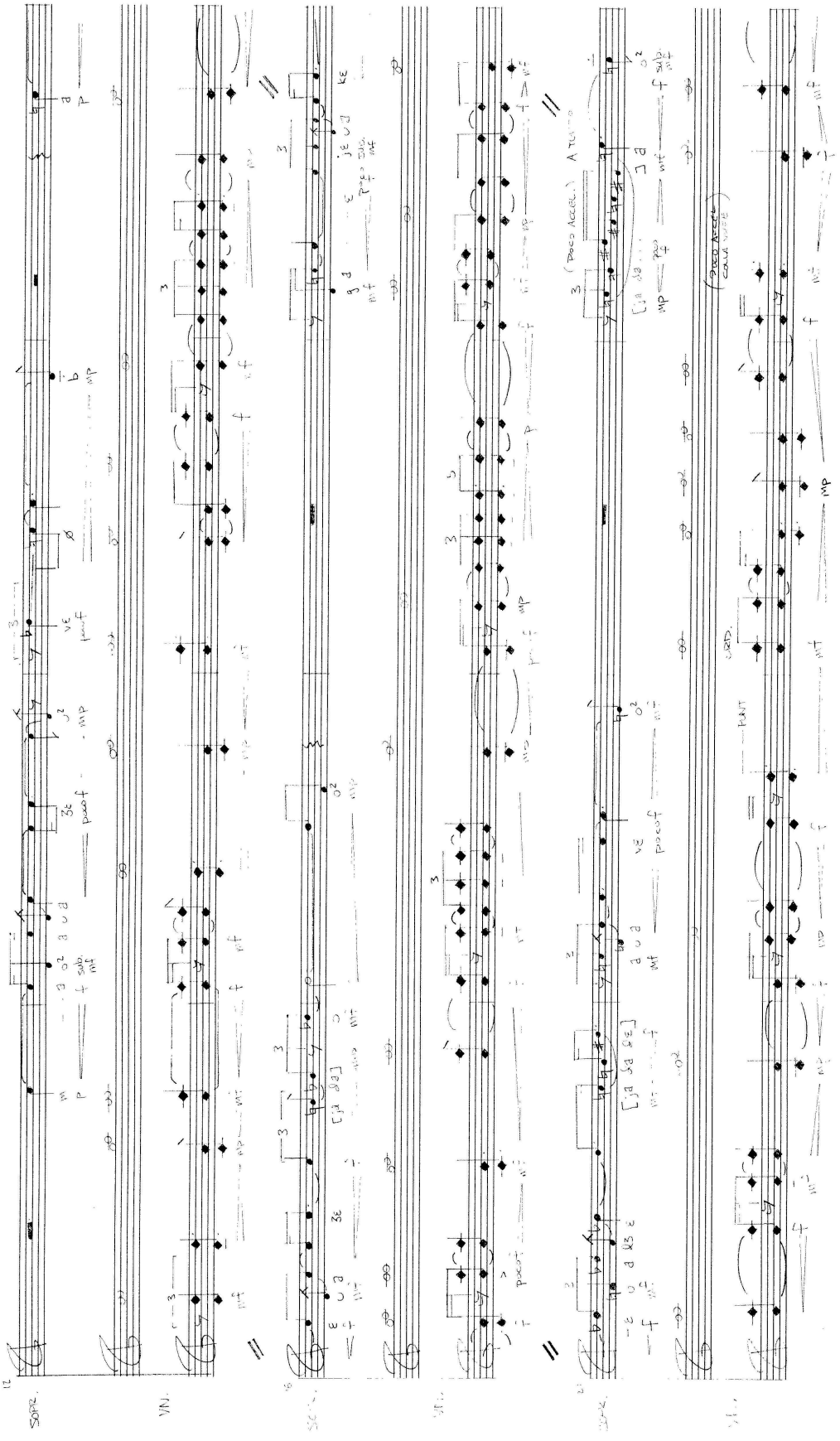

SOPRANO
VIOLIN
SOPR.
VN.
SOPR.
VN.
SOPR.
VN.

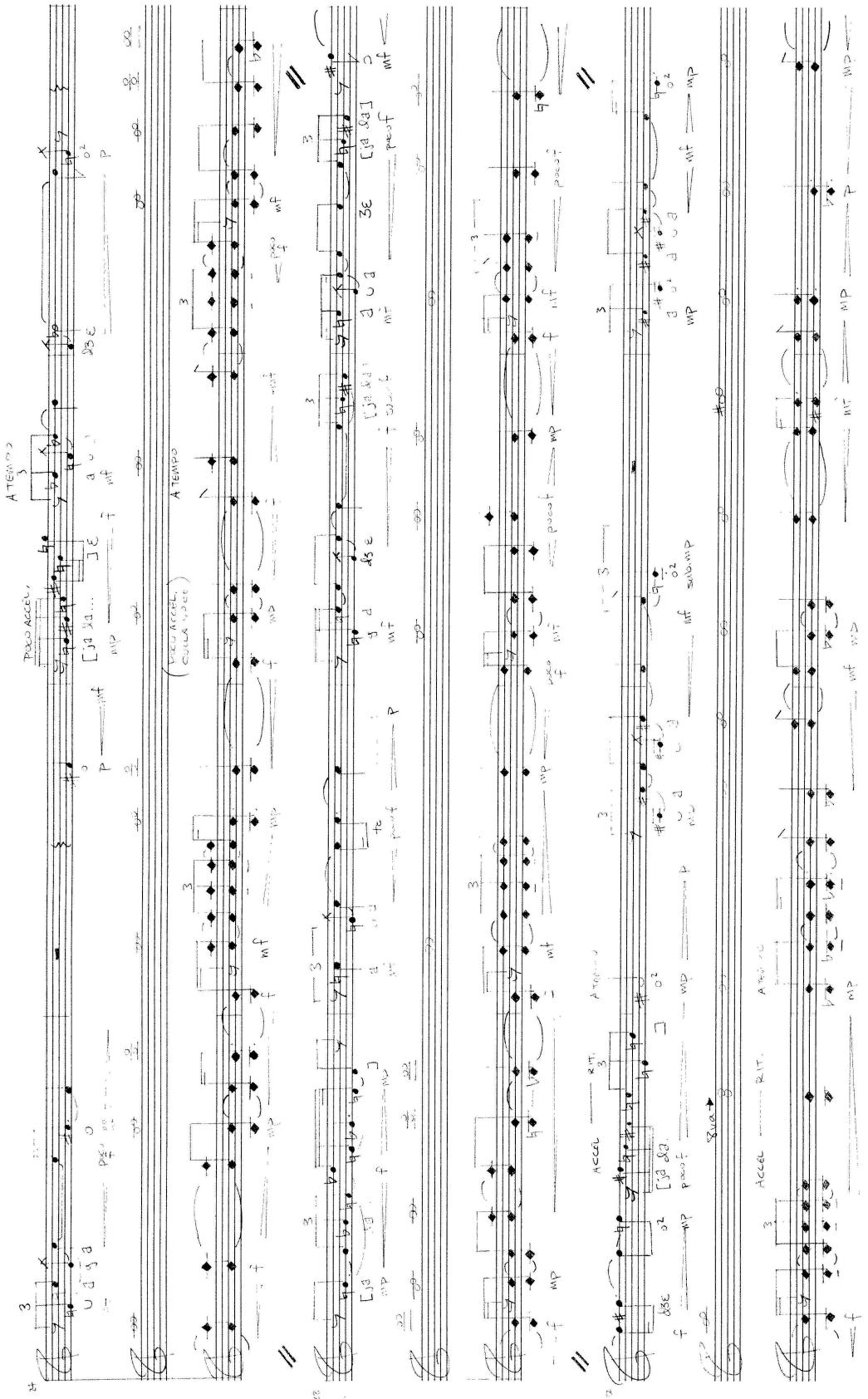


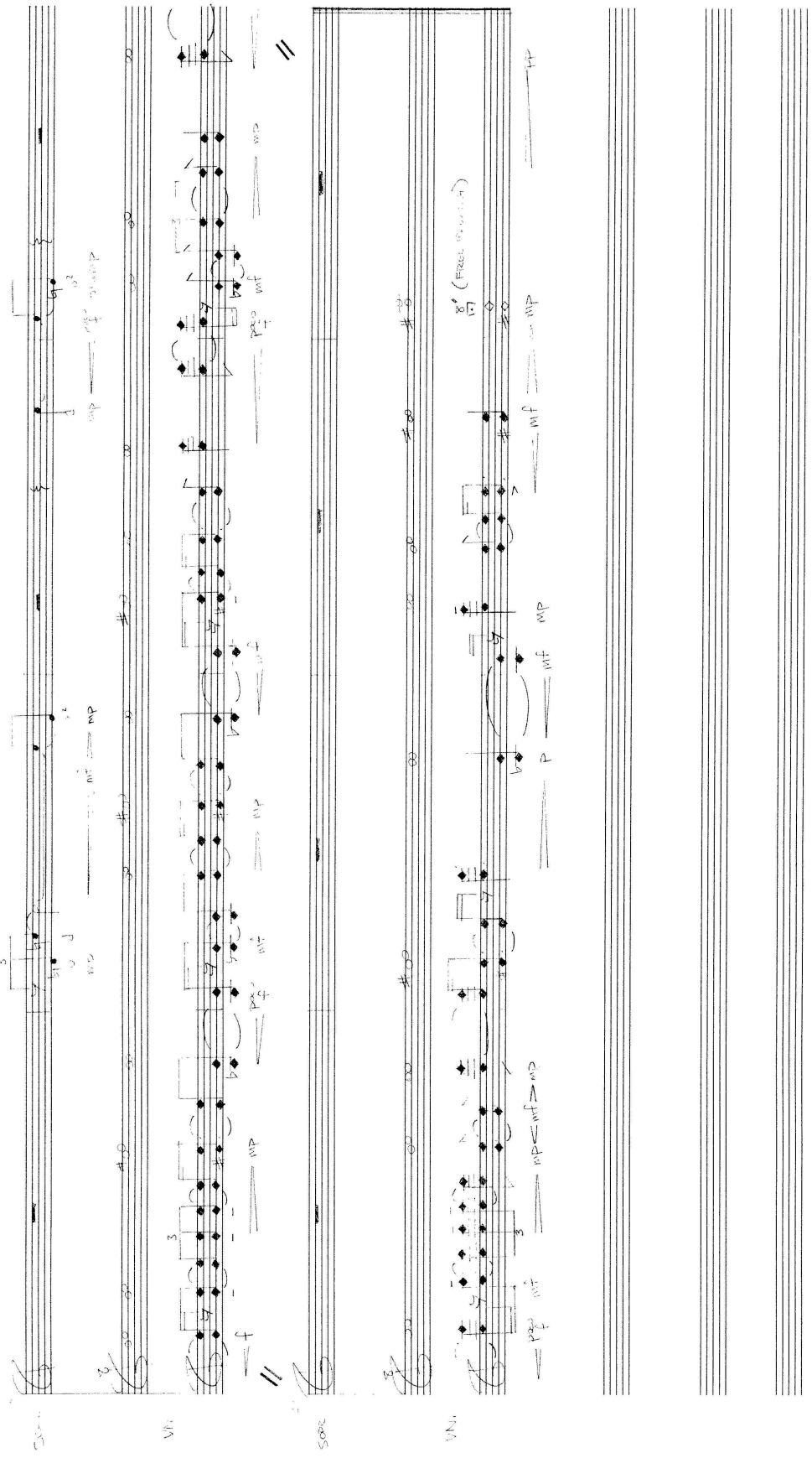


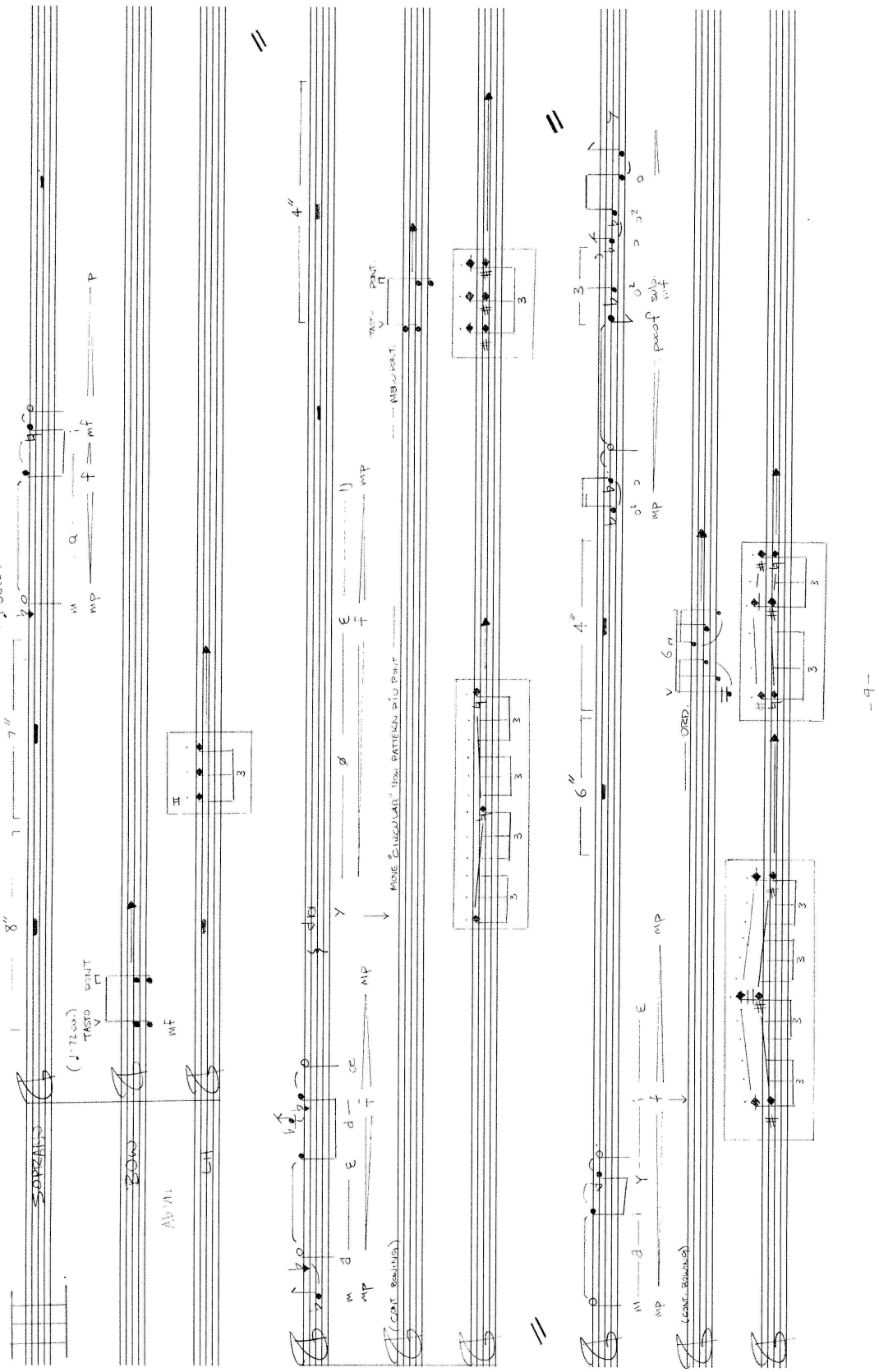

RALL. MOLTO
VN. CUES CUT OFF

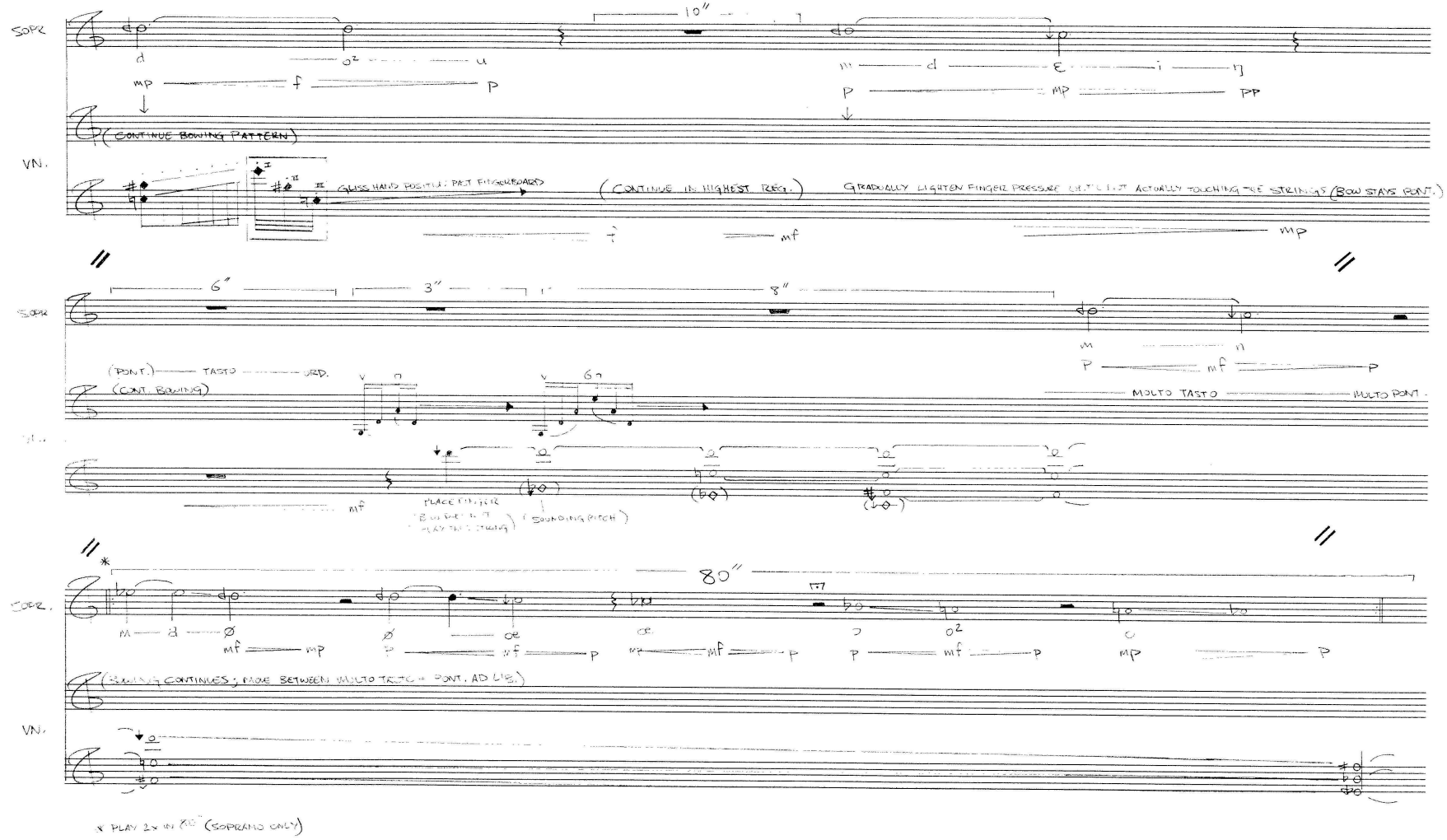

SOPRANO
SOUNDING
PLAYED
VN.
SOPR.
VN.
SOPR.
VN.
-5-

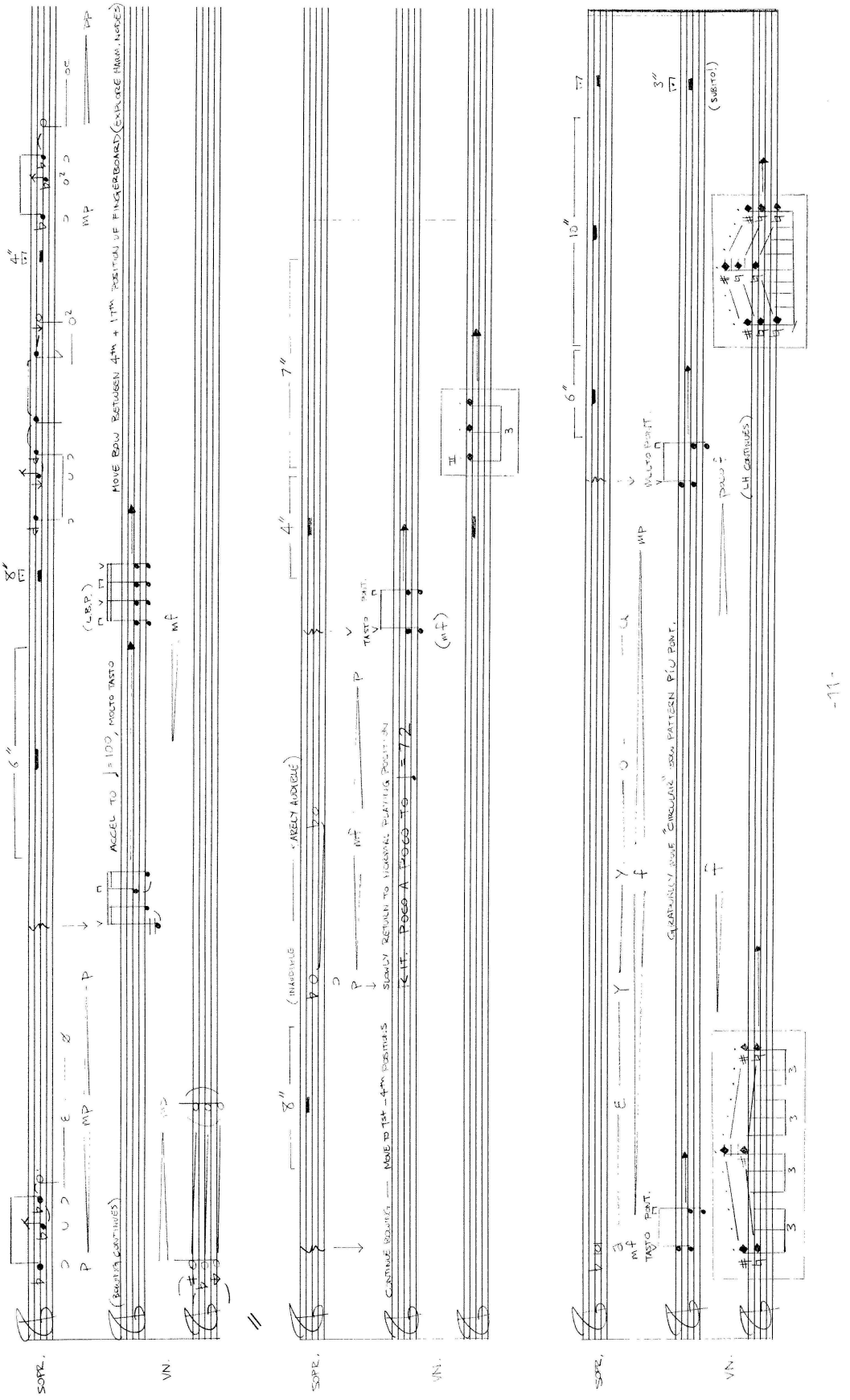







SOPRANO
BOW
LH
SOPR.
VN.
SOPR.
VN.
MOVE "CIRCULAR" BOW PATTERN PIU PONT
(CONT. BOWING)
(CONT. BOWING)
ORD.
TASTO
PONT.
MBLO PONT.
poco f sulp. mf
8"
7"
4"
6"
4"
6"
(J=50 ca)
(J=72 ca.)
-9-

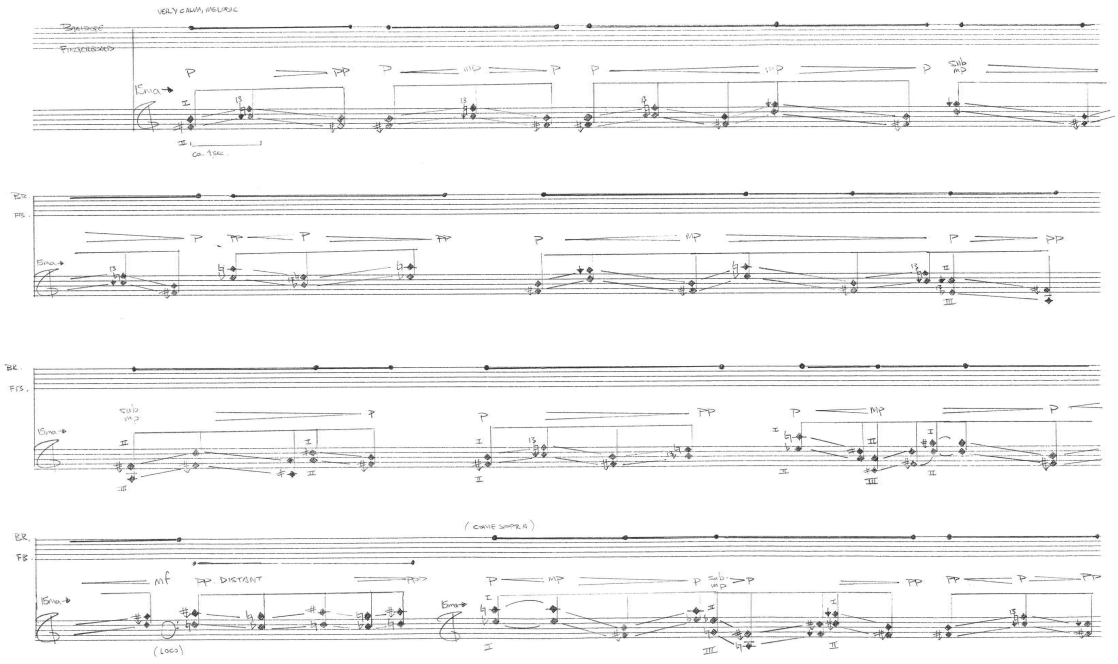

SOPR
VN.
10"
(CONTINUE BOWING PATTERN)
GLISS HAND POSITION PAST FINGERBOARD
(CONTINUE IN HIGHEST REG.)
GRADUALLY LIGHTEN FINGER PRESSURE UNTIL NOT ACTUALLY TOUCHING THE STRINGS (BOW STAYS PONT.)
6"
3"
8"
(PONT.) TASTO ORD.
(CONT. BOWING)
MOLTO TASTO
MOLTO PONT.
PLACE FINGER
(SOUNDING PITCH)
80"
(BOWING CONTINUES; MOVE BETWEEN MOLTO TASTO + PONT. AD LIB.)
* PLAY 2x IN 80" (SOPRANO ONLY)


SOPR.
VN.
MOVE BOW BETWEEN 4th + 17th POSITION OF FINGERBOARD (EXPLORE HARM. NODES)
ACCEL TO ♩ = 100, MOLTO TASTO
(L.B.P.)
(BOWING CONTINUES)
(INAUDIBLE — BARELY AUDIBLE)
CONTINUE BOWING — MOVE TO 1st – 4th POSITIONS
SLOWLY RETURN TO NORMAL PLAYING POSITION
(L.H. POCO A POCO TO ♩ = 72)
TASTO PONT.
(mf)
GRADUALLY MOVE "CIRCULAR" BOW PATTERN P/U PONT.
MOLTO PONT.
POCO f
(L.H. CONTINUES)
(SUBITO!)
-11-

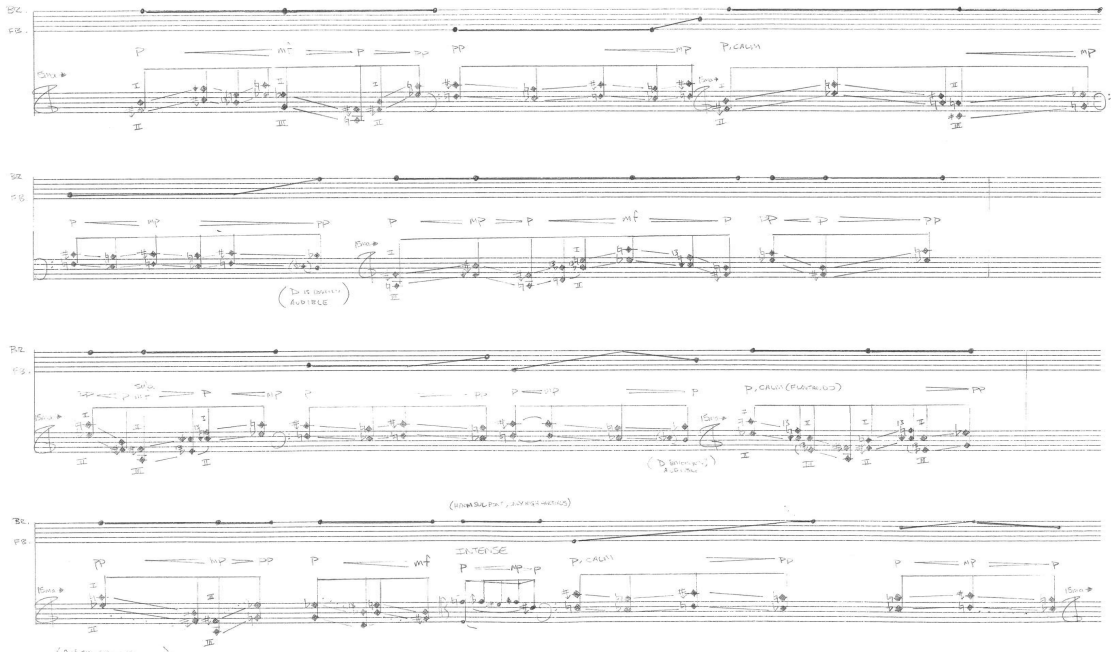
Fear of Patterns (2013)

for Cello Solo

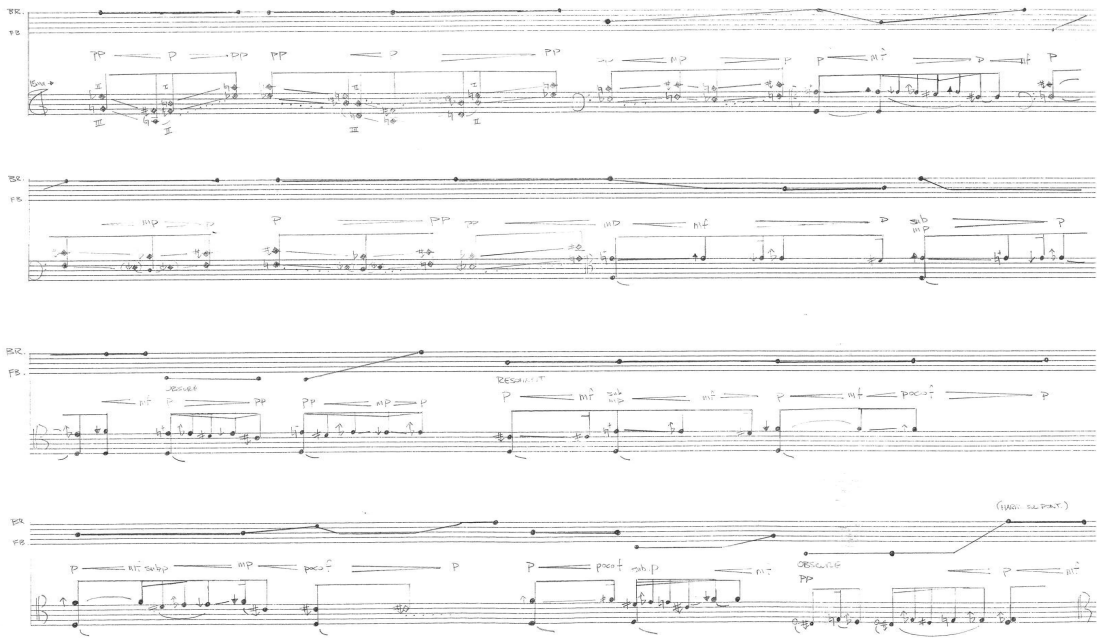
By Kevin Flowers


VERY CALM, MELODIC
BR.
FB.
15ma
ca. 1 sec.
(COME SOPRA)
mf
PP. DISTANT
(LOCO)

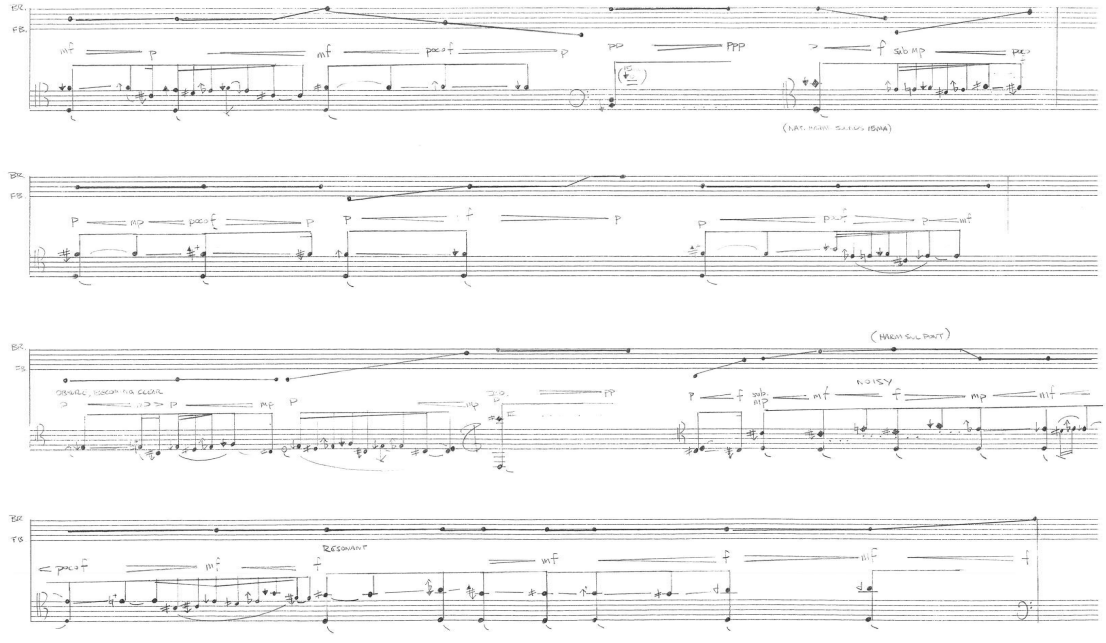
- 1 -


BR.
FB.
P, CALM
(D IS DIVIDED AUDIBLE)
P, CALM (FLATTENED)
(HAMMERPORT, INTERFERENCES)
INTENSE
P, CALM
(2nd FINGERING LIGHT STAC. w/ HARM. PRESSURE, D BARELY AUDIBLE)

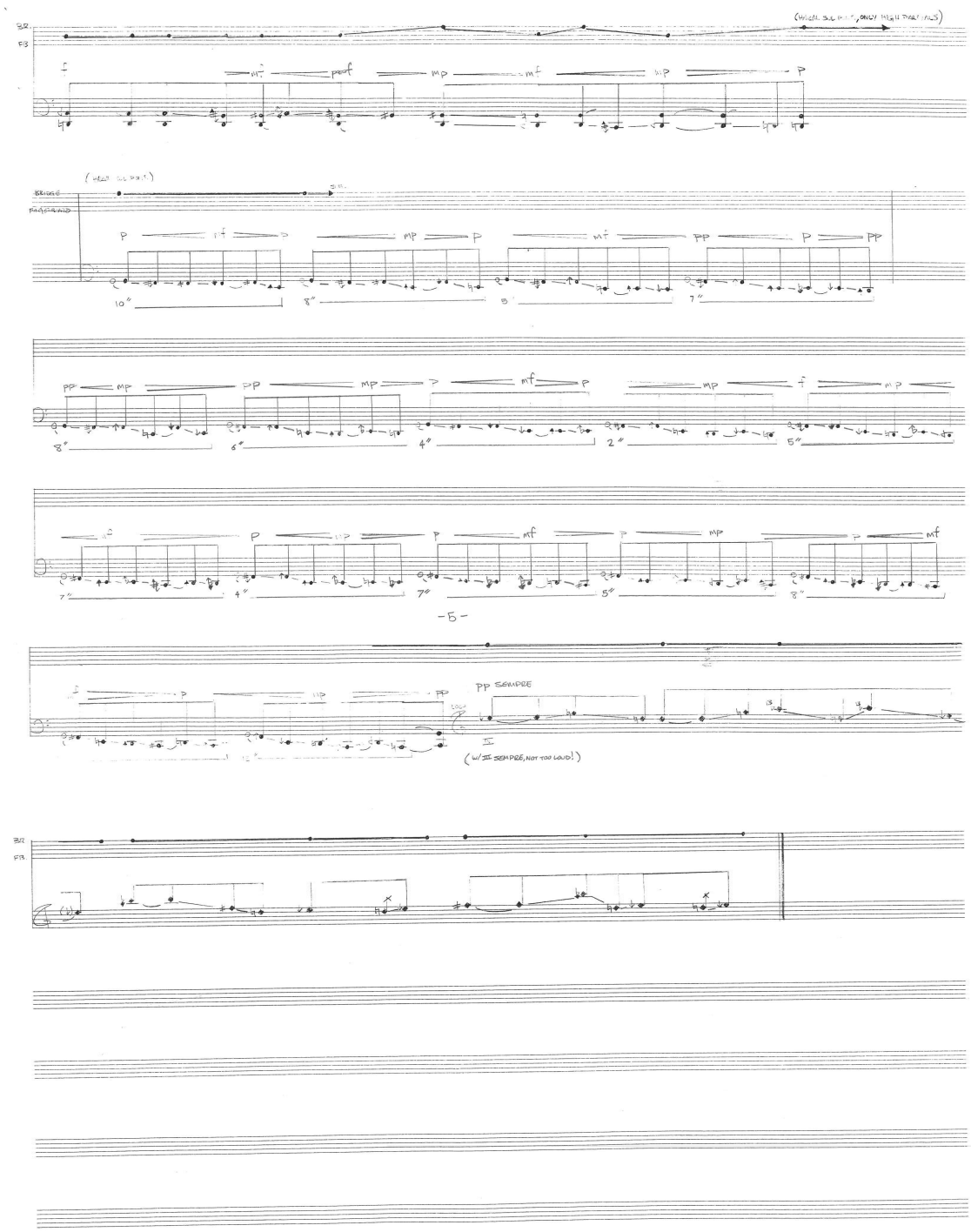
- 2 -


BR.
FB.
OBSCURE
RESONANT
(HARM. SUL PONT.)

- 3 -


BR.
FB.
(HARM SUL PONT)
NOISY
RESONANT

- 4 -

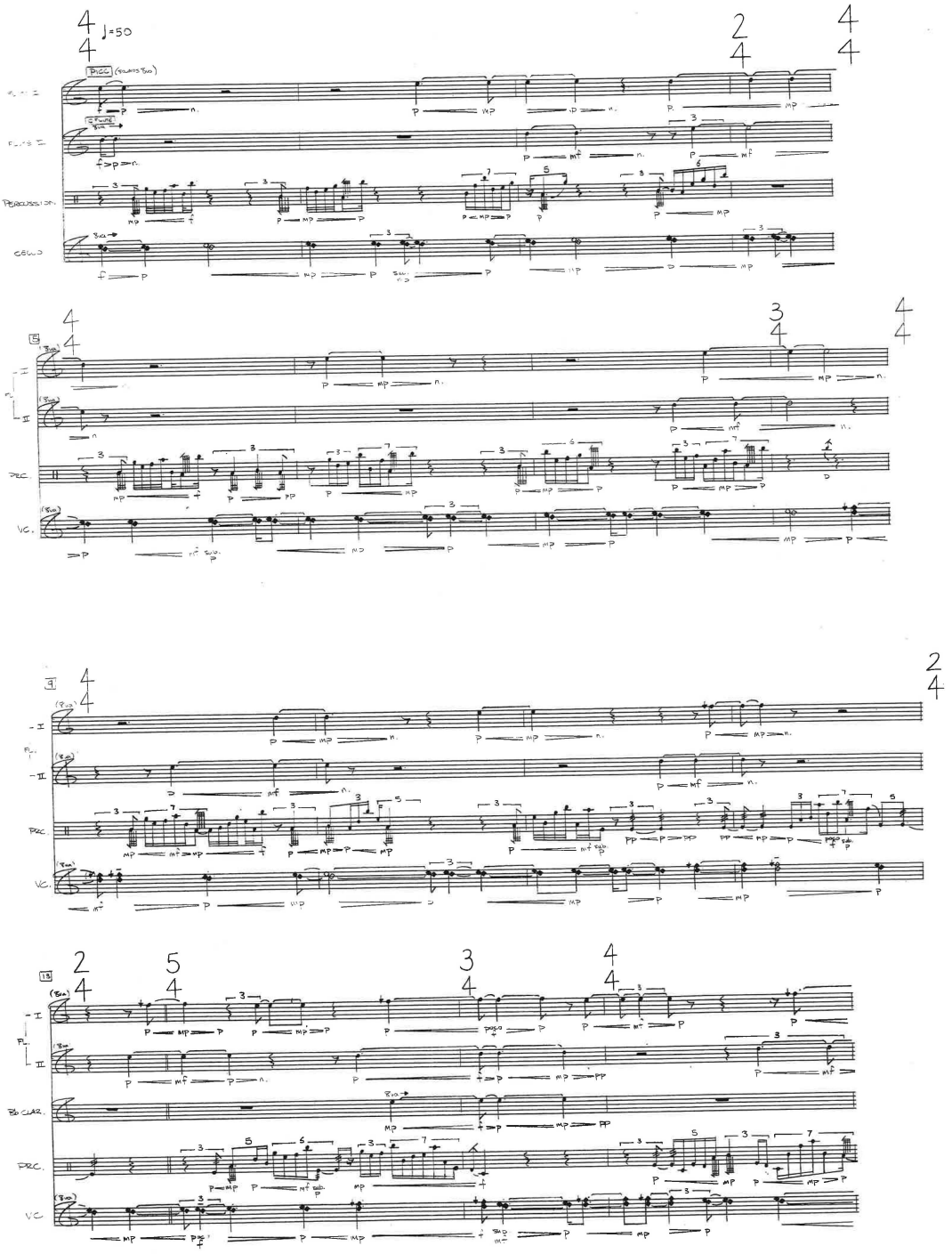

BR.
FB
f
mf
pesf
mp
mf
mp
p
BRIDGE
FINGERLAND
p
mf
p
mp
p
mf
pp
p
pp
10"
8"
7"
pp
mp
pp
mp
p
mf
p
mp
f
mp
8"
6"
4"
2"
5"
p
mp
p
mf
p
mp
p
mf
7"
4"
7"
5"
8"
-5-
f
p
mp
pp
pp SEMPRE
(w/ III SEMPRE, NOT TOO LOUD!)
BR
FB.
-6-

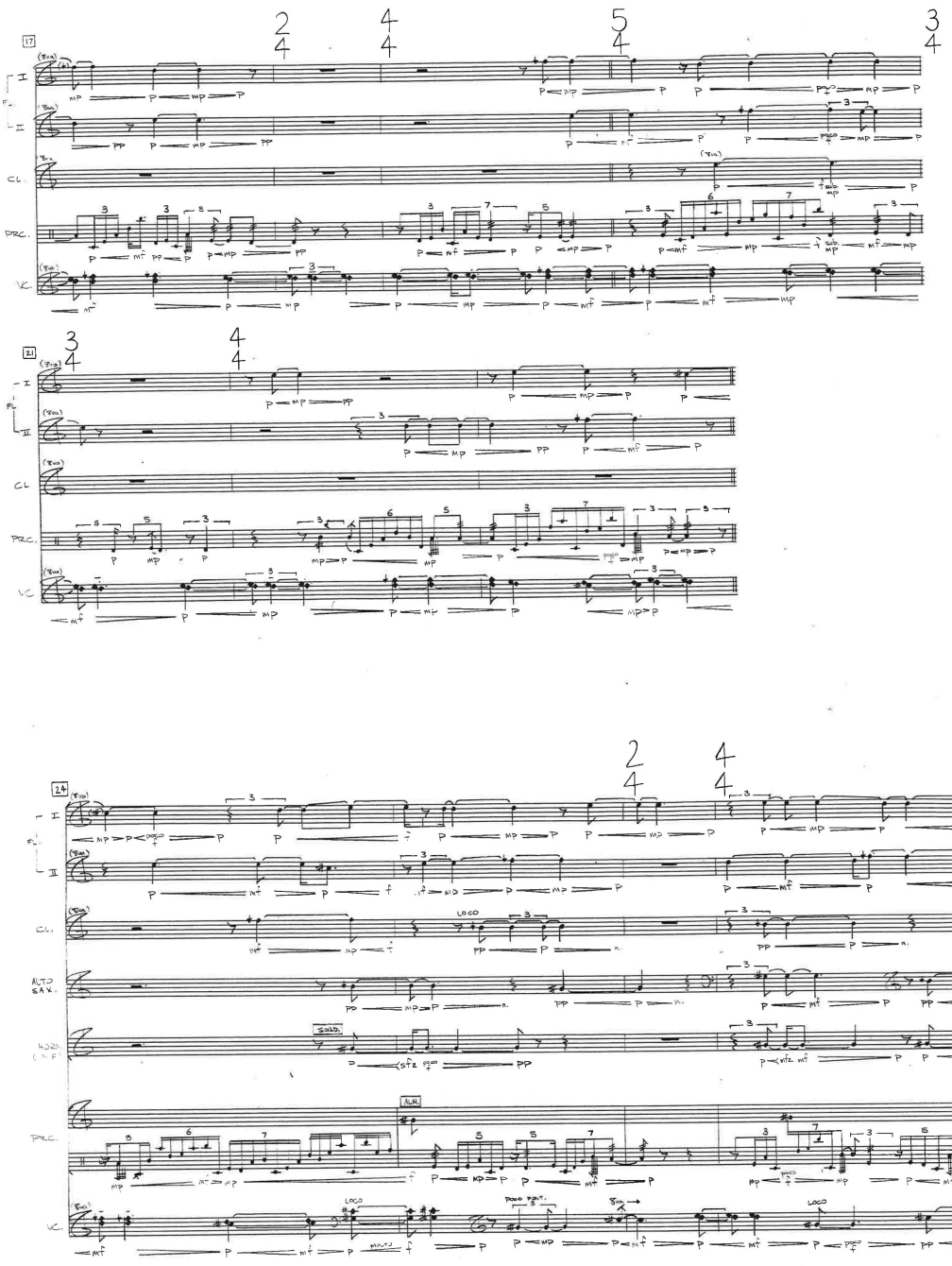
scene/sense (2013)

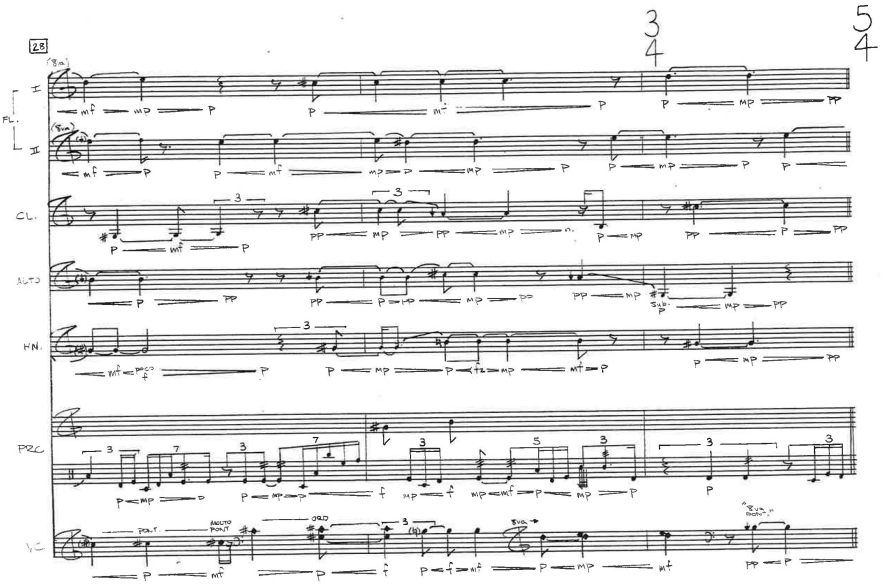
for Chamber Ensemble

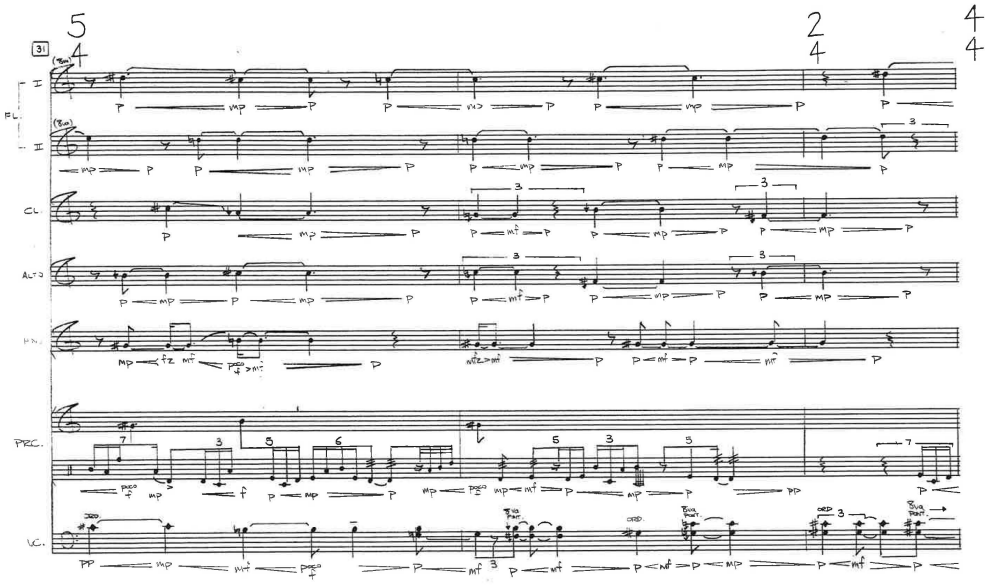
by

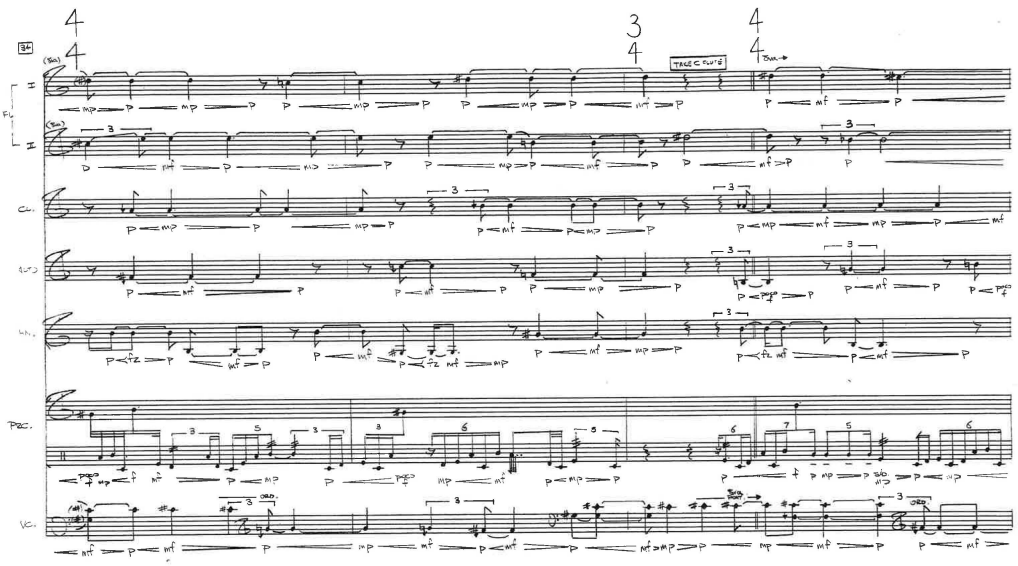
Kevin Flowers

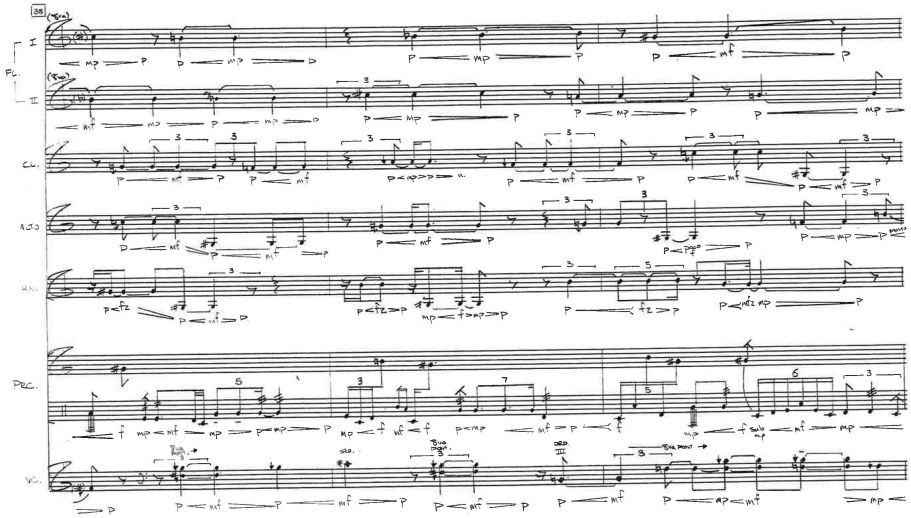

♩=50
PICC.
FLUTE I
FLUTE II
PERCUSSION
CELLO
PRC.
VC.
FL.
BB CLAR.

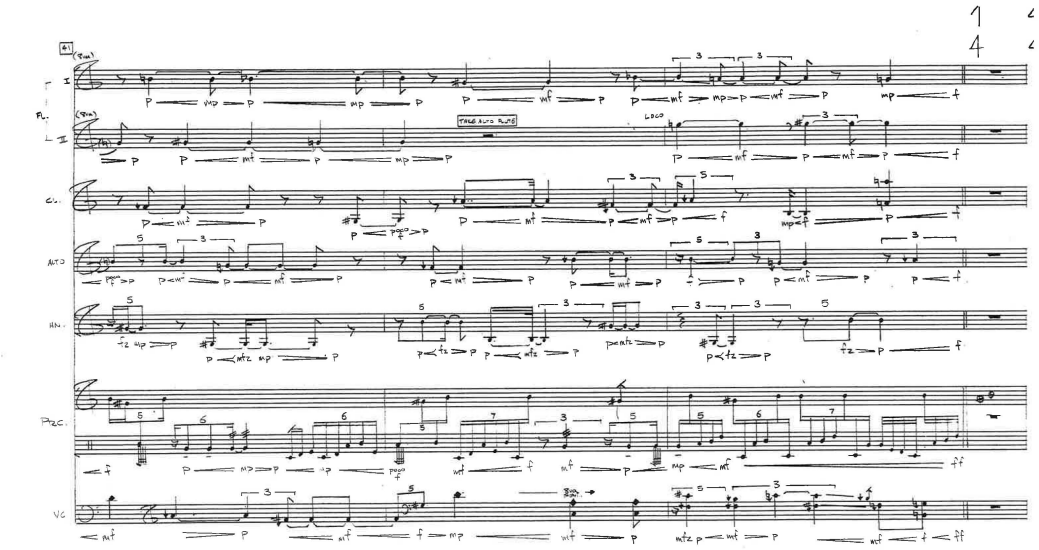

17
21
24
FL. I
FL. II
CL.
PRC.
VC.
ALTO SAX.
SOLO
ALL
LOCO

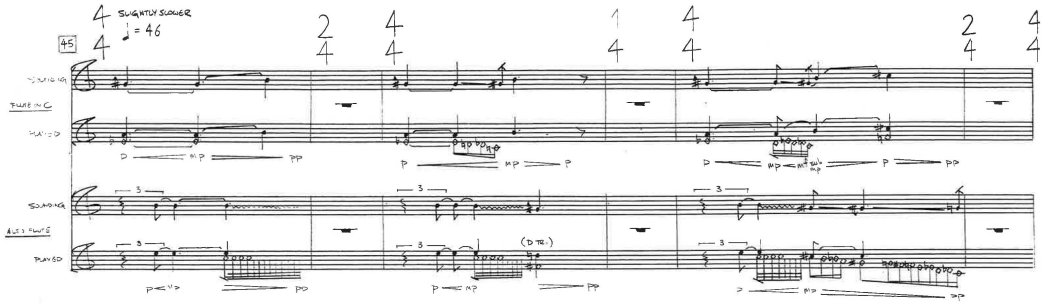

28
3/4
5/4
FL. I
FL. II
CL.
ALTO
HN.
PRC.
VC.

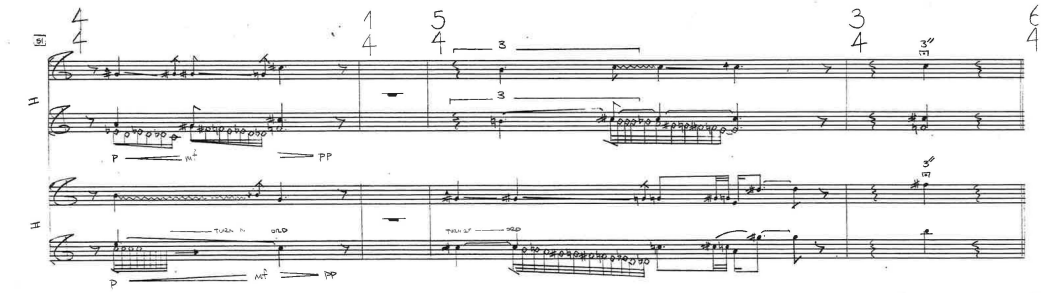

31
5/4
2/4
4/4
FL. I
FL. II
CL.
ALTO
HN.
PRC.
VC.

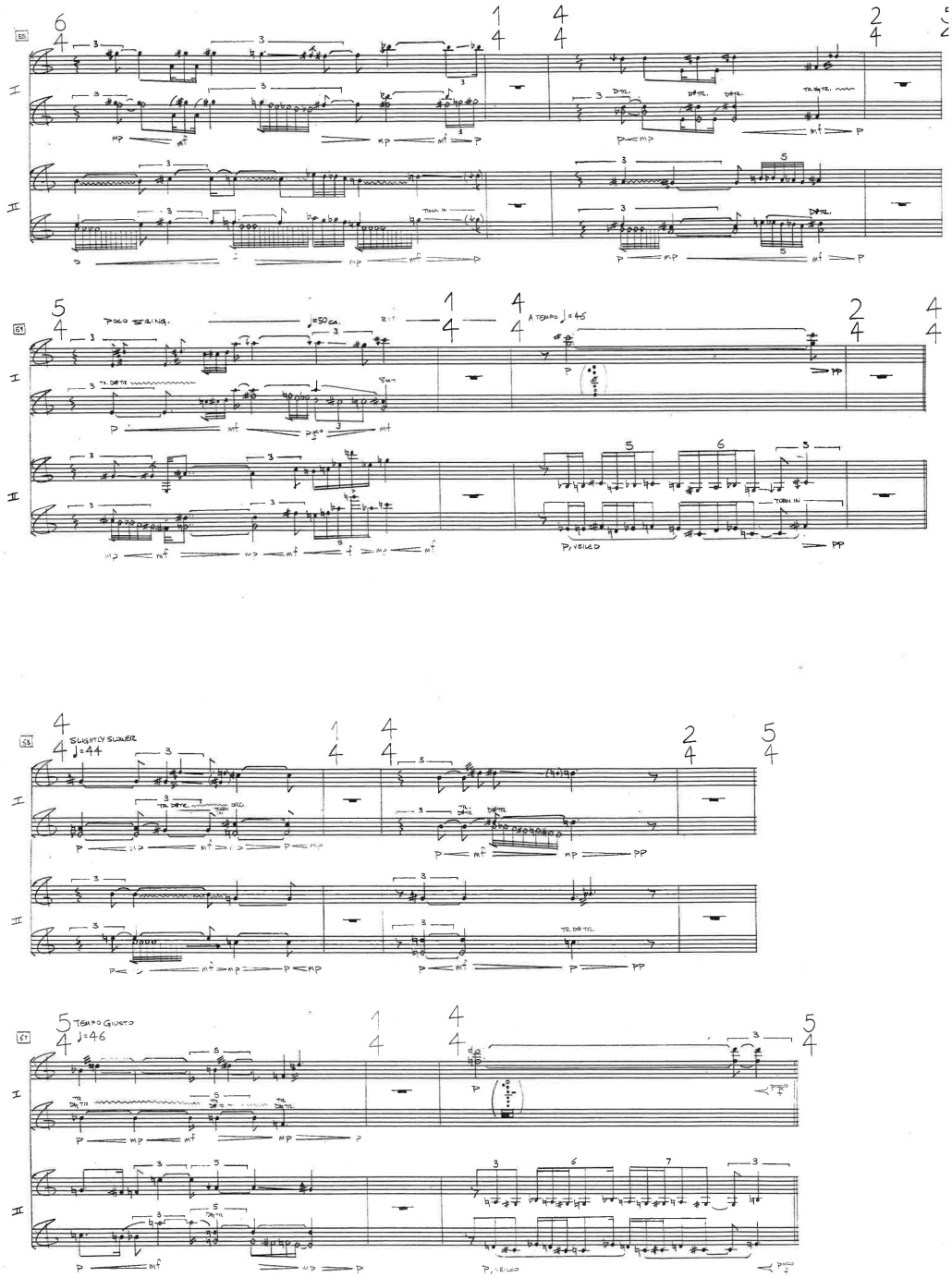

34
TRUE C FLUTE
Fl.
I
II
Cl.
Bsn.
Hn.
Perc.
Vc.

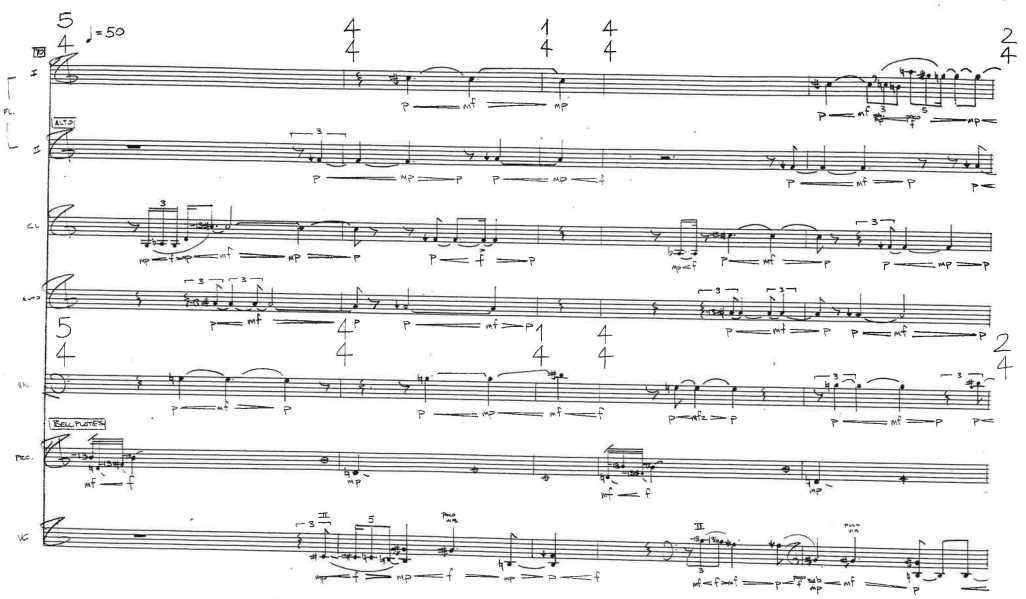

38
Fl.
I
II
Cl.
Bsn.
Hn.
Perc.
Vc.

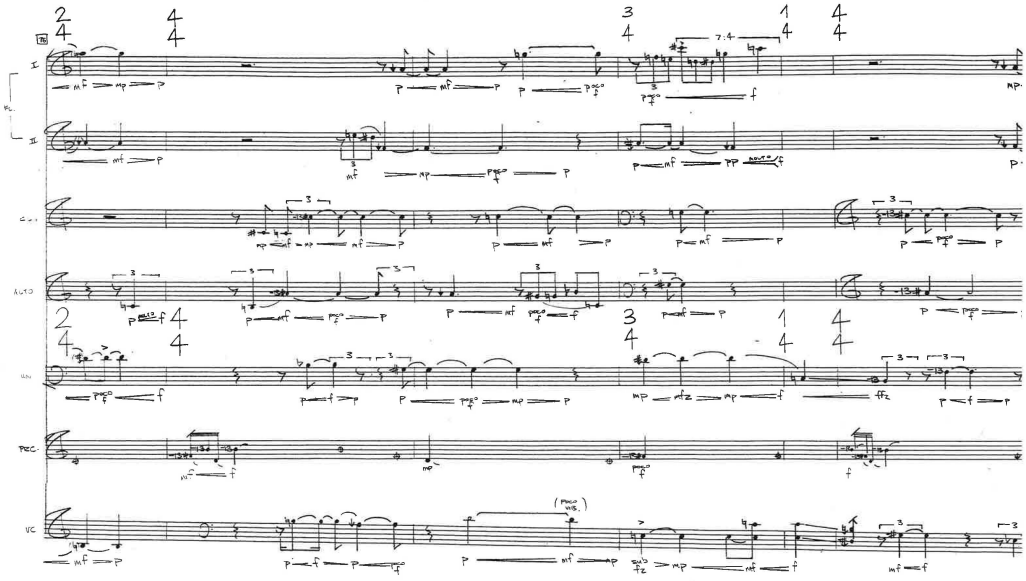


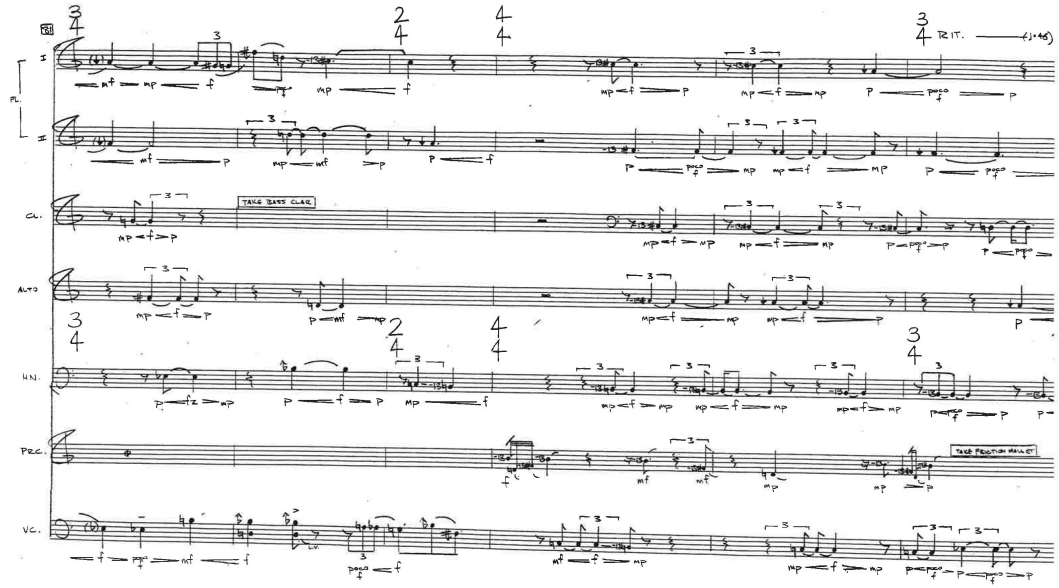

SLIGHTLY SLOWER
♩ = 46
FLUTE IN C
PLAYED

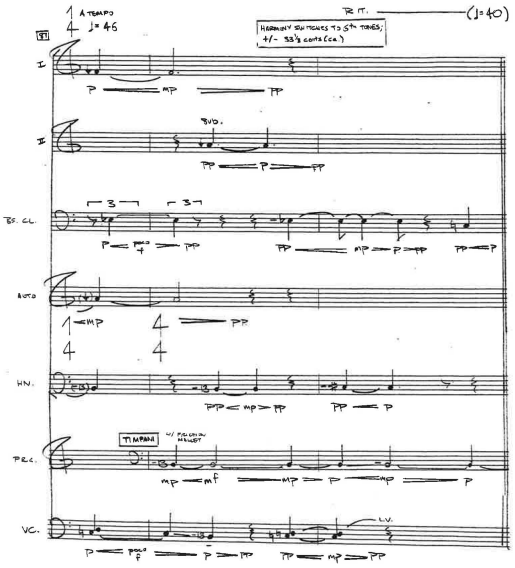


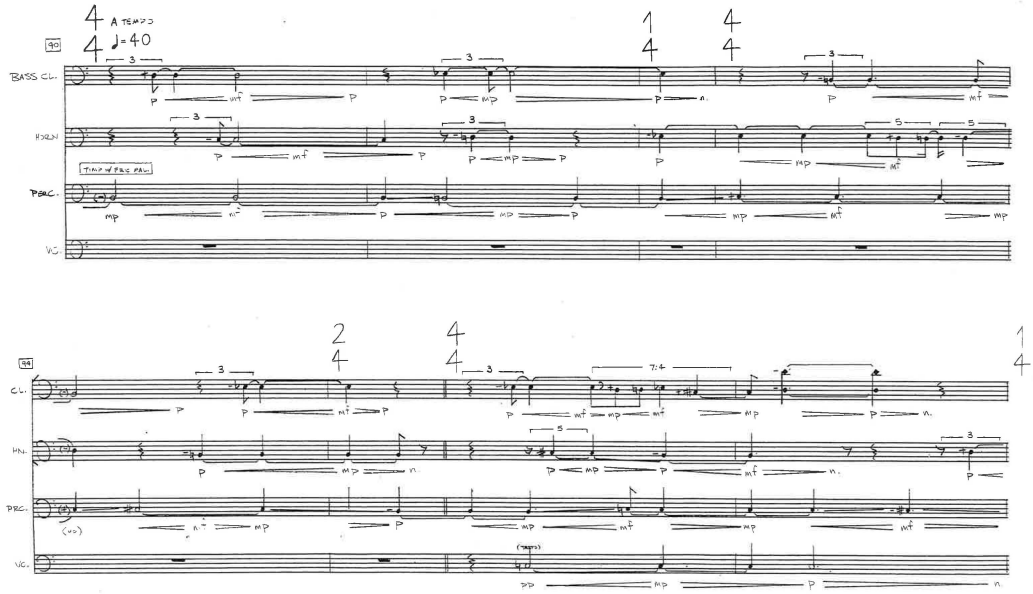

POCO STRING.
A TEMPO ♩=46
SLIGHTLY SLOWER
♩=44
TEMPO GIUSTO
♩=46

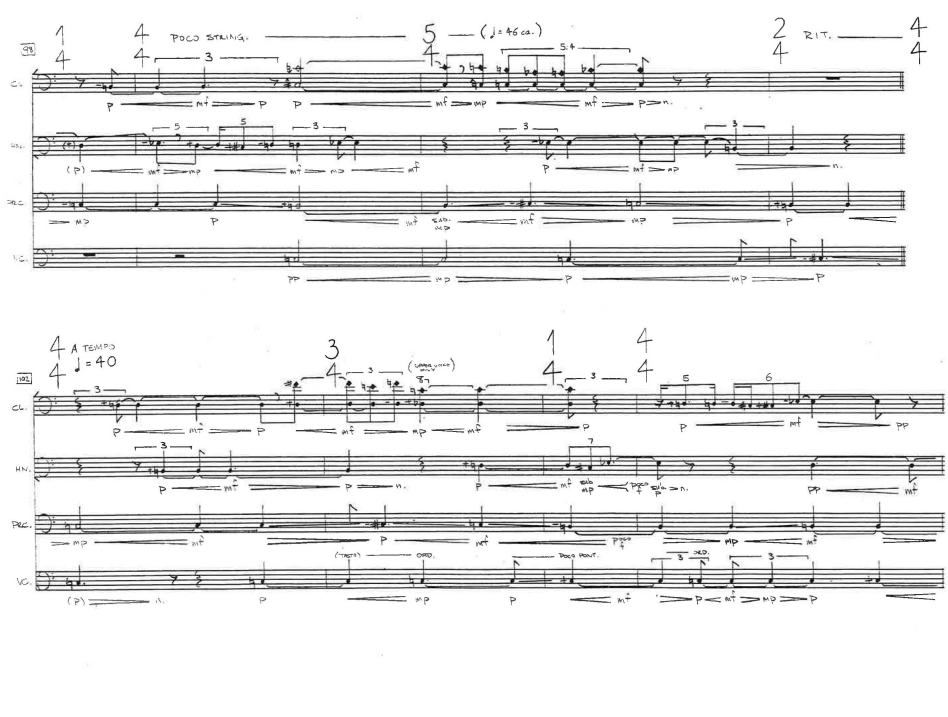

♩=50
ALTO
BELL PLATES

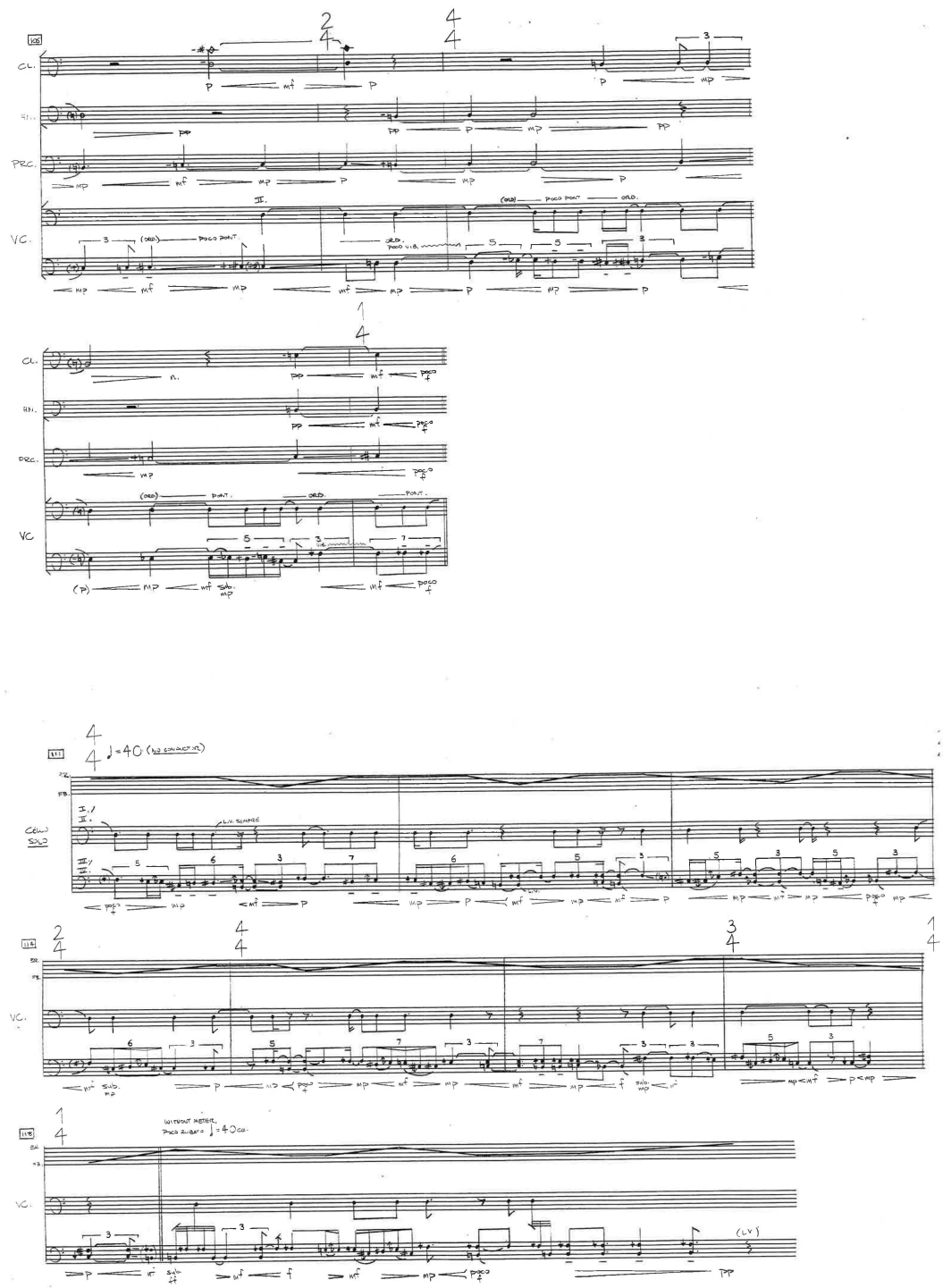

7:4

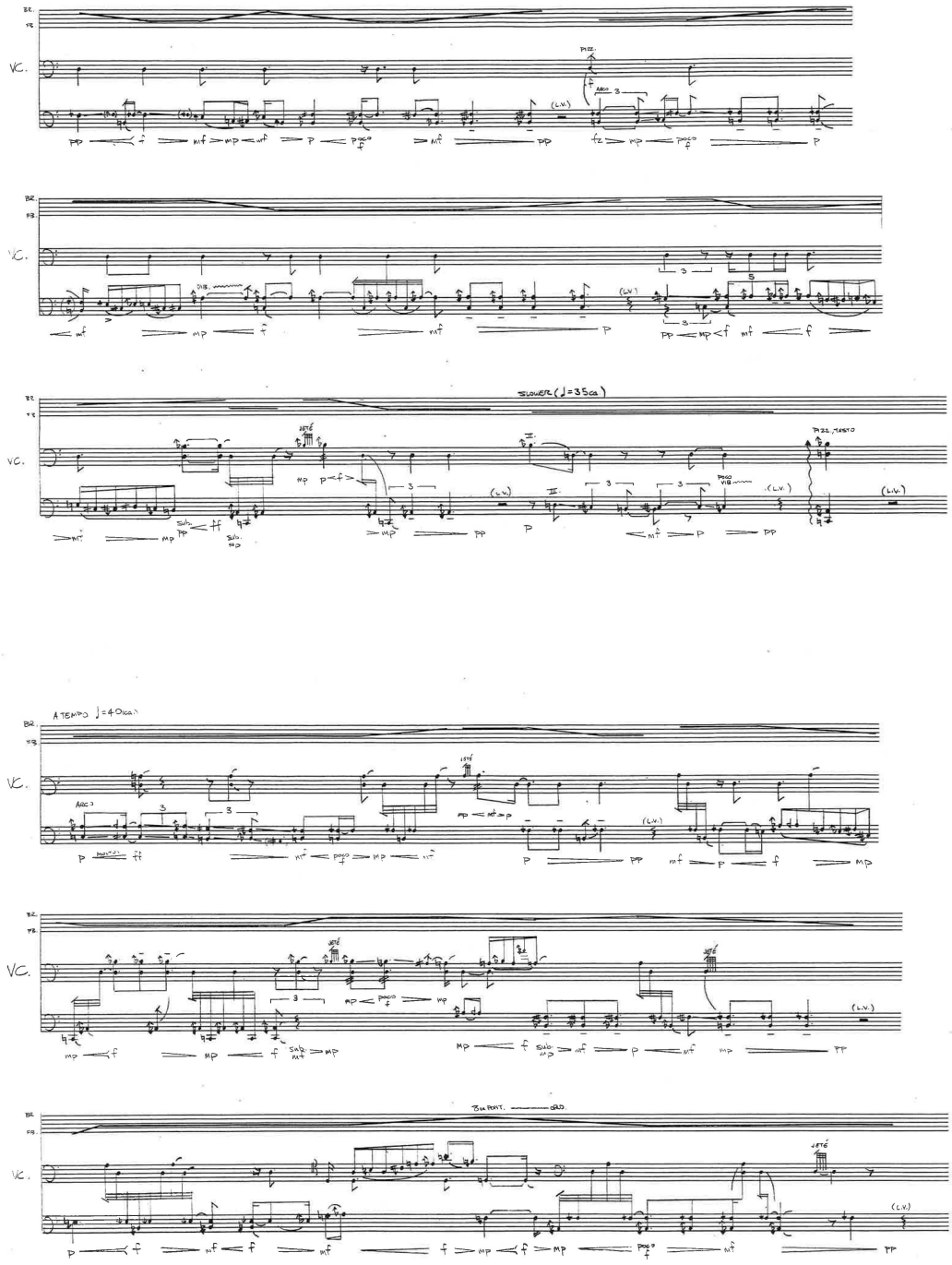

RIT.
(♩=46)
FL.
CL.
TAKE BASS CLAR
ALTO
HN.
PRC.
TAKE FRICTION MALLET
VC.

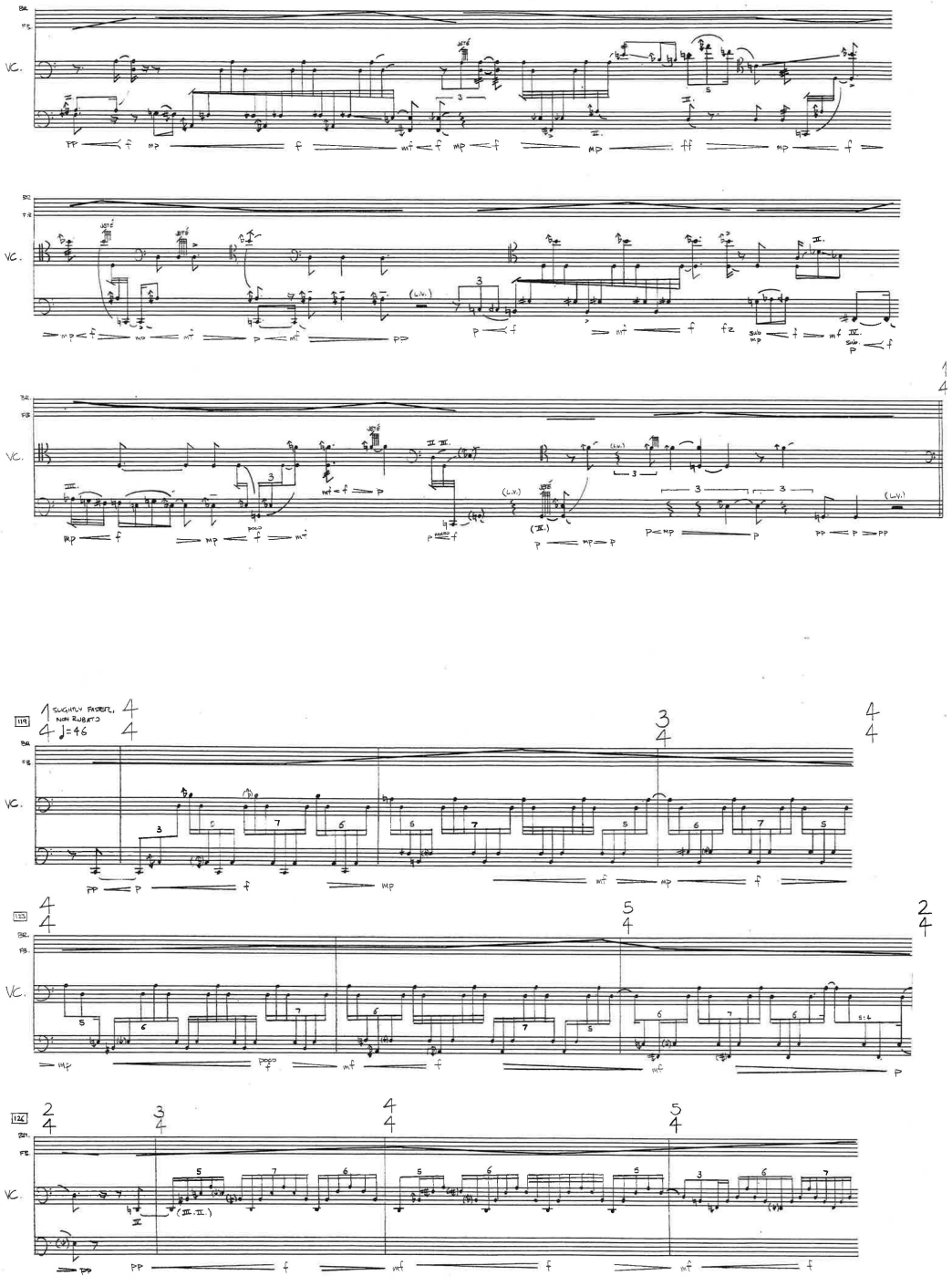

A TEMPO
♩=46
RIT.
(♩=40)
HARMONY SWITCHES TO 5th TONES;
+/- 33⅓ cents (ca.)
BUD.
BS. CL.
ALTO
HN.
TIMPANI
w/ FRICTION MALLET
PRC.
VC.
L.V.

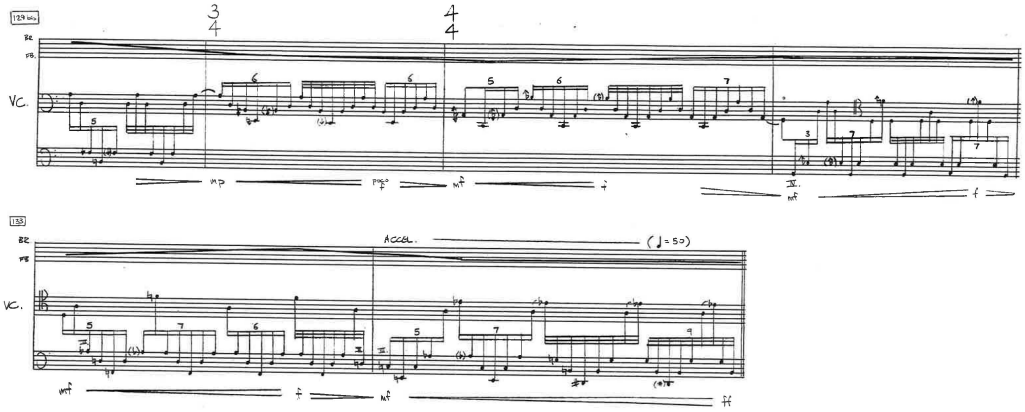

A TEMPO
♩=40
BASS CL.
HORN
PERC.
VC.
CL.
HN.
PRC.
VC.

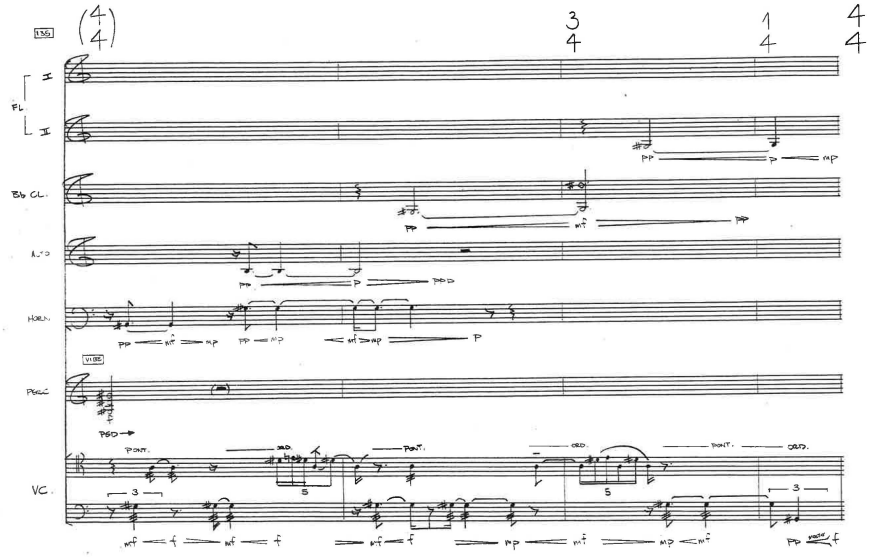

POCO STRING.
(♩=46 ca.)
RIT.
A TEMPO
♩=40
CL.
HN.
PRC.
VC.

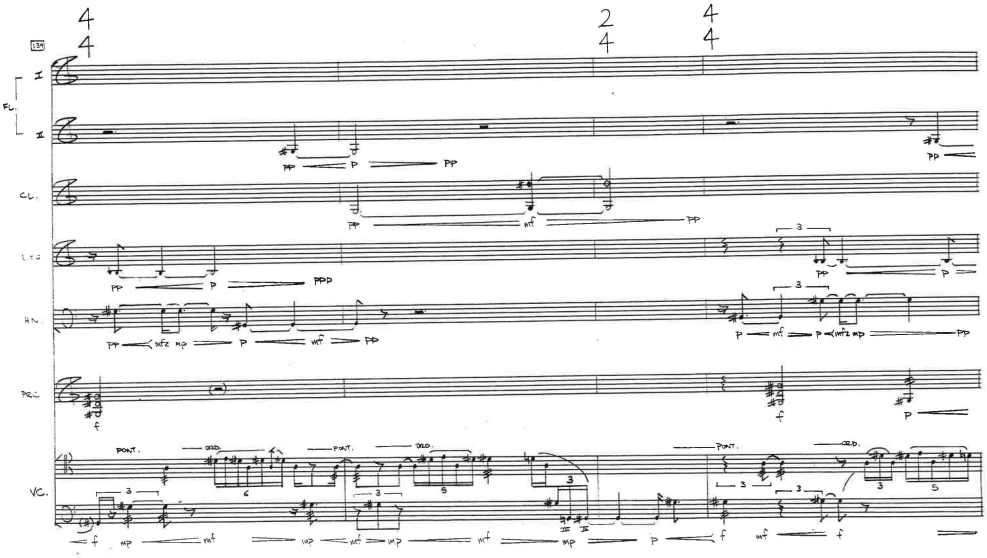

CL.
HN.
PRC.
VC.
CL.
HN.
PRC.
VC
CELLO SOLO
VC.
VC.

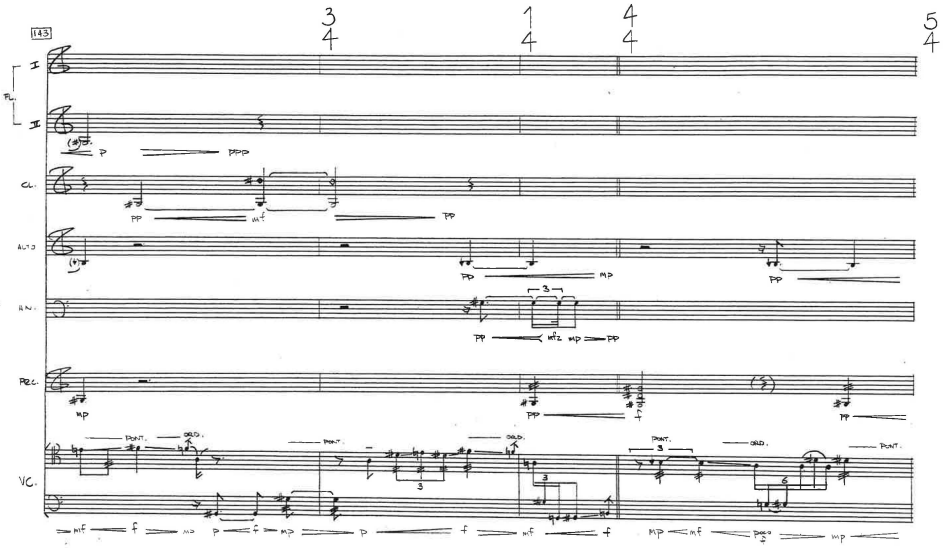

VC.
SLOWER (♩=35ca.)
A TEMPO ♩=40ca.
BIS PORT. GRD.

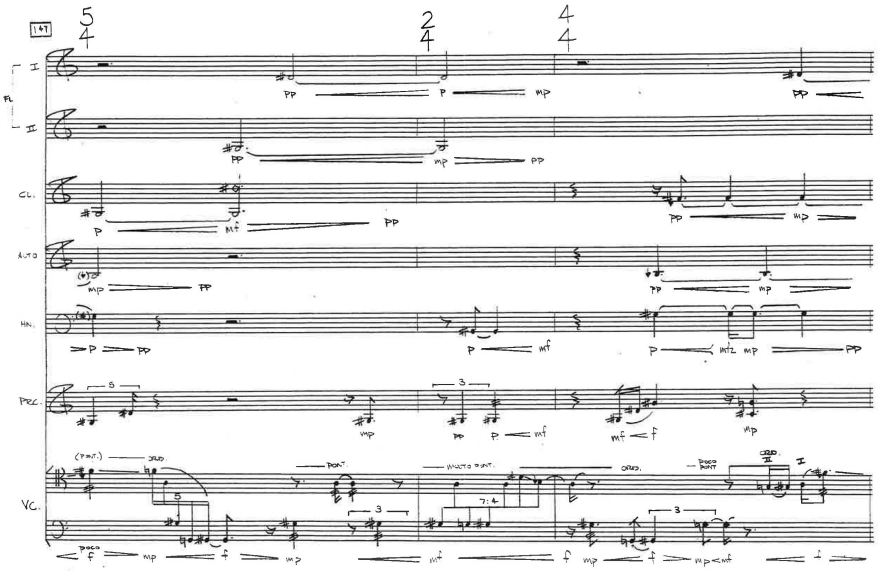

VC.
SLIGHTLY FASTER, NON RUBATO
♩=46

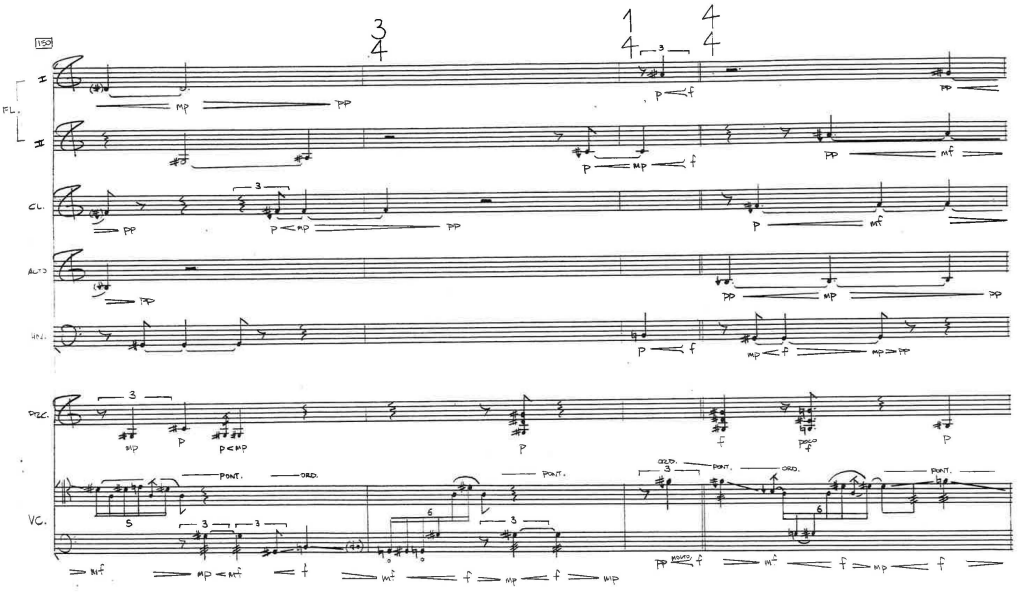

129 bis
BR.
FB.
VC.
ACCEL.
(♩= 50)

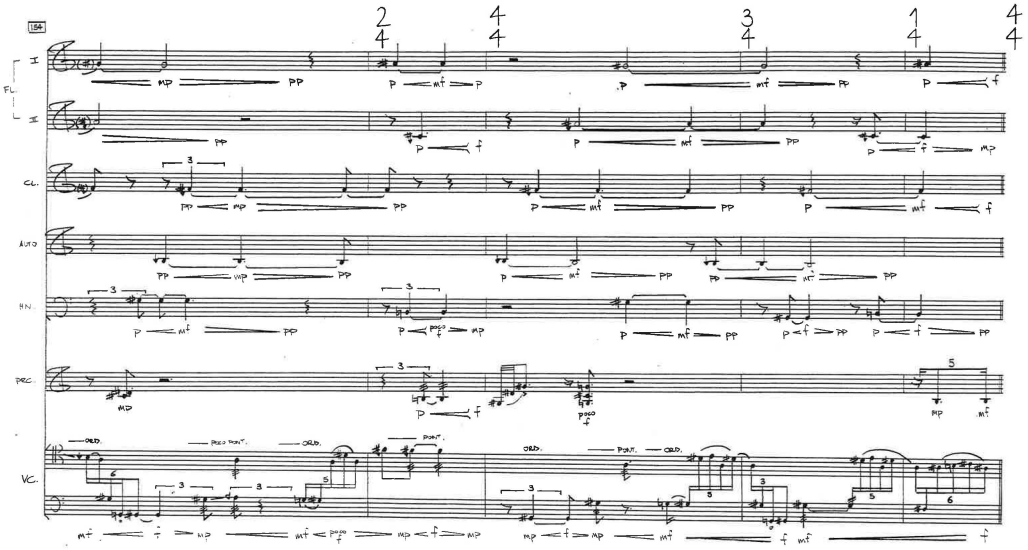

135
FL.
Bb CL.
ALTO
HORN.
PERC.
VIBR.
PSD
PONT.
ORD.
VC.

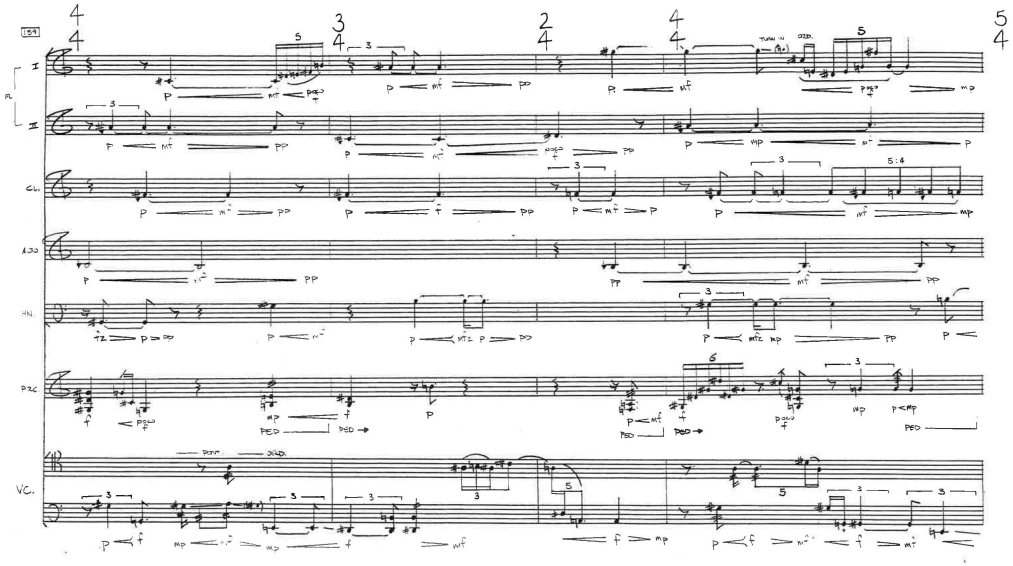

134
FL.
I
II
CL.
ALTO
HN.
PERC.
VC.
PONT.
ORD.

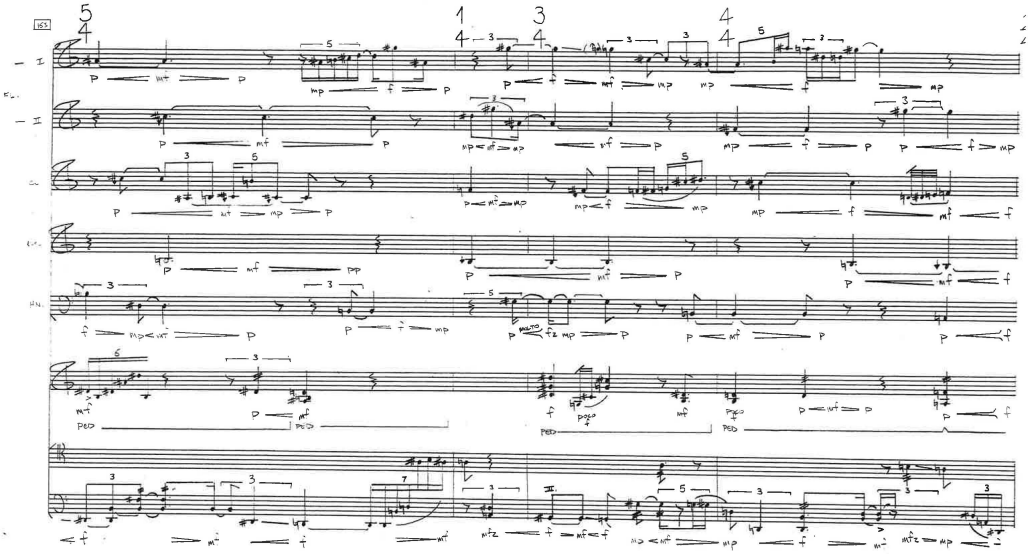

143
FL.
I
II
CL.
ALTO
HN.
PERC.
VC.
PONT.
ORD.

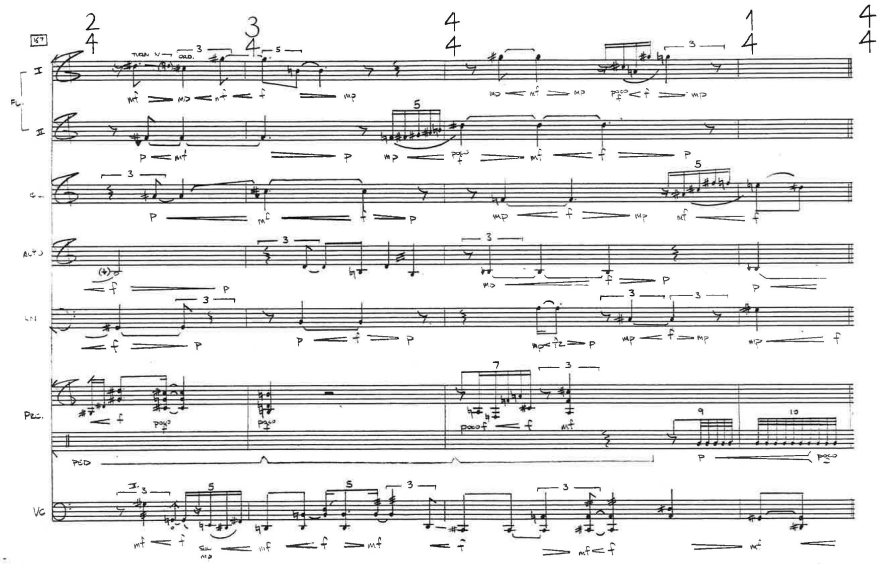

147
FL.
I
II
CL.
ALTO
HN.
PRC.
VC.
ORD.
PONT.
MOLTO PONT.
POCO PONT.

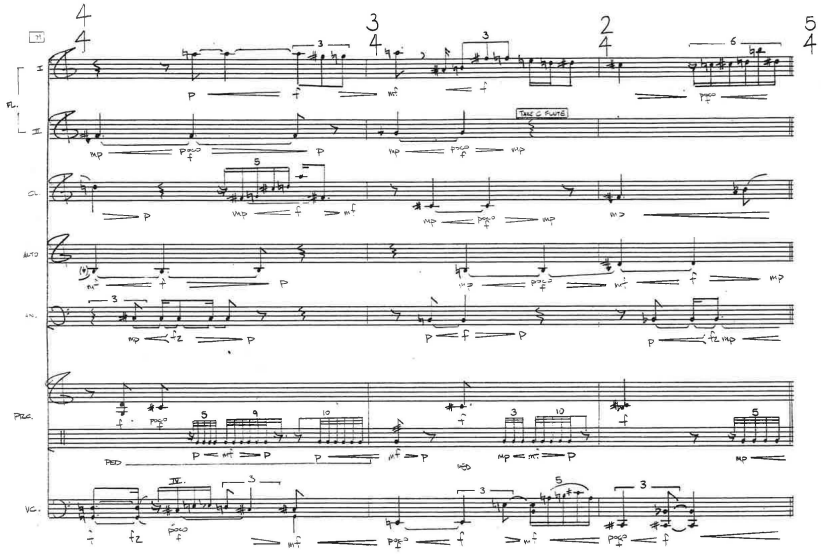

150
FL.
I
II
CL.
ALTO
HN.
PRC.
VC.
PONT.
ORD.
MOLTO

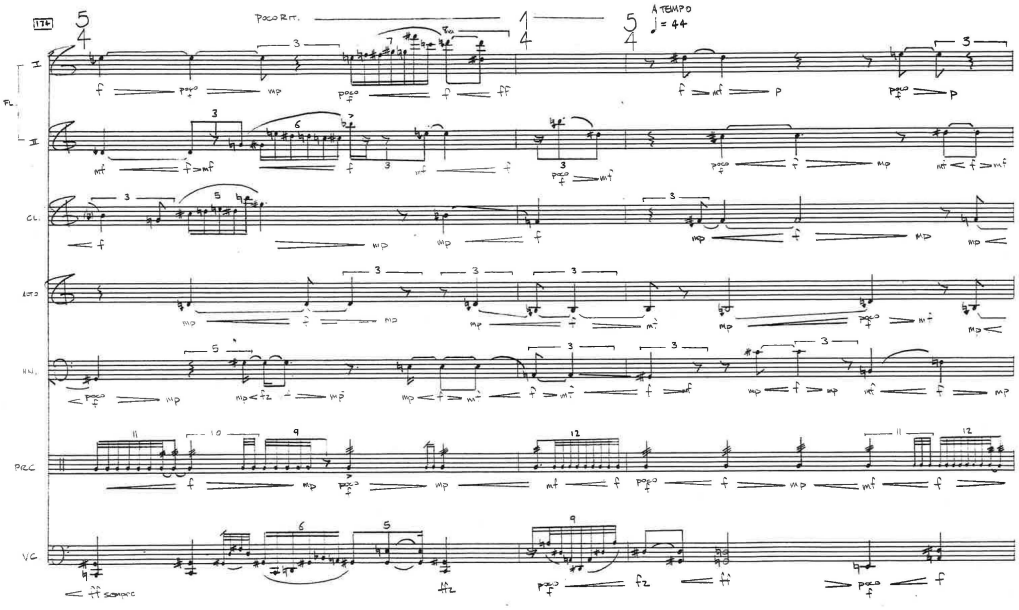

154
FL.
I
II
CL.
AUTO
HN.
PERC.
VC.
ORD.
PONT.

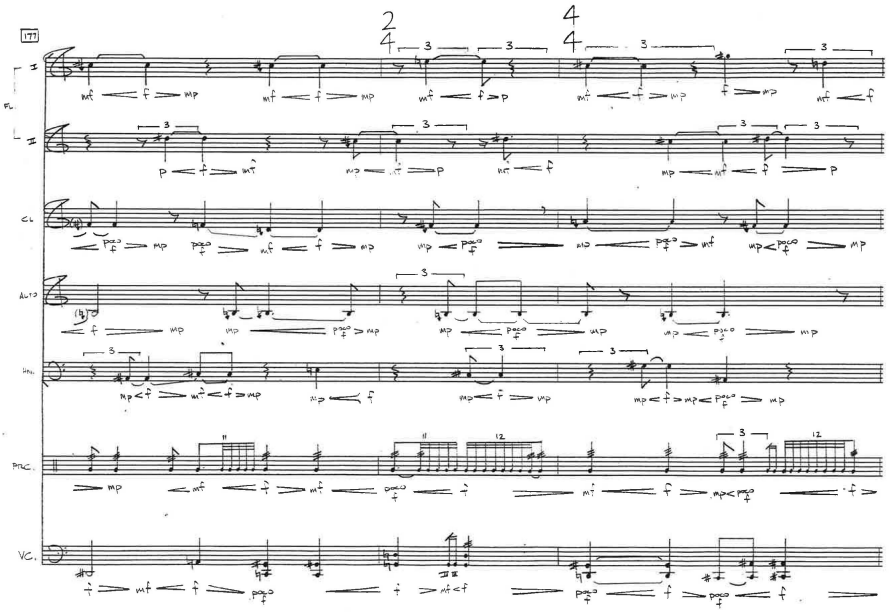

159
FL.
I
II
CL.
AUTO
HN.
PERC.
VC.
PONT.
ORD.
PED.

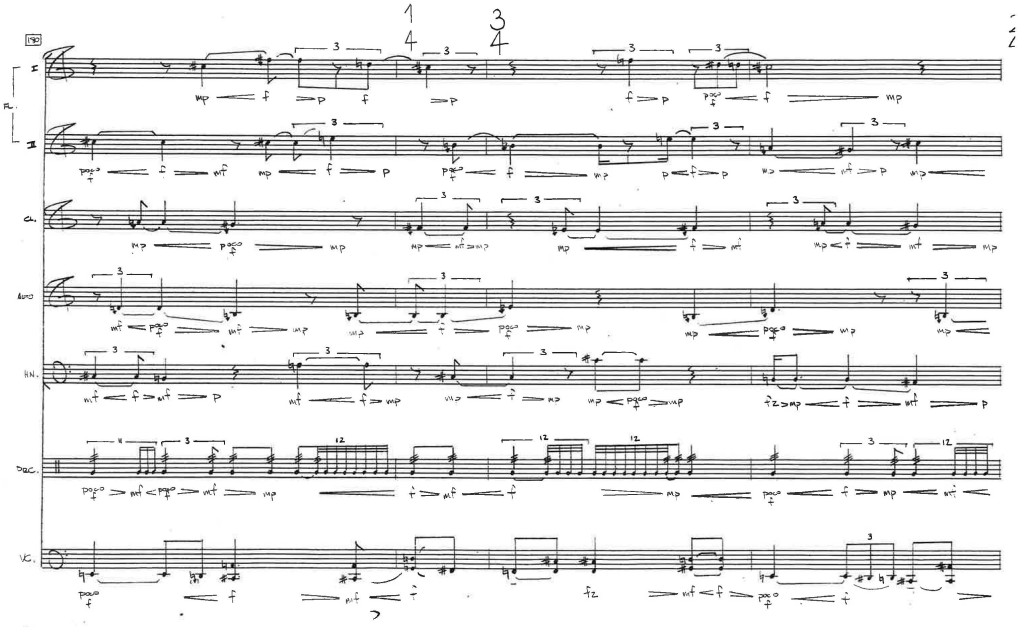


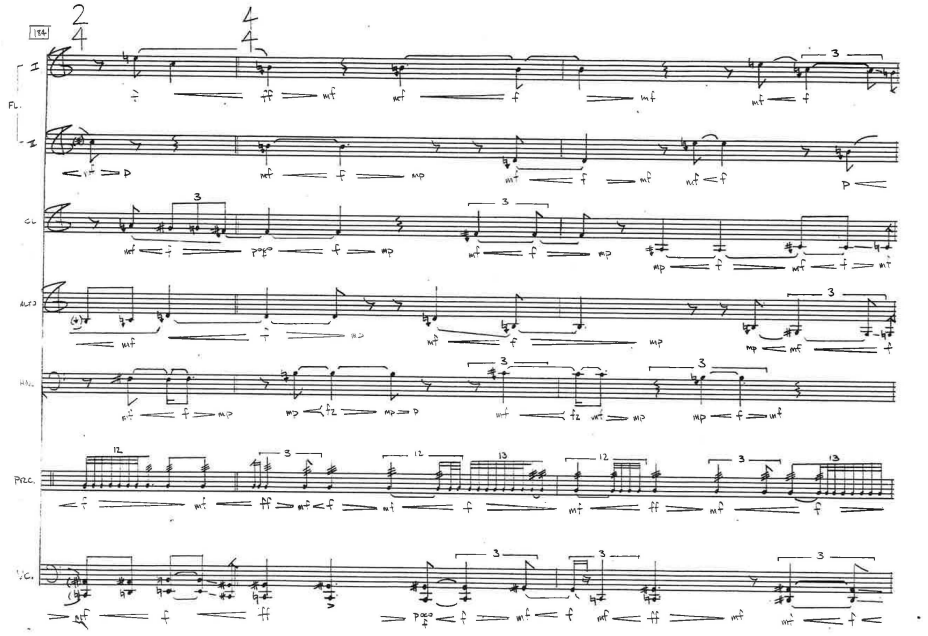


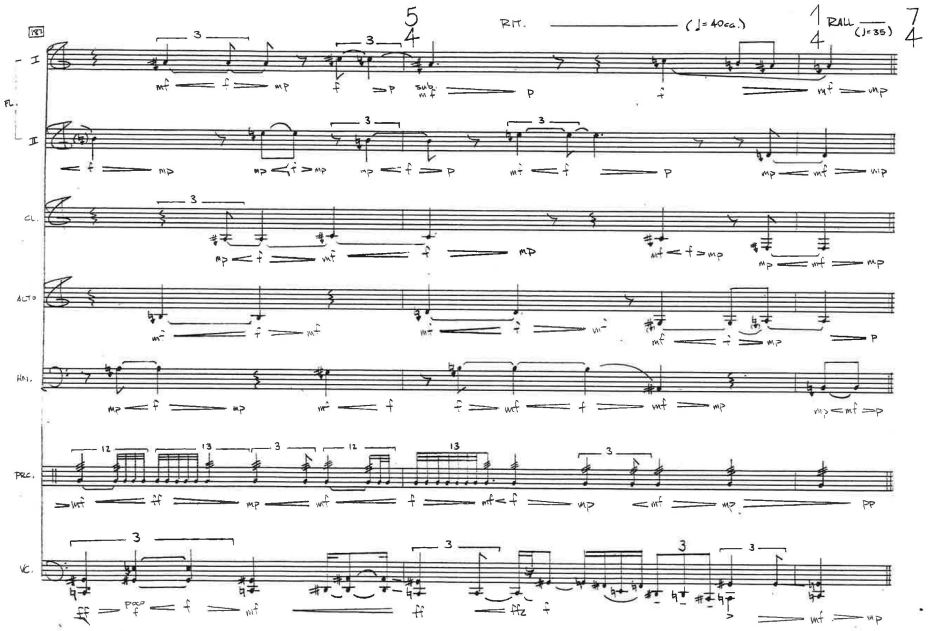

TAKE C FLUTE
PERC.
VC.

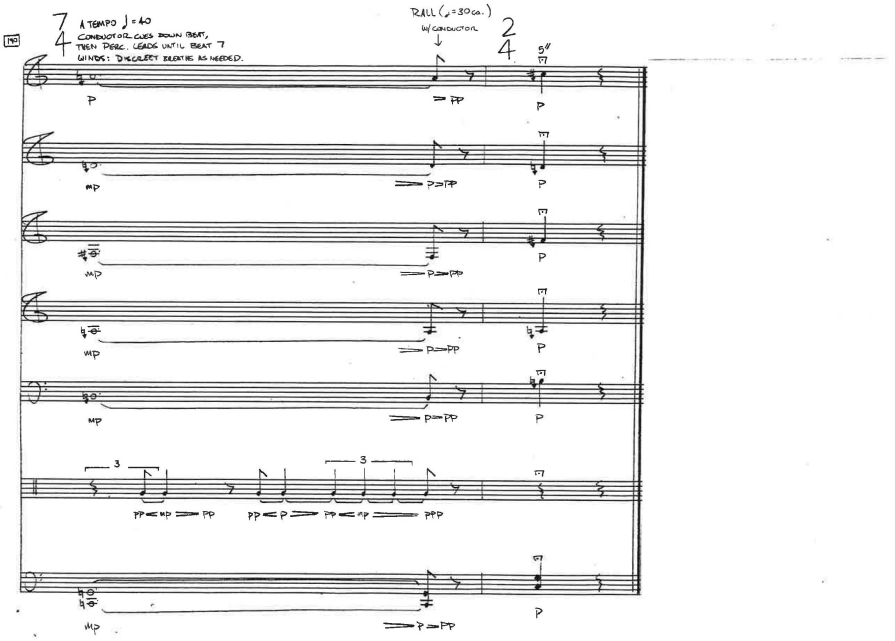

POCO RIT.
A TEMPO
♩= 44
PERC
VC





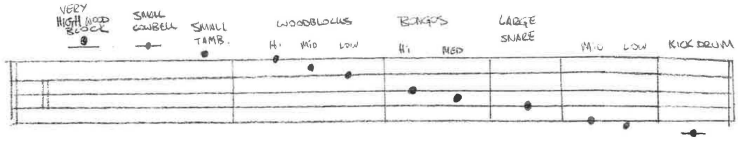

FL.
CL.
ALTO
HN.
PRC.
VC.


RIT.
RALL.
FL.
CL.
ALTO
HN.
PRC.
VC.

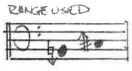


PERCUSSION NOTES:

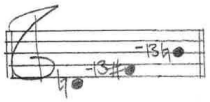
UNPITCHED PERCUSSION



PITCHED PERCUSSION: 1 VIBRAPHONE; 1 TIMPANI



— 3 TUNED GONGS:
"UTONAL" 13th PARTIAL RELATIONSHIP; F# + B♭ ARE ca. 40 CENTS LOW.



— TIMPANI IS PLAYED W/ A FRICTION MALLET (SUPER BALL)
ALL OTHER MALLETS ARE LEFT AT PLAYER'S DISCRETION.

References

Partch, Harry. “Genesis of a Music” Da Capo Press 1949, 1972.