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Emergent Qualities of Collectively Improvised Performance

A Study of an Egalitarian Intercultural Improvising Trio

DAVID BORGIO

This article is based on ethnomusicological fieldwork with a trio of improvising musicians in Los Angeles and discusses the emergent qualities of collectively improvised musical performances. Related research from anthropology, performance studies, sociolinguistics, and most importantly the rapidly developing fields of chaos and complexity studies, supports the article's emphasis on qualitative and context sensitive analysis. Interview materials from the musicians and a transcription of a three minute excerpt from one of their performances illuminate the importance of musical interaction and emergent phenomena in collectively improvised performance.

You have improvised music where it's pretty clear what kinds of things can happen and why and when. And then you have improvised music where the fact that there's an understanding is clear, but quite how it works is moved to a level of mystery again.

— Evan Parker (Corbett 1994: 204)

When the band begins to play... this energy ["the musical force"] proceeds to that area and it says, "All right, I'm here, I will direct you and guide you. You as an individual must realize that I am here. You cannot control me, you can't come up here and say 'well I'm gonna play this'... you can't go up there and intellectually realize that you're going to play certain things. You're not going to play what you practiced... Something else is going to happen... So the individual himself must make contact with that and get out of the way.

— Cecil McBee (Monson 1991: 164-65)

Free music can be a musical form that is playing without pre-worked structure, without written music or chord changes. However, for free music to succeed, it must grow into free spiritual music which is not... a musical form; it should be based off of a life form. It is not about just picking up an instrument and playing guided by math principles or emotion. It is emptying oneself and being.

— William Parker (Such 1993: 131)

In the materials and techniques with which they constitute their provisional language, improvisers enjoy the constancy of their selfhood (that is their pleasure); in experimentation with new materials and in the encounter with other musicians, they seek its loss (that is their bliss).

— John Corbett (1995: 237)

THE paradox of developing an extensive repertoire of skills only to abandon them and oneself to intuition and risking the unknown plays a part in all forms of human improvisation, but is particularly pronounced in musical performances of collective improvisation. Although a single performer may introduce musical ideas or attempt to steer certain variables of a performance in a general direction, the details of collectively improvised music are at least equally determined by the immediate interactions between performers and the unplanned combination of musical expressions within the collective texture. The combining of musical elements and personalities through collectively journeying into uncharted musical territory provides a continual source of mystery and intrigue for performers and listeners alike. Unfortunately, these emergent qualities of improvised performance are the most difficult to discuss with the conventional tools of musical analysis and as a result have often been overlooked in the music academy.

Emergent phenomena are collective properties that may “spontaneously” develop in a collection of interacting components without being implicit in any way in the individual pieces. As Jack Cohen and Ian Stewart (1994: 232) write in *The Collapse of Chaos*, emergent phenomena are “regularities of behavior that somehow seem to transcend their own ingredients.” The study of emergent phenomena is an important component of the new sciences of chaos and complexity and has already substantially reoriented many of our common reductionist beliefs in the natural and social sciences. I believe a heightened awareness to emergent phenomena in musical and cultural studies could initiate a similar transition in the field of ethnomusicology.

Possibly the most readily apparent emergent phenomenon in music is harmony. When the tones C and E are played simultaneously the sonority of a major third “emerges” from their union, transcending the implicit qualities of the isolated pitches. Melody is also an emergent phenomenon that combines pitch and rhythm to produce a significantly different collective meaning. In fact, our conventional methodology of dissecting chords into their constituent pitches and performances into their respective individual parts and sections runs contrary to the very es-

sence of musical creation. While I do not wish to abandon this reductionist approach to musical analysis entirely—for it operates well within a certain perspective much like Newtonian physics performs adequately for the development of new technologies, etc.—the new scientific paradigm focuses instead on the dynamic relationships between interconnected agents of complex adaptive systems and investigates ideas such as irreducibility, uncertainty and paradox, far-from-equilibrium flux, self-organization, iteration or positive feedback, deterministic chaos and castastrophes, fractal organization and self-similarity, attractors, bifurcations, phase space and emergence.

Scientists are beginning to move beyond the search for fundamental simplicities and linear, deterministic models to describe the complex systems of our everyday experience and are now questioning how and why these complex systems evolve and become meaningful at the level of our normal perception. It is rather obvious how complex musical systems can be formed from the dynamic combination of simple elements, but far less obvious and far more interesting in my opinion is how those complex systems organize themselves into understandable and meaningful events for participants and listeners. Collective musical improvisation offers a virtual laboratory for these sorts of investigations; the system is overtly self-organizing, the complexity is readily apparent in the dynamic interplay of the performers, and the meaning and the perceptibility of the music are not questioned by its participants (although they are often fiercely questioned in the academy and the music industry). Since the meaning of the music is hardly reducible to its component parts it offers an exceptional challenge to this new paradigm of emergence. To their credit, anthropologists and ethnomusicologists have become increasingly aware of the emergent aspects of ritual and musical performance. The now classic study by Victor Turner (1982) on liminality—an idea first investigated by Van Gennep (1960)—is an excellent example of anthropological work with this orientation.¹ A burgeoning field called performance studies, spearheaded by Richard Schechner (1988) from within the discipline of theater studies, also intends to follow a more context-sensitive approach to cultural performances of all types. Recent studies in sociolinguistics have focused on the pragmatic and metapragmatic qualities of human communication in which meaning resides not in the content of the information transferred (i.e. syntactics and semantics) but instead in the larger context of a conversation event. Writing around the same time as the early development of chaos theory, sociolinguist Richard Bauman (1977) spoke of the “emergent qualities of performance” in his important work *Verbal Art as Performance*.² For my own work (Borgo 1996) I have also investigated the idea of play and its relationship to emergence as expounded by scholars as diverse as Hans Georg Gadamer (1993), Gregory Bateson (1972) and Margaret Drewal (1992), to name only a few.

The Trio

My fieldwork from January 1995 to May 1996 has involved a Los Angeles-based trio of musicians concerned with an intercultural form of collective improvi-

sation rooted in American jazz. The group includes Kevin Eubanks on guitars, Adam Rudolph on hand percussion and Ralph Jones on various woodwinds.³ The trio is egalitarian in organization and is publicized only under the names of the musicians involved. They perform most every Sunday afternoon at a club called the Jazz Bakery in Culver City. At these performances, the trio members do not incorporate any prearranged or precomposed musical models on which to base their improvisations. Instead, they rely on their extensive musical backgrounds in jazz and various world musics and their ability to mediate their individual contributions within the collectively improvised ensemble texture in order to create a meaningful musical statement of the moment.

The Jazz Bakery is a non-profit space devoted to the presentation of live music on Venice Boulevard. The stage of the auditorium is elevated a few feet and houses a grand piano and ample room for a complete big band. On Sundays, Ralph Jones sets up with his arsenal of aerophones in front of the piano at stage right. His instruments for an average performance include a soprano and tenor saxophone, a bass clarinet, an alto flute, a Norwegian overtone flute, an Indonesian *suling* flute, a Japanese *hichiriki*, an Indian *shenai*, a Middle Eastern *ney*, an African recorder-type flute, and finger cymbals. Kevin Eubanks plays his hollow body electric guitar from center stage and Adam Rudolph fills the stage's left side with his percussion instruments.

Adam's collection includes all varieties of what he calls "things that make interesting sounds, sounds that are evocative and language-like." The heart of his drum sound is two conga drums and a *djembe* drum, a goblet-shaped hand drum used in various parts of West Africa. He also performs on an *udu* clay hand drum from Nigeria and various frame drums. Behind Adam on the stage is a rack of wind chimes and hanging gongs. On the floor space in front of him he keeps a set of temple gongs, wood blocks, a thumb piano, various wooden flutes, bird calls, an Australian *didgeridoo* and "toys from Chinatown."

From the perspective of a traditional small jazz ensemble, as described by both Ingrid Monson (1991) and Paul Berliner (1994), the instrumentation of this trio is extremely unusual. Although Ralph or Kevin have on occasion been known to play the piano—nothing is off limits for the musicians if it is on hand and can be used to produce musical sounds—regular contributions from the three primary jazz rhythm section instruments of piano, bass and drum set are noticeably absent. Lacking the traditional role-playing functions of these instruments, the trio's unique group configuration necessitates a markedly different approach to ensemble improvisation. The broad spectrum of musical experiences on which the trio members draw also adds to the unusual, syncretic aspects of their performances.

Adam has studied intensely the hand drumming styles of many African, Asian, and Afro-Caribbean musical traditions. He has also had many formative musical experiences with members of the Association for the Advancement of the Creative Musician, or AACM, an important Chicago-based collective of improvising artists since the mid-1960s. Ralph's early years were spent in Detroit and he has vast mu-

sical experiences ranging from work with popular Motown artists, Brazilian groups and jazz fusion ensembles. Kevin Eubanks has recorded and toured with many of the most respected jazz artists in both traditional and avant-garde performance contexts. He currently leads the house band on the *Tonight Show with Jay Leno* which performs a wide spectrum of popular American styles including rock and roll, rhythm and blues and contemporary jazz.

Despite this wide spectrum of musical experiences, the African American tradition of improvised jazz music is considered by all three performers to be the central factor in their musical direction. Adam bluntly stated that "jazz is the glue." According to him, "it has the ability to maintain an identity while freely absorbing all kinds of musical influences."

Metaphors Describing Performance Interaction

The use of language and transportational metaphors to describe the process of musical improvisation is commonplace in both academic studies and vernacular interpretations of improvised music. Several of the most prevalent metaphors describing the musical intent, interaction, and intensification of improvising ensembles are storytelling, conversation and journey.

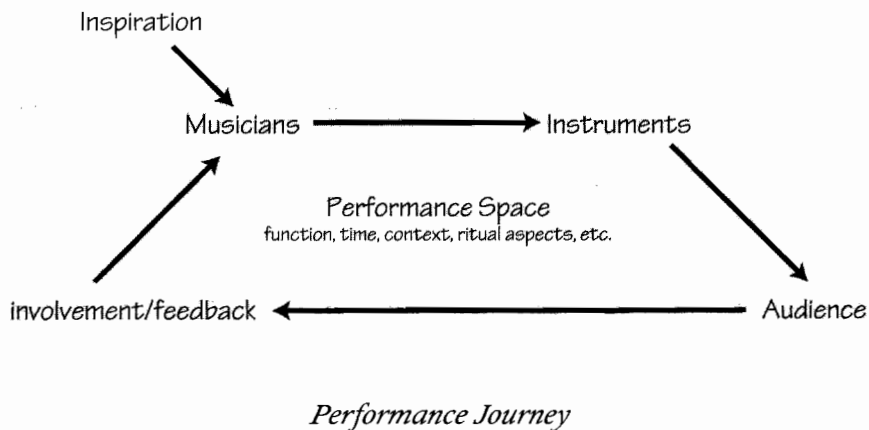
The metaphor of storytelling focuses on the individual musician's recounting of an often self-reflexive narrative through his/her acquired skills and experiences with improvisation. When evaluating a performance, Adam stressed to me that "if it tells of feelings and thoughts then it succeeds." Several scholars have championed an analytical approach focused on the individual performer and the narrative aspects of improvisation. The oral storytelling traditions of the Balkans, studied extensively by Milman Parry (1971) and Albert Lord (1960), have provided models for several scholars interested in jazz improvisation, most notably Lawrence Gushee (1977) and Gregory Smith (1991). While there are most certainly interesting emergent qualities associated with this format of oral storyteller/musician and audience, this paper is concerned instead with the emergent qualities of collectively improvised ensemble performance.

The metaphor of conversation pervades almost every aspect of our conventional analysis and interpretation of ensemble improvisation. Ingrid Monson's recent dissertation on "Musical Interaction in Modern Jazz" presents conversation and other language metaphors as "meta-metaphors... which comment upon the entire musical-social context and enable us to clarify the mutual influences between sound and culture within the context of the jazz ensemble" (1991: 176). Her work comes a long way in shifting the emphasis in studies on improvisation away from musical products and towards a holistic approach concerned with musical process, interpersonal interactions and performance context. However, a crucial element of much improvised music, namely the ability for performances to metaphorically transport the participants and listeners and subsequently transform their sense of individual, cultural, and spiritual identity is noticeably absent from her treatment.

The members of the trio under study used the transportational metaphor of a journey in two distinct ways. They invoked it to describe the life-cycle of an artist's personal growth and musical exploration, or as Adam stated, "as you go along your journey you begin to understand what your journey is all about." This sense of a journey centers on the individual and the long-term process of artistic and spiritual transformation.

Secondly, the metaphor was used to describe the more immediate performance journey that the musicians and audience embark on together ideally involving an ecstatic feedback process. Adam described the trio's performances as a "unique expression of the three performers and the audience at that time." For him, "the music exists only relative to what people are experiencing it as... It exists in the context of the relationship [between the player and the listener]." It is interesting to note Adam's emphasis on the context-sensitive and dynamic qualities of performance rather than the isolatable structural content of the music.

Each of the performers also emphasized to me the meta-conscious sources of inspiration in performance. Adam believes that "music comes from something else and it should express something else other than music." Ralph stated "it [the music] comes through you from, you know, a divine order." Kevin defined improvisation to me as "being active in the moment - nature will tell you what to do." Figure 1 is a graphic representation of the performance journey as described to me by these musicians. A similar ecstatic feedback model was devised by A. Jihad Racy (1991) regarding the *tarab* musical cultures of the Near East.



The Musical Journey

Finished art works that we see and may love deeply are in a sense the relics or traces of a journey that has come and gone. What we reach through improvisation is the feel of the journey itself.

— Steven Nachmanovitch (1990: 6)

On Sundays, the music begins shortly after the performers walk on stage and continues uninterrupted by applause or substantial pause, often for up to an hour, until the musicians collectively sense an ending and conclude the performance set. A brief intermission follows and another uninterrupted set concludes the afternoon's performance.

During the course of a set many different musical textures and moods are explored by the trio, but in a rather seamless fashion which provides the sense of a musical journey through both time and space. The trio's syncretic musical approach—which draws on traditional musical practices from many diverse world cultures yet presents them in a transformed and personalized manner—gives the listener a sense of traveling through both familiar and yet strangely un-worldly locales. Their incorporation of sounds evocative of ancient civilizations juxtaposed with modern timbral and harmonic techniques also provides a sense of traveling through vast expanses of time within the course of an hour-long set. Their use of metered time (most often a meter of 6 which is popular in music cultures from Havana to Cairo, a meter of 4 common to most jazz music, or less frequently a meter of 10 based on the Near Eastern *sama'i*) and extended periods of a-meter in performances—at times even superimposing the two—gives the listener both an acute sense of the passage of time and a feeling of atemporality or timelessness.

The distinction in the philosophical literature drawn between chronometric time and experiential time is most appropriate here.⁴ In an eloquent description of the spiritual qualities of Persian music which relates well to the trio's performance practice, Seyyed Hossein Nasr writes:

Persian music possesses extremely fast and regular rhythms, and moments in which there are no beats or any form of temporal determination. In the first instance man is united with the pulsation of cosmic life, which in the human individual is always present in the form of the beating of the heart. Man's life and the life of the cosmos become one, the microcosm is united to the macrocosm, and thus man's spirit undergoes expansion and participates in the joy and ecstasy which encompass the world and which man fails to perceive only because of his state of forgetfulness of God (*ghaflah*). In the second case, which transcends all rhythm and temporal distinction, man is suddenly cut off from the world of time; he feels himself situated face to face with Eternity and for a moment benefits from the joy of extinction (*fana'*) and permanence (*baqa'*) (Nasr 1987: 171).

Glen Velez, a fellow hand drum expert who, like Adam Rudolph, incorporates overtone singing in his performances states:

The long deep breathing used in overtone singing alters the mind's perception of time and place and turns one towards timelessness. The fast paced rhythm and hand movements of the various drum techniques activate the body and stimulate an acute awareness of the flow and movement of passing time. Overlapping these two experiences creates a feeling of upliftedness and a powerful inward and outward expansion of consciousness (Velez n.d.).

David Such, in his work with saxophonist Daniel Carter, discusses the “preperformance roles.. (e.g., parent, record store salesperson, band leader, and so forth) that musicians assume in their day-to-day social interactions” (1993: 139). According to Carter and Such, these roles may be dissolved in free-form, collectively improvised musical performances, leading to an undifferentiated state of mystical awareness, unity or selflessness.

Victor Turner incorporated in his work Csikszentmihalyi’s idea of “flow” where action and awareness merge for the performer in a state of heightened concentration and focus (Csikszentmihalyi 1996). Turner writes that “A performance is a dialectic of ‘flow,’ that is, spontaneous movement in which action and awareness are one, and ‘reflexivity,’ in which the central meanings, values and goals of a culture are seen ‘in action,’ as they shape and explain behavior” (Schechner and Appel 1990: 1). His views are strikingly similar to ideas expressed to me by Adam concerning the cognitive processes of the improviser. Adam believes that the intellect and intuition become fused in the moment of improvising, and the mind, body and spirit of the performer ideally work in a harmonious unity. Adam also described an ongoing balancing act between the “player’s mind,” which is involved with the intuitive and immediate micro-decisions of improvisation, and the “composer’s mind,” which reflects on the long-term development and structure of an improvisation.

The improvisers I spoke with share a desire to take the listeners on a journey by embarking on one themselves; in other words by stepping out of their individual ego shell and collectively journeying into unknown musical territory. Adam believes that “artists are the shamans of today.” According to him, musicians may embark on a spiritual journey in performance in order to guide their listeners and ultimately transform their perceptions of what it means to be meaningfully in this world. In Adam’s view, only if an artist is aware of his/her role as shaman in society, is prepared to embark on a spiritual journey in performance, and is welcomed by an aware and receptive audience, then may the music exhibit emergent qualities that embody and impart this power of transformation. Richard Schechner (1988) differentiates between a temporary transportation in performance which simply returns the participant to the point of origin and the more pronounced transformation that may occur when the perceptions and identities of the listeners and performers are significantly reconfigured.

While Adam has often expressed to me his desire to bring about a communal transformation through musical performance, because of the rather restrained nature of concert-going behavior in American culture the effect of the trio’s performances more often falls under the rubric of individual ecstasy as discussed by Gilbert Rouget (1985) and others. On a recent Sunday afternoon, the conclusion of the trio’s performance was met by understandably sparse applause from the small audience in attendance. A middle-aged gentleman who had been seated alone and deeply involved during the entire performance decided to convey his deepest ap-

preciation to the performers. He stood and shouted out to the stage, "Thank you for this wonderful, rich, internal journey."

The metaphor of a journey describes both the episodic following of linear temporal events and the process of ego and time disassociation discussed by the performers above. For example, when attending to a conversation or story, a listener (or participant) may embark on a journey simply through the followability and inherent structuring of events provided by the tale or discussion. However, a rather different sense of a journey is involved in either grasping the story's meaning as a whole, or by a sudden bit of insight triggered by a turn in the narrative or conversation. In the same sense, a listener at a freely improvised performance may attend rather stoically and analytically to the sonic details presented by the performers, or instead may experience a temporal, spatial, and perceptual refiguring by allowing the improvised soundscape to transform and reorient his/her understandings and sense of identity. To adopt the vernacular, it is not enough to *listen* to this music, you must also *hear* it and allow it to *play* you.

In his important work *The Act of Creation* (1964), Arthur Koestler describes bisociation as the ability to perceive self-consistent but habitually incomparable frames of reference together. For Koestler, the flash of inspiration at the center of any creative act involves transcending habitual patterns of thought by coupling together often radically different frames of reference, a sort of chaotic mental attractor resulting from a far-from-equilibrium flux. Freely improvised music on the surface often seems to contradict the notions of musical coherence and linear design prominent in mainstream Western culture. However, recent scientific understandings of numerous and diverse natural and social phenomena support the idea that uncertainty, non-linearity, far-from-equilibrium states and dynamic evolution are the rule rather than the exception in the observable world. In this light, free improvisation not only embodies, but relies on, the essential tensions between intellectual and intuitive approaches for the individual, the balancing of individual and collective ideals for the performers and the juxtaposition or bisociation of traditional and innovative musical elements and chronometric and experiential temporal experiences in the structuring of the musical event.

Kinetic Dialog: Transcription and Analysis

I have included a partial transcription of a three minute kinetic dialog, to borrow the performers' own terminology, from the first set of their performance on February 19, 1995 to elucidate a few moments of conversational interaction and emergence between the musicians and audience. The dialog at this point in the performance is between Kevin on hollow-body guitar, and Adam on *udu*, a Nigerian clay hand drum. The *udu* notes with stems facing upwards denote the finger strokes on the clay shell of the drum, while the notes with downward-facing stems symbolize the palm strokes on the open hole of the drum which produce a variable bass tone.

A

3 minutes

guitar

udu

audience noise- X X X X X

B

C

Letter A of the transcription shows how fluidly Adam adjusts to the rhythmic idea just initiated by Kevin, filling the unaccented spaces of Kevin's pedal point with a contrary, yet complementary rhythmic idea of his own. After this groove is established a noise can be heard in the audience which serves as a rhythmic impetus to Kevin to halt the current development and begin anew. In fact, Kevin borrows from the rhythmic pattern of two followed by three beats provided by the audience noise to begin his new exploration. This extreme openness to musical and non-musical stimuli of the moment is in perfect accord with the trio's worldview

The musical score is presented in five systems, each with a treble and bass staff. The first system consists of two measures in 2/4 time. The second system consists of three measures; the second measure is marked with a double bar line and the text "28 seconds not transcribed". The third system consists of three measures. The fourth system consists of three measures. The fifth system consists of three measures. The score includes various musical notations such as chords, notes, rests, and drum hits (marked with 'x'). A key signature change to two flats is indicated at the beginning. A section labeled "D" begins in the second measure of the second system, where the time signature changes to 4/4.

and illustrates the spontaneity of both the conversation metaphor and the concept of emergent phenomena.

Letter B of the transcription shows how Kevin develops this rhythmic idea by introducing syncopation in the fourth measure, and finally a cadential line that leads to a sustained chord in measure six. Adam produces a finger roll on the *udu* drum which heightens the cadential effect of Kevin's improvisation and the subsequent musical resting spot signifies to him an opportunity for a turn-taking transition of the solo voice. He immediately responds with three strong hits with his palm on the open hole of the drum, producing its characteristic bass sound. Adam's

The musical score consists of five systems of piano notation. Each system has a grand staff with a treble and bass clef. The first system shows a complex rhythmic pattern in the right hand and a bass line in the left hand. The second system includes the instruction "shut up" above the right hand. The third system includes the instruction "grunt" above the right hand and a key signature change to E-flat. The fourth and fifth systems continue the rhythmic patterns. The score ends with a 4-measure rest in the right hand.

role as percussionist may at times relegate him to the status of accompanist, but he is always ready to assume the role of soloist, however briefly, when a lull in the musical conversation affords it. The three hits refer back to the rhythmic idea that Kevin was developing, all initiated by the unexpected, and probably unintentional, audience noise.

The two musicians then play a stop-time figure together—letter C of the transcription—with the intuitive finesse that only comes from familiarity and a deep trust in the other's musical instincts and sensitivity. The use of stop time has a long tradition in jazz dating to the early recordings of Louis Armstrong and others, and its presence here in a rather unorthodox configuration may be understood as signifyin' on the tradition of jazz.⁵ The performers then launch into an intense,

The musical score consists of five systems of staves. The first system shows a guitar part with a series of 'x' marks on a single line, indicating muted notes, and a vocal line with a few notes. The second system continues the guitar part with triplets and a vocal line with sustained chords. The third system features a guitar part with triplets and a vocal line with the text "aborted call and response" and "accelerate and dissolve meter". The fourth system is labeled "G" and "unmetered", showing a complex guitar part with various rhythms and a vocal line. The fifth system is labeled "H" and shows a guitar part with a few notes and a vocal line with the text "21 seconds not transcribed" and "8 seconds".

unmetered musical dialog (not transcribed) which effectively climaxes on an open-voiced guitar chord.

In the third measure of letter D, Kevin begins a repeated, off-beat pattern followed by syncopated hits—first four hits, then five hits, and then three hits—while Adam provides a steady accompaniment. Kevin plays the pattern leading to a sustained chord which Adam responds to again with uniform bass tones from the *udu* drum (measure 11). The groove is next interrupted by an exclamation from what sounds like a young girl or boy in the audience saying “shut up.” Kevin immediately locates the proper pitches to mimic this utterance on his guitar. This example may be compared, at least indirectly, to the participation frameworks of storytelling as described by Marjorie Goodman (1990: 239-257). In these storytelling frameworks, interjections from parties not initially involved in the discussion often

The image shows three systems of musical notation. The first two systems are for piano, each consisting of a grand staff (treble and bass clefs). The bass clef contains a rhythmic pattern of notes, with some notes marked with an 'x'. The treble clef contains rests. The third system also has a grand staff. Above the treble clef staff, it says 'bass clarinet (rubato)'. In the right margin of the third system, it says 'develop into free meter'. The piano part continues with the same rhythmic pattern as in the previous systems.

significantly alter the telling of the story both in terms of actual syntax used and in terms of psychological and emotional alignment with the storytellers. The trio performers, while not consciously trying to cater to an audience, are continually aware of their presence and importance to the evolving musical framework.

After this exchange between audience member and performer which could not have gone unnoticed to attentive listeners, Kevin lets out a grunt as he works into the next stop-time section at letter E. Adam complements his punctuations again and a very sophisticated five against four rhythmic placement leads the two performers to another climax in the eighth measure after letter E. Adam responds at the climactic moment and Kevin tries to build on his final two note rhythmic motif three measures before letter F. However, this new development is quickly aborted, possibly because it does not feel comfortable to the performers or because in a sense it involves returning to previously explored musical territory (letter C of the transcription). Adam decides at this moment of musical uncertainty to affect a tempo change (letter F), slowing the pulse to the two against three feel that was only implied earlier. Kevin joins the new tempo but quickly attempts to accelerate it and the performers' shared metric pulse becomes precarious. Another brief call and response passage fails to create an agreed-upon sense of time so the two settle into a non-metric space for development.

Kevin incorporates the same pitches as his syncopated pattern shown at letter D but this time to initiate an unmetred call-and-response passage between the two musicians. After their initial telepathic rapport, they finally interrupt each others musical statements and Kevin launches into another extremely heated dialog (not

transcribed). At the end of this kinetic exchange, the two performers again land squarely together on a sustained chord, this time opting to simply let the chord ring for eight full seconds in order to dramatically emphasize the musical release (letter H). Adam finally enters and returns to his previous groove of nearly two minutes earlier in the performance. This time Kevin removes himself from the conversation and Ralph decides to enter on bass clarinet at a meditative pace, triggering Adam to halt the groove and begin a more ethereal accompaniment.

Order out of Chaos

Chaos does not mean disorder. . . . It represents an abstract cosmic principle referring to the source of all creation.

— Ralph H. Abraham (1994:2)

In the parlance of chaos theory and complex dynamical systems (CDS) theory, attractors are regions of phase space (the imaginary geometry of possibilities) that temporarily organize the long-term dynamic behavior of systems. Chaotic systems trace irregular yet elegant paths towards attractors which gently “fold” the phase space around them and then disappear or radically transform in an unpredictable instant. Bifurcation is the relevant term referring to the appearance, disappearance, and transformation of attractors in evolving systems. Rather than simply describing steady states (static or point attractors) or even closed-loop cycles (periodic attractors), the chaotic attractors (or strange attractors) of complex adaptive systems demonstrate fractal organization with fine structure on all scales (see Cohen and Stewart 1994:204-7). In other words, once a system has temporarily settled on an attractor it stills displays very complex and unpredictable behavior. Although this may on the surface appear to be a very poor analytical tool, chaotic attractors have been used with great success to explain diverse complex behaviors from the boiling of water and the random foraging strategies of ant colonies to the patterns of global economy and weather.

Attractors are emergent phenomena that, like other details of complex and chaotic dynamical systems, cannot be predicted mathematically without simply initiating the experiment and observing. In fact, many complexity researchers are currently intent on developing a meta-mathematical “proof” (much like Gödel’s celebrated theorem) that will demonstrate how emergent systems are inherently unpredictable and incalculable. This unpredictability should in no way discourage its use in musical and cultural research whose main goal has always been comprehension and explanation rather than prediction. Natural scientists are finally coming to terms with the reductionist nightmare that a model purporting to flawlessly explain the workings of the entire universe would necessarily be as large and as cumbersome.

From my own experiences with collective improvisation and from observing the trio’s performances for more than a year, I have found that attractors and bifurcation are a convenient and effective way of describing the musical “peaks” reached

in the dynamic spatial and temporal landscape of collective improvisation. By “peaks” I do not mean to convey only the sense of moments of greatest intensity, but rather moments where a musical idea space seems to coalesce. These performance peaks are often surprisingly reached, explored for variable amounts of time, and just as quickly discarded by the appearance of even a trifling divergence. Like the often mentioned Butterfly Effect of chaos theory, the slightest musical “flapping” may have profound effects on the future improvisatory climate of an ensemble performance. Hopefully my rather qualitative analysis of the transcribed example provided above and the aural evidence of the recording managed to convey some sense of the role of attractors and bifurcation in the process of collective improvisation. The growing evidence in these scientific fields that complex and chaotic systems often demonstrate extremely subtle qualities of ordering may also be the best argument for the ordering of collective improvisation.

Perhaps the reader is concerned that I am overindulging in rather poetic and tenuous metaphors? I, however, firmly believe that the meaning of collectively improvised performances lies at this level of associations with the natural, chaotic processes of the universe. Performers and listeners alike draw their enjoyment from being privy to this spontaneous and unpredictable source of creativity. The rigorous math, computer simulations and metaphysical ideas associated with these emerging sciences (forgive the pun) can also be put to good use in the social sciences—as they have begun to in economics and political science (see Kiel and Elliott 1996) and historiography (see Abraham 1994)—and the humanities in general (e.g., fractal music, computer graphic design, natural chaos in the visual arts, etc.). Artists have always intuitively learned about chaos—well before the term was adopted in the natural sciences—and I believe music scholarship will benefit from additional attention given to the dynamic, emergent phenomena of musical performance.

While several brave scholars have embarked on the study of performance-related and emergent phenomena, each author often favors a set of terms that either have little to do with the work of others or describe essentially the same perceptions and occurrences with markedly different words. Liminality, flow, play, journey, transition, transformation, transcendence and even intuition are all attempts to get an analytical hand-hold on these chaotic experiences. Even as I am now just beginning my investigations into this promising area, I feel strongly that the language, methods and insights of these new sciences will be of great benefit to future ethnomusicological study.

Notes

¹ Turner adopts the term liminal (from the Latin *limen* or “threshold”) to describe any medial, transitional, or transformative stage similar to a rite of passage or initiation rite. He describes “communitas” of fellow liminals that may experience profound camaraderie in their shared transition from an ambiguous state of self-loss to one of self-redefinition or transformation.

² Bauman discusses three distinct types of emergent structures in performance, namely, text, event and social structure.

³ The subsequent quotes offered from these musicians stem from formal interviews held at their homes or at the concert venue spanning the time period from January to December 1995. Many of the ideas in this article have also evolved from my experiences as an improvising saxophonist for the past eighteen years and more recently from my weekly experiences with an ensemble of improvisers at UCLA.

⁴ These terms stem from my courses with Dr. Roger Savage at UCLA. This duality of temporal experience is also described by Suzanne Langer in *Feeling and Form* (1953:104-119) as clock time and virtual time. Jonathan Kramer, in his important work *The Time of Music* (1988) utilizes the terms absolute time and musical time to describe the listeners dual temporal perceptions. Philosopher Paul Ricoeur incorporates the idea of time of narrating and narrated time in his section on "Games with Time" in volume two of *Time and Narrative* (1985:77-81). Ruth Stone also presents the idea of inner time and outer time in her ethnographic work among the Kpelle of Liberia, *Let The Inside Be Sweet* (1982).

⁵ Signifyin' is discussed in detail in Gates (1985) and has been adopted and expanded on by several leading jazz scholars.

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