Growing a rhizome: A way to go on after loss of foundations

by

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ABSTRACT

Within the dominant philosophical traditions in the West solid foundations for knowledge are assumed to exist. This study is an exploration of the loss of such foundational beliefs and how to go on afterward. It is an examination of the post-modern shift from a foundationalist epistemology to a rhizomatic ontology, that is, from believing that there is a trustworthy foundation for knowledge to living with the realization that knowledge emerges in unpredictable forms in unsuspected places.

While the phenomenon of a post-modern shift in various disciplines and in society in general has been well explicated, what is entailed in living through this shift at the level of individual experience has not been described. The personal is a vantage point that affords a view that is not furnished by the abstract perspective usually taken in writing about the dissolution of foundations. While the site of the thesis is my experiences, my experience is never just my experience alone. Studying the single site of the self illuminates the general structure of the phenomenon under study through the principle of recursive symmetry (in chaos theory, that the single site contains the pattern of the whole) rather than through principles of generalization.

Technology appears in this exploration as both as topic and as medium; it contributes to the acceleration of what has been called the post-modern condition and at the same time it offers the possibility of another way of knowing. In a non-foundational rhizomatic space the fragmentary, the relational and the multiple, all become more important in knowing, and keeping the question open and in play is used to move the inquiry. The thesis is presented as a hypertext document with six main paths through the text. A

variety of genres (e.g. fiction, autobiography, essay) are deployed and played off of one another in order to engage with these two distinct, yet connected, ways of being and knowing which collide repeatedly in my own experiences. Hypertext allows the fragmentary, relational, and multilinear nature of the pieces of writing and of my experiences to be better expressed and allows the reader a more visceral experience of foundational loss, and the resulting twists, turns and uncertainty.

Examiners:

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Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth.

Then took the other, as just as fair,
And having perhaps the better claim,
For it was grassy, and wanted wear
Though as for that the passing there
Had worn them really about the same,

Both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day;
Yet knowing how way leads on to way
I doubted if I should ever come back...

(Frost, 1921, p. 9)

Chapter 乱

Down the Rabbit Hole

There were doors all round the hall, but they were all locked; and when Alice had been all the way down one side and up the other, trying every door, she walked sadly down the middle, wondering how she was ever going to get out again.

(Carroll, 1865/1972, p. 27)

Introduction: the difficulty

I've given up trying to find it – or so I tell myself. It is simply not out there waiting to be found. It cannot be captured, encompassed or represented in any other way than as itself. It is an impossible task that I have set for myself. It cannot be done, and still…and still…somehow I have to do it. As Gregory Bateson (1972) noted, such "double–binds" can result in either a "profound reorganization of character" or mental disorder (pp. 301–306). The difficulty that I have stayed with for the last five years has very nearly driven me into the abyss of the latter.

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I am driving to work, peering out of the windshield through half-open eyes as I yawn again. I've had a full night's sleep, but frankly I'm still more than a little bleary. It's a good thing my car knows the way. I'm barely breathing but I don't notice. I'm pre-occupied with thoughts about the writing I've been working on. As I wait at a stop sign I notice that I really don't feel very well. My chest feels tight as if someone is sitting on me. I try to take slow deep breaths but in the back of my mind I know something is terribly wrong. I turn left by the Esso station and my stomach begins to churn and rumble and a list begins to form in my head: Call John about the computer network, mark several assignments before 9:00 am, reset all of the clocks on the school's computers, proofread the chapter of my thesis that I'm working on, and then…I'm sweating even though it's

cold in the car. My heart pounds like it wants to escape from my chest and I'm really struggling to breathe and to remain calm. And then I know. I can't go there. If I go to work I will die. I'm having a heart attack. Or going crazy. Or something. Something is seriously wrong with me. I can't think of anything except this one certainty. Turn the car around. Turn the car around and go home.

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Throughout my inquiry, there is a question that I have forgotten to ask myself: What is this "it" that I am searching for? When I first started my master's program, I intended to work on the implications of technology in adult education. Very quickly, I realised that the topic was enormous so I began to work at narrowing it down. I started keeping a journal where I could jot down ideas and write things out. Then something strange happened. I began to notice a common theme emerging from my writing. The theme was not technology in adult education. It was foundations, or more specifically, the loss of foundations and foundational beliefs. Suddenly I had a new topic and I was off and writing. Things began to come together and everywhere the theme of foundations emerged. I wrote more and more, the words seemed to pour out onto the pages. But the more I tried to zero in on the topic, to pen it in or pin it down, the more easily it seemed to escape my grasp.

As I struggled with the topic I began to notice something else. Another idea, that seemed more basic and more primal than foundations, was making its way to the surface. It's not about foundations, I realised, it's about self. How self is constituted in a post–modern world. But, of course, that wasn't it. Almost before I started down that path, I decided that because the post–modern self is constituted in language and discourse, that

my real topic was language. But after working with this idea for some time I began to have serious doubts as to the primacy of language and found myself exploring an even more basic question: What is the nature of reality?

It was at this point that I realised that my old reductionist scientific self was alive and well and directing my inquiry. I was still trying to get down to some essence, some ultimate, reductive answer. I was still building foundations and walls.

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I have it. Eureka! Aha! How could I have missed it? It's all so clear to me now. So simple. The answer to my thesis. The topic. How to do it. How could I have overlooked it for so long?

I'm driving over the Malahat on my way to Victoria (I always seem to be driving over the Malahat – I imagine my epitaph will read "He drove over the Malahat – a lot")…I'm driving over the Malahat, my son and daughter are asleep in the back seat. My wife is in the back seat too, sitting quietly. I want to shout it out, this idea, but I don't for fear of waking the kids. Instead, I think it through again. I can't believe I missed it. I can hardly wait to get started. It's so elegant and simple – it's embedded firmly in my mind. In my elation I make a fatal mistake. I don't write it down.

I don't write it down.

It's so clear and simple that I know I won't forget it. So I don't write it down and I don't even notice it slip away.

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Foundations tend to act as a blockage that limits flow, trapping thinking between two poles in an either/or binary logic. As Michel Serres (1983/1991) said, "foundation occurs

when a multiplicity makes itself into a unity" (p. 232). Complex multiplicities are reduced to a unity with two possible values and "the third must be excluded" (1983/1991, p. 168). The excluded third is precisely the third way, the hidden option in an either/or statement.

> For or against, your money or your life, yes or no. Classical logic occupies this space and allocates it militarily. What is rigorous in discourse or useful in the working of things can be deadly for human relations....If you are not with science, are you against it? (Serres, 1983/1991, p. 170)

When I go about building foundations, I always unavoidably go about building walls. The price of foundations is walls and the price of walls is freedom. Categorisation, naming, binary oppositions, and language, all work to striate[1] my space – to chop it up, to compartmentalise, regulate, and control it – to box me in. My thoughts, choices, and actions become limited. Within binary logic there are only two choices, there is no middle ground. There is no third choice, no passage between the either and the or, no way out.

Language itself is built on difference, as Humberto Maturana and Francisco Varella (1998) suggest, designed to coordinate action by making linguistic distinctions. It is built on separation and categorization, and in its written form it is built on linearity. Almost before we've started, we are trapped in it. And yet, paradoxically, it seems to offer me escape.

One way out of the either/or trap is to respond creatively and dynamically, by experimenting with a variety of styles, discourses and forms. When I write without a

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[1] Striated space is defined by Stuart Moulthrop (1994) as "the domain of routine, specification, sequence, and causality. Phenomenologically, it consists of the world of perception as processed by the coordinate grid or some other geometric structure into a set of specified identities. Socially, striated space manifests itself in hierarchical and rule–intensive cultures, like the military, the corporation, and the university" (p. 303).

particular focus or purpose or goal in mind, when I construct my writing differently, when I don't try to build a solid linear argument – I escape the tiny little rationalistic box within which I am imprisoned. The process of inquiry is kept flowing by the refusal to give in to a definite answer but instead to keep the question open. Questions are transformed into other questions and as Heidegger might say, a way is built through questioning[2]. Questions are used in an exploratory way as probes and the point is the proliferation of possibilities rather than their reduction. "Against the solidity of opinions, questioning makes the object and all its possibilities fluid" (Gadamer, 1960/1998, p. 367).

The thing I am after in my inquiry is not a point to be made, an object to be grasped or encompassed, or a concept to be pinned down and penned in. What I am after cannot be caught, but *in the pursuit something is revealed*[3]. When I imagine there is an answer, when I orient myself toward what calls me, when I search – I do find something, even though *it* is never the universal that I was after. It's not an answer to a question and it's not a method or procedure. The thing I am after is not a thing at all, but a process.

For a long time I thought of it as something missing, an absence. When I was about six years old I decided that watermelon was the answer. When I felt this emptiness, this desire, I thought that what I wanted was watermelon. But watermelon no longer fills this

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[2] Heidegger (1954/1977) begins his essay "The question concerning technology" with the two sentences: "In what follows we shall be *questioning* concerning technology. Questioning builds a way" (p. 287).

[3] "I have never doubted the truth of signs, Adso; they are the only things man has with which to orient himself in the world. What I did not understand was the relation among signs…There began a sequence of causes, and concauses, and of causes contradicting one another, which proceeded on their own, creating relations that did not stem from any plan, Where is all my wisdom then? I behaved stubbornly, pursuing a semblance of order, when I should have known well that there is no order in the universe."

"But in imagining an erroneous order you still found something…"

"What you say is very fine, Adso, and I thank you. The order that our mind imagines is like a net, or like a ladder, built to attain something. But afterward you must throw the ladder away, because you discover that, even if it was useful, it was meaningless…The only truths that are useful are instruments to be thrown away." (Eco, 1980/1983. p. 492)

hollow and I no longer think of this feeling in terms of absence but instead in terms of desire as Deleuze and Guattari (1972/1977) reformulated it. It is "desiring production" that keeps my inquiry going. It is my process. The inability to resolve the conflict between modernism and post-modernism, between science and chaos, the inability to escape this insoluble dilemma between the desire for certainty and the realization that there is none, is the creative impetus. It is the "it," the process that I have been after all along. This is a call, a desire, which is not built on an absence but on actualization. This is desire as a creative act. As Elizabeth Grosz (1994) puts it:

> ...while psychoanalysis relies on a notion of desire as a lack, an absence that strives to be filled through the attainment of an impossible object, desire can instead be seen as what produces, what connects, what makes machinic alliances. Instead of aligning desire with fantasy and opposing it to the real, instead of seeing it as a yearning, desire is an actualization, a series of practices bringing things together or separating them, making machines, making reality. Desire does not take for itself a particular object whose attainment it requires; rather, it aims at nothing above its own proliferation or self-expansion. It assembles things out of singularities. It moves; it does. (p. 165)

The answer: the question

There are really two "its" that I have been dealing with, two sides of the same coin. There is it, the topic, and there is it, the drive or the process of inquiry itself. As my slippery it changed from technology to foundations to attach meaning to, to a search for an essential self, and on to a hunt for reality, the question of what my topic is has eluded me – until now.

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My Father–in–law is at my house to pick up my wife to take her on an outing to Nanaimo.

"Kevan's staying at home to work on his thesis today," she says to him, explaining my presence at home. Then she is gone up the stairs to finish getting ready.

"So, how's it going?" my father–in–law inquires, referring to the thesis.

"Not so good. I'm having some trouble…" my voice trails off.

"What's your topic?" he continues.

"Well that's a tough question…" I start, and then pause, feeling uncomfortable. I dread this question, because even though I am more than half–way done I have no idea how to articulate the topic.

"You *are* in trouble," he says.

"Yeah, I guess so," I agree, "But I think it'll come together somehow," I add a bit weakly, as I head down the hall toward my office to check my e–mail. As I scan the messages, I hear my wife saying the word "technology" and my ears prick up. And then she calls down the hall, "Is your thesis called 'Technology Unmasked?'"

"Oh, no, no…God no," I say, slightly alarmed, "It's not about technology. Although that's part of it," I add as I hurry back to the entryway. "It's actually more about…" and as the words leave my lips I become aware that I am actually articulating my topic. I am sure. For the first time in four years I am sure what *it* is that I am working on. For the first time it all makes sense together.

What I am writing is the story of what happens when hidden assumptions are questioned and foundational beliefs are shattered. As a biologist, and a science, math and computer technology teacher, I had certain beliefs and understandings about knowledge, knowing and method. For a variety of reasons I found my scientific paradigm less and less adequate for dealing with everyday life. When I returned to university and began the curriculum studies program I was confronted with many alternative ways of knowing and doing research, ways that I initially characterized as invalid. Through the coursework

(reading and classes), discussions with classmates and friends, and experiences outside of university, more and more stress was placed on my foundational beliefs and internally my thinking became more and more chaotic. Then, when things reached critical mass, my perception shifted slightly and a new order emerged from the chaos. I found myself in a brand new space, a new terrain opened up by entertaining a simple question: what if it was me who was wrong and not all of these curricular theorists? What happens when I realise that there are no real, solid foundations on which to ground knowledge, when all ground looks equally fluid?

This is the story of what happens as I move from the closed, rule–bound system of foundationalist scientific understanding into the open dynamical system of post–modernism. It is the story of one pivotal moment, really many stories of a plurality of pivotal moments. It is the story of a place of uncanny balance, teetering on the brink of the abyss, the ground crumbling away, unsure whether to jump over the edge or to jump back away from the edge and uncertain whether I have any choice. This thesis is what it is like to experience loss of foundations and how to go on afterward.

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One of the usual purposes for an introduction is to orient the reader. The *Oxford English Dictionary* (OED) defines orient as to "bring (oneself, different elements) into a clearly understood position or relationship, esp. to known facts or principles" (1998). However, because of the nature of my topic and my method, the purpose of my introduction is *also* to disorient the reader. This dis-orientation is not done to be cruel, cynical, or ironic, but is done out of necessity. It is important that the reader be put a bit off balance almost immediately so that they can gain a more visceral appreciation of the

experiences I narrate and also to orient them toward what may be an unusual way of knowing. In the case of this thesis the topic, the *topos*, the place, that is opened up is itself somewhat irregular. None of the usual markers and signs are here to tell us where we are, to guide us, to tell us which way to go. Or if they are here, they have taken on different meanings, different significance. The usual landmarks and methods of navigation simply do not suffice. In a one-hundred-and-eighty degree turn, being oriented in this space is to be disoriented.

This thesis is an attempt to describe a way of knowing appropriate to the space I have opened up through questioning. I am trying to articulate and enact an alternative to the modern linear hierarchical way of thinking, a way of thinking and being that Deleuze and Guattari (1980/1987) have termed arborescent thought[4]. The alternative is a lateral or horizontal way of thinking that, for me, emerges from lived post-modernism, and is what Deleuze and Guattari call rhizomatic or nomadic thought[5]. The purpose of this text is to examine the post-modern shift from a foundationalist epistemology to a rhizomatic ontology, that is, from believing that there is a trustworthy foundation for knowledge to living with the realization that knowledge emerges in unpredictable forms in unsuspected places, like bamboo shooting up seemingly of its own accord when and where it is least

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[4] Arborescent thought is described by Deleuze and Guattari as being linear, hierarchical and stratified. "Arborescences are hierarchical, stratified totalities which impose limited and regulated connection between their components" (Bogue, 1989, p. 107)

[5] Deleuze and Guattari (1980/1987) and Morris Berman (2000) speak at length of nomad thought and nomadism. For them, nomadism is a way of life and is also "an attempt to pull the rug out from under the fake security of agricultural civilization" (Berman, 2000, p. 155). Nomadism is opposed to the state, the sedentary, and "there is a significant difference between the spaces [in which each exist]: sedentary space is striated, by walls, enclosures, and roads between enclosures, while nomad space is smooth, marked only by "traits" that are effaced and displaced with the trajectory " (Deleuze & Guattari, 1980/1987, p. 381). "Nomadism displays auto–nomy, self–rule...nomad thought...dwells in the midregions...points are reached only to be left behind. The road to truth is always under construction; the going is the goal" (Berman, p. 157).

anticipated. I see the collision of two distinct (yet connected) ways of being and knowing in my own experiences. A foundational modernist science on the one hand and a mapless post-modernism on the other. Certainty and uncertainty. Logos and nomos.

What now?

This thesis is about the experience of foundational loss. It is about that loss and about how to go on – because we always, it seems, must go on. When foundations are abandoned or shattered, when they have taken on an ethereal, ghostly quality, how do I go on and continue to make meaning and know? What happens when I give in to the flux and accept that there are no certain answers, no firm ground, no reliable foundations? How does this change my way of doing research or even what it means to do research at all? How does it transform my way of teaching or what it means to educate? How does this change my way of being in the world? Rather than throwing my hands in the air and giving up in frustration or blindly fighting the shift I need to recognise that this shift may be exactly what I need – just the push that's necessary to free me. To allow me to move on, to allow me to escape in a "line of flight[6]" (Deleuze & Guattari, 1980/1987). To see new possibilities and new ways of going.

While the phenomenon of a post-modern shift in various disciplines and in society in general has been well explicated, what is entailed in living through this shift at the level of individual experience has not been described. Researchers such as Noel Gough (2000) have termed their move into post-modern territory as "taking a poststructuralist turn." I would argue that Western culture in general has taken such a turn and that we are in the midst of a paradigmatic shift. More and more our culture is permeated with post-modern

[6] Gilles Deleuze and Felix Guattari (1980/1987) describe lines of flight as a temporary escape or movement that can allow for the transformation of a structured, hierarchical, rule–bound, linear space.

thought and sensibilities. Post-modernism *is* our culture. It is pervasive. We all feel and live it to varying degrees. Technology seems to accelerate or facilitate it, and the youth, as Sherry Turkle (1995), Katherine Hayles (1990) and Marshall McLuhan (1967) all pointed out, are more deeply affected and are more in the middle of it.

However, my experience has been anything but a poststructuralist turn. In these words it sounds so gentle, so soft, so small and unimportant. It sounds like I turned a corner and there I was – no big deal.

For me, however, it is a big deal. This shift has taken over my life and everything is changed. What is at stake here, what all the fuss is about, all the fear, anger and criticism – it's all about loss. With a perceived lack of grounding for post-modern theory, with nowhere to put my feet, when I can't say anything with certainty, I begin to lose my definitions and my definition. I become blurry, boundaries begin to dissolve and the illusion of the unitary self, the individual, begins to break down. What is lost is the self. But paradoxically self isn't lost at all. Because what replaces the unitary self are multiple connected selves.

This is really the condition I speak about, the condition I live. This is lived post-modern taken to the extreme. Because above all, I always take things to their extreme, to their limit. I took objectivism there. Swing. I take post-modernism there. Swish. Certainty. Uncertainty. The pendulum swings again, and again, and again; it is like a perpetual motion machine that never settles down again. What keeps it in motion? What outside or inside force? Is it the inter-play between the seeming opposites that I continually take up? When two flows come in contact there is friction and turbulence and out of the chaos new order can emerge, a new direction, a new flow. This chaotic system

refuses to settle down as long as I keep the question open. I continue to write in order to try to make sense, to try to understand, but sense never comes. Just as it forms, as it begins to form, just as I begin to see its form – swish. The pendulum swings again. The questions become mobile and the doubt and uncertainty flow anew.

> In order for me to be able to speak or think or write, the third must be excluded. If it is not, I wander, unstable; I talk nonsense and no one understands me; I never conclude. Never do I close my reasoning or my text or my remarks. (Serres, 1983/1991, p. 168)

So I find myself where I always seem to find myself, in this middle that I call the beginning. Back to square one, back to trying to articulate what it that is I am doing. I am frustrated at my inability to say anything without it quickly coming unraveled or becoming entangled. I cannot speak without endlessly qualifying and contradicting what I say. Where can I find a place to speak from that doesn't become totalising? Although all grounds are defensible, all can also be attacked. And there is really no defense except one's authority, which in modernism amounts to certainty. And that is something that I can truly never have again. So how can I take up and defend a position? How can I defend this thesis? More and more I believe that the answer is in my lived experience.

Autobiography

When I write autobiographically, I write from a place of strength. Grounded in my own experience I write authoritatively – as the author of my life, my experience.

> Whatever one does, if it is done in a way that is real, and that has a sense of presence, then it is a manifestation of "I am what I am talking about. I am what I am doing. I am what I am writing. It is not about it. It's in it. I am not talking about truth. I am truth. But so are you." (Krieger, 1991, p. 48)

I am telling the story of my own experience of finding myself with foundations lost. To render as detailed and accurate an account as possible, I have portrayed the shift through fictionalized accounts of my own experience. I have an acute awareness that all

explanations and descriptions of reality are stories. I no longer want to hide behind an objective *one* and pretend that I am telling the one true way. Science and objectivity already distanced me from my own lived experience, my own truth, and my loss of foundations has only made this distancing more difficult to deal with. In part, what I am searching for is *myself* in these words and on these pages. There was no place for me in the modernist scientific and objectivist discourses that I was living. In my search for absolute truth and certainty I lost myself. My body, my flesh, my bones, faded away leaving only my mind. Another way to look at my attempt to re–build my foundations is as the project of writing myself back into existence. To write the bones and the flesh. To tell a different story than the one I've been telling. To tell my story.

The site of the thesis, the topic, is me. But my experience is never just my experience alone. Everything is connected and interconnected and interwoven in an intricate and complex web of relations. In a fractal way I see my experiences as part of something bigger but what that something bigger is has been a stumbling block. It seems that there are any number of bigger experiences linked to my experience. One connection that I think is particularly appropriate is how my experiences in life in general tie into my experiences as a technology teacher. I see questions similar to the ones that I've been dealing with both academically and personally as fundamental to technological literacy and I see these same questions being largely ignored in the high school technology curriculum. How can I help students to be more critically aware of what is going on when they use technology? How can I better prepare my students for life in a post-modern world? How can I design curriculum that is more open and dynamic? In the science and technology curriculum I think that using hypertext is one way to help escape from the

rationalist box.

As well as autobiography, this work has aspects of phenomenology, hermeneutics and post-modernism. Phenomenology is used to help understand experience as it is lived. As Max Van Manen (1990) puts it, "What first of all characterizes phenomenological research is that it always begins in the lifeworld. This is the world of the natural attitude of everyday life which Husserl described as the original, pre-reflective, pre-theoretical attitude" (p. 7).

In a traditional phenomenological study, many people experiencing a phenomenon would be studied in order to uncover the "essence" of the phenomenon through their experience of it. I am studying the phenomenon of foundational loss, but at a singular level, and the essence I seek is more an emergent surface effect than a deep buried universal truth.

The hermeneutic aspect is involved in the interpretive process, in the meaning that emerges from the text of this work, from the interplay between what I call the post-modern sciences (in particular chaos and complexity theory) and post-modern thought in a philosophical/literary sense and my life as a technology teacher. It is also present in the cycles of reading, writing, and reflecting which move my inquiry. The way I work is a form of Kierkegaard's repetition forward:

> Genuine repetition repeats forward and bears the responsibility to produce what it would become. Genuine repetition always operates in the element of becoming and *kinesis* and learns to make its way through the flux. (Caputo, 1987, p. 59)

The Fall: the difficulty revisited

I stood at the edge and looked out. The clouds below obscured my view so that it was hard to tell what lay below. The master had said that it was all illusion, that all I needed to do was step off the edge without fear. But I was afraid; I was shaking like a leaf.

I'd like to be able to say that I went bravely forward and stepped off the cliff into the abyss. But the truth is I slipped as I was backing away. I slipped and fell, kicking, screaming, and clawing all the way down. At this critical point, when I sensed it was already too late, I let go and I gave in to the fall. Down I went, spiraling into the clouds. And after some time – an indeterminate, frightening time – it occurred to me that I was not going to hit the ground below. There was no ground, no-thing to grasp hold of, no way to stop falling. It also occurred to me that without anything to grasp, with no sides, no ground, that up and down and left and right didn't make any sense. And neither did falling. No ground. No gravity. No weight. I began to notice that I wasn't afraid anymore, and as the fear gave way the falling began to seem more like floating. Gently floating, like Alice's descent into Wonderland. As I gave myself over to the floating, I began to notice something else. There were tiny currents around me, gently swirling and wafting, a space permeated by lines of flight. Catch an updraft and soar.

Travel is possible here. Getting to a carefully pre-planned destination is not.

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I feel tired. It's too hard, too frustrating to go on. And, at the same time this impossible process, this insoluble dilemma is extraordinarily generative. There are multiple possibilities, a multiplicity of directions, many twists and turns and folds. Boundaries vanish and categories and discourses merge into a unity that is not reducible to the one. But when it comes time to write it down, to shut it down, to foreclose, to produce the final product, I am frozen. How can I pick from the myriad of possibilities? Which way is best when I know no way is best? How can I continue when there is no way to go, when

there are many ways to go but all ways are the Queen's ways?[7]

I have to be careful what I choose to focus on. If I am looking for an end, an ultimate answer, then I am defeated before I start. If I pay attention to the journey, to the search, to the call, then I will get somewhere. Not to the answer but to a new place of *inter-standing.*

> When depth gives way to surface, under–standing becomes inter–standing. To comprehend is no longer to grasp what lies beneath but to glimpse what lies between...Understanding is no longer possible because nothing stands under...Interstanding has become unavoidable because everything stands between... (Taylor and Saarinen, 1994, Interstanding: 2–3)

Method

My office is a rather small eight by ten-foot room in the basement of my house. Tucked against the wall near the door there is four-drawer file cabinet that is filled with paper related to my thesis. On the wall opposite my desk is a bookshelf filled with books, piled willy nilly along with papers that I have used recently. The floor and desk are both covered in still more paper – envelopes and napkins with writing scrawled across them, copy after copy of work in progress, and pieces of paper that have been snipped out of other papers and stapled, glued, or paper-clipped together. The entire wall behind the desk is covered in brown kraft paper with a map of the web version of my thesis glued to it and all of links drawn on in coloured pen.

I tend to work in what I think of as a chaotic way. I write in fits and starts, in bits and pieces. I read and reflect and re-read and re-arrange, and eventually some order begins to emerge from my writing. It is a productive process that I have likened both to Deleuze

[7] As Antoinette Oberg (1998) puts it: "This way of moving is non-linear and contingent. It is difficult and humbling. It requires constant vigilance over power, over the will to impose a scheme, a goal, a method to make thinking easier, indeed, to make life easier. For this way of inquiring is a way of living" (p. 3)

and Guattari's desiring production and Kierkegard's concept of repetition, which John Caputo (1987) describes as a process that "does not limp along after, trying to produce what is already present, but is productive of what it is repeating. The repeating is the producing – of the self" (p. 30)

In a sense, it's a self-organising system. My smaller "finished" pieces of writing arise this way and then they too begin to connect to other pieces until a new larger piece of writing emerges. My work is a continual process of emergence.

I'm constantly making and taking apart and re-making. Understanding, for me, comes as the bits and pieces play off of one another in different ways. I work by playing in the space opened up, in a passage negotiated between disparate texts. As Marshall McLuhan said, "When two seemingly disparate elements are imaginatively poised, put in apposition in new and unique ways, startling discoveries often result" (1967, p. 10). It's about this place in–between, in between certainty and uncertainty. The oscillations in–between and the brief escape, the lines of flight, that allow movement, a way to break out of my old scientific ways of doing and knowing.

For me, it is all about the process, the relationships, and I have chosen to show this importance by drawing attention to it. The process is all there is. An idea or thing or person, in isolation has no meaning. Everything depends on everything else for a context in order to have a meaning. Or better – everything is interconnected with everything else in a complex dynamic where each part is completely dependent on all of the other parts, for its meaning – which is never fixed, and will change as the system, or any part of the system, changes.

These writings are the "map" of my travels, of my attempts to re–build, re–create,

re–inscribe foundations. Because I can't make meaning, I can't live, without a foundation of some sort.

> The rhizome is altogether different, *a map and not a tracing.* What distinguishes the map from the tracing is that it is entirely oriented toward an experimentation in contact with the real. (Deleuze and Guattari, 1980/1987, p. 12)

I know I don't know, or at least I don't know with certainty. There is no longer one right way for me to proceed. It's a bit like working in the dark; it has to be done by feel, by experimenting, by engaging with the question that drives my inquiry. Going on involves playing, trying out a variety of styles and forms to see which ones work, to see which methods emerge from my practice, to see which way of going is congruent with my topic. In this way it is an experiment without the method predetermined; it is a practice.

In an important sense my thesis is an experiment, though not in the strict scientific sense of the word. It's an experiment in the OED's (1998) definition of "a course of action tentatively adopted without being sure of the eventual outcome", or in the verb sense of the word, as in to "try out new concepts or ways of doing things". These meanings tie experiment back into experience, both of which share the same Latin root - *experiri*, try.

Form: hypertext

The form of this document is a direct outgrowth of the process of writing it and is congruent with the method and topic. Or more accurately, the form *is* the process. The form is inseparable from the content, in that the content came about through the form-process, or as Marshall McLuhan (1967) would say, "the medium is the message" (p. 9).

In another sense, the form is my methodology laid bare. I try to show what I did, by leaving the traces instead of trying to write them out. In fact, I am trying to draw attention

to the process – to my way of working through, to my thought/writing/reflecting/writing process.

The thesis is a web document consisting of several hundred multiply linked pages. There are six main streams through the text consisting of pieces that I have written throughout this process. The pieces are related to one another in a number of ways and are also separate entities unto themselves, having their own topics. When I step back and experience the whole, or view the entire work, a different level of order or pattern, another topic, shared among the pieces emerges. As I said earlier, I think of my experiences as a fractal of larger societal patterns. The metaphor of the fractal is a useful way for me to think about the relationships between my personal experiences and group experiences at various other levels. In the same way that I think of my experience as a fractal of the larger group, each section of this thesis is a fractal of the larger pattern of my experience, a fractal of the dynamic tension between certainty and uncertainty and the fluctuations in–between.

The various texts have been selected and links have been made so that the user in some sense experiences the topic, so the phenomenon can be better expressed. It *is* what it is talking about. It's intended that the reader should feel the loss, experience the twists and turns, the uncertainty. I think that hypertext (linked text such as web documents) allows the growth of a rhizome, the deterritorializing, non-linear structure described by Deleuze and Guattari (1980/1987) in *A thousand plateaus*:

> A rhizome has no beginning or end; it is always in the middle, between things, interbeing, intermezzo. Between things does not designate a localizable relation going from one thing to the other again, but a perpendicular direction, a transversal movement that seeps one and the other a way, a stream without beginning or end that undermines its banks and picks up speed in the middle. (p. 25)

Writing hypertextually allows my thinking to roam in a way described as nomad thought by Deleuze and Guattari. I am attempting to map out a territory[8], not by taking up a position, by becoming stationary, sedentary, but by wandering, by nomadizing, by occupying[9] the territory. Nomadizing is a spatial way of being, being–in–space rather than being–in–time.

> The way I relate to the world of instant and pervasive communications is from my point–of–being, not my point–of–view. There is only one place where I am completely there, and that is within my own skin, even though that skin and its technologically assisted sensory extensions reach far beyond the immediate limits of vision, touch and hearing. My point–of–being is not exclusive but inclusive; it is not a perspective vision that frames reality, but rather, is a place defined by the precision and complexity of my connections with the world. (de Kerckhove, 1995, p. 187)

It is an ontological move — a different way of being–in–the–world — that gives rise to a different way of knowing. This nomadic wandering is not without purpose; however, the purpose is not to reach a pre–defined goal or to answer a question, but rather to keep the question open, to keep the play in play, to create more questions. These wanderings know no disciplinary and stylistic bounds, but instead cross, intersect, connect seemingly disparate elements. Boundaries blur, membranes become permeable and the solid becomes fluid.

Protext

When I started my Master's program I was already ripe for a change. If I think of this in chaotic terms I would say that I was a dynamic system, far from equilibrium. Systems

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[8] Map is used in the way Deleuze & Guattari (1980/1987) use the term. Mapping is a way of knowing and a way of being. Maps are of rhizomes, they are a way of living that "is in contact with the real," a way of living that doesn't simply reproduce the same old either/ors. Mapping is the act of negotiating a multiplicity without reducing/organizing/capturing it.

[9] The term occupy is not used here in the sense of holding a position or taking control of a (striated) space but in the sense of spreading out, of distributing myself, of moving within and through a (smooth) space.

of this type are waiting for just the right push, the proverbial straw to break the camel's back. The push sends the system spiraling off into either a new place of stability, or into true chaos from which it never recovers.

There is no trodden path to follow in this space that has opened up before me, but now I have a way of going. I am not so much trying to capture something in these words as I am trying to create a pattern. Like a sculptor that must listen to the stone, to find out what it needs to be, I need to listen, to feel my way through this hall of mirrors. I won't know exactly what it is I've done until I'm done. The finished pattern, the pattern that emerges, will always be both more and less than I intend. In a sense, what I am trying to do is get at a whole by looking at the parts in a non-reductive way. Normal science starts with the parts in an attempt to discover how the whole works, but within the analytical additive framework something is lost. I am embracing the fragmentary aspect of experience in an attempt to escape science. Along the way, ideas are picked up and explored. Some are kept, only to be discarded later. Some are discarded, only to re–surface again anew. On my search I carry with me an ever–changing network of ideas with which to work, always aware of the contingency of my choices and the price to be paid for their use.

I want to try and tell the whole story. The beginning, the middle, and the end. At the same time, I need to be aware that there is no beginning or ending, that I am always already here in the middle of this story, this inquiry. So I find that I have started at the end and will start again now, perhaps with the beginning.

> At any rate…one cannot hope to tell the truth. One can only hope to show how one came to hold whatever opinion one does hold. One can only give one's audience the chance of drawing their own conclusions as they observe the limitations, the prejudices, the idiosyncrasies of the [writer].
>
> Fiction here is likely to contain more truth than fact…(Woolf, 1929/1994, p. 8)

Chapter 42

The Thin Ice

If you should go skating
On the thin ice of modern life...
Don't be surprised, when a crack in the ice
Appears under your feet

(Waters, 1979, disk 1, track 2)

The room is hot, smelly, and painted a dingy institutional blue. Under buzzing fluorescent lights is a diverse group of people seated on an assortment of well–worn folding metal chairs. Some speak quietly to their neighbors, while others simply wait expectantly. Finally, one man stands and walks slowly to the podium at the front of the room. He is in his late–thirties, unshaven, and looks as though he hasn't slept in days. He leans heavily on the podium and begins to speak:

"Welcome to the Victoria group of Objectivists Anonymous, my name is Kevan Brewer, and I haven't had a scientifically rational thought in four weeks."

The crowd breaks into light applause, and the man draws some strength and resolve from their support. The man surveys the crowd. The man is me.

On some faces, I see the same haggard look, the same uncertainties that I see through bleary eyes in the mirror each morning, as I struggle with my addiction — our shared curse. Others in the crowd tonight have a different look, the look that drew me to this place. They appear contented, confident, happy. They seem to revel in the ambiguity, their struggle long since over. And while I'm not there yet, I long to be.

I long to be free from the tiny rationalistic box in which I've been imprisoned. I want to be able to feel again. I want to escape living in the past and future in my head and live in the here and now in my body. I long to try meet the challenge posed in a recent issue of Adbusters *magazine: "Can you*

live your life as a series of direct experiences instead of abstractions in your head?" (2002, p. 99) But there is a cost for this kind of freedom and that cost is living with uncertainty. I no longer know anything for sure. Everything is suspect. If I'm not careful I could descend into paranoia. Every statement I make must be endlessly qualified and contextualized. I begin and stop, and begin again, stuttering, trying to find the right words. But one word is as slippery as the next and I can't express my inability to express. At times my new space gets as oppressive as the rational objectivism from which I am trying to break free. How can I be comfortable in this chaotic place? Or maybe that's the point. Maybe I shouldn't be comfortable. Perhaps the discomfort calls on me to be careful and alert, attentive. In a world I now understand as on the edge of chaos I can't know the complete consequences of my actions. As Stuart Kauffman (1995) puts it:

> At this poised state between order and chaos, the players cannot foretell the unfolding consequences of their actions...If one can never know if the next footstep is the one that will unleash the landslide of the century, then it pays to tread carefully. (p. 29)

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This certainly isn't the life I was promised growing up. When I was young there was a pervading image of a near perfect future, a future that somehow seemed attainable in my lifetime. I read all about rockets, planets, and space travel. I played with a chemistry set and built model rockets. I watched Neil Armstrong step onto the moon one hot night in July — I was nine years old when I decided to be an astronaut. The future looked bright, with predictions of a shorter working week, increased leisure time and even flying cars and household robots. Many diseases had already been vanquished and cancer would be cured in a few decades at most. Science, it seemed, could solve any problem. There was more technology to do the job faster and better. The mantra of the promise of science was everywhere — utopia was only years away. Science combined with a naive faith in the human spirit allowed me to believe that even if some moron did start world war three that somehow people would go on and even be the stronger for it.

The promise of science was amplified in part by the news media, but there was also a murmur coming through the science fiction of the time. Star Trek gave perhaps the clearest image of the bright future that we were promised. In a sense, it portrayed humanity's final triumph.

Everybody I knew in grade school watched Star Trek and all of the boys wanted to be Captain Kirk. He was the hero, a man of action. Kirk always knew what to do and he always got the girl. In contrast to the other boys I wanted to be Mr. Spock. Well, that's not quite true. It's just that I knew I could never be Captain Kirk. He was too outgoing, too sure of himself, too much of a leader. And above all he was too emotional. Even in grade two I knew that I needed to distance myself from my emotions; I had already been hurt enough.

So Spock was the logical choice. He was an outsider, as foreign as anyone could be. He had difficulty fitting in and through it all he remained cool, calm and logical. I loved his science. I loved his detachment. I loved his difference. It had already become apparent to me that I was as different from my classmates as Spock was from the rest of the crew of the Enterprise. Try as I might, I couldn't seem to fit in and I've never fully understood why. My school life was difficult. I was picked on, taunted, beaten–up, excluded, called names. And I was deeply hurt. But Spock gave me a way out. I could only be hurt if I felt things. Feelings were my enemy.

I suddenly become aware that I've been lost in thought, and so I continue hastily:

"Some people suggest we are weak willed, or that it's a disease that we have no control over, but I know better. I can trace the "causes," can see the wrong turns, can see the little things that might have been different. A different choice here, a more careful word there…And then the "If only's" begin: "If only I had studied art or music instead of science as my parents insisted," "If only I had known about my adoption all along" or "If only I hadn't read Ayn Rand". However, that is all beside the point now. Now I have to take it day–by–day. Now I have to fight against the seductive lure of science and

objectivism.

"Science is no longer the answer for me — There isn't a single clear answer. And that's part of what troubles me so. I feel like I need something to anchor myself, something to grasp on to or I fear I'll be swept away with the river. It's as if there is nothing but flux and movement and nothing of any substance or permanence. The same feeling, the same uncertainty, the same freedom sometimes makes me feel exhilarated and at other times it just makes me feel hopelessly lost. Why does it have this dual character?

"I still long, on occasion, for a taste of scientific rationality; but now I'm aware that I must use it in moderation, that it's only one way among many, and that it doesn't hold a patent on the truth. That there isn't only one truth, one way. I realise too that I can't give up rationality completely as some would have. I need to be able to use it as a tool, but to be aware of its limitations and its dangers. I need to remember that as the user uses the tool, the tool shapes the user."

In quiet moments, I sometimes find myself slipping gently back into the too familiar, easy patterns of scientific rationality. I begin to believe in science again and I have answers — definite, quantifiable, generalisable, all encompassing answers. To be honest, there are times when I would like the world to be entirely measurable and explainable. I would like to have a place of certainty from which to speak. The difficulty is that such places are exclusive. One discourse always covers over another, negates the other, is in conflict with the other. In order for the one to speak, the many, the multiplicity must be silenced. As Michel Serres (1983/1991) puts it:

> The intense division of knowledge defines sites, the places from which to speak. From there one speaks above all of the site itself. Places impose words; they are mouthpieces. An inhabitant speaks his language and defends his culture...The division of the sciences creates the conflict of the faculties; inversely, this war creates the partition...Thus we often see discourses shaped with the unique purpose of showing the nonvalidity of the neighbouring

> discourse...This speech is, alas, empty of speech; it reveals nothing more than the hatred nourished in one place for the neighboring places. (p. 252)

I spent many years putting together an objective world–view, a belief that reality existed independently from my experience of it and that I could know and understand this world through reason. The universe was clear, simple and knowable. Using my senses and rational thought I could understand the world without contradiction. Reality was self–evident and was the standard against which all else was judged. At times felt I was getting close to "The answer," some absolute, ultimate, universal truth. Something that would explain everything: the nature of reality, our place in the cosmos, or in Douglas Adams' (1979) words "the answer to Life, the Universe, and Everything" (p. 128). However my experiences over recent years combined with my exposure to post–modern sciences such as quantum mechanics, relativity, and more recently chaos and complexity theory, have led me to the realization that the world is a messy place. It doesn't operate on clean, linear, predictable principles. I have come to suspect, that if — and it's a big if — there is a unified field theory, or an ultimate answer, that it is probably as pointless as the one described in The hitchhikers guide to the galaxy *(1979). In that story an alien race, tired of philosophical squabbling, decide to solve the problem once and for all. They set a supercomputer called Deep Thought the task of answering the ultimate question: What is the meaning of life, the universe and everything? After millions of years of calculating the computer finally awakes and gives them the answer — forty–two.*

> "Forty–two!" yelled Loonquawl. "Is that all you've got to show for seven and a half million years' work?"
>
> "I've checked it very thoroughly," said the computer, "and that quite definitely is the answer. I think the problem, to be quite honest with you, is that you've never really known what the question is! (p. 136)

I see this as one of the major problems with a reductive approach. As we zero in on a single, unitary, ultimate answer, the answer becomes more and more universal, more expansive, and

ultimately meaningless.

I continue:

"For me, the downward spiral into delusional objectivity began in my twenty–first year with Ayn Rand's (1943) *The Fountainhead.*" I survey the crowd and see several heads nod in agreement and recognition.

"I mean, I'd always had an interest in science, but I was much more comfortable in art and more freely creative endeavors. Not to say that science doesn't allow creativity, only that the creative side is something that cannot be easily acknowledged from within the discourse and the bounds of what is acceptable in science are very narrow. I ended up in science largely because of my parent's insistence that I study something that would be practical in the "real world". My science background set the stage for objectivism, and *The Fountainhead* was the text that crystallised it for me.

"The Fountainhead, as most of you know, is primarily a tribute to innovation, human progress and man as a heroic being. The hero, the first of Rand's ideal men, is Howard Roark a brilliant architect, whose integrity puts him in conflict with the majority of society. Ayn Rand's stated theme for the novel is "individualism versus collectivism, not in politics but in men's souls" (1961, p. 68). Roark's architecture is misunderstood and maligned by the public and he is forced to struggle in order to be able to maintain his convictions and to continue to do his chosen work. In the end he triumphs "because he has won the right to act according to his own principles" (Machado, n.d.).

The Fountainhead starts with the simple phrase "Howard Roark laughed" (Rand, 1993, p.1). From the first time I read it, I thought it was an intriguing response from a man who has just been expelled from school, whose life seemed to be falling apart. He should be upset or furious or

something, but he goes to a quarry "to swim, to rest, to think, to be alone and alive" (1993, p. 2). Roark is portrayed as an outsider. He is misunderstood by almost everyone and he himself finds other people puzzling. And yet, in a strangely Spock–like turn, none of this seems to bother him in the least. On the same page Rand continues:

> He laughed at the thing which had happened to him that morning and at the things which now lay ahead. He knew the days ahead would be difficult. There were questions to be faced and a plan of action to be prepared. He knew that he should think about it. He knew also that he would not think, because everything was clear to him already, because the plan had been set long ago, and because he wanted to laugh. (p. 2)

"Roark's character was easy for me to identify with as a young man because he had similar difficulties as I did with fitting in. But unlike me, he acted heroically, he stood up for what he believed in and he seemed to have an answer — his troubles didn't trouble him. Roark's certainty, clarity of vision and ultimate success made the novel, and the ideas it contained, gripping."

"Rand's writing was so powerful and convincing, that I was willing to ignore the nagging gaps and difficulties inherent in her philosophy, and devour the whole thing — and then every other book she had written."

I don't have time to go into it in great detail here, but Nathaniel Branden a former associate of Rand's wrote of a number of objectivism's shortcomings, several of which are important to my story because as I adopted and began to practice objectivism they became my shortcomings as well:

1. *Rand had difficulty in maintaining the distinction between reason and the reasonable. This lead to her branding "any viewpoint she did not share as not merely mistaken but 'irrational' or 'mystical'...to say nothing, of course, of its being 'evil,' another word she loved to use with extraordinary frequency" (Branden, 1984). I can add that many objectivists, myself included shared in this difficulty. It became all too easy to categorize and exclude other views as invalid, irrational and evil.*

2. *She also practiced an "appalling moralism" (1984). The path to objectivism is a narrow road that shares much in common with many organized religions. It's very easy to stray from the righteous path and into the realm of sin and guilt.*
3. *Rand's philosophy privileged reason over emotion, particularly in her novels where some characters are shown "...being heroic by ruthlessly setting feelings aside" and others are show being evil by "in effect, diving headlong into [their] feelings and emotions" (1984) The message to me was clear: repress your feelings.*
4. *Her philosophy also encouraged dogmatism in that it was presented as an integrated whole that was entirely self-consistent and that had to be accepted as a whole. It is an all or nothing approach.*

> What she was saying, translated into simple English, is: Everything I have to say in the field of philosophy is true, absolutely true, and therefore any departure necessarily leads you into error. Don't try to mix your irrational fantasies with my immutable truths. (1984)

"The negative aspects of Rand's objectivist philosophy led to much guilt and angst for me, for try as I might, I couldn't be wholly rational. I felt guilt over things as simple as liking the band *the gang of four,* a rock group with strong Marxist influences. By liking them, I was betraying my objectivist principles. I was guilty, I could hear her say, irrational, maybe even evil.

"I also found it difficult to accept objectivity as an integrated whole. Rand is described as possessing "an odd kind of scientific conservativism, a suspicion of novelty, and indifference — this is only a slight exaggeration — to anything more recent than the work of Sir Isaac Newton" (Branden, 1984). I, on the other hand, had largely accepted "newer" science such as quantum mechanics and relativity which placed limits on what could be known and put the idea of an independent observer into question. This was

problematic since one of the basic tenets of objectivism is that "[r]eality exists as an objective absolute—facts are facts, independent of man's feelings, wishes, hopes or fears" (Rand, 1962, p. 35).

"However guilt and inconsistencies didn't stop me from continuing on an objectivist path. As I fell in further, I began to see any inconsistencies as my problems, not hers.

"Through the next several years, I expanded what I had read into a way of life. I didn't see the toll that my views were taking on my personal life. I didn't even notice it when I read a biography of Ayn Rand, and learned that she herself had run into the same kinds of practical problems as I had in trying to live her objectivist philosophy."

****

I came home to find her waiting, her bags already packed. She's leaving. I'm blindsided, in spite of my supposed objective stance I didn't see it coming. And yet in retrospect I can't imagine how I could possibly have been surprised — she's been sleeping on the couch for weeks after all.

How can someone so smart be so stupid? I just stand there, numb — a feeling that has become all to common to me, a feeling I would call "normal." Somewhere, I think, I'm feeling something. There's a vague, nondescript, something going on in the pit of my belly, the place where I imagine I shove all of my unwanted feelings. But I can't for the life of me identify it. I remember years ago someone telling me they weren't sure what they felt. "How can you not know what you feel!" I'd said, incredulously. And yet here I was years later — I didn't know what I felt. And so I stood silent, watching her arrange a few last items, taking a little longer than necessary, almost as if she was waiting for something.

And what did I say at this moment? Did I tell her "I love you, don't go"? Did I cry? No, I made an appeal to her logic, her common sense, to the practical. I said "You're not going to have a dental plan if you leave." She stared, open mouthed and then, her unsaid question answered, she picked

up her bags and walked out the door.

I had been living, more or less, objectivity for ten years, and along the way many relationships had ended and ended badly. Objectivity allowed me to withdraw more and more from the emotions and pain associated with each break–up into an increasingly dulled sense of living. That night, I wondered for the first time if it wasn't my fault and not theirs. Perhaps, just perhaps there was something wrong with the way Id been living, with my objective foundation. Until now I had assumed that each failure was related to straying, to not practicing objectivity strongly enough. I had been weak. I had let emotions slip in and control me. The full expulsion of emotions was the answer. And yet it seemed the more objective I became, the less happy and the less in touch with reality I was.

****

"One way I think of my problem with science, objectivity and my way of life is as a dissonance between an objective epistemology and my own way of being in the world. My particular problem between a strict objectivist epistemology and my life lived as a human being was addressed by becoming less and less human. I tried to fix the dissonance by changing my way of being to match my way of knowing. I tried to become completely rational and completely separate from the world, to control and bury my feelings."

I stop again for a moment to gather my thoughts, and think back.

I came to the graduate program in curriculum studies at UVic to explore my beliefs, my philosophy, but I had no idea of how difficult or transformative the process would be. Already in my first classes I felt isolated. It seemed as though I was the only rational objective person in the

program, maybe in the world. I was careful and guarded about what I said. I kept this dirty little secret to myself. It seemed like everyone else had different ways of knowing than I did.

The first book I read in Graduate Studies was Bill Pinar's (1995) massive tome Understanding Curriculum. *If I open my copy and flip to almost any page I find angry, indignant, self–righteous scrawlings (mine) filling the margins. My difficulties began in chapter two of the text. To be sure, I had problems with some of the earlier curricular theory presented, but it took John Dewey to get me angry, which is perhaps fitting because Ayn Rand also had difficulties with Dewey.*

> In The School and Society (1899) Dewey asserts that schooling must be linked with society. Specifically, Dewey shared Ward's view that students ought to discuss, plan, and effect meaningful social change. Schooling which ignored this dimension produced egocentric individuals. This potential for "selfishness" worried Dewey considerably.
>
> > The mere absorption of facts and truths is so exclusively individual an affair that it tends very naturally into selfishness. There is no obvious social motive for the acquirement of mere learning, there is no clear social gain in success...Indeed, almost the only measure for success is a competitive one, in the bad sense of the term—a comparison of results in the recitation or in the examination to see which child has succeeded in getting ahead of others in storing up, in the accumulating the maximum information. (Dewey, 1959, p. 40; quoted in Pinar, Reynolds, Slattery & Taubman, 1995, p. 105–106)

Written in the margin next to this section is: "But learning is an individual experience. Child centred but society gains". My problem here is linked to one of the common themes in Rand's writing, that of the individual versus the collective. As Rand said "[o]bjectivistist ethics, in essence, holds that man exists for his own sake, that the pursuit of his own happiness is his highest moral purpose, that he must not sacrifice himself to others, nor sacrifice others to himself" (n.d./1964). Dewey's use of the word "selfish" in the above quote triggered a response. And that, for me, was what understanding had become — stimulus/response. Either it fit into my objectivist scheme of things and was good and true, or it did not and was wrong and misguided at best, and insidious and evil at worst. The real problem was that my thinking process was shut–down at the initial

categorization. Once something was lumped in one of the two groups there was no further thought, just the dogmatic application of rules.

In my initial curricular courses I was fighting hard to maintain my rigid beliefs, even though I had already realised that there was something seriously wrong with them. It was if at some level I knew that I was losing my footing, that my ground was crumbling out from beneath me. And as I was faltering I was clinging ever–more tenaciously to what was left – like a wild animal backed into a corner, teeth–bared. I was afraid; I sensed the danger. As the summer unfolded, I was becoming more and more sensitive to what I perceived as an already constant barrage against science, rationality and objectivity. Something had to give.

A few days into one of my classes something happened. One of the students was presenting on the first chapter in Understanding Curriculum, *and the class was discussing a quote by Elliot Eisner (1995):*

> The upshot of my message is to urge that we recognize objectivity for what it is: a concept built on a faulty epistemology that leads to an unrealizable idea in its ontological state and a matter of consensus...in its procedural state. (p. 53)

Finally frustrated and defensive I blurted out, "What's the problem with objectivity anyway?"

"It's discredited, an unattainable goal. It's a fantasy," someone answered.

"Oh," I said quietly. And that's all. Just "Oh." Because of course it was true. I'd always known it was true. Even as I tried to live objectively I new it was an unattainable ideal. A theory. But I had never thought seriously about this difficulty. About what it meant to my whole way of being. This was the moment when things began to come completely unraveled. I had not questioned my assumptions since they had formed in my early twenties and as I struggled I could glimpse a life without a foundation; it was not a pretty sight. One wrong step could lead to unimaginable loss; I had a lot invested in science, a lot of myself. My identity was tied up in science and objectivity and I was

fighting hard to maintain it. More and more I was feeling very much like Alice being questioned by the caterpillar:

> "Who are *you*?" said the Caterpillar.
>
> This was not an encouraging opening for a conversation. Alice replied rather shyly, "I — I hardly know, sir, just at present — at least I know who I *was* when I got up this morning, but I think I must have been changed several times since then."
>
> "What do you mean by that?" said the Caterpillar sternly. "Explain yourself!"
>
> "I can't explain *myself*, I'm afraid, sir," said Alice, "because I'm not myself, you see."
>
> "I don't see," said the Caterpillar.
>
> "I'm afraid I can't put it more clearly," Alice replied very politely, "for I can't understand it myself to begin with..." (Carroll, 1865/1972, p. 65–66)

Despite, or perhaps due to, the difficulties in this journey a new space has been opened in my thinking. I'm no longer trapped inside a tiny scientific box, allowed only to think and express myself in proper and limited ways. I'm no longer trapped by foundation. I have moved from the "logic of boxes" to "a logic of sacks" (Serres, 1983/1991, p. 236[10]) I'm no longer searching for "the answer", but I am content to explore the possibilities.

The pessimist in me now wonders if some unnamed disaster awaits us if we do find an ultimate answer. I'm reminded of a short story by Arthur C. Clarke in which a group of Tibetan monks set a super computer on the task of compiling a list of all of the possible names of God. In doing so, they believe they will achieve God's purpose for man. The story ends as the programmers ride down the mountain on donkeys.

> "Wonder if the computer's finished its run. It was about due now."

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[10] "I believe that there is box–thought, the thought we call rigorous, like rigid, inflexible boxes, and sack–thought, like systems of fabric. Our philosophy lacks a good organum of fabrics; I often dream of it. If we had one, many tricks would no longer be possible, but reason would be spared much inflexibility...Our multiplicities are like gases...The concepts that capture them are as fluid as they are..." (Serres, 1983/1991, p. 236)

> Chuck didn't reply, so George swung around in his saddle. He could just see Chuck's face, a white oval turned toward the sky.
>
> "Look," whispered Chuck, and George lifted his eyes to heaven. (There is always a last time for everything.)
>
> Overhead, without any fuss, the stars were going out. (1967, p. 22)

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"My way of life, my paradigm was failing me. There were problems with the lack of space for emotions, as well as the straightjacket that it imposed on my thinking. As I encountered more and more difficulties in my life, I began to see that they invariably related to objectivity. I needed to find another way, an alternative to my totalising project."

"In post–modernism[11], I found that alternative. Now I'm not saying that it's the way for everyone; I'm not going to fall into that trap. But for the moment it's the way for me. It allows me to reframe my life and look at things through a lens that magnifies rather than reduces. I can focus on the relationships and the overall pattern instead of zooming in in a reductive way on the details. This is important for me, because I have come to relate more strongly to the words of Yanagi rather than those of Descartes."

> What is the beauty that a man of erudition sees as he holds a fine pot in his hands? If he picks a flower to pieces, petal by petal, and counts them, and tries to put them together again, can he regain the beauty that was there? All the assembly of dead parts cannot bring life back again. It is the same with knowing. (1972, p. 110)

In particular, I have difficulty with Descartes' second and third methodological rules for directing reason:

> The second, to divide each of the difficulties under examination into as many parts as possible, and as might be necessary for its adequate solution.

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[11] Post–modernism has as many definitions as there are theorists. I myself subscribe to the definition that Jean Francis Lyotard suggested: "Simplifying to the extreme, I define postmodern as incredulity toward metanarratives." (1979/1984, p. xxiv).

> The third, to conduct my thoughts in such order that, by commencing with objects the simplest and easiest to know, I might ascend by little and little, and, as it were, step by step, to the knowledge of the more complex; assigning in thought a certain order even to those objects which in their own nature do not stand in a relation of antecedence and sequence. (1637/1950, p. 12)

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I stop to reflect for a moment on recent readings, and my thoughts meander to Radical Hermeneutics *(1987) by John Caputo and Jacques Derrida's* the Gift of Death *(1992/1995). Reading these texts was a revelation for me; it helped put many emerging ideas into a new light. At first each text was totally incomprehensible, but as I stopped trying to understand, as I gave in to the flow and the rhythm, a sense of order began to emerge. Tonight, I began wondering what it was about these two writers that affected me in the same way. Reading these works was like a roller coaster ride through western philosophy and religion by way of the flux, with Heidegger, Nietzsche, Kierkegaard, Hegel, Caputo and Derrida along for the ride. It was uplifting and depressing, affirming and negating, enlightening and obfuscating all at the same time. I was allowed to see things first from one perspective, then from another, and just when I was convinced, the folly of the view would be pointed out, and tacks would be changed. I was kept off balance, off centre, and never allowed to get a firm hold on anything of substance. The playfulness and the convoluted, chaotic nature of the writing, circling and swirling around, and back in on itself made it difficult to find a firm footing.*

> In a moment of decentering, then, of eroding authorities, of disappearing absolutes, we have to discover new ways of going on...to shape our narratives in ways that do not duplicate other narratives. (Greene, 1994, pp. 217–218)

Instead of making a point Caputo and Derrida embrace the multiplicity. The objects of such work "carry their shadows with them — they are black boxes...They make us think without concepts. They make us see simultaneously the thing, the dynamic of the thing, and the misunderstanding in which our understanding of the thing is immersed" (Serres, 1983/1991, p.

233). When reading texts such as these with no foundation to attach to, I have to make my own meaning. Because language is referential, I have to connect it to something to make sense of it, and the most immediate thing is my own experience. Writing of this type, by its very nature, draws the reader into it and forces them to connect with it.

It cannot be read passively.

In the curriculum of my life, then, I have come to a point where I look upon things differently. Where there are no absolutes and where "the answer" that I used to think I was getting close to was really a glimpse of something else entirely.

> What breaks down in the breakthrough is the spell of conceptuality, the illusion that we have somehow or other managed to close our conceptual fists around the nerve of things, that we have grasped the world round about, circumscribed and encompassed it...This is not to say, of course, that we no longer have to do with conceptual thinking...Nor do I mean that this is some sort of after-hours pastime, something which we might entertain after dinner, just before we nod off. I would say, rather, it inhabits the margins and fringes and interstices of everydayness and keeps turning up on us disturbingly, unexpectedly, only to vanish again...(Caputo, 1987, p. 270)

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I recall working in the laundry room trying to untangle the string that's become wrapped around some clothes. I can't believe that it has become so intertwined in the washing machine. I struggle for a long time, and I begin to wonder how many pieces of string are involved. And then it occurs to me that I should be looking for an end. In order to untie the knot I need to find an end. But strangely there are no ends, just knotted string. Then, all at once it loosens, and the knot seems to come untangled almost by itself. It is only then that I realize I have been struggling with a single piece of string in the form of a loop.

It's an odd space in which I find myself or as Alice might say, "curriouser and curriouser." Relationships have been radically altered. Old familiar either/or relationships have shifted into both/ands, or something even more complex. I used to think of pairs of binary opposites such as

presence/absence or self/other as different sides of the same coin. And I still do — they are on what appears to be different sides of the same surface — but it is a Mobius[12] plane, and there is only one side and one edge. These opposites are not so much opposite as they are partners, partners that share the same space. If I start at any point on the plane and travel, I eventually return to my starting point. There is no sudden, clear flip or shift from one to the other, from one side to the other, because there is only one side. And yet at any point, I can touch two opposing sides. In a sense, what I'm dealing with here is a matter of scale. On one scale, at one magnification, there are obviously two sides and two edges, and on another only one of each exists.

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I recall working in the garden. I'm admiring the shape and flow of the rows of lavender, black–eyed susans and shasta daisies. There's a calming effect to the order in a formal garden.

And then I see them, their ugly little heads poking up through soil. I can't believe it — I pulled out all of the invading weeds yesterday and they are already back. Tiny grass—like blades, jabbing their way into the uniformity, breaking up the symmetry and choking out my flowers.

This bamboo was planted by someone else, somewhen else, and I've never been able to rid my garden of it. I pull the shoots out violently but I never get the roots[13] and they come back. Popping up unexpectedly, where and when I least expect them. Where do

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[12] A Mobius strip is a non–orientable surface. It can be constructed by taking a long rectangular piece of paper, giving it a half twist length–wise, and connecting the two ends.

[13] Bamboo does not have roots. It has a rhizome, a horizontal underground stem, like most grasses. The rhizome grows laterally underground and periodically sends up shoots, a characteristic that makes it particularly invasive and hearty. It is an ideal for colonizing new spaces.

they come from?

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Like Caputo and Derrida, the words to the Pink Floyd song Comfortably numb *strike something deep inside me, and remind me of the feeling I used to get when I thought I was getting close to "the answer", to some ultimate certainty, only to have it slip away like so much quicksilver.*

When I was a child
I caught a fleeting glimpse
Out of the corner of my eye
I turned to look but it was gone
I cannot put my finger on it now
The child is grown
The dream is gone

(Waters and Gilmour, 1979, disk 2, track 6)

I'm beginning to feel that what I was sensing wasn't a presence, but perhaps an absence. Maybe what I've been unable to see is the flux, lying just beneath the surface of everyday experience. "[T]he absence…in everything which we try to summon into presence…but not just the absence but the play of the presence and absence, the unsettled, unsettling fluctuation between the two, so that we can never lay hands on a fixed structure or stable stuff" (Caputo, 1987, p. 270).

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I recall walking across the University campus with a friend continuing a discussion from class. A particular section of William Doll's book A post–modern perspective on curriculum *(1993) struck a chord with me. In the book Doll is describing an experiment in which playing cards are flashed at subjects over short intervals (subliminal up to one second). In the pack is an anomalous card, a red spade. Most subjects eventually spotted the red spade for what it was, but as Doll describes, sometimes:*

> [T]he subjects became perceptually and conceptually confused, about both the anomalous and normal cards. As one subject reported (at 300 milliseconds, the usual exposure time for recognition):

> I can't make the suit out, whatever it is. It didn't even look like a card that time. I don't know what color it is now or whether it is a spade or heart. I'm not even sure now what a spade looks like! My God! (p. 165)

As we walk I'm relating a story of a similar perceptual problem that I experienced the summer before. One night while driving a dark, winding, narrow rural road I spotted an animal crossing the road ahead. At first I thought it was a dog but then I noticed the way it was moving. Then it was a racoon but I suddenly realized it was too big. And before I could think anything else it was gone. "The thing is," I tell my companion, "that when I thought it was a dog it looked like a dog, right down to details of its face. I still don't know what I saw that night. The scary part is, that if I hadn't kept looking, I would still think it was a dog. It casts into doubt the trustworthiness of perception. It's like thinking those rabbits over there are cats," I add, pointing across the lawn.

She looks where I'm pointing and says "Those aren't rabbits, they're crows."

I look again, and sure enough, they are crows. It's now obvious. Even from fairly far away I can see their beaks, and I can see them hopping bird–like around, looking for food. But as we get a bit closer, something isn't right, and then another perceptual click occurs. "Those aren't crows either," I say, "It's just ripped up pieces of a black garbage bag."

The problem is one of perception. As I try to identify the object, I am trying to fit it to one of the concepts I have formed. When I get an approximate match, my mind seems to overlay the concept on the object, so that the object appears to be what I think it is. This does not bode well for either objectivity or concepts. Concepts seem to dominate and distort reality. Michel Serres (1983/1991) suggests that concepts capture the multiple and reduce it to the single, silencing the multiplicity by force: "Silence is the zone that surrounds concepts, theories, orders in general....The multiple clamors noisily; the capture of the multiple is tacit" (p. 247).

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"In closing, I want to thank all of you for your help, and continued support. I couldn't

have come this far without you. It hasn't been an easy journey so far, and I don't expect it to get easier. I wish you all success in your own journeys, and I hope I can be of some help to you. As for me, I'm tired and I still have "miles to go before I sleep" (Frost, 1923, p. 87)."

As I leave the building the cool, fresh night air hits me. I stop for a moment and look up at the stars. My struggle is far from over, but now I have hope. Not the hope that I will find *the* answer, but the hope that I will find *an* answer, one that is meaningful and useful to me. There is hope that somehow, I can continue to go on, despite the uncertainty. I imagine I can see Richard Bernstein's (1995) "new constellation" in the star mottled sky, a "juxtaposed rather than integrated cluster of changing elements that resist reduction to a common denominator, essential core, or generative first principle" (p. 8). I think back to Clarke's short story and I smile. I don't think the stars will be going out any time soon.

Chapter $Z_{n+1} = Z_n^2 + C$ where $Z_0 = 0$

Another Brick in the Wall

The most obvious aspect of this field of actual experience is its disorderly character. It is for each person a continuum, fragmentary, and with elements not clearly differentiated…I insist on the radically untidy, ill–adjusted character of the fields of actual experience from which science starts.

(Whitehead, 1929, p. 105–106)

All in all it's just another brick in the wall

(Waters, 1979, disk 1, track 5)

The scientist stood in his laboratory and stared blankly at the computer terminal in front of him and blinked. He removed his glasses and rubbed his eyes, but the results refused to go away or conform to his expectations. This was deeply troubling, though he was not quite sure why.

He had worked toward this moment for years. It was the culmination of his life, his life's work, and it made him nauseous. His project reduced humanity to a few simple non–linear equations, each with several variables. He ran computer simulations that eerily mimicked the behavior of complex social systems, from economics through to elections and education. But in spite of the simplicity and elegance of his system, the numbers he was looking at on the screen now told him a different story. They told him he was never going to find the answer, the unifying principle, or obtain the predictive power he was seeking; they told him he was never going to be famous. In fact, they seemed to be whispering, almost mockingly, that he would be lucky to escape with his life.

Suddenly he deeply wished that he'd listened to his brother when they'd spoken last. Spoken was probably not the right word; he and Castor had not had more than an argument in years. At their last meeting, Castor had been saying something about situated knowledge, and there being no real world accessible beyond language. The

scientist had taken it as a personal attack, as an attack on the world he worked with, and it had triggered his usual tirade. But now he knew that he had been wrong. He had undeniable proof for himself — scientific proof. It was no coincidence that at the same time, halfway around the world, his brother was having some difficulties of his own.

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"Would you tell me, please, which way I ought to go from here?"

"That depends a good deal on where you want to get to," said the Cat.

"I don't much care where—" said Alice

"Then it doesn't matter which way you go," said the Cat.

"—so long as I get *somewhere*," Alice added as an explanation.

"Oh, you're sure to do that," said the Cat, "if you only walk long enough."

(Carroll, 1865/1972, pp. 87–88)

Like Alice, I find myself foundering, wondering which way it is that I should go. Since I began to suspect that scientific rationality was inadequate for explaining social life, I have been struggling to make some sense out of the world, to find some kind of foundation — even as I realize that foundations themselves are illusory. The problem is not so much that I don't know which way to go; I am definitely drawn toward a post–modern place. The difficulty I have is that I'm not sure I want to go there. Post–modernism claims to be non–foundational and resists attempts to turn it into a master narrative, so it would seem I can't find the solid ground I am seeking there. Within this paradigm knowledge is seen as local, partial, discontinuous, and constantly in process. Social reality and self are constituted in language and with the disconnection between signifier and signified, all seems to all spiral inward in a kind of self–referential solipsism. As I ponder this, my old objectivist rationality, always circling, surfaces and

I'm Alice again:

> "I can't believe *that,*" said Alice.
>
> "Can't you?" the Queen said in a pitying tone. "Try again: draw a long breath, and shut your eyes."
>
> Alice laughed. "There's no use trying," she said: "one *can't* believe impossible things."
>
> "I daresay you haven't had much practice," said the Queen. "When I was your age, I always did it for a half–an–hour a day. Why sometimes I've believed as many as six impossible things before breakfast."
>
> (Carroll, 1865/1972, pp. 257–258)

The question for me is, I think, to be foundational, or not to be foundational. The choice is between certainty and limitations and uncertainty and freedom[14]. Perhaps an even bigger question is whether it is possible to be non–foundational even if I want to. As I struggle with the question of post–modernism, I find myself regularly slipping back into patterns of modern thought, and I relate strongly with Alfred North Whitehead's (1925, 1929) struggles with an inadequate modernist paradigm and yet his unwillingness to toss the whole thing out. I suspect that unless I am careful I am in danger of throwing out the rationalist baby with the modernist bath water.

Thomas Kuhn (1962) suggests that scientists are unwilling to give up a failing

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[14] It is a binary opposition that I have set up, a dualism, an artificial distinction. But like Deleuze and Guattari (1980/1987) I "employ a dualism of models only in order to arrive at a process that challenges all models" (p. 20). As Michel Serres (1983/1991) puts it: "Foundation occurs when a multiplicity makes itself into a unity" (p. 232). When there is a unity there is only one answer, one right way; there is certainty. Methods are prescribed; there is a pre–mapped way of going and an end in sight. Foundations mean having a ground from which to speak and a language with which to speak. But they also mean immobility, dullness, and repetition. Foundations are dangerous precisely because they pretend to give us everything. To operate without foundations is about having "another way of traveling and moving: proceeding from the middle, through the middle, coming and going rather than starting and finishing" (Deleuze & Guattari, 1980/1987, p. 25). The non–foundational has to do with improvisation. It is about making it up as you go along, in response to the going. It's not knowing and living within the tension of uncertainty. The non–foundational is openness to the flux, to the mystery. But as I said at the start, the dualism is false. There are foundations in the non–foundational and cracks in the foundation.

paradigm unless there is a better one to adopt, and I suspect that this is part of my reluctance to embrace post–modernism fully. Science and objectivism gave me what appeared to be a firm foundation. Something of substance — absolute knowledge — and with it power and a sense of security. Caught in the human condition described by the Buddha I divided "the perceived world into separate objects that [I saw] as firm and permanent, but which are really transient and ever–changing" (Capra, 1996, p. 294). I had fallen into the trap that both Gregory Bateson and Whitehead warned of and no longer realised that "the map is not the territory" (Bateson, 1987, p. 21).

Before I started my master's program, I had already begun to realise that my science, my rationalistic, objectivist world–view, was not working. Oh, it was fine in a limited sense, but as a way of living my life it was sadly lacking. The objective distance that allowed me a clear vantage point in scientific arenas led to a separation and detachment from life and others that I had not anticipated, did not want, and did not notice until it was almost too late.[15]

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> But when our world view is thrown into doubt, we feel anxiety, and anxiety is a visceral reaction. As Peter Marris shows in his book *Loss and Change,* all real loss involves grief and mourning, and the loss of a paradigm is often an emotional catastrophe...Knowledge is learned, and generated, first and foremost by the body,

[15] I came home to find her waiting, her bags already packed. She's leaving. I'm blindsided, in spite of my supposed objective stance I didn't see it coming. And yet in retrospect I can't imagine how I could possibly have been surprised — she's been sleeping on the couch for weeks after all.

How can someone so smart be so stupid? I just stand there, numb — a feeling that has become all to common to me, a feeling I would call 'normal.' Somewhere, I think, I'm feeling something. There's a vague, nondescript, something going on in the pit of my belly, the place where I imagine I shove all of my unwanted feelings. But I can't for the life of me identify it. I remember years ago someone telling me they weren't sure what they felt. "How can you not know what you feel!" I'd said, incredulously. And yet here I was years later — I didn't know what I felt. And so I stood silent, watching her arrange a few last items, taking a little longer than necessary, almost as if she was waiting for something.

And what did I say at this moment? Did I tell her "I love you, don't go"? Did I cry? No, I made an appeal to her logic, her common sense, to the practical. I said "You're not going to have a dental plan if you leave." She stared, open mouthed and then, her unsaid question answered, she picked up her bags and walked out the door.

> and it is the body that suffers when serious changes are required. (Berman, 1984, p. 177) .
>
> Time is so full for people who are dying in a conscious way, full in the way that life is for children. They spend big round hours. (Lamott, 1994, p. 179)

I'm lying in a hospital bed. My body is so full of morphine that the nurse is afraid that I'm going to die from the painkiller. She didn't say this out loud as she checked my blood pressure — she didn't have to. In this pain–heightened state I can read her face, read surfaces — for the first time in my adult life. Another wave of pain erupts from deep within my belly, doubling me over, interrupting my thoughts again. In a couple of minutes it ebbs, but never quite stops. And I know I am going to die. I am wrong of course, at least temporarily.

I have never given much thought to dying. I am thirty–eight and it hasn't occurred to me that I will die. Or rather, the thought occurred to me long ago, and I pushed it away. I was fifteen when I first read Robert Heinlein's (1973) *Time enough for love: The lives of Lazarus Long*. The hero in that book, Lazarus Long, is a futuristic Methuselah, who attributes his longevity to never thinking that he is going to die. It seemed like such a good idea that I adopted it myself and never looked back. Until now.

I can feel another wave coming, rushing up on me as if from a great distance. All there is, is the pain and waiting for the pain. Strangely, this agony has put me firmly inside my whole body instead of just inside my head. I am feeling more and thinking less and what thinking there is has a surprising clarity. As the attack subsides, a thought strikes me: what is going to happen to all of my stuff after I die? I finally understand that I really can't take it with me when I go. I think about all of the things I have accumulated, the material of my life, and I know that to someone else, it is all virtually meaningless.

Meaningless because the meaning isn't in the objects I am leaving behind. Any meaning they have for me dies with me. The only trace of my life will be the relationships that I had with people — not with objects.

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As I drive home from the hospital several weeks later I notice a new intensity to everything. The trees — were they always so green, so alive? The sweet smell of fresh–cut grass is intoxicating, almost too much. I stare around wide–eyed. Everything seems new, like it was just taken out of the box. I smell and hear and feel like a five year old kid again.

The doctors have managed to untwist my bowel and to everyone's surprise I survive and begin to heal. Things are different now and I notice my body in ways I never have before. My large intestine is churning and tightening, sending me some kind of message that I'm unwilling or unable to interpret. My near–death experience has me paying attention to a body I barely knew I had, having lived in my head for so long. Now I'm faced with the difficult task of figuring out what my body is trying to say.

Is my bowel, my body, trying to tell me something, or is trying to *show* me something? It's strange, but as I was lying in the hospital so near death, I felt more alive and grounded and in–touch than ever before. But now it's slipping away as I again slip away into my mind. My body, however, is not going to let me off that easily. Pains begin to re–surface. The twist is still there. Is the twist in my bowel or in my thoughts and emotions? Everything seems to keep getting tangled up; I'm all wound up. Do I have to fix it, or learn to live with it? Or is it an either/or choice? I'm not sure. If I learn to live with the indeterminacy and to go on and make choices, and live anyway, despite

incomplete and incorrect information, will the physical aspect take care of itself? Perhaps. I want the message from my body to be an intellectual one, something I can figure out or reason through. But this isn't about thinking; it's about another kind of knowing altogether.

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Ever since my first exposure to Ayn Rand's thought in my twenties, I strongly believed that foundational beliefs were necessary, and that the only reasonable ones were rational, objective, and rooted in an appropriate philosophy[16]. And above all the system must be internally consistent. There could be no contradiction. Anything less was just a load of misguided fluff, or worse.

As Ayn Rand (1984) wrote in her book *Philosophy: Who Needs It:*

> A philosophic system is an integrated view of existence. As a human being, you have no choice about the fact that you need a philosophy. Your only choice is whether you define your philosophy by a conscious, rational, disciplined process of thought and scrupulously logical deliberation — or let your subconscious accumulate a junk heap of unwarranted conclusions, false generalizations, undefined convictions, undigested slogans, unidentified wishes, doubts and fears, thrown together by chance but integrated by your subconscious into a kind of mongrel philosophy and fused into a single, solid weight; self–doubt, like a ball and chain in the place where your mind's wings should have grown. (p. 5)

Throughout my life, through science, and philosophy, and reflection, I was building what appeared to me to be a solid foundation — a secure platform from which I could under–stand things. But at some point my foundation swallowed me up. I was so busy categorizing and analyzing that I didn't notice I had reached the corners and I began

[16] My foundational beliefs were a form of what is usually called foundationalism; the belief that knowledge rests on a fixed foundation from which further propositions can be inferred to build a structure of truths. My foundations were perceptual in nature, coming either from the senses, rational thought reflection and memory. They served as a starting point for decision making and provided a way of understanding the world. I began from 'basics', from perceptual givens and built, logically and rationally, step–by–step a coherent and solid structure.

building walls instead. Each new fact, each new piece of the puzzle became "just another brick in the wall" (Waters, 1979, disk 1, track 5). Before I fully grasped what had happened, I was boxed in.

> ...He only says, "Good fences make good neighbors."
> Spring is the mischief in me, and I wonder
> If I could put a notion in his head:
> "*Why* do they make good neighbors? Isn't it
> Where there are cows? But here there are no cows.
> Before I built a wall I'd ask to know
> What I was walling in or walling out,
> And to whom I was like to give offense."
>
> (Frost, 1997, p. 127)

I had created a set of beliefs that were difficult to escape, and almost impossible to see outside of. I failed to ask "what I was walling in or walling out." I completely failed to notice the wall. This wall was my foundationalism, my objectivism, run rampant. In one sense it was designed to protect me from attack. But it was built into such a rigid structure that it acted to separate me from my own feelings and to a large extent from the world. The problem was, that rather than altering my framework of understanding to accept new facts, I simply discounted that which didn't fit my framework as false. Instead of trying to find out why I felt a particular way, the feeling was discounted as irrational and locked away. My belief in this rational, objectivist foundation left many aspects of myself and the world excluded. Within my wall there were no acknowledged emotions, contradictions, or unknowns. I treated emotions as particularly dangerous, equated by a Randian short–circuit with "whims."

> Emotions are not tools of cognition. What you feel tells you nothing about the facts; it merely tells you something about your estimate of the facts. Emotions are the result of your value judgments; they are caused by your basic premises, which you may hold consciously or subconsciously, which may be right or wrong. A whim is an emotion whose cause you neither know nor care to discover. Now what does it mean, to act on whim? It means that a man acts like a zombi [sic], without any

> knowledge of what he deals with, what he wants to accomplish, or what motivates him....
>
> A rational man knows — or makes it a point to discover — the source of his emotions, the basic premises from which they come; if his premises are wrong, he corrects them. He never acts on emotions for which he cannot account, the meaning of which he does not understand. In appraising a situation, he knows why he reacts as he does and whether he is right. He has no inner conflicts, his mind and his emotions are integrated, his consciousness is in perfect harmony. (Rand, n.d./1964)

Rand doesn't ever actually write in her philosophy that emotions are bad, or that they should be repressed — quite the contrary. But, as I noted elsewhere, she shows the characters in her novels modeling emotional repression through their actions. The message to me was clear; decisions are not to be based in emotion and in order to be safe from acting like a zombie it was best to bury emotions completely. Yet by ignoring emotions, by not listening to my gut feelings, I made error after error.

Even though much of my rationalist[17] wall has since been knocked down, I still find myself tripping over the bricks that now lay strewn everywhere. In my writing, my inquiry, I continue to notice my reductionist tendencies. I must be careful to keep the question open, to search but not for the ultimate nature of reality. I have to remember that knowing is always open, always contingent.

My rational, objective, modernist foundation was a safe defensible location from which I could withstand any attack. From this position a game was set up that I couldn't lose. The defense was based on dualism, reason and linear logic.

> The dualist supposes one space of error, illusion, and ignorance; and another, an open plateau soaked by the sun. Error and truth; the known and the unknown; the unsayable and the said...His is a simple world made of one black planet and one

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[17] The OED (1998) describes *rationalism* as "the theory that reason rather than experience is the foundation of certainty in knowledge." Or as Ayn Rand (1996) would say: "Man's reason is fully competent to know the facts of reality. Reason, the conceptual faculty, is the faculty that identifies and integrates the material provided by man's senses. Reason is man's only means of acquiring knowledge" (pp. 1074–1075).

> white; it makes it easy to judge....Dualism...belongs to violence...It belongs to those who want to be right. (Serres, 1983/1991, pp. 72–73)

The game was over before it started, as long as my opponent accepted my ground and ground rules. Once they accepted my basic tenets, my foundational beliefs and my rules, then the rest followed logically. There was only one right answer with reason as the ultimate tool and objective reality as the gauge against which truth is measured. The key was to never accept the opponent's ground, they had to fight on my turf. With science, reason, logic and objectivity — all weighty discourses — on my side I couldn't lose. I couldn't lose if I refused to listen. So long as I stood my ground, I had all the answers. Then, in a moment of weakness, I let the unimaginable thought form; what if I was wrong? Not just a little wrong. What if the whole basis, the foundation of my belief was wrong? What if foundations themselves were illusory, all smoke and mirrors, perhaps just a trick of the light? Like some post–modern Dr. Jeckyll:

> I began to perceive more deeply than it has ever yet been stated, the trembling immateriality, the mist–like transience, of this seemingly so solid body in which we walk attired. (Stevenson, 1981, p. 80)

I had been operating under a series of unquestioned assumptions. Upon closer examination, it became apparent that they were unexamined for good reason. It seemed the deeper I dug, the bigger the mess became. As I began to question the nature of objectivity, certainty and knowledge, my carefully constructed reality slowly melted away. I was overcome by a distinct sensation of vertigo, a feeling echoed by John Caputo (1987):

> ...there is a fine point in the mind where one is brought up short, a moment of midnight reckoning where the ground gives way and one also has the distinct sense of falling into an abyss. (p. 269)

I continue to struggle with science[18] and modernity[19] on the one hand, and chaos[20] and post–modernity[21] on the other. I don't want to reconcile these two incommensurables. Instead, I'm trying to find a third way, a passage negotiated between them. I hope that by keeping decentred and a bit off balance, small perturbations will lead to unexpected order emerging as the system moves into a higher, more complex state.

> Reconciliation/rupture are themselves irreducible elements of this new constellation — points of attraction and aversion...To say this means we must seek to do justice to *both* elements, without succumbing to the illusion that they can finally be integrated. In a Hegelian (but also an anti–Hegelian) manner we can characterize this as the logic of "Both/And." For this "Both/And" is itself tensed and unstable — never quite...reconciled. (Bernstein, 1995, p. 309)

> When two seemingly disparate elements are imaginatively poised, put in apposition in new and unique ways, startling discoveries often result. (McLuhan, 1967, p. 10)

What I'm speaking of is some sort of radical hermeneutics, used at a location where "the surface wears thin and the flux shows through, one of the interstices and joints which are prone to leak." I want to be able to keep the "play in play" and catch a fleeting glimpse of what lies beneath (Caputo, 1987, p. 271). I don't want to force science and post–modernism together, to dominate them, but to explore the jagged, tangled,

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[18] The term science is used throughout this thesis to refer to modernist science, which I see, as William Doll (1993) suggests, as based on Newton's clockwork universe, Descartes' rationality, and Galileo's experimental method.

[19] Modernity refers to a paradigm beginning in the 1600's with the intellectual revolution that is characterized by modern science as the chief way of knowing.

[20] Chaos is used as a shorthand name for chaos theory, which is includes a wide range of related sciences such as non–linear dynamics, complexity theory, irreversible thermodynamics and fractal mathematics. I see chaos somewhat in opposition to modern science. As James Gleik (1987) puts it, "where chaos begins, classical science stops" (p. 3). Katherine Hayles (1990) suggests that chaos "can be generally understood as the study of complex systems" with two major emphases: "chaos is seen as order's precursor and partner, rather than its opposite" and "hidden order...exists *within* chaotic systems" (p. 9).

[21] Post–modernism and post–modernity have as many definitions as there are theorists. I myself subscribe to the definition that Jean Francis Lyotard suggested: "Simplifying to the extreme, I define postmodern as incredulity toward metanarratives." (1979/1984, p. xxiv).

dangerous passage between them. This chaotic passage between science and the social sciences is described wonderfully by Michel Serres' Northwest Passage:

> Have you noticed the popularity among scientists of the word *interface* — which supposes that the junction between two sciences or two concepts is perfectly under control? On the contrary, I believe that these spaces *between* are more complicated than one thinks. This is why I have compared them to the Northwest Passage...with shores, islands, and fractal ice floes. Between the hard sciences and the so–called human sciences the passage resembles a jagged shore, sprinkled with ice, and variable...It's more fractal than simple. Less a juncture under control than an adventure to be had. (Serres with Latour, 1995, p. 70)

There is no simple way to navigate such a passage. The journey is often broken and fractured, fractal. And there is always the danger that I will end up wrecked on one rocky shore or the other.

Through this difficult journey there are still times when I wish for a world that is entirely measurable, quantifiable, and explainable. But science no longer brings me the kind of comfort it once did. Instead of answers it offers more questions. I no longer look upon science with innocent eyes and see the clear–cut nature that I once did. Now there is another slightly ominous controlling level lurking just beneath science's shiny facade.

So science has failed me, at least science of the deterministic, Newtonian brand. But I'm not ready to give up science and rationality completely. Relativity, quantum mechanics, and chaos and complexity theory put a spin on classical science that sends it reeling in a post–modern (or perhaps a post–mortem) direction.

In *The end of science* (1996), John Horgan talks of the move into what he calls ironic science. As more and more of the big questions have been answered within science, it has started to move outside of, or push at its boundaries — to the point where Horgan argues that many prominent scientists are no longer practicing science. Similarly, William Doll (1993) has written about an increasing interest in areas such as cosmology that "takes one

beyond the scientific into the metaphysical, religious, and metaphorical" (p. 22).

The story of my journey from science into chaos and post–modernism seems to be a fractal image of Katherine Hayles' description of the history of science, chaos and post–modernism itself. The parallel goes so far as to include the current rebound of my thinking in a post–modern direction.

> In the early years of this century, efforts were made in a variety of areas to construct unified field theories that would eliminate ambiguity and self–reference. These efforts failed; but the failures brought to light certain intrinsic limits to representation. Having swung as far as it could in the direction of closure, the pendulum began to swing the other way as people became interested in exploring the implications of ungrounded representations. (1990, pp. 290–291)

Both William Doll Jr. (1993) in *A post–modern perspective on curriculum* and Katherine Hayles (1990) in *Chaos bound: Orderly disorder in contemporary literature and science* include extended histories of science in their books. Both focus their histories on the modern/post–modern divide, a split Hayles characterizes as being between Newton's clockwork universe, and quantum mechanics, Einstein's relativity and chaos theory's turbulent views of the universe. Since this is the divide that characterizes my own life experience and is the metaphor through which I have come to understand my own transformation I think that these histories are worth a closer look.

The shift to science as the dominant paradigm in the West arguably has its beginnings somewhere in the 1600's although the roots likely run at least as far back as Aristotle's empiricism and Plato's rationalism. However, as William Doll (1993) suggests, the mechanical world–view that developed during the scientific revolution laid "...the foundations not only of modern science...but also of our mechanistic and scientific curriculum, one we might call 'measured'" (p. 28). In the west, science has so dominated our thinking and our lives that in Morris Berman's (1984) words it has become our

consciousness:

> ...the scientific world view is integral to modernity, mass society, and [our current difficulties]. It is our consciousness, in the Western industrial nations — uniquely so — and it is intimately bound up with the emergence of our way of life from the Renaissance to the present. (p. 8)

Although Newton clearly belongs in the empiricist camp, his work supported Rene Descartes' central idea — "that the world is a vast machine of matter and motion obeying mathematical laws (1984, p. 30). The fusion of Newton's empiricism and Descartes' rationalism into the scientific method led to an atomistic world–view where the principles that apply to atoms apply to the universe as a whole and a reductionist methodology since the whole can be understood in terms of its parts.

At the start of the twentieth century, however, quantum mechanics, which was "a full–scale break with the epistemology of Western science" (1984, p. 135), dealt a serious blow to Newton's mechanical particulate world. The shock of this blow can be heard in the words of Werner Heisenberg, one of quantum theory's principle architects:

> The violent reaction to the recent development of modern physics can only be understood when one realizes that here the foundations of physics have started moving; and that this motion has caused the feeling that the ground would be cut from under science. (Capra, 1996, p. 39)

Even though he did much of the early work in the field, Albert Einstein never fully accepted later developments in quantum mechanics particularly Heisenberg's uncertainty principle. This principle places a limit on the accuracy of certain measurements and prevents scientists from being able to make absolute predictions about future states of a system. In quantum theory, particles become relationships, and these pieces of pseudo--matter seem to "guess" which way they should go and how they should behave based of the method of observation chosen. In quantum systems, just the act of observing seems to affect the outcome of an event forever hobbling the concept of an independent

observer. As Fritjof Capra (1996) explains, quantum mechanics suggests that at a subatomic level the

> ...solid material objects of classical physics dissolve...into wavelike patterns of probabilities. These patterns, moreover, do not represent probabilities of things, but rather probabilities of interconnections. The subatomic particles have no meaning as isolated entities but can be understood only as interconnections, or correlations, among various processes of observation and measurement. In other words, subatomic particles are not 'things' but interconnections among things, and these, in turn, are interconnections among other things, and so on. In quantum theory we never end up with any 'things': we always deal with interconnections. (p. 30)

Although consistent with classical physics, Einstein's theory of relativity when combined with quantum mechanics also served to destabilize Newton's clockwork universe. Both quantum mechanics and relativity point toward the non–neutrality of the observer and the importance of position and relationship, rendering objectivity impossible. Chaos and complexity, relativity, and quantum mechanics work together to tear apart cause and effect, and reassemble them in a relationship that is anything but clear and predictable. Chaos also wreaks havoc with the concepts of order and disorder, with orderly systems descending into chaos, only to have a higher level of order spontaneously emerge, like the Phoenix from presumed destruction. And even though the equations used to describe chaotic systems are strictly deterministic, prediction is often impossible.

> In the nonlinear world — which includes most of the real world, as we begin to discover — simple deterministic equations may produce an unsuspected richness and variety of behavior. On the other hand, complex and seemingly chaotic behavior can give rise to ordered structures, to subtle and beautiful patterns. (Capra, 1996, p. 123)

Chaos is one of the spots where science and post–modernism bump up against one another. While they touch and interact at many sites, I feel it most in chaos theory, at once a science and a refutation of science. What I want to do here is keep the "play in play", and open up a space for new meaning — to "deal with this loss of meaning by

confronting the meaning of the loss" (Caputo, 1987, p. 271). I see chaos as arising from the interplay between science and post–modernism and all three are transformed in the process. As a result this mini–constellation becomes much more than the sum of its parts.

The first time I heard about chaos theory was from a book review in the newspaper. It struck me immediately that chaos was an important piece of the puzzle, a missing part of my scientific explanation of "life, the universe and everything". I thought that this might be the answer I was looking for. I bought the book, James Gleik's (1987) *Chaos: Making a new science* and then read everything else I could find on the subject. I took a theory that said there are some things that can't be known, and tried to make it into a master narrative with which to explain everything. It is an ongoing struggle to keep foundationalism (in a totalizing sense) from taking over my thinking.

Related to my former grounding in an objectivistic scientific paradigm are my continued attempts to find foundations in areas such as post–modernism, which reject all such attempts. Katherine Hayles (1990) really hit the nail on the head for me when she wrote

> ...different disciplinary traditions can impute strikingly different values to isomorphic paradigms. In the physical sciences, for example, nonlinear dynamics is seen as a way to bring complex behavior within the scope of rational analysis. Analogous theories in literary studies, by contrast, are often embraced because they are seen as resisting totalizing theories. This double edge to the current preoccupation with chaos — the ambiguity of whether it brings chaos within rational compass or signals the final defeat of totalizing projects — suggests that disciplinary traditions can play crucial roles in determining how isomorphic ideas are valued and interpreted. It also suggests that postmodern culture authorizes both of these visions. (p. xiv)

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Within chaos theory, I experience science from a post–modern viewpoint, and learn much more than I could from within the traditional scientific paradigm. Kuhn (1962) said

that there is nothing new to be discovered within an established paradigm, only details to be worked out — what he called normal science. But perhaps by viewing a paradigm such as science from a new location I can gain fresh insights. From the vantage of post–modernisms, science is anything but clear–cut. It is like the face that Caputo describes:

> It is, on the contrary, a hall of mirrors, a play of reflections, a place of dissemblance and dissimulation, sometimes a place which we manipulate in order to produce an effect, sometimes a place where the truth gets out of the bag on us against our will...It is streaked with hidden depths and concealed motives. (1987, p. 273)

Similarly, I can view post–modernism from a scientific perch. From there, post–modernism appears monstrous and unruly, and more than a little dangerous. The lack of solid ground is truly disconcerting, and Copernicus' dismay with the state of astronomy in his time echoes my feelings:

> It is as though an artist were to gather the hands, feet, head and other members for his images from diverse models, each part excellently drawn, but not related to a single body, and since they in no way match each other, the result would be monster rather than man. (Kuhn, 1957, p. 138)

As I said earlier, I believe that chaos and complexity, relativity, and quantum mechanics — together hold the seeds for the destruction of the modern scientific paradigm. I'd even go as far as to say that the patient has stopped breathing, and we've just been too busy to notice.

> Something there is that doesn't love a wall,
> That wants it down. I could say "Elves" to him,
> But it's not elves exactly, and I'd rather
> He said it for himself. (Frost, 1997, p. 127)

Both Katherine Hayles (1990) and John Horgan (1996) suggest that science, as we know it has or is coming to an end. Horgan believes the end of science is due to its extraordinary success. Instead of seeing a brewing paradigm shift in the recent explosion

of scientific theories, Horgan sees a future of ever diminishing returns. Science has found all there is to know in a large sense and all that is left is normal science. Because his vision of science is closed, boxed in by the truth it has discovered, there is nowhere else to go. Although Katherine Hayles takes a different tack, she suggests a similar result. Science's demise in her vision is due to the rise of post-modern culture and thought, which has eroded away the very foundations on which science stood.

I would like to suggest that a third possibility exists, that a third possibility always exists, that takes into account both Hogan's and Hayles' stories. I believe that a radically altered post–modern science will open up areas of scientific truth that were thought closed, in the same way that quantum physics, relativity, and chaos theory did when it seemed we knew all there was to know. Horgan's ironic science (un–testable and un–provable) is already leading the way to a new science that is no longer science at all. Post–modern experiments in science call into question the foundations and assumptions hidden within modern science, which is, as Kuhn suggests, a necessary pre–condition for any big shift to occur.

For me, the shift toward post–modernism has opened up a new space, a space where the questions have moved from the purely empirical, testable, and verifiable into the realm of the potentially unanswerable and certainly — at least in scientific terms — un–testable. My goal, however, is not to answer questions, but to explore possibilities and to create new possibilities for exploration. It is a post–modern move of opening up more space for inquiry rather than closing off avenues for exploration with answers.

The overall shape of my story is the pendulum swing from unified theory to ungrounded representation, from science to post–modernism, from a foundationalist

epistemology to a rhizomatic ontology — a giant oscillation within which there are many smaller–scale oscillations. But always there are the oscillations between the desire for certainty and the inevitability of uncertainty. Each of the experiences I narrate in this thesis is a (partial) swing of the pendulum. However, this is no Newtonian pendulum simply oscillating between two poles. My pendulum has more in common with a motor driven pendulum and magnet system that appears to oscillate wildly but which shows a hidden order when its path is plotted in phase space. Systems of this type generate complexity rather than settling into a static equilibrium.

"The essence of atomism, whether material or philosophical, is that a thing consists of the sum of its parts, no more and no less" (Berman, 1984, p. 21). In the human sciences, Newtonian scientific foundations meant that the study of individual units, such as people, and the application of general laws would lead to the prediction of the behaviour of the group, for example society (Hayles, 1990, p. 218). But this atomistic method is lacking. When the parts are studied reductively out of context the relationships are missing, and in complex systems relationships are everything. In a chaotic system, which includes most living systems, small disturbances can completely change the outcome, and large disturbances may have little effect. In such systems, Descartes' linear cause and effect simply does not make sense. An individual can only be understood in relation, that is, as part of the larger pattern. But, the reverse is not true — the whole cannot be discerned by analysing, measuring or dissecting out the parts. With the rise of non–linear mathematics and the study of complex dynamical systems comes the realisation that the whole is greater than the sum of its parts, and the behaviour of the group cannot be reliably predicted by any simple means. Causes are multiple and interrelated and effects are not

necessarily proportional to the cause. In extreme cases, effect may even precede the cause.

In chaotic systems, however, there is an important aspect to relationships across scale — there is a "recursive symmetry between different levels of the system" (1990, p. 170). This idea can also be seen in writers such as Foucault, where "individuals do not constitute culture; culture constitutes individuals. Moreover, the concept of the episteme implies that different sites within a given cultural period are self–similar" (p. 218). In a fractal way, there is a "recursive symmetry" between me and society, a student and the classroom or a school and the school system. I can think of my experiences as having a similar pattern as the larger society, as being a fractal image that corresponds to a point in the larger cultural fractal image or episteme. When I examine my own experiences, it's as if I have zoomed in on a section of the larger cultural pattern, only to find a pattern similar to the whole.

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I'm reading Katherine Hayles' (1990) book *Chaos Bound* and the parallels strike me more clearly than ever before. As she speaks about pendulum swings back and forth, the oppositions and contradictions all wrapped so tightly together, I feel that she is writing my life:

> In its theoretical guises, cultural postmodernism champions the disruption of globalized forms and rationalized structures. In its technological guises, it continues to erect networks of increasing scope and power. Despite their apparent opposition, these two aspects of cultural postmodernism engage each other in self–sustaining feedback loops. (p. 291)

This is what I am doing and what I am writing. This is what it is to be me. Cultural and technological post–modernisms engaged with one another through me — one groundless and deconstructing, and the other busily trying to build totalizing structures.

As I struggle I am tempted to fall back into science as an answer, as certainty. Chaos theory and my post–modern bent give me what amounts to a new grounding and if I'm not careful it begins to become a totalizing, global theory like my old objectivity. I begin to feel like I'm almost there, like I almost have "it", like I was wrong before but now I am right. And then I catch myself, but only just barely.

Suddenly, surprisingly it seems to crystallize; order seems to emerge. As I step back all of the dots resolve themselves into an understandable pattern. I see the bigger picture and the connections at a scale that I hadn't noticed until now. In the space of a few short days, all of the seemingly disparate elements have come together into a coherent field — the field that gave rise to them in the first place. It's as if I am more a conduit than a creator — that the field flows through me, through my experience, rather than me writing it into existence. It's as if there are really essences, and this particular essence has leapt into stark relief for me to see. There are connections between my experiences as a scientist, a science and technology teacher, my childhood, science and technology as fields of study, and post–modernism (both theoretical and cultural). If my life is a fractal of larger cultural patterns, what are the implications of my experiences to my day to day life as a science and technology teacher?

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I appear to be left with no foundation at all. Science seems to have crumbled, and try as I might, I don't seem able to turn post–modernism into a comforting totalizing theory. When I try to boil post–modernism down, to find some essence, the essence somehow eludes me; it sometimes seems like there's nothing of substance there. If science is matter, solid, formed, being, then post–modernism is process, fluid, amorphous,

becoming. I am not, however, complaining. I am enjoying the space I'm in — it's a less sterile and a lot more playful than the objective reality I left behind.

> Looking at the floor,
> Looking at the ceiling,
> they confine themselves,
> To right angled triangles,
> If they tried rhomboids,
> Cones, waving ellipses—
> as for example, the ellipse of the half moon—
> Rationalists would wear sombreros. (Stevens, n.d.)

That's not to say that it's all a bed of roses. I find every statement becomes difficult. I can no longer give a straight answer. Everything I say must be qualified and explained. Answers become multifaceted, crystalline — but not clear. The pendulum's oscillations come dangerously close to descending into true chaos[22].

But now I have no choice, I have to continue to navigate this rift, and try to keep on making meaning. Maybe the space I've opened up for myself can serve as a pseudo–foundation, which I can approach as Doll (1993) suggests "by making a commitment to it, yet aware of the contingency of that commitment" (p. 155). I must be careful to "keep the play in play", and avoid falling into the solipsistic abyss. By recognising the interconnectedness of all things I achieve a kind of non–foundational grounding. I see connections and interconnections between ourselves and others and between ourselves and our environment, through a chaotic lens, as a series of interlocking and yet never touching spirals of relationships, which connect us to the other and then back again and again. The line between myself, others, and my environment becomes blurred, the edges fuzzy, and the closer I look, the more complex and unclear the border

[22] True chaos refers to the absence of any natural laws or order. It is completely formless, unstructured and unpredictable — unordered disorder.

becomes. And in a chaotic way, order and new patterns will emerge; if I look at the problem long enough, from enough angles, and with enough attention, an outcome or a course of action will emerge.

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The philosopher was deeply troubled. He had spent the better part of his life in this small country, and although he was famous beyond his imagination, the accolades had begun to ring hollow. He had found favour with the ruling government and his books were widely quoted, but the latest round of government propaganda sent shivers down his spine. They were his words and his ideas all right, but they had been twisted hideously.

The press relations officer had stopped in earlier in the day.

"Chaos is just around the corner," he said. The prospect seemed to give him a discreet pleasure. It was at that moment that the philosopher realised the full extent of his folly, and of his responsibility. He understood how his writings, so open to interpretation, had been used, misused really, to mislead and control people. He had crossed the line into extreme relativism, and in so doing he had delivered the masses over to a government that was quickly becoming totalitarian.

Now, he was wishing he had listened to his brother's rationality a little more. It was true that Pollux always came–off a little self–righteous, but the philosopher now knew that Pollux's warnings had been correct.

> "As I was saying, that *seems* to be done just right, though I haven't time to look it over thoroughly just now—and that shows that there are three hundred and sixty–four days when you might get un–birthday presents—"
>
> "Certainly", said Alice.
>
> "And only, *one* for birthday presents, you know. There's glory for you!"
>
> "I don't know what you mean by 'glory'," Alice said. Humpty Dumpty smiled contemptuously. "Of course you don't — till I tell you. I meant 'there's a nice

> knock–down argument for you!'"
>
> "But 'glory' doesn't mean 'a nice knock–down argument,'" Alice objected.
>
> "When *I* use a word," Humpty Dumpty said in a rather scornful tone, "it means just what I choose it to mean–neither more nor less."
>
> "The question is," said Alice, "whether you *can* make words mean so many different things."
>
> "The question is," said Humpty Dumpty, "which is to be master—that's all."
>
> (Carroll, 1865/1972, p. 274)

Here, the real problem that I have with some post–modernisms is alluded to; they may be used to gain power, to be master. Post–modernism suggests that there is no reality accessible to us beyond language. Reality is constituted in and through language as discourse. Therefore all we have are representations of reality which are naturalized through ideology. Even self is constituted through practices mediated by language. Because everything is left open to interpretation, and no interpretation can be easily judged superior, then we are left with the possibility that someone will take control.

However, I don't want to trap the words, to kill them, to pin them down like a framed collection of butterflies on an entomologist's wall. I prefer my words to be like butterflies, alive, in fluid motion, their meaning ever–changing. There is of course, great risk in all of this, for as chaos and complexity theory teaches us, a live butterfly can be a dangerous thing. As Edward Lorenz, one of the fathers of chaos theory said, a butterfly flapping its wings in Hong Kong can cause a hurricane in Florida. Words are always open to interpretation, and the more movement that's built into a text, the more open to interpretation it becomes.

There is the possibility that the text will take on a life of its own, and like some Frakensteinian monster, run amok, eventually destroying its creator. There is an

enormous amount of energy stored up in such a text, and as with atomic nuclei, the trick is to release the energy gradually and carefully rather than all at once.

It seems ironic that the very instability which gives the writing its life also makes it prone to blowing up in your face. This is the double–edged sword of chaos. Systems and texts of this type can show spontaneous emergence of a higher order, an incredible richness and diversity, or they can descend into "true chaos", ultimate disorder and incomprehensibility.

A foundation that is no foundation at all. Words upon words upon words. But what is at the base holding the whole thing up? If it is truly words all the way down then I have to ask — are words up to the task?

> Words strain,
> Crack and sometimes break, under the burden,
> Under the tension, slip, slide, perish,
> Decay with imprecision, will not stay in place,
> Will not stay still. Shrieking voices,
> Scolding, mocking, or merely chattering,
> Always assail them. (Eliot, 1968, p. 149)

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I've been thinking about the metaphor of foundations in a new way. Rather than imagining a foundation, with a broad supporting base, I've been thinking of the image of a funnel or an inverted pyramid. The structure is situated with the vast weight of material above the foundational belief, the whole thing supported on the tiny point at the bottom. This image reflects the unbalanced nature of knowledge, with so much being supported by so little, and to me it rings much more true than the foundation metaphor. In the dominant discourse, foundational beliefs are usually very few (ideally one), with the all other ideas arising from these few constants, which are thought to be objectively true.

The structure accurately reflects reality and exists independently of the observer. The benefit of the funnel metaphor is that it indicates a few things about systems of belief and foundations that may go unnoticed otherwise. The first is that the structure is inherently unstable. It shouldn't take much to knock the whole thing down. That this doesn't occur regularly or easily indicates that either the idea(s) at the point are very strong and rigid, so as not to break when things get a bit rough or that the ideas are flexible, so that a disturbance sends them spinning chaotically, until a new point of stability is reached, at a higher level of organization. I think that both flexibility and rigidity are needed to explain the functioning of paradigms. In order to continue to operate and adequately explain and describe the world as new information is accumulated, they need to be able to increase in complexity. They also need to be fairly rigid, so that the whole structure doesn't collapse when faced with small anomalies. For me this inverted version of a foundation fits postmodernism well. In post–modern thought, there is the realization that everything is constructed in language, and there is nothing truly foundational outside language. Social reality and indeed all reality is constituted in language, and as such is open to the flux, to change and interpretation. In fact both reality and language change because of interpretation. So the question is, what is holding the whole thing up? What's at the point? A positivist would hope to peer down this funnel and discover, at the bottom, the answer to life, the universe and everything, that is, the grand unified theory. But this is just a pipe dream when viewed from my post–modern perch, just one discourse among many. So what is strong enough to support all that weight and yet flexible enough to bend and strain and change at a moments notice? What is this ultimate foundation to be grounded in? What is it that supports me in these post–modern times? What is it that underlies all

these fictions? The self or subject? No, constituted through discourse. The soul? Nope, ditto. Science? Come on now. Reality? No again. As Derrida said, there is nothing outside the text. So what is the point? In a word, words.

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Every time I get close to the spare bedroom downstairs I hear it. The quiet patient hum. It's waiting there in the darkness. The only clue to its position is a faint soulless whir. Or is it more a hiss, like a serpent coiled, ready to strike? As I move cautiously forward in the dark, I can just make out the cool blue–green glow and I think: I should write. The machine waits for the words of inspiration, for the hint of a topic, for any rubbish that I choose to put down. It wants me to be clever. It wants me to be expressive, artistic, brilliant. The computer is sitting there expectantly, on, as it has been for weeks. Waiting for the thought or inclination to strike.

It is ready, but I am not. Ready to take when I am ready to give, but not nearly as patient as I have said.

It goads me on. Calling to me. Guilting me. Sneering at my half–formed attempts, mocking me, ready to throw my ideas in my face. I am paralyzed with fear; I am lost. And yet, somehow, I escape. An idea surges into my mind, fully formed, yet unclear. In a dim, through–the–fog way I can see a silhouette. A figure standing against the background — text and context, subject and object, knower and known, signifier and signified. But now is not the time to sort all this out. I write quickly, trying to keep up with the thoughts. I write in broad strokes, as an amateur might paint. I don't wish to belabour the point so I write too little. And I don't get to the point, because the point cannot be gotten to.

For me, language is the ultimate masker — it conceals as much as it reveals, conceals, in fact, as it reveals. This concealing/revealing is, for me, the true nature of language as a process. And this is at the heart of my difficulty in articulating my work. How do I say or write what I am doing using language when there aren't the words? When the words cover as they uncover and close off possibilities simply by their use? The more I write, the more I try to get down to some essence, the further I get away from what Caputo (1987) called the "mystery which withdraws, which never hands itself over in a form we can trust" (p. 271). And yet paradoxically, the more I seem to understand it. How can I get to the essence of what I am doing if the harder I try to pin it down, the easier it wriggles free?

Although the point can't be gotten to, perhaps it can be etched out. Maybe, the background can be painted so fully that the point is left exposed. But how? By doing what I am talking about. By writing around it, by writing the context or background. By not saying what I am trying to say, but saying everything else that is close. When I do this, I am left having not said what I wanted to say, and yet having revealed it nonetheless. A silhouette revealed against the backdrop of what has been said. I usually think of this metaphorically in chaotic terms. I say that order emerges from chaos. I don't, I can't in fact, write what I am trying to say, but it is there after all as an emergent property of the text.

As I near the end of this chapter, I want to return to the question that drives me: What are foundations and how can I do without them? It is a double–question that leaves me doubly–blind. The question itself is misleading on two fronts. In the first place, I never really do without foundations. Every act, every thought, presupposes some sort of belief,

some sort of foundation whether conscious or not. The second problem is that foundations themselves are never the sort of solid ground that I originally supposed them to be. Foundations are always laid down in flow and are essentially of the flow. Katherine Hayles (1990) argues that there is an "archipelago of chaos" within the culture (p. 3). She sees this underlying chaos as a constructive force rather than as an absence or a void. Michel Serres (1983/1991) also sees foundations as laid over chaos, flux, turbulence, the non–standard state. In *Rome: The book of foundations*, he explains:

> The non–standard state is fundamental. Foundational from an epistemological point of view…Foundation is the passage, foundations are the passages, from a nonstandardized to a standardized state. (p. 201)

As such, foundation is always by force, tyranny and oppression. As Serres states: "It remains to found a city, science, or knowledge that is not, like ours, founded on death and destruction (1983/1991, p. 108). He wants to find a place of peaceful foundation that breaks from a Western history based on tragedy. Serres wants to go farther, to move beyond tragedy, to bifurcate at the moment of foundation and find a different path, a third way:

> But even lower, beneath tragedy itself, is the foundation of sand and straw, the peaceful multiplicities without murder or execution, under the unmoving summer sun.
>
> Here lies foundation, or, dare I say, reality. (p. 282)

He suggests that good foundations are not laid on solid rock, that "the solid is not solid; it erodes and escapes" and that liquid "is the most solid, most resistant, most permanent of beings in the world" (p. 275). A good foundation must be built on liquid, on that which moves. Underneath all foundations is chaos, fluid, "[u]nderneath concepts, underneath conceptual pavement, lies the sandy myriad of the beach" (p. 246). Serres is suggesting a non–foundational foundation, one that takes into account the multiple, the

noisy clamour of the crowd. Foundations are always in motion, always unstable and fluid, always changing. The scientific foundations that I once held were every bit as fluid as the post–modern channel that I now negotiate. What has changed is my relationship with foundations, my acknowledgement of the flux and the flow. What has changed is the nature of my engagement with foundations. When I recognize the multiple I can begin to escape from the violence, the exclusion and the domination. I escape from the kind of knowing that kills.

It occurs to me that the split between modernism and the post–modern that I've been playing between is constructed and contrived in the same way as any dichotomy. It is the view of the dualist, and as Serres suggests: "Dualism is imaginary; belongs to violence…It belongs to those who want to be right. That has nothing to do with the process of knowledge" (p. 73).

However it is sometimes useful to set up such dichotomies in order to break them down. I've come to the gradual realization that by virtue of the way I work and my underlying beliefs, that I am already very much lost within post–modern territory. But I now think of the post–modern not so much as a split with the modern but rather as a transformation of modernism. And following Doll (1993), I find it appropriate to indicate this "connection with and transcendence of modernity" (p. 3) by using a hyphen in the term post–modern. Thus conceived, the post–modern and the modern are both located on the same surface, the same plane. The either/or choice between modernism and post–modernism becomes a both/and inclusion. Besides, like Caputo (1987), "I do not think anyone really succeeds in getting to one side or the other of this undecidable rift"(p. 287), that anyone is wholly modernist or wholly post–modernist. What I am really

looking for is a third way. Some way to negotiate this passage that I have opened without falling into the abyss, or getting straightjacketed by a set of "inert ideas" (Whitehead, 1929, p. 2). Some way to keep the play going, to keep the question open. Some way to make sure these two incommensurables continue bumping up against one another, exposing the flux, so that I can catch a glimpse of what lies beneath.

All of this affects not only the way I teach, but also the way I live. The curriculum of my life has undergone an incredible transformation, an irreversible change. The "double bind" I struck between post–modern and modern science has thrown my assumptions into the open, thrusting me into Bateson's (1972) Learning III, with a "profound reorganization of character" (p. 301). As a friend remarked, when he returned to University for our second summer in graduate studies, it quickly became obvious to him that the old Kevan was gone. So I think I'll don my sombrero, and let Okakuru (1956) close, but not finish:

> In art the importance of the [unfinished] is illustrated by the value of suggestion. In leaving something unsaid the beholder is given a chance to complete the idea and thus a great masterpiece irresistibly rivets your attention until you seem to become actually a part of it. A vacuum is there for you to enter and fill up to the full measure of your aesthetic emotion. (p. 46)

Chapter 11010011

Technology Unmasked?

> Information pours in on us, instantaneously and continuously. As soon as information is acquired, it is very rapidly replaced by still newer information. Our electrically–configured world has forced us to move from the habit of data classification to the mode of pattern recognition. We can no longer build serially, block–by–block, step–by–step, because instant communication insures that all factors of the environment and of experience co–exist in a state of active interplay.
>
> (McLuhan, 1967, p. 63)

I would like to open some questions regarding technology in education. In particular, I am interested in the ways in which computer related technology masks its own essence, how it covers at the same time as it reveals — and to consider the danger of this masking.

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I run up the stairs two at a time and weave my way through a maze of bodies until I reach my office. I practically leap into my seat at the computer terminal and with a couple of clicks of the mouse I finally fix the printer problem that has been plaguing me all morning. My head is buzzing with caffeine — I've had six cups of coffee so far and it's only ten o'clock. I look up from the terminal as a student enters the room to tell me that her computer is not working. I follow her into the main computer lab and spend the next ten minutes or so trying to track down the reason that her computer won't log on to the local network. Unsuccessful and frustrated, I move on to help a student who has been waiting for help with an algebra problem.

This is part of my reality as a technology teacher. I spend more time in service to the machines that I do serving the needs of my students. My teaching job, loosely described as "science, math, computers", has come to include previewing software, ordering software and hardware, maintaining the school's software and hardware inventory,

troubleshooting software, hardware, and networking problems, and helping students and staff with computer related questions. In a school with forty computers, these tasks tend to take up much of my day. If these machines are labour saving devices, I'd like to know whose labour is being saved. By the time the school day is done, I don't have the time, energy, or inclination to question technology or anything else.

Technological change, particularly in computer related areas such as communications and media, is occurring at an ever–increasing pace. Although these changes have been likened to those that occurred during the industrial revolution there is one important difference. The changes wrought by the industrial revolution took almost one hundred years, while the technological changes we are experiencing have occurred in less than half that time. We have reached the point where our ability to deal with such change and its consequences is compromised.

This is no accident. It is a direct consequence of what Martin Heidegger (1954/1977) called *technological enframing*. I have to keep on top of the problems, keep in control, or be controlled. The fast pace of technological development in this "information age" in which we are constructed and construct ourselves, does not give us the free time that was promised, and actually makes matters worse, giving us less and less time to think or act. As Jacques Ellul (1964/1973) said:

> The interval which traditionally separates a scientific discovery and its application in everyday life has been progressively shortened. As soon as a discovery is made, a concrete application is sought. Capital becomes interested, or the state, and the discovery enters the public domain *before anyone has had a chance to reckon all the consequences or to recognize its full import* [italics added] (p. 10).

It is ironic to me that it is this very lack of time for questioning that first draws me into an engagement with technological questions. Somehow, the way in which the essence of technology is masked is also that which draws it into the open, makes me sit up and take

notice. It is this putting–upon, this technological time demand, that forces me to stop and ask: "What is going on here? What is at work?"

However, the pace of technological change is not the issue. It is more a symptom of a problem than a problem in and of itself. I am concerned, not so much with technology, but with what moves through it — with how we are through and with technology. In other words, I am concerned with the relationships that we enter into with technology.

The traditional view is to look upon technologies as tools that we can use. Our interaction with technology is thought of as value–neutral, and technologies can be put to good or evil ends, but are themselves neither good nor evil. However, as Heidegger (1954/1977) notes, "we are delivered over to [technology] in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us blind to the essence of technology" (pp. 287–288).

What is wrong with viewing technologies as mere tools? What does this instrumental view of technology hide? For me what is missing is the recognition that technologies are a part of life, not apart from life. Technologies participate in socio–cultural relations — they are produced by and produce them to such an extent that early in his essay, Heidegger makes the startling assertion that "the essence of technology is by no means anything technological" (p. 287).

In my questioning concerning our relationships with technology, I will draw on a number of philosophical explorations of technology, with a particular focus on two: Martin Heidegger's 1954 essay, *The question concerning technology*, and Jacques Derrida's (1992/1995) writing concerning the relationship between technology and

responsibility in *The gift of death*. These writings will be used as a jumping off point for my own inquiry.

In his essay, Heidegger (1954/1977) carefully leads us along a way built through questioning (p. 287). Like me, he is not so much concerned with technological things, but with an essence of technology that is nothing technological. To clearly see where Heidegger is taking us, I think we need to be careful to understand what he means by essence. He explains that "[t]hus far we have understood 'essence' in its current meaning" (1954/1977, p. 311). This meaning of essence is what something is, or its "whatness." For Heidegger, this doesn't adequately describe essence as it pertains to technology. For him, technology makes us think of essence more as a process than as a fixed state. He wants us to think of essence as the Greeks did, as that which "essences, what comes to presence, in the sense of what endures." And he adds, "only that which is granted endures" (p. 312).

Two questions immediately arise for me here: What is the nature of this process–essence, and what does he mean here by "granted"? It may be tempting to think of this essencing as a linear, cause and effect, predictable, controllable process. But I don't think this is what Heidegger has in mind.

Heidegger tells us that "Technology is not equivalent to the essence of technology. When we are seeking the essence of 'tree,' we have to become aware that what pervades every tree, as tree, is not itself a tree that can be encountered among all the other trees" (p. 287). From my chaos–informed perspective, the essence of a tree, its "treeness", is not something buried deep within the tree. Nor is it something belonging to trees in the sense of what a tree is. Rather, the essence of the tree is more an effect than a cause. And

effects occur at the surface, rather than hidden away. Because technology is not a thing in the same way a tree is, it is necessary to think in terms of a larger scale system — a system that is in–process with multiple layers of interactions. For purposes of analogy, it is more appropriate to speak of a forest rather that an individual tree. In this sense, I should add that the essence of a forest is not found in any one species or in any one group of organisms. Rather, the essence of a forest is found in the in–between. "Everything happens at the boundary between things and propositions" (Deleuze, 1964/1990, p. 8). The essence of a forest is an emergent property of the interactions within it and between the forest and us. In order for there to be an essence, there must be an observer, an engagement. Essences do not inhere in things. There is no essence before existence, some transcendent being. What a thing is, its whatness, its essence is relational. Essences are complex, changing, and emerge from the engagement. It depends on what I bring to the engagement as to what essence I "find." The essence is what is brought forth in the relationship between the object and me. It wells up from the relationship and not from either the object or subject. In the same way, the essence of technology is not some primal, core, hidden, aspect of technology, but is at the objects emergent surface, and is an effect of our relationship with it. Our relationship with technology becomes part of the essence of technology. The essence is not some property of technological things, or even of the system itself. The essence of technology is the name we give to the nature of our interaction with technology — what happens between technology and us. As such, the essence isn't hidden within but is out there in front of us if we care to take notice. If we are attentive to the relationship in which we are engaged, to ourselves and to technology, to all three at once — then we can catch a glimpse of the essence of technology.

Heidegger himself starts us on this path when he says that essences must be granted. In order to be granted, there must be a granter, an observer. For Heidegger, the granter would be man. But his use of the term man, rather than mankind or humankind obscures the plural and relational nature of the term. It hides the radical subjectivity of the essence that Heidegger is trying to get at. If I open up the question of essence to the plurality of the human condition, it quickly loses both its universal character and its rootedness within technology. Instead, essence is forced into the open into the in–between, exposed in the boundary regions.

Now just because it is a surface effect, out there, visible, staring us in the face if you will, doesn't mean it is obvious. Sometimes the best place to hide something is in plain view. Derrida (1992/1995) refers to this when he speaks of "a logic of secrecy. It is never better kept than in being exposed" (p. 38).

When I think of essence in a non–linear, chaotic way, something strikes me. The essence of technology is not fixed or permanent; it is relational in nature. If I then go on to search for "that which essences, what comes to presence, in the sense of what endures" (Heidegger, 1954/1977, p. 312) I have to be very careful. Careful that I am not trying to get at some fixed, unitary, core of technology — what it is deep down.

Heidegger has already moved away from essence as referring to a unitary core "whatness" of something. I want to continue this move and return to the Latin root of essence, from esse for "to be." Here, rather than what it is, essence refers to how something is what it is — its being. Or perhaps its becoming, since what is referred to is a process, always in motion, never complete, rather than a final or fixed state. If I think of essence in a relational way, then a number of things happen. The question of

essentialism, of essence preceding existence ceases to make sense. Essence and existence are inextricably linked, woven into and of the same fabric. I also become more aware of the social nature of essences, and what becomes important is our relationship with technology, and what technology becomes with and through us, rather than some essence that technology has on its own. Essences seem more an emergent property of a dynamical system of interactions. More arising from the surface than from deep within. The essence of technology is the result, in a way, of the interaction of multiple changing factors. This essence is not a fixed, quantifiable, encompassable, graspable whole, but the being of a fluid, amorphous, in–process, changing, relation. If I can keep the essence of essence in play, perhaps I can be more aware of the covering that occurs every time something is revealed.

At this point I think it's important to make several things clear. I want to backtrack for a moment and be more careful, because the terms cause and effect that I have been using belong to a Cartesian, linear, viewpoint. I'm not saying that cause and effect are no longer important, only that, in non–linear terms, cause and effect are inseparable[23], and effects are not necessarily proportionate to causes. In extreme cases, such as quantum entanglement[24] effect may even precede cause in a particular frame of reference. It may

[23] "Every cause is simultaneously and effect, and every effect is also a cause" (Hayles, 1984, p. 20).

[24] One feature of particles that are entangled is non–locality, which is sometimes referred to as spooky action at a distance. "Quantum entanglement is a...phenomenon in which the quantum states of two or more subsystems cannot be described without reference to the other subsystems of the same system, even though the individual systems may be spatially separated" (Wikipedia, 2002). Two particles that have been entangled can influence one another instantaneously across any distance. Spooky action is called "spooky because there is no known mechanism for such an interaction, and because it would entail that things can be affected by events which, in some frame of reference, haven't happened yet" (Murray, 1999). This feature of quantum particles has been used recently in experiments involving teleportation and quantum computing.

be more proper to say that the essence of a tree or a forest or technology is both cause and effect, and at the same time it is neither.

Secondly, when I'm speaking of technology as a non–linear dynamical system, I am speaking metaphorically. I am not suggesting that technology belongs to or is such a system, although it may well be. For my purposes, however, it doesn't matter. I am using the language and concepts of chaos and complexity theory to give myself different ways to think and speak about technology and essences. I am hoping that different language will lead me to fresh insights. I want to avoid shutting down the process of inquiry and keep the questions open. As Gadamer (1960/1998) suggested "against the solidity of opinions, questioning makes the object and all its possibilities fluid" (p. 330). In naming the essence of technology, indeed, in searching for the essence of technology, we are in danger of closing ourselves off to other possibilities, much in the same way that Heidegger says that technology closes off all other ways of being.

For Heidegger, our problem with technology begins with conceiving of it in an instrumental way. Then everything depends on how we use technology, on our mastering technology.

> Everything depends on our manipulating technology in the proper manner as a means. We will, as we say, 'get' technology 'spiritually in hand.' We will master it. (Heidegger, 1954/1977, p. 289).

Heidegger traces the essence of technology through the instrumental and arrives at revealing, where technology "is the realm of revealing, i.e., of truth" (p. 294). For him what is new in modern technology is that the revealing is a challenge upon nature. That all of nature becomes a "standing–reserve", waiting on–call for duty (p. 298). He names this "challenging claim which gathers man thither to order the self–revealing as standing reserve: "Ge–stell"[enframing]" (p. 301). For Heidegger this destining of revealing is the

supreme danger. It forces everything to come to presence as standing reserve, even man himself. As we are threatened with becoming ourselves standing reserve, our essence is transformed into a desire for mastery and control. Control becomes our way of being–in–the–world and we act as though we are "lords of the earth" (p. 308). The real threat is that this mode of being blocks all others, that it transforms the world and our relationship to the world.

> Things are endangered even if the bomb is not dropped, [Heidegger] said, endangered in their "essence," in the way they come to presence, namely, as the raw material of technical power. Things are put upon by man because man is himself put upon by the way technology comes to presence, by its essence as Gestell. (Caputo, 1987, p. 232)

I want to return for a moment to the word essence. Heidegger has traced an answer to his question of the essence of technology, but I would like to re–open the question of essences. The question of the essence of technology as an act of enframing brings to the front the question of the essence of self. Technical power endangers us in our essence, in the way we come to presence. For me, though, the question is whether or not there is an essential self, or better: how can we think of the essence of self in a process way? Heidegger claims that we are "endangered in our essence" by the essence of technology. Technology and self are firmly intertwined, in that self comes to presence under the spell of technology. And the reverse is also true — technology comes to presence under the spell of the technical self. Another way to think about this is to say that technology and self are linked in that they are both socially constructed.

I don't believe that there is a unitary, core, essential self any more than I believe that there is a core essence of technology. There is not some part of me that remains unchanged throughout my life and my experiences, a central overseer that simply wears different masks — the teacher mask, the father mask, the son mask, the husband mask. I

think that the masks are all there is. That if you succeeded in removing them all there would be nothing left. And yet, that is not the whole story. My experience is of a seemingly coherent self. I would prefer to envision an emergent self. A self that arises from within and without the complex dynamical system that is us.

Unmasking selves seems very much like peeling off the layers of an onion. As each layer or mask is removed there is another to take its place. And like an onion, when the final mask is removed, there is nothing there. There is, it would seem, no core essence — if there is an essence at all it must be found in the pieces of the onion and not the empty core. But the pieces cannot be re–assembled and the onion cannot be re–animated. Something intangible is gone — it is dead. In the same way, the reassembled masks do not equal the persona or self. The whole is more than the sum of the parts.

> What is the beauty that a man of erudition sees as he holds a fine pot in his hands? If he picks a flower to pieces, petal by petal, and counts them, and tries to put them together again, can he regain the beauty that was there? All the assembly of dead parts cannot bring life back again. It is the same with knowing. (Yanagi, 1972, p. 110)

How do I have a cohesive experience of a self and yet, at the same time, recognize the multiplicity in selves/masks? Is the cohesive self illusory? Or real? Or both, and neither? The spark of self seems to emerge from the constant cross–talk in the in–between, in the interaction or dialogue between various selves, and between the body and the outside.

In the Santiago theory of cognition, consciousness is viewed as a whole–body experience not confined to the brain. Humberto Maturana and Francisco Varella identify "cognition with the full process of life — including perceptions, emotions, and behavior — and understand it as a process that involves neither the transfer of information nor mental representations of the outside world" (Capra, 1996, p. 286). There is a lot that goes on inside my body and brain that is not directly accessible to my consciousness. In

fact, most brain processes are subconscious, and are inaccessible to introspection.

It appears that "many different brain processes function in parallel — independently of each other, and simultaneously" (Cohen & Stewart, 1994, p. 176). In a sense, the brain is more like a committee, say the academy awards committee, with each member acting as an independent unit until a decision must be made. The workings of the committee are hidden to us; all we see is the group decision, which makes it appear that only one person was involved. Similarly, the actions that emerge from the chaos operating within the brain and body make it appear as if a coherent, unified self is at work, rather than numerous fragmentary, independent "selves."

As human beings, we exist in a "semantic domain" created by our languaging. The key feature of language, according to Maturana and Varella (1998), is "that language enables those who operate in it to describe themselves and their circumstances" (p. 210) to generate a self by using the notion of an object and the associated abstract concepts. To be human is to exist in language. In language we coordinate our behavior, and together through language we bring forth our world. "The world everyone sees is not the world, but a world, which we bring forth with others" (1998, p. 245).

Self–awareness and human consciousness can only be understood through language and the whole social context in which it is embedded, and an ever–increasing part of our social context is technology. So much so, that Jacques Ellul (1964/1973) has argued that we live in a "technical civilization":

> ...that our civilization is constructed by technique (makes a part of civilization only what belongs to technique), for technique (in that everything in this civilization must serve a technical end), and is exclusively technique (in that it excludes whatever is not technique or reduces it to technical form). (p. 128)

Computers, like any tool are extensions of the tool user. However, it's important to

remember that the tool itself determines to a large extent what it can be used for and how — and in that sense it, or rather our relationship with it, begins to control and fashion the user. It is worth repeating the saying often attributed to Abraham Maslow: "When the only tool you have is a hammer, every problem begins to resemble a nail." Technologies begin to limit the way that we respond to problems and to the world. If we are not careful, we begin to see only technical solutions. Other possibilities are obscured and closed off to us.

Computers are extensions of us, and we are extensions of them, and in this two–way interrelationship it becomes more and more difficult to find where technology ends and we begin. The edges are fuzzy, and as we move in with our microscope for a closer look, we see increasingly more complex patterns in the boundary region, but never a clear boundary. When we look at technology we are looking at ourselves. The computer screen is much like the eyes Caputo (1987) describes:

> The eyes of the other lure us into mystery and confusion, shadows and dark recesses; they are not windows of the soul but a house of mirrors. They are soft spots where the ground gives out beneath us and we plunge downward, unable to touch bottom, black holes trapping light. Who is speaking here? What looks out upon us from these eyes? What strange powers inhabit this look? (p. 275)

The house of mirrors reflects multiple changing selves back at us from the computer as it does from the other. We are seeing ourselves but we don't recognize the blank and vacant stare. We who have never known who we are. "The mystery consists not in a self–transparent Cartesian ego hiding behind the cloak of the body, but in the mystery that the other is to himself, that all of us are to ourselves" (1987, p. 275). What is being created and recreated in AI programs and so called "smart systems" and computer networks is ourselves. In a society that is fast becoming almost exclusively technological, the essence of technology as Gestell takes on an increasingly important role in the

complex interactions in which self is formed. And as Heidegger notes, our coming to presence under the force of Gestell forces the self into a technological role as standing reserve.

> The individualism of technological civilization relies precisely on a misunderstanding of the unique self. It is an individualism relating to a role and not a person...modern individualism...concerns itself with the role that is played rather than with this unique person whose secret remains hidden behind the social mask. (Derrida, 1995 p. 36)

We who fashion and are fashioned by technology have rarely really understood it. It seems there was never a time when we were outside it, apart from it for long enough to question it. Its grasp can be traced all the way back to the first human toolmaker when we first began to transform a cooperative relationship with nature into one of domination. And yet, technology has not caused these changes. It is not an independently operating entity, so we need to think about self as well as technology for a better grasp of what is at work here. As we in the west moved from an agrarian society to an information age, the concept of self has been placed in an ever larger arena. "Today that arena is global in size and the multitude of selves crying out for space produces a cacophony of sounds — one can hardly hear oneself think, one hardly knows who one is" (Doll, 1997, p. 2).

Heidegger would say that this is the challenge of coming to presence under the force of technology. That technology obscures all other modes of being. What happens to a coherent sense of self in this environment? What about children and adolescents, who are often said to be in a process of establishing a self? Where do they turn? Who do they become? If we do come to self interactively, between self and other, then what happens to this process when the other becomes a computer? When reality becomes virtual reality?

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Terry and I are talking about some recent upgrades that have been done on the school's computer network. He is sitting in a grey, high–backed chair at the server — the main computer in the network.

"So how did it go?" I ask. The question is bit loaded, because we have had a history of difficulties associated with any changes made to the system.

"Actually, it was surprisingly smooth," he answers, "except . . . " He pauses for a moment and grabbing the mouse he turns to face the screen. As he moves the mouse, intently watching the pointer on the screen, his face begins to develop a frown. Then he mutters a curse under his breath. And suddenly he is laughing. Laughing so hard that he can't even tell me why. He finally regains his composure and begins:

"I've been working on computers for too long," he says, "You know how I'm in the habit of using the mouse to point out things on the screen to students?" I nod and he continues

"Well I was trying to use the mouse to point at this," he says, starting to laugh again. And then I'm laughing with him. The thing he was trying to point at was a yellow sticky–note stuck to the side of the terminal.

What happens when the reality on the screen becomes continuous with or indistinguishable from the reality outside of the screen? When the boundaries become permeable and fluid? When we further sever our ties with concrete reality? If it is possible to get confused between a computer screen and "reality" then what kind of crossovers and confusions are we going to experience as virtual reality becomes more realistic?

Marshall McLuhan (1967) argued that youth had little difficulty with new technologies, that "[y]outh instinctively understands the present environment — the

electric drama. It lives mythically and in depth" (p. 9). Although it seems to me that there is truth in this statement, I'm still concerned that we are distancing ourselves from lived experience in what might be called the "real world."

> In the line that runs from orality to literacy to the printed book to the computer, we find the computer bringing to near completion the severing of the world from its live source in the individual (Talbott, 1995, p. 22).

Precisely because we come to presence under technology's spell, it becomes difficult to think outside of technology. I can't say exactly what technology is, or what its essence is, in part because I can't say exactly where technology begins and ends or where I begin and end. When I focus in on the border regions, the areas between technology and myself, meanings explosively multiply and I am quickly lost in ever increasing fractal complexity. Where does interaction with the computer occur? On the surface of the screen? Within me? Within the computer? Where does my thought end and the computers begin? With a computerized spell checker, a digital thesaurus, and digital cutting and pasting, my writing becomes a joint production of the computer and me. My writing is no longer done on a page, but it is writing in a page. And the page is no longer a page at all, but a virtual page or what Jay Bolter (1991) would call "a writing space". But the space is nowhere, dematerialised, disembodied. The digital space/place is a space where words and images collide and meanings multiply and divide

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My son is playing a video game on the computer. He has found that his character can get behind the tall grass of the scenery where the "bad guys" can't get him. To one side are the backs of the blades of grass, to the other a vast white emptiness. He calls this being outside the game. But he is never really inside the game in the first place. Where exactly are outside and inside?

In a different game he tries to get his character to a city visible beyond a fence. But it is not possible to go there within the game parameters. He asks me why he can't go to the city. "It's because the city's not real," I say. And I stop because none of it's "real" in the everyday sense of real. What is this "not real" place within the "unreal" virtual environment?

Heidegger's all–pervasive technological essence seems to flow about, becoming intertwined and woven into everything. In education, it is not sufficient to ask if we should have computers in the classroom or even to remove computers from classrooms (which probably isn't possible anyway). Technology has invaded our psyche, it is a part of us, and much that we do in education is coloured by it. We use the computer as a metaphor for the mind and computer processes as a metaphor for learning. We think of the brain as an information processor, and this all serves to reinforce mechanistic concepts of thinking, knowledge and communication. We speak like technicians of learning objectives, and pre–plan the outcomes of activities.

This transfer of metaphors occurs in the other direction as well. Language formerly reserved for human beings is used to refer to machines. We talk of computers as thinking, learning, and creating. We talk about computer intelligence, write programs in computer languages, and check our computer's memory.

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I walk into the computer room and pause for a minute to watch a student working on Data Processing 11. He is slumped down in his chair, staring blankly at the CD–ROM instructional material being presented on the computer screen. One hand is ready, gripping his mouse, but all of the action is taking place on the monitor. In a small

window, an "instructor" explains how to select a block of text. Then the computer "demonstrates" the "action." After about ten minutes of similar explanations and demonstrations, the student gets a chance to practice. His hand barely moves as he copies the procedures, pointing and clicking his mouse. This is called "interaction."

Computers seem to privilege abstraction over the concrete, and in this move away from the "real world", some strange transformations in meaning and language use are occurring. Interaction becomes pointing and clicking with a mouse. Conversation is reduced to contact via e–mail. Community becomes "the Internet". Research becomes "Internet search". Questioning becomes "finding answers" (and unquestioning acceptance of the computer's authority and the authority of what the computer delivers[25]). Education becomes information transfer — but not transformation. And the self becomes increasingly more fractured as it tries to find some grounding in this increasingly groundless[26] domain.

At this point, I want to stop and ask a different question: How do I respond to the essence of technology as enframing?

> It is precisely in enframing, which threatens to sweep man away into ordering as the supposed single way of revealing, and so thrusts man into the danger of the surrender of his free essence — it is precisely in this extreme danger that the innermost

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[25] Something I hear again and again from students is: "It must be true, I found it on the Internet." The other constant is that students are convinced that computer crashes and other errors are always their fault. They have bought into the rhetoric of "Computers don't make mistakes, people do." This is incorrect however. Small power fluctuations and even quantum events may play off of one another and build to emerge at the macro level as a computer error.

[26] By groundless, I am referring to the virtual nature of our computer experience. Technologies seem to blur the distinction between themselves and "reality". Jean Baudrillard (1981/1983) calls this lack of an absolute stable distinction between sign (or medium) and referent (or content) the "hyperreal" or "hyperreality," As Baudrillard says "there is no longer any medium in the literal sense: it is now intangible, diffuse and diffracted in the real, and it can no longer even be said that the latter is distorted by it" (p. 54). Words slip from real to hyper real in the blink of an eye. Maybe there never was any fixed, stable reality but I think there is a difference between the meaning of interaction on a computer and interaction in person, a difference that isn't acknowledged in the use of the same term for both.

> indestructible belongingness of man within granting may come to light, provided that we, for our part, begin to pay heed to the essence of technology.
>
> Thus, the coming to presence of technology harbors in itself what we least suspect, the possible upsurgence of the saving power. (Heidegger, 1954/1977 pp. 313–314)

Heidegger shows us the paradoxical double character of enframing. That enframing itself also holds the "upsurgence of the saving power". Everything depends on our "paying heed to the essence of technology". If we are vigilant and attentive, if we are ready and waiting, then we may yet save ourselves.

I want to be careful here, for just as Heidegger makes a show of unmasking technology another bit of sleight–of–hand is occurring. Is Heidegger really unmasking technology? Has he shown us the real essence of technology, the ultimate danger? Is there really some kind of "saving power?" Or is Heidegger's unmasking an "inauthentic dissimulation" that consists of exposing the "saving power" of technology as one thing, all the while covering up other possibilities?

As Heidegger delves into this question of the "saving power", there is a strange omission — a concealment in his writing. Heidegger, like technology, both conceals and reveals, has a surprising double–character. In his genealogy of technology as a tool, as the instrumental, he tells us that "*techne* belongs to bringing forth, to *poiesis*; it is something poetic" (1954/1977, p. 294). Heidegger then reinforces this statement by introducing a "discussion of special importance" (p. 295) by Aristotle in the *Nicomachean Ethics.* Heidegger explains that the Greeks distinguished between *episteme* and *techne* "with respect to what and how they reveal. *Techne* is a mode of *aletheuein*" (p. 295). Technology is not simply a tool; it is a mode of revealing. "Technology comes to presence in the realm where revealing and unconcealment take place, where *aletheia*, truth, happens" (p. 295). As Richard Bernstein points out, the problem isn't in what he

says but in what he doesn't say, in what he leaves out.

> Aristotle does indeed distinguish between *episteme* and *techne* and relates them to *aletheia*. But Aristotle does not stop there. Indeed, Aristotle's main point is to distinguish *phronesis* from the other "intellectual virtues." *Phronesis* is the intellectual virtue or "state of the soul" that pertains to *praxis*, just as *techne* relates to *poiesis*. This is one of the classic texts in which Aristotle carefully distinguishes *praxis* (the subject matter of the Ethics) from *poiesis*. (Bernstein, 1995, pp. 120–121)

Why are *praxis* and *phronesis* absent from Heidegger's discussion? What possibility is being covered over? Heidegger's "saving power" is to be found in *poiesis*, in the "poetic revealing" which he tentatively locates in the arts. *Poiesis* is concerned with making, with bringing into being, and *praxis* is concerned with action. For Heidegger, the *praxis* based question "What am I to do?" is the wrong question, since human action has already become a challenging–forth. In Heidegger's (1954/1977) words, "human activity can never directly counter this danger. Human achievement alone can never banish it" (p. 315).

Praxis, human action, encourages me to think I can control or master the danger. To try and find a technical solution to the problem. My true response to this "supreme danger", my response, my action, is to be essentially, inaction. My work is to think and question, to reflect and wait. My work is to prepare for "the possible upsurgence of the saving power" (p. 316).

> ...Heidegger seduces us into thinking that the *only* possible response (the highest possibility) to the supreme danger of *Gestell* is poetic revealing...Heidegger himself conceals what needs to be unconcealed — "the possible upsurgence of the saving power" may be revealed in action (*praxis*) and not only in "poetic dwelling". (Bernstein, 1995, pp. 127–128)

In a very real sense, Heidegger's focus on the heights of true, genuine, authentic thinking, on *poiesis*, takes his work out of the realm of the human — it becomes disconnected from lived experience. By spending so much time pursuing the highest

mode of inaction, thinking, we risk disengaging from the world, from other people, and from practical action. I'm not suggesting that Heidegger is wrong in what he suggests, but I am suggesting that *praxis* — that action — is also a valid course. In fact, if we look at what Aristotle said about *praxis*, it becomes clear that *praxis* is a more appropriate course than *poiesis*.

> The remaining possibility, then, is that [praxis] is a state grasping the truth, involving reason, concerned with action about what is good or bad for a human being. For [poiesis] has its end beyond it; but action does not, since its end is doing well itself, and doing well is the concern of *praxis*. (1985, p. 154)

Praxis is a more appropriate than *poiesis* because we are dealing with questions about what is good or bad for human beings. We are dealing with precisely the kind of situation that Aristotle suggests is the concern of *praxis*.

I am going to return to essences one last time, because there is one problematic aspect of essence that I have not yet raised.

I think we need to think of essences more in personal terms rather than in a universal or essential way. Each person's experience of a thing or an idea will be unique, and while there may be some connection between different people's experiences, e.g. shared cultural context, I don't think there is a universal experience or essence involved. It is also important to note again that essence, in these terms, is not a property of the thing or idea itself, independent of a subject, but is an interaction between the subject and the object — it is a process negotiated between the two. That subject and object are not really distinct, disconnected, clearly delineated things, but are instead different aspects of the same process. This is true also when I am speaking of technology using chaos metaphors. In a sense a thing's essence is fractal, with each person's experience of the essence being unique, and yet somehow echoing the experiences of others. I am suggesting that what

we think of as the essence of something is negotiated and re–negotiated within a group through shared cultural, social, economic, and historical experiences. So we can reasonably expect that people, for example, that share the same socio–economic group should have a more similar experience, of say, the essence of technology, than those of different groups should. And if we're not careful, we may mistake this shared relationship with an essence belonging to the thing itself.

I also believe we have to be careful not to think that the essence of technology is something completely outside of our control or domain, that it somehow arises and exists independently from us. While I think control itself is often an illusion, I think that changing our relationship with technology is within the realm of possibility. The danger in the alternative lies in the lack of responsibility that this view can encourage. If this essence of technology is not our creation, we may be tempted to think it is not our problem, and we need do nothing about it. Derrida was right when he said that our relationship with technology creates "indifference and boredom" and a return to "demonic" irresponsibility. And this is exactly what we risk if we unquestioningly follow Heidegger's poetic way of revealing as the *only* way. There is nothing that can be done except to watch and think, and to be prepared. But at no time are we to act. In fact action leads us into the hands of technology. We are already under its spell, and practical action is exactly the wrong response.

So the questions are now: "What is my responsibility in this?" and "What should I do?" For me, being responsible means being fully present in the situation and acting despite incomplete information. I can not possibly know all of the contingencies and possibilities that are open in this action, but this is the nature of action.

> The activating of responsibility (decision, act, praxis) will always take place before and beyond any theoretical or thematic determination. It will have to decide without it, independently, from knowledge; that will be the condition of a practical idea of freedom. (Derrida, 1995, p. 26)

So if I accept action as an addition to "poetic dwelling", what next?

I said earlier that removing computers from the classroom isn't enough, and it is probably at best futile, and at worst exactly the wrong move. As educators, we need to realize that we can't protect children or ourselves from technology simply by ignoring it or removing it. "Everywhere we remain unfree and chained to technology whether we passionately affirm or deny it" (Heidegger, 1954/1977, p. 287). Technology may be the most important curricular issue facing today's students and educators. With the introduction of Technology Education, and Information Technology curricula in the Canadian Province of British Columbia at all grade levels, it is evident that the B.C. government shares this sentiment.

> [Technology] provides the tools to extend our vision, to send and receive sounds and images from around the world, and to improve health, lifestyle, economies, and ecosystems. As technology assumes an increasingly dominant force in society, technological literacy is becoming as essential as numeracy skills and the ability to read and write (Ministry of Education, 1996a, p. 2).

> To be responsible members of society, students must be aware of the ever–growing impacts of information technology. They need to reflect critically on information technology's role in society and consider its positive and negative effects. The information technology curriculum fosters the development of skills and attitudes that increase students' abilities to address the social and ethical issues of technological advancements (Ministry of Education, 1996b, p. 1).

However, it is also clear that the Ministry of Education has adopted an instrumental view of technology as a tool, a tool that students must learn to use in a responsible manner. This instrumental point of view has led many of us as educators to ask the wrong kinds of questions concerning technology. The questions that do get asked, are almost exclusively of the means or "how to" variety — how to make the machine work, how to

use technology to the best effect or at best how should we teach this or that technology. When the M.O.E. suggests that we "increase students' abilities to address the social and ethical issues of technological advancements" a look at the specific goals tells me that they are concerned only with the proper application of technology[27]. The more serious value questions as to the nature of technology and of our social–ethical relationship with it have not been raised. When the assumptions that lie hidden within the technological revolution are brought to light, we see not only the means technological schools can provide but also the social ends which become affected as we use these means. Technology is not value neutral. As a tool it controls us as much as we control it. To ignore this truth delivers us over to technology "in the worst possible way."

Perhaps the move that needs to be made here is to change the nature of technology education. In too many schools, technology education consists in learning how to use the technology. In the IRP's for Technology Education and Information Technology, I notice several of things. First, as I've already said, the view of technology is overwhelmingly instrumental and positive. This view is echoed throughout the IRP's, whether I look at the intended learning outcomes or the suggested teaching strategies. Secondly, the talk is mainly of technological literacy. And while the goals sound good on paper, when I think of what the term literacy means, I get suspicious. The English literacy students that I

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[27] For the prescribed learning outcome: "Identify and analyse legal, ethical, social, and security issues related to network systems and stand–alone computer systems" the IRP suggests that I "have students analyse network case studies for issues related to privacy, productivity, ethics, and geography. Have them report to the class in a multimedia presentation on the implications and issues that come out of the analysis (e.g., access to e–mail)" and then later they are to produce an essay. "To focus students' thinking, ask questions such as:

- How can privacy be infringed upon or protected?
- How can copyright be protected?
- How can piracy be prevented?
- What are the implications regarding shareware?" (M.O.E., 1996b, pp. 18–19)

This is more a "how to" series of questions than a serious questioning of technology.

teach are learning the basics of how to use the language. Some of the more advanced literacy students may critique literary works, but at this level, they never critically examine the English language itself. In the same way, teaching technological literacy does not equip students to question technology itself, only its application. The question is never "Should technology be used to solve this problem?" or "How does technology change how we think about and act within the world?" but is rather, "What technology should be used to solve this problem?" Within this instrumental curriculum, "[e]verything depends on our manipulating technology in the proper manner as a means" (Heidegger, 1954/1977, p. 289). Everything depends on mastery and control.

Not only are questions about our use of technology important, but as Neil Postman (1996) said:

> [W]hat we needed to know about cars — as we need to know about computers, television, and other important technologies — is not how to use them but how they use us (p. 44).

I think what we need to look at, is what technology education should be. Do we need to teach how to use computers? Perhaps. But more importantly in our classrooms, we should be exploring the ethical/political/personal implications of technology. Not just the use of technology but technology itself, and the underlying assumptions that make these implications a reality. And even though the curriculum is provincially mandated, I can still take action. For me, this action, this *praxis* and *poiesis*, takes on a variety of forms in

my practice[28]. For example, it is my job to interpret the intended learning outcomes that the ministry gives me. I can interpret "It is expected that students will identify and analyze legal, ethical, social, and security issues related to network systems and stand–alone computer systems" (Ministry of Education, 1996, p. 15) to mean "students will learn to question concerning technology." I do not need to be limited by the narrow realm of technological literacy that seems to be envisioned by the government. I can give the Government what they claim they want in their general goals — students with the ability "to reflect critically on technology's role in society and consider its positive and negative effects" and that have increased "abilities to responsibly address the social and ethical issues of technological advancements" (Ministry of Education, 1996b, p. 1) and more.

I believe that students need to be aware of and explore the interconnectedness of technology and society and self. They need to question the nature of these connections/relationships and not just accept them as natural. They need to be aware that technologies shape us as we shape them and to be aware of what emerges from our interactions with and through technologies.

What is the nature of these emergent essences of self and technology that seems to spring spontaneously into being out of the complex interactions and interrelationships between the various interconnected elements? How can we understand emergent

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[28] I think teaching involves both *praxis* and *poiesis*. Teaching involves *praxis* when it is concerned with the particular, the local, the multiple, with regard to things that are good and bad for us. Also, teaching, like *praxis*, is an end in itself. There really are no clearly predetermined goals in mind when I teach, only a general aim. What actually occurs, what emerges in the moment — that is what I'm after. Teaching for me is very much about this moment, here and now, with no ultimate goal beyond the moment itself. But the fact that there is some pre-planing, some idea of the general form that the course will take seems to lead me into *poiesis* as well. In a sense teaching is a making, a bringing something into being, a revealing and so also belongs to *poiesis*.

essences? How does this apply to curriculum?

Do we, perhaps, need some sense of spirit here? A sense of spirit that doesn't come out of religion, but that emerges more from an understanding of and reverence for the world. A sense of spirit that comes out of awe. An openness to the mystery. A shaking in the face of the "mysterium tremendum." The realization that we don't and can't know everything or with certainty. An understanding that we must tread carefully, because we don't know if our next step will be just another step, or our last. We don't know whether or not our "next footstep is the one that will unleash the landslide of the century." (Kauffman, 1995, p. 29).

So the question that I began with has been transformed from "What is the essence of technology and what is the danger associated with it, to "What is my relationship with technology?" and "Can I speak of this relationship in any larger or more general sense?" In the end, I agree with Heidegger's skepticism. I'm not sure that we can solve this problem of our relationship to technology. There is no clear answer to the questions concerning technology, just as there are no clear answers to any of our problems. I think that, as Stephen Talbott (1995) said, "no genuine social problem has ever been solved by a program of action. Or even that no problem has ever been solved at all. As we slowly change, we eventually transcend old problems, simply leaving them behind in order to face new ones. Or, you might say, old problems simply assume new forms" (p. 380). This however, does not absolve me or any of us of our responsibility. It does not mean that I simply do nothing. Our world is human–made, and technology as part of that world has only the metaphysical character that we have granted it. As I realize that there is a very real danger in our "technical civilization," that there is no easy way out, that a technical

answer is probably not going to save us, the more open I am to "an altogether different level of response" (1995, p. 400). What this response might be is still unclear to me, but I believe that in some sense, I'm already in the middle of it.

Chapter 09/19/60

Mother

Mother do you think they'll drop the bomb?

(Waters, 1979, disk 1, track 6)

Foundations are tricky things. For much of my life, I operated without giving much thought to my foundations, to my roots. In a sense, my foundation was transparent, allowing assumptions to go unquestioned and even unrecognized as assumptions. My beliefs seemed factual and true — a system that emerged naturally from reality.

Seven years ago, almost to the day, reality gave me not so subtle wake–up call. It was the kind of autumn day that reminds you of spring, and although winter is just around the corner, you feel that endless possibilities are open to you. The sun cast a warm afternoon glow through the windshield and danced playfully on the tiny specks of dust floating up from the dashboard and the resulting heat made me wish that I hadn't worn my winter coat and hat to work that morning. The tape player blasted a Green Day tune; it was a great day to be alive.

I was driving home from work on my daily commute from Duncan to Ladysmith. My family and I had recently moved from Vancouver and we were still adjusting to a very different way of life. I had a new job, and quickly found myself in the midst of setting up a self–paced, continuous intake program for adult learners in Duncan. Everything in my life seemed to be proceeding with amazing precision, exactly as planned, and I was busy constructing the perfect future. My foundations seemed completely secure. It was the day when I finally heard from them.

I slowed the car down and pulled into a parking spot beside the post office, and went

in to get the mail. In the box that day were a couple of bills, and the last thing I needed — an official–looking letter from a government office in Alberta. When I saw the bulk of the letter, I felt a bit faint; my chest tightened up making it difficult to breath and my heart started to pound noticeably harder. It doesn't matter, I told myself, the outcome is inconsequential, but for some reason I didn't open the letter right away.

Instead, I walked out of the building into the mid–afternoon heat and got back into my car. I threw the mail on the hot vinyl seat next to me, started the car and headed for home. On the short drive to our townhouse, my mind began to race.

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I think all kids suspect they're adopted at some point in their lives. I guess for me, it began when I was about seven, at least that's the first time I remember asking my parents if I was adopted. My mothers "answer" should have been a dead give away, since she didn't answer the question at all. Instead, she turned my query back on me and asked, "Why do you think you're adopted?"

The lack of an answer troubled me, but I explained that the kids at school had been teasing me about my skin colour, and I couldn't help wondering why my skin was so much darker than my parents' skin; the question seemed natural. My mother eventually assured me that I was not adopted, and that satisfied me for a while. However, the possibility of my adoption continued to haunt me through my life. I asked my parents if I was adopted on several other occasions and I received a similar non–answer, followed by their assurances. While this comforted me on some level, I was left with a deep uneasiness.

I have never really felt like I "fit in". Throughout my childhood, in my schooling, at

university, in my teaching, I've always felt as though I was on the outside looking in, a spectator in my own life, or a bit–part player. Even in my own family, I didn't seem to belong. I was different from my parents as much in beliefs and personality as in appearance. When I was in my undergraduate program, majoring in biology, I felt it too. I wasn't like the other biologists, in their rain–gear and Gore–Tex, their hiking boots and knapsacks. Oh, I could play the science game well enough, but there was something different about me — something that kept me excluded.

People who haven't seen me in some time are always surprised — actually shocked is a better word — when they learn I'm a teacher, as are people who meet me first outside of work. I don't seem to fit the label "teacher" any more than I did "biologist" or "son". While this feeling of being an outsider has been difficult, it has given me a kind of perspective. This distance from society or foreignness that I feel leads to a loss of moorings, a kind of transcendence, an ability to see differently. However, this is not always a blessing. It can be extremely difficult to make decisions when I see each possibility with equal clarity.

The last time the adoption question came up I was eighteen. After that, I gave in and played along with the game that my parents had chosen. We would all pretend that I was not adopted, that I had inherited my dark complexion from my grandfather, and that all the inconsistencies in my parents' stories were just memory lapses.

My wife, however, refused to play our little game, and after much coaxing I finally requested a copy of my adoption order from the Post Adoption Registry in Alberta, even though I was sure the document didn't exist. My initial reluctance became a grim determination to put the question to rest once and for all and I was puzzled by my

nervousness as I waited through the summer for a reply. I had suspected for many years that I was adopted, so why were my feelings so mixed? Why was I so anxious? I kept telling myself that it didn't matter, that I was just confirming my suspicions or putting them to rest; either way, I would finally be sure.

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As I pulled into the driveway, I could see my wife Heather, my son John, and our neighbor Shannon sitting in the sun on a blanket in our front yard. I got out of the car, and after exchanging pleasantries, told Heather that something had come from the Post Adoption Registry. Shannon, who was aware of the situation made an excuse and quietly toddled off home leaving us alone. As we went into the house I could feel the weight of the letter in my hand. Even unopened I knew that it was much too thick to be a letter saying, "What adoption order?" In the kitchen I tore open the envelope, and pulled out the letter. Fumblingly, I unfolded it and read the five short lines that changed my life:

> Dear Mr. Brewer:
>
> Your request for a copy of your adoption order has been forwarded to our office by the Post Adoption Registry, a division of Alberta Social Services, pursuant to Section 66(7) of the Child Welfare Act.
>
> Enclosed please find a certified copy of your adoption order.

My stomach knotted tighter and I forgot to breathe. My arms dropped to my side and my whole life fell away.

I had hit the moment of crisis and come up short. The ground gave way and I fell into the abyss, into the flux. At this point "one enters uncharted waters, unmarked ways. All there is, is the way, making–one's–way...the movement..." (Caputo, 1987, p. 211) and I was left traveling without a map. At this critical point, when I sensed it was already too late, like a cartoon coyote who realises that the ground is gone, I began to fall. And

instead of hitting the floor, all there was was the falling. The falling and the horrible realization that all there had been was my belief in the floor. All there was to do was fall. And fall. Spiraling into the abyss. And after some time — an indeterminate, frightening time, it occurred to me that I was not going to hit the ground below. Once I gave into the fall I realised that there was no ground, no–thing to grasp hold of. No way to stop falling. My carefully constructed reality slowly melted away and I was overcome by a distinct sensation of vertigo, a feeling echoed by Caputo (1987):

> ...there is a fine point in the mind where one is brought up short, a moment of midnight reckoning where the ground gives way and one also has the distinct sense of falling into an abyss. (p. 269)

I didn't think it would matter whether I was adopted or not. It did. At that moment, it seemed that everything in my life that was foundational vanished, and I was left to see that I had been standing on lies. My parents' lies to me, and my lies to myself. The "true" nature of foundations began to reveal itself to me, and the seeds of the destruction of my objectivist paradigm were planted.

These were the first stirrings of the idea that the self is created not only by itself, but in complex interactions between self, culture, and society, which are all mediated through language. I was surprised at the important role that heritage plays in identity. I didn't know who I was anymore. An important part of the foundation of me, something that I believed in and relied on was gone. How could this happen? How could something so fundamental suddenly turn out to be untrue?

Although I knew that in science, theories, and less often, whole paradigms become false, it took this personal loss to really see the implications — to see what this meant to my entire world–view. If something I believed to be reality could be swept away like a light fog, what did that mean about reality? The instant I found out the "truth" my whole

reality changed — something a good stable objective reality is not supposed to do.

As I stood there holding the letter to end all letters, my head was swimming with thoughts and images and feelings ranging from disbelief to anger. I didn't want to read any further but I did, and as I did I was thinking about all of my relatives, who suddenly seemed little more than strangers, or brief acquaintances. I thought about how the time of my birth, changed from morning to afternoon to evening, depending on when I asked. I thought about the look that people get just before they ask me what my ethnic background is. I thought about all of the questions that I no longer had answers for. I thought I was putting an end to something, once and for all. Instead it turned out to be just a beginning.

Chapter 48.46N 123.19W

What Shall We Do Now?

What shall we use to fill the empty space?

(Waters, 1979, disk 2, track 8)

Before we begin to draw any map, we must be clear about the difference between "map" and "territory." In description we frequently refer to "structure," not to specify what must be, but to attempt to describe the infinite detail we have observed...We claim, by calling something "structure," that we can do better than concentrate upon single details one at a time...The very notion of the word structure always gets away from the infinite detail of the particular....There is, however, a more problematic aspect of our notion of "structure," which must be stressed. As we scientists use the word, it promotes in us the false notion that the more concrete details subsumed under a given named structure are somehow *really* components in that structure. That is, we easily come to believe that the way we dissected the real world in order to make our description was the best and most correct way to dissect it.

(Bateson & Bateson, 1987, pp. 152–153)

Does a story have to have really happened in order to be true? No, I haven't said that right. In order to communicate a truth about relationships, or in order to exemplify an idea.

(Bateson & Bateson, 1987, p. 34)

I love to come here and sit by the water for hours and just be; my thoughts' meander as the waters flow by, gently swirling here and there, flowing fast and almost straight in other places. Chaotic and turbulent but with a seeming purpose — an ultimate flow. Actually, a better word for what I experience is becoming. Being implies that no change is taking place, that things are static, and in a living systems equilibrium is death. If being is static, within it there is no life, no process; there is no room for movement or change or growth. In contrast, I find that my journeys are invariably transformative; no matter where I travel, I am never the same after as when I began. Even when I'm not going

anywhere in particular, just out for a while and then home, the experiences of the day always leave me changed[29].

I went to a local park the other day. I watched the kids busily playing on the slides and climbing over the play structure. As I took in the scene I noticed a broken bottle in the gravel of the play area and, instead of thinking "someone should clean that up," I found myself collecting the broken pieces of glass and putting them into the garbage can. It's only a small change, but somehow between my last trip to the park and this one something changed in me. The "someone" who should clean up messes was now me. Small internal changes have bubbled up to the macro level and emerged in a new sense of responsibility.

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I need to get away from the hustle and bustle that distracts. In my house I can hardly think. There are endless interruptions. The kids need to be watched and played with and bathed and put to bed. Dinner has to made, groceries bought, lawn cut. The stuff of life pulls me away from actually experiencing life. Things have to be done, ordered, organized, structured. It is this particular intellectual engagement with life that leads me away from life if I am not careful. My focus becomes temporal instead of spatial — time ticks endlessly by and there's never enough of it. I need to find another place, another space, another way of engaging with the world, another way of living.

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[29] Every change in a network like my cognitive system does change the entire network. However, not all changes show themselves immediately. It's similar to changes that accumulate in the genome, the genetic makeup, of an organism, while the phenotype, the outward expression, shows no change. The organism is poised on the edge of chaos, achieving both stability and flexibility (Kauffman, 1995, p. 86). It's a strange new direction in evolution that suggests that "bodies change the most when genes stay the same. They respond to the environment as they grow. Conversely, when the phenotype is static, when the organism seems well adapted between evolutionary punctuations, that may well be the time when genetic variation is at its greatest" (Cohen & Stewart, 1994, p. 327).

Sitting here by the flowing water at the forest's edge, all of the confusion dissolves and a clarity emerges. Here I find myself enveloped, in the midst of, wrapped up in the world. I can sense everything around me in an animal–like way while also paying closer attention to specific things. There is both a unity and a distinctness. There is a shocking aliveness, as if I've been startled awake. I've been sleepwalking through the world and I've taken my dreaming for reality. Like magic the world is new once more.

I am a child again spending endless hours in these same forests. Crouched almost motionless in the cedar scented warmth, waiting. Waiting for whatever called my attention or action. Creeping silently through the underbrush I am an explorer, or a hunter, stalking and being stalked. My purpose is clear and I am clearly alive. There is a spiritual connection with this forest, though connection is perhaps not the right word here, because there is no separation to be connected through or over. I belong in a deep way to the forest. To the trees and the bugs and the snakes and the birds. Here — these mountains, this valley, these trees, these rivers, this creek, this ocean.

Today I watched the surveyors out measuring, marking and calculating. They busied themselves with their tripod–mounted auto–focus levels and range–finders, their compasses and lasers. All this self–important bustle was to ensure that the maps would be more precise. People want accurate maps. They need to know how far it is from here to there, or how long it will take to get there from here, and what obstacles they will encounter along the way. They need to get places.

The maps show the locations of mountains, and the streams, and lakes, and roads, and towns, and other geographic and man–made features, but they never capture the beauty;

the aesthetic, the feeling; they never even try.[30] When I look at a map, I am surprised at which features are emphasized and which are under–played. Many things that are important to me are conspicuously absent from these constructions, and other things, such as mountains, rivers and lakes, are often thought of as obstructions by others. I am not certain why this is so, but I have my suspicions. And then there is the question of representation. Does a map ever represent anything other than itself?

I look up from my thoughts and watch several people scurry by. They occupy themselves with getting there, as if where they are is somehow inferior. Always in such a rush to get somewhere, their faces stuck in their maps, blind to everything around them. All these hurriers, spiraling toward their end, all of our ends really, where they'll realize a little too late, that it was supposed to be about the journey. It's not the getting there, the end; it's the trip[31] along the way that's important.

I heard a story told once that suggested that there are two kinds of people, referred to metaphorically as miners and travelers[32]. Miners spend their time digging for some ultimate truth buried beneath the surface, for gold nuggets, essences. For them there is an objective, external, real world to make sense of. They seek things foundational. In

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[30] A map can tell me how to find a place I have not seen but have often imagined. When I get there, following the map faithfully, the place is not the place of my imagination. Maps, growing ever more real, are much less true. (Winterson, 1989)

[31] The OED (1998) traces the origin of the word trip to Middle English, from Old French triper, from Middle Dutch trippen 'to skip, hop.' And in this sense of the word, this thesis is indeed a trip. Rather than smooth things over, gaps are the norm here — my focus is on the relationships and not the objects. Interruption is necessary.

[32] Steiner Kvale (1996) uses two metaphors for the qualitative researcher — the researcher as a miner or the researcher as a traveler. According to Kvale, '[s]ome miners seek objective facts to be quantified, others seek nuggets of essential meaning' (p. 3). In contrast 'the traveler explores the many domains of the country, as unknown territory or with maps...The traveler may also deliberately seek specific sites or topics by following a method, with the original Greek meaning of "a route that leads to a goal"' (p. 4)

contrast, travelers journey and explore new territory. Sometimes they travel with a map, sometimes without. When they return home they tell stories about what they saw.

On more than one occasion, I have been referred to as a traveler, but I feel that the label doesn't really represent my position very well and implies some things that I don't wish to be associated with. Travelers sometimes deliberately seek specific sites following a particular route. To me, going somewhere in particular implies the need for a map or exploring in order to get the information needed to make a map. It implies a specific method, a way of going which doesn't interest me. I would rather travel using my rules, making my own decisions and interpretations based in the moment. Maybe interpreter is a better metaphor for me, I look at the world around me, and I make meaning without using a map, without following a prescribed methodology. But that's not quite it either. I think, perhaps nomad[33] is a term I can live with. Everything nomadic is in the middle. There are points, but they are points of departure. What is important is the trajectory, the journey. What I take notice of tomorrow may be different than today, and what I thought were the crucial features may not be so next week. My "map" is in flux and subject to change. I need to stay grounded in my own meaning and find my own way — not follow somebody else's map.[34]

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[33] Deleuze and Guattari (1987) and Morris Berman (2000) speak at length of nomad thought and nomadism. For them, nomadism is a way of life and is also "an attempt to pull the rug out from under the fake security of agricultural civilization" (Berman, p. 155). Nomadism is opposed to the state, the sedentary, and "there is a significant difference between the spaces [in which each exist]: sedentary space is striated, by walls, enclosures, and roads between enclosures, while nomad space is smooth, marked only by "traits" that are effaced and displaced with the trajectory " (Deleuze & Guattari, p. 381). "Nomadism displays auto–nomy, self–rule…nomad thought…dwells in the midregions…points are reached only to be left behind. The road to truth is always under construction; the going is the goal" (Berman, p. 157).

[34] "A few turnings later and I was thoroughly lost. There is a school of thought which says that you should consult a map on these occasions, but to such people I merely say, 'Ha! What if you have no map to consult? What if you have a map but it's of the Dordogne?' My own strategy is to find a car, or the nearest equivalent, which looks as if it knows where it's going and follow it. *I rarely end up where I was intending to go, but I often end up somewhere that I needed to be*" [italics added] (Adams, 1988, p. 122).

A well–dressed man walks towards me to ask directions. I immediately know the man's intentions; I recognise the look, I have seen it often. Every day, at least one person asks me directions. The conversation usually goes something like:

"Which way do I go to get to Midtown?" they inquire.

"Anyway you want," is my standard answer. This isn't a very promising opening for them, even though it is true that no matter which way they go, sooner or later, if they travel long enough, they will get there. It is also true that I get a certain discrete pleasure from answering in this slightly obtuse manner. They hate to think in any way that holds the remotest chance of revealing that their assumptions are not universally held. Their next attempt is usually a clarifying question of the type:

"What's the best way to get to midtown?"

"That depends on the purpose of your trip," I answer. This usually pushes them over the edge, and their frustration begins to show.

"Look. I just want to get to Midtown, and I'm in a hurry. I'm just trying to get there. What's the fastest way?" At this point, their foundation thoroughly exposed, I feel that there is nothing left to do but point down the fastest, straightest road and send them on their way.

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Through discussions with many of these hurriers over the years, I have come to understand their beliefs, and at the risk of creating a stereotype I'll share them here. In addition to being solely focused on ends, on getting there, they seem to believe in a unitary, particle–based, objectively knowable reality. Objects are ultimately important, and subjects are secondary and contaminating. They think there is one right way, and

they think they have it. Their belief in this foundation is absolute — they take its seeming concreteness literally[35]. They seem to have forgotten that foundations, maps, and most of our social reality are constructed. It's not that maps don't serve their purpose, it's just that they are not the perfect reflections of reality that the hurriers take them to be. I really don't have anything against mapmakers, travelers, miners, or any other group. I just think it's important to consider all of the things at play, such as power issues, when we use a map. There is no special status afforded any of these beliefs that makes one universally better than another[36]. And there is certainly no reason to let beliefs or maps go unquestioned.

In a sense, there is some common ground that we share. I too believe there is a structured reality, though not in the usual sense of either of these words. By reality, I refer to the flux or to a process reality, constantly in change. Structure[37], in respect of this flux is not static but is based in relationship and pattern. It seems to me, that at any time, there are forces within the flux which partially determine its emergent properties. These emergent properties are also partially determined by any observer. The large–scale simplicities that we experience, what we call reality, are emergent phenomena — patterns — that appear only when chaos is collapsed in an act of interpretation. So complexity and

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[35] Whitehead (1925) would call this "misplaced concreteness" (pp. 58–59) — mistaking an abstraction for concrete reality. The trouble with abstraction is that it always excludes things, parts of our experience and so we need to be careful to remember that an abstraction is necessarily incomplete.

[36] We live...lives based on selected fictions. Our view of reality is conditioned by our position in space and time — not by our personalities as we like to think. Thus every interpretation of reality is based on a unique position. Two paces east or west and the whole picture is changed. (Durrell, 1963)

[37] Bateson, in the quote at the start of the chapter is saying structure is communicative and is a description that is necessarily full of gaps. The map is not the territory, but the map is all we have. For Bateson structure is an incomplete description of "what is." While I am not disagreeing with this view, I am looking at it from a different angle. I'm more interested in how the structure arises. I'm suggesting that the structure of reality is in flux and what we experience as structure are the properties that emerge in the interaction between the flux and us. Structure is co–produced.

chaos at a "lower level" can emerge as simplicity "higher up". However, complexity and chaos are processes rather than ends, and my "goal" is to experience the process and the pattern rather than answer a particular question.

I believe we're looking in the wrong place when we look only at the emergent phenomena, the material "things", in order to make sense of the world. And we are also looking in the wrong place when we take things apart in order to understand how they work or when we look deep inside of them in to see how their complexity arises. Reductionism and essentialism are totalising narratives that simply do not paint a complete picture. While chaos and complexity also begins to sound like a totalising, static, map–like structure, the theory can be kept in motion. The underlying relationships and pattern need not be constant. A chaotic system is stable without being static; its place of stability can change. It can move to another basin of attraction, another stability. In my view, reality is anything but constant and unchanging and knowable. It is, in effect, un–mapable.

If this process reality is un–mapable then what can we know? For a start, we can't know anything with certainty. Reality is partially knowable at a particular place, time, and within a context. In other words, we each have our own interpretations or stories, which are our own realities. It is very difficult for us to get a handle on what is "really real" because our sensory and nervous systems, our cognitive systems, are themselves in flux, based on the same complex processes as the universe that they are trying to understand. Since our cognitive system is independent of the outside environment (in that there is no direct contact between the mind and the physical world), the relationship between what we experience as real and reality doesn't have to be representational. Nor

does there have to be a one–to–one mapping. The way we experience reality may have little resemblance to what is "really real" (if there is such a thing) — it only has to work[38]. Consequently, reality is not knowable in the universal, all–encompassing sense that the map–makers would like.

So I travel mapless. That's not to say I have no pre–conceptions[39]. I can't make

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[38] Maturana and Varella (1998) write about this at length in *The tree of knowledge*. "[T]he operational closure of the nervous system tells us that it does not operate according to either of the two extremes: it is neither representational nor solipsistic" (p. 169).

[39] But of course, I don't really travel mapless. There are always some structures, some signs, some foundations. The fact is, the term map is in itself somewhat problematic for me because of its usual reliance on the Cartesian coordinate system and linearity. I do think of myself as a nomad who wanders and then tells stories of where I've been, and these stories are maps. The problem is, is that there are two very different ways of going that have been legitimately called maps. I find the distinction that Deleuze and Guattari (1980/1987) make between maps and tracings is useful here.

> All of tree logic is a logic of tracing and reproduction...The tree articulates and hierarchizes tracings; tracings are like the leaves of a tree.
> The rhizome is altogether different, a map and not a tracing...What distinguishes the map from the tracing is that it is entirely oriented toward an experimentation in contact with the real. The map does not reproduce an unconscious closed in upon itself; it constructs the unconscious...It is itself part of the rhizome. The map is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification...A map has multiple entryways, as opposed to the tracing, which always comes back to "the same." The map has to do with performance, whereas the tracing always involves an alleged "competence" (p. 12).

Here, a one hundred and eighty degree turn occurs. What I've been calling maps, Deleuze and Guattari call tracings. And for me, tracings are the problem. And the problem is a particular way of going about things. A particular methodology, but more than that a particular way of being. Tracings are associated with hierarchy, linear thought, compartmentalization, reductionism and ultimately with death. There is nothing creative or originary in a tracing. It is not even a copy of something else, it is merely a copy of itself. Rather than travelling mapless, I could say that I do use a 'map' in the sense that Deleuze and Guattari use the word. But perhaps it is better to say I perform a map. Maps are of rhizomes, they are a way of living that "is in contact with the real," a way of living that doesn't simply reproduce the same old either/ors.

> Have we not, however resorted to a simple dualism by contrasting maps to tracings, as good and bad sides?...It is a question of method: the tracing should always be put back on the map. This operation and the previous one are not at all symmetrical. For it is inaccurate to say that a tracing reproduces a map. It is instead like an X ray that begins by selecting or isolating, by artificial means such as colorations or other restrictive procedures, what it intends to reproduce. The imitator always creates the model, and attracts it. The tracing has already translated the map into the image; it has already transformed the rhizome into roots and radicles. It has organized, stabilized, neutralized the multiplicities according to axes of significance and subjectification belonging to it. It has generated, structuralized the rhizome, and when it thinks it is reproducing something else, it is in fact only reproducing itself. That is why the tracing is so dangerous. It injects redundancies and propagates them. What the tracing reproduces of the map or rhizome are only the impasses, blockages, incipient taproots, or points of structuration (Deleuze & Guattari, 1980/1987, p. 13)

meaning without a space, or a foundation or equivalent. Meaning is contextual and relational, and therefore can only occur within some kind of framework or network — meaning is pattern. When a foundation is shattered or a map discarded, something new must be created to take its place, or every single act of interpretation or meaning–making becomes an originary act. So in place of a Cartesian map, I speak of a space opened up[40] or of a rhizome grown.

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It hasn't always been this way. I used to have a map, the standard one that everyone got in high school. I received a more detailed version at the University and it was useful for a time. But even that map was incomplete. Now of course, you can't put everything on a map, and even reality is only perceived partially, but the question of what gets left off leads to power issues. Who decides what belongs and what doesn't? What finds its way onto a map is always determined by the presuppositions and power structures that the map–maker is embedded within. This becomes extremely important, since things that aren't on the map often don't get noticed or explored any further; they are simply ignored as unimportant, and eventually they cease to exist. And after using a map for a time, there is always the chance that you will mistake the map for the territory. I still remember the day things changed for me, the day I threw away my map.

I was maybe twelve years old, and it was one of those hot summer days, where you can almost see the heat in the mid–day stillness and the bugs clamor rises to a frantic

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[40] "Reconciliation/rupture are themselves irreducible elements of this new constellation — points of attraction and aversion...To say this means we must seek to do justice to both elements, without succumbing to the illusion that they can finally be integrated. In a Hegelian (but also an anti–Hegelian) manner we can characterize this as the logic of "Both/And." For this "Both/And" is itself tensed and unstable — never quite aufgehoben or reconciled" (Bernstein, 1995, p. 309).

pitch. I was sitting at one of my favorite spots by a stream watching the cool water tumble chaotically by, little whirlpool–like structures and eddies emerging magically every now and again. I could do this for hours, becoming lost in intricate web–like patterns of thought. This day, somehow, everything became clearer. It was as if a small window opened up, and I could see beyond the everydayness of existence.

On this particular day, a woman with a clipboard and a small entourage came by and disturbed my contemplations. She hurriedly glanced around and proclaimed, "Well this cesspool will certainly have to go. We'll simply have to fill it in. Harris, make a note of that."

"What about the environment, we could build around . . . " Harris began.

"There's plenty of space left for the environment," she snapped with a dismissive wave of her arm, vaguely indicating the surrounding area. "Besides, we're talking about one small brackish creek as opposed to the people, who need to get places. No, the new route will be straight and will save time and a considerable amount of money." At this, she had tromped off to find a mountain to move out of the way.

I was flabbergasted. Cesspool! Couldn't she see the beauty? Couldn't she feel it? Were we even looking at the same creek? I spent the rest of that afternoon pondering this, and in the end, arrived at the only spot that made sense to me. We must be looking at different creeks. And more than that, our worlds were different too. In her world, the world of maps, the desire to get from A to B overrides all. Maybe the problem wasn't just using the wrong map, maybe it was using any map. This realization changed my world forever. When I went home that day, it was to a different place than I had left in the morning.

I love to come here and sit by the water for hours and just become. I'm not sure where I am going, but I also know that it isn't a question of where. It is a question of keeping options open and allowing experience to flow and tumble chaotically by, little whirlpool–like structures and eddies emerging magically every now and again. If I am patient and attentive, order and structure emerge from the flux for me to attend to. The experience of working and living this way is at times frightening but it is also exciting and invigorating. I never know what I'll find around the next corner. A final thought occurs to me: Maybe the difference between the map–makers and me is that they have forgotten that their maps are metaphors. I think of maps as an abstraction of the lived world and as such they separate us from lived experience and the world. In order to really see, you can't walk around with your face stuck in a map. You have to discover and explore the terrain on your and its terms. Perhaps they think their maps are perfect reflections of reality. They know there's one reality, and I know differently.

Chapter 192.168.1.257

Knowing in Internet–mediated–interactions: What is the effect of the medium?[41]

The medium is the message because it is the medium that shapes and controls the scale and form of human association and action. The content or uses of such media are as diverse as they are ineffectual in shaping the form of human associations. Indeed, it is only too typical that the content of any medium blinds us to the character of the medium.

(McLuhan, 1964, p. 9)

The Medium is the Message

In keeping with the way in which post–modernism is often defined in terms of what it is not rather than in terms of what it is, I will start by saying what this chapter is not about. It is not about evaluating the content of the web, about knowing how to measure the validity, accuracy, or truth of the information or content of a particular site or page. I am not so much concerned with the content of the web as with the medium itself and its message. I am concerned not with what we know but with how the process whereby we come to know affects what we know. The content of any given message is less important in shaping what we know than is the medium itself. The online environment shapes what we know more than the online content.

My intent is to explore what knowing might mean in hypertextual environments like the Internet, and to use the following questions to frame my inquiry:

- How does the medium influence what we come to know?
- How can educational contexts connect with the medium of the Internet?

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[41] This chapter evolved from discussions with Mechthild Maczewski and is based on a paper titled *Knowing in Internet–mediated–interactions: What we know and how do we know it?* that she and I co-authored and presented at the Annual Meeting of the American Educational Research Association, Seattle, Washington, USA, 10–14 April 2001.

I will explore the overlaps, gaps and links among Internet–mediated–knowing and theoretical conceptions of knowledge. Frequently invisible similarities and discrepancies between knowing in online and knowing in onground[42] settings will be illuminated and ruminated. But rather than specifically answering these questions, I will use them in an exploratory way as probes, as a way to keep the questions open and keep the inquiry moving. My point is the proliferation of possibilities rather than their reduction. As Hans–Georg Gadamer (1960/1998) suggested, "against the solidity of opinions, questioning makes the object and all its possibilities fluid" (p. 330).

For this exploration it is important to say what I mean by the term knowing. The Oxford English Dictionary (OED) defines *know* as to "be aware through observation, inquiry, or information." The etymology of know leads back to an Indo–European root which is shared by the Latin (g)noscere, Greek gignoskein and by the word *can*. I'm interested in expanding the meaning of know somewhat from the OED definition to recover the "knowing by acting" or "doing" inherent in the word *can* and historically in the word know. Simply having access to information does not give us knowledge. The Internet is full of information and ideas but information and ideas only become knowledge through the active engagement of a critical person. Acting, doing, and critical practice all intersect for me in the term *praxis*[43]. Knowing is more tied to my experience than it is to information and it is a multi–dimensional concept. Knowing through praxis is knowing in the thick of things, it is knowing when there is not an established way to go

[42] Following Mechthild Maczewski (1999), I will use the terms online and onground to distinguish between my experiences in the virtual world of the Internet and those of everyday experiences. Like all binary pairs, I recognize that the separation is not complete, and that there is much crossover—my onground experiences inform and transform my online life and vice versa.

[43] As Aristotle put it, "[praxis] is a state of grasping the truth, involving reason, concerned with action about what is good or bad for a human being" (1985, p. 154).

or an end in mind. It involves acting despite uncertainty. As such, knowing is situated provisional and uncertain. It is always under revision and is a continuous, ongoing, mediated process. The question then becomes: What is the nature of this process? How is the process influenced by the medium of the Internet?

medium ▶ **noun** (pl. media or mediums) **1** an agency or means of doing something. **2** a means by which something is communicated or expressed

The OED definition of medium is fairly close to what I have in mind when I use the term, although what may not be clear is the extent or scope of the meaning. I have been influenced in this case by McLuhan and in particular by McKenzie Wark's reading:

> 'Media' doesn't just mean print, TV, radio, movies, it means any vector along which information moves. It includes architecture. It includes the alphabet. Media is any surface, any material, via which human activity might transmit an action from one place or time to another (1999).

While none of the individual aspects of the Internet (text, graphics, audio, video etc.) are new in themselves, the combination, interaction and the intensity of the various media is. These combinations produce a knowledge environment characterized by interactivity, hypertextuality and connectivity. Researchers such as Derrick deKerckhove (1997) suggest that the parameters of the Internet could lead to the emergence of a "connected sensibility and new psychology" (p. xxxi). As a hypertextual medium, the Internet seems to encourage us to think in a more relational, connected, web–like and non–linear or multi–linear fashion. These shifts serve to counter in part the previous fragmentation that Marshall McLuhan attributed to the "visual space" of modern print culture. As McKenzie Wark observed:

> Media form matters as much as content, and the bias towards abstract reasoning in purely textual media was for [McLuhan] the reason for the fall into fragmented and meaningless life in modern times. (1999)

In a hypertextual environment fragments can be connected and meaning can reemerge. In the words of Taylor and Saarinen (1994):

> Compu–telecommunications technology involves an epistemological shift no less radical than Kant's Copernican revolution. The very forms through which we perceive and categories with which we think are transformed by the changing technologies of knowledge production. Things give way to events, identities to differences, and substances to relations. Everything is simultaneously connected and in flux…Epistemology offers no relief if it is not humanly wired. (Interstanding: 3)

Surface Knowing

The medium is indeed the message. The medium or environment that a technology helps create is as important as the content of that medium — perhaps more important, because the medium is the aspect that usually goes unnoticed, and therefore its effects are more insidious. This hidden aspect of media has also been explored by other writers; for example Martin Heidegger's (1954/1977) "technological enframing", Jacques Ellul's (1964/1973) "technological society" and Neil Postman's (1993) "technocracy" are all grappling with the same issue — technology's invisible effects as a medium. But it is Marshall McLuhan that is the starting point of my exploration. From a McLuhanesque perspective, the Internet as medium draws us in to focus on its content rather than on the larger scale effects that it has on our perceptions, experiences and the way we come to think about and act within the world.

"The content of any medium is always another medium. The content of writing is speech, just as the written word is the content of print, and print is the content of the telegraph" (McLuhan, 1964, p. 8) and the content of the Internet is nearly every prior medium. Although the Internet as a medium is in part a container for the older media that are its content it is not an inert container. The Internet and its content media cannot be thought of simply in terms of a series of nested boxes because the media are always in

relation with one another and with their own histories. The containers are permeable and the boundaries continually shift, blurring the distinctions. The nature of the relationships between the Internet as a container of text and text as a container of speech and speech as a container of thought is an irreducible hierarchy that has much in common with non–linear dynamical systems where distinctions are difficult and cause and effect are thrown into disarray. However there is something more in this layering of media. McLuhan would say that the content of a medium blinds us to the medium and its effects. The effect of layering is important in that it makes it easier to see the medium and its effects when it becomes the content for another medium. The Internet or hypertext allows the effects of its content media to be seen more clearly. By studying the contents of the Internet we can learn things about text, books, television, radio and graphics that we may not have noticed if they were still themselves mediums.

Media of all kinds are usually employed for communication — for the transmission of thoughts from one person to another, or as Wark (1999) and Humberto Maturana and Francisco Varella (1998) suggest, for the coordination of action within a group. One measure of a medium's success is how well or how cleanly it communicates the thought, or coordinates the action, or how little of the medium itself is added into the interaction as "media side effects" (Levinson, 1998). Paul Levinson goes on to describe an evolutionary theory for media, with humans as the selectors of a medium's success on the basis of how close the media experience is to what he terms "unmediated reality." The

success of the Internet, when compared with the book, as a medium of communication, is due to how close the online experience is to "unmediated reality"[44].

In *Laws of media: The new science* (1988), McLuhan proposed a framework called the tetrad for thinking about the effects of media. The tetrad is presented as an alternative to traditional Western analytic models with their bias toward linear, serial, either/or logic. Rather than excluding the middle ground, the tetrad is designed to create a comprehensive awareness of the medium and its environment, both figure and ground. In a tetrad, a medium is organized as a "resonating interval" which is an active space between that allows both/and thinking. The tetrad permits us to simultaneously examine the medium's multiple, often contradictory aspects. A tetrad can be created by asking four questions about any medium, and using the answers as a starting point for an exploration of the effects of that medium, rather than as an end in themselves.

The four questions are:

- What does the medium enhance?
- What does the medium obsolesce or render obsolete?
- What does the medium retrieve that was previously obsolesced?
- What does the medium reverse into when pushed to its limits?

Responses to these questions are then arranged in a tetradic structure that allows them to play off one another, to interact and resonate in a way that "...illuminates the borderline between acoustic and visual space as an arena of spiraling repetition and replay, both of input and feedback, interlace and interface in the area of an imploded circle of rebirth and metamorphosis" (McLuhan & Powers, 1989, p. 9). Here McLuhan is striving for a dynamic balance between acoustic and visual space, between right brain

[44] The term "unmediated reality" is problematic because knowing is always mediated. It may be useful to think in terms of less mediated and more mediated. Fewer layers of mediation are then closer to the theoretical ideal of "unmediated reality" to which Levinson refers.

and left brain, between linearity and creativity. A possible tetrad for the Internet[45] is shown below (Fig. 1).

> In Tetrad form, the artifact is seen to be not neutral or passive, but an active logos or utterance of the human mind or body that transforms the user and his ground. (McLuhan & McLuhan, 1988, p. 99)

Fig. 1

Enhancement	**Reversal**
• encourages lateral (hypertextual) thinking and pattern recognition • breaks down barriers between home/school/work, disciplines • speeds up everything • compresses time and space • information as a commodity	• infoglut, "noise"(no gatekeeper) • loss of identity, place, history (replaced by an ever–changing landscape) • totalizing "god–trick" of being everywhere and nowhere at once • information as free • simultaneity • compu–literacy, post–literacy
Retrieval	**Obsolescence**
• tribal culture and non–linear thought • holistic thinking • "public" space (global village) • community (but of common interest rather than physical place) • social responsibility (global more than local) • skills and literacy	• privacy • memorization (erodes individual memory) • reference works • all prior media while retrieving them as content in altered forms

Rather than explore each of these possible avenues in depth, I will treat the whole tetrad as a surface[46] with multiple points of departure or "lines of flight"[47] that allow a

[45] Adapted from Anthony Hempell (1996).

[46] A surface is a space that is lateral rather than hierarchical, where every point is connected with every other point. Surfaces are complex structures but the complexity does not "involve alternative epistemological or ontological dimensions" (Taylor & Saarinen, 1994, Superficiality: 8). By treating the tetrad as a surface, I am simply saying that there is nothing more to it than the complex surface that you see.

[47] Gilles Deleuze and Felix Guattari (1980/1987) describe lines of flight as a temporary escape or movement that can allow for the transformation of a structured, hierarchical, rule–bound, linear space.

brief escape from "arborescent thought"[48] (Deleuze & Guattari, 1987). The tetrad is a surface because it aims at describing effects rather than delving in a deep way for hidden or historical causes. There is no search for transcendence in the tetrad.

Computers and the Internet are both part of the ultimate surface experience — they represent more than any actual artifact a surface without depth. I surf from link to link, skimming along a surface that is always image–inary. On my screen I see re–presentations that are never things in themselves. Here even the text is a simulation. Certainly there are actual components inside the computer case, and other computers in the global network that is the Internet, and other people operating them on their side of the looking glass. But the surface that I interact with and through, that I respond to and that responds to my touch, is all surface and unreal virtual depths. On a desktop that isn't a desktop I open folders that aren't folders to see an inside that isn't inside at all. I surf in hyperspaces that occupy no space and involve no actual travel. What is going on here? Even the transparent case of my iMac is only apparent. I can see inside to the components but they are so far removed from my surface experience at the screen that I have no real conception of them; they are things that I can see but that I dare not touch. It's a curious world where the interface keeps being moved farther and farther away from the "reality" of ones and zeros, of electrical on and offs, either/ors. And all the while I get the appearance of more control at one level as my choices are gradually erased at another[49].

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[48] Arborescent thought is described by Deleuze and Guattari as being linear, hierarchical and stratified. "Arborescences are hierarchical, stratified totalities which impose limited and regulated connection between their components" (Bogue, 1989, p. 107)

[49] See Marcel O'Gorman, (2000) for an extended treatment of transparency, interfaces and user control of computers.

As I see it, the Internet and hypertext are both what might be termed surface media, or perhaps interface media. Not only does all of the interaction occur through the surface of the screen, but the engagement with a linked–text also shifts knowing from depth to surface. In fact a colleague of mine remarked that he worries that the use of the Internet for research leads to a kind of superficial, surface, skimming mode, where quantity and surface are privileged over quality and depth of knowledge. And while this is a possibility it is not the complete picture.

> Superficiality is not merely a matter of knowledge but is a style of practice. The practice of superficiality carries one beyond the bounds of expert culture by crafting techniques of adaptation that have transformative effects. Superficial practice produces a bricolage that is perpetually shifting. (Taylor and Saarinen, 1994, Superficiality: 13)

When I as an educator am aware of the shift from depth to surface, the nature of online learning can become one of the foci of instruction and the use of the Internet and hypertexts can increase the richness of the student's experience. Then "[t]he interplay of surface and depth gives way to a perpetual displacement of surfaces that is anything but superficial" (Taylor & Saarinen, 1994, Telewriting: 6). In my experience, this surface knowing provides a "depth" of understanding that I don't get very often from standard texts. Surface knowing is a knowing that is not predicated on hidden static essences, on depths. It is not based on the chopping up of knowledge, on categorization and rigid classifications, on hierarchies and power structures, and binary oppositions. It is a knowing that is not limited to logic, linearity and rationality alone. It is a knowing not based in the head but in a whole body experience. Surface knowing is based in relationships and pattern. Its structure is lateral, its pathways multiple. It is based not on a search for the truth but on exploration and experimentation. Its aims at the opening of possibilities.

> ...understanding presupposes a substantial metaphysics in which depth and interiority are valued more than surface and exteriority. If, however, depth is but another surface and interiority is really an alternative guise of exteriority, nothing stands either under or within the play of appearances. Representing nothing beyond itself, this play is an inter–play, which is the medium that constitutes every place between and renders every thing transitional. In contrast to the dialectical structure of the Hegelian idea, the rhizomic structure...establishes connections without integrating differences or sublating opposites...things neither come together nor fall apart. Circuits are not closed but open, constantly changing, and repeatedly shifting. Governed by neither the inclusive logic of both/and nor the exclusive logic of either/or, *interstanding* [italics added] apprehends that which stands between. To play its intermediate role, interstanding must remain as open–ended and shifty as the errant milieu of folding. (Taylor, 1995)

Another way of thinking about surfaces and networks like the Internet is Deleuze and Guattari's concept of the *rhizome*[50]. In fact it almost seems as though they are theorizing the Internet. The parallels between Internet and rhizome were strong enough for Robin Hamman (1996) to conclude that "the Internet is a rhizome."[51]

> A rhizome has no beginning or end; it is always in the middle, between things, interbeing, intermezzo. Between things does not designate a localizable relation going from one thing to the other again, but a perpendicular direction, a transversal movement that seeps one and the other a way, a stream without beginning or end that undermines its banks and picks up speed in the middle. (Deleuze & Guattari, 1980/1987, p. 25)

There are at least three important hypertextual concepts touched upon in the above quote. Like the rhizome, the Internet has "no beginning or end"; there is a blurring of boundaries between distinct things. Where does a web document begin and end? Where does the Internet begin and end? Where does *this* writing begin and end? In hypertext, the

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[50] In biology, a rhizome is a horizontal, root–like stem that extends underground and sends out shoots to the surface. The term is used here by Deleuze and Guattari to describe non–hierarchical lateral networks of all kinds. In their words, "...the rhizome is an acentered, nonhierarchical, nonsignifying system with a General and without an organizing memory or central automation, defined solely by a circulation of states" (1980/1987, p. 21).

[51] Robin Hamman (1996) takes up each of the six rhizomatic principles — connnection, heterogeneity, multiplicity, asignifying rupture, cartography, and decalcomania —outlined in *A Thousand Plateaus* and examines how well each one maps onto the Internet.

answers to these questions are not clear and I am drawn in to question book–based texts in this way. Because there are no clear beginnings or endings there is only the in–between. We are "always in the middle, between things, interbeing, intermezzo".

In the Internet, this parallel with the rhizome shows up in several ways. It is in the drawing of my attention away from the nodes, the points, the objects, the content, and toward the links, the connections, the gaps, the space. "In striated space[52], lines or trajectories tend to be subordinated to points: one goes from one point to another. In the smooth, it is the opposite: the points are subordinated to the trajectory" (1980/1987, p. 478). In hypertextual writing and reading, the parallel with the rhizome shows up in the sense that the job is never finished, that there are always other avenues to explore and develop.

Speed is another important concept in *A Thousand Plateaus: Capitalism and Schizophrenia* (1987). For Deleuze and Guattari, speed is not so much concerned with actual motion as it is with achieving a lightness, a freeing of oneself from the gravity that constrains striated space/thought, that pulls it back to earth. The speed of access of information in a hypertextual system like the Internet allows me to "pick up speed" and lift–off in a "line of flight" rather than follow a line of reason. In standard book–based research, if I care to follow up on a reference the process may involve a period of days. I

[52] Striated space is defined by Stuart Moulthrop as "the domain of routine, specification, sequence, and causality. Phenomenologically, it consists of the world of perception as processed by the coordinate grid or some other geometric structure into a set of specified identities. Socially, striated space manifests itself in hierarchical and rule–intensive cultures, like the military, the corporation, and the university." Smooth space, on the other hand, is "defined dynamically, in terms of transformation instead of essence. Thus, one's momentary location is less important than one's continuing movement or line of flight; this space is by definition a structure for what does not yet exist. Smooth social structures include ad hoc or populist political movements, cooperatives, communes, and some small businesses, subcultures, fandoms, and undergrounds" (1994, p. 303). But the two spaces are not in binary opposition, "...the two spaces in fact exist only in mixture: smooth space is constantly being translated, transversed into a striated space; striated space is constantly being reversed, returned to a smooth space. (Deleuze & Guattari, 1980/1987, p. 474)

make a thirty–mile trip to the University library in Victoria, check through the catalogue to see if the book is there, retrieve it from the shelf (or put in a recall order), take it home, and finally read it. Between the time of the reading of the original text and the reference are many other experiences and thoughts — the original network of thoughts that led me to follow up the reference is gone and another has taken its place.

In a hypertextual system, the same process can be instantaneous, a simple click on a link. There is most certainly an effect of this "absolute speed" of access. What I am thinking while reading the original text when I chose to follow the link, and what I am thinking a week later when I finally get the book the old way are likely to be very different. And even whether or not I chose to follow a reference is determined to some extent by the ease of the task. I follow many more links in online research than in onground work simply because the task is simple. I click and I am there. No car, no trip, no time. My writing, reading and thinking are more connected, relational and open, less linear. The process is more spontaneous, emergent. I begin to think in patterns instead of facts.

On the Internet time and space collapse in instantaneous access, in a moment of "absolute speed." This move toward an electronic "allatonceness" (McLuhan, 1967, p. 63) is experienced as the increasing permeability of boundaries, as a blurring of differences and distinctions, as the multiplication of possibilities. It is almost a collage effect — texts and discourses appear in such close proximity in this collapsed time/space that they are almost juxtaposed. When reading hypertextually what becomes apparent are the connections and relationships between different discourses and fields of study rather than their differences — "the points are subordinated to the trajectory."

Cognition, mind and knowing

A number of theorists, Landow (1992), Turkle (1995), Moulthrop (1994), Hayles (1999), Bolter (1991), have noted parallels between post–modern theory and hypertext. Although the language used in each of these discourses is somewhat different, the themes seem to be remarkably similar. I see the post–modern turn in these fields and in my description of the Internet and hypertext as post–modern spaces as being symptoms of the same large–scale shift. This move can be seen as another example of the kind of convergence that Katherine Hayles has repeatedly described (1984, 1990, 1999). She suggests that what appear to be relatively simultaneous and independent paradigmatic shifts in a number of fields are more likely symptoms of a larger cultural change. But I would prefer to think of these changes in reversed terms — as emergence rather than convergence — as rhizomes that open the flow in rigidified discourses and allow "lines of flight" to emerge, to escape. I believe it is useful to follow George Landow (1992) and Sherry Turkle (1995) who see the Internet as an embodiment or grounding of post–modern theory. At the same time, I think it's important to recognize that post–modernism can also be seen to be theorizing hypertext (Taylor & Saarinen, 1993). But a more pressing question for me is: does acquiring a "webness" also mean having a more post–modern understanding of the world and my experience in it?

The epistemological shift from modernism to post–modernism also has an important parallel in the changes wrought by new scientific models of knowledge and learning on the cognitive sciences. Epistemological and scientific conceptions of knowing have both moved away from linear mechanistic descriptions into a realm that can be characterized as chaotic — both in terms of chaos theory and the ancient more familiar meaning.

Modern epistemology and cognitive science can be seen to begin with Rene Descartes' philosophical splitting of the mind and body. As noted by William Doll Jr. (1993) "...Descartes' division of the human into two mutually exclusive parts — *res cognitans* (the mental) and *res extensa* (the physical) — has led to two different views of mind" (p. 115). These two views have been the domain of the rationalists (Descartes, Plato) on the one hand and the empiricists (Galileo, Bacon, Newton, Aristotle) on the other hand. Although Newton belongs clearly in the empiricist camp, as Morris Berman (1984) argues his work supported Descartes central idea — "that the world is a vast machine of matter and motion obeying mathematical laws (p. 30). In a sense Newton's work fused rationalism and empiricism into the scientific method.

The difficulty in either the rationalist or empiricist position comes in the assumed relation between mind and body. The mind–body dichotomy forces us to select between the mind as immaterial or the mind as a bodily organ. This either/or choice demands the exclusion of other options and makes it impossible for either rationalist or empiricist to fully describe cognition.

Historically the empiricist view of the mind as an organ gained prominence and a mechanistic way of describing cognition and knowing developed. The mind as a muscle was the perfect mechanistic metaphor for Newton's mechanical universe and the idea persisted until well into this century reaching its pinnacle immediately after world war two with the cybemeticists. During this period much of the research in cognition was directed toward theories that sought to explain it in mathematical terms, a direction that was extended by the invention of the computer. According to Fritjof Capra (1996), "John von Neuman's invention of the computer and his analogy between computer and brain

functioning are so closely intertwined that it is difficult to know which came first" (p. 66). Soon after the computer's invention, the mind as a computer became the dominant metaphor in brain research and remained so for more than thirty years. This mechanistic cognitive model reduced human beings to information processors and learning to information transfer. In education it served to reinforce a mechanistic lock–step curriculum designed to follow the Tyler rationale and we in education began to speak like technicians about learning objectives and preplanned outcomes.

More recently post–modern shifts in science, philosophy, and the culture at large have led to new models of learning, mind, and knowing. One important thing that came from cybernetics and systems thinking, as Capra (1996) points out, is a recognition of the importance of pattern. And the pattern common to all living things is the web or the network — networks that are self–regulating and self–organizing. Maturana and Varella (1998) use the term autopoiesis, "self–making," to describe these self–regulating and self–organizing networks. They also equate autopoiesis with the pattern and organization of living systems. "Autopoiesis… is a network pattern in which the function of each component is to participate in the production or transformation of other components in the network" (Capra, 1996, p. 162). Of course, autopoietic systems do not exist in isolation; they interact with one another. Maturana and Varella (1998) would say that structural coupling occurs when "there is a history of recurrent interactions leading to the structural congruence between the two (or more) [autopoietic] systems" (p. 75). As I quoted Capra (1996) in an earlier section, Maturana and Varella identify "cognition with the full process of life," and so cognition and autopoiesis are intimately related. I also noted that cognition is "a process that involves neither the transfer of information nor

mental representations of the outside world." In other words, the human mind does not process information at all as a computer does, but modulates its structure in response to the environment by the process of structural coupling.

> [Maturana] postulated that the nervous system is not only self–organizing but also continually self–referring, so that perception cannot be viewed as the representation of an external reality but must be understood as the continual creation of new relations within the neural network. (Capra, 1996, p. 96)

Maturana's views of the mind as a complex multiplicity are echoed in the description of thought given by Deleuze and Guattari (1980/1987) in *A Thousand Plateaus*:

> Thought is not arborescent, and the brain is not rooted in ramified matter. What are wrongly called "dendrites" do not assure the connection of neurons in a continuous fabric. The discontinuity between cells, the role of axons, the functioning of synapses, the existence of synaptic microfissures, the leap each message makes across these fissures, make the brain a multiplicity immersed in a plane of consistency or neuroglia, a whole uncertain, probabilistic system ("the uncertain nervous system") (p. 15).

Following these descriptions of the mind as a complex self–organising dynamic system, I think that rather than conceive of a Cartesian mind–body split, it's more useful to follow Paul Davies' path as described by William Doll. Davies conceives "of mind at two levels — as a thing at the brain level and as an abstraction or a metaphor at the conceptual level" (Doll, 1993, p. 116). At the physical level, the brain can be thought of mechanistically, but at the higher cognitive level the metaphor of a network with emergent patterns and relationships becomes more important. The cognitive level is "filled with nonlinear, spontaneous, chaotic activity" (1993, p. 116). To follow this chaotic metaphor further, I could say that mind is an emergent phenomenon of a complex non–linear system. I want to be careful here to emphasize what it is I mean when I use the term emergent. Emergence is not predictable, controllable, or part of a linear cause and effect relationship. It is more accurate to say that emergence is the welling up of

pattern from within the chaos. It is the grass that sprouts from the complex rhizome beneath the soil.

The move from mind as machine to mind as a network is consonant with many parallel changes in the move from modernism to post–modernism. It is the shift from knowing as a linear, hierarchical process located within an individual, to knowing as a non–hierarchical network process occurring "out there" on the surface inter–subjectively. According to Maturana and Varella (1998), "Self-consciousness, awareness, mind...are phenomena that take place in language" (p. 230) and are therefore social activities in a social domain. What happens to what we know as the way we know shifts from linear to multi–linear and from depth to surface?

Interstanding

The shift in the process of knowing opened up by theorists such as Deleuze and Guattari, Capra, and Maturana and Varella is described well by Taylor and Saarinen's (1994) *Interstanding*:

> When depth gives way to surface, under–standing becomes inter–standing. To comprehend is no longer to grasp what lies beneath but to glimpse what lies between...Understanding is no longer possible because nothing stands under...Interstanding has become unavoidable because everything stands between...(Interstanding:2–3)

Interstanding means quite literally "to stand between" and is as Stuart Moulthrop suggests "a way of knowing appropriate to hypertext" in that it allows the "exploration of what Joyce calls 'interstices' and 'contours,' or what Giles Deleuze and Felix Guattari call 'lines of flight'... In moving from the page to the interstice, from understanding to interstanding we ostensibly reverse figure and ground, transforming the condition of textuality" (1995). This "between" is the smooth space of the rhizome, a space opened up between discourses in which to make meaning. Interstanding is not characterized by

points made and defensible positions (if I chose to take up the war–like vocabulary of modern research). It is rather a space that is occupied, its primary attribute being motion. It is a place of guerilla warfare, of "strike and move" rather than the sedentary method of "build and defend". But I think we would all do well without the war metaphors because they lead to the war–like behavior that has become institutionalized in research and education and the culture at large. I think it is better to say that the rhizome and the smooth space it helps create are multiplicities, spaces that are nomadized but not built upon. They are occupied without settlement. Interstanding is the move from an epistemological base for knowing to an ontological one — from logos, the law of substances to nomos, the designation of places or occasions. Knowing is no longer tied to place and identity but to movement across boundaries.

Jacques Derrida in his deconstruction can be seen as moving from understanding to interstanding, from depth to surface. In his famous pronouncement, Derrida (1967/1976) said "there is nothing outside the text" (p. 158). By expanding the concept of text without limit Derrida erased the outside. Text is the same as context. There is no interiority or exteriority, surface and depth are one in the same. In Derrida's reading, the Internet, and every other part of our "reality", is within the text, in the sense that all understanding occurs through language. However, language is not the only mediating technology involved in understanding. There are many other levels of mediation occurring as well. Language in its various forms (i.e. written, spoken, iconic and gestural) is always itself mediated by our sense organs, our ganglia and our nerves. It is also mediated by our emotions and our history. Given that "the medium is the message", the medium in which language occurs is as important as the communication itself. The Internet is not simply

text on the screen (even on a text–only page) instead of text on the paper. And even this distinction is misleading, since I am focussing on the text — which in the Internet's case is a medium within a medium, and so is not quite text. When text is mediated through the Internet, the text itself becomes part of the message rather than simply the means of communication. This discussion becomes even more complex if I consider the effects that the addition of graphics, sound, animation and video have on the environment and our engagement with it. To put it simply: Our experience (and therefore the way we know) is different on the Internet than in our onground experience (which itself has many ways of knowing).

But I have to be careful in pushing the distinction between printed text and hypertext too far. As Paul Levinson (1999), a former student of McLuhan's put it when speaking about the similarities between text and hypertext: "If we stare too long into the rear–view mirror, focussing only on how the new medium relates to media of the immediate past, we may crash head–on into an unseen, unexpected consequence. On the other hand, if we only look straight and stiffly ahead, with no image or idea of where we're coming from, where we've just been, we cannot possibly have a clear comprehension of where we are going" (p. 176). So this is the challenge — to not get too caught up in similarities with the past but at the same time to not lose sight of the past altogether.

Hypertext is not text

With the emergence of the hypertextual and multimedia capabilities of the Internet come changes in the educative potential of the medium. As McLuhan recognized, changing one aspect of a medium can altogether change the environment. By connecting a computer to the Internet the computer becomes part of an entirely new medium. And

while the linearity and deterministic aspects of computer hardware, software and print itself are not gone, they are most certainly transformed at the surface/interface.

> ...print is not dead, nor is it merely sleeping...[it] is actually undead, which is to say that it lingers on, monstrously transformed, haunting us in the dead of night...technologies like hypertext portend a cultural paradigm shift. This would be a change from monologue to polylogue, from edifice to improvisation, from Bildung to bricolage. (Moulthrop, 1995)

As Scott Bukatman (1994) suggests, despite movement towards multimedia, hypertext — and the Internet itself — still "remains rooted in the culture of the word" (p. 14). But hypertext is not the same as book–based text and although it is sometimes presented as non–linear hypertext is really multi–linear. The reader always follows or creates a line through a series of hypertext documents. Since the structure of a hypertext can be lateral instead of linear and hierarchical its use begins to break down the traditional step–by–step logical argument. Other forms of knowing which were often difficult to work with in book form, such as bricolage and juxtaposition, lend themselves to the form of hypertext[53].

Something else that comes from a hypertextual reading is a clearer recognition of a text's or discourse's situatedness within a larger fabric of power relations. And as I notice the connections more, an almost contrary effect occurs so that I also notice the in–between, the inter–textual, the gaps, the unsaid and perhaps the inarticulable.

Documents become less linear and less hierarchical. There are often sections and attempts to organize around some key concepts but it is often a rather loose structure. Ideas come up again and again and recurse on themselves perhaps reflecting the

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[53] According to the O.E.D. (1998), *bricolage* is the practice of assembling a diverse range of fragments into a new construction, usually making use of materials at hand a while *juxtaposition* involves arranging disparate elements close together for contrasting effect.

non–linear processes that went into producing the hypertext. Contrary to much writing about writing, links between ideas are always multiple, shifting and contextual. For me, ideas need to be multiply connected and multiply contextualized. Rather than making a point hypertext rambles, roaming like the nomad thought described by Deleuze and Guattari. In a hypertext, I am attempting to map out a territory[54], not by taking up a position, by becoming stationary, sedentary, but by wandering, by nomadizing, by occupying[55] the territory. Nomadizing is a spatial way of being, being–in–space rather than being–in–time.

> The way I relate to the world of instant and pervasive communications is from my point–of–being, not my point–of–view. There is only one place where I am completely there, and that is within my own skin, even though that skin and its technologically assisted sensory extensions reach far beyond the immediate limits of vision, touch and hearing. My point–of–being is not exclusive but inclusive; it is not a perspective vision that frames reality, but rather, is a place defined by the precision and complexity of my connections with the world. (de Kerckhove, 1995, p. 187)

It is an ontological move — a different way of being–in–the–world — that gives rise to a different way of knowing. This nomadic wandering is not without purpose; however, the purpose is not to reach a pre–defined goal or to answer a question, but rather to keep the question open, to keep the play in play, to create more questions. These wanderings know no disciplinary and stylistic bounds, but instead cross, intersect, connect seemingly disparate elements. Boundaries blur, membranes become permeable and the solid becomes fluid.

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[54] Map is used in the way Deleuze & Guattari (1980/1987) use the term. Mapping is a way of knowing and a way of being. Maps are of rhizomes, they are a way of living that "is in contact with the real," a way of living that doesn't simply reproduce the same old either/ors. Mapping is the act of negotiating a multiplicity without reducing/organizing/capturing it.

[55] The term occupy is not used here in the sense of holding a position or taking control of a (striated) space but in the sense of spreading out, of distributing myself, of moving within and through a (smooth) space.

It is in this way that I understand the space that's been opened by hypertext: It is a space filled with complex interactions of surfaces that appear discrete but are really continuous with one another. There are no truly separate things or ideas in this space, just relationships through it. Or, as Ted Nelson (1987) observed "[e]verything is deeply intertwingled" (2/31).

As I said before, the Internet can be seen as the confluence of a number of media, or perhaps better, as the emergence of a completely new medium from the system of older media. The variety of media involved makes the Internet a very complex experience, and a difficult one to analyse in any traditional sense of the word. Each of the content media is important in shifting our engagement and how we know, and although the shifts are not always in the same direction, there is an overall pattern to the change. By focusing on the medium of hypertext, I am trying to discern the shape of this larger pattern. Ted Nelson (1987), the originator of the term hypertext, defined it as "non–sequential writing" (p. 29). I think Nelson's definition is useful because it includes the crossover multi–linear book–based texts written by such post–modern theorists as Roland Barthes (1970/1974), Deleuze and Guattari (1980/1987) and Derrida (1974/1986) as well as focusing on what I believe to be the most important aspect of the Internet — its potential for non–linear[56] knowing — interstanding.

Hypertext, because of its linking capabilities, is a multi–linear medium. The basic building blocks of hypertext documents are nodes and links. Nodes are pieces of information, the content. Arguably the single most important (and if I were disposed to using such terms, the essential) feature of the Internet and hypertext is the hyperlink (or

[56] Non–linear is used here to shift the focus away from a step–by–step, hierarchical linearity but the term multi–linear may be a more accurate description of the alternative I'm suggesting.

simply the link). Links allow the users to navigate between associated nodes. The link is an object (word, phrase, icon, picture) that, when clicked on with a mouse, takes the reader to another document or another point in the current document. This single innovation allows writing, reading and thinking the opportunity to escape from the hierarchical, linear box within which it's become progressively imprisoned since Gutenberg.

> A hypertext is not a closed work but an open fabric of heterogeneous traces and associations that are in a process of constant revision and supplementation. The structure of a hypertext is not fixed but is forever shifting and always mobile. The interplay of surface and depth gives way to a perpetual displacement of surfaces that is anything but superficial. Branching options multiply, menus reproduce, windows open on other windows, and screens display other screens in a lateral dispersal that disseminates rather than integrates. Hierarchy unravels in a web where top and bottom, up and down, lose consistent meaning. Everything everywhere is middle. Instead of an organic whole, a hypertext is a rent texture whose meaning is unstable and whose boundaries are constantly changing. There is no clearly defined preestablished path through the proliferating layers of a hypertext. Though the network is shared, the course each individual follows is different. Thus, no hypertext is the product of a single author who is its creative origin or heroic architect. To the contrary, in the hypertextual network, all authorship is joint authorship and all production is co–production. Every writer is a reader and all reading is writing. While sometimes printed on a page, the medium of the hypertext is essentially electronic. Neither simply universal nor individual, general nor particular, fixed nor fluctuating, structured nor amorphous, grounded nor groundless, original nor copy, hypertextual space displays and evokes an alternative architecture. (Taylor and Saarinen, 1994, Telewriting: 6)

There are a number of features of hypertext that distinguish it from most book–based texts:[57]

- Authority and authorship are disrupted
- Roles of author and reader are blurred
- There is no clear beginning and ending of a text and no clear centre (decentred) — containment is disrupted. There is a shift from a closed system with one true meaning → Open system and the proliferation of meanings.
- The relationship of a text to other texts is less/not fixed

[57] See for example Landow (1992), Taylor and Saarinen (1994), Moulthrop (1995), McLuhan (1967), and Deleuze and Guattari (1980/1987) for extended treatment of these points.

- Linear→ non/multi–linear
- Depth (understanding) → Surface (interstanding)
- Space and time are collapsed into an "allatonceness"

Because hypertext still "remains rooted in the culture of the word," poststructuralist and post–modernist philosophers, with their view of the primacy of language can be particularly informative. And of course, as Landow and Bukatman suggest the reverse is also true. In Bukatman's (1994) words: "...hypertext permits an exploration of some poststructural tenets". Catherine Beavis and Noel Gough (2000) identify some of these, and suggest that "[i]nteractive computer games and the non–linear hyperlinked texts of the internet challenge many of the conventional understandings of narrative, reading and location..." (p. 1). They go on to describe what reading might mean in this context: "Computer games seem almost to materially enact many metaphoric dimensions of much recent literary theory–including the view that the text in some respects only comes into existence when engaged by the reader, that the reader is an active participant in the joint construction of meaning, that the same text is never read twice, that reading moves forward through an interaction between expectations, extra– and intra– and intertextual knowledge and speculation, and so on" (2000, p. 2). Hypertext is, as these theorists suggest, the embodiment of post–modern theory. But it is more than just the testing ground for post–modern theory that Landow envisions; it is important because the medium is shaping our culture by shaping people's experiences. As more and more people, particularly the youth, experience this more connected way of knowing, their expectations of learning and schools and of society in general are likely to change. Seeing many discourses side by side (or at least in close proximity to one another) almost forces one to take notice, to ask questions, to begin to think critically. There is of course no

guarantee that critical thinking will emerge all on its own, but I think the web offers an opportunity for educators to help shape the process. It offers the chance for students to begin to understand the relational nature of knowledge.

Implications for Educational Contexts

From McLuhan and his heirs in media research, to post–structural and post–modern philosophers, to literary criticism, to hypertext research and cognitive science, there is evidence of similar movements in thinking. These shifts lead to what may be termed a post–modern experience for the user, a shift to knowing as relational, contextual and connected.

Youth, more than anyone, are already living this "electronic drama" — are already always in the middle of this new story — one that is likely very different from their teachers' and parents' and bosses' ways of living and knowing (Tapscott, 1998; Turkle, 1984; McLuhan, 1967). Because "all media are active metaphors in their power to translate experience into new forms" the ways people learn and know can also be assumed to be moving along a post–modern vector (McLuhan, 1964, p. 57). Young people who spend a considerable amount of time in Internet–mediated environments learn to think, feel and act within the new parameters of interactivity, connectivity and hypertext. Participating in web surfing, global chat rooms, online communities and creating their own websites are actions that influence students' knowing in ways that may differ from people who do not participate in these environments. As Catherine Beavis and Noel Gough (2000) put it, "many young people have different ways of being in the world as a consequence of their immersion in digital culture—ways of being that we 'the occupants of history' could do well to learn from" (p. 3).

The implications for education, which is largely still rooted in linear, hierarchical ways of knowing that privilege a depth of understanding are enormous. McLuhan (1964) ventures to say that "in the history of human culture there is no example of a conscious adjustment of the various factors of personal and social life to new extensions except in the puny and peripheral efforts of artists" (p. 64). I think it's time for education to take up this challenge and begin to question the vast social changes to which the new media are contributing.

Computers, or the Internet, or more specifically the web as a medium, are rarely used to their educational potential. We are continually "striving to force the new media to do the work of the old" (1964, p. 94). We put pieces of paper onto the web, and make some links. Sometimes we put in a sound or a picture or a video clip. But we are making large–scale use of only one of the webs' possibilities — we use it as an information distribution system. Information is posted on fairly static pages, and in place of footnotes and bibliographies there are hyperlinks.

At a recent Vancouver Island school district administrator officers' meeting, the question on everyone's mind was "O.K., now we have the technology, what are we going to do with it?" Little thought was given in advance as to why the technology was needed or what it was going to be used for. When this occurs, computers often become little more than glorified typewriters (when equipped with word processing software) or glorified libraries (the Internet as research tool). In many ways, the web has not yet decided what it is going to be when it grows up. This is typical of the early years of any new medium, as access, resources and skills remain scarce and a fuller understanding of the new medium has not yet developed. But the question I have, the one that continues to

remain unanswered, is what is the web about as a medium in educational contexts? What possibilities do computer mediated interactions open up for education that weren't there before, or weren't this accessible or doable? What are the larger social and moral issues that we need to pay attention to? And how do people's experiences on the web make their other experiences different as well?

Hyperliteracy

> The use of computers in schools is based on the now outdated view of human beings as information processors, which continually reinforces erroneous mechanistic concepts of thinking, knowledge, and communication. Information is presented as the basis of thinking, whereas in reality the human mind thinks with ideas, not with information...information does not create ideas; ideas create information. Ideas are integrating patterns that derive not from information but from experience. (Capra, 1996, p. 70)

> Hypertext is a characteristic product of the late age of print, which is to say it is deeply ambiguous. While still dependent on alphabetic literacy, algorithmic programming, linearity, hierarchy, and other trappings of Gutenberg culture, hypertext implicitly challenges the episteme from which it sprang. (Moulthrop, 1995)

In other words, hypertext is rhizomatic text, which allows for the breaking free of textual constraints. Although individual pages are still very often composed of text in traditional linear sentence/ paragraph style with pages linked to one another in a linear and/or hierarchical structure, with hypertext they no longer have to be. The structure of most web pages and web sites is not a result of the medium but of the human habit of "striving to force the new media to do the work of the old." The key feature of the Internet/hypertext that I have been considering is the link and the connectivity that it allows. Making use of this linking capability in non– and multi–linear forms is one possible educational use that has been under–explored.

R.J. Spiro and his colleagues at the University of Illinois have developed a model called "Cognitive Flexibility Hypertext" that applies Cognitive Flexibility Theory to the

design of instructional hypertext. Their model has considerable promise for educational use particularly for teaching in "ill–structured domains" which "are characterized by the *contestability* of foundational hypotheses..." (Spiro, Coulson, Feltovich, & Anderson, 1998, p. 154). The idea is to simply make use of the strengths of medium of hypertext — e.g. non–linearity, multiple pathways, re/multiple configurations for multiple readings. They have found their method to be effective for teaching particularly complex and chaotically structured knowledge. But I think I can take this farther and include hypertexts for teaching in "well–structured domains" as well. Because hypertexts allow for multiple pathways and multiple readings they offer new and creative ways to understand rigidified, "well–structured" disciplines and I have found hypertexts to be a particularly effective deconstructive tool. They allow a way out, a line of flight.

When I look for a student to have a grasp of a concept or a depth of understanding I am presupposing concepts as objects and hidden essences. When I want them to follow my line of reasoning or get my point, when I say I am reading between the lines but am actually searching for what is behind the words, I am trapped in what Deleuze and Guattari (1980/1987) would call "arborescent thought." Statements such as "you're not thinking straight" belie the modernist rationalistic linear paradigm from which they emerged. I don't expect students to "think straight," step by step. Straight thinking has been unnecessarily equated with correct thinking, proper method and validity. And while it *may* have been fine for a linear mechanistic industrial world and workplace with schools modeled on the production lines on which the students would later work, it should have a much smaller place in today's fast changing post–modern landscape. In an era when a one–career lifetime is no longer likely or even possible, a method that arrives

at one certain answer takes on less importance. Now it is more important to think in a connected, big–picture way. With the recognition that there are no clear answers and with the end of certainty come knowing as contingent and contextual, as embedded and emergent — knowing as pattern recognition and pattern making. Literacy as an educational aim takes on a new meaning in a hypertextual environment.

> The term computer literacy has been taken to mean either the ability to operate a computer...or a technical knowledge of programming and concepts of computer science...we have been exploring a different and more general definition of computer literacy: the ability to read and write in the computer medium and an understanding of how the computer fits into the long tradition of the technologies of writing. (Bolter, 1991)

> It is important to remember that when computers are networked, they cease being like fancy typewriters and take on new powers: the power to change how people relate to each other and the power to speed up classroom processes. Both powers can be brought to bear on the writing classroom, but only with training that is far different than the usual computer training. The normal computer training is like learning to drive: you still move along the ground but faster; training in networks is more like learning to fly: you have to become comfortable in a new medium. (Batson, 1989, p. 254)

Given the new medium and related shifts in knowing, do the Internet and hypertext require a new form of literacy? Or does our online experience just draw attention to the way we already make meaning in the world, the way that we often deny as illogical and irrational? Is it just magnifying the post–modern trend and exposing and exploding our assumptions about validity, truth, learning, knowledge, knowing and being?

Beavis and Gough (2000) suggest that a new form of literacy is necessary and in the same way we have critiqued conventional forms of literacy, they point out that we as "[e]ducators...have a moral obligation to critique [the meanings of digital texts that we chose to privilege] — and dispose students to do likewise" (p. 5). This is a very important stance, made all the more important if we look at digital media such as computers and the Internet using McLuhanesque tetrads. McLuhan (1988) noted that every medium

retrieved something of the past that a previous medium had obsolesced[58]. Television brought back costumes and lighting which had been obsolesced by the non–visual medium of radio. At the same time, television enhanced instant visual global communications and obsolesced literacy, requiring little or no reading for its use. The Internet with its retrieval of text also retrieves the literacy that TV obsolesced. The retrieval of text and literacy makes media criticism of a literary nature a viable enterprise again. Because the main content of the Internet is text, we're going to have to learn to "read" this new medium. And if we have to read hypertext then we had best learn to read it critically, so that we aren't entirely trapped under it, enframed.

At this point at least, some training is required to make proper use of the Internet or a home computer. This kind of training was not required by prior media such as TV, radio, or automobiles but has much in common with the literacy necessary to make use of books.

The Internet's retrieval of both text and literacy (albeit both in digital form) has led to much of the current talk about computer literacy, digital literacy and even hyperliteracy but before going much farther, I think we need to be careful of what we mean by literacy.

> When I think about the English literacy students that I teach, what they are learning is how to use the language. They are learning to use language as a tool. Some of the more advanced literacy students may critique literary works, but at a literacy level, they never critique the English language, the tool itself.
>
> In the same way, teaching technological literacy does not equip students to question technology itself, only its application. The question is never "Should technology be used to solve this problem?" but is rather, "What technology should be used to solve this problem?" Within this instrumental curriculum, "[e]verything depends on our manipulating technology in the proper manner as a means" (Heidegger, 1954/1977, p. 289). Everything depends on mastery and control (Brewer, 2000, p. 11–12).

[58] It is important to note that the elements that are obsolesced are not gone from culture, they merely serve a less important function, being dominated by the new medium.

Perhaps a better term than either computer or digital literacy is hyperliteracy. Hyperliteracy implies more than literacy. It suggests that we must move beyond the basic ability to read and write and beyond the skills necessary to make use of a computer. In British Columbia, there is an information technology curriculum from grades K through 12, which allows plenty of time for students to develop more than just basic computer skills. Students need to be aware of and explore the interconnectedness of technology and society and self. They need to be able to question the nature of these connections and relationships and not just accept them as "natural". Questions of power relations, of who programs hierarchies and relations into software programs, who designs search engines and their underlying search functionalities are among the issues that need to be made explicit in education. Individuals need to be aware that technologies shape us as we shape them and to be aware of what emerges from our interactions with and through technologies. As Neil Postman (1996) puts it, "[w]hat we needed to know about cars — as we need to know about computers, television, and other important technologies — is not how to use them but how *they* use us" (p. 44).

The kind of critical thinking that we teach can also shift. In a traditional linear text, we often critique by finding holes in an argument. And because the writing process is one of piecing thoughts together, of smoothing over the rough spots, the holes are there to be found if we look close enough. "[T]he structure of ideas is not sequential. They tie together every which–way. And when we write, we are always trying to tie things together in non–sequential ways" (Nelson, 1987, p. 29). There are always gaps in the thought process that come through as gaps in the written work, which we then work very hard to cover up, so that the final text appears to be seamless. Hypertext can be different:

> The work must also be riddled with gaps, spaces and openings that invite the reader to write. White space becomes the site of transaction in which the event of understanding occurs. (Taylor and Saarinen, 1994, Gaping: 13)

In a hypertext where the gaps are left as gaps, the focus of critical thinking can move to the links themselves — why this connection was made rather than that one, why this gap. "In such an electric and postliterate age, new forms of semiosis...need to be part of our constructions of schooling and curriculum. Models of semiosis moving beyond word and number into image and spatiality need to inform the curriculum of the contemporary world" (Beavis & Gough, 2000, p. 5).

Text has been the content of other media but has never before been present in this particular multi–textual mode. What is different for me is that the connections, the interrelationships become more obvious, more important, and what I experience is a true inter–textuality. A space opened up between texts, where texts play off one another in an almost infinite variety. This post–modern pastiche or collaging has changed the way I write — well it hasn't really changed the process but it has changed the product. I no longer always try to close the seams, to weave a tight knit, to cover over all of the gaps and discrepancies, to linearize what is for me, and I suspect others, a non–linear process. Hypertext gives me permission to create other kinds of texts. In my writing I now play up the gaps, focus on the play between, on the difference and the difficulty. The process of my writing is no longer hidden beneath a well transitioned paragraph but is out there for all to see. Keeping the gaps is desirable because I think it is a more honest approach to writing and because it opens a space for interstanding. The gaps, the cracks, are a way to gain entry, or a way to escape. They allow a place of play, a place of creativity, a place of experimentation, a place of the new. They allow me to be freed from the tiny rationalist box in which I've been imprisoned. My point is to try to move away from the lock–step

linear methods of writing that have boxed teachers in since education became programming, since learning models viewed kids as computers or machines, since schools were modeled on factories and production lines.

The Internet allows us to experience what the post–modernists have been saying all along but which can't be easily experienced in printed texts. In the flattening out, in the move from depth to surface, "one could say that the old depth having been spread out became width" (Deleuze, 1964/1990, p. 9). And in that move, it can be said that depth of knowledge becomes a width or breadth of knowledge, which is what it has always been anyway. Higher learning in particular is very often more about making connections and interconnections between ideas, about making new patterns, than about plumbing the unknown depths.

> Hierarchical and sequential structures especially popular since Gutenberg, are usually forced and artificial. Intertwingularity is not generally acknowledged—people keep pretending they can make things hierarchical when they can't.
>
> Everything is deeply intertwingled.
>
> In an important sense there are no "subjects" at all; there is only all knowledge, since the cross–connections among the myriad topics of this world simply cannot be divided up neatly.
>
> Hypertext at last offers the possibility of representing and exploring it all without carving it up destructively. (Nelson, 1987, 2/31)

We need to begin to move away from treating the Internet as if it is merely text on the screen, or some jumble of text, video, and audio that is a simple additive whole. If we can begin to recognize the medium for what it is, there is a very real possibility that we can design online curriculum that can lead to "interstandings" rather than understandings. Curriculum that allows students to develop a post–modern critical thought where discourses are seen in their power relations as part of the larger global culture. A way of

knowing that is based in interstanding rather than understanding, that "is relational but not dialectical, connective but not synthetic, associative but not unitive. The between of the inter neither fragments nor totalizes" (Taylor and Saarinen, 1994, Interstanding: 2). I am not saying that "interstandings" don't happen with good old–fashioned book–based reading, writing and research. In fact, much of the original pattern for this text emerged from a more traditional paper based process. But the shear force of my web–based experience seems to be another thing altogether.

My experience of the Internet encourages me to blur boundaries between what might be called different discourses or different fields of study. It also begins to blur the boundaries between many other arbitrary distinctions such as between home, work and school. Hypertexts allow me to be aware of the connections and similarities between discourses rather than to focus on their differences. On the Internet, writers who would never come in contact in books are a single mouse–click apart. This opens up a space for "interstanding" that is not as simple to achieve in traditional reading, writing and research. My experience or phenomenology of being on the web transfers to my everyday, onground existence. And why shouldn't it? They are in fact part of the same whole. The separation between online and onground is distinct only if I believe it is. The reality is much muddier, the border less clear, the boundary more permeable. For example, the simultaneity experienced online, the collapse of time, as well as the spatial and travel metaphors of the web all contribute to an "out of time" onground experience. I now experience the world spatially as a nomad instead of as an "occupant of history." Another online experience that transfers to onground is that of fragmentation and pattern. The fragmentation of the experience of web surfing leads me to make connections

between fragments, to create patterns, in order to make sense of my experience. I connect this page with that page, this writer with another, and try to connect it all with my own ideas. This pattern making, or a way of seeing, is a skill that can be developed. The experience is similar to trying to "see" the hidden image in those somewhat annoying 3–D posters that were everywhere a few years ago. These pictures appear to be an abstract repeating pattern but a computer had been used to embed a "hidden" three–dimensional image within this pattern. Having the hidden image emerge from the "background" is difficult the first time, so hard that some people are simply unable to do it. But if you can do it once, the second time it's easier. Soon it becomes just another way to look at images.

The experiences of connectivity and interconnectedness, of "webness," of the compression of space and time, is a shift between content and context that is for me, the fundamental post–modern shift. It transforms how I am in the world, my being. And from this shift, a new paradigm emerges: that of lived post–modernism. I now recognize the larger pattern rather than the details. Knowing is for me more an intuitive creative process than an analytic logical one. I know that I don't have all of the answers and because I don't know, I must always be careful. I must be mindful and attentive and I must move more slowly. I am not saying that this shift is good or bad — that is for modernists to decide. I am not even looking for a traditional cause. Rather I am following McLuhan's lead, and I am merely describing effects.

> The medium is the message because it is the medium that shapes and controls the scale and form of human association and action. The content or uses of such media are as diverse as they are ineffectual in shaping the form of human associations. Indeed, it is only too typical that the content of any medium blinds us to the character of the medium. (McLuhan, 1964, p. 9)

There is no final word. There can be no final version, last thought. There is always a new view, a new idea, a reinterpretation. (Nelson, 1987, 2/61)

...I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I —
I took the road less traveled by,
And that has made all the difference.

(Frost, 1921, p. 9)

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