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Emergence: The generation of material spaces in Anthony McCall's *Line Describing a Cone*.

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abstract:

Anthony McCall's solid light film *Line Describing a Cone* (1973) is about the emergence of dimensionality in space. This paper uses *Line Describing a Cone* to discuss emergence as a material algorithmic process occurring across the media of informatic systems and installation art. Evolutionary models of emergence trace patterns, whether behavioral, spatial or genetic. *Line Describing a Cone* suggests the emergence of a new kind of mobilized viewer within gallery spaces who does not necessarily 'evolve' but who (through interruption and noise) becomes an interactive emergent part of the material processes of the work. Noise travels and generates the excess dimensionality within which an emergent material process can occur. It is contested here that emergence can only occur within noisy environments. Emergence then, introduces a process within which viewers interact with and experience art installations.

Keywords: Emergence, Materiality, Installation Art, Noise, Dimensionality.

This paper begins from a belief that all media are material, and that in their specificity time-based media can introduce us to different kinds of relationships and experiences across material surfaces and forces within gallery spaces. To this end, it will demonstrate how a film installation within a gallery space presents materiality as emergent. The paper focuses on an artwork that draws on installation's cinematic legacy *Line Describing a Cone* by Anthony McCall (1973). *Line Describing a Cone* is currently undergoing a renaissance of sorts possibly because it invokes a particularly affective interactive experience that echoes many works being produced within digital environments. *Line Describing a Cone* is an interactive solid light work dependant on a 16mm film projector and a smoke filled room. It is expanded cinema, that is, cinema falling off (or without the need for) the screen and the other usual accoutrements of the cinematic apparatus. *Line Describing a Cone* suggests the emergence of a new kind of mobilized viewer within gallery spaces. In discussing some basic ideas of emergence alongside this

work I want to demonstrate that materiality is not a pre-existent condition of art installation but emerges through and by virtue of the forces of noise.

Before I take this discussion further, I need to explain the use of the term 'noise' in this essay. For Claude Shannon (1948) and others working on the perfecting of models of communication noise was something to be eliminated, or at best overcome. Systems were designed to repress or eliminate as much noise as possible, whilst also acknowledging that without noise information could not be transmitted. In Shannon's model noise is both an interruption to the flow of information and something encoded within the information itself. This attention to noise has another history found within experimental and avant-garde music. In 1961 John Cage famously wrote:

Wherever we are, what we hear is mostly noise. When we ignore it, it disturbs us. When we listen to it, we find it fascinating. The sound of a truck at fifty miles per hour. Static between the stations. Rain. We want to capture and control these sounds, to use them not as sound effects but as musical instruments (2004, p.25-26).

Noise for Cage was productive of listening, and thus interaction. Listening to noise means that we can shift preexistent structures and habits. This idea has a resonance with Jaques Attali's political definition of noise. Attali's definition is political because it locates noise as an operation of power across and within society. Attali writes: "Noise, then does not exist in itself, but only in relation to the system within which it is inscribed: emitter, transmitter, receiver" (1985, p.26). These shifting roles or definitions of noise make noise a rich tool for the discussion of a work such as *Line Describing a Cone*. It is in the bringing together of Shannon and Cage's radically and pragmatically different approaches to noise with the politics espoused by Attali that I locate a working definition of noise, which forms the basis of my argument here. For the moment the focus is on the productivity of emergence within gallery environments and results from a particular localized reading which finds pleasure in incomplete, disordered and potential systems. Within this noise is found operating at different levels. Disorder is noise and, as I will show, it is also information. Emergence can only occur within noisy environments. In this, emergence suggests movements outside of closed systems. Thus, for the purposes of this essay an art installation is understood as a false construction of a closed system: what might appear closed is of necessity open.

In highlighting emergence as a key term within this essay, I also acknowledge existing understandings and uses of the term. In populist interpretations of academic science, emergence is used as a biological concept which addresses the continuum of evolution. Because of this, it is tied up within ideas of progress whether physical, social or intellectual. Emergence is based on a common denominator; that of a movement from "low-level rules to higher-level sophistication" (Johnson 2001 p.18). Similarly, in applied social sciences such as the approach highlighted by Anthony Wilden (1972) emergence is located within a specific event of

evolution. In his examination of "collective intelligence" Pierre Levy (1997) highlights the ways in which emergence allows us to see how molecular technologies exhibit scalar similarities. Within Levy's framework emergent formal properties open up structures to other influences. Kenneth Rinaldo (2004) extends this approach to discuss the coming together of scientific and artistic attitudes to neo-biology suggesting that emergence is convergence, a sharing across disciplines. It is within the physical and chemical sciences that emergence is used a key disruption to these discourses of evolution. Theories which approach chaotic realms recognize that pre-determination is not the only force leading to emergence, but that their studies have to include contextual and unseen factors, such as noise or entropy (Prigogine and Stengers 1984; Kauffman 1993).

Following the arguments of DeLanda (2002) and Massumi (2002) emergence across media or material forms can also be seen as a counter to the above discourses of convergence and determinism, where one singular media form overtakes another. Emergence here implies a greater connectivity between media forms, where strands of one are found (to use DeLanda's terms) to not be "clear and distinct" but "clear and obscure" in relation to the other (p.16). The distinction here is between emergence as an evolutionary property where changes occur within predetermined material forms, and emergence as an event which is not anticipated by an essential form, but that generates new material relationships (what Deleuze would term the "progressive differentiation" of a multiplicity) (DeLanda 2002, pp.15-17; Deleuze 1994, pp.255-264). These ideas have been picked up in literature particularly in the work of Katherine Hayles (1996, 1999, 2003) who uses emergence as both description and methodology for our encounter with hypertextual media.

In visual art emergence has long been a tool for the construction of immersive works, for example, Leon Narbey's *Real Time* (1970) art environment which opened the Govett Brewster Gallery in Aotearoa New Zealand. Narbey constructed a work that was dependant on the movement of people through various levels of the gallery, triggering lights, sounds and further movements which were transmitted across the spaces. The systems basis of *Real Time* anticipated many later developments within digital interactivity, as well as suggests an open concept of the work, viewer and space where a viewer does not only enter a space but constructs it for others. Further uses of emergence within art are found in experiments with fractals and self-determining systems. There are two trends here, firstly, the use of emergence within the computer in terms of modeling self-organising systems, and secondly, when the tools of emergent or generative technologies are applied outside the hard and soft-ware in order to produce these systems. It is the latter approach found in works such as David Haines and Joyce Hinterding's *Purple Rain* (2004, Sao Paulo) or Patricia Piccinini's *Swell* (2002, Sydney) that offers a beginning point for the current study. Within this context my use of the term draws on Deleuze and Delanda's materialist arguments regarding crystallisation (DeLanda 2002 pp.17-19; Deleuze 1989 p.126). Following them I will use emergence to describe a

force occurring within a particular event, or manifestation of an information system which is the result of the bringing together of different material sources (digital, analogue, physical and virtualised) within a particular spatial environment. Emergence then is used here to introduce a process within which it is possible to articulate the shifting ways in which viewers interact with and experience art installations.

In order to begin a discussion of emergent materiality I will do two things. Firstly I want to engage discussions of materiality in video and experimental film which have been ongoing since the late 1960s. This will open up a space for a provisional working definition of emergence as an event occurring within an open system of gallery, artwork and viewer. Here I shift my discussion away from the closed informational systems discussed by Shannon and Weaver (1948; 1949) amongst others, towards a self-organising, or defined, environment within which there are different temporal and spatial operations and through which different material processes generate change. This environment shares much with those idealized in the cybernetic worlds of Wiener (1961) and further developed by Umberto Eco in *The Open Work* (1989). Secondly, I will approach the concept of noise as something both productive of, and produced from within emergent materiality.

1. dimensionality

Line Describing a Cone is what I term a solid light film. It is dealing with the projected light-beam itself, rather than treating the light-beam as a mere carrier of coded information, which is decoded when it strikes a flat surface (the screen). The film exists only in the present: the moment of projection. ... For this film every viewing position presents a different aspect. The viewer therefore has a participatory role in apprehending the event: he or she can – indeed needs to move around, relative to the emerging light-form (McCall in Walley, 2004).

Anthony McCall's solid light film *Line Describing a Cone* (1973) is about the emergence of dimensionality in space. Over the duration of thirty minutes a small dot grows. Projected as a single light point which travels the length of a smoke-filled room, a dot begins to draw on a wall. As it draws, its traces leave an arc of solid white light that runs the length of the space. Gradually the light opens up into a semicircle, finally completing a full circle by meeting its own edge on the wall, and generating a large cone of solid light. All this activity on the part of the projector impels audience members to move. First tentative efforts are met with black shadows, interruptions to the surface of the cone; gradually whole bodies become suspended within the boundaries or spaces of the light. The fragments of bodies breaking the beam become disconnected from anything outside of the beam and the room appears to shrink, becoming encompassed by the artwork. Because of the intensity of the audience's concentration within the light space, black spaces outside the light beam are not only invisible – they momentarily disappear.

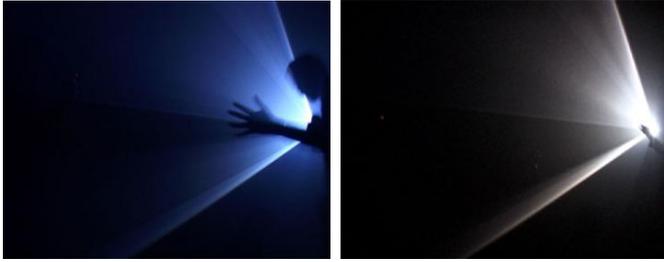


image 1 and 2. Anthony McCall *Line Describing a Cone* 1973, 16 mm film solid light projection, smoke. Perth screening, Bakery Artrage Complex, 2005. Photos: Jo Law.

For me, *Line Describing a Cone* reignites my desire for an impossible physics as experienced driving down a New Zealand harbourside road towards a forever-receding rainbow. Both situations suggest an emergent materiality where fixed spatial objects generate unfixed spaces of questionable dimensions. Michel Benedikt (1991) in his early exploration of dimensionality in cyberspace also tries to articulate such an object, which when rotated on its axis not only changes in dimensionality but on another level also contains the potential to transform according to the position of its viewer. He too thinks of rainbows, he writes:

rainbows have this quality: that is, the quality of not being anywhere reachable in absolute, geographic space, but existing nonetheless visually, and always remotely, at a place determined by the invariant spatial relationship that obtains ... between a given observer, the sun, and the water droplets (which, of course, themselves all have stable, reachable geographic positions). These kinds of objects travel with you, or appear and disappear as a function of your own motion and circumstance (p.147).

Benedikt is imagining objects existing within a cyberspace that do not adhere to two- or even three-dimensionality. The implication of his discussion is that a rainbow is not a forever receding illusion, but emerges from a particular combination of material objects at a specific moment. It exists but always remotely. McCall brings the remote dimensions of the rainbow to the screening space of film. Here, the projected light (which is no longer remote and sealed in a projection booth but present within the room) combines with particles of smoke to create something solid. It is the projection beam itself that is rendered visible, becoming more than a carrier of pre-recorded and coded visual information. The artwork here is not confined by a space but actually generates a space. Or as Benedikt put it, it is "here we see intrinsic dimensions expand to become the extrinsic dimensions of the object now extended enough to have space within it, to *be* a space" (1991, p.143). *Line Describing a Cone* relies on this dimensionality of space; the fact that its own process of definition, of shining solid light, holds enough space within it to *be* a space. It is through its activation of the triple process of space generation, impossible dimensionality and viewer intervention that *Line Describing a Cone* can be said to be emergent.

2. emergence

As I have mentioned, a definition of emergence as an informatic system moves away from standardised evolutionary models of emergence. Emergent materiality is key to installation's dependence on the parameters of noise and dimensionality (rather than those of selection and self-similarity). The dominant use of emergence in relation to contemporary visual art is found in projects which tend towards evolutionary, generative or formal object-based finality. For example, Richard Brown's *Mimetic Starfish* (2000) and Jane Prophet's *Technosphere* (1995) both develop ideas of emergence in line with Artificial Life explorations. The works use generative software programs to develop and present emergent behavior to an audience. The *Mimetic Starfish* in particular operates within an uncanny space between the emergent life form and the not-quite real. Interactions with the starfish encourage the emergence and sedimentation of new behaviors for both the work and the viewer. Because it is bound within the dialectic of mimesis the starfish has an aim - a final point of emergence to which it aspires - this is the point at which it might be mistaken for the real. *Technosphere* modeled emergent social behaviors at the same time as giving (human) users connections to particular creatures within the community, and the attendant joy and sorrow at their antics. Similarly, the projects conducted through SymbioticA in Perth critically evaluate emergent and generative ideas as part of their focus on Bio-arts. These works reflexively examine their own process and underlying methodologies conducted within an interdisciplinary art science context. Emergent phenomena are 'grown' and produced ending with a result which is solid and object based - albeit potentially consumable in the case of Tissue Culture and Art's *Semi-living Food: 'Disembodied Cuisine'* project (2003). Each of these works share something with the way that *Line Describing a Cone* reaches a final point of completion. Despite the emergent intensity of the thirty-minute experience, after the circle has been drawn and the cone completed the work can only loop rather than emerge further. In the above cases an analogue model of emergence is operating, within which continuous operations and processes move toward a definite point of closure: the food is consumed, the creature finds a mate, the starfish looks and behaves like it should were it real, the cone is drawn. However, although these works can be said to end when this point of closure is reached, for the viewer they do not resolve and continue to resonate differently.

In one of the more populist texts on emergence Steven Johnson (2001) argues for a reading of emergence as systematic social, biological or cultural change driven by a "bottom up" process. Emergence in this model is closely tied to feedback, where "circuits reverberate" and there is a "subtle sense of information being plugged into itself in ever more baroque ways" (pp.133-134). This form of decentralized change management within a system is designed to create adaptation in order for the system to respond to forces both within and without. Drawing on Norbert Weiner's arguments, Johnson presents the fundamental law of emergence as the behavior of individual

agents being less important than that of the overall system. This means that the system is not simply representational; it has rules. He writes,

What's interesting here is not just the medium, but rather the rules that govern what gets selected and what doesn't. It's an algorithmic problem, then, and not a representational one (p.158).

In using the term representational Johnson opposes emergence with a reflective (representational) process in which the medium can be 'seen' to transform. Johnson's analysis highlights the importance of a separation of our concepts of medium and material. Emergence is a material algorithmic process and not representational change occurring within the medium of informatic systems. The emergent transformation occurs at a material level; it is more than what can be seen. The impact of emergence within informatic systems is found in the way in which the notion of medium is transformed and rendered redundant. From a slightly different perspective, Katherine Hayles (1999) has discussed emergence in relation to media. For Hayles the "medium is not something that is given once and for all, but a structure that is discovered and produced by its use and content" (Baetens 2003). Hayles connects the medium with emergence through the operations of flickering signification. In particular, Hayles addresses the relationships of mutation, pattern and randomness within hypertext. Hayles explains that pattern (such as the binary 0101) results in a situation whereby "any symbol can appear in any position" (1999, p.32). This means that pattern cannot invite or contain mutation, simply more pattern. In other words it will tend toward the periodic. Mutation is essential if a text is to emerge, or contain emergent properties. This is because "mutation normally occurs when some random event ... disrupts an existing pattern and something else is put in place instead" (pp.32-3). Mutation is thus the "bifurcation point" between pattern and randomness (p.33). It is here that a system can evolve in a new direction. Once mutation occurs the pattern is never the same and as a result we can only understand the passing of pattern through randomness. Hayles turns the equation around: "The randomness to which mutation testifies is implicit in the very idea of pattern, for only against the background of nonpattern can pattern emerge" (p.33). Pattern becomes a kind of analogical end-point, and randomness an inherent material quality. Evolutionary models of emergence trace patterns, whether behavioral, spatial or genetic.

One more element needs to be considered in this initial mapping of emergence within a gallery space: the relation of dimensionality to noise. When Benoit Mandelbrot was working on possibilities for fractal geometry he found that noise within an informational pattern occurred in bursts and gaps and not in a steady stream. He concluded that 'pure' noise did not exist, and consequently neither did pure signal. This enabled him to revisit the notion of 'cantor's dust' which was "bursts of noise plotted along a time axis" (Nunes 1999). Mandelbrot found that non-periodic noise was essential to the generation of the self-similar pattern that we recognize as fractals. In the

terms of this paper Mandelbrot found noise located within movement and duration, it was an emergent space within which he was able to map difference and repetition. Mandelbrot's space was emergent because it introduced a shifting uncertainty – a non-periodic noise which disrupted an illusion of pure space - into the aspects of dimensionality discussed above. *Line Describing a Cone* uses a similar notion of noise within its emergent surfaces. Introduced by the audience as gaps in transmission, bursts of noise become plotted along the time axis of the work's duration. This interactivity is crucial to the screening of the work, and marks a key shift in notions of the screen, and audience behavior 'in front' of that screen. Emergent materiality encompasses a broader spectrum than that of mutation and pattern. This is because it suggests a method for discussion of artworks operating within open systems. One reason for this, important to *Line Describing a Cone* is that noise or randomness is not only a trigger, but is necessary to the whole 'process' of emergence. As I have mentioned, the process of emergence generates new materialities, (what Hayles termed mutations) which themselves contribute other potentialities for emergence within the ever-shifting viscosity of the work. The way this occurs in *Line Describing a Cone* is through a process that treats noise and information as the same property, and not as a movement away from noise (chaos) into information (order). This relationship of pattern to non-pattern plays out in the sonic relations of periodic and non-periodic sound. Noise travels and generates the excess dimensionality within which an emergent material process can occur. Take away noise and there is not emergence, simply evolution.

Line Describing a Cone therefore highlights elements that together construct a notion of emergence in gallery installation. Firstly, the work describes and generates a space, rather than being confined by it. Secondly, the work operates by way of challenges to fixed dimensionality (whether spatial or temporal). Thirdly, within this process the presence of noise removes any mandate for linearity or self-similarity in the screening of the work. *Line Describing a Cone* is both emergent and non-linear; it is an experimental film installation, which anticipates discussions of and approaches to digital media in art which were only just beginning in the mid-70s. *Line Describing a Cone* is emergent because of the way it generates a process within and across space compelling the audience to behave interactively. Furthermore, in this work another ground is being transformed: that of cinema. Cinema presents a contained world, one that as viewers we find ourselves within. Consequently without its representational and framing structures the cinematic world would not exist. Roland Barthes (1977) attributes this co-dependence to the framing structures of the theatre, which found their way into the cinema.

In the theatre, in the cinema, in traditional literature, things are always seen *from somewhere*. Here we have the geometrical foundation of representation: a fetishist subject is required to cut out the tableau.(p.76)

Sean Cubitt (2003) approaches this figure of the viewer (the fetishist subject) from the other side of the screen. Cubitt argues that the problem with media representation is that it is “based on the premise that there is an individual prior to mediation on which the media operate” (p.10). The cinematic apparatus is founded on this structured subject and set up for their view. As such, the apparatus is not simply a technological combination but is already enmeshed in social and cultural histories. Barthes continues his discussion and uses the cut-out as a way to explain the representational connections he sees between geometry and theatre, and by implication, cinema.

The tableau (pictorial, theatrical, literary) is a pure cut-out segment with clearly defined edges, irreversible and incorruptible; everything that surrounds it is banished into nothingness, remains unnamed, while everything that it admits within its field is promoted into essence, into light, into view (1977, p.70).

Using a similar cut and paste aesthetic, Deleuze illustrates Bergson's process of making representations, suggesting that “rather than being a part of its surroundings part of existence and duration constituted in the flow of images in the zone of indetermination, the thing detaches from them as a picture” (Olkowski 1999, p.97). For Deleuze however, even when cut out, isolated and represented, the thing or object still cannot be directly perceived because total isolation is impossible. As such, perceptual representation is always impure, infected by spaces of memory, affect, and noise. The spatial limitations and boundaries of perceptual representation are a direct result of the framing and cutting of the cinematic apparatus and its relationship to the viewer. These spatial and temporal limitations of the apparatus are disputed when the work itself exceeds the screen. *Line Describing a Cone* does not reflect some elsewhere space of the screen, a thing, or an image but instead projects a noisy new form of dimensionality into the exhibition space. Because of its embrace of impurity and noise, there is potential for direct relationships with the work. At the same time, this space is in the process of being defined by the work. The work is generated across and generates its own multiple emergent materialities. The installation does not occur within a preexistent or essential space, but actively determines the what, how and where of space.

In *Line Describing a Cone* a viewer is confronted with matter forming. Noise becomes the function by which all movement happens. In this paper a similar movement has occurred. Instead of a discussion that analysed viewer experience through the languages of immersion and interactivity, I have suggested an alternative framework which I have termed ‘emergent materiality’. Emergence is not suggested as a taxonomic or evolutionary system – fundamentally this is because we should not rely on a viewer's judgment of pattern or noise to assess whether emergence has occurred within an installation. Rather, emergence is a material process – a flow that is not that of an object or form, and is not object-forming – but is however material. This argument shares something with Claude Shannon's approach

to information. Information, separated from meaning making or judgment can be understood as a flow or a measure. It was because of its shifting material (or potential immateriality) that Shannon saw information as entropic. Like noise or entropy, emergence is a measure of that flow, an indication that process is occurring. Lastly, if we return to Jaques Attali's definition of noise cited at the beginning of this essay, noise is found operating the system of the work as emitter (the 16mm projector) transmitter (the smoke filled room) and receiver (the audience). It is these various operations or processes of noise within the installation that generate what I have termed 'emergent materiality'. An emergent materiality, then, shifts our understanding of installation as something that deals with the bounded relations of space and time brought together by a specific art work. By developing emergent materiality as phenomenon specific to installation we can begin to understand this as an assemblage of information-noise in which the relations of dimensionality, movement and duration coalesce without cohering; and anticipate the development of emergent materiality in digital realms.

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Biography:

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