

2009 Benjamin
MENSCHEL
Fellowship
EXHIBITION

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THE COOPER UNION
FOR THE ADVANCEMENT
OF SCIENCE AND ART



Susan Little | Anurag Panda | Espen Vatn | Nick Wong | Alexander Wood

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The Benjamin Menschel Fellowship Program to support creative inquiry was endowed by a grant given to The Cooper Union by the Horace W. Goldsmith Foundation in 1994 to support work in the fields of art, architecture, design, and engineering. This generous grant was intended to provide funding to exceptional students who propose scholarly, independent projects that will in some way provide a culmination to their educational endeavors at The Cooper Union. It is the hope of the Goldsmith Foundation that students designated as Benjamin Menschel Fellows will be encouraged by their awards to complete bodies of artwork, develop scientific protocols, or otherwise further their intellectual investigations in a manner that will provide inspiration and illumination to the community as a whole.

Front Cover: **Stephanie Little**, Pecanorchard (Ralls,TX)
Right: **Nick Wong, Anurag Panda**, Fireflies

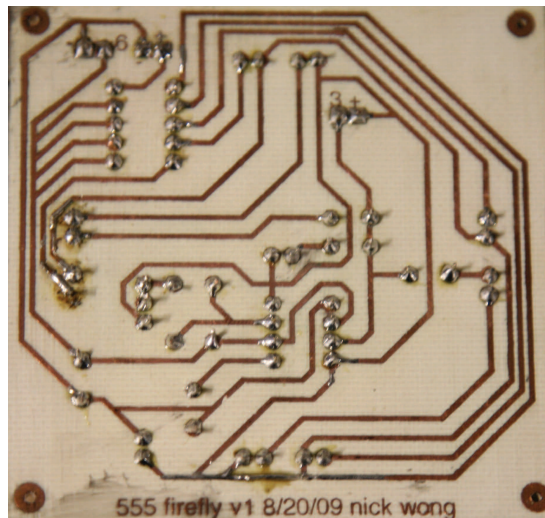


SYNCHRONIZING FIREFLIES

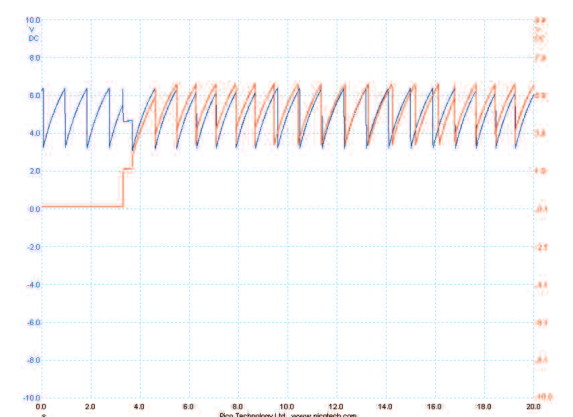
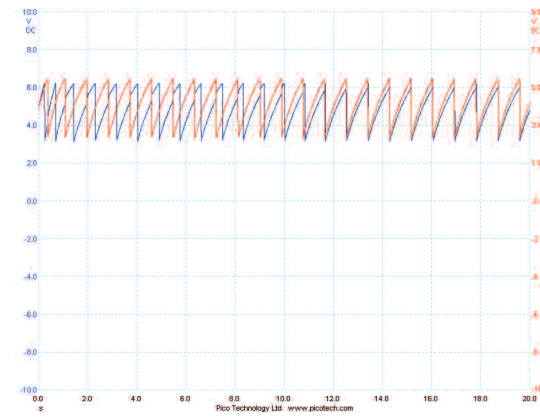
The exhibit is a recreation of the scene witnessed on a mid-June night at Elkmont Park in the Smoky Mountains. Flashing electronic circuit boards have been constructed and placed along the walls of the darkened chamber, simulating the behavior of self-synchronizing fireflies (*Photinus carolinus*) in the ambience of a dark tree-lined forest. Visitors can entertain in the fascinating beauty of the natural phenomenon and are also, unlike in the actual park, encouraged to freely interact with the “fireflies” by rearranging and disturbing them. Through this interaction, visitors can contribute to the endless array of emergent patterns and also glean for themselves the underlying principles of synchronization.

A “firefly” is little more than a circuit that pulses periodically at a constant frequency with the ability to sense the pulse of other fireflies. Synchronization occurs because a firefly's pulse will excite its neighbors, driving them closer to pulsing themselves. This mechanism of mutual communication of oscillating elements, termed “coupled oscillation,” ultimately pulls the system into reaching and maintaining a common flashing pattern.

Synchronization is not unique to fireflies; the mechanism just described can be abstracted and applied to many other biological and physical systems. Therefore, the exhibit can be enjoyed not only as a representation of fireflies in specific, but also of the more universal process through which decentralized interactions lead to unified behavior.



NICK WONG
ANURAG PANDA



MOJAVE DESERT AND MYTH



With the Menschel Fellowship we have produced a film to investigate the relation of myth, nature and man in the Mojave Desert. Our project was based on three different encounters with the desert in the history of cinema, the history of science and forms of nomadic life.

In John Ford's 1956 film *The Searchers* cinema becomes the encounter of the mythological estrangement of man and his burden of evil with the desolation of the desert landscape. Ethan Edwards (John Wayne) is ultimately abandoned to his searching. This man is the landscape. The landscape is inscribed into him. Through his search this man discovers a split within himself, he is drawn to a landscape of opportunity and immense freedom after the Civil War, yet finds that an inescapable violence and despair is immanent to the forsaken life of this very same landscape. This tragic relationship to nature

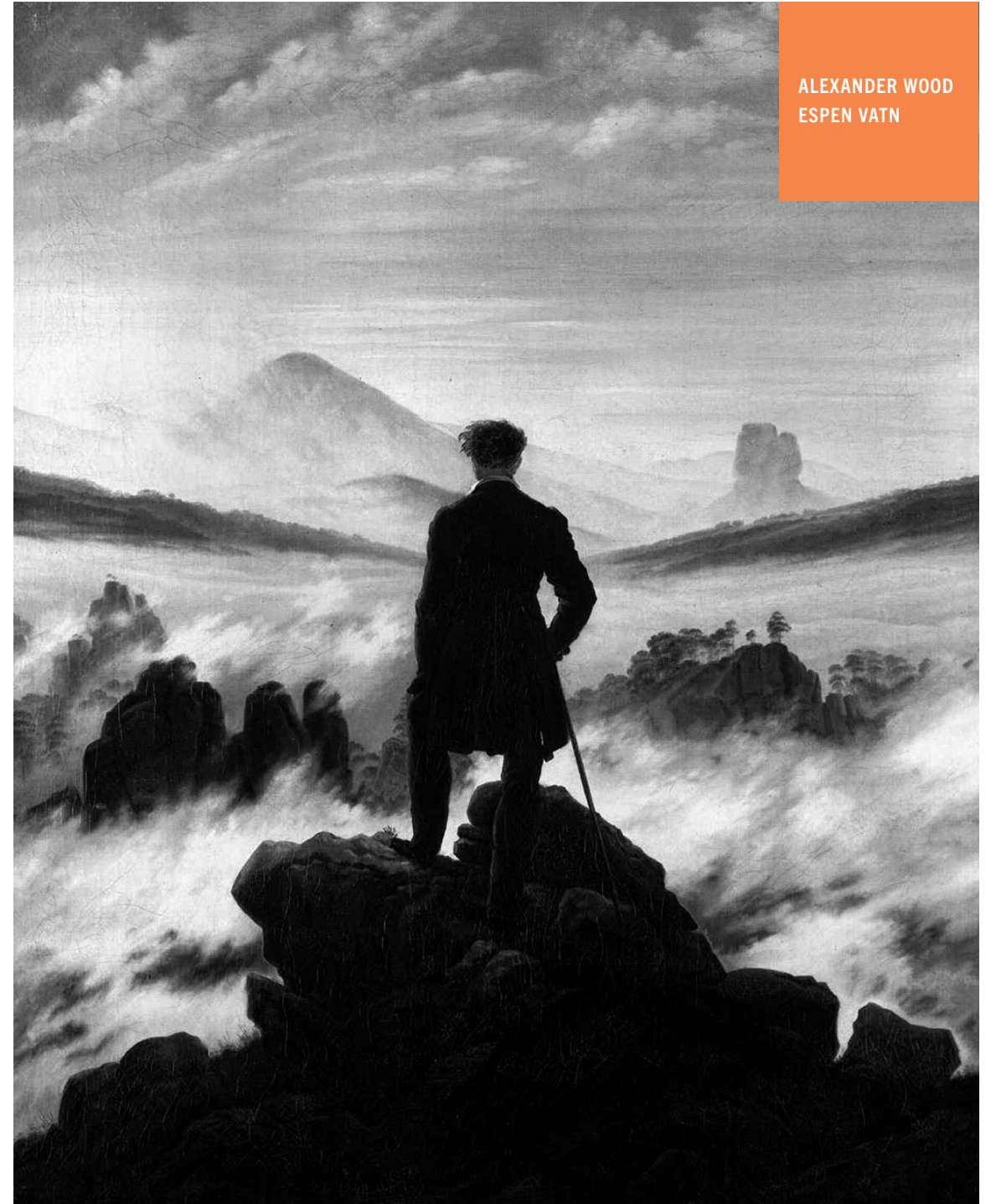
*"Man absent from,
but completely
within the landscape."*
Paul Cézanne

is comparable in a certain sense to the philosophical aesthetic of German Romanticism; with, for example, the painting *The Wanderer above the Sea of Fog* by Caspar David Friedrich. Except the beautiful soul of this man full of wonder and mystery in the face of nature in Friedrich's painting has become in John Ford's film a man for whom nature is not the distanced subject of reflection or art over which the beautiful soul contemplates itself, but the

Robert Oppenheimer is the symbolic equivalent of this figure in the history of science, a scientist who embodies the nihilism of modern science. He too is a searcher and his search brought him deep into the desert. John Ford went to the desert to search for the desert light, and Robert Oppenheimer went to the desert to recreate the source of this light and the mythic radiance of a thousand suns in the heart of the desert night.

Finally, the Mojave tribe and the form of life it has created in the desert tells an altogether different story of the relation of myth, nature, and man; for this tribe, the landscape itself is a story and this story sustains their union with the landscape. Here, man is inscribed in the myth, and the myth of man is inscribed in the landscape.

Our project proposes a search that is a film, a film that illuminates the land, and an ancient and apocalyptic landscape that traverses these stories.



ALEXANDER WOOD
ESPEN VATN

CIRCLE LANDS



To say that you are “off to photograph the aquifer” is like saying that you are about to slip through some hole in the ground like Alice following the White Rabbit, and end up canoeing in some vast underground lake, snapping photos along the way. Most people don’t know what an aquifer is, let alone how you would get to it, and even if they know that exists underground, there is still the question of how you plan to photograph in complete darkness.

These misconceptions about aquifers, and groundwater in general, are not new. People have the same theories now as they did when the first

wells were dug on the High Plains. However, the difference is that now science has found the truth. We are not floating upon a great sheet of water, with only a thin crust of earth as our raft. This is because an aquifer does not flow or pool, at most it trickles (and very slowly) through sandy gravel beds.

The water itself does not come from rain or the oceans, and it is not a thundering underground river with a source of its own. Ogallala is made up of “fossil water,” or water that was generated in the last ice age from the, then, glacier-laden Rockies.* This aquifer in particular exists 50 to 300 feet below the

SUSAN LITTLE





surface in saturated gravel beds 150 to 300 feet thick.* So, needless to say, I was not photographing the aquifer itself. In fact, the closest I actually got to Ogallala was running my hands under the water as it was pumped out of a center pivot irrigation system in the panhandle of Texas.

My exploration of Ogallala was from the surface, as if I was creating some kind of negative impression. I could only search for the evidence, both geological and agricultural, to define the image. The proof was in water-intensive crops like corn and cotton, or in the center pivot sprinklers that irrigated them. The changes in soil, and the cliff formations that

exist along the aquifer's perimeter, especially the Caprock and Mescalero escarpments were something I could photograph, not the mysterious "sandy gravel beds."

Due to this separation between what I was trying to document and what I was able to see with my own eyes, I discovered how easy it was to lose perspective and forget what I was looking for. However, if I wove in and out of the area I was focusing on, and continuously reintroduced myself to my surroundings, it became easier to spot the changes that had occurred geologically and were occurring agriculturally directly above the Ogallala.

This meandering took me from the southeastern most corner of New Mexico, all the way to the top of the state, and then throughout the panhandles of both Texas and Oklahoma. I attempted to cover most of the Southern High Plains Region of the aquifer, which lies beneath these three states. Traveling mainly on state roads, I moved slowly from one side of the map to the other, and back again. Sometimes I had a specific playa lake, or dam site I was looking for, but mostly I just wandered, collecting evidence along the way.

This evidence, or proof of Ogallala, exists as a series of photographs, which document the aquifer in as much as it can be documented from above. I attempted to capture both geological and agricultural connections to it, and perhaps draw a little attention to what has been called an "invisible resource." Perhaps it can now be understood that we don't need to go swimming in the Ogallala to know its nature.

*Opie, John. *Ogallala: Water for a Dry Land*. Lincoln: University of Nebraska Press, 1993.