Chapter 4
0h!m1gas:
A Biomimetic Stridulation Environment

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ABSTRACT

Ants represent a natural superorganism, an autopoietic machine, much like the human society. Nevertheless, the ant society stands out due to self-organization. Ants accomplish the generation of bottom-up structures communicating mainly by pheromones, but they also produce modulatory vibrations. This phenomenon represents a fascinating subject of research that needs to be amplified in order to identify the connections between these social organisms and humans; they share the same environment with humans and participate, thus, in the construction and mutation of posthuman ecology. The human-ant relationship plays an important role in the creation of new ecosystems and the transformations of old ones. Man can approach and embrace this relationship by means of artistic experiments that explore the bioacoustics involved in the social behavior of ants supported by the combination of cybernetics, autopoiesis, self-organization, and emergence.

INTRODUCTION

Media are a contraction of forces of the world into specific resonating milieus: internal milieus with their resonation, external milieus affording their rhythms as part of that resonation. An animal has to find a common tune with its environment, and a technology has to work through rhythmic relations with other force fields such as politics and economics. In this context, sensations, percepts, and affects become the primary vectors through which entities are co-created at the same time as their environmental relations. (Parikka, 2010, p. 14)

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0h!m1gas is an artistic research and audiovisual installation that approaches the self-organization in ants as a cybernetic system with emergent manifestations. 0h!m1gas is based on a 'do-it-yourself' approach of bioacoustics, measuring the vibratory

sounds and mapping the activity of an ant colony and their relation to the artificial ecosystem where they live. By means of contact microphones and video surveillance interfaced with the computer that feeds this bio-data to two turntables, the life of the ant colony emerges as a soundscape of scratching effects. The source of inspiration for this sound-reactive installation is based on the functional resemblance of the turntable, as an artifact for sound production in human culture, with the stridulatory organ of several highly evolved ants, specifically the Attini leafcutter ants, as an artifact for social organization.

The aim of this artistic research is the exploration of the stridulation phenomena of ants as a modulation mechanism in their self-organization, which can be perceived artistically as well as scientifically like a network of parallel task allocations regulated by local interaction and feedback. My artistic approach is predominantly based on the studies of the first and second wave of cybernetics[1], from Wiener (1948) to Von Foerster (1961), the theory of autopoiesis from Maturana and Varela (1992), which I approached as self-organization in regard to my work, and reflections and abstractions about emergence and its relation to sound creation and propagation in general. Stridulation, is the main bioacoustic focus of my work. In ants, stridulation can be simply put as a stimulus, energy as vibration, which incites decision-making in nestmates. It is a vibratory signal that travels through the soil and the organic material that construct the nest and its surroundings, to stimulate a response. Stridulation is part of the ant's communication repertoire, and along with pheromones and an array of tactile gestures, embodies a social behavior that the human observer and listener can relate to.

The social behavior of ants can be exposed as a complex social soundscape by means of this cybernetic installation based on the observation and audiovisual documentation of their colonial development. This experimental approach has opened new paths for me in understanding the stridulation phenomena and self-organization in the ant society, and has served as a great inspiration for my artistic practice. The impact of ants in the ecosystems, that we think we have taken for ourselves, can be perceived as a communal agency of chemicals and sounds constantly shifting and rearranging the territories occupied by humans. Moreover, to a great extent the relevance of studying ant stridulation and its social implications relates to territoriality. Territoriality in my work is approached as a concrete autonomous system in space defined by the processes of the unity that constitutes it. This is what Maturana and Varela (1992) called autopoietic system. The territories the ants invade can be defined by the communicational nodes and the invisible markings produced by the propagation of pheromones and sounds in their social network. Therefore, and strictly related to the matter of sound production in ants, such ecosystems can be visualized and can be sensed by analyzing those acoustic and vibratory signals that allow these communitarian beings to regulate their communication and survive in human environments.

It is of great importance to mention that my research focuses on two main aspects: the computable analysis of the sounds ants produce when they organize their labor, and the social significance and scope of stridulation with their potential biomimetic application towards a post-human ecology. Furthermore, relations with the human experience as the producer and interpreter of sounds are emphasized taking into account all the cultural implications involved in this investigation. Important to clarify is that in regard to my theoretical framework I decided not to discuss the fundamental inhumanity that technology and media could have. Despite the fact that I feel such discussion can be complemental, and indeed it would need to be integrated in future discourses, I instead decided to concentrate the experience of my research on the relations to human culture. Finally, the key of this research lies in revealing the connection between scratching, as an aesthetic