Master's thesis

From Noise to Filter: Cybernetics, Information and Communication in Thomas Pynchon's *The Crying of Lot 49* and William Gibson's *Neuromancer*

By

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This Master's thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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"In a certain sense, all communication systems terminate in machines, but the ordinary language systems terminate in the special sort of machine known as a human being."

Norbert Wiener[1]

1. Introduction: a new perspective for new bodies

The above quote by Norbert Wiener has a flavour of Charles Darwin to it, but where Darwin made humans into a special sort of animal, Wiener turns the human into a machine. While Darwin's effort surely provoked more reactions from his contemporary fellow humans, Wiener's does not lack in impact. After all, where Darwin left us all still composed of biological matter, Wiener opens the door for something that is at least part mechanical, either in its construction or operation. Regardless of how sinister such a change might appear, it is nevertheless, just like Darwin's ideas in *On the Origin of Species*, more a change of perspective than an actual change of human nature. In the preface to the second edition of *Cybernetics: or Control and Communication in the Animal and the Machine*[2], Wiener writes that:

> "The automata which the first edition of this book barely forecast have come into their own, and the related social dangers against which I warned, not only in this book, but also in its small popular companion *The Human Use of Human Beings*, have risen well above the horizon." (Wiener, *Cybernetics*, vii).

If there was already change in the air when the second edition of *Cybernetics* came out in 1961, then there certainly is even more of it today. Many humans have been connected to various electronic communications systems for a long time, such as the telephone and the television, but

[1] T*he Human Use of Human Beings: Cybernetics and Society*, page 79
[2] Henceforth, references in parenthesis will be shortened to *Cybernetics.*

the technology of today (2010) provides a much greater exposure and is often hard to avoid on a daily basis. The amount and extent of new information networks and links between human and machine increase our dependency on these systems.

While neither Norbert Wiener nor any other individual can take credit for these developments on their own, Wiener's quote, and his works, gives us both a tool for analysing information systems, and food for thought. While advancements in technology are usually considered a good thing, the question of what it does to society and the individual remains an open one. We now live in an age where our access to information is unrivalled throughout history, but how much information is too much – and can we even evaluate, process and act on such large amounts? Technology gives us a convenient tool with which to access information, but it can not be considered a wholly optional tool. In many instances, connecting to an electronic information network is both expected and necessary, at work and in private.

This interaction can create a certain dependency, but more importantly it makes us part of the systems we connect to. Even with only a telephone at our disposal we become connected to it, and even without it we are still part of another system – society. Our bodies are systems, made up of parts that must communicate with each other and the world in order to function. The thought of man as a machine is not a strange one any longer, we have already arrived at a point where we are connected to non-biological information systems and communicate both with other humans and with machines through them. Are these connections and dependencies, in spite of obvious advantages, really such an asset? Do we need to develop them as far as we can in order to increase our access to information, and the use we get out of it, or would we do just as well by regressing? For some, our identity as human beings is at stake as well, as we spread parts of

ourselves throughout the systems we use. Are we becoming information, are we perhaps information already, and do we risk getting lost inside the lines of communication?

Thomas Pynchon published *The Crying of Lot 49* in 1966, not too long after Norbert Wiener wrote *Cybernetics*. Pynchon gives us a very contemporary 1960's world, one that has seen change as attested by Wiener. Progress was evident, for example transistors had replaced vacuum tubes in computers, the (unmanned) lunar lander Surveyor 1 launched at the middle of the decade and the first manned spaceflight mission to leave earth orbit, Apollo 8, was launched at the end of the decade – both integrating various automated and operator-controlled systems. However, this was still a few steps behind the world of today with regard to technology. The infancy of mechanic/electronic systems is however no hindrance in the novel; there is no lack of information or communication systems. In 1984, William Gibson published *Neuromancer*. While the 1980's had seen considerable technological advancement, such as the advent of personal computers and several versions of what was to become the Internet, *Neuromancer* easily tops this, being a vision of the future that is brimming with technology and the problems associated with it. Both novels give their protagonists a considerable amount of information to work with. But where Gibson gives us a fairly realist, even slightly linear, world where the amount of information available is staggering but still fairly accessible, Pynchon has created a veritable labyrinth of information[3] where few things are certain. Since the novels present different starting points for their protagonists, how do these two information systems compare to each other in terms of information input, processing efficiency and output?

[3] Though it is arguably more straightforward than for example *Gravity's Rainbow*.

Norbert Wiener's two books, *Cybernetics* and *The Human Use of Human Beings* will be used extensively in the thesis, providing the basis for the cybernetics framework used to look at the novels by Gibson and Pynchon. There has been written a large amount about cybernetics since Wiener wrote his books, but his are a good primer for understanding the basics of cybernetics, which is perhaps in part due to the fact that the subject was in its infancy at that point and not yet as detailed as it is today. *The Human Use of Human Beings* was written after *Cybernetics* "In response to a certain demand for me to make its ideas acceptable to the lay public, [...]" (Wiener, *The Human Use of Human Beings*[4], 15). The book offers what Wiener promises, an easily accessible primer to cybernetics, as well as cybernetics in relation to society. While *Cybernetics* is a much more technical book, it nevertheless offers a more detailed account of cybernetics than *The Human Use of Human Beings*, and it will be used both to expand on as well as to supply information not found in the latter.

While the body of criticism on both *Neuromancer* and *The Crying of Lot 49* is substantial, very little of it contains direct discussions on cybernetics. Two works that treat *Neuromancer*, Tom Bukatman's *Terminal Identity: The Virtual Subject in Postmodern fiction* and N. Katherine Hayles' *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* will also be used as a supplement to Wiener. While both works also include a look at *Neuromancer*, they are useful for the more general ideas they present as well. Because they are far more recent, they offer a fresher take on human and machine communication, and they, unlike Wiener deal mostly with cybernetics-related subjects in fiction. Hayles treats the issue of embodiment in the information age, and the nature of information, and she is the one dealing most explicitly with cybernetics as such. Bukatman has less of a direct

[4] Henceforth, references in parenthesis will be shortened to *The Human Use*.

focus on cybernetics, but he presents a relevant discussion on human identity and how it is shaped by (and shapes) advanced technology, with some emphasis on the concept of cyberspace. Much of the other work on *Neuromancer* only deals with parts of this, such as Philip Elmer-DeWitt who in *Welcome to Cyberspace* writes more about the definition of cyberspace, which while interesting is not on its own relevant enough in relation to the topic at hand; Veronica Hollinger makes an interesting contribution on cyberpunk in relation to postmodernism in *Cybernetic Deconstructions: Cyberpunk and Postmodernism* , and Nicholas Ruddick makes some good points, particularly on information theory, in *Putting the Bits Together: Information Theory, Neuromancer, and Science Fiction*. While all these works are good contributions to their respective fields, they approach the topic of this thesis somewhat too obliquely, and most are not quite extensive enough to be of much direct use, though they have provided inspiration.

In relation to *The Crying of Lot* 49, William Gleason focuses on the information or "postmodern labyrinth" of Pynchon's book in his essay *The Postmodern Labyrinths of Lot 49*, but mainly with regard to the symbolism in the text; David Seed in *Media Systems in The Crying of Lot 49* takes an excellent look at the mass media in the novel, but again with less of a direct focus on cybernetics. Victoria De Zwaan has a very short, but informative, commentary in *Pynchon's Entropy*, which looks at entropy in Pynchon's work, but unfortunately she leaves out *The Crying of Lot 49* and mostly discusses entropy as a concept. In *Thomas Pynchon's Narratives: Subjectivity and Problems of Knowing*, Alan W. Brownlie treats the difficulties of gaining reliable knowledge in some of Pynchon's works, but mostly in relation to the effect this has on the reader. The essay *Pynchon's Prophesies of Cyberspace* by Brian Stonehill takes a solid look at cybernetic references, but only in Gravity's Rainbow. There is some material on the

postmodern subject, but this is also covered (more thoroughly in relation to the topic at hand) by Bukatman and Hayles.

Timothy Melley's *Empire of Conspiracy: The Culture of Paranoia in Postwar America* will be used occasionally. While Melley deals with how conspiracy theories gained ground in postwar America as a result of a loss of agency in the individual, he also has some good material on nature and the shaping of the individual, and he also treats both Gibson and Pynchon. In addition his work has been an inspiration for this thesis as it marks the authors first experience with cybernetics in relation to the human subject, so even if it does not appear directly in the text it is at least in the background.

Typically, the fiction analysed with regard to information, technology, human-machine communication and such is of a type that lends itself very well to this kind of analysis because it already contains many of the mentioned elements, in particular advanced technology (both Hayles and Bukatman deal largely with science fiction and cyberpunk literature). However, since cybernetics is a theory for studying communications systems in general, not only those based on technology, it should be possible to apply it to texts that have less of a technological focus, especially as long as they deal with information. Note that the focus will be on applying the cybernetics framework to analyse the text, not to deal with cybernetics as a theme. In other words, instead of just identifying parts of the text where for example entropy is mentioned and explaining its thematic role, I aim to identify the entropy and to explain why it occurs, and how the cybernetic aspects that are discussed present important plot junctures in a new light.

By using a cybernetics framework in its original and more technical form it should be possible to analyse *Neuromancer* and *The Crying of Lot 49* to see how information is treated in these two texts, which represent more and less technologically advanced worlds respectively. The more recent literature-related works on cybernetics will be used to provide additional information and to contrast with Wiener's work. With the texts analysed in this way, the next step will be to contrast and compare them to see which elements they have in common and not, how the different elements interact with one another, and finally what this says about the efficiency of the information systems in the texts.

The first chapter of this thesis will present an overview of cybernetics as treated by Wiener in *Cybernetics* and *The Human Use of Human Beings*. Cybernetics as treated by other authors will be included in the second and third chapters in order to broaden the discussion. The goal is to establish the cybernetics framework that will be applied in the subsequent chapters, hopefully explaining some of the more important elements of cybernetics, and also establishing the terminology associated with it. The chapter will not deal with the most technical sides of cybernetics, as this is both largely irrelevant to its application in this context, as well as beyond the capabilities and interests of the author. Instead, the focus will be on creating a framework that can be applied equally to systems consisting of humans, machines and the two combined

.

The second chapter will focus on Thomas Pynchon's novel *The Crying of Lot 49*. It will identify cybernetic elements in the text and analyse these, with a focus on how the protagonist, Oedipa Maas, treats and is affected by information. The systems analysed here will mostly be of the human (individual and social) kind, with less human-machine communication.

The third chapter will treat William Gibson's novel *Neuromancer* in much the same way *The Crying of Lot 49* was treated in the previous chapter but with a, perhaps not surprisingly, larger focus on communication in machines as well as between humans and machines. As in chapter two, the focus will be on the novel's protagonist, in this instance Henry Dorset Case. Further, the two novels will be contrasted and compared on the basis of the findings resulting from using the cybernetics framework. The goal is ultimately to explain the differences in how the two novels treat information, and how this affects the two protagonists.

Though cybernetics is at its roots a very technical discipline, it will hopefully help to give a different look at both technical and non-technical texts, while keeping the focus on the text itself rather than straying too far out into the realms of hard science.

2. Cybernetics: mechanisms of information

The term "cybernetics" comes from the Greek word "kybernētēs", meaning "steersman". Cybernetics is in its most broad sense a theory of information, communication and messages. (Wiener, *The Human Use*, 15). Norbert Wiener states the goal of cybernetics thus:

> "It is the purpose of Cybernetics to develop a language and techniques that will enable us indeed to attack the problem of control and communication in general, but also to find the proper repertory of ideas and techniques to classify their particular manifestations under certain concepts." (Wiener, *The Human Use*, 17).

The "birth" of cybernetics was made possible by collaboration between scientists from many different fields, including Wiener, that sought to unite the sciences necessary to develop a unified

theory of communication.[5] The need for cross-disciplinary work came, among other things, from the fact that

> "[...] the problems of control engineering and of communication engineering were inseparable, and that they centered not around the technique of electrical engineering but around the much more fundamental notion of the message, whether this should be transmitted by electrical, mechanical, or nervous means." (Wiener, *Cybernetics*, 8).

The inclusion of transmission by nervous means necessitated that not only mathematicians, physicists or engineers be included in the process, but also neurologists, psychologists and others who studied the functions of the human being. The human being had to be included because of, amongst other things, the increasing development of various automated and more advanced human-operated mechanical and electronic systems. One example given by Wiener is the construction of (automated) anti-aircraft artillery, and the necessity for the targeting mechanism to be able to predict the course of a human-operated plane (Wiener, *Cybernetics*, 5-6). Humans and machines had begun to be more connected than before, and this necessitated the new approach of cybernetics.

Since cybernetics is a theory of communication, and therefore information, it is necessary to establish the term "information" Information is both the smallest and the largest building block, as it refers to both the smallest parts that constitute communication, as well as communication itself. For example; messages consist of information and communication consists

[5] A process described in detail in the introduction to *Cybernetics*.

of messages. Without information, there cannot be communication.. The term information merits its own definition in this case; it is a more extensive term than what we might think. The word easily invokes various physical associations, such as sheets of paper printed with numbers, textbooks and spoken sentences. All of these are acknowledged as information within the framework of cybernetics, but to a much larger extent than what we can easily discern through our sensory apparatus. Wiener tells us that (under quantum theory), a transfer (or coupling) of information also requires a coupling of energy, making the two very hard to separate (Wiener, *The Human Use*, 39). Most forms of interaction require a coupling of energy, and thus information, which means that we can for most intents and purposes consider everything as made of information (at least during the process if interaction).

To clarify further, it is useful to consider how interaction between for example particles, takes place. If two particles collide, there are several possible scenarios that might result. The particles might alter course, one or both might split up into smaller parts, they might combine to form a single new particle, and so on. In order for any of these scenarios to take place, we are forced to view the particles as consisting of information, as indeed they do; information that gives their speed, their position, their mass, their composition, and anything else that determines how they will behave in any given situation. We can extend this definition to cover larger objects consisting of enormous amounts of single particles, such as humans.

When considering communication between humans and humans and machines it will not do to look at the smallest possible units of information, because observing the behaviour of every single particle in this equation amounts to an impossible task. Here we need to resort to studying messages of types that are easily recognizable as such, and the systems they are transmitted

through. To a human being, messages are limited to signals we can receive through our sensory apparatus; visual input, audio input, smell, taste and touch. All these signals are interpreted by the brain, where they are converted into electrical signals. To act on the information received, the human being employs what Wiener terms “effector organs,” such as arms and legs. The internal and external functions in a human are quite similar to that of a machine, as a machine receives signals in much the same way, either in an electrical or mechanical fashion, and acts on them by using its own type of effector organs (Wiener, *The Human Use*, 32). In light of this it does make sense to compare humans to machines in the study of communication, as Wiener does.

In order to make use of information, both humans and machines must possess a certain set of abilities. First of all, they must be able to receive the information through some sort of sensory organ. Second, they must be able to process the information and filter out any disturbances (a topic which will be covered later in this chapter). Third, they must be able to store the information, at least until it has been acted upon, and at last they must be able to act on the information. In order for all of this to take place, the information received must be of a type that corresponds to the type the sensory organ can receive and it must give meaning to the receiver. In a machine, such as a radio, a signal must match the wavelength and frequency the radio is tuned to, and it must decode as sound. If a signal decodes as static, it will partially have fulfilled the first requirement; corresponding to the sensory organ of the receiver. It will not however have fulfilled the second criterion of giving meaning, since the end receiver of the signal is a human which will not get very much out of listening to static. It should be said however that in this case, the static might be acted upon by the human receiver, signaling to him or her that the radio might need tuning. But, this will not let the signal transfer successfully with its original meaning intact. In human communication, especially speech, messages sent must be

in a language the receiver can understand, and the message must contain information that the receiver can understand. Wiener uses the term "semantically significant information" to cover information that manages to get into a transmission line, through the "filters" or processing mechanisms connected to it, and to an activating mechanism.

> "Semantically significant information in the machine as well as in man is information which gets through to an activating mechanism in the system that receives it, despite man's and/or nature's attempts to subvert it. From the point of view of Cybernetics, semantics defines the extent of meaning and controls its loss in a communications system." (Wiener, *The Human Use*, 94).

Meaning in itself is also directly linked to our sensory and processing abilities; the same goes for machines, at least on a purely logical level. Wiener states that "*All logic is limited by the limitations of the human mind when it is engaged in that activity known as logical thinking.*" (Wiener, *Cybernetics*, 125). The same goes for machines, and especially computers, as no machine in existence today (2010) can exceed its processes beyond what its programming allows. To a certain extent, Wiener's statement can be applied to processes other than logical thinking alone. Both humans and machines are limited in what they can observe, understand and do, based on how their bodies are constructed. This being said, while a brain of one sort or another is limited in what it can perceive and do by the sensory organs and effector limbs it controls, the brain also limits what the body can perceive and do. Brain, sensory organs and effector limbs are all heavily interconnected parts of the same system, and not independent units. These bodily limitations, and the possibility of overcoming some of them (or not), will be treated further later in this chapter.

"When I control the actions of another person, I communicate a message to him, and although this message is in the imperative mood, the technique of communication does not differ from that of a message of fact." (Wiener, *The Human Use*, 16). In this passage from *The Human Use of Human Beings*, Wiener illustrates another important part of cybernetics; the fact that communication and control are closely linked to each other, and that a message is sent with the hope that someone or something will act on it. The response expected need not be directed back at the sender; but some sort of response or action is nevertheless expected, because sending information would otherwise be unnecessary. While the word "control" might give the wrong associations in this case, such as an image of a drill sergeant yelling at recruits to make them march properly or something similar, this is not the whole meaning of the term, but rather only a small part of it.. Whether we send a signal by pressing a button on a computer, pulling a lever on a machine or by speaking to another person, we ultimately seek to control the recipient by sending them a signal they act upon. If the recipient acts on the signal, it will be because it contained sufficient meaning important enough to merit a reply. Even though a signal might provoke a response because the sender has some sort of malevolent power over the recipient, this is not the only type of signal that gives the sender control. If you take a picture of someone, the mere act of pulling out the camera might make them straighten up and smile, because they have been taught that they should try to look good when someone takes a picture of them. In a conversation involving two people, there are at the same time two senders and two receivers. The one that sends the first message provokes a response from the other person, which in turn sends a message back, which again provokes a response from the first person, and so on. In other words, while a sender with ill will can control others by communicating with them, all information that is sent resulting in a response exerts some level of control over the receiver.

When studying what information is, how it is transmitted, the effects of its transmission and so on, it is hard to avoid looking at how it is also lost and degraded. While messages of all different kinds are continually being transmitted successfully, both reaching their recipient and making the recipient act as the message instructs, many messages also fail to reach their recipient, or fail to cause the desired effect. Perhaps surprisingly, all information degrades to some extent, sometimes noticeably and sometimes not. The term used to cover this degradation is *entropy.*

Wiener defines entropy as the amount of disorganization in a system, making it the opposite of information, which is defined as the amount of organization in a system (Wiener, *Cybernetics*, 11). Another way of putting it would be to say that information is order, while entropy is chaos. This latter definition in particular gives a useful point of view, since entropy leads to a decrease in the quality of a message, thus increasing the chances of miscommunication, thus increasing the chances for the message to cause chaos.

Wiener also gives a useful example of how entropy works, in relation to the second law of thermodynamics. The second law states that heat cannot flow spontaneously from a low-temperature material to a high-temperature material, but instead the heat from the high-temperature material will dissipate to the low-temperature material over time. The result of this is that it is impossible for all the heat from, for an example, a heat engine to be converted into work, some of the heat will always flow to regions of lower temperature. This also makes it impossible to construct a truly closed system or a machine capable of perpetual motion, since both would bleed off energy to the outside, and require outside sources to replenish the lost energy. In relation to the second law, Wiener states that “That information may be dissipated but

not gained is [...] the cybernetic form of the second law of thermo-dynamics." (Wiener, *The Human Use*, 78). As heat, using the cybernetic definition, is information, this rewriting of the second law of thermodynamics is a useful reminder that entropy is ultimately present in any system. Entropy is inevitable because information cannot be transferred without interaction, interaction that always results in some form of change in the information, a fact that is also confirmed by Wiener:

> "However, under the quantum mechanics, it is impossible to obtain any information giving the position or the momentum of a particle, much less the two together, without a positive effect on the energy of the particle examined, exceeding a minimum dependent on the frequency of the light used for examination. Thus all coupling is strictly a coupling involving energy [...]" (Wiener, *Cybernetics*, 58).

Before I go on to describe some more concrete examples of how entropy might increase in communication, I wish to look at a mechanism that can help decrease the chances of it occurring in too large quantities. This mechanism is called "feedback," and it is present both in mechanical and electrical systems and communication, as well as in humans. Feedback is in essence a way to monitor a known system in order to ensure that the system is working properly before sending a message. The individual components of a system record their performance or lack thereof, and should the performance be less satisfactory, the components in question can be repaired or deactivated by a central control mechanism. A feedback system might only encompass one specific function in a mechanical or electrical system, or it might encompass a more complex system such as a human being. In the latter case, there is enough memory

available to store a much more extensive list of past performance, which can be used to regulate present performance. In addition, more complex systems can have the facilities necessary to extrapolate the outcome of a new process on the basis of performance in past, similar processes. In humans, feedback can take the form of conditioned reflexes, where a type of behaviour is regulated by past experience (Wiener, *The Human Use*, 33).

A conditioned reflex can manifest itself as something slightly mechanical, for an example by ducking when a shadow passes overhead (because the person in question once saw a shadow in the corner of their eye, and promptly was hit in the head by a soccer ball). Or, it could manifest itself in a conversation, for an example by a person steering away from a certain conversational topic because he or she knows that one of the other participants dislikes the topic, or by awaiting confirmation from the recipient of an order that the order has been received. While both humans and machines employ feedback mechanisms, they differ in that humans are usually able to learn from their experience, while machines mainly rely on a very narrow set of data – typically by comparing their present performance to one set of data detailing their target performance. However, while machines will always respond to feedback as long as the devices recording performance and adjusting performance are in working order, humans can choose to disregard feedback, or they might do so involuntarily.

The fact that humans can disregard feedback opens up an interesting conundrum. If a piece of information reaches through to a human, and the human chooses to disregard the information, does this increase entropy? In a very strict sense, perhaps it does, because the human acts on the information in a radically different way than the sender intended. At the same time, disregarding information is also a way of acting upon it, as it is one of the many possible

decisions available in a more complex system like a human. I believe the answer depends largely on the reason for disregarding the information. If it is done even if the receiver understands the meaning of the information, it can not be said to really increase entropy since the information has caused a conscious response in the receiver. If it is done for an example because the receiver is unsure of the true meaning of the information, it is really an error in processing, and can thus be said to increase entropy.

A typical cause of entropy in electrical systems is background noise; a signal interfering with communications in a transmission line, often caused by the interaction between the line and the signal sent through it. In order for signals not to be drowned by the background noise they themselves create, they need to be of a certain strength (Wiener, *The Human Use*, 39). Otherwise, the information in the signal is disturbed by the energy coupling with the line. Background noise of this type can occur in human communication as well, for an example when attempting to have a conversation in a very noisy environment where the noise interferes with and blocks the participants' voices. Similar situations can occur in any situation where a human being's sensory organs are being hard pressed or shocked; the energy of the shock blocks out the information.

In machines, entropy is usually caused by component or programming failures, insufficient power or outside interference. While these problems might be difficult enough to fix, identifying the problems is nevertheless a doable task, as well as preventing them. The design of the machine is usually known, it usually has a limited amount of functions, internal connections and logical options in its programming. Identifying entropy in human communication is on the other hand more difficult, since there are more different factors in play. Preventing entropy, or

fixing problems caused by it, is potentially an even more daunting task, especially since all humans differ in the way they treat information. When it comes to processing, filtering and acting on information, humans are affected by such things as past experience, psychological state, physical state and environmental variables. In addition, all of these factors might interfere and interact with each other, such as reminding someone of their dead father because they are depressed because their rheumatism flared up because it rains.

Humans do not only process information based on a standard set of criteria such as machines do, they interpret it, and the interpretation is governed by both internal and external factors as described above. A message will be interpreted with respect to who sent it, and if the sender is present and conveying the message verbally body language, intonation and appearance also come into play. Messages will also be scanned for possible double meanings, irony, sarcasm, and so on. At any of these stages, it is possible for the receiver to interpret the sender wrong. Human communication is without complex, but it is also more vulnerable to entropy because of this. Simplifying human communication, while certainly possible, is not the best of solutions, since a decrease in complexity also means there is a decrease in the amount of information that can be transferred.

Entropy, while inevitable, can to a certain extent be decreased locally in a system, provided one can identify the elements of the system where the entropy is increasing. At the same time, identifying these elements requires sending and receiving information, therefore again potentially increasing entropy. Entropy ultimately affects all information, although the extent can differ, which we shall see later in the discussion on *Neuromancer* and *The Crying of Lot 49*.

Thus far I have described some aspects of communication mainly between humans, or between machines. I will now look at some of the aspects of communication between human and machine, a topic I will return to later, particularly when discussing *Neuromancer* by William Gibson. Communication between human and machine is a commonplace thing, although the form it takes looks less like the communication between humans that we are usually accustomed to. Transfer of information between human and machine as well as entropy in this transmission are of particular interest, since both are first of all problems when designing human-machine communication systems and because both offer a useful contrast between the two main parts in such systems.

"We ordinarily think of communication and language as being directed from person to person. However, it is quite possible for a person to talk to a machine, a machine to a person, and a machine to a machine." (Wiener, *The Human Use*, 76). Wiener writes this in relation to the operation of automated power stations, where humans control and communicate with the stations remotely, relying on feedback from the system to operate it. In this case, the machine does not have a central decision making system built in to it on site, but instead relies on a human to evaluate feedback and make decisions based on current data. Most machines found in a household operate in much the same manner. Lamps, ovens, vacuum cleaners and other appliances are all turned on/off and regulated by their human user, who evaluates their performance based on feedback directly from the machines or from the environment. The only difference is that most of these machines do not have purpose-built sensory organs that transmit feedback directly to their user; instead the user relies on direct observation of them. A lamp for example is activated or deactivated based on whether the user needs extra light or not. The feedback the user relies on is mainly whether or not the lamp produces any light or not. If the

lamp starts to flicker or turns off without interference from the user, the user can for an example check if the bulb is in working order or not, whether the electrical cord is plugged in properly, or even whether or not there is a power outage(by observing the performance/non-performance of other appliances dependent on electrical energy). A personal computer is an example of a device producing much more direct feedback. If its operations are successful, the results will be shown on the computers screen. Likewise, if its operations are unsuccessful, it will in most cases display an error message or similar on the screen.

Communication between human and machine is problematized by the fact that humans and machines do not possess the same type of input/output devices. Machine controls must usually be designed with an extra step in mind to accommodate their human user, such as buttons or levers, and their performance must be physically visible, whether it is in the form of moving pistons or figures on a screen. The most efficient types of input/output for a machine, such as electrical signals, are not available directly to a human user. This has the potential to increase entropy, since it introduces another component into a system, namely any device needed to make the input/output available to use by a human. These devices also tend to simplify the workings of the machine to such an extent that it becomes difficult for the human user to evaluate its actual performance, instead forcing the user to rely solely on the performance evident in the results the machine gets. A personal computer for an example, does not display its myriad of logical operations to the user, but instead only displays a representation of its results suitable for viewing by the user. In this case, the user has neither sufficient processing power nor understanding to review the machine's performance directly. The lack of a suitable way to communicate with a machine also means that humans are ill fitted to take direct part in its inner workings.

> "[...] in general, any computing machine is used because machine methods are faster than hand methods. In any combined use of means of computation, as in any combination of chemical reactions, it is the slowest which gives the order of magnitude of the time constants of the entire system. It is thus advantageous, as far as possible, to remove the human element from any elaborate chain and to introduce it only where it is absolutely unavoidable, at the very beginning and the very end." (Wiener, Cybernetics, 119).

While a human element might slow down the workings of a machine, its lack of a way to communicate directly with a machine also opens up the possibility that it will misinterpret the output from the machine, thus increasing entropy in the system.

However, while humans and machines usually communicate through a very limited system adapted to allow a human to physically interface with the machine, there remains a more direct option; establishing a direct neurological connection between the human users body and brain and the machine. As the brain works by transferring electrical signals to the rest of the body, which then translates these signals into physical action, a direct connection with the brain can largely remove the limitations encountered in human-machine communication. A prime example of such a connection is presented in *Neuromancer* in the form of *cyberspace,* an advanced version of today's internet. Cyberspace allows a human to directly access a network of computers, controlling the operations mainly through thought. This book will be discussed in detail later, but for now it is interesting to present some of the problems that may affect such a connection. One is a question of performance; does such a direct connection really give the human user complete access to the information stored in the machine? While it without doubt

gives the human user a more extensive and more direct access to information, the information will still have to be presented in a way the user can comprehend. While the brain is a powerful computer in its own right it might not be well suited to processing millions of 1's and 0's, being more suited to processing representations of larger strings of code. Wiener states that "The physical identity of an individual does not consist in the matter of which it is made." (Wiener, *The Human Use*, 101), and while this may be true, the matter making up the body does limit the ways in which the body can work. In relation to cyberspace, this brings up the question of how free from bodily limitations an individual connected to it would be. The upper limit of freedom would be decided by the brain, since it limits just how much a human can understand, but also by the body, since the body is vital in how we as humans define ourselves. And since humans and machines are different in how they communicate, how well are they really able to comprehend each other?

3. The Crying of Lot 49: please feed the demon

Thomas Pynchon's 1966 novel *The Crying of Lot 49* lends itself well to being examined using a cybernetics framework, because it's oblique relation to detective fiction in general necessitates a substantial focus on information. The protagonist, Oedipa Maas, sets out to execute the will of her late ex-husband, Pierce Inverarity. As she does this, she stumbles upon a mysterious renaissance play called "The Courier's Tragedy" full of events that apparently correlate with real-life occurrences, many of which seem to lead back to Inverarity. As she investigates these clues, it starts to look like the shadowy organisation Trystero/Tristero, a great source of mischief and conspiracy in the play, might actually exist in real life. While she embarks on a classic detective hunt for information, she is at times presented with such large

amounts of it that she starts to both feel overwhelmed by the task of making sense of it and to wonder whether any of it is really true.

As Wiener tells us, control and communication are closely linked to each other. Messages are sent with the intention of provoking some form of reaction; if the sender of a message receives a response, he has successfully controlled the receiver enough to produce said response. This has the side effect giving a slightly new meaning to the popular tenet "information is power"; information is power if it is used, because the sender controls the receiver. In turn, the original receiver might control the original sender by sending a response back, but the amount of control can easily be limited by how well the original receiver understands the original message. If the receiver does not fully understand the message, it might be difficult to produce an adequate response, although this can of course happen by chance. At any rate, information that is simply received without provoking a response is of less use, since it is not particularly suited to storage because of entropy. Large amounts of information can potentially control a receiver if he or she is not able to access and process the information properly, because the receiver will then spend much effort on trying to make sense of the information, rather than acting on it.

. We have already established that within the cybernetic framework, everything is information, but we also know that not all of the information is necessarily accessible. Early in the novel, as Oedipa is looking down at a part of San Narciso, she is already becoming aware of the fact that information is everywhere.

> "[...] and she thought of the time she'd opened a transistor radio to replace a battery and seen her first printed circuit. The ordered swirl of houses and streets,

> from this high angle, sprang at her now with the same unexpected, astonishing clarity as the circuit card had. Though she knew even less about radios than about Southern Californians, there were to both outward patterns a hieroglyphic sense of concealed meaning, of an intent to communicate. There'd seemed no limit to what the printed circuit could have told her (if she had tried to find out) [...]" (Pynchon, 14).

In a sense, comparing a circuit card to a city is fairly accurate. Scott Bukatman also notes that, in this case microchips, look like "urban sprawls" when magnified and viewed from above (Bukatman, 110). The size of a circuit, and how it is connected to others, defines (and limits) what kind of and how much information it can let through. A city street is a good analogue in relation to this. Its connections with other streets limits how much traffic it can handle efficiently; too much and the traffic starts slowing down.

The use of a particular street is not only dependent on how efficiently it can get people and vehicles from one geographical location to another. The preferences of its users; based on concerns such as whether it is considered to run through a safe neighbourhood, whether it offers nice scenery, and so on also play their part. Oedipa's thoughts on San Narciso as a city reflect this, because the city and its constituent parts are not so much purely geographical locations, but a number of ideas that provoke different associations in an individual. "Like many named places in California it was less an identifiable city than a grouping of concepts - census tracts, special purpose bond-issue districts, shopping nuclei, all overlaid with access to roads to its own freeway." (Pynchon, 13). From this point of view, a city does have a certain capacity to communicate, because different parts of it represent different ideas that are at least in part

accessible to the individual. A financial district for an example might just be the result of a single individual's idea that the area is a good place to conduct business in. At some point, for various reasons, other people agreed with this sentiment and proceeded to move their business there as well. The result is, again, not only a geographical location housing a certain type of upscale buildings marked with signs that say "Bank of ...," but a place that houses a certain type of people as well. In addition, people that are not part of the idea of the place might catch a certain air from it that says that it is not a place to go skating wearing jeans and a t-shirt, or that it is a place where the relation between money and personal status is highly stressed. In other words, the system can end up grouping similar types of information together, which again affects what other types interact with it.

There is a great variety in the kinds of information in the *Crying of Lot 49*, ranging from the plainly visible to background cues. One possible information channel is the one I just discussed, the city viewed as a circuit board. In this instance however, the city represents more of an idea of information, rather than an actual source. Therefore it is more useful to look at it, as I have done, as an example of information processing, rather than an actual example of the information processed by Oedipa. The latter is of course also important, so a look at the different types of information that Oedipa processes, or tries to process, is merited. With regard to that, one of the key issues that humans come across when they communicate is that they must interpret the information they process. As we shall see, this becomes a hindrance for Oedipa because of the sheer amount of information she is presented with, which again comes from many different sources, many of which are daunting to interpret by nature, and often not even primary sources (which is an issue since a secondary or tertiary source in itself offers an interpretation of another source, likely increasing entropy in the process).

Early in the story, she goes to “Echo Courts,” a motel in San Narciso, to meet her co-executor, a lawyer named Metzger. At one point, Oedipa turns on the television, and Metzger notices that the film running, called “Cashiered,” is one he starred in as a child. As Oedipa and Metzger watch the movie, Metzger decides he wants to bet on the outcome. Oedipa is reluctant to do so because, as she says, “”[...] the movie’s made.”” (Pynchon, 22). This is one of her first experiences with entropy (within the text), and it is a good example of entropy in human communication; Oedipa is assuming that Metzger wants to win the bet, which he could easily do since he already knows the outcome. Despite this they end up betting, and as it turns out she wins. In other words, her interpretation of the situation failed her. Another example of entropy as a result of human action presents itself as they watch the movie. Someone responsible for placing the film reels in correct order has failed to do so, thereby altering the flow of information (Pynchon, 23). Oedipa has Metzger there to tell her what just happened, but as the mistake takes place as the movie resumes after a commercial break; it could be difficult to notice that the change is a mistake if the viewer had not previously seen the movie. It might easily have been a wholly different experience if Metzger had not been there to spot the error.

For Oedipa, the confusion really begins as the story of the Tristero is presented to her when she goes to see Richard Wharfinger’s play “The Courier’s Tragedy”. Just before that, she is introduced to the postal system W.A.S.T.E by Mike Fallopian, whom she meets at a bar on the outskirts of San Narciso. As we shall see, these two sources of information alone shall manage to cause a great deal of confusion for Oedipa.

W.A.S.T.E. is an alternative, underground, postal system that aims to break government monopoly (Pynchon, 39). When Mike Fallopian describes the W.A.S.T.E system, he states that

"To keep it up to some kind of a reasonable volume, each member has to send at least one letter a week through the YoYodyne system. If you don't, you get fined." (Pynchon, 39). The letter he shows Oedipa and Metzger as a typical example of the mail sent with W.A.S.T.E. shows the result of this practice, as it does not contain any large amount of useful information, and as the sender seems to have the option of simply talking to Fallopian instead of sending the letter. Thus, much of the information sent through the system is sent simply to ensure that the system remains in use. While information is being sent, little of it is semantically significant, and most of it is more akin to background noise or static – signals without the ability to reach an activating mechanism that produces a meaningful response from the receiver.

The play "The Courier's Tragedy" and the events in it that correlate with the events connected with the legacy of Pierce Inverarity constitutes the backbone of the story, presenting Oedipa with the mystery of the Tristero. The play in itself is a problematic source of information, since there are several different versions of the script. Some information, such as Inverarity's connection to the Beaconsfield company which apparently bought the bones of a number of American soldiers that were killed and dumped at the bottom of an Italian lake (Pynchon, 46), is connected to events in the play, in this case the disappearance of the "Lost Guard of Faggio" which suffered the same fate as the American soldiers (Pynchon, 57). While information such as this suggests a link between recent events and events in the play, it is difficult to say with certainty. In the case of the American soldiers in the lake, the information is provided by Miles, a member of the band "The Paranoids," who is not necessarily the best of sources, as he was not there to witness the event (and it does not appear as if he has thoroughly researched the matter). Despite this fact, Oedipa does not attempt to get his story confirmed from other sources; rather, she is more concerned with the fact that it fits so neatly with the events in the play.

One of the most prominent visual cues in Oedipa's detective hunt is the muted post horn, which is associated with the W.A.S.T.E system, but which at the same time is the symbol of the Tristero. On the surface, the meaning of the muted post horn is easily discovered, as Oedipa is of the opinion that "Whoever they were their aim was to mute the Thurn and Taxis post horn." (a normal post horn, sans mute) (Pynchon, 78). The battle between the postal services of Thurn and Taxis and Tristero is thoroughly explained throughout the novel, especially through "The Courier's Tragedy", and the story supports the idea that the muted post horn is simply a jibe to a competitor. A mute placed in a post horn will also produce a quieter, less distinct sound, fitting well with the underground nature of the Tristero.

However, both the acronym W.A.S.T.E. and the workings of the postal system with the same name offers an alternative, albeit slightly self-contradictory meaning. It is difficult to claim otherwise than that a postal system is both an extensive and important channel for communication. It is perhaps even more important in Wharfinger's play, where there are no other means of efficient long-distance communication; no radio, television, or telephone. Therefore, controlling the postal system is a very efficient way of controlling the flow of long-distance communication (such control could also be used to disrupt the communication sent), something Professor Emory Bortz, a scholar who has worked a lot with Wharfinger's plays, suggests to be the Tristero's goal as he discusses "The Courier's Tragedy" with Oedipa later in the text (Pynchon, 135). On one hand, the Tristero definitely aims to stop the Thurn and Taxis system, to mute their post horn, but there is also the possibility that the Tristero is in a way muting its own post horn, not in the manner of simply making its tone deeper, but in the manner of pushing the mute so far inwards that it stops any sound what so ever from escaping. The latter idea, while odd, does have some support in the novel; such as the fact that there is a lot of useless

information being sent through W.A.S.T.E., creating background noise with the potential to interfere with more useful information.

The name of the postal service, W.A.S.T.E., is an acronym for We Await Silent Tristero's Empire (Pynchon, 139). The acronym ties in with the muted post horn, and goes a way towards suggesting that the final incarnation of the postal system or whatever other plans the Tristero has, will manifest as a silencing of (useful) communication. It is also interesting to note that one of the workers at the "Yoyodyne" industrial complex named Stanley Koteks, whom Oedipa meets just after being introduced to W.A.S.T.E. and Tristero, is quite adamant on the fact that the acronym is not to be pronounced merely as "waste". ""It's W.A.S.T.E., lady," he told her, "an acronym, not 'waste', and we had best not go into it any further." (Pynchon, 70). Another acronym that turns up later in the story, D.E.A.T.H., stands for Don't Ever Antagonize The Horn (Pynchon, 98). While fitting nicely as a warning to people mistaking W.A.S.T.E. for "waste", it does more to underline the Tristero's dark nature (though it is interesting to note that the one time the acronym appears, it is painted inside "[...]an exhausted busful of Negroes going on to graveyard shifts [...]" (Pynchon, 98)).

Another type of visual signal is found in the form of Pierce Inverarity's stamp collection, where a number of seemingly ordinary stamps contain irregularities linking them to the Tristero. While the stamps and their age do provide a timeline that seemingly confirms the organisations' activity in America, their main role is perhaps that they attract a possible Tristero representative to the auction that concludes the novel. Apart from this, the stamps do not really provide any useful new information, and as a source they are not easily accessible, being discovered almost

by accident by the philatelist Genghis Cohen who is charged with assessing the stamp collection left by Inverarity (Pynchon, 75-79).

As Oedipa plays the detective, she is faced with a wealth of information, a lot of which seems to fit neatly together, perhaps too neatly even from her perspective. But as we have seen, there is already a great potential for confusion based on the Tristero-W.A.S.T.E connection. The following quote nicely illustrates one of Oedipa's problems, the fact that she receives so much seemingly related information over a very short period of time:

> "*Though she saw Mike Fallopian again, and did trace the text of The Courier's Tragedy* a certain distance, these follow-ups were no more disquieting than other revelations which now seemed to come crowding in exponentially, as if the more she collected the more would come to her." (Pynchon, 64).

While Oedipa is aware of the fact that she is surrounded by information, that alone is not enough in itself; she must also be able to access it and process it for it to be of any use to her. According to Wiener; "Semantically significant information in the machine as well as in man is information which gets through to an activating mechanism in the system that receives it, despite man's and/or nature's attempts to subvert it." (Wiener, *The Human Use*, 94). Also, she does not only see herself as surrounded by information, but also by answers; "As if (as she'd guessed that first minute in San Narciso) there were revelation in progress all around her." (Pynchon, 31). While there might be revelation all around her, it need not consist of information that is directly useful to the case she is pursuing. Oedipa herself at times doubts the veracity of all the information and the seemingly connected events she stumbles upon; "Either Trystero did exist, in its own right, or

it was being presumed, perhaps fantasied by Oedipa, so hung up on and interpenetrated with the dead man's estate." (Pynchon, 88). Since she gains so much seemingly related information from different sources, her need to pursue all these leads is understandable. In theory, examining all the leads could reveal which of them are in fact connected, and which just share some random similarities. The trouble with the approach is that by doing so, she continues to stumble upon new, again seemingly related leads. She employs no mechanism by which the less important information is filtered out, and the result is that the amount of information she must process increases, the strain of this again allowing more information to pass through unfiltered.

Oedipa is introduced to the concept of entropy by the scientist John Nefastis, whom she learns about from Stanley Koteks. Oedipa learns of entropy by being given the same example Wiener uses in *The Human Use of Human Beings*, namely that of *Maxwell's demon*. Maxwell's demon works as follows: Imagine a closed system made up of a container (A) filled with hot gas connected by two tubes to another container (B) that contains a heat engine. One tube runs directly from A into the heat engine in B, fuelling it with gas, and the other tube runs from the exhaust system of the heat engine, letting the exhaust pass back to A. In each tube there is a trapdoor, and each trapdoor is guarded by a "demon" that can sense the speed of the approaching gas molecules. As hot molecules are faster than cold ones, the demon guarding the door leading from A to B only lets fast molecules pass through thereby fuelling the heat engine. The demon guarding the door leading from B to A only opens the door for the slow moving molecules that have spent some of their energy fuelling the machine. By doing so, the two demons ensure the heat engine always has hot molecules to run on, while they at the same time recycle the fuel the engine has already used, thereby apparently creating perpetual motion. (Wiener, *The Human Use,* 28-29)

This design only works because of the way it treats information. As Wiener puts it "In nineteenth century physics, it seemed to cost nothing to get information." (Wiener, *The Human Use*, 29). However, as we know within cybernetics the term "information" covers everything, in this case the molecules the demons sort, the speed of the molecules, and the demons themselves. The demons are part of the system, and we have to consider the entropy for both the gas and for the demons, not for the gas on its own (Wiener, *Cybernetics*, 58). In order to sort the molecules, the demons have to gain information about them, specifically whether they move fast or slow, which will result in some of the information in the gas molecules being transferred to the demons each time they evaluate them. Though it would take time, eventually too much information would flow from the molecules to the demons, and the system to be rendered inoperable, a process that could only be reversed by introducing an external source of power (Wiener, *The Human Use*, 29-30). The system could over some time avoid a localized increase in entropy, but only until a certain threshold was reached.

John Nefastis has constructed a machine similar to the one Maxwell describes, one he believes will work if a so called "sensitive" interacts with the demon by staring at a picture of Maxwell (Pynchon, 84). Nefastis is quite convinced his machine works, but Oedipa is more skeptical. "But had Clerk Maxwell been such a fanatic about his Demon's reality?" (Pynchon, 85). Although asking Maxwell is out of the question, I believe we can assume with some certainty that he was describing a theoretical principle, rather than an actual demon. And as we know, entropy can not be avoided by neither Maxwell's nor Nefastis' machine. Oedipa puts it rather elegantly when she is told of Nefastis and his machine by Stanley Koteks; ""'Sorting isn't work?"" (Pynchon, 68). Koteks, like Nefastis, is still working by what Wiener calls "nineteenth century physics," his reply being that ""'It's mental work," Koteks said, "But not work in the

thermodynamic sense."" (Pynchon, 68). But as we know, a transfer of information involves a coupling of energy as well, so even though thoughts might appear as being information-related work alone, they do involve "work in the thermodynamic sense".

Oedipa has the gist of it; that information is altered, and eventually destroyed by entropy. The element that introduces most of the entropy in *The Crying of Lot 49* is human; not only Oedipa herself, but also the myriad of sources she gets information from. The director of "The Courier's Tragedy," Randolph Driblette, illustrates one of the key problems humans face when processing information when he says ""The words, who cares? They're rote noises to hold line bashes with, to get past the bone barriers around an actor's memory, right? But the reality is in *this* head. Mine."" (Pynchon, 62). Despite her apparent understanding of information and entropy, and the fact that she is presented with a large number of sources and a lot of information, Oedipa is not thorough in checking the validity of the information she has received by going back to the source she got it from. Instead, she seems to prefer to validate it by comparing it to the other information she has, or by searching for new information. While this tactic can work, it can fail if any false information is used in the validation attempt. Oedipa wants answers, but her processing of the information that might give her answers is unstructured, and not sufficient to prevent or reduce entropy.

Oedipa's quest for answers leads her further and further into a mode of looking at information that is strikingly similar to the cybernetic definition, namely that everything is in essence comprised of information. This is particularly evident towards the end of the book, where the reader is allowed to glimpse Oedipa's thoughts on the city of San Narciso;

> "For it was now like walking among matrices of a great digital computer, the zeroes and ones twinned above, hanging like balanced mobiles right and left, ahead, thick, maybe endless. Behind the hieroglyphic streets there would either be a transcendent meaning, or only the earth."(Pynchon, 150).

One could argue that Oedipa is in essence correct in this case, at least partially. The information that makes up everything around her might well be represented by ones and zeroes, although it might be safe to assume that she does not really see everything in code (like Neo in *The Matrix*), but rather that the amount of information she is receiving through different channels is overwhelming her, making it appear to her as if everything is (accessible) information. However, and this is perhaps the key difficulty Oedipa faces, whether or not the world can be viewed as information matters little if she is not able to extract some meaning from it, or as Wiener puts it: "*All logic is limited by the limitations of the human mind when it is engaged in that activity known as logical thinking.*" (Wiener, Cybernetics, 125). This is also shown, again in relation to the city, when she spends a night drifting through San Narciso; seeing a multitude of painted post horns, hearing people talking about using W.A.S.T.E, and other things related to the mystery she is trying to solve (Pynchon, 88-104). Here, the idea of the city as a circuit card, flowing with information, is to a large extent confirmed, but it is also evident that she is either following the wrong circuits, unable to access the information properly, or both.

There is, to put it mildly, a lot of information being presented to Oedipa. The quality of it however, is generally questionable. The safest source of information would appear to be the script for "The Courier's Tragedy", but the fact that it exists in different, conflicting versions makes it hard to decide which one to trust. The real-life events that mimic the play, such as the

American soldiers who were all thrown in a lake and had their bones fished up to be made into charcoal just like “The Lost Guard of Faggio,” might seem like they can not be based on coincidence, but this is hard to verify. The muted post horn and the acronym W.A.S.T.E, while they appear in situations apparently linked to the Trystero, do not provide any useful information on their own. In general, the information Oedipa has to deal with is presented to her in a disorganized and fragmented way, but appears to all fit together neatly if one wants it to. In a way, it boils down to how much Oedipa is willing to trust in coincidence, or to what extent she wants to see answers.

The problem Oedipa faces here is that of information or signal type. There is “The Courier’s Tragedy”, which is first of all a play and not a proper historical account, and secondly it is delivered to her both in the form of pure text (in several different versions) and as speech. The latter is also complicated by the fact that the actors’ interpretations alter the way the information comes across. Then there are the myriads of hints gathered from conversations with a great variety of sources, in addition to information not directly connected to Oedipa’s main questions, such as the conversation with Nefastis. Then there are the textual clues such as W.A.S.T.E., and lastly, there are the visual clues; ranging from the muted post horn to Inverarity’s stamp collection. Just as electronic signals at certain wavelengths can interfere with each other and even cancel each other out completely, so do the different signals Oedipa receives interfere with each other. Many of them contain very similar information, which makes it difficult to keep them separated; a fact that ultimately makes it hard to separate useful from useless information, which again increases entropy.

Oedipa displays a hunger for information, and one would initially presume that more information is preferable to less information, but this only holds true if the total amount of information is less than or equal to the total amount the receiver is able to process. Wiener notes that a human "[...] is then likely to perform a complicated type of behaviour efficiently very close to the edge of an overload, when he will give way in a serious and catastrophic way. This overload may take place in several ways: either by an excess in the amount of traffic to be carried, [...] (Wiener, 151), the latter certainly being a concern for Oedipa. A computer that is equipped to optimally handle a certain number of operations that total to a certain amount of data will not necessarily crash when faced with an extra workload, but it will process data at a slower rate, increasing the chances of information entropy. And unlike a human, a computer will always try to optimize how it handles data to avoid undue strain on the system. Oedipa is concerned with processing the information she is given, which is illustrated as she is thinking about Inverarity's business interests: "She would give them order, she would create constellations [...]" (Pynchon, 72). But she is also trying hard to find answers, which makes her pay less attention to the efficiency of her processing. This reflects the way she deals with the mystery of the Tristero as well; she wants to enforce some order to the information she has received, and create clear connections between the different units of information. She does not however seem to be able or willing to do this in increments or to filter out information that is of dubious value. She wants to use all of the information and to process it as a whole in order not to miss something. While the idea is good, the process is less than efficient.

To an extent, Oedipa might be aware of all this, which is illustrated by the following quote:

> "Oedipa wondered whether, at the end of this (if it were supposed to end), she too might not be left with only compiled memories of clues, announcements, intimations, but never the central truth itself, which must somehow each time be too bright for her memory to hold; which must always blaze out, destroying its own message irreversibly, leaving an overexposed blank when the ordinary world came back." (Pynchon, 76).

The truth is in a sense "too bright for her memory to hold", but not necessarily because the truth itself requires such a large amount of available storage, but because all the information she possesses that might contain the truth already takes up too much space and has become so disorganized and corrupted that little useful can be gained from it. Oedipa wants answers, but while the end use for the information is finding out who or what the Tristero is, that goal in itself is a rather unclear one. Why does she want to know about the Tristero? We do not know if it is to satisfy her own curiosity, to simply to bring order into the mass of disorganized information she has, to expose the Tristero to the public, and so on. At times it seems unclear whether she herself knows the answer, and while what she needs might be within her grasp or could already be so, a lack of a clear focus becomes a hindrance. Because all the information she possesses that might contain the truth already takes up too much space and has become disorganized and corrupted, there is the risk that little useful can be gained from it.

Simply going by the tenet "information is power," Oedipa should have power in abundance, but instead the information has power over her. Unfortunately for her, she mostly receives information, and often there is no easily reached sender to send a response back to. The quality of the information and the difference in signal types, coupled with her processing

capabilities leaves something to be desired. The result is that she is largely at the mercy of the information she receives; she can not do much with it except to use it as a motivator to go looking for more, but the information she already has interferes with both itself and new information. A transfer of information equals a coupling of energy, and the amount of information Oedipa receives drains her energy and leaves entropy to reign freely. As Timothy Melley notes; "Thomas Pynchon's characters frequently believe they have stumbled on a massive plot, but are unable to confirm its existence." (Melley, 16).

4. Neuromancer: connecting the whole

In *Neuromancer*, we follow the protagonist Case, who does most of his work and adventuring in *cyberspace*, also called the *matrix* – Gibson's version of today's internet. "Case was twenty-four. At twenty-two, he'd been a cowboy, a rustler, one of the best in the Sprawl." (Gibson, 11). The term cowboy is an apt job-description, at least if we compare Case to the typical Hollywood-cowboy, entailing a certain disregard for the law and a certain amount of risk. Case's relationship with information is a closer one, and a more professional one than Oedipa's. It is professional in the way that Case works with information for a living, and close in the manner of the connection he has to information through cyberspace, and in the manner this connection further increases his dependency on information.

At the beginning of the story, Case has been cut off from cyberspace; a disgruntled ex-employer has taken the step to render his nervous system incapable of interfacing with the matrix as revenge for Case's taking something that was not his. The fact that Case is unable to enter cyberspace shows us exactly how dependent he is on it. "For Case, who'd lived for the bodiless exultation of cyberspace, it was the Fall." (Gibson, 12). This illustrates one important point when

considering Case's relationship with cyberspace, namely that while he relies on it for much of what he does as a professional , it entails much more than just work for him. As we shall see later, this has much to do with how he views his body and the "real" world versus the world he can access in cyberspace. Case seems, if not addicted to, then at least quite dependant on his work. While it involves accessing the matrix, there is nothing stopping him from accessing it in non-work related circumstances. However, in my opinion there is one thing that links his love for cyberspace to the job he does while connected to it, and that is the fact that it necessitates taking risks. And the risks he is taking, the satisfaction of having those risks rewarded and the satisfaction of solving the problems he is presented with seem to constitute much of the thrill he gets out of cyberspace.

In the time he is not able to access cyberspace, Case grows careless, close to suicidal. His new employer, Armitage, who will help him in reestablishing his access, neatly sums up Case's attitude towards life without it when he says "'Our profile says you're trying to con the street into killing you when you're not looking.'"(Gibson, 40). While this degage attitude illustrates Case's dependency, it might not only be the result of his lack of it. It also appears that displaying this risky behaviour to a certain extent alleviates his abstinences, at least in the situations where he successfully manages to get someone to come after him, or believes he has done so. When he is first being shadowed by Molly, Armitages' hired muscle, close before being introduced to his new employer for the first time, the drugs in his body combined with an adrenaline surge provides him with the following revelation:

> "Because, in some weird and very approximate way, it was like a run in the matrix. Get just wasted enough, find yourself in some desperate but strangely

> arbitrary kind of trouble, and it was possible to see Ninsei as a field of data, the way the matrix had once reminded him of proteins linking to distinguish cell specialties." (Gibson, 26).

In a way, the drugs, the thrill and the paranoia combine to supply him with a form of ersatz-matrix. While this might be positive, we do not get to see the long term effects of such a brief exposure, but I believe it safe to say that the result might just as well have been one of frustration rather than solace.

I would perhaps not go as far as Bukatman who, perhaps slightly bluntly, states that "Humans become prisoners of the interface. Case's own painful withdrawal from the ecstatic conditions of cyberspace reveals his status as a prisoner, he is literally addicted to the Cartesian vectors of cyberspace." (Bukatman, 285). While I agree that technology offers a great potential for addiction, especially considering its potential for power, I would say that while Case is certainly dependent on cyberspace, he is not quite the addict yet. He does spend long stretches of time connected to the matrix, but he also spends considerable time outside of it – not quite what you would expect from the typical addict. Another point is that a lot of his time spent in cyberspace is used to do work he has been hired to do, not to be connected for the sake of getting away from the outside world. While he suffers withdrawal symptoms of sorts when not able to access cyberspace, this is not only the result of being cut off from the "bodiless exultation of cyberspace," but largely the result of being cut off from doing what he is good at and takes pride in doing. If one is to call Case an addict, one must at least acknowledge the fact that he is not a typical addict.

Case's vision of Ninsei gives us a glimpse of how he sees information. Through his work in cyberspace he is already well used to existing in an environment consisting wholly of information, where all his surroundings can potentially be accessed and analyzed. In other words, Case is already used to taking and employing a fully cybernetic view of reality, or virtual reality as it were. The parallel to Oedipa and her view of San Narciso is quite clear, and the fact that both novels touch upon cities as patterns of information is perhaps not surprising; I have already looked at how a city can, in Oedipa's case, be likened to a circuit board. However, Case and Oedipa's visions of their respective cities also provide us with a strong contrast. Where Oedipa is unused to viewing everything as information, sensing only a vague intent to communicate in the pattern of the city, Case is accustomed to taking this view. For Case, the information that constitutes the city would also be much like the fields of data in the matrix; information that can be received, accessed, processed and acted upon, but not necessarily information that attempts to communicate as if controlled by a single will. Although this latter view must be modified to a certain extent when Case learns of and comes into contact with the artificial intelligence Wintermute, I do not believe that it must be modified all that much. Unlike Oedipa, who experiences the city as one large mass of information, Case knows from cyberspace that it is made up of many parts, of many different computers and operators. He also knows of AI's and some of their capabilities already, and while he experiences what one single AI can accomplish on its own, he knows that there is not one single entity controlling everyone's experiences in cyberspace.

Another important fact about the difference between Oedipa and Case's view of their respective cities is whether or not they are able to confirm that their visions are rooted in reality. Oedipa on one hand gets no such confirmation, and it is doubtful whether there is any

information available that could give her an answer, and also whether or not she would be able to access and process any such information, should it exist, to produce a definitive answer. In Case's world, there are several things that allude to the existence of cities as information patterns. First of all, cities are already represented as information patterns on electronic maps, whether inside or outside of cyberspace.

> "Program a map to display frequency of data exchange, every thousand megabytes a single pixel on a very large screen. Manhattan and Atlanta burn solid white. Then they start to pulse, the rate of traffic threatening to overload your simulation. Your map is about to go nova. Cool it down. Up your scale. Each pixel a million megabytes. At a hundred million megabytes per second, you begin to make out certain blocks in midtown Manhattan, outlines of hundred-year-old industrial parks ringing the old core of Atlanta..." (Gibson, 57).

While this might not at first appear as a very good parallel to Case's vision of the actual city, the comparison has some merit because of the importance of technology present in the world he inhabits. Advanced technology is an important component of the every day lives of Case and his companions, and electronic information transfer has seemingly taken over completely for some non-electronic systems, such as today's postal service, and partially in other areas such as communication between individuals. Case can already see his city as an information pattern, which gives a good representation of the city because of the extensive use of electronic communication. Oedipa can not easily view her city as an information pattern, and the amount of electronic communication present in it is far lower. Viewing a city as an information network in

Neuromancer makes sense because of the individual's daily interaction with technology, and for professionals such as Case it can to an extent be viewed as a necessity.

Another interesting distinction between Case and Oedipa is the extent to which the comparisons between technology and cities are made. Oedipa likens the city to a circuit board, but the comparison is not used the other way around. As we have seen in *Neuromancer* so far, the same comparison as in *The Crying of Lot 49* can be made. However, as Case is testing his new computer provided by Armitage, the comparison also in Neuromancer goes the other way around when the computer goes through an introductory presentation of cyberspace: "'A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding ...'" (Gibson, 67). The light of course is data, or hot spots of data depending on the level of magnification. The receding city lights show that the data clusters in cyberspace can be viewed in much the same way as the streetlights (and other light sources) in a city; if they are receding you are effectively zooming out, gaining altitude and a better view of the whole complex. If you zoom in, the spots of light will grow bigger, but you will see fewer of them albeit in more detail. The architecture of cyberspace allows you to get your bearings easier, to find out in which direction to go to get to the target information, and finally to close in on the details you are after. In other words, if the data fields of cyberspace are cities, it is a city that it is difficult to get completely lost in. This is unlike the city of San Narciso, where Oedipa wanders lost at night through dim streets, believing but often unable to confirm if she is really seeing useful signs and other bits of information, and unable to zoom out to check if she is on the right track. To her, the mass of information that is the city is difficult to break up into details. The fact that cities are compared to information systems and the other way around

goes to show exactly how important, and integrated technology is in Case's world. Bukatman points out that "The very first sentence of *Neuromancer* establishes the impossibility of a "real" space existing apart from its electronic analogue: "The Sky above the port was the color of television tuned to a dead channel."" (Bukatman, 148). And in *Neuromancer*, the virtual reality is not easily separated from the real world. The virtual reality already mirrors parts of the real world, and it is linked to the life of many people, whether they are inside it or not. Even before we get to the descriptions of cities in relation to information networks, the link between technology and the real world has already been established. It makes sense, in the context of Neuromancer, to view a city as an information network to a certain extent, simply because the interaction and dependency on advanced technology is quite normal, and perhaps even unavoidable in some instances.

I have already mentioned that Oedipa does not, and probably can not, confirm her alternative view of San Narciso in any satisfactory way. Even if she was able to do so, it is not necessarily safe to assume that she could access any information inherent in the city. For Case, the situation is different, because he indeed does get his vision verified. As he speaks to the AI Neuromancer about the death of his short-time girlfriend Linda Lee, Neuromancer reveals the following about both Linda's death and about reality outside of cyberspace: "'No. I saw her death coming. In the patterns you sometimes imagined you could detect in the dance of the street. Those patterns are real. I am complex enough, in my narrow ways, to read those dances.'" (Gibson, 305). Exactly how these patterns can be read is not made clear, but it is tempting to see this as a sophisticated application of *statistical mechanics* as discussed by Wiener in *Cybernetics* (chapter II). In other words, the AI might just be able to get enough data to use its formidable

processing capabilities to predict the behaviour, not only of single particles in a system, but of humans and machines as well.

Both Neuromancer and Wintermute would have to experience humans as data, and that data could be directly analysed, or be used to calculate statistics. We do not know exactly how the AIs' gather data on humans; or rather we do not know exactly how much data on a single human they can gather. Presumably the data would often be limited to what could be gathered from visual or audio observations and such, and it would at least be difficult to gather more "internal" data unless the subject being observed was connected to cyberspace – in other words the AIs' would not always have the option (if at all) of directly downloading information from a human brain. Any statistical models would therefore most likely contain quite a few unknowns, but they would be sufficient to predict behaviour to a satisfactory degree. We do know that both Neuromancer and Wintermute are able to predict human behaviour, and plan accordingly, but the fact that their plans do not always work exactly as intended shows that they have not managed to remove all the unknowns from their statistics. No matter how it is done though, it is safe to assume that, while Case now knows that there are strong similarities between the data fields of cyberspace and of reality, he is not in a position to access the real-life data to such an extent as he can access data in cyberspace.

Case and Oedipa also differ in two basic respects relevant here, namely those of information access and information processing. We have already seen that while Oedipa has substantial access to information, the information comes through many different channels, some of which are difficult to access on the basis of the type of signal they send out, and some that become difficult to access in the cacophony that results from all the different signal types Oedipa

receives. In addition we have also seen that Oedipa's processing capabilities are not optimal, as she is in essence an amateur at the work she ends up doing. The technology level in *The Crying of Lot 49* is also rather low, especially when compared to *Neuromancer*, and a lot of the information is either transferred in written (paper) form or verbally. When the information is being processed, and has been processed, it is either stored in written form or mentally. This is a stark contrast to *Neuromancer*, where electronic transfer of information is the rule rather than the exception. Although it is often transferred as audio or text, it is also transferred in holographic form, especially in cyberspace. And, whereas Oedipa must be content with using her sensory apparatus to watch television or making a phone call, Case can have signals downloaded directly into his nervous system. Although Case, and his colleagues, store information mentally, they also have the option of storing it electronically, which gives them the option of playing back messages in their original form, or connecting research directly to the original material (such as when Case uses his computer to do background checks on for an example company names that appear in his research).

Another big advantage of the technology Case has at his disposal is that can do a lot of work on its own, such as searching for information, with the operator only needing to provide search parameters or such. This makes it much easier to gain new information, with a slimmer chance of error caused by the human operator. In addition, the information available in cyberspace is accessible pretty much all the time, provided one has a terminal to connect to it with. All this contrasts with the amount of work Oedipa must go through to gain new information; finding the right person or the right written source, which in itself requires information like names, addresses, telephone numbers, book editions, opening hours and so on, and then accessing it manually by asking the right questions or by reading.

Another advantage Case has because of his cyberspace access is the fact that cyberspace is at least to some extent easier to analyse and understand, because most of the information (but not all, something I will come back to later) making up cyberspace is directly accessible. Bukatman touches on this, saying that

> "J. David Bolter has stressed that electronic space is, in many ways, simpler to understand than its physical or mathematical counterparts, precisely because it is "an artifact, a constructed space that must function in thoroughly predictable ways in order to serve its technological purpose."" (Bukatman, 151).

Whether or not cyberspace is fully predictable to Case or the other cowboys is obviously limited by their understanding of it, but at any rate we can assume that Case avoids many of the unknowns that Oedipa must suffer in the real world.

While both Case and Oedipa work with information during the course of their respective stories, they are doing it from their own points of departure. Oedipa has limited experience when it comes to accessing and processing information on the scale required for her to do her detective work and she does not have access to a particularly impressive array of mechanisms that might help her do her work. This also means that she has to do quite a bit of work, mainly manual work, when looking for answers. Case however, is a professional when it comes to working with information, both because of the nature of the work he does ("hacker" is an apt description) and because of where he does it; in cyberspace, a place where accessing and processing information is a directly observable necessity. Cyberspace, the technology connected to it and the technology of equal sophistication used when outside of cyberspace is also an immense advantage because it

eases Case's workload. The fact that Case is so adept at working with information is at least partially due to his mechanical resources, and his linkage with them. He is good at the work he does because he is assisted by machines, and because he is skilled when it comes to making the machines perform the tasks he needs them to do. As Bukatman puts it; "The body is paradoxically extended by its own disappearance – the subject's control is increased by its implosion within the cyberspaces of electronic technology." (Bukatman, 315). Wiener says that "In a certain sense, all communication systems terminate in machines [...]" (Wiener, *The Human Use*, 79), and humans are counted as a special kind of machine. Further, he tells us that "[...] in general, any computing machine is used because machine methods are faster than hand methods." (Wiener, *Cybernetics*, 119). Case is not the "ordinary" kind of human machine, but a much more efficient one thanks to his direct connection to the machines he uses. The work the machines do for Case is presumably also of a better quality, since it is performed by systems optimized for the tasks, lessening the chances of errors occurring. Unlike Oedipa, Case seems to take more, or at least as much, pleasure in the processes involved in finding answers, rather than finding the actual answers. I believe the effect of this is rather evident, especially when comparing Case to Oedipa, as Case's obsession and skill evident in his processing means that he suffers far less confusion than Oedipa does.

We already know from Wiener that "All logic is limited by the limitations of the human mind when it is engaged in that activity known as logical thinking." (Wiener, *Cybernetics*, 125). This statement covers humans and what a their bodies as processing units can accomplish, but it also applies to the artificial intelligences and other computers in *Neuromancer,* and they are limited in the same way by their minds or programming.

Case offers us some interesting insight concerning the capabilities of cyberspace, and of a human in cyberspace, as he gets ready to use a device ("simstim") that will let him see through Molly's eyes and feel what she feels. "He knew that the trodes he used and the little plastic tiara dangling from a simstim deck were basically the same, and that the cyberspace matrix was actually a drastic simplification of the human sensorium, at least in terms of presentation [...]" (Gibson, 71). In other words, the full capabilities of the human sensory system are not accessible when jacked into cyberspace. This has an effect on what kind of input a human operator can get. While the simplified capabilities of the human sensorium will present the operator with less detailed and less total information to process (which would also limit the extent of the output from the operator), this would also allow for a greater level of focus and fewer irrelevant elements. It is not clear whether input is simplified because of limitations in technology or in the human body, but it nevertheless suggests that human operators are unable to comprehend certain parts of the information available to them in cyberspace.

This view is supported by N. Katherine Hayles in a discussion of visual representations of computer code, which also uses Neuromancer as an example, saying that Gibson "[...] represents the data arrays of a global informational network as solid polygons in a three-dimensional space that his protagonist, transformed into a point of view, or pov, can navigate as though flying through the atmosphere." (Hayles, 228), and she also points out that this representation is based on the viewers assumption of the code and makes up an imagined space rather than a material one (Hayles, 229). In other words, since humans lack the ability to view the raw code of cyberspace which must be converted into something they can view, they can not fully comprehend all parts of cyberspace since the true form of the code is hidden from them. Bukatman has a slightly different take on the subject when he says that

> "The reductionism of cyberspace also extends to its definition as an abstraction of the data in all the computers within the human system, a reprogramming which reduces the complexity to avoid an overload and permit the assimilation by human perception (as in the map of the Sprawl: "Cool it down," Gibson advises) [...]" (Bukatman, 152).

How large a part a potential overload plays when it comes to the visual versus the non-visual representation of the cyberspace code is hard to say, and it is not necessarily very relevant in any case; humans probably would not be able to access the raw code of cyberspace at all. Representing the code visually to "permit the assimilation by human perception" is the key.

One theme that runs throughout the story is the typical "cowboy's" disdain for his or her own body. As Case puts it when he recounts the story of how he lost the ability of connecting to cyberspace; "The body was meat. Case fell into the prison of his own flesh." (Gibson, 12). This disdain is brought up again when Case is getting ready to try out his simstim deck; "Cowboys didn't get into simstim, he thought, because it was basically a meat toy." (Gibson, 71). This attitude is not necessarily directed towards the body as such but to the limitations it imposes, which offer a counterpoint to the experience of connecting to cyberspace, where nothing but the "disembodied consciousness" (Gibson, 12) exists. In that state, Case and the other cowboys can exert an amount of power they can not access in real life; they can depend on their minds in a state where they are freer from the body than in real life. It is hardly difficult to understand that Case, so in love with cyberspace, finds it difficult to rely more on the "meat" part of himself.

The ideal for Case would seem to be ending up like his old teacher, McCoy Pauley, nicknamed the Flatline because of his tendency to do things in cyberspace that dropped his EEG readings to zero – represented by a flat line indicating brain death, who has had his memory downloaded into a memory bank after his sentence. In his present state, the Flatline exists only as the data that made up his personality, he is able to connect to cyberspace, and seems to have attained a state free from his body. Therefore, his state could seem ideal for someone expressing the typical cowboy attitude towards the flesh.. However, Case's thoughts about the Flatline before he is able to speak to him show unease; "It was disturbing to think of the Flatline as a construct, a hardwired ROM cassette replicating a dead man's skills, obsessions, knee-jerk responses ..." (Gibson, 97). This does to a certain extent suggest that his apparent disapproval of his own body is not entirely as serious as it might seem, but perhaps in part more of an expression of pride at what he can do in cyberspace with his mind, in the way a craftsman depending solely on hand tools might look down on those using mechanical tools for mass-production. When Case first speaks to the Flatline, the Flatline appears very much as a pattern of information rather than a personality, using repetitive language, and providing answers that sound like a result from a search engine – for example, as the answer to who Case is; ""'Miami, joeboy, quick study."" (Gibson, 99).

In essence, the Flatline is, in his present state, only an information pattern. He has little extra memory in which to store new experiences, and one could presume that it would be difficult for him to develop far beyond the information on the ROM cassette (unless he had assistance to do so), since it would entail him directly rewriting his own personality. Wintermute confirms that the Flatline is rather set in his ways as a ROM construct, saying that "'The Flatline here, if you were all like him, it would be real simple. He's a construct, just a buncha ROM, so

he always does what I expect him to.'" (Gibson, 245). In other words, existing as just personality data without a body has made the Flatline into something that appears more like one of the characters Wintermute uses; something I will look at in a moment. The Flatline also demands to be erased as payment for his services to Wintermute, strongly suggesting that his present state is an undesirable one, but also that his state still leaves him conscious and self-aware enough to make decisions about himself.

Hayles, discussing Baudrillard, touches upon the idea that the distance between the signifier and the signified, or original object and simulacra, may collapse, so that the simulacra may actually displace the original object altogether. (Hayles, 249-250) Later, she also remarks that "[...] we can no longer simply assume that consciousness guarantees the existence of the self." (Hayles, 280). The Flatline and his ROM-body are an attempt at a simulacra, one that has technically replaced the original – but only because the original no longer exists. In this instance, the distance between signifier and signified may appear to have collapsed initially, only to revert back to somewhere close to the initial position, due to the fact that the consciousness in the ROM-body is only a part of the original self. This reversal happens because there is still enough consciousness left to realize that it is incomplete compared to its original self.

One thing that Case does not immediately seem to realize, especially not before encountering the Flatline, is that body and mind are strongly linked; despite their apparent independence from one another in cyberspace. For an example, much of the brain is devoted to controlling the body's functions, and the body is built to react to the signals from the brain. Removing the mind from the body and connecting the mind to cyberspace would not necessarily result in a freer, more powerful mind, but in a mind that is still configured to perform certain

functions that are no longer accomplishable because the body is gone. A large portion of an individual personality is also built around the body, such as self esteem, self confidence and so on. If Case had ended up like the Flatline, and existed solely as information, he might need to code himself a body in order to function properly, and if that were to happen he might end up limited to the extent he is when inhabiting a body made of real meat. This being said, Case does use his body to operate his cyberspace deck, so at some level he is probably aware of the fact that he needs it to do what he does.

Bukatman also offers a useful point concerning the body in cyberspace; "The reader should not be misled by the references to "bodiless exultation," by the way, for the subject in cyberspace is granted perception and mobility, conditions predicated upon a lived body; a new body, perhaps, but a body nonetheless." (Bukatman, 207). This relates to what I have already said, with emphasis on the fact that since cyberspace is constructed so that it can be perceived by humans, and humans would have a hard time imagining themselves without some sort of body, the human must be represented by some sort of body in order to operate in cyberspace.

During the latter part of the story, Case is trapped in a closed off portion of cyberspace that is being controlled by Neuromancer. At that point, he seems to grow even more positively inclined towards his body.

> "Something he'd found and lost so many times. It belonged, he knew – he remembered – as she pulled him down, to the meat, the flesh the cowboys mocked. It was a vast thing, beyond knowing, a sea of information coded in spiral

> and pheromone, infinite intricacy that only the body, in its strong blind way, could ever read." (Gibson, 284).

Perhaps it is the prospect of having his mind trapped in an unsatisfactory part of cyberspace, or the fact that he is back with Linda that makes him realize that he does appreciate his body to a greater extent than what he expresses when tries to act like a typical cowboy. It might also well be that his experience with the Flatline has made him realize that it would be dreary to exist without a body. At any rate, and perhaps most importantly, he is now viewing the whole body as information, not just the mind, which might make it easier to like. Melley offers another interpretation that could be applied to this topic, saying that

> "Without stable boundaries, the notions of persons as discrete individuals becomes suspect and finally threatens to fall away, leaving what Thomas Schaub calls "a continuity" that transcends the individual, replacing the idea of "'self' as consciousness and memory" with "'self' as *intersection*" (Pynchon, 49-50). What is so troubling about this intersection is the way it resists theorization, the way it appears simultaneously to be a vague mathematical grid and an immense *individual*." (Melley, 102).

This could be what Case has seen happening to the Flatline, who has his ROM-cassette to provide boundaries for his personality, but who still is removed from his old self, now being only an information pattern or "mathematical grid" if you will. Case has found renewed pleasure in his body after sleeping with Molly, and to borrow his own words, he needs the body as a vessel and a reading unit for the "sea of information". Without the body to contain and shape the

information in it, the mind in cyberspace could end up as a diluted and stretched version of the original self.

The AI Wintermute, while extremely powerful in cyberspace, has limitations of its own outside of it. This is exemplified by Wintermute's use of different "characters" in order to deal with Case and other humans. Molly explains this in the following way: "'Why he has to come on like the Finn or somebody, he told me that. It's not just a mask, it's like he uses real profiles as valves, gears himself down to communicate with us. Called it a template. Model of personality.'" (Gibson, 248-249).

Apparently, this again concerns the limitations of human perception; Wintermute in its cyberspace-form is difficult or impossible for humans to perceive, and therefore the AI constructs characters that appear as real humans in order to bridge the communications gap. However, while it may seem that the reason for the use of characters is down to human inadequacy, it also appears that the AI itself is limited in how it is programmed. Wintermute, in the guise of the fence Finn, explains that "'Like I told Molly, these aren't masks. I need 'em to talk to you. 'Cause I don't have what you'd think of as a personality, much.'" (Gibson, 256). In other words, the reason Wintermute can not communicate with humans is indeed down to the fact that it exists in a form that would be hard for humans to grasp, but that form is a result of the AI's programming.

This also tells us something about how Case and other humans work in cyberspace. While it appears that Case would very much like to exist as pure information in cyberspace all the time, the fact that Wintermute also uses his characters when talking to Case inside

cyberspace suggests that this might not be possible, or at least not the experience he hoped for. Since Case is an individual, and is used to, and even limited to communicating with other individuals, it might be that he would still experience limitations if he existed solely as information in cyberspace. Unless the information in his mind was altered as it was downloaded into a computer, he would still be limited to communicating with entities that he could recognize as individuals. And if the information that makes up his personality was rewritten so as to allow him to bypass this limitation, it begs the question of whether he would still be Case, or even a recognizable individual. As Wintermute explains about itself to Case, it remarks that "'Your mistake, and it's quite a logical one, is in confusing the Wintermute mainframe, Berne, with the Wintermute *entity*.'" (Gibson, 145). Here, we can presume that Case is making his assumption about the entity Wintermute either because he expects it to have something akin to a personality, or because he simply assumes that the AI must act as a whole. However, he fails to understand that there are parts of it he *can't* understand, such as the fact that the AI can have a personality that does not encompass the whole of it, all software and hardware including.

> "Wintermute was hive mind, decision maker, effecting change in the world outside. Neuromancer was personality. Neuromancer was immortality. Marie-France must have built something into Wintermute , the compulsion that had driven the thing to free itself, to unite with Neuromancer." (Gibson, 315).

While Wintermute is described as a hive mind here, which might seem to make it difficult for it to communicate with humans since it lacks a clear personality, it does make sense for Wintermute to be the one of the two AIs' to interact with the outside world. While Neuromancer would seem to be the obvious choice for dealing with human individuals, one might also

consider that this could potentially make it less efficient at reaching the goal of uniting with Wintermute. Since Neuromancer has a clear personality, we might assume that it has some of the limitations of its human counterparts, and that its personality might cause it to make less rational decisions (for an AI at any rate) especially if it became closely connected with human individuals. Wintermute also has the ability to sustain several characters that are convincing enough to be of help to it, and it seems to be built around a very analytical core that can not only keep track of all the details in the big picture but that can also understand their significance and act when necessary. While its lack of a distinct personality makes it difficult for it to understand humans as more than just statistics, this same trait becomes useful as it needs to make long term plans based on many unknowns.

Wintermute also has trouble understanding humans because of their form, a view that is supported by Hayles, who, when discussing the AI Helen in the Richard Powers book *Galatea 2.2.* offers the view that

> "The problem that Helen confronts in learning human language is not that she is disembodied (a state no presence in the world can achieve!) but rather that her embodiment differs significantly from that of humans. There is nothing in her embodiment that corresponds to the bodily sensations encoded in human language." (Hayles, 265).

Without getting into a discussion about language and its role in human perception, thinking and identity (which is beyond the scope of this thesis), I believe we can safely say that Wintermute's type of embodiment hinders it in its understanding of humans. While the AI can act through its

characters, this does not give it the experience of a human body in the same way humans experience it, because it does not convert its whole self into a human, it is merely running a program to approximate a human. When looking at the AIs' from this angle, it also becomes clear that Neuromancer is also limited in its understanding of humans for the same reason as Wintermute is, although the fact that it has more of a clear personality would arguably give it better odds.

In a way, Wintermute is comparable to The Tristero in *The Crying of Lot 49*, as both operate in the background, are able to pull a lot of strings, and seem to be connected to long chains of, often seemingly unconnected, events. However, The Tristero never really comes out in the open, and possesses an apparently more malevolent agenda than Wintermute. In addition, The Tristero is not one single entity that acts with one single will, the latter being especially clear since Oedipa discovers evidence of internal struggle in the organisation. Wintermute, unlike The Tristero, does not seem to be after power in the form of direct control over others, although that would be a side effect of it merging with Neuromancer and encompassing cyberspace. While Wintermute does not use methods that can be described as wholly subtle, its goal is to merge with Neuromancer, not to cause havoc. Wintermute also exists as a fairly open player; at the very least it is possible to come into contact with it, and it does disclose parts of its plans and agenda. Obviously, the protagonists in the stories also have different points of departure; Oedipa is at least partly in opposition to The Tristero, while Case does his work for Wintermute without any apparent regrets.

Concerning Oedipa, we have seen that the human element often tends to increase entropy in a system. In *Neuromancer*, entropy is not as strong a theme, which, perhaps accidentally, fits

with the fact that the story takes place in a world where the human element is less involved in information processing. However, there is one element that might be considered as increasing entropy; the difficulty humans have when interacting with an AI and vice versa. For both parties, it is very much a question of the bodily limitations already discussed, whether or not we are considering a body made of meat or data. In essence, we get two different signal types going to two different receivers, and unfortunately each signal is going to the receiver it has the most difficulty in reaching. In the case of Wintermute, it has to send signals in its own very much rational language to humans which, while possessing rational capabilities, also have a tendency to act irrationally. Wintermute must base its decisions on statistics, which are difficult to apply to irrational behaviour. In addition, Wintermute has to use less than ideal channels of communications, its characters. While they do manage their job fairly well, it is difficult to perfectly manage a medium one does not understand fully. Case and his colleagues have similar problems when communicating with an AI. The fact that Case can not fully comprehend Wintermute does run the risk of increasing entropy, because some information may be lost in translation – a fact that also applies to the AI's communication as directed towards humans. As I have said, entropy is no major theme in the story, and it does not concern the stream of information as clearly as in *The Crying of Lot 49*, but there is a certain potential for chaos at hand. Bukatman states that "The interface relocates the human, in fact *redefines* the human as part of a cybernetic system of information circulation and management." (Bukatman, 192). This underlines the fact that Case has a much stronger connection to information than what Oedipa has. While both are part of a communications system, Case is part of a much more efficient system and he has better access to the different parts of the system, which while it does not guarantee a complete absence of entropy at least reduces the risk for it.

There is, as we have seen, a certain body/mind duality present in *Neuromancer* especially in relation to Case and his disdain for his body. However, I believe that this is less down to a view advocating the non-physicality of the mind and its separate existence from the body, but more a case of minds unfortunately *separated* from their body.

When it comes to the Flatline and Linda Lee, we are dealing with minds that have been saved from the death of their bodies. While both personalities still exist, they only do so in a reduced form if we look at the Flatline, or in less than free circumstances if we look at Linda. We have already established that the body is rather firmly anchored to the mind and the other way around, and while both forms of existence are manageable in one way or another, they still leave the personality with less than what they had when their minds were still in their bodies.

Wintermute and Neuromancer are perhaps best described as body and mind respectively. Wintermute possesses all the effector limbs, the ability to interact with the outside world, but lacks a clear personality. Neuromancer on the other hand is mostly personality, but without the necessary tools to act according to its own thoughts. The melding of the two AIs does not involve melding two separate personalities, but two parts of one body, each incomplete without the other.

Case never experiences any proper separation of body and mind, except for very short periods of time when he flatlines, and while he does temporarily wish for such a separation to occur, he too seems to realize that body and mind belong together, no matter how different they seem. All these views fit well with cybernetics, since both body and mind consist of information,

albeit information arranged differently. At any rate, the different types of information are keyed to work in concert with each other, not separately.

Communication and its relation to control also has its role in *Neuromancer*, not at all surprising in a society so saturated with information. Case for an example, is controlled by Wintermute through its characters for some time, a fact he probably would not have discovered if Wintermute had not revealed itself to him. Wintermute's characters are quite interesting because they allow the real sender of the message, Wintermute, to send it directly to a receiver that believes he or she is receiving the message from someone else, at least until the real nature of the receiver is revealed. The nature of the message is also two-faced in this regard, since what may appear as a message telling the receiver to do one seemingly normal thing is in fact a message that gets the receiver to cause one event in a linked chain of events. This is a rather efficient way of doing things, since the receiver will receive one semantically significant message, and send out what is in essence two messages in one – causing both the intended effect and by doing so triggering another effect. The latter may not be in the receiver's best interest, but it can be difficult to detect the potential for it in the original incoming message. Although, this also involves a certain element of risk, because it can increase entropy, as we have seen. Whether it works or not hinges on whether the sender of the message properly manages to differentiate between his or her preferred reaction to the message and the receivers' actual reaction.

One important difference between Case and Oedipa in relation to communication and control is the way they react to receiving information. As we have seen, Oedipa ends up being controlled by the information she receives, not necessarily because that is the intent of the sender, but because the sheer amount of information is too much for her to handle efficiently.

Case on the other hand, while receiving large amounts of information, does much better at processing it, especially when it comes to checking the veracity of it in order to avoid falling prey to false leads. In other words, he is better at employing proper feedback mechanisms than Oedipa. That being said, the information Case receives is connected to more readily identifiable tasks and goals, which means that he has the privilege of a certain sense of direction in his work. Oedipa on the other hand has only one very large question to answer, with a process leading up to it that lacks a clear set of stages.

To a certain extent, Case displays a certain need to become information by gaining it; to change himself by interacting with vast fields of raw data instead of the physical world. He prefers cyberspace over the physical world, and the use of drugs when in the physical world suggests that he tries to distance himself from reality and move himself closer to the state he experiences in cyberspace. His disregard for flatlining might be taken as an indication towards a certain hope for getting stuck in cyberspace permanently, as if the body dying while being connected to cyberspace might give the mind a chance to flee it and store itself in cyberspace. There is perhaps some envy present towards Wintermute, at least before Wintermute's connection and relation to Neuromancer is revealed. In a way, Case does become information by gaining it; not by separating his body from his mind, but rather by integrating his mind deeper into his body, by realizing that he already consists of one hundred percent information. Although the information is not arranged in the way he would ideally prefer, it is at least a better alternative than reducing the amount of information in him by sealing his mind in an electronic memory module. As Hayles argues throughout *How We Became Posthuman*, there is no such thing as disembodiment, and as she says, "[...] embodiment replaces a body seen as a support system for the mind [...]" (Hayles, 288), a view I agree with. However, she also argues that

Neuromancer represents a "[...] view that parses virtuality as a division between an inert body that is left behind and a disembodied subjectivity that inhabits a virtual realm [...]" (Hayles, 290). I believe Case does change his embodiment in the course of the story, going from a more disembodied view to a state where the two are more integrated. He might start out with a view of body-mind separation, but he does not keep it, he might still feel the "bodiless exultation" of cyberspace, but he accepts the fact that his body is a permanent part of him.

5. Conclusion: efficiency in worlds apart

Whether or not Norbert Wiener ever thought that cybernetics might be applied to literature is hard to say, but he certainly felt a need to apply it to contemporary society by writing *The Human Use of Human Beings*. While several researchers have tackled cybernetics in relation to literature, many of them have chosen to do so by looking at texts that might be termed "cybernetic" in themselves, containing for an example elements of advanced technology and human-machine relations, such as *Neuromancer*. In addition, a lot of work limits itself to looking at a few elements from cybernetic theory in the text, such as entropy, rather than applying a larger part of the theory to things like character motivation and actions. This approach is understandable, given that it makes sense to use a theory of information that has strong links with technology to analyse texts that mirror these qualities as closely as possible. Part of the motivation for this thesis, then, has been to attempt to use a larger part of the cybernetic model to look not only at a "cybernetic" text, but also at a text that seem less like a fiction version of a book on cybernetic theory.

Neuromancer and *The Crying of Lot 49* might at the first glance not seem like ideal candidates for comparison. Where *Neuromancer* features a hyper-advanced version of our own

world, containing technology we have just barely begun to research beyond the purely theoretical level, *The Crying of Lot 49* offers a world based on the west coast of the United States in the 1960s, where information technology is mainly limited to the television and telephone. While computers do exist in the world Oedipa Maas inhabits, there is not any such thing as a personal computer available. This contrast does however offer a good base for comparison, because, while the technology levels are different, information plays a major role in both texts. The protagonists offer further ground for a contrastive analysis, given that Oedipa Maas, inhabiting the low-tech world, is also the character with the least experience in information processing on a larger level. Case, in his high-tech world, is the character with the most experience, and the largest potential processing capabilities. In addition, while Oedipa qualifies as an "ordinary" human being, Case is much closer to being what N. Katherine Hayles terms "posthuman".

Viewing these contrasts from a cybernetics point of view first of all gives us a foundation that is ideally suited to treating texts that deal with large amounts of information. As we have seen, instances in the texts can be analysed with respect to different aspects of the cybernetic framework, such as entropy, feedback, processing power and so on. In addition, these elements can then be analysed and compared to each other to give a picture of the efficiency of the different systems in the text. The cybernetics framework thus allows both an examination of the details of a text as well as an examination of larger parts of the text that contain several of these details.

It is no surprise, and perhaps even fitting, that Oedipa, living in the world she lives in, experiences substantially larger difficulties than Case when attempting to process or put information into use. While entropy does, and indeed must, affect both characters and their

surroundings, it presents a far greater obstacle to Oedipa than it does to Case. As we have seen, the reason for this is a combination of the human and human communication as an entropic element as well as a distinct lack of mechanical assistance and proper feedback mechanism. In Oedipa's world, it is extremely difficult to act suitably on received information; information that is not immediately analysed successfully can at best be discarded and forgotten, a strategy Oedipa does not choose, or at worst it can stay in storage and interfere with future incoming messages. Unfortunately for Oedipa, she sees the usefulness of information but lacks the processing power to put it to good use, resulting in the above mentioned interference. In addition, Oedipa receives information in many different forms, which tend to interfere with each other to such an extent as to increase entropy. Case avoids this problem by receiving a lot of his information in cyberspace, which by its nature lets information be sorted and processed more easily, without undue interference.

The world of *Neuromancer* is the polar opposite of *The Crying of Lot 49*. While Case must still do his fair share of work to get use out of information, it is possible for him and others in his world to receive, process, and act upon large quantities of information. This is largely due to the advanced technology available, and in particular the connection between man and machine that it allows, but perhaps also a result of the experience gained from living in a world where information is as important and abundant as it is in Neuromancer. As Case overcomes the reservations against the human body typical of a cowboy, he becomes at the very least a prototype for Hayles' ideal posthuman, "[...]a version of the posthuman that embraces the possibilities of information technologies without being seduced by fantasies of unlimited power and disembodied immortality [...]" (Hayles, 5).

The Crying of Lot 49 illustrates the cybernetic principle that information is everywhere, even if it might not appear so. It presents us with a world that has less visible signs of information transfer, especially compared to the world in *Neuromancer*. Yet the information is there, potentially in unexpected places like a city. But whereas Case and many others in his world can access this hidden information as well as the more visible kind, Oedipa does not possess this capacity. However good or bad the efficiency of a system is, and regardless how much a system differs from another one, the fact that it is recognizable as an information system allows us to use cybernetics to look at it, analyse it, and hopefully understand why and how it works as it does. The question that remains is whether or not we in Oedipa's position are always doomed to lose to entropy, or if we can hope to approximate Case, without the fancy gadgets.

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