

MUSIC IN OUTER MORPHOLOGICAL SPACE

Reverse cross-domain mapping

In a program note for the 1997 premiere of *Ofanim*, composer Luciano Berio refers to electronic special effects that give an illusion of sound-samples moving in patterns around Carnegie Hall: "...the image of music as sound-architecture," he writes, "is no longer a mere metaphor: it represents a concrete possibility."¹ The purpose of the program notes is to draw the audience's attention to the spatialization (or seeming motion) of sounds, but his comment also provokes the audience to consider what such effects might *mean*. He identifies the underlying aesthetic motivation for using such effects, a spatial fantasy of music which as 'concrete representation' or as 'mere metaphor', is an 'image' of music worth having. At the very least, his comment suggests that a spatializing imagination of music is an activity with a history.

But how 'concrete' is this 'representation' of 'sound-architecture'? There is an *illusion* of a sound's trajectory in space and these trajectories have patterns that could be described in spatial terms, (i.e. left, right, up, down), but there are no shapes taking up space for the listener to witness. The sound sources in *Ofanim* are not literally moving around. The architecture is making no sound (although one might argue that speakers are architecture). A metaphorical quality remains despite Berio's effort to attain a more literal spatial 'image' of music.

The motion of sound sources or of sounds themselves is a device that is frequently used in pieces of contemporary music. A sound's motion can seem, conceptually speaking,

¹ Luciano Berio, *Carnegie Hall Stage bill*, October 1997, pp. 18-29.

both spatial and musical. The illusion of a sound's motion seems spatial, because of our experiences with objects and animals making sounds as they move. Such an illusion seems appropriate and natural to music perhaps because of our notion of melodic contour in pitch space—the most commonplace of the *inner morphological* spaces. In the Berio piece, *Ofanim*, the trajectories of sounds are treated serially; patterns of motion undergo repetitions and permutations as serial procedure might transform a row of pitches. Motion in pitch space is mapped onto real space.

While the idea of musical space has become more polyvalent, it has not entirely moved beyond its underlying metaphorical nature. Musical space is something the imagination does, at least for two out the three modes described earlier: to *make*, *think of*, or *invest* with spatial qualities. The application of pitch-oriented compositional procedures to patterns of sound-motions in space is metaphor built on metaphor. Whether pitch or time comprises an imagined musical space, and I will discuss both of these possibilities in this chapter, the metaphor of *motion* or *occupying* remains. I see a greater emphasis in 20th century music on *outer morphological* spaces while at the same time an effort to apply to the *outer morphological*, characteristics derived from the *inner morphological* spaces. Berio's application of serial procedure to trajectories of sound exemplifies this practice. The expansion of serial technique to parameters beyond pitch and rhythm marks a crossing of a boundary, if you will, between *inner morphological* elements (interval/pitch space) and *outer morphological* (acoustics, spatial location). The mimicking of *inner morphological* characteristics in the *outer* spaces is a reversal of the cross-domain mapping of phenomena on which the spatial metaphor in music is built in the first place. If our experience with motion and distance in space informs our

experience of music, this reverse cross-domain mapping seeks to do the opposite: to bring our experience of intervals and register to bear on our experience of motion in space.

Musical space's move to the surface and aesthetic value

Robert Morgan, in *Musical Time/Musical Space*, outlines the “musical-spatial” qualities of theoretical interpretations of musical structure. For him, “the most forceful representation of musical space in the tonal tradition resides in the ‘grammatical’ attributes of an underlying musical system, [whereas] in modern music the spatial characteristics are much more ‘on the surface’ and are, in fact, more closely related to the textural matters...”² That is to say, for Morgan, the most convincingly spatial of musical parameters are those that lie in the *inner morphological* space.

Given the loss of structural possibilities inherent in tonality, musical space in contemporary music can be said to have migrated to something like texture or timbre, as Morgan suggests. It has become, therefore, dependent on factors other than pitch alone for its seeming spatiality. Morgan’s comment has some important implications. For one, musical space is a concept having the potential for several “representations,” some of which are “more forceful” than others. That some of these representations are more ‘on the surface’ suggests a depth of field that separates, or contrasts types of musical space.

This is roughly analogous to my distinction between an *inner* and *outer morphological* space, (although my concept of an *outer morphological* space exceeds what Morgan seems to mean by musical surface). That some representations of musical space are “more forceful” than others implies also a potential *value* attachable to them. It seems

² Robert Morgan, “Musical Time/Musical Space,” *Critical Inquiry*, vol. 6, 1980, p.520

that Morgan and Berio both prefer a more “forceful” representation, but differ as to how such a representation is achieved. Berio's vision of a more “concrete image of sound architecture” (based on an illusion of a sounds motion) is quite different from Morgan's tonality-based ‘underlying grammar’ in terms of the (*inner* or *outer*) space types one’s imagination is most likely to engage while listening.

Morgan’s *Musical time/Musical space* (published in *Critical Inquiry*) participates in an interdisciplinary exploration of spatiality and the arts. Morgan writes about musical space from “the point of view of a musician,” though his ideas are not far from the “phenomenal motion of tones” model Scruton has proposed. Schenker’s theory represents for Morgan the most refined description of what a musical space might be like. An underlying tendency of tones at work “beneath the surface” of music exemplifies an *inner morphological* space that is potentially free from the temporality of the foreground.

As the title, *Musical time/Musical space*, suggests, musical space for Morgan is only analytically separable from musical time, like Bakhtin’s chronotope; the work of art brings the components together. Analytically speaking, relationships between pitches independent of their sequential ordering in time constitute musical space. In a most reductive sense, such an understanding of musical space might be defined as that which provides structure to music *outside* of time. The perception of motion in tones requires a temporal coordinate and a spatial coordinate (usually defined by pitch). We project on to what we hear a kind of grid, created by a culture of musical practice, according to which sounds appear to relate to some tonal logic. That culture of musical practice, however, changes, and with these changes come different notions of spatiality in music. A musical

space established through latent pitch connections at deep levels of structure (e.g. in tonal music) has become altered by contemporary experimentation, and a question of value arises. Morgan seems reluctant to embrace these more extreme changes in the spatiality of music.

... music is apparently unthinkable without the presence of some spatial, extra-temporal dimension, although the particular form that the spatial dimension takes may vary widely from one work or historical period to another. In those rare cases when a composer, such as John Cage in his more extreme moments, has attempted to transcend the spatial framework entirely, allowing music to unfold in time totally without restriction, the results seem peculiarly unmusical. Indeed, in Cage's most consequential experiments in this direction, the performer is provided with a unit of time within which anything-or nothing-can be done: musical time then becomes indistinguishable from ordinary time. But if that is so, in what sense can this time be said to be musical at all?³

Inner and outer morphological spaces in Cage's 4'33"

Cage's pieces along these lines are precisely about a listening act that distinguishes "musical time" from "ordinary time." *4'33"* is the first and most notorious of Cage's pieces employing what he later termed "time brackets." The piece epitomizes Cage's interest in time and silence as the most basic of structural devices of music. Cage said that it is *time* on which we must "agree," that is, we must establish a duration for listening during within which any sound might be thought of as music.⁴ *4'33"* is a kind of fable for listening, exploring the aesthetic experience of sounds independent of preconceptions regarding their relationship to musical form or meaning. Time, like silence, is a frame around the piece of music. It is perception, however, that must regard various sounds as material for music in the first place.

³ Robert Morgan, "Musical Time/Musical Space," *Critical Inquiry*, vol. 6, 1980, p.527.

⁴ John Cage, "In Defense of Satie," *John Cage: An Anthology* (New York: Da Capo, 1991) pp.77-83.

But must we not also agree on spaces and physical conditions on which sounds will depend, if various sounds are to be construed as musical? Cage imagined that 4' 33" could be performed anywhere; his favorite "performance" took place while once picking mushrooms. While the work might be said to exist independent of space, it does so like any written composition, that is, as a concept independent of unique implementations. But 4' 33" needs space even more than a typical musical piece, which can be experienced, at least in part, through silently reading the score. Space is not unlike time and silence in 4' 33"; it is an implicit material for the work. Cage liked the mushroom-picking performance because he liked the woods and the sounds happening in the woods. Space becomes an instrument in the performance of the 4' 33" just as musical space/music-and-space become inseparable—the "/" ceases to exist. During the premiere performance, the outrage that accompanied the fact that the pianist was not playing any sounds resulted from a collapse of a typically imagined musical space of sounds onto the performance space. There were, after all, plenty of sounds to hear, but they were not juxtaposed to an alternative imaginary space like that provided by a typical musical performance during which we ignore such sounds. The boundary between *musical space/music-and-space*, the "/", does not seem to exist, confounding the listener's imagination. While Cage shunned the faculty of judgment (i.e. good and bad) while listening, one cannot help but imagine that experiencing multiple performances of 4' 33" would lead one to make such judgements. Space would be an arbiter of the experience, just as it was for Cage in the woods. Space influences our ability to regard sounds as objects for aesthetic contemplation, as Cage would have us do. Certainly we are in a

better position to *aesthetically* contemplate the sound of an approaching train if we are not standing on the tracks.

The concert version of 4'33", with the pianist sitting quietly at the piano, requires visual cues for an audience to know how to time the event. The piano and pianist function as a signal to the listener that the listening space remains a space for music, yet performer and instrument also function as keepers of time, signaling the beginning and end of the experience. If one signaled the beginning and ending of 4'33" with a strike of a bell, for example, it would not be a Cagean piece of non-intentional sounds. A time bracket not directly perceived by the ears (but visually witnessed) marks musical space/music-and-space.

Form-intrinsic and form-extrinsic space

I wish to expand on two critical terms that qualify the *morphological* space types that I have been discussing up to now: *form-intrinsic* and *form-extrinsic* spaces. Before explaining what I mean by them, it might be helpful to review *inner* and *outer morphological* so that they remain distinct from *form-intrinsic* and *form-extrinsic*.⁵

The *inner morphological* spaces are "inner" because they are imaginary. They are morphological because they are form defining; pitch is the paradigm in this case. The

⁵ I apologize to the student of musical semiology. I am not wishing my terms to be confused with models of reference such as Jakobson's introversive vs. extroversive semiosis. My form-extrinsic/intrinsic opposition is a provisional distinction I will apply in various contexts all of which Jakobson might regard as concerning introversive elements. When real space is both considered a formal element and one open to *outer subjective* connotations, however, I see this as reaching into what Jakobson calls extroversive. Anyway, for my purposes, I prefer the opposition to be more fluid and less categorical; my categories combine and cross his as they do Molino's.

outer morphological are form defining effects that happen in real space. They include spatial location, resonance, and even timbre/instrumentation. *Form-intrinsic* and *form-extrinsic*, on the other hand, distinguish between elements unique to a given piece of music from more general ones. We might call for example Schenker's "Ursatz" a *form-extrinsic (inner morphological)* space distinguishable from *form-intrinsic* foreground realizations in a given piece of music. Imagining categories of musical space as Tarasti does, for example, allows us to construe genre or style as *form-extrinsic* spaces, in which specific pieces constitute *form-intrinsic* realizations.

Similarly, *form-extrinsic* and *form-intrinsic* spaces can be distinguished in the *outer morphological* domain. The resonance of a hall, for example, is typically an *outer morphological* space that is *form-intrinsic* to a given experience of a specific performance in a specific place, whereas instrumentation is *form-extrinsic*, a priori to timbral or acoustical issues. Boundaries between the *form-intrinsic* and *form-extrinsic* are redrawn in the creative act of treating musical space as a compositional resource, as is true of any recreation of music through performance or broadcast. This is one of music's oldest and most favorite games. Equal temperament tuning, for example, provided Bach and his contemporaries with a new *form-extrinsic* pitch space in which *form-intrinsic* modulations were realizable. The tunings of Harry Partch, Ben Johnston, and James Tenney are contemporary efforts to locate *form-extrinsic* spaces in which to construct new *form-intrinsic* realizations.⁶

⁶ A detailed comparison of these spaces and the kind of "form-intrinsic" things one might find in them is the subject of Bob Gilmore's "Changing the Metaphor: Ratio Models Of Musical Pitch in the Works of Partch, Johnston, and Tenney," *PNM*, vol. 33, 1 and 2, pp.458-503.

In performance, time is typically a *form-intrinsic* element. The length of a sonata allegro movement in minutes and seconds, for example, is not uniform from piece to piece, or performance to performance. With *4'33"*, space and time reverse their respective roles. Space is heard and time is seen! Time functions *extrinsically* (almost like a key signature) where sounds in *outer morphological* space actuate a musical form. Whether or not one's imagination (or one's listening space) delivers an acceptable performance, *4'33"* is a fable that reminds us just how contingent musical time is (in more traditional listening contexts) on circumstances in *outer morphological* space.

In Cage's music, a time bracket has replaced latent pitch structures as a *form-extrinsic inner morphological space*, and the *outer morphological* space (place, location) has become the other coordinate, that space where musical events change our perception of time. In *4'33"*, the time bracket fulfills the role of an *inner morphological* space that is agreed upon as a formal demarcation for sounds that are to constitute the piece. As in the "phenomenal motion of tones," time provides one of the coordinates, but pitch is replaced by sounds/events happening in the performance space as the other coordinate. To my mind, Cage's pieces and Morgan's comment about them raise a similar question. What does pitch space—the "phenomenal space of tones"—offer that Cage's time brackets and/or similar "happenings" effectively replace (or fail to replace depending on one's sensibility)? To ask it another way, what are valued qualities of the *inner morphological* spaces mimicked by time and real space in *4'33"*? The distinction between *form-intrinsic* and *form-extrinsic* is the salient characteristic of the *inner morphological* spaces that is sought after by Morgan and treated as a compositional resource by Cage.

4'33" is a more extreme example than the Berio example of what I see as a tendency in postwar music to reveal the *outer morphological spaces* as an *extrinsic* element and apply to it values derived from the *inner morphological*. The effect of such an effort in 4'33" is that we as listeners learn to appreciate distinctions between *form-intrinsic* and *form-extrinsic* spaces in the *outer morphological* domain more than we might given a more traditional *inner*, "phenomenal-motion-of-tones" type of musical space. Space as a variable in 4'33" is the *form-extrinsic* element making *form-intrinsic* realizations (e.g. Cage's mushroom-picking experience) unique determinations of the piece. The work makes *intrinsic-extrinsic* opposition the "stuff" of the piece.

Other works that I will discuss address this *intrinsic-extrinsic* opposition in perhaps less starkly reductive ways, but like 4'33", they rely on the *outer morphological* space to emphasize, set-up, or create an ultimate *form-extrinsic* element within which to make distinctions. I regard the search for new *form-extrinsic* spaces as an outgrowth of the prewar search for new pitch material. Varied approaches to pitch all seem to share a need to establish this form-intrinsic/extrinsic opposition within pitch space. The history of 20th century concert music (in composition and analysis) might be seen as an effort to refine or create new extrinsic/intrinsic distinctions. The 'music-literal' space of register, for example, has provided an ultimate *form-extrinsic* space for many composers such as Varese, Ligeti, and Stravinsky. The row in twelve-tone music attempted to provide a new *form-extrinsic* space, replacing what seemed an undifferentiated swirl of linear chromatic triads. The theorizing of 'background collections' (Forte) or the exploration of all-

combinatorial hexachords (Babbitt) or the search for ‘normative’ procedures in twelve-tone music (Perle), all point to ways of carving out *form-extrinsic* spaces between the chromatic and a more particular foreground musical realization.

The search for a new form-extrinsic element

The change in musical space in postwar music might be summarized by saying: that if pitch alone is unable to provide this form-intrinsic/extrinsic opposition then *outer morphological* spaces are to be relied upon to provide a more material *extrinsic* element. Like Cage, Stockhausen’s interest in spatialization directs the musical space metaphor “outward,” away from pitch relationships towards the *outer morphophoric* domain. This was the logical conclusion of a search for a more stable *form-extrinsic* element. To a large degree, this search is a result of a need to isolate “material qualities” of music in order to break with traditional forms and sonorities. Boulez’s “Schonberg is dead” criticism could be paraphrased by saying that Schonberg’s use of more traditional rhythmic phrases and forms provided an inappropriate *form-extrinsic* space. In keeping with a quest for pure form, musical space would need to become something more literal, or as Berio put it, a more “concrete representation” of musical space.

Once the serial moment had run its course, the focus on parameters became less about their being separate and more about searching for an underlying unity between them.

Stockhausen characterized this new approach by contrasting it with traditional music in which one saw things (the motive) transformed and presented in “a different light,” whereas the new approach places “different things in the same light.” The light he means is a *form-intrinsic* series of proportions specific to a given piece. For Stockhausen, the necessary contrasting *extrinsic* element is provided in part by temporality, as in Cage’s *4’33”*. How temporality is shared by different musical parameters is explained in “...*how time passes*...” This work laid the groundwork for the “new objectivity,” as Adorno called it, by exploring a potential *extrinsic* backdrop for a piece’s series.

In “...*how time passes*...” Stockhausen analyzed what he called order-relationships in time with the intention of providing a corrective to prevailing rhythmic procedures in serial composition.⁷ Like Hindemith’s *The Craft of Musical Composition: Book I*, Stockhausen’s *how time passes* sought justification for creative method in quasi-scientific reflection on acoustic perception. Even the volume’s title, *Musical Craftsmanship*, reveals some kinship to Hindemith’s text. Stockhausen links the musical parameters of pitch, rhythm, and timbre, by showing how all three articulate “periodic or aperiodic phase-groups;” that is, they can be described as pulses of varying degrees of evenness at different scales of temporal measurement. At the level at which we perceive the alternation of sound and silence to be a rhythm, we would call such ‘phase-groups’ duration(s); if sped up considerably, we would recognize them to be pitch or noise. “Thus the transition from one time-area to another,” Stockhausen writes, “causes a change in our perception of phases [this alternation of sound-silence, not the usual sense of a

⁷ Karlheinz Stockhausen, “...how time passes...” *Die Reihe: Musical Craftsmanship* English edition (Bryn Mawr, Theodore Presser, 1959)pp.10-41.

property of a waveform]. This observation could form the basis of a new morphology of musical time.”⁸ Stockhausen’s observation provides a model for hearing pitch and timbre as independent quasi-spatial forms.

Such an extension is not far from *Klangfarbenmelodien*. But whereas Webern is overtly metaphorical when he says of thematic development in his analysis of Schonberg’s Op. 11, that “...to develop is to lead through wide spaces,” Stockhausen claims justification in acoustic perception for his spatializing concepts.⁹ The objective rationalization of creative process sought in such quasi-scientific treatments of musical material in much of the postwar music, struggles to manifest the music-as-space metaphor as something literal, empirical. Webern’s idea of “wide spaces” acknowledges a musical space of tones. He would have called such a space “pan-tonal” perhaps, one in which stretched motives appear to traverse “wide spaces.” In Webern’s phenomenal space of tones, the perception of movement remains and is possible, he believes, without tonality. Serial procedure in Webern would explore an intensification of stasis, where intervals and timbres are fixed in register (thus emphasizing the *outer morphological*). The Darmstadt composers extended this technique to other parameters. Listeners would have to regard *form-intrinsic* articulations of musical space (derived from pre-compositional procedures) as relating to the *extrinsic* background (previously ignored) provided by physical participation of listeners, performers, and their locations, etc. (the *outer morphological* spaces). This would accompany a shift in musical value (or a reluctance to shift) as Scruton’s critique characterizes:

⁸ Ibid, p.11.

⁹ Anton Webern, *The Path to New Music*, trans. W. Reich, (Bryn Mawr, 1963) p.57.

The interest of more recent experiments in atonality often resides in novel sonorities, organized in ways which do not permit experience of musical movement. Music then retreats from the intentional to the material realm; and what we hear in hearing Stockhausen's *Gruppen*, for instance, is precisely what we do not here in a Beethoven symphony: a series of sounds, produced by many different sources in physical space, as opposed to a movement of tones which summon and answer one another in a space of their own.¹⁰

¹⁰ Scruton, p.281

The outer morphological form-extrinsic role

Stockhausen's interest in the spatialization of sound reached a high point during the 1970 World Fair in Osaka, Japan. For this event, Stockhausen was commissioned to collaborate with an architect to create a spherical hall seating 600 people on a platform in the middle. There were speakers all around: seven circles from bottom to top, three below and four above the platform, arranged in ten vertical rows around the audience. Performing for several hours per day for over a month, Stockhausen claims to have performed for close to a million people during the fair. (The Stockhausen myth with all its Wagnerian echoes probably began around this time). His participation in the Osaka World's Fair is a kind of installation. Musical space is a material, literal realization that one *enters into* rather than *imagines*.

Abandoning traditional harmonies and gestures early in his career, for Stockhausen, meant freeing musical space from what he found to be the fixed perspective of the traditional concert format as well. In the 1950s he had wished to place musicians in moving chairs to be rotated and lifted around the concert hall! The traditional placement of musicians was limiting:

Musical space has been fixed in the Western tradition, for as long as musicians gave up running through the woods for sitting on chairs on a stage. The function of space has been neutralized in Western music.

His statement reveals the degree to which *musical space* and *music-and-space* are linked in his conceptual vision of music: musical space = music-and-space. One might argue, on

the other hand, that musical space in the Western tradition has compensated for the fixed nature of performance spaces through harmonic and timbral invention—a kind of highly stylized aural-spatial illusion.

Helicopters in musical space

Stockhausen's *Helicopter Quartet* emphasizes real space as musical material, while at the same time, explores the pitch-as-space metaphor, though in a curiously conceptual manner. The piece is scored for string quartet and four helicopters (each player playing inside a separate helicopter), performed at its premiere in 1995 by the Arditti Quartet together with an elite unit from the Dutch Air Force known as the *Grasshoppers*. The audience inside the auditorium saw projected video images of the airborne helicopters flying outside, and heard, recorded by microphones, the helicopter's motor sounds blend with modulating tremolos bowed by each string player inside a cockpit. The *Helicopter Quartet*, like its counterpart *Outer Space* performed in a planetarium, is a fragment from *Licht*, the cycle of seven operas that has occupied Stockhausen since 1977. While many works by Stockhausen have depended on the physical motion of a sound source (e.g. the rotating amplifier in *Sirius* that proved too dangerous to continue using), none have required large motors struggling against kinetic and gravitational forces in such an expanse of space. Why did Stockhausen need live helicopters for this sonic effect?

The piece begins with a glissando-like sound made by the ignition of helicopter motors, a sonically familiar gesture in his music, not unlike the one synthesized for the opening of *Sirius*. Stockhausen has stated his preference for synthesis over sampling, yet on occasion he has employed pre-recorded “real world” sounds such as the lion’s roar in *Der Jahreslauf* or the anthems in *Telemusik*. Pre-recorded motor sounds have played a part in new music performance since Antheil’s *Ballet Mechanique*. Why are they not employed in this instance? Is it only for the sake of the considerable theatricality the four helicopters would bring to the performance?

That a real world sound in a piece of new music might refer to its cause, marks a departure from the purely formal status such sounds possessed in *musique concrete*. Stockhausen had once preferred that real world sounds be experienced without reference to their role in reality. While the theatricality of his later works had softened this stance (in *Der Jahreslauf*, real world sounds function as symbols for “temptations” that interrupt the “course of time”), he is nevertheless careful in *Helicopter Quartet* to limit the work’s theatricality. The realism of the helicopter sounds is integral to the entire form, not simply punctuating the texture as in *Der Jahreslauf*. The “performance space” of the helicopters, of great theatrical potential, is nevertheless removed from the space as occupied by the audience. The audience is not outside hearing the instruments in a specific place as they do in *Sternklang*, with five instrumental groups widely separated in a park, or in *Musik für ein Haus*, with instruments in different rooms. The listener’s physical motion in space, so important in those earlier works, would be irrelevant since

they would be unable to hear the quartet inside flying helicopters. Nor does Stockhausen simply choose to project sounds and images of flying helicopters in a performance setting with a live string quartet on stage, which would be adequate to suggest symbolic connections between sound and image.

Despite the spectacle of the four helicopters, both the realism of the helicopter sounds and the role of space (i.e. air) in the *Helicopter Quartet* are less about theatricality than they are about sound. The listener is meant to hear the instruments as played *inside* the helicopters, their music contingent on specific, though changing, physical conditions. The intonation of the individual string player (though they *can* hear each other through headphones) is determined in part by the sound of the helicopter in flight, modulating in pitch according to the helicopter's speed and direction in space.

The music relates a complex of spaces in *Helicopter Quartet*: the space where the helicopters fly, the cockpits where the players play, the concert hall, and the abstract musical space in which all the sounds are mixed. Stockhausen has used space as a compositional resource, but unlike *Sternklang* and *Musik für ein Haus*, in *Helicopter Quartet*, changes in pitch provide the central document for changes in musical space, and the videos just tell us how these changes are executed. In this work, a space articulated by pitch is determined by the actions of bodies in physical space yet is witness in another space; that is, it is placed within a mix and projected into the concert hall. The Doppler effect as a trace of physical motion is removed from the mix (since the helicopters are not recorded from a single point) further emphasizing the role of the helicopters as pitch-

producing instruments moving in a *musical space* (i.e. an *inner morphological space*) as well as real space. Real space is sonically traced by the motor sounds as they traverse the sky.

The role of spatialized sound and movement in Stockhausen's *Helicopter Quartet* is quite different from the same kind of effects in a piece like *Gruppen*, a work which Scruton found to be overly concerned with the 'material realm.' As many scholars on Stockhausen have noted, in the years in between these two pieces, Stockhausen became more and more concerned with mystical and/or symbolic aspects in music. But even without considering the symbolic meaning in terms of the specific narrative the helicopters might provide, the displacement of the helicopters from the musical space mixed in the concert hall, allows them to relate to pitch in a kind of symbolic fashion. It is a kind of a sign-signified relationship in which one component is not clearly the sign for the other. The helicopters are not just symbols for the slow glissandi contours in musical space played by the strings; they participate in the overall production of such sounds. The helicopters and strings mix to form a hybrid instrument that moves in a hybrid musical space. The “/” in the *musical space/music-and-space* is not so much erased as it is blended and reflected in different domains.

I see the link between motion, metaphor, and pitch-space in the *Helicopter Quartet* as a later development in Stockhausen's work. Instead of pitches being discrete points in space or moving through space, motion is tracked in a one-to-one relationship between real space and musical space. I see this blending of *musical space/music-and-space* as a

departure from what Scruton regarded as the solely material nature of musical space in a piece like *Gruppen* towards a more symbolic or imaginary musical space. The effects of real space (gravity and air) on the helicopters participate within an *inner morphological* space of register, and register becomes not simply a question of a high and low value, but is associated with motion and effort in physical space.

I am listening in a room

When I introduced the *extrinsic/intrinsic* opposition in the previous chapter, I stated as an example that the resonance of a hall is typically an *outer morphological* space that is *form-intrinsic* to a given experience of a specific performance in a specific place. This was to distinguish among *outer morphological* spaces and the various *extrinsic/intrinsic* roles they could play. This particular distinction depends more on an analysis of perception than composition. Listeners can choose whether or not to consider the resonance of a hall as *intrinsic* to their experience. Typically, the hall is ignored, or is certainly considered *form-extrinsic*. But boundaries between the *form-intrinsic* and *form-extrinsic* can be redrawn in the creative act of listening, performing, and treating musical space as a compositional resource; the *extrinsic/intrinsic* roles can switch. With the Cage, I argued how time and space reversed their typical roles. Time, typically *form-intrinsic* and unique to specific piece/performance/event is bracketed as *form-extrinsic*, and made a fixed index by which to highlight the details of a given space.

Alvin Lucier's *I Am Sitting in a Room*, written for spoken word on tape, plays on an oscillation between *extrinsic/intrinsic* roles as applied to the *outer morphological* space of location, in this case a room in Lucier's house. In *I Am Sitting in a Room*, recorded speech is played back and re-recorded, each generation reinforcing the resonant frequencies of the room in which the piece was produced. A given generation becomes a variation of the previous one changed by the reinforced resonances, transforming the spoken text step by step into what Lucier calls "pure sound". "I am sitting in a room," Lucier tells us in the spoken text, "different from the one you are in now." We are not meant to regard the recording as merely a simulation of someone speaking in our midst. The space in which Lucier speaks is to be noticed, not for any special social, personal, or historical reason, but simply for physical attributes that are 'different' from those of the listeners' space.

The natural resonant frequencies of Lucier's room are articulated by formants shaped by the vowels of his speech. After several generations, the recorded speech becomes incomprehensible as speech, turning into something rather like a melody with a slightly changing timbre and emphasis with each variation. Lower and weaker frequencies become reinforced with each generation eventually resulting in a kind of arpeggio of the harmonic series while at the same time, the complex irregularities of the consonants in the speech are suppressed with each pass. During the second half of the recording we are unaware of speech at all.

Lucier tells us in the spoken text that he “regards this activity not so much as a mere demonstration of a physical fact, but as a way to smooth out any irregularities [his] speech may have.” Yet the text as such is unimportant; it is a control in an experiment. He does not call the piece “I am *speaking* in a room.” It is as if each recorded generation removes the speaker bit by bit until we are left with space articulating space—with space as the subject. “The space acts as a filter; the speech is transformed into pure sound,” he writes on the record cover. The space of the sound (i.e. where it happens) elides slowly into a musical space of changing contours of pitch and timbre. “Musical space” directly results from the context of performance, the room in which Lucier is sitting. We become less aware of a realistically rendered space in which a recorded voice speaks. We focus rather on a “pure” musical sound projected into *our* listening space.

The piece was made in 1970 for an art installation at the Guggenheim Museum, at a time when process alone could be the concern of a work of art—the product only a document of that process. Lucier’s stated aim was to turn speech into “pure sound,” not into melody per se. The recorded version however (made in 1980), contains many more variations/transformations of the sound; we are clearly meant to put on “musical ears” to evaluate a continuation of the process. The piece is similar to the Stockhausen and Cage works discussed in that it draws *outer morphological* characteristics into an *inner morphological* play of melodic gestures. Yet it plays a curious game with *intrinsic/extrinsic* oppositions. His speech (a seemingly neutral control in the experiment) excites a wind-chime of tones and evolving timbres created by physical

factors that are *extrinsic* to the *form-intrinsic* phonemes of the words he chose. His room, however, is a unique space and is arguably as *form-intrinsic* as the phonemes.

Indeed, space is not a neutral element in the listening act and composers like those I have mentioned wish to make it a compositional resource by fashioning it as *extrinsic* but not ignored. Stockhausen and Berio (and to a lesser degree, Cage and Lucier) hope we as listeners perceive distinctions between *form-intrinsic* and *form-extrinsic* spaces in the *outer morphological* domain as we might given a more traditional *inner*, “phenomenal-motion-of-tones” type of musical space. But Lucier’s piece leaves us with some questions: is *I am Sitting in a Room* interesting because it is “musical” in the sense that the excited resonances seem melodic or are we simply attracted to the process of the sound’s metamorphosis? The harmonic series is not “musical” without a cultural context that deems it so; it has to be “excited” or “reinforced”, like Lucier’s room, in a meaningful way. Nor is metamorphosis “musical” without a suitably “musical” index that measures change (ordinary time was not musical enough for Morgan). The harmonic series does consistently maintain an *extrinsic* role in Lucier’s piece; we hear it long after we have forgotten the room in which Lucier was speaking. The intensity of intrinsic/extrinsic oppositions among the various spaces (“musical” and real, *inner* and *outer*) that I have sought to classify are not uniform. As composition continues to alter the musical space metaphor the success of rendering a sense of inside/outside, intrinsic/extrinsic will continue to be disputable.