Sound and Science

Arts Electric interviews David Dunn
December 5, 2005

AE Steven M. Miller, sound artist, interviews David Dunn, composer, known for his field recordings and compositions based on the the natural landscape. We asked him about his current projects.

David Dunn

AE Can you briefly describe some of the recent projects on which you've been working?

DD I've been studying the role of sound communication in the ecology of piñon pine and its primary invertebrate pest, the piñon bark beetle (Ips confusus). My research indicates that a sonic attraction effect may be a significant factor in the dynamics of bark beetle infestation. Not only do the beetles emit sounds which may be a mode of communication, but the trees themselves, when under drought-induced stress, emit ultrasonic signals that the beetles may hear and may be attracted to. Unlike all of the prior bioacoustic research relative to bark beetles, I've been making extensive field recordings within the interior of the trees using my own custom designed transducers in order to study the relationships of the beetle sounds and tree sounds to the extent and geographic distribution of the beetle infestation in the piñon forests.

This work is, in a very real way, a synthesis or perhaps a dialog between art and science. I've been trying to make the case for what I think is an opportunity - and now a historical necessity - for artists to contribute towards scientific thinking. E.O. Wilson talks about consilience and the role of art in relationship to science and the necessity for the two cultures to reconnect. Neither can be complete without the presence of the other. Artists are the best at presenting the facts of nature as revealed by science, interpreting those and disseminating them to a broader public. Science does its thing and art enters as a kind of back-end function to interpret this and disseminate it to the world.

One of my interests has also been in reframing a lot of the activity that musicians have been engaged in over the last half-century, particularly in the experimental American tradition. I've had the sense for a very long time that there's some deeper significance to this activity. We really don't know what it is we're engaged in when we make music. In some ways that's a silly statement, because we know perfectly well what music is - or at least most people think they do - there's an overt aspect to it which is its entertainment purpose and its deeper cultural resonance - ways in which music informs us collectively, the kinds of buttons it pushes in terms of emotional and physiological associations, etc. But I've had this sense that there's another level to musical activity, a kind of unconscious project that's at work. A lot of my work as a composer has been about reframing or re-examining - both historically and analytically - looking at what some of the more experimental music activity might mean in the light of what I think may be its larger purpose: Music is one of the most profound means we have for growing the capacity to perceive the world through sound.

AE How does this notion of a larger purpose relate to your current project on sonification of chaotic attractors and other types of dynamical functions?

DD There are a couple of levels. First of all, in recent years I've made an overt shift from framing my work within linguistic metaphors and concepts into framing what I do in terms of complexity science models. More specifically I've been collaborating with the physicist James P. Crutchfield on something called The Theater of Pattern Formation, creating visualizations and sonifications of non-linear dynamics (ordinary differential equations). Non-linear dynamics, popularly known as 'chaos theory,' underlies many aspects of the natural world, including turbulence flows, weather patterns, bird flocking mechanisms, etc. It's a particularly compelling project for me as a composer because the mathematics produces such rich sonic structures.

It's also a very good example of this interpretive function between art and science and the richness of potential collaboration. I'm interested in exploring these things not only because of the sounds that they make but also because it's a way of rationalizing some important historical activity.

I think a great deal of the activity we were engaged in as experimental composers and sound artists during the 60s and 70s was based upon very similar dynamical principles but we had no idea that that was what we were working with. It was all intuitive, and interestingly enough, the analog synthesizers that we were playing around with at the time really are forms of analog computers. We were playing with those at the same time that the chaos guys were using analog computers from the aerospace industry. We were all using the same kinds of tools, on one level mathematically rationalized and on another level entirely intuitive sonic play. So, part of my playing around with this stuff shines light upon a particular domain of musical research that's gone on and gives it a more rational perspective.

AE How has this work contributed to your understanding of humans' roles in the acoustic environment? What are our responsibilities there?

DD Well, I think the role should define the responsibility, but it hasn't. We really need to ask, "what is music about, what is this activity?" In terms of its evolutionary significance, Stephen Pinker, for instance, as a theorist of cognition, believes that music has no evolutionary meaning. He actually calls it auditory cheesecake. And yet, he thinks it's one of the great human mysteries because every culture we know or have known of had some form of music. There's obviously something significant about this, but on an evolutionary level he thinks there's no real imperative. It's just something that exists and is a rather extraordinary mystery because of that. I don't think that's true. I think that there really is a direct evolutionary imperative. Music is the vehicle through which we explore our auditory structural coupling to the external world.

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