PRIOR TO ANY FURTHER THEORY OF STRUCTURAL FUNCTIONALITY

CONCLUSIONS

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Since my initial departure from the hierarchies of tonality and microtonality toward a conceptualization of a musical holarchy, much of my musical research (if I might be so bold as to endow my theoretical conjecture with such lofty praise) and reflection has been focused around two distinct categories that are nonetheless profoundly intertwined: structural theory—the manners in which musical experience is directly determined by the manner in which a musical system is built, whether the prime factors be its functional building blocks (triadic and tetrachordal structure), an initial tuning (dodecaphony and serial music), a series of available pitches with indeterminate tuning values (gamelan, Indian classical music), or even the idiomatic traits of an instrument (the earliest instruments made from stones, bones, or reeds)—and the investigation of human perception of musical experience; succinctly, one a response to the work of Harry Partch, the other a reflection on the work of James Tenney.

To a small extent I have explored the expansive oceans of these two topics in my two previous major works, Prolegomena to Tetrachordal Structure and Eleatic Conceptions of Musical Experience, yet, just as it is so that the ocean's depths have not been properly explored so that our knowledge of them is inadequate to say that we know anything of our world, so too can I say, with total certainty, that the true possibilities of these two areas have yet to be fully uncovered; indeed, I would posit that my works, as mere introductions, barely express even close to one percent of the bounties hidden within those depths.

In the Prolegomena I discussed the necessary understanding of tonality not as a series of a posteriori theories, all determined by an aesthetic taste codified into rule—or, as the silly idea that I love to repeat goes, that Zarlino so loved Palestrina that he abstracted from it a triadic language to be the basis for tonality—but as an a priori series of generative relationships that determine the number of pitches, the kinds of pitches, their functional relationships to one another, and the coherency that those attributes provide.

This then led me to argue that the foundational building block, the primary unit of construction, if used to create a structure, will bring forth one that is coherent to a listener if, and only if, one maintains an obedience to the attributes formed by the primary building block.

That is, functionality is NOT determined by subjective taste, by those fancies and whims that one wishes to place upon something outside of its own will, but by the relationships generated by the primary building block; that is, it enacting its own gravity, its own

will, upon all other possible tones; indeed, it could be noted that it is this series of functional relationships that eventually determine our tastes. After all, the inherent qualities of Pythagorean tuning led to the primary consonance of early European music being perfect intervals, from which taste followed. And though taste changes, as in the notion of the "English Countenance," the tempering or "correcting" of the sour thirds according to taste, and though it might reflect the peculiarities of regional culture that might be compared to the difference in gamelan tunings across Indonesia, such questions of taste does not alter the structural integrity of the music, for the functional structure still remains, whether it be the consistent system of intervals in pelog and slendro, or the treatment of open fifths as the final harmony, the structures that determine these qualities are always apparent, always expressed, and always necessary.

The tuning of gamelan or the passing harmonies of thirds, the interior, no matter how much it asserts itself, always yields to its exoskeletal attributes.

Each possible microstructure suits its macrostructure; just as the qualities of dissonances and consonances are not poor as long as they are prepared and resolved by perfect fifths, so too are the qualities of a Pythagorean tuning without error as long as the perfect fifth remains primary.

This notion is all-pervasive: in dodecaphony, a macrostructure that works within the macrostructure of equal temperament, the tone row in function is equivalent to the perfect fifth or the triad; it not only defines a root, but also the thing in itself in all of its relationships. The row modifications, be they inversion, retrograde, cycling, all exist similarly to the functions of relationship to the root triad in tonality in mediant, dominant, and inverted chords.

In tonality, tension is built according to tones that are further from the root, and in dodecaphony the more one alters the tone row from the root row, theoretically the lesser one perceives its existence in relationship to the initial row, despite the combinatorial nature of rows in themselves. Both of these, just as the uses of thirds as interior consonances and suspensions as interior dissonance between perfect harmonies, represent the relationship between macro and micro dissonances, as all of the techniques that are dissonant in practice are theoretically so distant from the root that they are not comprehended as being part of the root, and such a lack of comprehension leads to that feeling of dissonance.

Thus the role of dissonance is important because it is intrinsic to the apparent power of the consonance. An interior change does not weaken the totality of the musical structure, but rather, pushing it

through greater stresses that appear non-functional proves how strong the structures are.

At the time of writing, the notion of the functional structure seemed to me groundbreaking, not necessarily as an original concept, but as a way of framing a new way of thinking about tonal structure, and thus all structures. The universality of music became then not the universality of a structure, e.g. tonality, but instead the ability for music, as the result of structure, to be coherent in any possible form as long as it was the organic result of some self-generative body. Musical perfection comes not through its measurement against an exterior scale, but through its identity with itself, with its own root point. And this is undoubtedly important to express as clearly and succinctly as possible, for it seems that we often take musical structures for granted, that tonality simply works because we know it to work, a stance that is perhaps a bit silly if viewed critically. Of course it works, but what makes it work is not that we are used to it. A point such as that would make it not necessarily a perfect structure, indeed it could simply make it something that could be totally flawed, yet be redeemed merely by the fact that we have an otherwise irrational cultural connection to it. The value of something cannot be argued through the comfort of familiarity, because that cannot express anything about the structure itself, but our apprehension of the structure, and by the time we begin to discuss our apprehension of something, we are immediately dealing with everything but that thing itself.

The foundational, functional root that gives rise to all possible relationships allows for one to abolish sentimental subjectivity, which, while useful for appreciating music, is not helpful in comprehending it. Appreciation is the least valuable to an understanding of anything, and at base level, appreciation points more to ignorance than enjoyment.

What I am trying to come to terms with is identifying why when we hear a root tone or chord, and then another following it, in what way does their relationship to one another affect our subjective experience?

If it is true that the root and those that follow possess a relationship, then it might be that we can subjectively enjoy and appreciate it when we can comprehend and understand that relationship. This is not a new idea, it is the entire theoretical explanation for post-tonal music, the META|HODOS thesis itself: music in the 20th century was not irrationally composed—that is, without a central point of reference that tonality generally provides—but rather the general point of reference for composition

shifted from tonality and harmony to other aspects such as pitch, loudness, timbre, duration, etc. Using Varese, Schoenberg, and Webern as general points of departure, Tenney highlights a shift as seismic as that of modality to tonality in the work of Monteverdi, and the comprehension of this radical change would allow for the better appreciation of new music.

Thus, Tenney, attempting to work in the same vein as tonal theory to better validate 20th century music, deals with the perception of moments of similarity and difference, identifying that any compositional method may relate to the perception of change in harmonic functionality. From this point I began developing my ideas, yet in time I became much more interested in a thesis that proposes the coherency of music not being in how one perceives it, but something deep within the thing-in-itself. For me it seems that perception is insufficient in explaining this; it is certainly useful for explaining how we subjectively encounter the music, but it cannot explain how we objectively encounter the music, because there is much more to music than that immediate hearing of something, even beyond a deeper listening for something. It is more about how music is a physical, definite thing that exists in relationship to all other things, perceivable or otherwise.

In short, if it exists in such a way that you can perceive it, then what you perceive must have a definite, objective form; if it exists in such a way that you cannot perceive it, then what you cannot perceive still must have a definite objective form. The goal of a total musical experience is attempting to express the total possibilities of music beyond that which is immediately perceivable, but one intrinsic to musical experience itself. Thus, Eleatic Conceptions dealt with the total coherency of the waveform, and Prolegomena the natural coherency of intervallic structures, even if the points between them appear as if haphazard.

What I wish to highlight here is a step beyond these two, further developing my ideas down to focus on the innate coherency idiomatic to all things, not simply the theoretical structures; thus, that instrumental bodies have their own structural coherency themselves, and that these subsets of the waveform promote a comprehension of musical experience that alters how we come to understand it. Therefore, tonality no longer can serve as the sole point of comprehension; rather, it must be understood as a macrostructure within the context of another macrostructure and one within which other macrostructures exist; the structure that becomes of greatest value to comprehend is then the one that determines the music the most.

Musical experience is multifaceted to the point in which the manners in which we might attempt to comprehend them can err from that modernist path towards the objective truth, because we can subjectively choose to highlight one over the other. We can ignore the clear tonal qualities of the concerto by focusing solely on the construction of the row and the tonal allusions as being merely compositional gymnastics, or even deny them and simply note that they reflect the violin itself.

So for those who fear that my desire is to destroy tonality to further my own ideological purposes, but that could not be further from the truth; for my goal is to save it, as well dodecaphony, serialism, and modality, from ideological attitudes about musical experience that chooses to categorize and label all that is good and evil, left and right, sheep and goat.

If I could even pretend to admit that I might make any contribution to the theory and philosophy of western music, it must be the speculative notion that all possibilities are valid if they are idiomatically understood, that they are identified and comprehended prior to any constructive ideology, as the means of such constructive ideologies will occur only through the traits of the thing itself, and that the means of understanding cannot come from any macrostructure, any musical analysis because, though the macrostructure may parallel the microstructure, without the comprehension of the first principles of the thing itself one will certainly not possess the means to identify anything, only apply their own beliefs to it.

I thought of this as so undoubtedly true that everything that followed the argument of the foundational block is entirely built upon it, and in Eleatic Conceptions I took a step to the other side, away from the object in the formal structure toward the subject who perceives the structure as to slash away at the overgrowth of perception that leads to the questions of taste that I denied in the Prolegomena.

The primary points of interest were the dual issues of perceiving motion and time, both the results of a subjective experience of functionality. Though I think it obvious, I was concerned whether we really understood music, and greater perception as a whole, as a sort of expression of memory and our frame of reference; therefore, in the discussion of motion, I explained the next proper step in the argument from the quality of structural generation, this being the nature of the foundational block as the generator of functionality, as opposed to any sort of subjective, referential one, so that it is not our personal experiences that determine what a musical experience

actually is, but what it itself expresses, not at any specific point in time, but rather as it always is, in every point in time.

It is already understood that a triadic structure will generate all other possible pitches from itself:

CEG
EGB
GBD
DFA
FAC

However, what was not initially discussed at length—that these developed structures possess functional qualities based upon their relation to the root point—became of importance to understand the perception of movement that occurs through function.

I IV III V I

CEG FDA EGB GBD CEG

In both situations the distance of generation leads to generative tension, or the qualities of dissonance vs consonance in tonality: because E and G are part of the initial root block, they retain an identity that makes their triads sound not only related, but correct in comparison to the root triad. These possess decisive roles that allow one to return to the root point due to their inherent relationships to one another as members of the root point, the tonic triad.

There are also the sort of roles that are secondary in that they have an intrinsic relationship to the root tone. If CEG is the root, then those constructions that contain the root, FAC and ACE, possess a connection to that root point, but one that is decidedly less powerful than those born from the root.

Thus, F is consonant at a perfect fourth and A is consonant at a sixth, but one that has less of a role within the functional structure, an intermediary between the primary constructions

However, as my final argument is that the notion of motion is a problem of perception, as musical experience is, at its core, the apprehension of a single waveform with many qualities as a series of

distinct, related or unrelated sounds, I must come to define why we perceive of music in such a way that it corrupts our ability to understand it as it express itself.

Thus we reach my thesis:

The foundational structural design of a musical experience is that by which the rest of the music is deemed coherent, not by exterior theoretical axioms, such as tonal theory, which the experiencer might place upon it.

That is, the perceiver will, based upon a single instance, such as a tonic triad, unconsciously formulate a Byzantine web of relationships among subsequent musical events according to their perceived distance from the root point and the way the musical experience expresses its own structural traits in the act.

This extends beyond tuning and structure to the influence of the physical qualities of a sounding body, e.g. a keyboard or the voice, which, by how they are made, alter one's engagement not simply with them, but the act of music making itself. A keyboard idiomatically will only possess the possibility of what it can express through its own structure; likewise, a violin idiomatically will only possess the possibility of what it can express through its own structure. This means that one must recognize the fundamental relationship between a body, its form, and the root cause for itself to take on that form; moreover, that such a root cause itself must possess some sort of root cause, a path that eventually spirals to the argument I made in Eleatic Conceptions of Musical Experience of the only form by which we should identify music being a single waveform with many qualities.

My essential argument being that all things are connected in some form with a root point, and that anything, and everything, is able to be perceived and understood according to their relationship to that root point, it is clear to me that all of our conceptions of melody, harmony, form, and structure are tied to it. In order to express this truth, it is best to begin with the interwoven structure of tonality created by triadic structures; in doing so the complexity of tonality as a harmonic system can be proven incorrect: just as nature is simple, so too is harmony; after all, much has been made of the complexity of tonal theory by theorists who seek to goad us into believing that tonality is a highly complicated form of musical theory that requires multiple years of study (or rather, multiple courses spaced out over an arbitrary amount of time by university bureaucrats).

The problem with the study and teaching of tonal theory to anyone below a graduate level is that, because it becomes a body of curricula via institutionalization, we essentially teach it as a fact, that we take it for granted that tonality simply exists. This appears fine because it is quite clear that tonality is so ubiquitous in contemporary society that it might as well simply exist, for it has supplanted the majority of other forms of musical organization; however, this is undoubtedly the wrong way about it. Tonal theory is not fact, it is a series of observations and qualities that, like any science, are not expressions of truth, but the manners in which we recognize them and how we parse and comprehend that knowledge.

So, if there is something about tonality that seems "perfect," it is found in its functional construction, that it builds itself in such a way that all of its parts, even at several degrees of separation, and that these find themselves in direct relationship with one another in such a way that when we perceive that relationship, it seems to be the only possible way it could be structured.

The value of teaching a structural understanding of tonality, and at as young an age as possible, is that it promotes the notion of musical experience not being taken for granted, but one of investigation and comprehension, of identifying these structural blocks as a means of understanding how they work, not simply accepting that they do work because it has simply been so before.

Tonality does not exist in a vacuum; rather it is part of a greater accumulation of harmony, it is a great garden, it grows naturally, according to itself, from its own root identity, among many other plants of different quality, yet all immediately understood as consubstantial. And as such it is a sumptuous hanging garden, one that continually accumulates, twisting in on itself, enveloping itself, and we are like gardeners who spend too much time pruning to

actually see that the fruit and the thorn, the flower and the weed, are one in the same: too much we discuss these problems of consonance and dissonance, of flowers and thorns! Yet, if I look, if I truly glance at the stem from which both come forth, then I see not flowers and thorns, but the plant in itself!

It is not tonality, the consonances, the flowers, nor it is it those dissonances, those thorns, that should determine anything that I understand about the root in itself!

So then, let us look to the major keys. Recall that original set of chords that develop from the root C

CEG
EGB
GBD
DFA

CDEFGAB

The next? A fifth above the root, G major (Ex. 1). And this can be seen in flats as well, which also create themselves from this under-fifth relationship, with the final pitch of a set always ending up being a perfect fifth from the root (Ex. 2).

Moreover there are other internal relationships between the keys beyond the fifth. Note that each sharp key can also be formed by raising the fourth above the current root; likewise for each sharp lower the seventh above the current root. Thus CDEF#GAB, GABC#DEF#, and so on for sharp keys, and CDEFGABb, FGABbCDEb, and so on for flat keys.

Not wanting to waste too much time in the Prolegomena, I never established the structural functionality of the minor scales; however, such a thing is easy, for we already know all possible minor chords from the construction of the major keys. Starting from the knowledge of the major and minor chord structures in the major scales we can apply that knowledge for our first minor scale, A minor.

ACE
CEG
EGB
DFA

ABCDEFG

The next? A fifth above the root, E minor, and so forth (Ex. 3). The flat keys are the same as major, a fifth below instead of above, thus (Ex. 4)

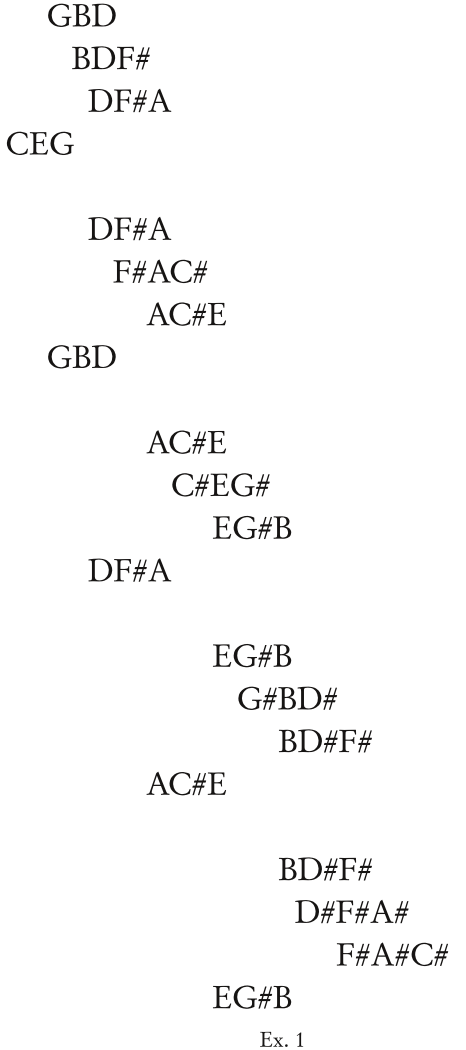
Llike the major keys, this can be seen as a series of inherent relationships, here each sharp key can also be formed by raising the sixth above the current root, and each flat key can be made by lowering the second above the current root. Thus ABCDEF#G, EF#GABC#D, and so on for sharp keys, and ABbCDEFG, DEbFGABbC, and so on for flat keys. Moreover, the relationship between major and minor key is a third, e.g. C major and A minor, G major and E minor, etc.

Therefore, I am quite willing to posit, without fear of reproach, that it is not only as I had written in the Prolegomena that triadic harmony determines the structure of the scale itself, but that the value of the third itself is intrinsic to the relationships of all scaling.

All pitches at any point in time hold the same degree of separation from one another, no matter the position in which one starts. The only essential quality that determines a difference is the focal point, the root pitch of the scale, from which all the others emerge from.

Consequently, the functionality of tonality appears not in the specific pitches themselves, but the relationship between them and the root point. Think about how intervallic relationships are parsed: perfect relationships are stable because the perfect interval is stable; that is, in every situation in which there is a perfect interval, the intervallic distance always remains the same; in contrast, thirds and overall triadic relationships are less because the internal third is not constant, but always fluctuates between the major and minor third. It is the stability of the fifth that allows for the fluctuations of the third: as long as the exterior is stable the interior may waver.

Thirds and, in inversion, sixths work well in motion because they do not exhibit finality, but a sort of state between perfects. Sitting between the root and the fifth, they are subject to the gravity of both, but pulled with greater force back to the root. This lack of stability, a lack of coherency found in perfect intervals, leads to the degrees of dissonance found in music. The closer to being perfect, best understood as the closer to the pitches in the root triad the interval, the less dissonant. Thus the root, the fifth, and, in inversion, the fourth are the most consonant in that they are all varying degrees of perfect intervals. The second, and in inversion, the seventh, are the least consonant because they figure into no part of the root triad,


GBD
BDF#
DF#A
CEG
DF#A
F#AC#
AC#E
GBD
AC#E
C#EG#
EG#B
DF#A
EG#B
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BD#F#
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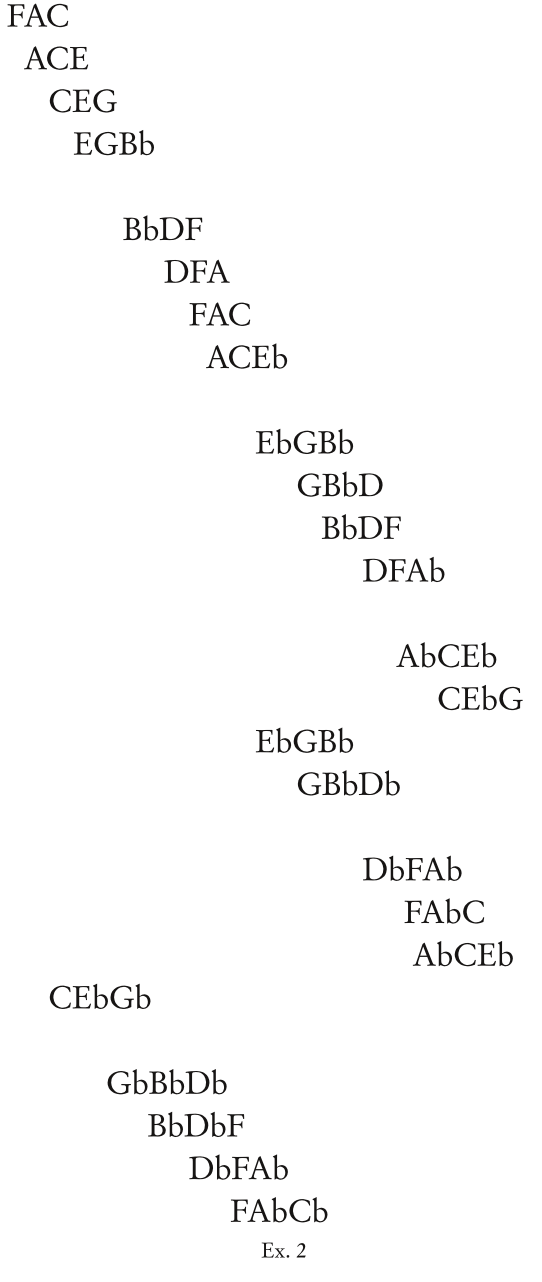
BD#F#
D#F#A#
F#A#C#
EG#B

Ex. 1


FAC
ACE
CEG
EGBb
BbDF
DFA
FAC
ACEb
EbGBb
GBbD
BbDF
DFAb
AbCEb
CEbG
EbGBb
GBbDb
DbFAb
FAbC
AbCEb
CEbGb
GbBbDb
BbDbF
DbFAb
FAbCb

Ex. 2

EGB
GBD
BDF#
ACE

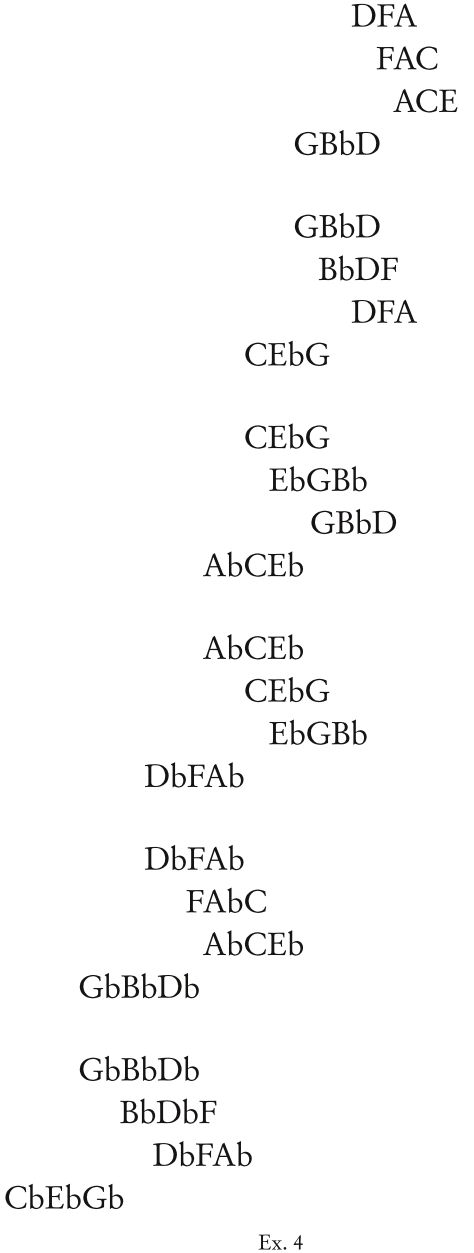
BDF#
DF#A
F#AC#
EGB

F#AC#
AC#E
C#EG#
BDF#

C#EG#
EG#B
G#BD#
F#AC#

G#BD#
BD#F#
D#F#A#
C#EG#

Ex. 3


DFA
FAC
ACE
GBbD
GBbD
BbDF
DFA
CEbG
CEbG
EbGBb
GBbD
AbCEb
AbCEb
CEbG
EbGBb
DbFAb
DbFAb
FAbC
AbCEb
GbBbDb
GbBbDb
BbDbF
DbFAb
CbEbGb

Ex. 4

their existence in construction is determined further away from the root than other intervals. The third and, in inversion, the sixth, sits between them, an intrinsic part of the triad, but lacking the quality of being a perfect interval.

Thus I consider thirds unstable in terms of chords, because they are, in relation to the root, imperfect consonances. This is best understood by first understanding the structural foundations for the modality that led into tonality, because tonality develops directly from juxtapositions of the chains of fifths of Pythagorean tuning.

First, like modality, the way in which triadic structure is determined is built upon the constancy of the perfect fifth, and the interval of the third is a variable determined NOT by its relationship to the structure of that triad, but the structure of ANOTHER triad.

CEG

This is, as we already know, C major. The relationship between C and G is naturally determined by the structure of the perfect fifth; there are no other possible options for a fifth (the augmented is a minor sixth and the diminished a perfect fourth, nothing more than renaming them to avoid building triads from not triadic functions, essentially a permutation of triadic structure by an outside force)

One would think E is determined by some relationship to C or G, but it isn't: it's determined by its relationship to its root tone AS A PERFECT FIFTH.

ACE

The fact that E is a major interval in C is not arbitrary, a decision made because we desire to create a C major chord, but that it is structural in such a way that it had been predetermined from the moment it came into being. If the C tone always existed, so did the F and G tones, and if these then all existed at once, then so did Bb for F and D for G; indeed, because at any point the harmonic series of any pitch must exist, so then all pitches exist at all times. Note well that our earlier C determines the minor third triad in A minor, for just as A-E determines CEG, so then does the resulting CEG determine ACE, and so on.

Thus, we find, in such a situation in which a series of fifths determines the thirds of triadic structure, then triadic structure is really not the result of consciously stacking thirds, but the result of

the juxtaposition of those fifths; thirds in triadic structure then become what we could call "exterior agents," actors that have no purposeful relationship to the structural foundation of a thing, i.e. the perfect fifth, and are taken as a whole because we choose to identify them as so. Therefore, because thirds in triads are these exterior agents, giving rise to mutations that should not exist, they create the sense of instability, and thus requirement of movement, found in functionality. If we had no thirds, then we would only have tonic-dominant relationships, or, in the tradition such an idea comes from, Christian chant, the final-reciting tone relationship. Our harmony would be determined only by suspensions of perfect intervals, a prime harmonic factor in organum. These relationships are highly stable, and essentially create a highly static music in comparison to what we are used to in tonality.

Each space between a perfect interval will reflect the push and pull that makes up this sense of instability, thus the focal points, those that we anticipate, are these perfect tones that exist in a three tone relationship; that is, the root point and its upper and lower fifths.

F-C-G

The lower fifth also represents the upper fourth in inversion, and the upper the under fourth in inversion. The perfect fourth plays a secondary, but highly structurally significant role in the modality of Christian Chant as the plagal tone; the plagal tone itself being the namesake of the plagal modes, those that are a fourth below their authentic forms, but retain the authentic final tone as their own final tone, e.g. The Dorian d-d' becomes the hypodorian a-a', however, a piece of music in the hypodorian will not end on a, but on d.

The plagal tone is also significant because it is a secondary--created through inversion of a strong fifth--and thus weaker, perfect tone, so it acts as the necessary point that requires resolution to a stronger perfect tone. Thus leads to what is called the plagal cadence, IV-I (which itself has a development in tonality as the I-V-VI progression).

This organic—and I cannot stress enough that this pure stratification comes into being by its own accord, not by the work of theorists—stratification of intervals into tiers of stability according to the initial perfect fifth is of importance to the very fundamental means of harmonic functionality; that is, a root point determines its relationships, which are all connected at differing strata of distance. The closer these are to the root point, the more stable they are; the further, less so. An inversion will always represent a point of greater

distance, e.g. a fifth inverted into a fourth maintains a semblance of its initial relationship through its intervallic quality, that being "perfect," but otherwise occurs as a weak stable tone because its relationship to the root has become disjointed in alteration.

Thus, the fourth, while appearing stable when understood as root-fourth, becomes decidedly less so when perceived in comparison with root-fifth. The failing of the fourth to maintain the same quality of stability as found in the fifth means it does not necessarily exist in itself as a point of rest, but always as a point in which rest must be found.

Consequently, modal functionality often finds itself hovering around structural points: Christian Chant, determined by the stacking of fifths through Pythagorean tuning, generally follows a pattern of beginning at the root of a mode, the final, and rising up to the dominant, the fifth, to with it orbits until to falls again to the final. My own proposed tetrachordal structure, built by the combination of a stack of two fourths, to highlight the perfect intervals of the unison, fourth, fifth, and octave, proposed a similar orbit around the pitch of primary stability, which in this form of construction is the aforementioned fourth.

However, what tonality promotes, a structure that represents a step beyond modal harmonic functionality, is the introduction of the third, the mediant, to the previously identified tonic-dominant relationship, which introduces a necessary factor for harmonic movement: a sound that is alien in such a way that it requires resolution to a stable, familiar sound. This notion already appeared as early as organum, and even in some sense in chant, where every pitch that exists between the final and reciting tones represents point that is not at rest, for the final represents both the beginning and end of a melodic line, to and from which the line travels, and the reciting represents a point is respite from this journey, as if an inn for the weary. The reciting tone is given prominence and is continuously repeated, signifying a certain space at which the line is at rest: this is the place that we have been seeking, and now we are to take a moment to appreciate it. Once doing so, we find that we have this anticipation of only one other pitch, the final. Perhaps it is due to the tonic-dominant relationship, but having heard the final tone, and having found the reciting tone, we can only be at rest at one of these positions, every other appears as if they do not quite belong, that they are simply not right.

This tonic-dominant relationship is not simply an internal phenomenon, part of the linear qualities of the music, but also external in the macrostructure; that is, what one sees in the chord, a

properly stable fifth profoundly transformed by an exterior fifth in juxtaposition, is naturally mirrored in the structure that naturally grows into the form of the scale:

CEG - major - root
EGB - minor - third (exterior fifth)
GBD - major - fifth

When you begin with a major chord, the minor becomes the point that must be resolved. It is thus the weakest point of the currently understood structure, and we find that the resolution of that third comes from the two stronger points, those already understood as being those of the greatest polarity; thus, the tonic and dominant possess the greatest stability and represent the path one must take to resolve dissonance.

From here the other positions of the structure can be understood as having varying levels of strength and stability; thus, the inversion of the lower fifth as the fourth is weaker than the upper fifth, and the inversion of the lower third as the sixth is weaker than the upper third, and so on.

As we move further from the perfect intervals, we notice that the remaining, the second and the seventh, possess no relationship to one another in inversion as the others do, but they also reveal no true relationship to the root tone. Both possess a relationship of a fifth to pitches that occur within the root triad, but because they lack the necessary relationship to the root itself, they are essentially totally exterior as intervals.

Thus, we have the octave as it is understood

Tonic C - major - root

Supertonic D - minor - determined by the fifth of the root, no connection

Mediant E - minor - exterior fifth of an exterior root

Subdominant F - major - inversion of

lower fifth of root

Dominant G - major - fifth of root

Submediant A - minor - inversion of an exterior root

Leading Tone B - diminished - determined by the fifth of the root, no connection

Those relationships that are direct, and thus the strongest, will retain not only the same quality of perfection intervalically, but also retain the same quality of triadic structure, being in this case, the major chords. Those with less of a relationship, or none at all, to the root pitch, will reflect this by being minor, or in the case of the seventh degree, a diminished triad, a highly unstable point that always must be resolved immediately.

From this series of relationships flowers what we call "functional" harmony. If I were to explain what this term “functional” actually means, I would answer that considering it “functional” means that each harmonic point serves a function in returning to the root point. All of these points work together in their varying degrees of separation to return to the original root source, because the manner in which they are formed determines how they are understood within the context of one another and with the root point.

So understanding this self generative quality, it is imperative to discuss those scales that fall outside of these, which can be best expressed through the melodic and harmonic minor.

ABCDEF#G#

Melodic Minor

ABCDEF#G

Hamonic Minor

It is clear, on first look, that they are nothing more than what I would consider an alteration, or what a microtonalist would consider nothing more than tempering: a permutation of a structure to yield a result that is not structurally or functionally derived, but one subjectively, as accordance to taste. The essential qualities of these scales is that they are minor, their core identities, aside from those accidental alterations, are those of minor scales, that is why they are identified, understood, and catalogued in such a manner. As to their purpose: it must have been that at some point in time someone found it easier to sing a scale in such a way, or one found the flattening of the pitch to be more sonorous; therefore, they altered the scale in such a way to reach that effect, as if ficta to avoid the clash of the tritone in the pythagorean. In fact, the altered pitches in these scales are like ficta in that they are quite literally fictitious notes, pitches with no organic, fundamental purpose for their existence in the current musical system--a chromatic aberration, if you will. Thus, when we view these we ideally must view them as results of both practical application and questions of taste, and then are not so much of value in identifying functionality according to the distance from a root point, but rather as sort of modifications to the underlying structures that determine our musical experience.

As a consequence these types of scalar forms are more than likely non-functional according to the means in which tonality determines its own form; rather, they are alterations of an already functional form. More than likely the harmonic functionality and fabric of a piece of music that uses these minor scales will retain the essential tonal qualities of the minor scale they are alteration of, the difference then is not the structural form, but the melodic embellishments that occur above it, e.g. a passage my occur in a minor scale and then fit in a flattened pitch corresponding to the melodic minor in a descending line, where it might naturally be easy to sing a flattened tone.

So it should be said that the reasons why these things come to be are never determined beforehand, but rather that they come to be through experience: understand that the problem of tuning and

structure is they are highly theoretical, not practical, manners of comprehending music; however, human performance, and more so the voice itself, is not capable of such theoretical rigidity. A voice that is moderately trained might more easily intone a flat than a natural, and so these alterations might be made to suit performance practice over structural objectivity; moreover, in practice, the root point becomes not necessarily the first pitch or a structure, but rather the thing on which the sound is acted upon, and the possible outputs of such a thing, not the theoretical inputs. So I can say objectively that the root point for C major, in its purest state within my mind, is that purest quality of the C major chord; yet, this is not where I start from with the voice, as I can only express that which is possible from the root source, that is, my own voice. Whether or not I am trained--whether or not I can even sing!--will determine the first point from which I even conceive of the musical structure. Indeed, if it is easier, or more pleasing, to sing all naturals upwards, but to flatten B as one descends, then that structural form, a scale that is altered depending on the motion of the line, becomes the root point for such a voice.

So, even if in theory all possible results are determined by the root structure, the root structure is not the entirety of the possible results: in Dorian in the purest sense I only use the white keys, D to D, but in practice I must apply ficta to reach the final sound that I desire. The ficta is a tool to avoid the structural aspects of the root structure that we do not care for, the tritone, and any alteration can be understood as a tool to augment or embellish the structural aspects of the root structure, according to the ends that I wish to manifest, not the true structural and functional aspects inherent to what I am manifesting.

The way in which we work with a structure is determined by the inherent qualities of the means by which we give voice to that structure. In my mind, and on paper, there is absolute freedom to identify the purity of the structure. Proponents of Microtonality, Just Intonation, and Equal Temperament begin with the ratio, and they then reformat the world to conform to those structures; however, the structure, being a pure thing, cannot exist where it cannot be purely expressed, that exterior to the mind. The voice is imperfect, and the ear is fickle, so the pure structure gives way to that which is more suitable.

Each layer that moves further from the pure expression of musical phenomena, the purest expression of the overtone and undertone series, moves further from that total unifying structure and closer to one that best fits the qualities necessary to the physical expression of that structure; and then, from that expression comes new ways and

ideas of better organizing the structure to fit these results apparent in such physical forms.

Modality is wonderfully suited to the voice, to this imprecise and quite free instrument; one that can shift and swerve between shades and temperaments, but one that cannot so accurately express much more complex harmonic fabrics.

Tonality is wonderfully suited to the keyboard, to this precise and rather rigid instrument, one that is determined prior to a set of axioms and first principles, so tightly bound it is to theoretical logic, but also to the inalterability of its construction.

For, a keyboard, whether the harpsichord or the archicembalo, is beholden to the structural straight jacket: a perfect situation where an instrument possesses all possible available pitches in a self-contained set, as in the twelve tone or twenty four tone scale. This situation, directly determined by the nature of equal temperament, is what we might consider idiomatic, its final result is one that is inherent to its form in itself. Likewise, a string is beholden to nothing other than its length and the ability to precisely demarcate divisions in order to define specific pitches; yet, it represents the totality of the natural spectrum of sound, not a form determined or reasoned beforehand, the idiomatic quality of the string is found in this ability to assume any sound between its ends; thus, it can be used freely to make note of theoretical decisions where one would otherwise be caged by the illusory nature of music as pure thought, something that the keyboard cannot.

So, what I mean by something being idiomatic is that the self-contained set is developed according to a physical, theoretical, or conceptual structure, and that object becomes inherently tied to that thing. For example, the modern keyboard is ultimately a highly rigorous and conceptual idiomatic instrument, as it is not the piano that determines the division of the octave, in the manner one works with a monochord, but the division of the octave that determines the keyboard. This could be said of many instruments, as reasoned by their structural forms. A natural horn is inherently tied to the consequences of its construction: the harmonic series. In the same sense, the valved horn is inherently tied to the consequences of its construction in the same manner, but also is inherently tied to the theoretical tonal system that informs valve construction and spacing.

Just as this can be said of instruments that follow theoretical structures, e.g. triadic tonality, so too could it be said of tuning, which represent a layer beyond that of pure theory and instrumental development. Thus, it might not wrong for me to say that such a rigid, heady structure like a tuning, a totally theoretical concept, can

be built to follow, even highlight, these these tightly woven relationships found in tonality, and, just as the instrument can be built to follow such a structure, so too can a tuning be constructed to follow the inflexibility of the instrument; thus, it appears to me that equal temperament, and no other form of tuning, has some truly intrinsic and idiomatic quality in its relationship to triadic tonality--inasmuch that the keyboard is truly intrinsic and idiomatic to it. The great celtic knot tied by the structural developments spurred on by a single chord, from any possible root pitch within the twelve tone octave, all make themselves out to be equivalent, whether or not we determine them to be so--inasmuch that the structural qualities of the keyboard are rendered as so.

So it is not that tonality requires equal temperament, but rather that equal temperament requires tonality--inasmuch that the keyboard requires tonality. Without this essential structural quality, such an idea could not come into being; thus, the inevitability of this gordian knot is equality; indeed, at some point a knot is so tight, so impossible to untie that it becomes just that, not two ends if a rope tied together, but a thing in itself.

We identify with our practice, our very means of making music, that structure that is inherent, idiomatic, perfect for such a thing, and that very perfection determines how we then can judge other means of doing so! When we engage with tonality, we begin to engage with the slow trajectory towards equal temperament, that unity of all as triadic blocks that are, at some conceptual, not essential, level, equivalent.

Consequently, modality becomes inferior to tonality because it, being the combination of interchangeable blocks, whether they be tetrachords or hexachords, does not exhibit as tight of a functional structure as tonality as the tunings begin to shift towards highlighting the unique results of triadic construction. Both are totally determined by their tuning, the creation of which determines their construction, but the contextual form of their construction ends up different. So it is true that modality's functionality is nothing more than the tonic-dominant of tonality, with the remaining pitches serving very little functional purpose other than being steps of separation, stones on the path between the two, often quite literally moving stepwise. Thus, as explained before, modality, from the beginning, is totally determined by this dualistic relationship, whereas a tonal piece, such as a C.P.E. Bach symphony, are totally determined by the triadic quality of the initial musical statement: the entire beginning of the symphony proclaims D major as the primary point of interest, as opposed to a modal piece not necessarily explicitly expressing a mode at once, but

rather the shape of it as time proceeds forward. One can say that it is only possible to identify a mode in chant by the shape of the line around a possible reciting tone or by the final pitch; yet, in tonality, since the work of Monteverdi, the triad is is primary utterance, and that itself determines not simply the structural qualities of the piece, but our comprehension of everything that follows.

When we begin to shift our conception of musical experience to these higher layers of complexity, we begin to alter how we compose and comprehend our final musical structures. Equal temperament develops from these triadic utterances, but it is a step beyond those that Monteverdi identified in his own tunings.

The tuning Monteverdi would use would highlight qualities of difference between the triads, and thus their keys; yet, the development of equivalency highlights the qualities of similarity between the triads, and thus their keys.

I had discussed this in some detail, with the reasoning and methodology of Schoenberg and Hauer in their own words, in the beginning of the Prolegomena, so here I will to leave it brief: both believed that the onset of equal temperament equalized the qualities in a tuning that would otherwise render certain intervals, namely the perfect, stronger than others. If a tuning privileged a certain interval, the music would revolve around that as the most stable, and therefore most coherent, point of reference; however, if a tuning were to flatten out those qualities and render all intervals essentially equal, i.e. equal temperament, then the music from that tuning should not really exhibit the sort of stress on a specific interval that another would possess; therefore, the methodology of modality and tonality that developed in European music was not necessarily accurate to the changing structural form in the development of equal temperament, because that assumed a greater coherency in certain intervallic and chordal structures over others, something lost to us with equal temperament performances of early music, which focuses on certain harmonic structures due to the wildly large distance between a "consonant" and "dissonant" interval. In equal temperament, all forms of dissonance are much tamer, and closer to consonances, than in other tunings that came before; therefore, when Schoenberg elected to "emancipate dissonance," he meant that the inherent qualities of equal temperament allowed for the traditional models of dissonance to be overruled and treated much more like consonance.

The new structure thus then turns to this innate quality found in equal temperament: total equality. What to do with it? Understand Schoenberg's reasoning here: in a tuning, if an interval is given greater consonance, and thus, coherency, than another, then it commands a

greater role in the musical form, e.g. a tonic and a dominant will occur more times, and with greater impact, than any other pitch; yet, in equal temperament, no intervals are given priority over any others, so it would be ridiculous to provide a tonic or a dominant a higher percentage of use than any other pitch when all of their qualities are essentially the same. Twelve tone music and the method of the twelve tone row develops directly from this inability for tonal and modal composition to have any sort of qualities idiomatic to equal temperament. In the past, composers, especially those who were also theorists interested in the specific issue of tuning, between the late medieval and late classical periods were highly invested in composing music that highlighted specific tunings, focusing on certain intervallic traits or quirks for musical effect that are lost on contemporary listeners when performed in equal temperament. We have some cursory idea of this in the most famous of these, Bach's Well Tempered Clavier, which was composed with the intention of being performed according to the qualities found within that tuning. Indeed, it works rather convincingly with equal temperament, but in this case all of the keys do essentially sound the same, whereas in a well temperament there would perhaps be a certain shade or minor alteration with each key simply due to the essential inequalities of the tuning. This is why Guido d'Arezzo and other medieval theorists attributed assignments of mood to the church modes, something that does not seem to carry over to the performance of them in equal temperament: they are all inherently the same to us by virtue of the tuning, something that would have been alien to these theorists, who were influenced by a pythagorean based tuning, with certain temperamental alterations according to region and time, as reference.

With this differentiation in the essential qualities of structural function, one can begin to unravel how formal traits are, directly or indirectly, consciously or unconsciously, intrinsic to the coherency of formal construction.

So, yes, the functional aspects of modality ride around the privileged interval of a fifth, which determines all possible pitches and their purest tuning; therefore, modality, like tonality, is determined by the distance between the current moment and the root; however, the manner in which it occurs functionally changes. In tonality the harmonic aspect is of greater importance than the melodic motion. In some sense the melody can follow any path as long as the harmony possesses the functionality to guide it—that is not saying that a melodic line will not most likely unconsciously gravitate toward the functionality, simply through the manner in which it must be coordinated with the harmonic fabric—however, in modality the melody must always adhere to the gravity of the generative interval, in this case the fifth, in order to maintain coherency.

Yet, you find in Mozart or Lully a difference in the handling of a melodic idea, one that is shaped according to the harmonic fabric, the structural determination of the music.

Thus, all tonal harmonic functionality is essentially a chain of triads that are connected not really by any sort of relationship, but by a sense of anticipation. If I sit at the tonic I am not necessarily asking or expecting for much, but if I move away from this point, I begin, in feeling the tension caused by distance from the root triad, and thus coherency, to anticipate relief. This is an essential trait in voice leading, the use of techniques like 7th suspensions and picardy thirds create a sense of tension that, aurally, must be resolved.

The functionality of a piece of music is totally determined by the qualities of these previous layers of conception.

The tonic dominant relations inherent to modal and tonal construction always exert control over the development of musical motion as if a spectral hand. Then, the instrument that becomes the major practical expression of that theoretical system controls the ways in which we not simply conceive of, but judge the construction of, music. All three actors: composer, performer, and listener are bound to these practical limitations and resultant expectations.

Any other method of construction will find melodic utterances to follow patterns inherent to its development as well, and it has only been recently, within the last decade or so, that mainstream musicology has really begun to identify that the ways in which we analyze music are so hung up in the twelve tones of the keyboard that it makes us incapable of understanding the ways in which instruments

other than the keyboard lead to results in form, harmony, orchestration, etc. in the act of composition.

This notion certainly is not new, but the ways in which we discuss it did not frame it in such a way where it was obvious, because our theoretical means of working ideas and suppositions out is through the keyboard.

Takemitsu mused upon a very important distinction between east and west in composing November Steps: he could not really resolve the differences between these musical cultures, he could only highlight where they might appear similar in timbre, but contrast the rest. These traditions cannot be reconciled precisely due to this problem of the instruments: classical Japanese musical aesthetic and structure is instrumentally idiomatic, it is determined by the possibilities and limitations of what is at hand, no different than Bach with the keyboard or Palestrina with the voice. The manners in which music for the Biwa and Shakuhachi is written is profoundly distinct from that of western music, and it is not simply in the question of pitch content though theoretical foundations, but also the way the pitches sound and the ways they are performed, so much so that aesthetic and philosophical ends become more important than the purely structural end.

Key qualities that become important in the structures and form of western tradition thanks to the layout of the keyboard, namely motivic development on the level of the pure pitch, are nonexistent in a framework in which the keyboard is not the major actor in expressing theoretical ideas. The pitch content of a medieval mass is quite 1:1 with the diatonic keys, but the formal and motivic qualities are not determined by pure pitch, because the voice is unique from the keyboard, somewhat in that it is not as precise or strict, but primarily in that it can carry a textual pathos that pure music must grasp at. Form is looser, built around the text, because the framework is textual, and the ways in which we engage with

Cage comes to mind as a major figure following Berlioz in dealing with the problem of form, mostly due to what could be considered by traditional music a sort of effective deficiency, this case being the composition of percussive music, especially that of the prepared piano, where the pianistic structure is apparent, but the resultant sound could not really be said to really be able to be comprehended in the way it is acted upon. Unlike Berlioz however, Cage composed on the piano, but despite this factor,it is pitchless and registerless, so playing it is much more as if performing from tablature.

The solution to cage in dealing with form was, like Berlioz, to make certain aspects other than intervallic pitch content the motivic element, elevating other musical parameters to play a greater role in compositional practice. Cage had a remarkable solution in his issues with form by dealing with music with structures exterior to the instrument. His percussion work and prepared piano are incredibly clever in their use of the number of bars as motivic signifiers. The *Sonatas and Interludes* are significant for this successful substitution of the number if bars as motivic sections as opposed to themes, giving the music a coherency that allows us to identify that these are sonatas in the vein of Scarlatti, a world of music placed under a unique stricture: two forms, self contained, their worlds determined by proportional limits, say 2-2-3-3, that determine the note values, the measures of the section's themes, and so on. Thus, his formal quandaries that would be missing in this new way of conceptualizing music, since it lacks the solidity of tonality and the keyboard as formal determinants of pitch.

Therefore, it is not necessarily an exterior assumption of a listener, e.g. expectations of tonality, but rather the foundational structural design of a musical experience is that by which the rest of the music is deemed coherent.

Cage trailblazed to greater effect in the composition of the String Quartet, in which the means of composition are inherent only to the instruments themselves. Cage, using sections of voicings and articulations inherent to the strong quartet, created a series of small collections of notes, gamuts, and then composed the music from those, the order being determined by chance. The melodic results of Cage's gamuts in the String Quartet are totally random and essentially incoherent, but this is the point: the incoherency of Cage's gamut based melodies becomes coherent due to a rigorous internal logic that takes the place of any generative gravity; Cage's actions and choices become the generative gravity, as if we are experience the

structure take form in real time.

A piece of music can be understood as "composed" externally, composed according to systems and structures that are exterior to those that generate the structural, e.g. Serialism, but the manner in which it is parsed is determined solely by the relationships that it itself develops. Looking at the score one can make theoretical explanations, expressing how one might conceptually understand the piece but in listening one cannot place upon music their own expectations and aspirations, but only that which comes from itself.

Cage's work is inherently tied to the consequences of its construction: it is totally, without question, built upon a series of inherent qualities that determine the end result; however, these qualities are not reflected in modality or tonality, but within a series of pitches abstracted from tonality, a subset, as to replace the functionality of equal tempered tonality with a functionality inherent to it alone as a musical experience, much in the same way the tone row would. Consequently, just as all the ways in which we engage with Mozart can only be done according to tonality, all the ways in which we engage with this music can only be done so according to this innate system. Just as with the overtone series and the natural horn, the music is totally idiomatic; yet, it is not to the instrument as instrument, but to the gamut as instrument.

At any point in time in which something might occur, it will occur according to the means by which it has been grafted to.

All that will be, has already been. The gestation of something is not that it will come to be, but that it is already there, even if we do not identify it. The fruit of a flowering tree does exist even if the tree is bare, because the tree and the fruit are one in the same, they exist simultaneously, as G exists within C. The rose is not the color, nor is it the thorns, it is the whole of the structure, the stem and the roots.

The formal logic of something must already conceptually exist for it to occur, if at all, be; thus, what unites Cage's gamut is something important that we often forget when it comes to the structural functionality of composition: those instruments themselves, with their idiomatic nature, determine the means, the input and the output, just as much as a tuning or scale because they are too derived from some sort of quality that determines their functionality.

So Cage's gamuts in the String Quartet are not simply notes, they are intrinsically tied to the instruments themselves, they gain their essence not through harmonic functionality, but through instrumental essentiality.

The aspects of the gamut are not necessarily pure notes, but rather the notion of those pure notes within the context of the structure

that manifests them.

It is really no different than thinking of the fifth degree of a scale as not simply a theoretical end, a perfect fifth, but rather as the physical end that is available, the fifth pitch within a scale, and in turn, that scale is understood within the context of its manifestation, the structural aspects of the tuning. Even in works of the classical period in which we do not necessarily think about the reason in which something was written, it had been ordained to be such a way by the qualities and limitations of the instruments at hand.

According to instrumental construction, certain compositional aspects appear with some precedence over others: say an instrument being more suited to certain keys over others by the nature of its construction, perhaps a horn with F major, this, though seemingly distanced from the discussion of consonance, is one in the same in the sense that these decisions that are made in practice are determined by certain structural qualities. In modality the tonic dominant relationship is key to proper performance, composition, and thus musical comprehension, in a horn the unique expression of a flattened B in the harmonic series is key to proper performance, composition, and thus musical comprehension.

Formal structure, that is, the structural expression that reveals the form of a thing, is functionality, not simply in harmony, but in all aspects of musical experience.

Those sections of any music, Lully or Mozart, are determined in content by the tuning, the scale, etc. but the actual growth they take as organic things are not determined necessarily ahead of time. The qualities of formal structure that make it exciting and energizing are not that of tonal functionality, but the relationships that come into being at the moment they begin. Certainly it could be said that they are informed by tonal functionality, but the paths are not simply the harmonic fabric we expect from a tonal structure; rather, the path is much more organic: shoots and growths that gestate from the roots of tonal experience.

So it can be said that the coherency of the music, despite the structures, tunings, instruments, etc. being determined beforehand, can be explained by such things. Tonality itself determines itself, but tonality as a structure does not determine the music; rather, it reflects what occurs within the music: a root point is determined and everything is thus understood according to that. It is not some formal predetermination. Tuning, tonality, modality, melody, harmony, these all occur at the same time, it is just that our framing of them is different depending on how we approach the situation. If we are listening, we are not identifying the music in the context of tonality,

we are identifying it in the context of form, and even then, the level at which we frame the music will determine what aspect of form we imagine, either the microstructure of the harmonic movement or the macrostructure of thematic engagement.

The future musical holarchy requires something different, something more nuanced.

It requires an understanding that musical experience is not as strict as rigid as we mean it to be, but that it is rather soft, malleable, modular; that cannot be moved with certainty, but will adapt and shift according to the means through which it comes into being.

Each formal structure, each instrument, each musical experience, is not really expressed as anything other than what it is, from what it comes into being from.