

Escaping Phenomenology: Towards a Martian-Friendly Music

Abstract

Can music ever escape phenomenology? That is, can there be music that simultaneously obviates the need for foreknowledge and obviates the need for bracketing to experience it? Can music rigorously define (and subsequently use) all its lexemes internally (without recourse to the faculties of the listener)? Then would we be able to create Martian-friendly music? This brief paper explores these questions and uses the case study of a hypothetical Martian to explore the possibilities of creating music that requires no prior foreknowledge whatsoever.

Definitions

In order to make our points, some definitions are in order.

- Music is organized sound. The means by which it is organized is a function of the intentional (human) projection of order onto the sound world.
- Phenomenology is a philosophical approach that concentrates on the study of consciousness and the objects of direct experience. Phenomenology often seems to assume a basic polysemy of the object under study (hence allowing for varying interpretations). One goal of this paper is to propose music that might transcend polysemy, and thus, phenomenology.
- A Martian is a fictional inhabitant of the planet Mars. Martians are invoked here (with no implicit subjugation of non-Martian aliens) to create a hypothetical subject with which to test our post-phenomenological music.
- Intelligibility is the state or quality of being able to be understood. But wait, you say! How can you “understand” something polysemic? Or something which has an abstract meaning? I do not have an answer to these questions. I claim (without proof) that intelligibility can be as visceral or intuitive as intellectual.

A Brief Background

Certainly I am not the first one to have ever thought about making music for aliens. The Golden Voyager Records were two phonograph records launched on *Voyager 1* and *Voyager 2* into space in 1977, designed to encapsulate some of Earth’s finest music as to showcase it to aliens. Although the package contained instructions on operating the phonograph, no attempt was made to de-obfuscate the music itself. What if Martians were to listen to Bach and walk away confused because they had no concept of counterpoint and fugue? This paper addresses some of the more musical questions posed by the alien–human–music connection.

Creation of the Martian

As a device through which to attempt a successful divorce with phenomenology (from music), we shall create a hypothetical Martian who will be subject to listening to the music we provide for

it. Bruno Nettl, in *Heartland Excursions: Ethnomusicological Reflections on Schools of Music*, invokes a Martian in critically examining ethnomusicology departments in American schools, pondering on the preponderance of names (of both dead and living people) in the discipline. A similar invocation is called upon here to shed light on fundamental musical questions that might be dismissed by the human for being too trivial. Some specifications are necessary in order to contextualize and ground the Martian.

First, it is asserted that the Martian has ears akin to human ears—that is, they perceive sounds in the same way we do, with latent and manifest overtones to vibrating media, etc. They can also be said to have a frequency perception of roughly 20 Hz to 20 KHz, just like the average human. The Martian also has basic memory function. Defining this precisely and rigorously is quite difficult without a metric and without a baseline for human memory retention in music, unfortunately, so suffice it to say that the Martian has the memory of an average human child (whatever that may be).

The key difference between the Martian and the human is in the exposure to (human) music. The Martian shall not have any acquaintance whatsoever with tonality, microtonality, serialism, or any other conceivable human musical language. Timbres of human instruments will also be foreign to the Martian, but this point will not be quite as germane to the discussion since the music we will attempt to construct for the Martian will not utilize complex orchestral timbres.

Beyond human musical languages, human metaphors of references will elude the Martian. For example, interpreting the opening of Mahler's Ninth Symphony as arrhythmia makes sense to humans (at least to Leonard Bernstein) but would be incomprehensible to the heartless Martian.

These provisos somewhat obviate the need for the Martian to be (or not be) phenomenological. For example, since all human musical languages and conventions are foreign to the Martian, there is no need to bracket them. Certainly, phenomenological listening is more than just bracketing, so perhaps our Martian can be said to be phenomenologically agnostic. Let us now embark on an attempt to create music that will be able to define all of its lexemes internally (and, as such, be intelligible to a Martian).

Consideration of the Varying Intelligibility of Existing Music

It may be instructive to first consider what type of music might be most diametrically opposed to Martian-friendly music. If the chief difference is the lack of foreknowledge of human musical languages and traditions, a piece of human music that builds significantly on foreknowledge of such things will be most incomprehensible. I humbly suggest Mahler's Fifth Symphony. The Beethoven 5 reference at the very beginning will be lost to the Martian, as will the progressive tonality (C# minor to D major), the modal ethos of the Adagietto, the various stereotypical Mahlerian references, etc. Now considering the unsuitability of a piece so steeped in an advanced and developed musical tradition, let us turn to something situated in a more nascent tradition.

The Second Viennese School provides an interesting case study as several of the members purportedly tried to categorically distance themselves from the immediately preceding prevalent musical language (tonality) as much as possible. Glenn Gould, a staunch proponent of the music of Arnold Schoenberg, argues in *Arnold Schoenberg: A Perspective*:

“Within the aesthetic which Schoenberg employed, the basic sentiment which governed the spirit of his work was an insistence upon regarding a work of art as a totally comprehensible, totally organized object” (12).

Gould goes on to describe how Schoenberg’s output and creativity appeared to be stifled in the “free atonality” period but flourished greatly after the advent of serialism, claiming that the narrow door through which Schoenberg was forced to put his music after creating serialism (and the logical justification that it provided for the musical construction) made it far easier to compose than previously. Indeed, serialism operated without recourse to tonal syntax, rhythm, or form, although the choices that determined those parameters were still largely idiosyncratic.

Schoenberg for example was decidedly fond of Austro-German forms and continued to write in traditional forms. Schoenberg’s student Alban Berg was even more unabashed in his embrace of Romantic music, borrowing harmonies, tonal references, and other backward-looking tropes. Anton Webern, on the other hand, started—like the other two—with tonal works but increasingly distanced himself from them, striving to achieve a complete departure from tonality in harmony, melody, rhythm, and form. It was Webern who was championed by the integral serialists of the mid-20th century, whose mission it was to rigorously systematize all the parameters of music, including dynamics, rhythm, phrase length, etc. Pierre Boulez said of his (own) *Structures I*:

“I wanted to eradicate from my vocabulary absolutely every trace of the conventional, whether it concerned figures and phrases, or development and form; I then wanted gradually, element after element, to win back the various stages of the compositional process, in such a manner that a perfectly new synthesis might arise, a synthesis that would not be corrupted from the very outset by foreign bodies—stylistic reminiscences in particular” (1986a. “Necessité d’une orientation esthétique (II).” *Canadian University Music Review/Revue de Musique des Universités Canadiennes*, no. 7:46–79).

The tonally acclimated ear (arguably) has trouble hearing this magnificently perfect synthesis in listening to *Structures I*, but perhaps the Martian would beg to differ. At any rate, we might turn to the music of Webern or of the integral serialists for a preliminary investigation of music that might be intelligible to our Martian.

Anton Webern – A Tangential Interlude

Webern’s middle and late style is characterized by extreme laconism and a dogged insistence on total structural organization. The Variations for Piano, Op. 27, are an interesting case study. The

tone row used features hexachordal combinatoriality (i.e., the first six pitches are a permutation of 0-5 whereas the latter six pitches are a permutation of 6-11) and privileges the semitone.¹

PO: $\overbrace{E^{\flat} B B^{\flat} D} \quad \overbrace{D^{\flat} C} \quad \bigg| \quad \overbrace{G^{\flat} E G F} \quad \overbrace{A A^{\flat}}$

Some noteworthy observations about the short first movement may shed light on how abstract musical processes might be rendered intelligible to a Martian. The phrases in the first movement are almost perfectly palindromic, a phenomenon achieved by invoking the retrograde of the opening phrase in the opposing hand after a statement of the first phrase. Palindromes are bisected on chords where notes that are elements of multiple row forms are juxtaposed, and usually this is clarified by voicing. However, toward the end of the movement, notes of multiple row forms show up in one hand (aurally, in closer voicing). A being with pitch retention (with which we can a priori imbue our Martian) ought to be able to discern the devolution of the neatly palindromic structure to a more entropic one with blurred eliding row forms (taking whatever semantic or semiotic metaphor from that which may be apt).

Of course, you may object, this sort of intellectualized listening is probably difficult enough for the human, let alone a Martian! When was the last time you plucked out notes that didn't fit in a Webern palindrome? The point being made here is not that making music more esoteric or erudite increases its intelligibility, but that reducing referential elements and instead cohering musical processes by abstract interrelations (or rather, *intrarelations*) might aid intelligibility for Martians.

A Case for Minimalism

One (a human, that is) might be wondering at this point: why has the author not mentioned minimalism as a friendly entryway into human music (for Martians)? Doesn't the repetition make it "easier"? Well, "easier" to do what? "Comprehend" the music? Consider Philip Glass's "Opening" from *Glassworks*—a quintessential minimalist work. The chords traversed in the first phrase are:

F minor–E \flat major–(D \flat -G-B \flat -A \flat -C)

and the syntactical "well-formed"-ness of the progression is a result of the third chord (a dissonant chord) resolving in an orthodox manner to a consonance at the onset of the next phrase (a repetition of this three-chord four-bar phrase). A Martian could hear this phrase an arbitrarily high number of times and still have trouble figuring out the precise reason it "works"—after all, why should that particular rule (i.e., the directionality of consonance and dissonance) decide the syntax more than any other? What about number of pitch classes per

¹ Wason, Robert W. "Webern's Variations for Piano, Op. 27: Musical Structure and the Performance Score." *Integral* (1987): 57-103.

chord? Might not the Martian conclude that syntactically “well-formed” phrases should terminate in chords with more pitch classes than the chords that begin phrases?

This example is much like a video published on YouTube by Veritasium in 2014.² In it, a man asks several people to identify a rule he is using to give them sequences of numbers. He gives people a sequence of three numbers and asks them to guess the rule of the sequence, allowing them to try an unlimited number of “test sequences” for him to confirm or deny the rule being followed. The rule is very simple: it is simply that numbers are presented in ascending order, but in spite of people eventually getting it, the astonishing fact is that so many people do not attempt to find a sequence that breaks the rule but appear to gain satisfaction from feeding the asker many sequences that eminently follow the rule. (For example, many people are convinced that the rule involves multiplication by two and try an inordinate number of such sequences in spite of not being able to correctly guess the rule.) Similarly, an alien with awareness of octave equivalence and pitch classes might draw the conclusion that the musical logic of Philip Glass’s *Glassworks* (and perhaps—by proxy—minimalist music) is guided by resolutions of high-volume pitch class sets to lower-volume pitch class sets, but this would be incorrect (although we would have absolutely no reason to blame the Martian for drawing such a conclusion).

Note that I have simply pointed out a feature of minimalist music that could be polysemous (and therefore confounding for a Martian). This does not negate its possible utility as a relatively Martian-friendly music, especially in comparison to highly referential music, like Mahler’s symphonies. However, I think we can do better. How might we reduce polysemy further to make music even *more* explicit?

The Question of Performance – A Brief Aside

Don Ihde, in *Listening and Voice: Phenomenologies of Sound*, says that “Notation does for music what writing does for language” (199). Indeed, music notation allows for a quasi-scientific replicability in musical performance—no performance is a verbatim reproduction of another (absent machine intervention, e.g., with a player piano), but the notation can provide a rigorous foundation from which to craft a musical performance. In performing music for Martians, how might an effective performance be achieved? Could we assume that the Martian, like Johannes Brahms, prefers hearing symphonies “on his lap” rather than out loud and will absorb all the musical data we wish to convey to it by handing it a copy of the score? Certainly not (especially as we have not even given our Martian vision yet!). Instead, some discussion of the spatiality of sound, with a tip of the hat to Ihde, is warranted.

Ihde invokes echolocation to show how we can hear “surfaces”—

“So with listening for shape-aspects it often takes repeated and prolonged listening until the fullness of the shape appears” (66).

² <https://youtu.be/vKA4w2O61Xo>

A temporality is necessitated here in order to divine the surface and spatiality of sound—one needs to listen intently and repeatedly in order to do this. Can this problem be transcended, or must we blare our musical sample to the Martian ad infinitum such that its spatiality can be comprehended fully? I suggest that our musical sample should employ one timbre and one sound source, placed squarely in front of the Martian’s auditory organ(s). A piano might work well were it not for the assumption of comprehending the twelve-tone division of the octave. At any rate, the spatiality of sound will not be a germane concern for this project as we shall assume that the “surface” of our sound will be moot to the experience and intelligibility of the music.

Creating the Martian Music Itself

We have examined how Webern, Boulez, Glass, and others might serve as good starting points for Martian-friendly music. But even those musical traditions build on precedents (even as they vehemently disavow them). For example, neither Webern nor Boulez ever strayed from the twelve-tone division of the octave that was codified centuries before them. The reasons for choosing a twelve-tone division are far from trivial and are actually quite interesting, but no doubt a lecture on the mathematics and physics behind this historical choice would go over our poor Martian’s head. Could such a system be “taught” purely musically?

It was asserted in the creation of the Martian that its pitch perception is akin that of humans’. That is, it can perceive overtones in sounds, and all else that comes in sonic signals. So perhaps a tone can be sounded such that its latent overtones become manifest over time, suggesting a way to parse them into a musical structure. Richard Wagner’s *Das Rheingold*, despite being a firmly Romantic-tonal work and building off of the musical syntax of his Classical predecessors, does some of this “establishment-from-first-principles” rather ingeniously. The prelude to the first act begins with E \flat octaves in the contrabasses, after which a B \flat (the first distinct overtone of the E \flat) is sounded in the French horns. The remainder of the prelude prolongs an immense E \flat major chord, so much so that after a few minutes the *latent* minor (or—to be more precise—somewhere between minor and major) seventh above the root starts to become aurally manifest. Thus when the Rhinemaidens enter in A \flat major, that harmony is prefigured not because of any rhetorical cadential motion but because the latent overtones of a tonic have been expounded by sheer assertion.

But wait, you say! Surely the Martian doesn’t know that a 9/5 ratio is less stable than a 3/2 ratio! But why not? In just intonation, a metric space is proscribed by the intervallic ratios between chords—that is, the ratio between any two notes is well-defined. An order on the magnitudes (i.e., a system of consonance and dissonance premeditated on the relative incommensurability of harmonic ratios) is roughly imposed on the tonal system (albeit with major contradictions, like the dissonant perfect fourth or the consonant minor third). So getting a Martian to assimilate common practice tonality will be extremely difficult without language to explain the idiosyncrasies. But what about a discretization of the pitch space between octaves based on a more rigorous mathematical principle?

Twelve-tone equal temperament is based on logarithmically equal half steps. Such a convention's motivation lies in the modulatory portability afforded by such a practice. Modulation is no easy concept to define to a Martian, but the necessity of 12tet could be demonstrated in the following manner:

- Establish the primacy of the octave by sounding a fundamental along with its octave-multiples
- Make the latent fifth manifest, earmarking it as the next-most-important tone after the octave.
- Use the interval of a fifth as a group action, iterating it successive on the fundamental, slowly but deliberately. Octave shifts are permissible to stay within the Martian hearing range. Perhaps the fundamental can remain sounding.
- After twelve iterations of just perfect fifths above the fundamental, the pitch at which we will have landed will bear a strong resemblance to an octave-multiple of the fundamental (i.e., a member of the same pitch class). More precisely, it will be about 1.3% higher than an octave-multiple of it.
- Sounding these two slightly-off tones simultaneously should alert the Martian that something has gone wrong. If indeed the fundamental interval is the fifth, why does it fail to close the octave? The answer is obvious to the mathematician, but it should leave the Martian confounded.
- Deliberately *correcting* the error ought to reconcile the Martian, alerting it to the fact that a conscious decision has been made to impose an discrete order on the gamut of continuous pitch space.

To get an example of specific frequencies that would be employed in an exercise like this, consider building it with a fundamental of $A_3 = 220$ Hz. Then, successive iterations of just perfect fifths (with octave switching represented by \equiv) would look like (with two significant figures) the following:

Pitch	Hertz
A_3	220
E	330
B	495
F#	742.5 ($\equiv 371.25$)
C#	556.87
G#	835.31 ($\equiv 417.65$)
D#	626.48 ($\equiv 313.24$)
B \flat	469.86
F	704.79 ($\equiv 352.39$)
C	528.59
G	792.89 ($\equiv 396.44$)
D	594.67
A	892 ($\equiv 446 \equiv 223$)

The A_3 we finally arrive at by brute-force iterations of just perfect fifths is about 3 Hz (or—more precisely—3.0015182496 Hz) more than our original A_3 . My contention is that the provenance of this discrepancy and the subsequent correction of it ought to be tantamount to an oral explanation of the utility of 12tet, effectively serving to teach a listener how to interpret 12tet music solely by aural means.

The audio composition accompanying this paper is a crude attempt at this sound exercise. It simplifies many aspects that would be fleshed out further in a true Martian composition—in the audio file, precisely five seconds are spent on each pitch combination, and the iteration is as follows in the chart below. Numbers refer to pitches of the given Hz (as in the table above).

Time (seconds)	Sound
0-5	pure A_3 (220)
5-10	A_3 and A_4
10-15	A_1 , A_2 , A_3 , and A_4
15-20	(soft A_3 and) 330
20-25	(soft A_3 and) 495
25-30	(soft A_3 and) 371.25
30-35	(soft A_3 and) 556.87
35-40	(soft A_3 and) 417.65
40-45	(soft A_3 and) 313.24
45-50	(soft A_3 and) 469.86
50-55	(soft A_3 and) 352.39
55-60	(soft A_3 and) 528.59
60-65	(soft A_3 and) 396.44
65-70	(soft A_3 and) 594.67
70-75	(soft A_3 and) 223
75-80	pure A_3

The most glaring difference between this crude version and the idealized version expounded in prose bullets above is the direct octave switching. For example, the pitch appears to go *down* in between seconds 20-25 and 25-30 even though the ascending just perfect fifth rule is still being applied rigorously—this is to preserve a roughly circumscribed range of the audio piece as to ensure it does not transcend the Martian hearing range. In a more robust realization, the proper octave would be sounded before transposing it to an acceptable range. At any rate, the final result is the same. Having established the primacy of the octave and the perfect fifth, the rule is applied until it leads to its own logical demise—the loop cannot be closed and *tempering* is rendered logically necessary to align our differing A_3 's.

No doubt we can never know if the above process will work on a real Martian. Studies on remote tribes and other peoples with no exposure to tonal music would be instructive in this regard. It is important to note that the above exercise barely qualifies as music—certainly the purpose of it is not so much artistic as it is didactic. The real interest would likely come in feeding some actual (12tet) music to the Martian after this “orientation exercise” (in the presumption that it worked). Would then the Martian be able to glean some of the syntactical rules of common practice tonality? Or some of the rhetorical devices latent in 12tet that are often exploited in tonal music?³ Probably, but not definitively.

This experiment invited some interesting questions in the domain of artificial intelligence. If we can teach a Martian to understand the provenance of 12tet through purely aural means, can we also induce a transcendental experience upon listening to *Parsifal*, given ample exposure to music to populate a database of rhetorical and syntactical devices? (Probably not.)

Answers

No stick-it-to-the-man philosophy paper would be complete without an “answers” section. (Isn’t philosophy supposed to ask questions rather than answer them?) A happy medium—one in which both the acolyte and the doubter of phenomenology is satisfied—is perhaps achieved by providing somewhat noncommittal answers to the questions originally posed.

- Can music ever escape phenomenology?
 - Probably not. Even the sound experiment described above basically has the Martian becoming a de facto phenomenologist, no matter how hard I rail for it to not be one de jure. A more interesting question arises from this answer—can *anything* escape phenomenology? Pure mathematics? Basic kinematics? The most infallible, incontrovertible, logically sealed self-consistent proof ever conceived? Probably not even that, as it involves some form of cognition to engender it.
- That is, can there be music that simultaneously obviates the need for foreknowledge and obviates the need for bracketing to experience it?
 - This question is more directed than the first one, so I am not so quick to answer it in the negative. We can probably create music like this if we work hard enough at it. The sound exercise suggested above (to aurally demonstrate 12tet) is a step in the right direction, I think. Perhaps if it was followed by something exploiting an ambiguity latent in the system, it could transcend prosaic description and enter the poetic realm of music.
- Can music rigorously define (and subsequently use) all its lexemes internally (without recourse to the faculties of the listener)?
 - Not *completely*, I would venture, but we ought to be able to get pretty close—close enough for it to be virtually the same. Even tonal compositions that rely on a great deal of foreknowledge, e.g., Wagner, very often create their own world within a particular composition. For example, modulation to iii (i.e., the minor key of the

³ Some of these are expounded more in detail in my own thesis, “Latent Possibilities of the Tonal System: Grammar and Historical Usage,” available to read at vishnubachani.com/music.

mediant scale degree) quickly becomes earmarked as an invocation of invisibility in *Der Ring des Nibelungen* (as evidenced by the tonal action of the Tarnhelm motif, an E major object which effects a modulation to G# minor in the consequent phrase), which is then used consistently throughout the four operas without any sort of “program note” explanation needed. The effect of that particular modulatory motion remains palpable even if the listener lacks the technical vocabulary to elucidate it, and the preponderance of such internally consistent and musically semantic devices in Wagner’s oeuvre are (in my opinion) a testament and empirical vindication of the enduring popularity of his music. So if one such lexeme could be defined purely through aural means, why couldn’t the majority of them be? It would likely require more work to build everything from first principles, but it could be done close to completion.

- Then would we be able to create Martian-friendly music?
 - The impossibility of knowing what would be familiar or relatable to Martians makes this question somewhat moot (at least if we are to interpret “friendly” as “enjoyable”). Intelligibility is a lower threshold and perhaps one more realistically achievable, even if that is a long shot. The sound exercise suggested above is—again—a likely first step, and ensuing steps could entail creating something more musical all the while paying equal attention to detail to deriving everything from first principles. Germane study guides for composers looking to do this would likely be linguistics textbooks, especially those on natural language acquisition. Once natural language acquisition is understood well, extrapolating the methodology to nonhuman beings would likely be possible.

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