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Musique Concrète Revisited

Chris Mercer

Our conception of what constitutes a musically meaningful sonic event has expanded dramatically as access to sound itself (via reproducible recorded media) has improved and as the tools for sound manipulation have grown increasingly sophisticated and user-friendly. It would seem that our ability to aestheticize natural (or ostensibly non- or extra-musical) sounds is at least partially a function of enhanced direct *physical* access (via digital or analog means) to a vast array of sound sources. Of course, complex sound phenomena beyond the limited domain of vocal/instrumental sound production have always been accessible to musicians; we are (and have been for millions of years) surrounded by such sonic phenomena on a daily basis and many are easily harnessed for compositional use even without the aid of advanced technology: glass is there to be broken, leaves to be crushed, water to be splashed or poured, etc. But it was not until virtually the entire world of sound, natural and synthetic, was placed quite literally at our fingertips (whether tape and razor blade or computer keyboard), that serious inquiry into the possibilities of compositionally functional sonic morphologies began in earnest. The Cageian notion that any sound or sonic environment, in order to *be* music, need merely be *framed* as such by the listening imagination, might be viewed as an apocalyptic revelation--it threatens to render obsolete (perhaps even slightly absurd) any neurotic composerly preoccupation with strict parametric control or morphological organization. The real import of John Cage's revolutionary insight, however, is that it brought to musicians' attention a common, and presumably ancient, mode of audition. Cage simply created a bridge between the natural, innately human appreciation of sound for its own sake (birdsong, the bristling brook, the howling wind, a beautiful speaking voice, an unusual animal vocalization, etc.) and the more narrow range of combinatorial possibilities associated with conventional composed and improvised vocal/instrumental music. With this aesthetic bridge in place, technological innovation has given concrete, pliable form to this mental framing process. Rather than having to seek out (or simply accept a la *4'33"*) a sonic environment that might elude our conscious control, musicians have the tools to harness, juxtapose, or transform the elements of sound in ways that are otherwise physically impossible. While such a re-exertion of compositional control over newly emancipated complex sound phenomena may run counter to the stated philosophical aim of Cage's work, it would appear to be a natural outcome of the encounter between our inherent aesthetic framing faculties and the vast array of new music technologies and compositional paradigms that have emerged since the late 1940's.

Nowadays, pop musicians and sound designers routinely employ sonic bricolage, often with considerable technical skill and creative sophistication. In Hip-Hop especially, where bricolage techniques appeared initially out of economic necessity, musical/sonic appropriation in the form of digital sampling has introduced the general public to a rich post-modern musical vocabulary that is, increasingly, taken for granted. The commercial proliferation of both aestheticized noise itself and of its accompanying production (and reproduction) technologies has broken down many of the barriers between musical comprehension and pure sonic appreciation (despite, unfortunately, giving rise to a whole

new set of stubbornly Pavlovian cues and expectations--witness the use of LP pops and scratches to *signify* appropriation in sample-laden pop music or the marketing of rainforest recordings to cue relaxation).

The effects are cognitive as well as purely aesthetic. Digital technology allows us to codify and quantize micro-divisions of time (down to the sample rate) and thus we are able to think in unprecedentedly precise terms about the placement and evolution of sonic events on a high resolution time-point grid. Working with digital editing software, one discovers very quickly that a millisecond can make an audible difference in the musicality of an edit point. The same degree of specificity applies to the frequency spectrum--micro-specification of pitch or spectral content is not only feasible, but easy. Most importantly, the technology enables us to *hear* this newly acquired precision realized as actual sound, resulting in a kind of creative biofeedback between the composer and computer. Regardless of whether such extreme precision can ever be literally, physically reproduced by a human performer reading from a score, the damage, as it were, to the composing imagination is already done. As a result, a new domain of quasi-obsessive aesthetic criteria have emerged for those composers and performers unable to dismiss the purely cognitive aspects of the new technologically engendered plasticity of the sonic-mental space. What we can quantify, codify, and execute as sound, we can also *conceptualize*. The temptation to pass along this information to the performer is, for some, too great to resist. Assuming an ethically sound compositional approach in conjunction with a responsible performance practice (admittedly, not always safe assumptions, but nevertheless...), surely the notational representation of such information will prove useful both to the executant who attempts to interpret and realize prescribed morphological features and to the analyst who attempts to decode and discuss them.

I would identify three significant trends in contemporary music that inform my personal approach to the problem of defining a set of analytically functional morphological categories and an attendant combinatorially abundant compositional syntax: 1) The line of development beginning with Pierre Schaeffer's pioneering efforts to devise an analytically-derived sonic syntax for musique concrète and manifested most recently in the work of the so-called spectro-morphologists such as Denis Smalley, Jonty Harrision, and Trever Wishart. 2.) The Lachenmannian *musique concrète instrumentale*, with its emphasis on the classical instrumentarium and the live performer, and its powerful social ramifications. 3.) The revolution in notational exactitude (the idealistic projection of pre- and paracompositional decision-making onto the score) found in the complexist movement.

According to Peter Manning, in the books *À la recherche d'une musique concrète* (1952) and *Traité des objets musicaux* (1966), Pierre Schaeffer documented his extensive studies of sonic morphology. The organization of *objets sonores* into an exhaustive set of morphological categories was proposed initially as 25 general definitions subdivided three primary aspects of musique concrète: 1.) Classification of sounds themselves. 2.) Classification of sound transformation techniques. 3.) Macro-structural processes relevant to the final stages of composition. In one of these initial definitions, Scheaffer proposed three plan *plans de référence* with a subset of 33 morphological criteria. As Manning notes in *Electronic and Computer Music*, "These 33 criteria, for all their generalities, provide for some 54,000 different combinations of sonological

characteristics, a daunting indication of the scale of the task facing any prospective morphologist."[1] Indeed.

Building on Schaeffer's early efforts, the spectro-morpholgists have developed a sonic language based primarily on the inner detail and temporal evolution of sound--its spectral envelope--that encompasses the entire range of Schaefferian *objets sonore*...and then some. The flourishing of this approach is engendered largely (though not solely) by the advent of digital signal processing techniques based on the Fourier Transform, which allows sounds to be deconstructed into readily manipulated stacks of sinusoidal components spaced evenly across the frequency spectrum. Theoretically, *any* sound can be subjected to this analysis process and reconstituted with or without the application of intervening transformative functions to the component sinusoids. In practice, it is not so straightforward, since sine tones, even thousands of them, cannot accurately reproduce noise components and the windowing process required for spectral analysis can interfere with the reproduction of transients. But as a model for understanding sonic objects, both natural and synthetic, the revelation provided by FFT-based analysis/resynthesis is invaluable, and the work of the spectro-morphologists gives philosophical substance to the technological innovation. (I should point out that, while FFT-based processing provides the most obvious implementation of a spectral approach--since it provides direct, microscopic access to the components of the spectral envelope--pure digital synthesis (FM and additive), granular synthesis/soundfile granulation, and linear predictive coding have also contributed greatly to the spectro-morphological conception of sound.)

In "Defining Transformations," Denis Smalley distinguishes between *source-bonded transformation*, "linked to identifiable, transcontextual source-causes," and *spectro-morphological transformation* "where extrinsic links and source-causes are imagined, imaginary, or seem so remote that they appear non-existent."[2] Smalley makes a distinction, in other words, between sonic behaviors that are literally traceable to known or surmised sources and those that act as (possibly mysterious) projections of compositional processes or abstractions. This is a crucial realization for concrète compositional practice, since the perception of sounds is complicated by their separation from the visual or other stimuli to which they are normally linked, and since so many electro-acoustic works derive formal meaning not only from the juxtaposition of identifiable sound objects, but also from variation in the degree of transformation applied (which has a direct impact on source recognizability).

The work of Schaeffer and his heirs is not limited to the external world of sound *production*, but extends into the internal world of sound *perception*. Schaeffer examined and classified the various modes of listening, and in so doing revealed one of the primary perceptual pitfalls of pure musique concrète. Of particular importance in this discussion is the concept of "reduced listening" and the complexity of its interaction with the other, less cultivated, listening modes. Reduced listening is essentially morphological listening. It is the mode in which pure sonic structure attains perceptual primacy and it requires the

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[1] Manning, Peter. *Electronic & Computer Music*, 2nd ed. Oxford: Clarendon Press, 1993, p. 40.
[2] Smalley, Denis. "Defining Transformations," *Interface*, Vol. 22, 1993, p. 282.

listener to effect a conscious rejection of certain ingrained responses to sonic stimuli. For example, if I encounter the sound of a cricket in a musical composition, my initial reaction will probably be to note that it is in fact a cricket sound--in other words, I am engaged in *information-gathering*. Next, I may ponder the narrative or poetic significance of the presence of an insect in the work. What does the piece have to do with insects? Or I may react to the cricket sound as a signifier of night. Is this part of the compositional narrative now taking place at night? These sorts of reactions follow naturally from the evolutionary functionality of human audition. But reduced listening necessitates the cultivation of an off switch for these kinds of reactions--we may choose to toggle the switch or to recognize gradations between modes, but it is perceptually important for musique concrète that this off switch be readily accessible. In the reduced listening mode, the cricket sound might be perceived as a series of rapidly iterated high-pitched impulses, at the edge of fusion into a unified timbre; furthermore, once the sound's morphology is thus derived, its macro-structural/contextual significance might also be considered. For most people, reduced listening can only be achieved with considerable practice and education and even then it may feel a bit funny: If I hear the sound of a rattle-snake, my autonomic system is going to have a hard time ignoring what, to any reasonable autonomic system, is a significant danger signal. Reduced listening also poses a significant cultural challenge. I may, for purely specto-morphological reasons, include a sitar sample in my concrète composition. But how many listener's will be able to dissociate that sound from its essential Indian-ness? And how many Western listeners would face the additional challenge of dissociating it from its Indian-via-60's-rock-ness? Indeed, this critique needn't be limited to musique concrète. Much contemporary instrumental music requires a special form of culturally reduced listening. The aforementioned public acceptance of new sounds or of newly musically appropriated sounds, and their incorporation into art and culture, is often highly conditional. For many uninitiated listeners, dissonance itself is a kind of danger signal and many of the textures associated with contemporary music have taken on distinct pop culture associations. In Hollywood film music, for instance, the "pizzicato cloud," first heard in compositions by Ligeti, Xenakis, Penderecki, etc., seems almost invariably to signify insect activity. For that matter, all kinds of music seem to accumulate culturally indoctrinated socio-economic associations that tend to act as barriers against the "pure" appreciation of musical/sonic information content.

In "The Listening Imagination: Listening in the Electroacoustic Era," Smalley addresses this problem using what he calls *transcontexutal interpretation*: "In transcontexts the composer intends that the listener should be aware of the dual meanings of a source. The first meaning derives from the original, natural, or cultural context of the event; the second meaning derives from the new, musical context created by the composer." Hence, the composer may assume gradations of source-meaning or parallel source-meanings. In the same article, Smalley elaborates on the problem of reduced listening, which he re-interprets as *interactive listening*:

> The interactive listening relationship is indeed a specialized acquisition which lies beyond the competence of most listeners. Yet it can be acquired by non-composers who become familiar with electroacoustic

> styles, and who are prepared to deepen their acquaintance with a work through repeated listenings which draw the attentive ear into interactive searching once the essence can be taken for granted. But how often does the expert listener, including the composer-listener, get that far into a work? I regret to say that as a listener I rarely do or feel the need to do so, and I suspect that in the end the composer is an interactive listener for his or her own music but less so for the music of others.[3]

Although we may not wish to pander to public perceptions born of ignorance (I, for one, will not let Bugs Bunny ruin Wagner!), we probably do not wish to labor in ignorance ourselves or, worse yet, force it on ourselves. It is important to note that much musique concrète has a strong surrealist flavor, verging on the hallucinogenic. The rapid juxtaposition of sounds not usually found under the same roof makes a general impression that is highly poetic in nature, however rigorous or analytical the foundations of those sounds' context-specific combinatorial framework. We will naturally tend to consider not only the morphological features of a series of discrete sound objects, but--insofar as we recognize the sound sources involved--their immediate poetic-semantic implications as well: How can we turn off the extra-musical relationships between a doorstop, a violin, and a spinning pot? And is it even desirable to do so; would we thus not deprive ourselves of a rich, emotionally charged aspect of the listening experience? As noted by Smalley, the transcontextual identification of sound sources is a complex process, involving the utilization *in degrees* of several listening modes at once. Trevor Wishart writes:

> ...the surrealism effect is usually quite different in the sphere of sonic art to the same phenomenon in the visual arts. Normally speaking in a surrealist painting, the juxtaposition of everyday objects in an "unnatural" way does not interfere with our recognition of the individual objects...In sonic art, however, this kind of juxtaposition may make it difficult for us to identify the source of the sounds, to recognize the individual objects.[4]

This article is primarily concerned not with electronic music, but with my recent instrumental music. However, it is largely through the creation of electronic music and engagement with its myriad practical and aesthetic dilemmas that I have arrived at my current approach to live acoustic music, which is at the time of this writing my primary creative preoccupation. Many composers have been thus influenced by their encounters with electronic music. Certainly the flourishing of the classical electronic studios in the 1950's had a profound and explicit impact on composers such as Ligeti, Xenakis, Penderecki, John Cage, and many others, who sought new approaches to the classical instrumentarium to reflect their newly expanded sonic horizons. But while electronic

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[3] Smalley, Denis. "The Listening Imagination: Listening in the Electroacoustic Era," *Contemporary Music Review*, Vol 13, Part Two, 1996, p. 106.
[4] Wishart, Trevor. *On Sonic Art*, Harwood Academic Publishers, 1996, p. 150.

music changes and complexifies our relationship to sound and redefines our aesthetic boundaries, giving us unprecedented access to and control over sonic objects, it is not a panacea. For one thing, the perfect reproducibility of tape music is both a boon in its reliability and sculpture-like permanence, and a severe limitation, bypassing as it does the live performer. For me, creative interaction with performers is an indispensable aspect of music-making. My recent instrumental compositions typically do not reach final form until after the process of mounting a live performance. Real-time computer music is a promising, but for now, highly problematic solution to this dilemma. Despite some considerable bright spots, especially in the domain of improvised music, real-time processing is (for the time being) too computationally expensive and logistically unpredictable. And composed real-time music, although admirable in its efforts to incorporate the energy of the live performance and to overcome the sometimes stale quality of the performer-plus-tape paradigm, still bears the burden of justifying its use in place of the more reliable and less computationally limited pre-made tape part. Composers who lack the technical prowess to implement sophisticated algorithmic or stochastic processes often attempt to validate the real-time paradigm via the use of stock random number generators which, unfortunately, usually have a distinctly clichéd sonic signature. Far worse are the many glorified guitar effects pedal real-time pieces (both composed and improvised)--digital effects processing on live sources that could have been implemented with greater sonic elegance (if with greater inconvenience or expense) in the analog domain. This field is still very young, however, so these remarks are provisional.

In searching for models that combine the morphological mentality of musique concrète with the musically galvanizing and interpersonally satisfying experience of live performance, I am led immediately to Helmut Lachenmann's *musique concrète instrumentale*. By developing a large set of sound objects, many hitherto unexplored, out of the classical instrumentarium, Lachenmann's music proposes a live acoustic alternative to Schaeffer's tape-centric conception of sonic morphology. But the underlying organizational principles in Lachenmann are distinctly different than in classical musique concrète and the resulting philosophical implications are nearly opposite, deconstructivist rather than constructivist, certainly never surrealist. Lachenmann uses the sounding bodies of musical instruments not only as concrète sound sources, but as the site of an astute socio-economic critique. The classical tradition is thus shot with its own gun, its underlying assumptions of privilege and exclusion exposed in a systematic negation of its own sonic and structural norms. (To be fair, this philosophical approach is true primarily of Lachenmann's work in the late 60's and early 70's. Since then, he has reincorporated various elements of the classical tradition--with no loss of insight or vitriol--while in the meantime many distinctly Lachenmannian extended techniques have been accepted both by the composer himself and many younger composers as beautiful in their own right, even if their origins were in the negation of conventional notions of musical beauty.) *Musique concrète instrumentale* has another essential feature that addresses problems inherent in the tape music model. In its insistence on the experiential relevance of being in close physical proximity to actual acoustic sounding bodies and of witnessing firsthand the interaction of concrete materials, it overcomes not only the energic shortcomings of mechanical reproduction, but also the fidelity loss inherent in reproduced, rather than

directly auditioned, sound. Furthermore, the disorienting causal disconnect between physical gesture and resultant sound object, necessarily an aspect of acousmatic music, is obviated (though, admittedly, acousmatic disorientation is not without some interest).

The restless mining of conventional instruments for new sounds or modes of expression has become a sine qua non of musical progress in my recent compositional practice. Though I certainly do not demand it of others, I find it unavoidable in my own work. That such efforts involve a critical rejection of western music's extensive and sometimes pernicious socio-economic baggage is something I regard as implicit in such work and not something I seek to problematize or foreground.

The most overt example to date of my concrete-influenced approach to instrumental music is the work *Untitled* (2001) for Accordion, Banjo, Piano, and Percussion. Sonic/gestural morphology at the local level is preceded by the establishment of a set of four broad categorical abstractions:

Category 1- Continuous iterative behaviors, speed change by interpolation, notated in Hertz (number of iterations per second). Examples include: a length of wire spun through the air, the ridges of a coin against banjo strings, the movement of a plectrum over roundwound (lower register) piano strings, ratchet.

C2- Sustained (non-decaying) complex tones, sometimes displaying incidental melodic behaviors. Examples include: accordion tone clusters, tape feedback, bowed cowbell, rubber ball on the banjo head.

C3- Inertial, gravitational, or other difficult to control behaviors, consisting of causally-linked groups of attacks, and characterized by naturally uneven rhythms, and moving in pitch-area plateaus. Examples include: bouncing balls, popped packing bubbles,

C4- Non-iterative pitch contours, such as runs or melodic figures, containing expanding or contracting intervallic content (irrespective of direction), with pulse rate changes occurring by interpolation or succession.

In addition, a variety cross-syntheses between these categories are taken into account, with the option of either weighting the resultant hybrid toward one or another category or effecting an interpolation from one to another. Features of one category can be grafted onto another or one category can simply "morph" into another. Also, some behaviors can, in special cases (for instance, in the case of a conflict between syntactic requirement and performative feasibility), cut across categories--this typically involves behaviors at the edges of categories, such as the bouncing ball whose behavioral characteristics lie primarily in the domain of C3, but bears a superficial sonic resemblance to C1.

So, at the highest level, morphological categories are defined primarily as abstractions (albeit ones with inherently gestural implications). A quasi-serial prescriptive syntax is used to order and layer these categories. At the local level, precise morphological parametric features are determined by the interaction of the categorical syntax with:

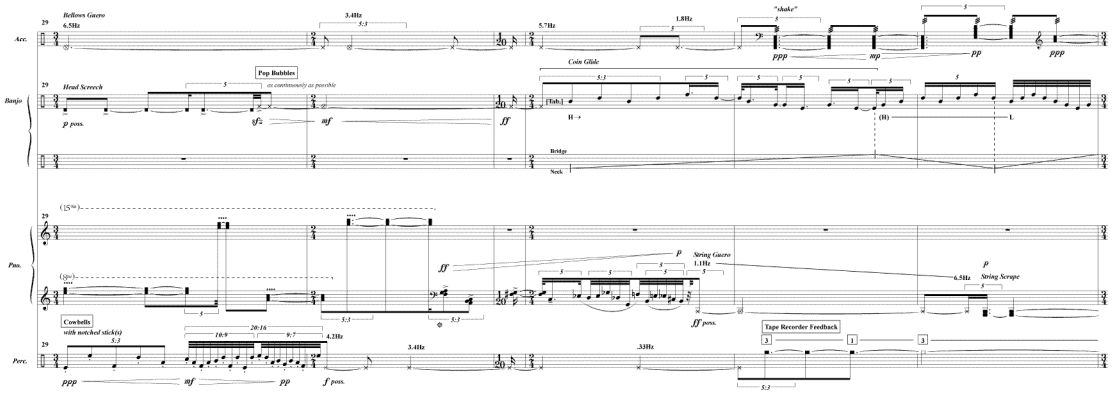
1.) A largely predetermined temporal structure that derives time windows for morphological change (macro and micro), pulse rate changes, number of onsets per pulse rate, and global time-point distribution/duration of morphological categories from a set of permutable/transposable logarithmically related proportion sets. The tempo is mm=60 throughout, so that measurements in minutes and seconds can be transcribed directly into rhythmic notation.

2.) Physical constraints on the performers. The music moves swiftly and the performers are besieged by rapid changes of playing technique and physical disposition. So in considering which local instantiation of a given category to apply, it is necessary to take into account what is logistically possible for a player at a given moment. The inevitable tension between this and the demands of syntactic and other considerations often requires novel solutions by both the composer and the performer. In fact, forcing behaviors onto instruments that have no idiomatic means of realizing them amounts to a form of development or processing in this context, since the syntactic requirement is fulfilled via the separation of a behavior from its usual physical/gestural attributes; it must be imitated, sometimes awkwardly, by the "wrong" instrument or playing technique and undergoes transformation in the process.

3.) Intuitive control over the amount of categorical variation that must apply for the music not to become overly repetitive or stagnant. That is, sometimes the solution that works best logistically is unacceptable aesthetically because of the danger of morphological overuse. Mine is an aesthetic of constant morphological variation, so this is a crucial consideration. Periods of categorical stasis appear in the work, but they are treated as special expository plateaus. Also, where the syntax demands highly polyphonic textures, problems of masking must be addressed.

The following excerpts demonstrate how these principles play out in the composition.

Example 1.



Mm. 29-34 consists of four simultaneous categorical strands in "pure" states, with slow, independent rates of change. **Accordion** begins with C1, a plectrum dragged across the bellows. Changes of pulse rate are notated in Hertz. At mm. 33, accordion switches to a tremolo tone cluster, an example of C2. **Banjo** begins the passage with Head Screech (rubber ball on banjo head), or C2, moves to Pop Bubbles, or C3, and finally at mm. 32, glides the coin over the strings in an instantiation of C4 (actually, a C4-weighted hybrid--the coin glide sound itself is C2, but the figural behavior is C4). **Piano** begins with slowly bounced balls (bounce speed "3" carries over from previous page) in the upper register, an example of C3 (note that the intervallic expansion/contraction of C4 is applied to the movement of pitch area plateaus). At the end of mm. 30, piano takes up a melodic burst of C4. (Note: the piano has been prepared by muting a substantial portion of the lower register, hence the notated pitches in this passage do not sound as written.) At the end of mm. 32, String Guero (movement of the plectrum across roundwound strings) instantiates C1, with a pulse rate interpolation. Finally, in mm. 34, the pianist applies a String Scrape to a block of strings, an example of C2. **Percussion** begins with melodic activity on the cowbells, C4. In mm. 30, the notched sticks (grooved wooden dowels) are dragged across the lowest cowbell at the Hz notated iteration rate, C1. Finally, in mm. 33, the percussionist takes up the handheld tape recorder, to produce controlled feedback, C2.

Before moving on to other excerpts, I would like to address a few of the work's notational features. As mentioned above, I have adopted a certain notational idealism in my recent scores, intended to provide performers not only with a direct sound production blueprint, but also to provide information pertaining to the underlying abstractions that shape the surface of the music. Although I have borrowed some conventions from the complexist movement, I generally do not go as far as they (not yet anyway--I will do so when/if it becomes necessary). I have also devised a number of notational devises of my own, in order to maximize the degree of morphological specificity available at the local level. The use of notation in Hz, in particular, has elicited criticism for its seemingly sunny optimism regarding performative feasibility. In fact, this notation has several notational functions. One is to illustrate the C1-ness of all passages that employ it, to persuade the performer to think in terms of continuous, periodic activity (which is usually reflected in the physical gestures to which it applies), despite its application to a variety of actual sounds. Also, by notating precise Hz values, I draw the performers' attention to precise ratios between successive speeds. It seems to me to be true of nearly all forms of rhythmic notation that *absolute* accuracy of realization is not the point; if it were, we would be content with midi realizations. Performers approximate, whether they perform Bach or Ferneyhough--that is their gift and that is what brings humanity, complexity, and individuality to their interpretations. The rhythmic notation in the quartet is intended to act as a fairly precise transcription of the compositional devices used to generate and organize the work's temporal features. The use of a click track in performance ensures that all essential time-point information (including the use of irrational meters) remains intact, despite occasional necessary approximations. With a little practice, my performers have tended to find Hz notation and other thorny rhythmic devices more intuitive than one might initially expect.

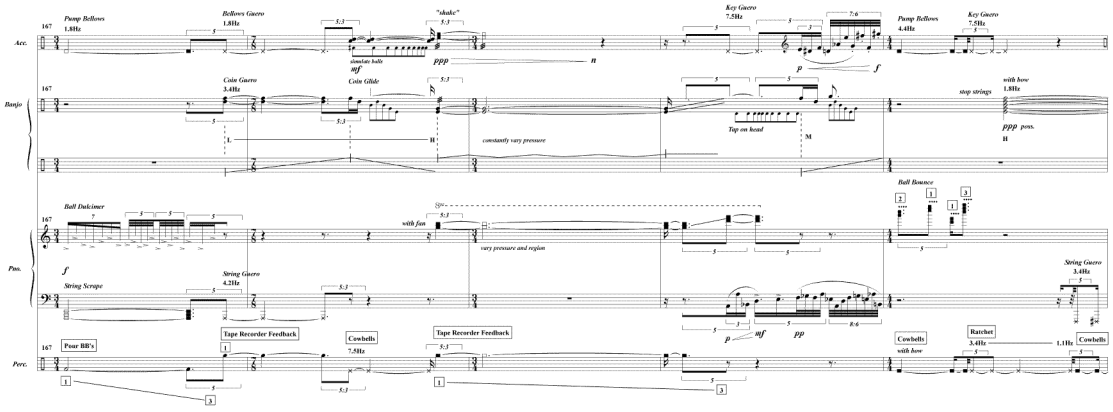
Other notational devices include: The use of numbers 1-3 to indicate various

degrees of speed or distance in some of the special extended techniques. For instance, bouncing balls are specified as 1 (tight bounce close to the sounding body) through 3 (slow, "classic" bounce dropped much further from the sounding body). Tape recorder feedback is specified as 1 (mic close to the speaker) through 3 (mic furthest from the speaker). The percussionist is instructed to pour BB's into metal cans, in which case the pour speed is specified as 1 (a mere dribble) through 3 (heavy rain). And in the banjo part, notation of coin technique specifies not only which string(s) to affect and in which direction (up or down neck) to move, but also the degree of pressure to apply (High, Medium, Low). Many of these devices also involve rhythmically precise interpolations between values.

Commentators on both sides of this issue--for and against extreme notational exactitude--seem to overlook some of its essential aspects, emphasizing either its necessity and ethical dimension or its purported decadence and self-indulgence. What is rarely mentioned is the *joy* of specificity: the loving attention to morphological detail and transcription of process on the part of the composer and the rewarding challenge (both cognitive and physical) of realization on the part of the performer. In addition, there is the interpersonal aspect, the collaboration and exchange that occurs between composer and performer as these problems are addressed in mounting a live performance, which usually results in improving the piece.

Also, in the absence of the array of processing tools available to the musique conrete computer musician, some degree of notational exactitude is required in order to impose a sufficiently varied set of ersatz processing techniques onto acoustic sound objects.

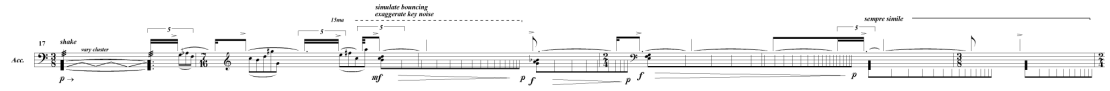
Example 2.



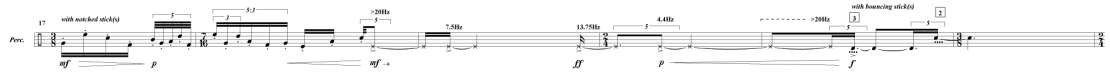
Example 2 is similar to Example 1, except that the rate of morphological change is faster and the points of change are now coordinated as tuttis. Categorical distribution within these time windows is alternately varied from one to the next. In mm. 167, all four are present; in mm. 168, only two (C1 and C3) appear; in mm. 168, ca. beat 4, all four are again present; in mm. 168, ca. beat 7 through mm. 170,ca. beat 1, only C2 appears; in mm. 170, ca. beat 2, all four are again present; in mm. 171, beat 1, three appear (C1, C2, C3); starting in 171, ca. beat 2, the instruments begin to break off into separate strands.

Examples 3 and 4 illustrate what is meant by weighted cross-synthesis.

Example 3.

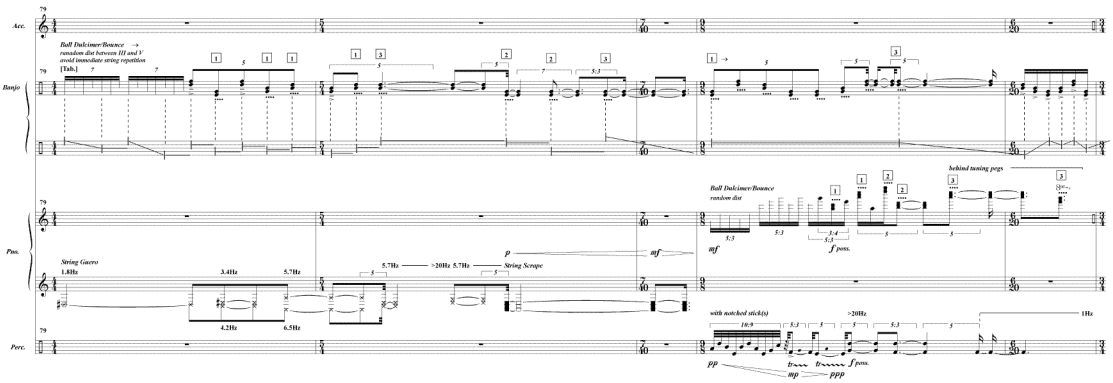


Example 4.



In Example 3, the accordionist imposes the familiar speeding up gesture of the bouncing ball, C3, onto the accordion keyboard in the form of tone clusters with exaggerated key noise. Although the dominant morphological category is C3, its imposition onto repeated accordion tone clusters implies the weak presence of C2--in other words, the rhythmic features of C3 are grafted onto the spectral features of C2. In Example 4, the percussionist, dragging the notched stick across the lowest cowbell, realizes an instantiation primarily of C1; but because the iteration rate gravitates toward higher speeds (>20Hz at the outset, 13.75Hz in the middle, and an interpolation back to >20Hz at the end), the passage is colored by C2.

Example 5.



Example 5 illustrates the morphing of categories. Throughout the passage, the banjo is engaged in a fluctuating morph between C4 and C3. In mm. 82-83, the piano effects a direct morph, in miniature, between the same two categories. In mm. 80, the piano twice morphs (as if it is hesitating) between C1 and C2 (iteration speed >20Hz). And in mm. 82-83, the percussionist performs a continuous morph between C4 (mm. 82, beat 1), C3 (middle of mm. 82), and C1 (mm. 82, ca. beat 9 to the end of 83).

Although in many respects this is essentially abstract music (in the usual sense of the term), it is conceived along a fine line between underlying formalist organizational principles and concrète-related surface features. Taken to a certain extreme, the idea of a live concrète music could easily amount to a kind of fantasy for foley artists. One could imagine a glorified radio play unfolding on stage, a sonic form narrative realism. In my

work, neither the realism of the "sound effect" nor the surrealism of musique concrète is the ultimate aim. Although the music does not, in Lachenmannian fashion, attempt to deconstruct the vocabularies of classical instruments--banjo and accordion are hardly classical instruments anyway--it does maintain the sounding body as the primary site of morphological exploration and uses instrumental physical gesture as the means to do so. In defining the quartet's superficial morphological components, Smalley's conception of dual listening modes--the "enlightened" acousmatic interpretation of transcontexts--constantly applies. A good example of this is the use of packing bubbles. Although I conceived of popped plastic bubbles as particularly exemplary of the rhythmic features of C3, this estimation is derived largely from composerly reduced listening. In performance, audiences react to them with (usually good-natured) excitement and giggling, especially in the packing bubble tutti, in which all four performers engage in a rhythmically complex bubble-hocket. As I point out in the performance notes to the piece, everyone love popping bubbles. The decision to stick with the bubbles was informed by both a purely abstract compositional consideration based on pure sonic information content, *and* on the full knowledge that packing bubbles are a readily identifiable sound source.

In other cases, the novelty of the performance situation elicits a strangely inverse acousmatic experience in which the visual accessibility of the sound production actually contributes to the listener's disorientation. The use of an alcohol-soaked rag rubbed up and down the strings of the banjo, which yields a piercing squeak, is bound to mystify many audience members *all the more* because of the on-stage spectacle of the banjo player's frantic and mysterious efforts to produce the sound and because the mode of sound production is as unfamiliar as the sound itself. On tape, it would be just a squeak.

The speculations in this paper and the trials in *Untitled* represent preliminary stages in my investigation of these complex issues. Since *Untitled*, I have produced three more pieces (for prepared piano, for 10 players, and for bass) which veer increasingly toward experimental instrument design. I fully expect that as the technology improves, real-time techniques will come to play a role in this endeavor as well. Sonic appropriation in the tradition of musique concrète remains for me a rich and enticing field of inquiry that I expect to take up in future works, both acoustic and electro-acoustic.