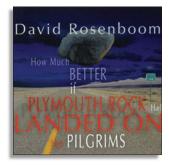
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1 of 8 (The following is the feature Wire Magazine published celebrating 50 years of David Rosenboom's musical explorations.)









Biofeedback, intelligence swarms, solar vibrations and generative opera are among the utopian possibilities proposed by US composer

David Rosenboom during 50 years of navigating new frontiers of music and technology. By **Julian Cowley**. Portrait by **Nathanael Turner**

David Rosenboom with the Neurona Omnivoila, an electronic instrument he developed in the late 1960s, in Baton Rouge, Louisiana, 1970





"I was never able to develop an interest in crafting a musical style," says California based composer David Rosenboom. "I'm an explorer and an investigator. Composition students used to be taught to find an identifiable individual voice, to get a style and stick with it. We all know examples of successful composers who took that advice to heart, and it's possibly the right path for many people. It just wasn't right for me. Early on I found music to be astonishingly liberating."

For Rosenboom, music is not to be made according to an established set of rules, values or techniques. Rejecting presuppositions about its nature and boundaries, he conceives of music as a vast open space where models of proposed worlds, of whole domains of thought and life, can be experienced through spontaneously emerging sonic forms. He describes his new CD *Zones Of Influence*, a mid-1980s composition which he has just revised and recorded with percussionist William Winant, as "a propositional cosmology activated in music". If you are able to track his identity within its fizzing volatility, it's in terms of questing intellect and a passion for experimentation rather than from a set of defining stylistic features.

Dig into Rosenboom's back catalogue with the aim of pinning him down and you are likely to find yourself frustrated and bewildered. Plunge into substantial works such as How Much Better If Plymouth Rock Had Landed On The Pilgrims (2009) or In The Beginning (2012) and you'll discover epics of inclusiveness, sonic density, plurality of voices and disparate components. "I have a pattern of becoming obsessed with the beauty of a propositional world and the surprises and discoveries that can be made in it." he acknowledges. "No individual piece can expose the full territory of a particular world and I end up making several pieces that explore that model in different ways. If particular emergent forms don't continue to provide rich territory for new discoveries, I move on. If they do, I think about ways in which I can share those territories with others."

The Plymouth Rock recording stretches across two hours. Its exhilarating mix encompasses massed cellos that drone and blare like horns on a fogbound coast: an unstable delay system that generates a jagged cascade of electronic arpeggios; five contrabass saxophones growling menacingly in a subterranean water tank; and improvising instrumentalists responding to the random interplay of birdsong and traffic noise in New York's Central Park. Indian musicians propel an iridescently unfurling American raga; two rock groups grapple, flexing funk, blues and metal muscle; a six note ostinato underpins a dialogue between a retuned piano and Balinese gamelan instruments. On one track, a mantra takes form from lapping waves of trumpets and keyboards; on the next, piano and percussion attacked with mechanical precision unleash a wild Dionysiac dance.

This music, written at the close of the 60s, was intended to be performed in immersive environments, with lightshows, mixed media action and audience involvement. Rosenboom's interest in such aesthetic saturation reflects but also transcends the creative surge of that time. It has drawn him recently into collaborative projects led by Indonesian artist and choreographer Sardono Kusumo. In 2010, he contributed electronic music to *Rain Coloring Forest*, a brilliantly staged fever dream in which sonic landscapes and processed voices blended with enigmatic physical action, gestural painting and the magical play of Jennifer Tipton's light design and Maureen Selwood's animated digital projections. For Kusumo's *Swarming Intelligence Carnival*, a flamboyant opening ceremony for the 2013 World Culture Forum, involving hundreds of dancers plus video imagery projected around a huge limestone arena in Bali, he used computer programs to transform recordings of swarming birds and insects, animals and urban clamour into freshly mixed sound environments.

"Much of my music might be called noise music, because of the way it handles complexity," he says. "I love complexity, not because it represents some higher level of something, but because it is simply another name for a rich soundworld, inside which one might explore endlessly and find extraordinary relationships that can only be found through active imaginative listening. Calling it noise helps strip away stylistic listening assumptions. That's a good thing, as long as we maintain awareness of all that's going on in the glorious noise of our inner neural beings."

Rosenboom, who turns 67 this month, grew up in west central Illinois, on a small farm that was so unproductive on account of rough terrain and poor soil that his father took a job as a machinist in a local printworks. "We didn't have running water in our house during my youngest years," he recalls, "but intellectual curiosity, hard work and a spirit of investigation were the soul food of our home. My mother always had an interest in music, though she could never afford to study it seriously. When I was around age five my father found an old upright piano and brought it to our farmhouse. I showed interest in it, so my parents did everything they could to find me the best teachers around. They turned out to be a trio of Catholic nuns who ran a conservatory in a high school in Quincy, Illinois. To this day, I consider those nuns some of the best teachers I've ever encountered.

"I was a kind of boy scientist as well as a musician from an early age," he continues. "I had a tiny laboratory in the attic in which I built things and explored chemistry, electricity, physics, radio, astronomy and acoustics. Those interests blended with my musical pursuits. When I was 12 somebody gave me an old tarnished silver trumpet with a plastic mouthpiece. I taught myself to play by calculating the valve combinations and tube lengths necessary to resonate with the notes of the musical scale. Then I'd sit in the woods for hours blowing that horn. I never had a formal lesson, but I actually got to a point where I could play the Haydn concerto."

As a teenager, then living in Quincy, Rosenboom gained wide experience of performing the classical orchestral and chamber repertoire. "When I arrived as a student at the University of Illinois in the mid-60s, some faculty members had high expectations for me, in orthodox ways. But it soon became apparent that the time demands of pursuing a pathway as a classical player would pre-empt my core interests in investigative music. So I stopped trying to maintain that repertoire. My friends and I created numerous controversies. That was a time when reactions to new music were expressed very strongly, sometimes even violently, pro or con."

Not all of his teachers were supportive, but Salvatore Martirano's compositional boldness, Lejaren Hiller's algorithms, Kenneth Gaburo's research in systems theory, computer engineer James Beauchamp's sound synthesis techniques and the biological computing models developed by cybernetics expert Heinz von Foerster were some of the ingredients that made the Urbana campus a particularly fertile environment for Rosenboom. "I made some tape pieces," he says, thinking back to his student days, "but my real interest was to bring new compositional ideas into live performance. Even in my early explorations of electronics and computer applications I was inspired by a vision – building on cybernetics, artificial intelligence, the beauty of noise and improvisation as real-time composition – that all of this new medium could one day be embedded in instruments for live performance."

His complex and ambitious piece Systems Of Judgment (1987) reflects just the kind of refinement of digital technology that he had earlier envisaged. Yet for all its sophistication and scope, Rosenboom did not conceive this music as a studio-bound composition. An array of computers, synthesizers, samplers and homemade circuitry has been used to realise the work in numerous live performances, as the score for a choreographic work by Duncan MacFarland. "When I came to teach electronic music, I resisted what I called knob-turning courses, instructing people how to play analogue synthesizers," he points out. "Instead I taught systems theory, looking at what goes on behind the knobs and front panel and, with software, what the core is behind the language syntax or user interface. I taught it as a plastic medium, like clay ready to be moulded to serve artistic ideas."

Rosenboom's perception of user interfaces and front panels as compositional expressions, rather than simply technological designs, led to an alliance during the late 1970s with synthesizer designer Donald Buchla. Together they recorded *Collaboration In Performance* (1978), featuring an intricately patterned section of *Plymouth Rock* on one side, and a synergetic electronic interaction with propulsive Steinway piano called *And Out Come The Night Ears* on the other.

Rosenboom accepts not only instrumental design but the conceptual models or ideas initiating such design as an integral part of the music making process. Notation may be a part of that process; so too sounds in the air and ear. But music is for him a model building discipline as much as a means of expression. "My piece *BC-AD I* [1969], for example, explored the nature of nonlinear dynamics and thresholds of change, embodied in circuitry built into an instrument. In other words, the model was approached as an instrument from the beginning, and circuitry was a way of making that material. But the most important thing was listening, and then understanding how electronics could open onto new worlds."

After leaving Illinois in 1967, Rosenboom spent a year studying at the Center of the Creative and Performing Arts in the State University of New York, Buffalo. There he came into contact with others who were radically unsettling the field of music, including Morton Subotnick, Morton Feldman, Maryanne Amacher, Max Neuhaus, Gordon Mumma, David Behrman and Cornelius Cardew. At the same time Rosenboom was playing drums with Think Dog!, ostensibly a rock group yet dedicated to the pursuit







of "genre-denying music". During that year in Buffalo, he also played viola at an epochal recording session.

"Terry Riley's *In C* was brought to us from the West Coast by trombonist Stuart Dempster in the fall of 1967," says Rosenboom. "I recall Stuart showing it to me, Jon Hassell and Katrina Krimsky, then known as Margaret Hassell. We tried it out and loved it. So when Terry arrived, we all joined in and the project took off. We performed *In C* in Buffalo and at Carnegie Recital Hall in New York and recorded it in the spring of 1968, mesmerized and inspired from the beginning. When we finished recording in Columbia studio, we gathered to listen to playback in the control room. At the end there was dead silence, only broken when producer David Behrman said, 'I think we have just changed music'."

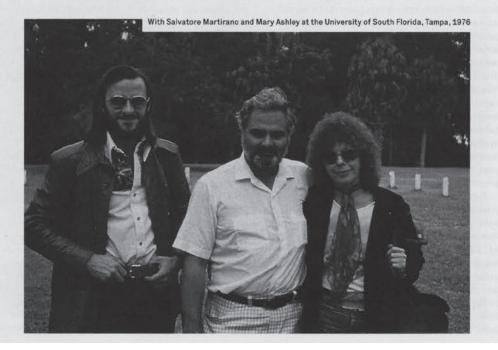
Rosenboom's own Continental Divide might suggest he had arrived by another route at a comparable game-changing gambit to In C. Opening Life Field, a 2012 compilation of his work from the 1960s onwards released by Tzadik, it was written in 1964, the same year as In C. It's a pulsating cyclical pattern piece, a hypnotically persuasive exploration of time's elasticity, that subverts conventional expectations of development and seems to level hierarchic relationships both within the instrumental ensemble and within the organisation of sound. Yet Rosenboom explains that Continental Divide is actually a solution to a challenge he set himself, to find out how long he could take to resolve a tritone, moving by gradual addition and then subtraction from a two note pattern to its natural resolution. "I wasn't interested then

in what we now refer to as minimalism – a word I absolutely hate," he declares, adding that he regards James Brown as a key progenitor of pattern music, especially on "Ain't It Funky Now". "I wrote a piano piece with optional trumpet quartet, called *Kicking Shadows*, in which a James Brown reference meets Zen thoughts."

A measure of the scope of Rosenboom's restlessly inquiring nature can be gauged from the dramatically different character of A Precipice In Time (1966). Dedicated to Ornette Coleman, whose playing he admired for its intrepid juggling of structure and improvisation, A Precipice In Time contains a complex, 12-tone serial structure that reflects the influence of his teacher Martirano, while the piece's 12 minute duration, approached as a long waveform from which everything is calculated in terms of linear and nonlinear harmonics, in part reflects his interest in Stockhausen's work on time. "After building a thoroughly calculated structure for the musical form," he explains, "I went about smearing it - like drawing an intricate mandala with chalk and then wiping it with your hand to obscure parts of the structure, while still allowing it to poke through. I stripped away layers of specificity in the notation, so the musicians move in and out of strict and free interpretations, making shapes in time."

A version of *A Precipice In Time* was later released on the compilation *The Virtuoso In The Computer Age* (1991). It was realised by Challenge, a trio Rosenboom formed, as a pianist, with saxophonist Anthony Braxton and percussionist Winant, while teaching at Mills College in Oakland, California during the 1980s. In 1986 Braxton invited Rosenboom to play piano in his quartet with drummer Gerry Hemingway and bassist Mark Dresser for a summer tour of European festivals and jazz venues. "Everything was very spontaneous," he remembers. "On a specified date, we arrived in Milan from different parts of the world, met for lunch and then went into a studio to record *Five Compositions (Quartet) 1986*. There was no rehearsing ahead of time. Then we did the tour of Europe. All the musicians in that quartet were master monsters. We could sight read anything and make fantastic spontaneous realisations."

The extraordinary synergy between Braxton and Rosenboom, both voluble and virtuosic improvisors. is still more evident on their duo recording Two Lines (1994). The basis for the music is a Rosenboom score that began with a drone. He amplified microscopic variations contained within it, then traced through them the notes of a melodic line, before finally removing the original drone. The surprisingly ordered pattern that remained, preserved "some of the rhythms of life", Rosenboom suggests, and the duo's interpretation reflects that with sensitivity as well as immense skill. "Anthony used to talk about musical technocrats, whose understanding of our exploratory musical territory was limited by their focus on a right way to play instruments, brilliantly, so as to dazzle audiences - that's a problem. I have certainly







With Donald Buchla (right) performing How Much Better If Plymouth Rock Had Landed On The Pilgrims at Toronto's Music Gallery, 1978

continued to draw on the instrumental technique I gained from my training. But I take a composerly approach to everything I give my fingers to work on, such as practising the piano. I know that will influence my fluidity in spontaneous musical situations. I think of improvisation partly as composing yourself as a musician."

After leaving Buffalo, Rosenboom moved to New York City. He got to know La Monte Young through Terry Riley and Jon Hassell, both of whom were playing at that time in Young's Dream House group, which also included Marian Zazeela, Tony Conrad, Alex Dea and, occasionally, the likes of saxophonist Lee Konitz and artist Walter De Maria. The group spent many hours rehearsing in Young's loft on Church Street, and Rosenboom was a member of The Theater Of Eternal Music when they played a concert series at New York's Metropolitan Museum of Art, a festival in the south of France sponsored by the Maeght Foundation, and performed at the 1972 Munich Olympics.

During this period Rosenboom supported himself in part as a freelance instrumentalist. For a while he acted as artistic coordinator for the countercultural nightclub Electric Circus. The club fed off the kind of criss-crossing circuits of ideas and practices that Rosenboom relished. Indeed his involvement came about through Morton Subotnick, who had also made his own electronic studio available for Rosenboom to work in. Ted Coons, a psychologist who had studied composition with Paul Hindemith at Yale, helped the club make vital connections with artists and musicians. it was through Coons that Rosenboom made contact with early researchers into biofeedback, leading up to the 1968 launch of his ongoing exploration of the ground where music meets neuroscience.

Rosenboom wasn't the only musician to engage at that time with the creative potential of bioelectric signals. Alvin Lucier's *Music For Solo Performer* (1965) used EEG (electroencephalogram) scalp electrodes to channel a wired-up performer's alpha rhythms through speakers that activated sympathetic vibrations in percussion instruments. Richard Teitelbaum's *Organ Music* and *In Tune* (both 1968) generated electronic music textures from EEG signals. But Rosenboom's work with brainwaves has remained an active field of research for him, and in the process it has achieved greater resonance. In the 70s it led to the foundation of a Laboratory for Experimental Aesthetics at York University, Toronto, where he had been engaged to set up a new music department. The Laboratory's specific task was to investigate information-processing modalities of the nervous system in relation to aesthetic experience.

Invisible Gold (2000), subtitled "Classics of live electronic music involving extended musical interface with the human nervous system", features the lush drones and sweeping transformations of Portable Gold And Philosophers' Stones (1972), a piece for four performers transmitting EEG signals, and a fifth who channels the bioelectrical information through a sound synthesis system. The disc also contains On Being Invisible (1976-77). This vigorously effervescing two part piece, which Rosenboom has described as "a self-organising dynamical system rather than a fixed musical composition", tracks shifts of attention and changes in the state of consciousness of a solo performer, wired to a computer that analyses brainwave signals. That data is fed through Buchladesigned electronic music modules and a Buchla Music Easel, generating synthesized sounds that are





enhanced in the second part with samples of Tibetan finger cymbals, a snake charmer's horn, a small drum and a snippet of human voice. On a fascinating and readily available video clip from a 1972 TV show Rosenboom, sitting cross-legged before an electronic keyboard, demonstrates the use of biofeedback to make music, with neural input from Yoko Ono and John Lennon, while Chuck Berry looks on.

Rosenboom's most recent composition, Ringing Minds, was created in collaboration with Tim Mullen and Alex Khalil, researchers at the Schwartz Center for Computational Neuroscience in San Diego. "Many years ago, I imagined ways to explore musical and whole brain complexity in parallel," Rosenboom explains. "At that time, neither technologies nor theoretical models were advanced enough. Now they are, and Mullen and Khalil invited me to collaborate." Mullen adapted tools developed originally for epilepsy research in order to analyse data from an ensemble of five brain-music performers. "We treated the data as if it were arising from a collective brain," he elaborates, "and we were interested in attention shifts resulting from musical events, with me improvising on electric violin and Alex playing a stone

xylophone. I built a software based electronic music instrument for this work that generates a vast sound field of ringing components. The field of music and the brain is exploding now."

Although his uncompromisingly exploratory approach to propositional music might conjure up an image of a solitary figure roaming the frontiers of art and science. Rosenboom thrives on stimulating connections and collaborations. Working with others fosters a kind of unattached openness to change that he finds a healthy condition for creativity. "Collaboration," he observes, "requires shifts in the way we regard material we believe we originate, towards a deeper understanding of group consciousness." Playing with others involves an obvious shift towards such collective awareness. A spectacular example is Suitable For Framing (2004), a high energy audio snapshot of his mid-70s keyboard duo with JB Floyd, a formidable Texan pianist who at that time ran a multimedia ensemble called Electric Stereopticon and is best known now for his adventurous work with the Yamaha Disklavier. Rosenboom has enjoyed intensive musical alliances

with numerous other exceptional musicians, including woodwind multi-instrumentalist Vinny Golia, percussionists Trichy Sankaran, Swapan Chaudhuri and Nyoman Wenten, and his trumpet playing son Daniel Rosenboom.

"I've written a lot of music primarily for my friends who are also some of the world's best living musicians," he observes. "I've been very lucky that way. But when people I didn't previously know rise to comparable heights, it's wonderful." He talks enthusiastically of a performance by a bassist and an electric guitarist from the What's Next? Ensemble in Los Angeles of *Shiftless Drifters*, a piece composed exclusively from gliding sounds. "I had nothing to do with the performance, didn't coach it at all. The musicians had found this very unconventional score themselves, assessed its freedoms and its structures, and they gave it incredible life. When that happens spontaneously, it's really fantastic."

During the 70s Rosenboom entered into a songwriting partnership with Jacqueline Humbert, best known for her work as singer and designer with Robert Ashley. *Daytime Viewing* (2013) preserves a flavour of Humbert and Rosenboom's smart,



ironic collaboration, originally presented within a performance art context. Mixed means presentation suits him well. He has linked up with director Travis Preston on several projects, "to create what we loosely call 'theatrically lifted music performance'. We've attempted to develop a unique composer and director collaborative medium, a way to enhance an audience's immersion in a musical work without in any way detracting from that work."

In 2009 Preston directed a large-scale public performance in Los Angeles of AHI, an ongoing opera project hatched with poet Martine Belle, to investigate the potential for creative relationships within globalisation. Rosenboom and Bellen devised an 'opera generator', a kind of mandala-shaped interactive score or prompt for participation, involving 13 interlinking stories with movable parts and multiple pathways, designed to accept creative input from composers around the world.

As a sustaining backdrop to these and other creative alliances, Rosenboom has held academic posts at Toronto's York University and CalArts and, from 1979 until 1990, at Mills College. In all three institutions, he acknowledges, he has been able to establish "happy homes for the experimental", and he has regarded cultivation of such a favourable climate as part of his overall creative task. During the 70s, while teaching at York, he got to know Marshall McLuhan, then head of the University of Toronto's Centre for Culture and Technology. "I will never forget how impressed I was by what it was like to walk around town with him," he enthuses. "McLuhan was naturally hyper-aware of our surrounding environment, with all perceptual channels open and turned up high."

A closer friendship developed when kindred spirit James Tenney arrived in Toronto to take up a post at York. "Jim and I used to joke about calling ourselves amateur cosmologists. We spent a lot of time discussing how the universe works and what that means for music. We talked about models for things like neural network systems, black holes, quantum gravity, harmonic perception, the nature of matter, evolution and on and on. We were both interested in algorithmic composition, which involves a huge range of possible model investigations.

"In a way, Jim and I were responding to what we saw as a crisis in music theory," he expands. "Most of what we call theory in music is not theory in the scientific sense. It predicts nothing. It merely provides a language for retrospective analysis of musical styles and forms. And following the great expansion of styles and forms during the first half of the 20th century, it was clear that we didn't have analytically useful languages for much of the new music. In retrospect, we also didn't have analytically useful languages for music outside the European and American classical traditions

'Especially troubling were musical forms that weren't oriented towards goals, like resolution and recapitulation - and forms in which pitch was not the dominant, perhaps not even a prominent, parameter with which to describe the structure of musical works. In order to discuss such forms, Jim drew heavily on principles of perceptual organisation, like gestalt and psychoacoustic theories. My approach was to start inside the brain, to investigate parsing principles evident in neural network signal processing and then to work outward towards musical experiences."

That outward journey has taken Rosenboom great distances in terms of research and speculation. His monograph Collapsing Distinctions (2004) poses the question: "What can we learn from experimental music that might aid us in interstellar communication?"

"The sound with which music, as I see it, can deal," he says, "might include acoustic vibrations of the sun, cycles of the emergence and dissolution of universes, rhythms we can perceive with sense organs and the body, and very high speed cycles found on the scale of quantum particles or waves. Acoustic vibrations of the sun are invoked in my piano piece Bell Solaris. Stars do ring like big bells." Yet Rosenboom recognises the interconnectedness of solar chimes and human lives. Listening to his string quartet Hymn Of Change (2010), recorded for the Cold Blue Music label anthology Cold Blue Two (2012), you might conclude that its vernacular romanticism is no more than a quaint memory of boyhood piano playing on an Illinois farm. But for Rosenboom nothing is so simple; nothing exists in such isolation.

"When beauty speaks to me, I allow it to speak," he asserts. "I don't choke it off for polemical reasons. This is also part of the universe I'm investigating. In the case of Hymn Of Change, that little gospel waltz was used as the DNA for all 12 movements of Bell Solaris. Except for an opening, Fanfare For The Sun, every note in that work is derived from methods of transformation and evolution applied to the materials that make up the Hymn. It serves as the genetic material needed to embody another propositional model. And in this particular embodiment, we may feel the personality of a musical genesis, we may sense it and fleetingly see it rise to the surface, like sensing a



Performing with Anthony Braxton in Santa Barbara, 1990



whale under the sea and only once in a while seeing it rise. The same process, though with different models, happens in *Zones Of Influence*, in which the genetic material comes from two freely composed melodies.

"People say my music is all over the map," he continues. "Maybe that's about its range. Maybe that's a result of free exploration. Some form of interdisciplinarity is almost a given in most of the work I do. True interdisciplinarity is entirely emergent. You can't legislate it. Right now, I kind of prefer the term anti-disciplinarity. It's important to give oneself licence to create new practice without the requirement that it be based on extant practice, to have free access to information, sources of inspiration, and facilities with which to make new work, no matter the media context in which these tools may be embedded."

Rosenboom has written a "whispered chamber opera" called Naked Curvature, already recorded for future release by Tzadik. Words and phrases in various groupings are inserted inside the unfolding music by voices that only whisper. The text was inspired by the structure of A Vision, a propositional world conceived by WB Yeats, with assistance from otherworldly instructors, heard during his practice of automatic writing. Rosenboom refuses to make a hard and fast distinction between the inspiration he draws from the study of stellar oscillations within the scientific discipline of asteroseismology, and what he derives from tapping into an occult system conceived by a wildly imaginative modernist poet. "One of the ways we navigate our universe depends on our implementing and embodying propositional models," he insists. "Our material experience involves comparing perceived realities with these propositional models. I'm not concerned that propositional cosmologies correspond in an exact way with some idea about reality, because in my view the realities we believe in are also propositional."

In 2015 Rosenboom will take a sabbatical leave from CalArts, partly so he can work on a book elaborating on the theory and practice of propositional music. Meanwhile, he says, the recent grotesque increases in financial inequality have negatively shifted our cultural economy towards a patronage society. "I observe more and more that ostensibly well-meaning patrons grant commissions to work they mistakenly identify as experimental," he says. "It may be strong and uplifting work, but it brings out territory that has been thoroughly unrolled long before. Our large concert stages and galleries are full of the faux experimental these days."

His own work, on the other hand, remains driven by an undiluted spirit of exploration. At times the means by which he manages to embody in music some propositional world takes him to a situation where he senses "something like an ineffable musical knowingness, with deep comprehension about the nature of the universe". It's Rosenboom's belief that we all have the potential to reach this place. "All the means of our collective intellect, embodied minds and materialised souls are available to be applied to the job, provided we are willing to work hard at disciplined inner and outer explorations. I give myself the freedom to learn from and draw musical insight from everything." \Box David Rosenboom's *Zones Of Influence* is released by Pogus

