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Information, Noise and et al.

Su Ballard | Respond to this Article

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1 The two companions scurry off when they hear a noise at the door. It was only a noise, but it was also a message, a bit of information producing panic: an interruption, a corruption, a rupture of communication. Was the noise really a message? Wasn't it, rather, static, a parasite?
Michael Serres, 1982.

2 Since, ordinarily, channels have a certain amount of noise, and therefore a finite capacity, exact transmission is impossible.
Claude Shannon, 1948.

Reading Information

3 At their most simplistic, there are two means for shifting information around – analogue and digital. Analogue movement depends on analogy to perform computations; it is continuous and the relationships between numbers are keyed as a continuous ordinal set. The digital set is discrete; moving one finger at a time results in a one-to-one correspondence. Nevertheless, analogue and digital are like the two companions in Serres' tale. Each suffers the relationship of noise to information as internal rupture and external interference.

4 In their examination of historical constructions of information, Hobart and Schiffman locate the noise of the analogue within its physical materials; they write, "All analogue machines harbour a certain amount of vagueness, known technically as 'noise'. Which describes the disturbing influences of the machine's physical materials on its calculations" (208). These "certain amounts of vagueness" are essential to Claude Shannon's articulation of a theory for information transfer that forms the basis for this paper. In transforming the structures and materials through which it travels, information has left its traces in digital art installation. These traces are located in installation's systems, structures and materials.

5 The usefulness of information theory as a tool to understand these relationships has until recently been overlooked by a tradition of media art history that has grouped artworks according to the properties of the artwork and/or tied them into the histories of representation and perception in art theory. Throughout this essay I use the productive dual positioning of noise and information to address the errors and impurity inherent within the viewing experiences of digital installation.

Information and Noise

6 It is not hard to see why the fractured spaces of digital installation are haunted by histories of information science. In his 1948 essay "The Mathematical Theory of Communication" Claude Shannon developed a new model for communications technologies that articulated informational feedback processes. Discussions of information transmission through phone lines were occurring alongside the development of technology capable of computing multiple discrete and variable packets of information: that is, the digital computer. And, like art, information science remains concerned with the material spaces of transmission – whether conceptual, social or critical. In the context of art something is made to be seen, understood, viewed, or presented as a series of relationships that might be established between individuals, groups, environments, and sensations. Understood this way art is an aesthetic relationship between differing material bodies, images,

representations, and spaces. It is an event.

7 Shannon was adamant that information must not be confused with meaning. To increase efficiency he insisted that the message be separated from its components; in particular, those aspects that were predictable were not to be considered information (Hansen 79). The problem that Shannon had to contend with was noise. Unwanted and disruptive, noise became symbolic of the struggle to control the growth of systems. The more complex the system, the more noise needed to be addressed. Noise is both the material from which information is constructed, as well as being the matter which information resists. Weaver (Shannon's first commentator) writes:

8

> In the process of being transmitted, it is unfortunately characteristic that certain things are added to the signal which were not intended by the information source. These unwanted additions may be distortions of sound (in telephony, for example) or static (in radio), or distortions in shape or shading of picture (television), or errors in transmission (telegraphy or facsimile), etc. All of these changes in the transmitted signal are called *noise*. (4).

9 To enable more efficient message transmission, Shannon designed systems that repressed as much noise as possible, while also acknowledging that without some noise information could not be transmitted.

10 Shannon's conception of information meant that information would not change if the context changed. This was crucial if a general theory of information transmission was to be plausible and meant that a methodology for noise management could be foregrounded (Pask 123). Without meaning, information became a quantity, a yes or no decision, that Shannon called a "bit" (1). Shannon's emphasis on separating signal or message from both predicability and external noise appeared to give information an identity where it could float free of a material substance and be treated independently of context. However, for this to occur information would have to become fixed and understood as an entity. Shannon went to pains to demonstrate that the separation of meaning and information was actually to enable the reverse. A fluidity of information and the possibilities for encoding it would mean that information, although measurable, did not have a finite form. Tied into the paradox of this equation is the crucial role of noise or error.

11 In Shannon's communication model information is not only complicit with noise; it is totally dependant upon it for understanding. Without noise, either encoded within the original message or present from sources outside the channel, information cannot get through. The model of sender-encoder-channel-signal (message)-decoder-receiver that Shannon constructed has an arrow inserting noise. Visually and schematically this noise is a disruption pointing up and inserting itself in the nice clean lines of the message. This does not mean that noise was a last minute consideration; rather noise was the very thing Shannon was working with (and against). It is present in every image we have of information. A source, message, transmitter, receiver and their attendant noises are all material infrastructures that serve to contextualise the information they transmit, receive, and disrupt.

12

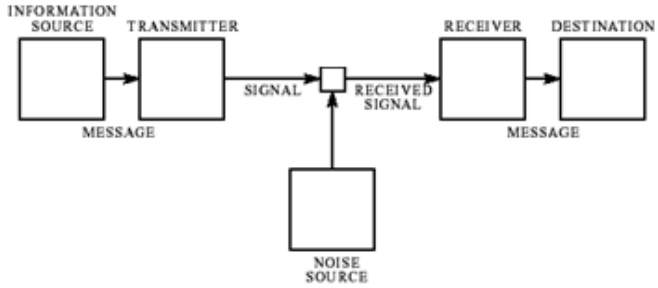

Fig. 1—Schematic diagram of a general communication system.

Figure 1. Claude Shannon "The Mathematical Theory of Communication" 1948.

13 In his analytical discussion of the diagram, Shannon actually locates noise in *two* crucial places. The first position accorded noise is external, marked by the arrow that demonstrates how noise is introduced to the message channel whilst in transit. External noise confuses the purity of the message whilst equivocally adding new information. External noise has a particular materiality and enters the equation as unexplained variation

and random error. This is disruptive presence rather than entropic coded pattern. Shannon offers this equivocal definition of noise to be everything that is outside the linear model of sender-channel-receiver; hence, anything can be noise if it enters a channel where it is unwelcome.

14 Secondly, noise was defined as unpredictability or entropy found and encoded within the message itself. This for Shannon was an essential and, in some ways, positive role. Entropic forces invited continual reorganisation and (when engaging the laws of redundancy) assisted with the removal of repetition enabling faster message transmission (Shannon 48). Weaver calls this shifting relationship between entropy and message "equivocation" (11). Weaver identified equivocation as central to the manner in which noise and information operated. A process of equivocation identified the receiver's knowledge. For Shannon, a process of equivocation mediated between useful information and noise, as both were "measured in the same units" (Hayles, *Chaos* 55). To eliminate noise completely is to sacrifice information. Information understood in this way is also about relationships between differing material bodies, representations, and spaces, connected together for the purposes of transmission. It, like the artwork, is an event.

15 This would appear to suggest a correlation between information transmission and viewing in galleries. Far from it. Although, the contemporary information channel is essentially a tube with fixed walls, (it is still constrained by physical properties, bandwidth and so on) and despite the implicit spatialisation of information models, I am not proposing a direct correlation between information channels and installation spaces. This is because I am not interested in 'reading' the information of either environment. What I am suggesting is that both environments share this material of noise. Noise is present in four places. Firstly noise is within the media errors of transmission, and secondly, it is within the media of the installation, (neither of which are one way flows). Thirdly, the viewer or listener introduces noise as interference, and lastly, it is present in the very materials thorough which it travels. Noise layered on noise.

Redundancy and Modulation

16 So far in this paper I have discussed the relationship of information to noise. For the remainder, I want to address some particular processes or manifestations of noise in New Zealand artists' collective, et al.'s *maintenance of social solidarity–instance 5* (2006, exhibited as part of the SCAPE Biennal of Art in Public Space, Christchurch Art Gallery). The installation occupies a small alcove that is partially blocked by a military-style portable table stacked with newspapers. Inside the space are three grey wooden chairs, some headphones, and a modified data projection of Google Earth. It is not immediately clear if the viewer is allowed within the spaces of the alcove to listen to the headphones as monotonous voices fill the whole space intoning political, social, and religious platitudes. The headphones might be a tool to block out the noise. In the installation it is as if multiple messages have been sent but their source, channel, and transmitter are unintelligible to the receiver. All that is left is information divorced from meaning. As other works by et al. have demonstrated, social solidarity is not a fundamentalism with directed positions and singular leaders. For example, in *rapture* (2004) noise disrupts all presence as a portable shed quivers in response to underground nuclear explosions 40,000km away. In *the fundamental practice* (2005) the viewer is left attempting to decode the un-encoded, as again sound and large steel barriers control and determine only certain movements (see http://www.etal.name/ for some documentation of these projects) .

17 *maintenance of social solidarity–instance 5* is a development of *the fundamental practice*. To enter its spaces viewers slip around the table and find themselves extremely close to the projection screen. Despite the provision of copious media the viewer cannot control any aspect of the environment. On screen, and apparently integral to the Google Earth imagery, are five animated and imposing dark grey monolith forms. Because of their connection to the monotonous voices in the headphones, the monoliths seem to map the imposition of narrative, power, and force in various disputed territories. Like their sudden arrival in Kubrick's *2001: A Space Odyssey* (1968) it is the contradiction of the visibility and improbability of the monoliths that renders them believable. On the video landscape the five monoliths apparently house the dispassionate voices of many different media and political authorities. Their presence is both redundant and essential as they modulate the layering of media forces – and in between, error slips in.

18 In a broad discussion of information Gilles Deleuze and Felix Guattari highlight the necessary role of redundancy commenting that:

19 > redundancy has two forms, frequency and resonance; the first concerns the significance of information, the second (I=I) concerns

> the subjectivity of communication. It becomes apparent that information and communication, and even significance and subjectification, are subordinate to redundancy (79).

20 In *maintenance of social solidarity–instance 5* patterns of frequency highlight the necessary role of entropy where it is coded into gaps in the vocal transmission. Frequency is a structuring of information tied to meaningful communication. Resonance, like the stack of un-decodable newspapers on the portable table, is the carrier of redundancy. It is in the gaps between the recorded voices that connections between the monoliths and the texts are made, and these two forms of redundancy emerge. As Shannon says, redundancy is a problem of language. This is because redundancy and modulation do not equate with relationship of signal to noise. Signal to noise is a representational relationship; frequency and resonance are not representational but relational. This means that an image that might be "real-time" interrupts our understanding that the real comes first with representation always trailing second (Virilio 65).

21 In *maintenance of social solidarity–instance 5* the monoliths occupy a fixed spatial ground, imposed over the shifting navigation of Google Earth (this is not to mistake Google Earth with the 'real' earth). Together they form a visual counterpoint to the texts reciting in the viewer's ears, which themselves might present as real but again, they aren't. As Shannon contended, information cannot be tied to meaning. Instead, in the race for authority and thus authenticity we find interlopers, noisy digital images that suggest the presence of real-time perception. The spaces of *maintenance of social solidarity–instance 5* meld representation and information together through the materiality of noise. And across all the different modalities employed, the appearance of noise is not through formation, but through error, accident, or surprise. This is the last step in a movement away from the mimetic obedience of information and its adherence to meaning-making or representational systems. In *maintenance of social solidarity–instance 5* we are forced to align real time with virtual spaces and suspend our disbelief in the temporal truths that we see on the screen before us.

22 This brief introduction to the work has returned us to the relationship between analogue and digital materials. Signal to noise is an analogue relationship of presence and absence. No signal equals a break in transmission. On the other hand, a digital system, due to its basis in discrete bits, transmits through probability (that is, the transmission occurs through pattern and randomness, rather than presence and absence (Hayles, *How We Became* 25). In his use of Shannon's theory for the study of information transmission, Schwartz comments that the shift in information theory from analogue to digital is a shift from an analogue relationship of signal to noise to one of the probability of error (318). As I have argued in this paper, if it is measured as a quantity, noise is productive; it adds information. In both digital and analogue systems it is predictability and repetition that do not contribute information. Von Neumann makes the distinction clear saying that to some extent the "precision" of the digital machine "is absolute." Even though,

> 23 error as a matter of normal operation and not solely … as an accident attributable to some definite breakdown, nevertheless creeps in (294).

24 Error creeps in. In *maintenance of social solidarity–instance 5*, et al. disrupts signal transmission by layering ambiguities into the installation. Gaps are left for viewers to introduce misreadings of scale, space, and apprehension. Rather than selecting meaning out of information within nontechnical contexts, a viewer finds herself in the same sphere as information. Noise imbricates both information and viewer within a larger open system. When asked about the relationship with the viewer in her work, et al. collaborator p.mule writes:

> 25 To answer the 1st question, communication is important, clarity of concept. To answer the 2nd question, we are all receivers of information, how we process is individual. To answer the 3rd question, the work is accessible if you receive the information.

26 But the question remains: how do we receive the information? In *maintenance of social solidarity–instance 5* the system dominates. Despite the use of sound engineering and sophisticated Google Earth mapping technologies, the work appears to be

constructed from discarded technologies both analogue and digital. The ominous hovering monoliths suggest answers: that somewhere within this work are methodologies to confront the materialising forces of digital error. To don the headphones is to invite a position that operates as a filtering of power. The parameters for this power are in a constant state of flux. This means that whilst mapping these forces the work does not locate them. Sound is encountered and constructed. Furthermore, the work does not oppose digital and analogue, for as von Neumann comments "the real importance of the digital procedure lies in its ability to reduce the computational noise level to an extent which is completely unobtainable by any other (analogy) procedure" (295). *maintenance of social solidarity–instance 5* shows how digital and analogue come together through the productive errors of modulation and redundancy.

27 et al.'s research constantly turns to representational and meaning making systems. As one instance, *maintenance of social solidarity–instance 5* demonstrates how the digital has challenged the logics of the binary in the traditions of information theory. Digital logics are modulated by redundancies and accidents. In *maintenance of social solidarity–instance 5* it is not possible to have information without noise. If, as I have argued here, digital installation operates between noise and information, then, in a constant disruption of the legacies of representation, immersion, and interaction, it is possible to open up material languages for the digital. Furthermore, an engagement with noise and error results in a blurring of the structures of information, generating a position from which we can discuss the viewer as immersed within the system – not as receiver or meaning making actant, but as an essential material within the open system of the artwork.

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Work Discussed

et al. *maintenance of social solidarity–instance 5* 2006. Installation, Google Earth feed, newspapers, sound. Exhibited in SCAPE 2006 Biennial of Art in Public Space Christchurch Art Gallery, Christchurch, September 30-November 12. Images reproduced with the permission of et al. Photographs by Lee Cunliffe.

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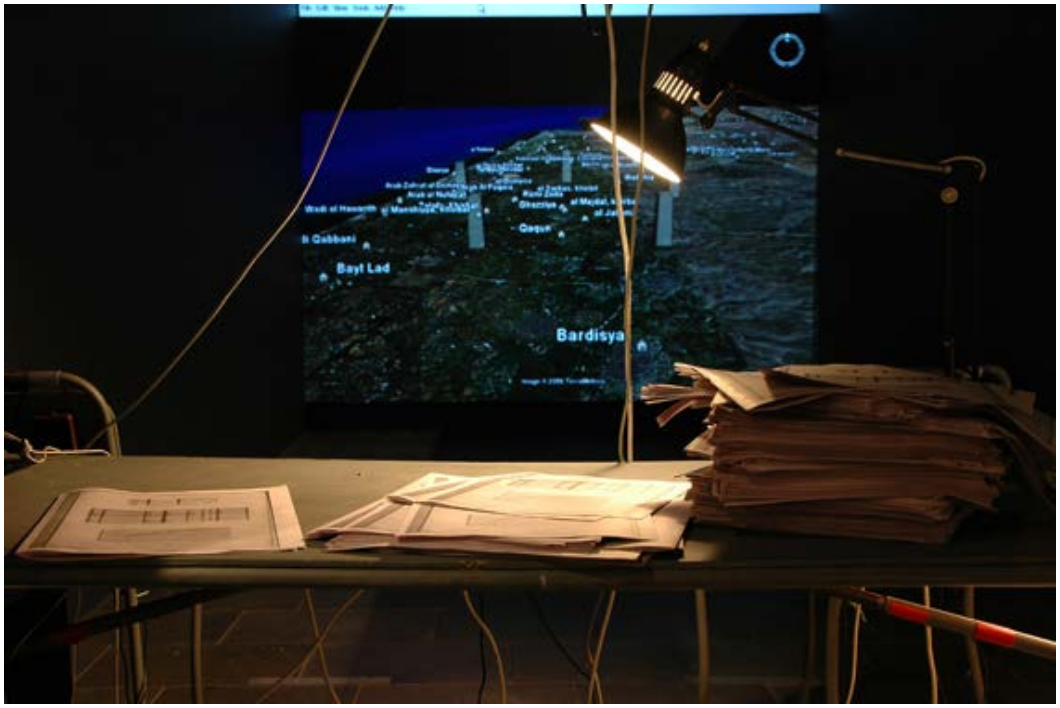

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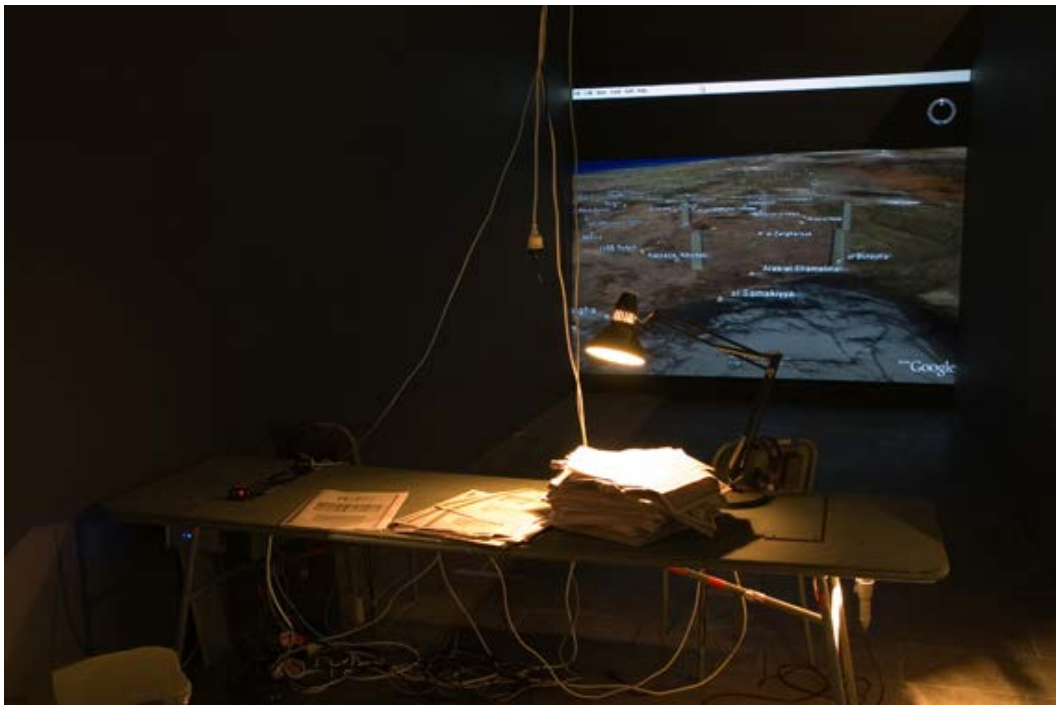
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