Throughout history, artists have taken the materials and forces of nature and used them in the creation of works. The sculpting of clay, the mixing of pigments both represent the use of natural or organic materials as servants to artistic inspiration. However, a subset of art has allowed that relationship to be reversed. Using a wide range of tools – wind, entropy, erosion, mapping – some artworks allow nature to be a physical, determining influence in the realization of an artwork. A group of artists have shared their vision with the natural environment and transferred the power to shape its form to the forces of nature.

More recently, artists have been using data from the natural world as a driver for the visual, temporal, narrative or dimensional components of their work. Taking advantage of the increasingly inexpensive and portability of computational sensors, these artists are ‘reading’ the natural environment and then using the data to shape artworks that exist in a mediated but symbiotic relationship with the natural world.

Easily understood as a type of data visualization, the projects often focus on the computational and can be associated with other information arts. Alternatively, they can be viewed as ecological art, tapping into the contemporary zeitgeist surrounding sustainable design. However, if one considers the interactivity of the works – nature as a collaborator – they fall rather interestingly into a history of Land Art sculpture. Perhaps by viewing these projects as Mediated Earthworks, we broaden both the depth of these artworks and our understanding of our complex relationship with nature.

The moving image is usually considered a mediated art form since it is difficult to separate kinesis from the machines that power it. However, kinetic sculpture is also time-based, often narrative, and its changes in shape, color, and even materiality share many qualities with cinema. Making this leap, one can consider the evolving form of Calder’s mobiles and the rambling wind-powered sculptures of Theo Jansen as moving images. Media is a thing between, the bridge or the wall between the artist’s idea and the viewer’s reception. In a sense, kinetic artworks are non-mediated moving images.

Although the Land Art sculptures that began emerging in the 1960’s would rarely be considered ‘moving images’, they were often both programmatic and time-based. Their innate ephemeral qualities – artworks that embraced entropy and change instead of battling it – made them temporal forms whose changing ‘image’ was part of the artists’ creative strategies. Rising once again from the Great Salt Lake, but
now encrusted with white salt, Robert Smithson’s “Spiral Jetty” (1970) is becoming one of the 20th century’s great artistic narratives. As sculptor Robert Morris explained, “What art now has in its hands is mutable stuff which need not arrive at a point of being finalized with respect to time or space. The notion that work is an irreversible process ending in a static icon-object no longer has much relevance.” [1] Presenting themselves in stages and created with specific life spans in mind, Earthworks were images that moved.

Interactivity is art constructed as a context for experience. Like the moving image, interactivity is strongly associated with computation and media. However, interactivity can be purely relational, with no mediation required. Paul Willemen puts it almost bitterly, “To refer to interactivity as a new feature characteristic of ‘new tech’ discursive forms is, again, nonsense. Indeed, in many respects, the digitalization of information has rendered interaction between reader/viewer and text-production more restricted in that the protocols governing interactivity have become tighter, narrower, more inflexible, and more policed. The expansion of opportunities for interaction has become accompanied by reductions in the scope for action.” [2] Part of that scope of action is limited by a view that interactivity must occur with machines.

However, interactivity is not limited to Willemen’s reader/viewer either. The emphasis on process and temporality of the Earthworks sculptures was directly tied to dynamics in the environment. The Land Art sculptures were interactive through context – the artist interacted with the landscape, the viewer interacted with the sculptures as spaces or systems, nature interacted with the sculptures by changing their form.

This emphasis on time and process forced viewers to look at the dynamics of the elements in the environment. One had to experience different stages of the system to experience the whole work which had its own life span. The physical properties of the landscape became a form of interactive driver for the realization of the visual artwork. It was “a programmatic approach to the work and advocates sculpture which experiences, reacts to its environment, changes, is non-stable... art is gradually entering into a more significant relationship with the viewer and the component parts of his environment.” [3]

Changes in time led to changes in form and the Earthworks movement celebrated art as a spatial event – sculpture was viewed as malleable, changing, entropic, and participatory. Earthworks connected physically with their environments and were designed to react to the forces found there. Nature was the hammer that pounded the sculptures, the brush that changed their colors. “During the period, many artists worked with natural materials, often fascinated by their evolution and their organic decomposition. To better observe this process, the artist became almost a laboratory assistant, engaging in artistic experiences.” [4]
Many of the Earthworks artists would probably contend that they were fighting the creeping technology and mediation of the 1960’s and took to the desert for its innate isolation and primitivism. It is ironic that many of the works were actually very complex systems and, when connected with the programmatic strategies evolving in Conceptualism and Fluxus, became keystones in the computational arts of today.

Thematically, most Earthworks artists embraced an ecological sensibility and concern for the man-nature interaction. The Land Art movement occurred just as society was gaining a deeper understanding of ecological systems. The 1960’s spawned movements that emphasized the delicate and endangered systems around us. Some of the sculptors of this era responded by creating systems that were designed for cleaning or repairing damaged nature. They joined a trajectory in art where stewardship towards nature is part of the creative strategy.

These artistic systems are celebrated as early ecological art but could easily be equally lauded as early programming art. Hans Haacke’s creation of artificial ecosystems (“Rhine Water Purification Plant” 1972), Agnes Denes harvesting wheat in downtown Manhattan (“Wheatfield: A Confrontation” 1982), Robert Smithson pouring tar down an eroded hillside (“Asphalt Rundown” 1969) all contained very direct environmental agency in their work. The sculptures could not exist without the input of nature itself. As Don Krug observed, “the artists are doing cultural work, through art, in relation to the systemic characteristics of human, plant, and animal interactions within particular geographic locations.” [5] The direct use of forces and processes in nature to create sculpture continues today. John Grade’s “Host” (2007) is partly sculpted by the local birds pecking away at the form of his work.

According to Mark Rosenthal, the land art movement was gestural sculpture: coarse masculine actions, gentle ephemeral actions, performance where the environment is the stage, journeys as art, alternative ‘gardens’, and systems for cleaning or repairing damaged nature. [6] The gestures could be revealed in a wide range of interactions that directly tied to nature including deconstruction, mapping, dispersion, growth, negation, rehabilitation, displacement, and marking.

Art often reflects the society of its time, and the Land Art emphasis on ecology tied to society’s better understanding of natural systems. In each gesture, a two-way relationship with nature is emphasized by the artist. These sculptors were interacting with natural systems within an environment. Rosenthal’s gestures are a good starting point for working with nature as a strategy, but do not cover the second half of the equation: the direct influence or impact of nature on the formal properties of a work.

Today culture has shifted towards an emphasis on sustainability – how those ecological systems can survive without diminishing. It is an approach that empowers natural systems, giving them the capacity to endure. Systems of nature
has been replaced by forces of nature as sustainable design often incorporates a direct agency with environmental power – wind, currents, sunlight, etc.

Tapping those forces means that artistic gestures can be shared. What are nature’s gestures? Kinetic art has often recognized this possibility and used natural force as a method to change the form of a sculpture. Alexander Calder’s mobiles “introduced an intricate dynamic of dispersed and reciprocal forces that took the notion of sculptural mass beyond the uni-directional force of gravity, and he opened it up to outside influences.” [7] The direct influence of natural power on the properties of an artwork continues today with the kinetic works of Theo Jansen whose wind-powered skeletal ‘strandbeests’ ramble across the beaches of the Netherlands.

Two recent exhibitions of kinetic works have emphasized the forces of nature as a collaborator in the creation of an artwork. Guy Brett, curator of the Force Fields: Phases of the Kinetic show in Barcelona, explained that “we begin to see that ‘natural phenomenon’ and ‘aesthetic decision’ were at this time in a shifting and reciprocal relationship to one another. The working-out of natural processes was allowed to change the conception of the beautiful; artists ceded their ‘will to form’ to certain degrees and in certain ways, and allowed natural events to prevail, which was seen as an emancipatory process, and to offer deeper insight into reality.” [8]

The Drip, Blow, Burn: Forces of Nature in Contemporary Art exhibition at the Hudson River Museum presented artworks that used wind, water, and fire to shape the materials of the art. Curator Thomas Weaver observed that “the natural here is not just a subject, and certainly not just a material...moving natural elements are primal elements that, by rupturing the boundaries that govern the significations of visual art, embody the power of art to wrestle with the world.” [9]

Although they are dynamic forces to use as creative influences, wind, water and fire are just the beginning of the possibilities. Computer technologies have not increased the distance between man and nature, but new sensors have actually introduced new types of environmental agency. Many natural forces are not directly tangible but now the invisible energy fields, patterns, rhythms and dynamics of nature are possible artistic tools.

Today, incredibly minute changes in motion, light, sound, temperature, depth, and a host of other variables can be detected. Our newfound computational detail is spreading and giving us unique information about the natural environment. One of the largest initiatives, Hewlett-Packard’s “Central Nervous System for the Earth” plans to release a trillion sensors into the natural and built environments. [10] This global swarm of miniature wireless devices will provide real-time information on ecological systems, seismic vibration, natural energy activity, etc.

Increasingly, artists are co-opting these stunning data streams for artworks. When the sensors are matched with kinesis, data over time, we see the possibility of nature itself affecting the artwork. Similar conceptually to Earthworks, these new
computational versions have a key difference. Mediation is not limited to the photographic or video documentation of the artwork but now includes the actual collection and input of artistic materials. Media is no longer just presentational.

With sensor and data stream as a type of mediation, emerging technologies make it possible to create new media artworks in remote, wilderness locations. The miniaturization, portability, and cheapness of sensors, computers, projectors, etc. is leading to a body of work where the landscape is inextricably linked to the artwork. The list of sensing technologies is growing at a phenomenal rate; this includes commonly used sensors like GPS, DNA, motion, altitude, tilt, speed, light, sound, SONAR as well as emerging technologies in 3D/stereoscopy, 360 degree cameras among others. When matched with artistic strategies, we’re seeing GPS Drawing, light and sound installations, projections, and a host of other technologies all using captured datasets that transform the artwork in real time as the data from nature is incorporated.

The narrative possibilities are also being explored when nature is used as a driver for narrative construction. The natural environment can now become a protagonist, not metaphorically but literally, in the evolution of a story. Sensed changes in nature can be used to select and present from databases of a wide range of media, creating real-time stories in text, moving image, sound, etc. One of the lures of exploring environmental agency is the hidden interactivity of the process. The narrative still allows for interactivity’s flexibility, but is not controlled by direct human interface. Tomorrow’s auteurs may be dynamic spaces.

The direct agency of the natural environment has been investigated by several artists. Mary Lucier’s “Dawn Burn” (1975) used a video camera to record the rising sun until its rays left a scar on the image and eventually destroyed the camera’s tubes – the power of sunlight directly shaped the visuals on screen. The Center for Land Use Interpretation (1994, ongoing) has initiated several projects that merge database arts with a proactive nature and have made advances in the art of mapping. Paula Poole and Brett Stalbaum have mixed painting technologies with GPS systems, and Haruki Nishijima has designed systems that capture ambient sound and translate it into light and motion. Sheldon Brown’s “Video Wind Chimes” (1994) used wind sensors housed in streetlights that had been converted into projectors. Changes in wind changed the television channels being projected down onto the sidewalk.

In my own practice, I have been working with the forces of nature. The Sustainable Cinema series (2009, ongoing) are kinetic public sculptures that use natural energy – wind, water – to generate the moving image. [Fig. 1] Earlier, I created a light installation based on the topography of Los Angeles’ famous Mulholland Drive. Together with programming by Michael Chu and sound design by Martin Bonadeo, we collected the tilt, altitude, location, direction, speed and sound of the drive and created an exact duplicate of the experience in a 3D computer program. That virtual path was then used to control two robotic lights in a dark room filled with fog. Like
cinema, direct data is captured, then edited and presented. However, here the environment directly defines the experience, the precise geography is used computationally. “Mulholland Drive” [Fig. 2] demonstrates how the rhythms, patterns, and random chance of the environment can be sensed through new media technologies and used to create new forms of visual experience.

Emerging technologies are also opening options for the presentation of these datasets – a mediation of the mediation. Presentation choices now include technologies like light and laser projection, directional sound, GPS drawings, 360 degree and immersive film, and real-time, 2D, or 3D animation or text. As technology introduces more options for relocating the moving image back into the environment, we now can take the environmental drivers and circle them back into nature. The environment is read, creates the story or a visual/sonic artwork, and presents the result back again in the original site as a type of new media feedback loop.

Another field exploring interactivity with space is the art and research being done in ambient telepresence – the representation of a remote site through alternative displays. Ambient telepresence is about awareness, not communication, and attempts to make use of the entire physical environment as an interface to remote digital information. Information is moved off the monitor and into the physical environment. Working with ambience is an interesting subgenre of telepresence where temperature, sound, lighting, etc. are the interface. Remote environment affects local environment; spaces are now talking with spaces.

Computational sensing, database aesthetics, real-time processing and visualization systems all can give new perspective on the natural environment. Working with science, media artists can now use the same materials that shaped the Earthworks movement like water, air, soil, stone, temperature, light, acoustics, topology, geography. However, with sensing, shared creative input can be given to natural forces and phenomena in those materials – flow, echo, wind, currents, reflection, decay, animal migration and behavior, topology, projection, and so on.

Once again, artists are reflecting society's views on the environment but now with an emphasis on shared input – natural energy paired with creative energy. With emerging sensing technologies, hidden natural forces can also be used in artistic strategies. For centuries, nature has been celebrated as an inspiration for the arts. Finally, nature can do more than inspire, it can pick up the brush itself.

CAPTIONS

Fig. 1. Sustainable Cinema No. 1: The Image Mill, 2009, Scott Hessels, steel kinetic sculpture, installed at the Ford Presidential Museum, Michigan. Copyright Scott Hessels. (Used with permission.)
Fig. 2. *Mulholland Drive*, 2004, Scott Hessels, Michael Chu, Martin Bonadeo, light and sound installation, installed at UCLA, Los Angeles. Copyright Scott Hessels. (Used with permission.)

REFERENCES


