2006

Of both worlds: How the personal computer and the environmental movement change everything

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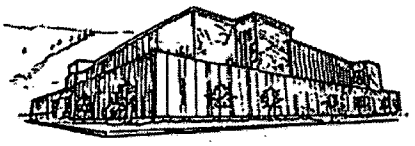

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OF BOTH WORLDS:

HOW THE PERSONAL COMPUTER

AND THE ENVIRONMENTAL MOVEMENT

CHANGE EVERYTHING.

by

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B.Sc. Eckerd College, 2002

presented in partial fulfillment of the requirements

for the degree of

Master of Science

The University of Montana

May 2006

Approved by:

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Committee Chair

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6-1-06

Date

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

Green, William H. M.S., May 2006 Environmental Studies

Of Both Worlds. How the Personal Computer and the Environmental Movement Change Everything

Committee Chair: Phil Condon pc

This piece explores the effects of the personal computer and the modern environmental movement on American culture. The author explores these issues personally, philosophically and in recent history.

The author concludes that the environmental movement and the personal computer both spring from the creative well of the 1960's counter-culture. The piece also explores the interaction between these two movements, and how they each represent an undeniable part of humanity.

The conclusions of this work are largely not revolutionary, but they speak to the dangers we face, and the power of understanding and accepting both cultural and natural systems.

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Not an Introduction

This book does not have an introduction, because I don't like introductions. I don't even like being introduced to people. I'd rather finish an hour long conversation by saying "Oh, and I'm Hank" than walk way from a person knowing nothing but a name and occupation. So your introduction to this book is its sub-title. It should give you a pretty good idea of what you're in for, though for a while it may seem like someone's put an interesting title on a book that, apparently, is about nothing.

Chapter 1: My Big Head

We annoy our mothers. Young people are annoying, very annoying. When I think back to decisions I made just five years ago I am annoyed. It must be horrible to be a mother, to love something that brings you pain – almost from the moment of conception it brings you pain. But you love it forever, and it annoys you forever.

My mom attempts to control that annoyance with an always-available threat: "Do you want to hear your birth story?" Upon becoming annoyed with one of her sons, my mom would go into long descriptions of the pain, fright, and unpleasantness of their births – to make us feel guilty for the pain we still caused her, I suppose. And then, after I realized how much I hated that story, how annoying and unpleasant it was, the mere threat would make me drop whatever adolescent condescension I had been spewing. If I didn't drop it, as promised, the birth story would come.

Condensed version: "My water broke on your dad's birthday, or at least I thought

it did. 'How wonderful,' I thought, you'd share birthdays, exactly 30 years apart.' But you never did like change, did you? My amniotic sack was leaking, but my doctor told me it was just a yeast infection. A day later, I went to the hospital and they told me what was happening, and that you were in danger. So they pumped me full of a chemical that made labor start and I forced your big head out of that little hole. And I said 'Hi,' and you were blue, and then, after all that work, they just took you away from me."

My lungs were under-developed and my body temperature was low. Amniotic fluid is important, baby-sustaining stuff, and my mom had been running low on it. If the doctors hadn't induced labor, I probably would have died before birth. They kept me away from my mom for almost a day. When she finally demanded to see me I had more color, but still the wrong color...yellow. My liver hadn't kicked on yet and my body's poisons were building up inside of me. But the doctors said that nature was better suited to fix me than they were. They prescribed sunlight and water, a natural cure. Two days later, I had attained the color I've been stuck with ever since...kinda pinkish beige.

So that is my birth story, and also the story of the first time I almost died. It's not my favorite story, especially because hearing it invariably makes me feel guilty. Though it's not as bad as my conception story, a story of nature triumphing over technology. That's as much as you get to know though, mostly because children shouldn't even know the story of their conception, let alone have to talk about it in a book.

Childbirth is horrible and dangerous for both mother and child. And then, once it's over, life continues to be horrible and dangerous. I've heard that we humans have it worse than any other animal. We're more complex, so we have more disorders. More

parts, more nerves, more ideas. More to break, more pain, more danger. Any intelligent engineer knows that simplicity is the only objective after usefulness. But evolution is not an intelligent engineer. We are not simple, and as a result, life often sucks.

Childbirth is the most obvious and peculiar example of this. I mean...what the hell? Why would god make such a blessed event so horrible? Why would evolution select for the goal of living to be deadly? Thinking about what my mother went through, it's easy to identify the origin of Christianity's idea of 'Original Sin'. I don't care how good it feels, sex was never as awesome as childbirth is awful. There has to be a reason for all that discomfort and for a long time that reason was punishment. Punishment for that dirty thing you did nine months before.

Original sin almost seems verified, for why would evolution allow such a vital process to be so dangerous. In a preindustrial world I would have died the day I was born, me and a fairly large percentage of the rest of humanity. A huge amount of energy and time goes into the creation of a fertile woman, and then a huge amount of energy goes into making a human child. It would seem logical that the success rate for this enterprise would be much higher. We're not crocodiles, we don't have 200 babies a season. We have one, hopefully, and so evolution should select overwhelmingly for safe births. For some reason, it doesn't.

That reason is the same reason I'm writing this book. Some time ago, animals got smart enough that they could pass skills as well as genes down through generations. Those skills, anything that can be passed by even the most primitive form of communication through a generation, is culture. These new animals kept on passing

down genes, but they were simultaneously evolving in a novel way. Then, a couple million years ago, one animal took another step.

We split off from the pack and became more cultural than genetic. More nurture than nature. Or, at least, more nurture than anything ever has been before. And it was that switch that makes birth, not to mention life, so difficult for the human species.

Since culture took over, it has been a driving force behind our evolution. Men and women who could hunt, woo, lie and lay more efficiently became the ones whose genes were passed through the generations. The man with the biggest brain was the one who could plant his seed in his own, as well as in his neighbor's nest without repercussion. His big-headed genes prospered quickly, to the advantage of the species. Our big heads were selected with such overwhelming genetic force, that the birth canal did not have time to catch up. Thus, my big head and the dangers of human childbirth. If the reproductive success of lies is our original sin, then the pain of childbirth is indeed our punishment. Here, my fiance points out that big-headed men simply get to have more sex, while big-headed women are the ones to suffer the consequences. She's pretty much right.

Humans, more than any other animal, are of both worlds. Subject to natural laws, at home in natural flesh. But our actions, our environments, and our abilities are cultural. We are both natural and artificial.

In ecology, there's a word for the place where the land is neither marsh nor scrub, rock nor ocean, forest nor plain. It's the ecotone, and I know I have to explain because

my word processor's spell-checker doesn't even know it's a word. Ecotone: a transitional zone between two communities containing the characteristic species of each. It can be a fine line – behind me there is forest, in front of me grassland. Or it can be gradual – a forest reaching into wetter land, until the last tree is surrounded only by reeds and pitcher plants.

An ecotone is a fine place to live. For mobile species the ecotone provides two different but easily accessible habitats with different advantages and disadvantages. A bird can keep its nest off the ground in the forest, while gleaning a bounty of grasshoppers from the nearby plain. Ecotones have an unusually high diversity of species and play an important role in the life cycles of many animals and plants. They are a place of increased opportunity for living a good life. But there is more to the ecotone than abundance and opportunity. The word itself comes from eco (that all-inclusive word for nature that is actually derived from the Latin word for household, *oikos*) and tonos, meaning tension. Houses in tension. Wherever opportunities are increased, tensions arise. Ecotones become places of genetic innovation as well as abundance. Those that are well adapted to handle a specific ecotone may become specialist sub-species, or even specialist species. The ecotone becomes its own habitat – one of conflict, danger, proliferation and extinction. It may sound like a scary place to live, but tension is the fuel of evolution and diversity. The ecotone is a place of great change and great possibility.

Humanity lives in the largest of all ecotones – on the edge of a world of pure culture and a world of pure nature. We can and do exploit either world depending on our

needs, and the fruits of both have created a remarkable new specialist, Homo sapiens, who thrives at this edge, in the tension between the largest of houses. This tension is the greatest power in our lives. Where our culture conflicts with our nature we can become depressed, egotistical, maniacal. We want to kill our fathers and sleep with our mothers. We turn to drugs, question the worth of our lives, our species, our gods, our planet. Childbirth becomes deadly and child rearing, annoying. And here we are again. The tension between culture (the size of my head) and nature (the size of mom's birth canal). Once again, it's the reason I'm writing this book.

We humans tend to think an awful lot about how powerful our culture is. Certainly, cultural evolution is faster than genetic evolution. But our culture, on its own, is nothing. It builds on and would crumble without, natural systems. It is not culture that is powerful, but the blend of culture and nature. Just as a chickadee can bring food from the grasslands to its chicks in the forest, we reach between nature and culture as it suits us. It isn't hubris to say that we've become the most powerful species on the planet; it is hubris to say that we did it alone.

We draw from both these influences, but they also tear us between them. Culture almost killed me. I was stuck in my mother for too long. But culture also saved me. In this tension between nature and culture, we all find situations in which we feel lost or discarded: When our nature and our culture are not compatible - when the size of our heads won't allow us to do what nature knows we must - when our feeble brains will not let us be what culture requires us to be. We've all been there, forced into the knowledge that we weren't created for this culture and that we are failing. Some of us, too many of

us, even in the affluent countries, do not have natures suited for culture. Those people are discarded, less than people, worker bees or worse. I think that we've all felt it happening to us, we've all had glimpses of that fate, stared it in the face. For me, it happened early.

Though nature kept my flesh balanced and running in daily life, it was technology that saved me the day I was born and, later, delivered me from scarlet fever. Then, for seven years human culture cooperated with my flesh to keep me both pleasant and pleased. People liked me when I was seven years old and considered me to be a normal, happy child. But those who knew me better, my parents, my teachers, my friends, knew there was something wrong.

Most significantly, I couldn't read. Not very long ago this would hardly have been an inconvenience. Literacy wasn't always necessary for wisdom (see Socrates) but today we think poorly, are ashamed of, or feel sorry for those who cannot read. Just like those with chronic depression, schizophrenia, social anxiety, or speech dysfunctions, society fears and shuns the illiterate. Nature found no fault in my difficulties, but culture wasn't having any of it. As I stumbled through second grade, my parents feared for my future. Though I was mostly oblivious to the problem, my future was being decided by some mysterious dysfunction of my brain. Culture was ready to drop me. I was unfit.

My problems didn't end there. I ran into, fell off of, fell into, and got stuck in whatever I got to close to. I was afraid of unusual things, like my window. When I came home to find the hedges around my house recently trimmed, I hid and cried. Even as I

waded into the murk of literacy, teachers discovered that I was as bad at writing letters as I was at reading them. My future seemed dim. There was talk of 'severe learning disabilities' and special classes with other special kids. That kind of talk finally caught my ear, and I understood. I wasn't doing anything wrong, I just was wrong. Inherently broken, just born that way.

Everyone hates school, and if they don't, they keep their mouths shut about it. But I was out of my element, constantly confused. My nature refused to comply with culture. A page in a book was not a page in a book, it was a collection of a thousand letters, each separate from one another. I didn't actually see words for years. The difference between a 'b' and a 'd' was obscure. I had to make up a song to remember which was which. "'B' goes forward, 'd' does not." No one else even seemed to realize that letters had directions.

As out of place I was with my face in a book, that's how comfortable I felt with my hand in a stream or sunk deep in soil searching for earthworms. I could face an acre of forest and find every arrowhead vine in my line-of-sight without actually spending time doing it. Colors, shapes, and movement made sense to me. My nature was good at spotting deer at a hundred yards. But my nature wasn't much good in school.

My family owned a cabin in the Ocala National Forest in North Central Florida while I was growing up. My dad bought it because he has always loved nature and having infants was keeping him away from the trekking he'd done all his life. Someone had cobbled together a one-room house with a two-room trailer, painted it red, and named it The Brier Patch.

I assume we all know the Uncle Remus tale of Brer Rabbit, who, upon being captured by Brer Fox, begged to be drowned, skinned or roasted, anything before being thrown in the brier patch. But because Brer Fox wanted to hurt Brer Rabbit as bad as he could, he tossed him into the brier patch instead of doing one of those other nasty things. The punch line of course, was that Brer Rabbit was "Bred en bawn in a brier patch," and simply hopped away, safe from the fuming Brer Fox. My parents tossed me into that brier patch, which was indeed filled with prickers, ticks and cottonmouths, with the same force that Brer Fox mustered in the Uncle Remus tale. Of course, their purpose was much different, and I never had to do too much deceiving to get them to do it. The days in that cabin, sleeping with my brother on a moldy, damp, pull-out sofa, were some of the best days of my childhood. I can remember that place back to when I was seven, the same year when people began to question my prospects as a human in culture. There was no question in my mind about my prospects as a human in nature.

My brother was ten when I was seven. He was smart. He did well in school and he understood people. I did poorly in school and was afraid of people. He understood me better than he ever let on. But I grew faster than him, was stronger than him, and always more ready to fight than him. I was the one whose fists came out, and I was the one who'd fight hard for a win. John could think his way out of a fight, and he was smart enough to know when something wasn't worth fighting for.

There was a fallen tree on the edge of the litter-free zone of our cabin, where the lawn ended and the forest began. The tree was ancient, a slash pine that had grown too tall and had been struck by lightening not long before we were born. The bark was

flaking away, but the heart of the tree was firm. My brother and I took it for a jungle gym – either that, or the tree took us for monkeys. Leafless, graying, the tree sometimes made me sad. But even lying on its side, the old branches reached up high, many times higher than me, and its crushed branches on the underside held the trunk several feet off the ground. It was perfect for climbing.

My brother, always yearning to test his brains out on my brawn, made games out of the tree. The tree-long dash was a favorite. He, of course, defined the rules and the starting place for each of us, giving himself the advantage, knowing I was lighter, faster, and more fearless, but also knowing that I wouldn't notice the inequalities in the rules. Every time I began doing well, the rules seemed to change.

It was good practice, really, for later in life. I've never since expected the rules to stay the same long after I start doing well. My brother set me on an interesting path with his games. One day, in the pine, he set a different interesting path, one he thought was destined for failure. He began on the left hand side of the trunk, looking up from the rootball, close enough that he could hop to the trunk and use that as his highway for the first 20 yards until the tangle of branches would set him climbing with a more free form. I started on the left, two yards away and two feet up from the trunk. It was going to be faster for me to climb from the beginning, than to use the trunk highway.

John's voice was the starting pistol, and we shot up the tree together, I jumped straight for the next highest limb in the tree, a long four-foot gap for seven-year-old legs, but I cleared it, and with enough momentum and balance to push off and hit the next one. I was managing a tight second, even with John dashing top speed along the trunk. I

began to move up into the tree, to where the branches were coming out more perpendicular to the trunk. I scrambled along these branches, looking down on John as my carefully placed feet found perfect holds. Always, there was a limb nearby that my hands subconsciously shot to. It was the perfect tree, the perfect climb. John had hit the denser area of the trunk and was slowing, but I was still moving at top speed. All I had to do was drop down to the trunk and I would be only feet from the brittle tips of the old pine. I could see a hundred ways to finish and win, there was always a foothold, always a failsafe for my hands in case my feet slipped. I was headed to a victory of nature over mind, the victory I needed.

But then my foot did slip, and my failsafe proved insecure. Hanging only for a moment, the small limb I held cracked. From weightless primate to a greased pig, I crashed through the tree. As I fell I struck twigs, limbs, and then the trunk with my head, back, arms and legs. I landed in a world of prickers and snakes and bugs.

John, ever too smart, but always a great brother, was by my side instantly. No blood showed, no bones broke, and I rolled silently, testing my parts. He knew I was winning when I fell but he didn't know how I'd done it. At home in the tree, I let myself be overtaken, controlled by what my body wanted to do, not my mind. But the price was heavy, painful, and still, I had lost. I was going to need more than nature to survive in this world, if I was going to win even when the rules kept changing.

I thought I could simply unleash my nature and win every battle, but a hard tree branch in the back of the head can knock sense into even the most stubborn seven-year-old. I was ready to look beyond my nature, because being discarded didn't feel like an

option.

Of course my parents were also dedicated to my future. They put me in an after-school program for special kids, but kept me in regular classes, and I began to do well. The after-school program, called The Children's School, was dedicated to giving chances to kids who were slower than average. They assessed me, tested me, trained me, and equipped me. In the assessment, they diagnosed me with Sensory Integration Dysfunction, a fairly common problem linked with both autism and dyslexia, but milder than both.

The doctors almost always used the same analogy to explain my dysfunction, rarely even allowing for personal flair. "Think of your nervous system as a highway." This is obviously a better metaphor for an adult than a kid, but they kept using it all the same. "People with Sensory Integration Dysfunction have poorly designed highways, with lots of bad drivers. Your nervous system puts too much information into your brain, and your brain puts too much information into your nervous system. There's so much information that it conflicts with itself and sometimes the brain gets overloaded. Other times there are accidents and the information never gets where it was going." A thousand letters staring me in the face could easily overwhelm me. I couldn't pick out one if it was surrounded by others on all sides. Fine motor skills were out the window. Any dreams of I had being an artist were gone. A writer? Ha! I could hardly hold a pen.

But I had a future somewhere. No one knows what causes Sensory Integration Dysfunction, but they do know ways of helping kids become more 'normal.' They strengthened my fine motor skills. I spent a lot of time looking at dots on walls, forcing

my eyes to learn how to look in one place and see one thing.

The handwriting therapist was one of my favorite people, possibly because he was so afraid of me. He was young, just out of college probably, and unprepared for a seven-year-old who more wielded a pen than held it. During our sessions, I would stab and slash at the paper while he asked me to take my time, pay closer attention to the lines and hold my pen with a bit less force. I owe this man a great debt. Though not because he helped me through my difficulties. In fact, I owe him thanks because, in a way, he gave up on me.

At the end of a year at The Children's School, I knew I was doing better. My grades were higher, I could read well, though slowly, even out loud. But I was still left feeling that my (much improved) nature would not be enough to carry me through life. That young handwriting therapist, when saying goodbye to me and filling in my parents on my progress, said something odd. Something, he admitted, he'd never said before. "He needs to get a computer. He needs to learn how to type faster than people can write."

He said it with a bit of sadness, but also with hope. Of course, I didn't really even know what a computer was, though my dad had had one since before they were called computers. But I liked electronics, and they made sense to me, so I was optimistic. The computer's contribution to my life would be extraordinary. It would make me fit.

And so we've reached the point at which you find out the whole reason why I'm writing this book. Living in the ecotone makes us unsuitable for both pure nature and pure culture and we can't embrace one or the other; culture saves, nature saves, either,

alone destroys. I'm writing this book because culture gave me a big head, nature made me feel at home in the forest. Because a 22-year-old speech therapist told me to get a computer when I was eight. Because computers were culture's cure for my broken brain.

The natural and the cultural create us. In a million ways, they define our daily lives. To write a book exploring those relations would be to write the biography of our species. That's not what I'm doing here. The journey I have to offer is my own – my modern experience in the ecotone. But in that journey I have seen the ecotone changing. Two forces, more than any other, have changed that landscape, and they are the two most powerful forces in my life.

This is a unique time in the history of the ecotone. Not because we're more powerful or dangerous than ever before, but because we're bridging a more significant gap. We are on the verge of attaining pure culture. A culture independent from nature. Simultaneously, we have re-conceptualized the environment. We understand it to be something other, apart, independent but valuable for its own sake. The personal computer and environmentalism are forces contrary to that. Together, they are saving us from a dangerous fate.

It's happened because of two seemingly contrary ideologies. But they are the ideologies that I live my life by. The ideologies of the online personal computer movement and those of the modern environmental movement. One creates a new world while the other saves the old one. Sitting here at my interface, where I sit up to twelve hours a day, the tension is present, always. If I concentrate, I can physically feel it.

These worlds are moving apart, and we are the only bridge. But the tension doesn't pull me apart, it lifts me up. It's something I learned at birth, or while crashing through pine boughs. My raw heart, my RAM. I pour both out into each other. I reach, and always find a foothold. If my nature falters, my culture is there to catch me. I am in them both, they are both in me. When we can reach between unnerved, and withdraw unscathed, that is when we are powerful. Maybe even powerful enough to save ourselves.

Chapter 2: The Matrix and the Meatspace

We know about the first direct interaction between nature and computers.

The Harvard Mark I was the sixth computer ever created. It was a mass of over 760,000 humming and clicking parts that lumbered through ballistics calculations that would eventually help America win wars.

Grace Hopper, the Mark I's first programmer, dedicated her life to the US military and computers. She was married in 1930, at the age of 23, and divorced her husband in 1943, the same year he was killed in World War II. From that point, no biography I discovered made mention of her personal life. She lived computers, and all of her accomplishments involved computers. She was named 'Man of the Year' by the Data Processing Management Association. And she received the National Medal of Technology, which no one knows about, but is a significant honor. She died an Admiral of the U.S. Navy.

On September 9th, 1945, the Mark I broke. Hopper's laboratory notebook states that at 11:00 am they were working on a cosine calculation for which they never received

results. They had only just received the machine from IBM and it had simply stopped working. After four hours of mucking through the insides of the fifty-five-foot-long machine, they found what had gone wrong. It was nature. A moth had landed on an electrical relay and, when the machine closed that relay, the moth was crushed and the relays did not connect.

...An ominous beginning. Nature had collided with a computer and both had stopped working. It is worth noting that, while the computer sprang back to life after the relay was cleaned, the moth stayed quite dead. After nature was crushed, tweezered away, and taped into a laboratory notebook, the computer operated perfectly.

While I was inside my mom, in December of 1979, a young guy, younger than I am now, was visiting a research center in his hometown, trying to find some fresh blood for a company he and a friend had recently started up.

His name was Steve, and he was a Californian. He had spent time in India when he was 18 and had returned wearing traditional Indian garb. He did not and does not eat mammals, only fish. He would later become the lover of folk singer and activist Joan Baez. And he has been quoted saying that using LSD was one of the two or three most important things he has done in his life. Not a trivial statement, mind you, as Steve is the founder and CEO of Apple Computer and the 140th richest person in the world.

Steve walked out of the Xerox Palo Alto Research Center (PARC) with a destiny. He had seen the mouse and the graphical user interface. He would bring computers to the average person. He would change the world.

The personal computer movement's prologue begins with Grace Hopper and ends with that young Steve Jobs. The most mind-shifting, irrevocable and powerful technology since the printing press, maybe before, begins with a war machine and ends with a humming box for the everyman. Where is the line that connects straight-laced, military electrical engineer Grace Hopper and drug-using, hippie, college dropout Steve Jobs? Somewhere something vital changed. So what was it? What force drove computers out of the military industrial complex and into the hands of the masses. What was it that happened between the 1950's and the 1970's. I'm putting my money on a pretty simple answer, "The 60's."

In Grace Hopper's time computers concentrated power and information to the advantage of governments and corporations. The smallest computers in the world were the ones that we managed to shove into nuclear missiles. Only the largest corporations and governments had computers and IBM was not interested in seeing that change. Consider, for a moment, where the personal computer industry truly took root. It wasn't in the massive IBM data centers of upstate New York, though that is where most computers and computer research was being done. No, it was on the San Francisco Midpeninsula, far from the center of the established computing industry. The PC was born in the swell of the sixties counter culture, though it would take quite a while to grow up. The sixties tore the country to shreds, opened new avenues of thought and challenged a lot of our most trusted assumptions. It was there, amongst the antiwar protesting, the Acid Tests, and the Grateful Dead concerts that our future was written.

Not in the cold offices of IBM or GE. Those CEOs knew nothing about the power and potential economic explosion that computers presented. If they did, they certainly would have done something about it (and, probably, screwed it up). But, in fact, personal computers didn't seep out of corporations who saw money for the coffers, they sprang from the minds of individuals who saw a cool new toy and maybe something that would truly matter to the future.

Young people at progressive schools and hobbyists in their garages created the personal computer, not for profit or for the military, but for fun and to fulfill their ideas. These people were visionaries and they were shaped by the culture in which they were steeped. For some of these people, computing was about freedom, communication and enhancing the human experience. In these ways, computers were like drugs, and many of computing's pioneers (notably, not Bill Gates) were users. They were building up the power of computing while others were fanning the flames of America's first true environmental movement.

While Grace Hopper's moth flapped its last in the jaws of that dangerous beast, the environmental movement petered along without significant support from the world at large. It was an older movement, to be sure, but one populated by scholars like Thoreau and Emerson, wealthy and powerful men such as Bob Marshall and Teddy Roosevelt and one fanatical fundamentalist nature lover, John Muir. Just as computers were never meant for the average American, environmental issues were ignored by the public at large. By the time the fifties rolled around, Bob Marshall was dead, Rachel Carson's first

book had been largely ignored, Leopold's A Sand County Almanac was selling poorly and environmental organizations were focusing entirely on preserving habitat for two reasons that average Americans found uninteresting. First, conservation groups such as the Sierra Club and the Wilderness Society preserved land because, well...just because it deserved preserving. And the Izaak Walton League tried to convince government to protect wild places so that rich people could shoot large animals.

The successes of those small organizations were marvelous, and I don't want to belittle them. The successes of Naval engineers working on super computers were also marvelous. But neither of these movements had a fraction of the power that they would see in the coming decades

The Navy's electrical engineers increased the power of our military and our industry, to be sure, strengthening the governing culture. And, yes, the American conservationists increased the value of plants and animals...strengthening nature for nature's sake. But the average American resides in a place between culture and nature, not overly concerned with the workings of military and economic systems, nor, at the other extreme, too concerned with wild nature. Throughout the 50's computers and the environment, two powerful ideas representing pure culture and pure nature, grew in the country's consciousness, but they didn't really matter to the average person.

Something was keeping them from caring. Computers were far out of reach, something only interesting to scientists and admirals. The environment was below notice, not actually affecting their daily lives. The fifties were a time of affluence.

People were embracing the suburbs and the television. They were Grace Hopper's generation. The people that had been scarred by the Great Depression and World War II were taking time to enjoy normal American life. Nothing extraordinary was perfectly acceptable.

We've all seen those wonderful videos from the fifties in which some perfectly coiffed blond in an apron shows us the wonders of the future: the kitchen of the future, the car of the future, the whole damn house of the future. All brought to you by Ford and GE. It all seemed possible, with the wonders of plastic, pesticides and heavy duty cleaning chemicals making lives infinitely more pleasant while Disney's *Tomorrowland* showed glimpses of the virtual utopia that lay on the horizon. We didn't question Eisenhower. Communists were evil because...just because. And that's why we fought the Koreans.

As the 50's progressed, workers began dying of chemical exposure all over the nation. The bald eagle was approaching extinction. Thousands were dying from smog exposure in London and Los Angeles. Carson's second book, *The Sea Around Us* sold well. Eugene Odum was busy creating the science of Ecology (with help, of course). The United States was building up an arsenal of nuclear weapons and testing them on American soil.

By 1962 a stage had been set. Utopia wasn't coming. The future looked...lame. The industry and the government that had promised us a future brighter than any we could imagine were actually in it for their own good, their own profit. A generation that couldn't remember what World Wars were like neared adulthood. Rebellion, this time,

would be more than Elvis Presley shaking his hips. It would be Ken Kesey, Rachel Carson, Bob Dylan, and Douglas Engelbart, shaking the whole goddam world.

You're probably wondering who Douglas Engelbart is. I promise, he belongs in that list. Just hold on with me for a little while longer: I hope you don't mind.

While environmentalism lingered in the air during the 1950's, so too did the power of computers. People in very different situations with very different ideas were beginning to feel the power and need for this new technology the same way Rachel Carson had begun to see the natural dangers culture was pushing us towards.

In 1945, a young soldier saw this future in a way no one else had. Doug Engelbart wasn't concerned with hover-cars and robots. How could he be, when the problems of humankind were so much deeper and more immediate? He expected, correctly, that the problems of the world would continue to become more complex and that there would be more stakeholders and more data to take into account. After the war, but before his plane ride home, Engelbart spent a year kicking around the island of Laiti, in the South Pacific, where he mostly read books and watched clouds.

Engelbart's single most powerful insight came to him while reading in the Laiti library. In an issue of *Life* magazine, he read an account of Vannevar Bush's Memex, a device for storing and rapidly retrieving information. Since this was the '40's, the device was not based on a computer, but on microfiche. Nonetheless, the idea stayed with Engelbart, and when he returned to California, he went back to school, studied computers, and began to search for the perfect job, one where he could work to fulfill Bush's vision using the newly heralded power of the computer. Unfortunately, that job

didn't exist. People were impressed with his work, and he had no shortage of job offers, but everything he tried, he found too limiting. Even worse, nothing brought him any closer to his dream. Finally, in 1960, the Stanford Research Institute agreed to let him do whatever he wanted to do. On that day, Douglas Engelbart created the Augmentation Research Center.

It was a big idea, this idea of Augmentation, and very few people were ready to buy into it. Here's how Engelbart's vision went. There should be created a man-machine interface. Some method by which the man can input into the machine, and the machine can output to the man. This should be a rapid and subconscious relationship. The machine should be a store-house for information, and this information should be networked with itself through a system of links inside the text. These links can be navigated simply by the user allowing him or her to gather all the information needed in the shortest possible amount of time. This would be a common interaction and there would be a large number of these machines for public use. It was Engelbart's dream that this system for augmenting the human mind would someday find its way into homes across the nation.

Computer scientists everywhere were intrigued by his ideas. But the majority believed the future of computing to be nothing so mundane as all that. Besides, what sort of person would want a computer in their house? Computers were for the government, not for people.

In 1962, the same year Rachel Carson published *Silent Spring*, Engelbart published a paper called *Augmenting Human Intellect.* The second section of this paper

was a "Hypothetical Description of Computer-Based Augmentation System." This hypothetical description set the stage for the entire personal computer revolution. Within three years he would have developed the beginnings of the augmentation system, including a most ingenious invention, the mouse, a kind of hypertext and several peculiar human interface devices (including a mouse you moved with your knee, and a five keyed keyboard that registered different letters when you pressed more than one key at a time). Engelbart's simple idea had been ready for decades, but it took the freedom of the sixties for the rest of the world to see value in it. Just ten years before, no university in the country would have been ready to say, "OK, we don't know what you're talking about it, but do it...just do it, whatever, we trust you."

This wasn't the kitchen of the future or flying cars, it was a real invention with real promise. Engelbart didn't want to speed up America's cars or dishwashers. He wanted to speed up our minds. He wanted to change the way we think.

As Engelbart's lab grew, his projects and ideas began to attract young engineers who realized the power of what Engelbart was trying to do. John Markoff's What the Doormouse Said provides a marvelous look into the Augmentation lab. Markoff writes:

> Engelbart's "Augmentation Framework" was brought to life by a small band of researchers who were deeply influenced by the political and cultural climate of the Midpeninsula. Indeed, withing Stanford Research Institute, the research center where Engelbart began his work in Menlo Park, his researchers came to be seen as the lunatic fringe.

Engelbart's lab existed in Grace Hopper's world. But the researchers that were attracted to Engelbart's vision were the kind of people who brought wine to work, slept in

their offices and created custom yoga computing work stations. The straightlaced engineers were not attracted to Engelbart's vision. Why, after all, should serious electrical engineers be working on a system that might someday be useful to mere average people? But engineers who were effected by the politics of the sixties could see that there was a potential for revolutionizing the human experience. Among those people, it was quickly recognized that Engelbart's lab was working on all the most interesting projects at Stanford.

Drugs were common, in and out of the Augment lab. And when Engelbart heard that LSD might be an alternative solution for augmenting human intellect, he attended a couple of acid tests himself. Doug spent several hours of his first low-dose trip staring at a wall but later recalled that he enjoyed the experience very much. At his second test, the dose was lowered, and he agreed that his creativity had been enhanced by the drug. As for his intellect, he felt the effect was less certain. Engelbart abandoned LSD in favor of a more concrete augmentation system. The one that the handwriting therapist suggested I invest in. The same augmentation system that I'm using right now.

Carson and Engelbart made their movements relevant. Their ideas, while not the product of just one person, or even one decade, were given to a world ready to listen and ready to change. America was ready to accept that technology could threaten life, and that our world depended on natural systems. At the same time, they were ready to believe that technology could enhance our minds as well as our standard of living.

Carson and Engelbart bridged the ecotone. It was a wide gap, but one that had

been narrowing thanks to a generation that questioned everything. Neither Carson nor Engelbart were of that generation, but the open minds of the sixties were ready to hear those questions. "How separate were we, really, from natural systems?" "If computers can make the government more powerful, what can they do for people?"

These are the sort of questions that were hardly ever asked until the sixties. And they're the sort of questions that have a way of changing the world.

Thanks to Douglas Engelbart (and a young handwriting therapist,) by the time I graduated from third grade, I could type faster than I could write (not so unusual now, of course, but unheard of then.) I was using the computer to draw interplanetary battles. I was writing programs in BASIC. In another year I would be creating cities, and then, six months later, planets, using Maxis' line of Sim games. That same year, 1991, I went online and downloaded a picture of Captain Picard of the Starship Enterprise. It took all night. I've been online ever since.

Thanks to Rachel Carson, by 1979, the Nature Conservancy was a large enough organization to actually hire a Florida State Director, who was my dad. The environmental revolution had a great effect on my parents. They weren't "there," but they were part of that generation. They felt the power of the environmental movement, and my dad became a part of it. They passed those values to me, even though I grew up in a town made mostly of concrete. They took me to Ocala to play, in a world where I was still comfortable. They sent me to a summer camp run by people who most definitely

were "there" in the sixties. In Ocala and North Carolina, my ties to nature grew stronger. I learned to understand as well as love that world. I remembered the power of dirt underneath my fingernails. I knew that nature was bigger than me.

The sixties had allowed two visionaries to bridge the ecotone. They had made a whole world out of two technologies that were once supposed to be unimportant to average people. I occupied that weird world, a world that had never existed before, with my feet in a concrete mess, my brain in a jumble of wires and circuitry, and my heart in the nature I always knew made me more whole. If you were wondering, that's where I grew up.

Chapter 3: The Actual Home of the Virtual World

Place is the base unit of environmental literature. You're supposed to define your landscape by hydrology, ecology or geology, and dive in. Dive deep, millions of years down, and broad through events that made the place and the writer what they are today.

But what does it matter where my feet were? The watersheds of Central Florida are, I'm sure, fascinating. But the only stream I ever knew in my town connected two man-made lakes. I could do it, I'm sure. I could dive into the history of Orlando, and it would be fascinating, enlightening, and undoubtedly depressing, but it's not my place, because I don't feel tied to it. It was all hard pavement and sharp blades of St. Augustine grass. When we played football, the end-zone was a driveway. For three weeks a year, I went to North Carolina. If I ever had an attachment to a place, that was it. I could still

map that summer camp's trails in detail on a napkin, no problem. I could mark the place where the creek came out of the ground and the best places to catch a sunfish. For 49 weeks a year, my wilderness was a manicured hedge. My heart was lost, and my head wandered out of the real.

By the time I turned twelve I was growing in a new and uniquely unnatural world. I made friends, enemies, and business partners on a fledgling network that spanned the globe. That's how my adolescence went. I was part of it, watching it happen, and, as much as a high school student could, making it happen. The internet was my place, but it's not a place. It's beyond the ecotone. I was still a natural being, but in a purely cultural place. My head was in it, deep in it, and it's often still in it. Inside an experiential medium separated from the physical. It exists nowhere and, increasingly, everywhere. It has its own unique ecological laws, and contains nothing but human creations. Nothing on the internet is natural. I grew up in place that isn't a place. I was formed by completely unnatural surroundings where my physical body was often a mere nuisance and experiences were limited entirely to the visual. My heart remained clenched on the idea of nature. I lived in it probably one month of every year. But, more often than not, nature was more abstract than a placeless place.

So what is an environmental writer to do? We're supposed to spend a lot of time writing about our "Place" I'll tell you one thing, you don't write about the internet, because that's a sure way to score dozens of sad or annoyed glances from the environmental community. I doubt even my most lenient professors would be okay with me wandering through the valleys of the net, espousing its ecology and the hydrology of

information. No, that would be interesting, but it wouldn't be environmental. So, a few months ago, I decided to take a hard look at the actual physical place where I grew into a man.

It wasn't Florida – that was all cinderblock high schools and occasional illicit substances – it was the land of dreams where my virtual world took geological residence: The Silicon Valley.

I've never been there, but I did grow up there. We grew up together really, the valley and I: Both awkward and unsure of our future, both with big dreams that seemed attainable, both with a lot of learning in front of us. I reached maturity along with the internet. But that's not where the story begins, remember. We have to dive deep... millions of years down.

California has had a complex relationship with water: Sometimes being washed away by water into water, sometimes being thrust up above water, sometimes covered in its solid form, sometimes lying hundreds of miles beneath it. The best place to start these stories is usually when the water retreats, but with the Valley, it was when the land surged up.

Mountains are pretty new to me. The occasional glance out my window while writing code in Florida didn't give me any inspiration to ponder the properties of mountains, so I had to do some research to learn about the formation of valleys. First method: start with high craggy land, and erode sediment into a low lying area until you create a nice flat valley. Second method: start with flat land, then, using the force of

colliding and transversely sliding tectonic plates, push some of the land thousands of feet into the air.

Silicon Valley is no erosional valley. It's structural. The flat land has always been there, it's the mountains that are new. The whole valley rose out of the sea less than four million years ago. The Valley's geology is like its culture: startlingly complex, extremely young and ever-changing.

The Santa Cruz and Diablo mountain ranges were formed by the transverse movement of the North American plate against the Pacific plate at the San Andreas Fault. This movement has created several faults around the Valley, two in each of the mountain ranges. It is the movement of these faults that created the mountains. To this day, the Diablo range is rising faster than it is eroding.

Between these two mountain ranges is an industrial gray stain one can see on any satellite photograph. It reaches from the foothills of the Santa Cruz Mountains on the east to the Diablo Mountains on the west. The valley stretches North, around the west side of San Francisco Bay's beefy arm, and south, until the Santa Cruz and Diablo ranges almost meet at the Coyote Narrows. This gray swath, where the newest world was conceived and created, is locked within its geography. It can neither spread over the mountains nor into the waters of the bay. It has natural boundaries and, until recently, a thriving natural existence.

The Santa Clara valley is a wonderful place by human standards. Located in the Northern half of California, it is cool but rarely cold. The structural Diablo and Santa Cruz ranges have served the valley well in several ways. First, the Santa Cruz Mountains

shelter the valley from the cold, wet and foggy climate that plagues San Francisco. Also, because the valley is so narrow,and flat, the two main rivers, the Guadalupe (draining the Santa Cruz range) and the Coyote (draining the Diablos), amble through the flat valley and, in the last four million years, have laid down a huge amount of alluvial sediment. Not only is this sediment extremely fertile (32% of the Valley's land area was graded Class I for agriculture by the USDA), it also stores a great deal of water, and has allowed for constant recharge of the large independent Santa Clara aquifer.

This valley, with only 15 inches of precipitation a year, is one of the most fertile spots in America. The faults that surround it, and their consequent mountain ranges, are the cause. They provide fine soil, a mild climate, and a great deal of water. It is a perfect land for a tribe of people to set up shop, whether to gather, farm, or etch microscopic lines into silicon chips.

Before people arrived, this was a different landscape. Fifteen hundred years ago, the bottom of the San Francisco Bay was dry and verdant. The rivers of the Diablo and Santa Cruz ranges flowed through that valley and into the Sacramento River, which then ran through the Golden Gate and over nine miles of land before finally meeting the ocean.

As the ice-caps melted, and the shoreline approached the Santa Cruz Mountains, the Valley began to take its current form: a deep-water bay pouring southward into the champagne glass formed by the Diablo and Santa Cruz mountains and a natural estuary to the north where the fresh water from the Sacramento River mixed with the ocean's tides. Tidal mud flats formed throughout the gently sloping alluvial valley. The Santa

Cruz Mountains met the Pacific with rocky shores. Each of these areas, an ecotone: Freshwater to saltwater, water to land, mountain to valley, shore to sea. These emerging ecotones created a huge amount of diversity, and, combined with the gifts of the mountains, made the valley rich and full of life.

These changes were not the most significant of the time though. Twelve thousand years ago, the Valley had taken its modern form, and it was about to undergo its first technological revolution. As long as there have been humans in California, there have been humans in Silicon Valley

The first technologies were introduced by a people broadly known as the Costanoans, from the Spanish word for "coastal people." The original inhabitants of the region, probably the Esselen people, seem to have been in the region more than 9,000 years ago.

The Esselens were assimilated or pushed out by the Ohlone people sometime within the last 7,000 years. The Ohlone Indians established over 90 tribes of 150 to 250 people each throughout central California. Each of these tribes found its own ecological niche and, seemingly, became quite unique from other tribes. Tribes separated by less than 50 miles of land are thought to have had languages as different as French and English.

It is likely that the ecological diversity and bounty of the region kept the Ohlone people from relying closely on one another. Though some members of tribes seemed to have been multi-lingual, and intermarriages were fairly frequent, the Ohlone people were unusually autonomous from one another.

The population of Central Californian Ohlone people is thought to have remained constant at around 10,000 for thousands of years. Scarcely two hundred years ago, that ecological and cultural balance was finally upset.

In 1579 Sir Francis Drake claimed the area for England, and then promptly left. England likes to do this sort of thing, and we can assume that the Ohlone pretty much ignored them. They then lived without visitation from Europeans for two centuries. In 1776 the Spanish explorer José Francisco Ortega was assigned to scout modern-day California in response to Russian movement down the Pacific Coast from Alaska. Ortega, upon reaching the Valley, gave it its first western name, Llano de los Robles, an apt description meaning "Plain of the Oaks." Ortega's men were treated well by the Ohlone people, and the Spanish treated the Ohlones well in return.

Less than a year later, in 1777, the valley was renamed "Santa Clara" after the founding Santa Clara de Asis Mission. That same year five families, one cowboy and nine soldiers were ordered to create California's first official town, San Jose. It took 198 years from the time of European discovery until the Spanish named Santa Clara Valley. It would only be 194 more years until the Valley received its most recent name.

By 1825, California was changing quickly. Mexico had declared independence from Spain and was selling off church lands to the highest bidder. The newly created Mexican gentry deprived the native people of their lands and formed ranches throughout the Santa Clara Valley. The verdant valley of oaks did a fine job of keeping them

wealthy.

But it wasn't long before the booters got booted. In 1846, the Mexican-American War ended Mexican colonization of California. Just before gaining statehood in 1849, another gift of the mountains began the Valley's, and San Jose's, largest transformation yet. The gift was gold. While the Mountains around the Valley were not suitable for mining, San Jose did become a main supply post for the '49ers. As California's population grew from 14,000 to 360,000 in twenty years, towns that would later become the heart of a digital revolution began to appear throughout the Valley: Palo Alto (Hewlett Packard), Sunnyvale (National Semiconductor), Mountain View (Netscape), and Cupertino (Apple Computer).

It was during this period of expansion when John Muir walked through the Santa Clara Valley on his way to Yosemite. And because no environmental historian should pass up a good John Muir quote:

> It was the bloom-time of the year over the lowlands and coast ranges; the landscapes of the Santa Clara Valley were fairly drenched with sunshine, all the air was quivering with the songs of the meadowlarks, and the hills were so covered with flowers that they seemed to be painted. Slow indeed was my progress through these glorious gardens, the first of the California flora I had seen. Cattle and cultivation were making few scars as yet, and I wandered enchanted in long wavering curves, knowing by my pocket map that Yosemite Valley lay to the east and that I should surely find it.

We should all be pleased that he can not see it today, for though some of us may prefer a world where one can easily Google a John Miur quote, none of us would be cruel enough to show a man such as Muir scars so far beyond those of cattle and cultivation.

The scars of cultivation, as Muir probably feared, lay just on the horizon. Ranchers, finding the soil in the valley surprisingly productive, began to modify their agricultural style in the eighteen sixties. By 1880, the oaks that gave the Valley its first western name were gone. Thanks to the transcontinental railroad and new techniques for canning foods, Santa Clara was becoming, as it would later be widely known, the "Valley of Heart's Delight," the largest orchard the world had ever seen.

The mountain's gifts have always been plenty for the people of the Valley. At the turn of the century, the fertile land of Santa Clara, laid down over millions of years, was fueling an agricultural revolution. Plum, apricot, and pear trees are thirsty, and in a land with only fifteen inches of rain, they don't make much sense. That is, unless the mountains have provided a sub-surface bounty. Many wells in the valley were artesian, meaning that, once drilled, they would flow freely. The Santa Clara aquifer seemed as bountiful as its soil.

The Santa Clara orchard continued to grow until 1940 when there were some 6,000 farms that produced 50% of the world's prunes, cherries, and apricots. A 132,000 acre piece of alluvial valley floor became the largest continuous orchard in the world with over 8 million fruit trees. The Ohlone people had found something special, and we were ready to take advantage.

Over two thirds of the orchard land was irrigated with thousands of wells. At the height of agricultural growth in the 1920's, over 1,700 new wells were being drilled every year. The Mediterranean climate never produced anything like enough water for all those trees, and slowly, wells began to dry. By 1930, the aquifer level had dropped

from zero to 80 feet below the valley floor. By 1935 it was down to 120 feet.

But somehow, it wasn't the pumping of millions of years of stored water that brought the Valley of Heart's Delight to its knees. It was war.

The Valley seems to be some kind of locus for innovation. Maybe it's another gift of the mountains. Stanford University was founded in Palo Alto in 1890 and soon became a research center for radio and telephone amplification tubes. In 1912, the city of San Jose became the first to ever receive regular radio broadcasts, and the Valley was already being heralded as a technological beacon.

But it wasn't until World War II, and the accompanying increased military presence in the region, that those seeds began to grow. The strategic advantages of the Santa Clara valley in defending the country against the Japanese led to an increase in population from 50,000 to over 200,000. The Santa Clara Valley became a center for government-funded aerospace industries. As World War II ended, housing costs dropped, the automobile caught on, and veterans returned home to start working hard on creating a baby boom. The orchards went the way of the Ohlone.

While government sponsored tech was raging over the valley, no private sector businesses were taking hold. Stanford was shipping all its highly trained electronic engineers back east. Fredrick Terman, a professor at Stanford, saw the green space that Stanford owned around the University as real estate, and began a program whereby the university would lease land cheaply to students starting businesses. Terman, for his part, would work his hardest to attract venture capitalists to invest in his student's businesses

Of the dozens of businesses that started as a result of this program, the one you've heard of is Hewlett Packard.

The success of Terman's program led to an expansion in which the Stanford Research Park was built and then space within it rented cheaply to technology businesses. The Research Park became the true beginning of Silicon Valley though silicon chips did not yet exist when he began his initiatives. Not only had Terman created the infrastructure for a revolution, he had made the Valley magnet for electrical engineers from around the country. High-tech businesses began to explode throughout the Valley.

While Terman was laying the foundation for Silicon Valley, William Shockley and his team at Bell Labs had created a technique to use Silicon to amplify electric signals (a job previously done by bulky, expensive vacuum tubes.) That invention was originally patented by Bell Labs, who threatened to control this tremendous discovery. Fortunately for William Shockley, Bell was forced by an anti-trust suit to give up the patent on the silicon transistor and allow it to be licensed freely to "all interested parties." This was huge, and it's the only reason why you've never seen an AT&T computer. Six years after the 1949 antitrust suit, Shockley left Bell Labs with his best engineers and moved back to his hometown, now a budding electrical engineering hub, to found Shockley Semiconductor Laboratory. He recruited the brightest engineers and physicists he could find from every corner of America. And so silicon was brought to the valley.

The bedrock laid by Terman was now teaming with the best minds in America. And as they took root in this valley of oaks, of heart's delight, of Saint Claire, of the mountain's gifts, the cycle of innovation became unstoppable.

Even when the large-scale creation of semiconductors began to take place, the train couldn't be stopped. Creating semi-conductors is not only a dangerous and toxic process; it also requires a tremendous amount of water. By 1964, the creation of semiconductors was draining the aquifer faster than the orchards ever did. Water levels hit record lows, 240 feet below the ground, and the Valley, having taken all the mountains had to give, began to import its water.

Transistor companies led to computer companies. Computer companies led to software companies. As I was born and raised on the other side of the country, the personal computer became the newest of Santa Clara's bounties. The boom of the Ohlone, of the Gold Rush, and of Post War industry, all paled beside this explosion. By the time the foundation of the internet was laid, the Valley had fallen beneath a layer of concrete that stretched from the Diablo to the Santa Cruz.

The internet took off, the economy exploded, but the Valley could sprawl no further. Rents surged. Thousands of gainfully employed people were forced into shelters. Almost every inch of green space and ancient pear tree was taken out to make room for more development. The gifts of the mountains were ignored. This new world seemed to promise freedom from constraints such as weather, geography and body.

And so it was in a paradise where humans first conceived of and created a placeless place. How could it be that this perfect valley with the perfect climate, the gushing wells, the fertile soil 40 feet deep could be the place where humanity decides that it can exist independent of nature? How could this be the place where we invented and began to live in a virtual world? The Valley of Heart's Delight, where thousands made

their living growing sweetness for half the world. The Llano de los Robles, where the Ohlone Indians were so satisfied with their land that they stayed put for so long that a tribe 50 miles away spoke a completely different language. The Silicon Valley, where we sucked the land dry, poisoned the water, and closed our doors to the world. The Santa Clara valley, that gave us the gifts of this revolution, has the highest concentration of Superfund sites in America. Twenty three in that narrow valley.

High tech pollutes. The creation of silicon chips is dangerous and toxic business. The personal computer revolution had, and is continuing to have, significant environmental impacts.

It was an exchange...one that we were willing to make. Any cursed spot on the earth could have been Silicon Valley, but we chose one of the most ecologically diverse and fertile places in America. Somehow, to me, it seems right.

It's hard to imagine a tight relationship between personal computers and environmentalism. Not only do computers rely on brominated flame retardants, mercury filled monitors, and cadmium in their circuits, but computers tend to promise what can be seen as a replacement for the natural, actual world. It certainly seems to have provided that for me, since I ended up writing about them when I set out to write about my 'Place.' But, as you might expect, to me there seems to be very little contradiction. The reasons for that, though, I can only allude to here. This chapter isn't about resolving the conflicts, it's about pointing them out.

By the time I was born, in 1980, the Valley was already an ecological disaster. But all we had gained from that mess were missiles that could be fired in North Dakota

and land in Moscow. From the first time I peered into the toxic guts of my Dad's Apple II, something much more important has been seeping out of that wound. We sucked the land dry, and grayed the green, but that loss of ecological complexity gave us a whole new dimension of human complexity. Computers created a new medium for art, communication and entertainment. Because of computers, I can draw! Sit me down with a pen and paper and I'll give you the same scratches I struggled through in third grade. But, at a computer, I can draw things that people will *pay* for. I get paid to draw, something I had no chance of without the augmentation.

Computers have increased my abilities and altered my brain. We have a new place in which we can exist. A world that was my place for years, a world I love but can't really see or touch or place my body inside. A new world purely of the mind, but created from the sand and stone of the Earth. A place of human invention destroyed a place of natural bounty. How could a new world be created without something beautiful being destroyed? We could have done it better, but something had to be lost in the exchange.

Chapter 4: What Else was Lost

The age of seven seems to be an important age in this story. It was the year I was rejected by culture, and the year I found hope and home in nature. And also the year that Bill McKibben heralded the End of Nature. In his book, he put forth the idea that nothing was completely natural anymore, that everything was affected by culture. Not

only was no place in the world untouched by the hand of man, but we were creating one place in the world touched only by the hand of man. And that's where my path led.

After my introduction to computers, I became a force. I could run the things better than my dad (who'd been using computers since they cost around $30,000 and had four monitors hooked to one CPU). I could write simple programs before I was in high school. I threw myself fully into culture. My mom, ever proud of (though pretty constantly annoyed by) her sons, says that she's never seen anyone learn like me.

I began to love school. Not in the healthy way where you're happy to see your friends and goof around at lunch, but in that scary and unfortunate way that no one will ever admit to. I liked to learn. I did it with an attitude. Through middle school and most of high school, I had very few friends. My one friend, Jeff Hagman, would come over to my house and we would play computer games together. Then, on particularly adventurous nights, we would put fallen tree limbs in the road and watch as cars either crashed through them or stopped and pulled them out of the way. That was our fun.

Other than Jeff, my friends were online. My brother, at the age of 15 was just as into it as I was. He had become a systems operator at CompuServ. Basically, he was in charge of administering chat rooms and making sure nothing inappropriate went on. By this point, John had his own computer in his own room, a situation I greatly envied, especially because his door was so often locked. But I spent my fair share of time at his terminal. By this time, I had all but abandoned nature. Science fiction was the order of the day, and I spent my time on a computer talking to people who were both older and geekier than I was. But I held my own. In those early days my handle was Kay-9, a

Doctor Who reference that led many a creepy guy into thinking I was a lady. I corrected them on that, but I generally let people make their own assumptions about my age.

My general operating procedure was to log into the CompuServ SciFi forum, and then click on names and see who would chat with me. Everyone did. I was amazed by how friendly people were. In real life it seemed impossible to just talk to a person, but on CompuServ, I just did it and it was fun. So that's when I made my first online friends, around the age of 12, and also when I made my first online dollar. I sold a *Magic the Gathering* playing card, a Sengir Vampire, for a crisp five dollar bill that arrived by mail. The card is worth about a buck now...score.

I still went to North Carolina every year, to the summer camp that was stuck in the sixties. We hugged, talked about Mother Earth, learned about native peoples, told stories, learned how to start fires, and I spent nights alone in the Shining Rock Wilderness. Those three weeks would go by in a blinding flash, and I remember always thinking that it was too short and that, somehow, more had happened in those three weeks than in the entire rest of the year.

It felt that way, of course, because summer camp was completely different from my computerized life. There were no computers at Eagle's Nest, there wasn't even a TV. Life changed, the things that mattered changed, and I questioned everything that I cared about. Those three weeks, every summer, were my personal sixties. Something totally different to break into my world and let me see that the way I was living life wasn't the only way. Upon returning home, I'd spend less time with the TV, and more time with the computer.

I'd never heard of Bill McKibben, but his ideas had permeated popular culture by the time I was thirteen. I read my first novel that year. Jurassic Park. I had always been afraid of them – novels, not dinosaurs. They were such gigantic books, so many words, and I had always fudged my way through book reports until then, reading the first few chapters and then maybe doing some research on CompuServ. But I could do *Jurassic Park.* It was almost like a movie and I was interested in it. I even dug the moral: Life finds a way. No matter how technologically advanced we become, we can't really ever control nature. *Jurassic Park* led directly to me looking for something similar, but wilder. I was looking for science fiction that presented a real wild place. Because that place, apparently, didn't exist in science fact anymore.

I don't know how it happened, but I discovered Kim Stanley Robinson's *Red Mars*, and in it, I found my wilderness.

You want untouched, wild places...some place where the hand of man has only just reached? Mars is it, and I was enthralled. By the time we had access to the web I spent all my time researching Mars. Before long, I had created a website, figured out how to host it, and managed to get it listed on Yahoo with the big guns. I was in it now. I had long email conversations with professional SciFi artists and aviation engineers. I read long reports on life support systems, artificial gravity and terraforming. My site "Hank Green's Mars Exploration Page," was genuinely one of the top resources on the internet for Mars stuff. I was totally into it.

A lasting morsel of those bygone days still awaits those who Google me. Though

my site has been washed into history, an essay I wrote (a bad essay, mind you) has lingered for almost ten years at a site called "West to Mars." The thesis of the essay is that Mars seems to be semi-sentiently calling us to visit. I was writing about the study and colonization of Mars in the same way (though with considerably less skill) as John Muir extolled the virtues of pure wilderness. It was my religion, to seek out and become a part of the only place that was still wild.

On the Mars of Kim Stanley Robinson's imagination, two factions arise. The Greens, paradoxically promoting all development at all costs, and the Reds, devoted to keeping Mars wild and beautiful. I wanted to go to Mars so that I could speak for Mars. So that I could speak for her Wildness, and let her be a place where people could feel what untouched land felt like. I lost almost all connection with the Earth, not because it was spoiled (though it's hard to see past the suburban sprawl of Central Florida) but because I was living in a new world.

The summer after I created the Mars site, I went on my three week excursion into the natural world of Eagle's Nest Camp. A week into my stay, a counselor made mention of a newspaper article he'd seen. Apparently, a meteorite from Mars had been analyzed and showed possible signs of life. Now, I don't want to exaggerate too much, but I'm about ready to use the world "Grail."

This was a very big deal for me. There I sat, miles away from any computer, completely at a loss for information with no connections to the world, and I didn't even really know what had happened. I begged the man to get me a newspaper, and the next day I was rewarded. I read and re-read the article but it simply wasn't enough. It started

thoughts that seemed wholly unfinished. The findings were inconclusive, yes, but what was being done to corroborate? Who found it, where did it come from, what kind of life were we talking about, were there signs of water or concentrated atmosphere in the geology of the rock? None of these questions were answered. I had a dozen friends who were, at that moment, sleep-deprived, tunnel-visioned into their machines, augmented to hell and collecting every scrap of information they could. They were ready to hack the computers at NASA to get more information. And I wasn't there to help them. I wasn't there to post the news at the site, or to participate in heated debates about nonobacteria and exogenesis. I was, frankly, angry at a place I had loved all my life. This disconnection was simply not tolerable.

When I returned home, my website had been visited by more than ten thousand people, all searching for information that I could not provide them. I was angry but also ashamed of my disconnection. I haven't been back to Eagle's Nest since.

It wasn't a conscious decision, but my world changed that day. I started to see culture as the path of most opportunity and I simply ignored the natural. That lasted for several years. But Eagle's Nest did leave its mark. Somehow, through all my appreciation and love of my machine-augmented self, I am an environmentalist. And I genuinely believe that my experiences at Eagle's Nest and in Ocala had a great deal to do with that. Being in and bonding with a place as a young person has been shown to increase environmental awareness. The next generation below me has less experience, and the generation below them will have even less experience with wild nature. Who

will care about the land then? Will environmentalism be a wholly rational decision, wholly anthropocentric? That is the vision that we were brought in the sixties, that environmental concerns were human concerns, but is that enough? Will my children know more about artificial worlds than National Parks? Will they suffer from the obesity and mental health disorders that are currently linked with indoor childhoods. I'm not the kind of environmentalist who actually spends a lot of time outside, but I recognize the importance of the outdoors. Actually loving a place, and there are places I love, brings the environmental movement power. Though I don't spend a lot of time outside, I do care deeply about the natural world and, once in a while, I get down into it, and I remember.

Those whiles, during which I get back to nature only once, are getting longer. In fact, I do a lot of things once in a while. I write journal entries – once in a while. I take breaks and relax – once in a while. I spend time just sitting and talking with friends – once in a while. I leave the house, shower and eat breakfast – all just once in a while. All those very important and healthy things that I only do once in a while...what am I doing the rest of the time?

Yeah, good guess. I'm here, at the interface. God, this place is a mess. My fiance scoffs at what she calls my 'cup garden'. The coffee cup from this morning, the afternoon milk. The mid-afternoon Gatorade. She hates them. They take up a little corner of my desk and procreate. But they have no room to spread out, because, like the Santa Clara Valley, my desk has limited geographical space on which things can exist. It is populated by scattered magazines, mail, electronics, CDs, brochures, my checkbook,

business cards, books, cables, headphones, a rubber ducky, some keys to...I don't even know what, a "Republicans for Voldemort" sticker, a guitar pick, a camera, more books, some pictures, batteries, ooo...I found a buttermint.

Of course, I see none of this. When I'm "jacked in," as it were, the only thing I see is the words I'm writing, the game I'm playing, or the conversation I'm having. One hundred and seventy square inches of screen is my world (note: the measuring tape was on my desk too, but I didn't see it until I needed to measure the monitor). It's not a small monitor, mind you, but it is much smaller than my window. Yet the world behind it is somehow more compelling than the world behind my window. And I spend much more time looking into this glowing screen than I do looking out, or even existing outside of, my window. I am stuck here.

Three months ago I was on the phone with Cindy Shogan, the Executive Director of the Alaska Wilderness League and general environmental bigwig. She was offering me a job. At the time, I was working what I consider to be the equivalent of 2 full time jobs. This doesn't mean 80 hours a week, though sometimes it gets pretty close to that. The most labor intensive thing I do is write. There's really no way to speed up the process, so writing is something I actually find to have a frustratingly slow pace.

I asked Cindy Shogan how much they had budgeted for the position, and the answer she gave brought her around fifteen seconds of silence from my end of the line.

I have never had a full time job. Once, when I worked at Wal Mart, I worked more than 40 hours a week, but I was still considered part time. I've generally been self-employed, with a few unfortunate stints of part time work here and there. As soon as I

began to take third year classes in college, I knew that I hated specialization. The traditional academic cycle of going deeper and deeper and deeper until you were the world's foremost authority on something extremely obscure actually pissed me off. I was really afraid of that, and I believe that the rapid information retrieval of the internet has allowed me to follow my instincts in avoiding specialization. I have access to and interest in too much information to have any desire to specialize in any one thing. I desire to know a lot about everything, but not the most about anything, and that shapes my decisions. And those decisions often puzzle the people around me, especially those from generations above me.

I actually talked Cindy down. I gave her my terms - that I would be a contractor, that I wouldn't get benefits and that I would put in fewer hours than she wanted me to and she would pay me considerably less. The most intelligent thing I could have done would have been to drop my other jobs, drop this book, drop my side-projects and work full time doing something I love for a cause that I deeply care about.

That is not what I did. I couldn't bear the idea of doing one job all day every day. I dropped none of my responsibilities. I continued writing this book, I continued working on my online magazine, I continued my marketing business and I continued my graphic design projects. I continued planning my wedding. And everything else, became every once in an even longer while.

The truly frightening thing is that this doesn't just happen to 25-year-olds with a desire to make a name for themselves in the world. It happens to twelve-year-olds with one eye on the message boards, one eye on their homework, and both ears on Green Day.

The cover story in *Life* magazine a few months ago shone the light on this process. They pried into the lives of some modern teens and found that, lo and behold, they have no time to think. Their schedules are so packed with extra-curriculars, hobbies, work, and socializing, that they never relax. One of the harshest criticisms of the internet that I can imagine is that it's making us less wise. We have more information, but less time to really think about what we should be doing with it. On this issue, the jury is out; did the written word make us less wise? What about the printing press or the lightbulb? Many inventions have made us more productive before, but individual humans don't seem to be getting any stupider, just more productive in their culturally constructed environments.

I am more productive than my father; my children will be more productive than me. Engelbart's augmentation reaches deep. And the very nature of the computer and the silicon chip assures us that it will, in the future, run even deeper.

Computers have changed the way we think. But, as you might expect, I don't generally assume change to be bad. What I am afraid of is that we're valuing productivity so heavily that simple things are being left behind. I know it is happening in my own life. I know what society asks of me. Culture wants me to make money, make a difference, and make people happy. If I can do those things faster than ever before, then my life becomes more valuable. The end result is that I must spend every waking moment either making money, making a difference, or making someone happy. I am afraid of any time I spend not doing those things.

Ultimately, we're in a dangerous place.

About six months ago I was kicking around a professor's house. He was out of town and I was watching his cats. I picked up a book off his coffee table and started reading. The people in the book, not too far in the future, had taken Engelbart's augmentation to a new level. The man-machine interface had been refined. Human intellect was augmented to a new level. The end result was unfortunate. Long story short, a lot of people died, but the new technology was not going away. The author, Pat Cadigan, summed the moral up on the last page. "Every technology has its original sin." The main characters of the book use the examples of fission's Hiroshima and the Ford assembly line's objectification of the worker. But those are technologies that augmented our physical power.

No, it would be more accurate to discuss the sins of the augmented mind. The spoken word gave us symbols - cultural representations for natural things. The written word allowed us to remove those symbols from their natural context, and place them, and the stories of our lives, in a fully cultural context. The computer threatens to make everything that is natural into data, and make that information universally available instantaneously.

The original sin here is not as obvious as the sin of fission, or even as the sin of Ford's assembly line, but that is only because it's more comprehensive. When we augment our minds, our whole world changes, it isn't just one event. We have a hundred thousand new abilities, not one. The original sin of all intellectual augmentation is a loss of the natural. Every time we make our brains more efficient, we move further into culture. Every time we do that, we lose some of the power that nature once gave us. As

we move further into the jungle of culture and out of the plains of nature, we will become more powerful, but only if we can continue to rely on, and not too strongly contradict, natural systems. The natural systems that support us, as well as the ones that are a part of us.

The internet changes the way we see nature, it deprives us of the time needed to understand nature, and it makes us think that nature is unnecessary. And the next step in augmentation can't be too far away. We can't lose sight of our nature without losing all context. Without losing all meaning. We must avoid that, by reconnecting, by taking sabbaticals back into the sixties where we can question cultural values, and back into nature where we can remember that, really, it's the only beautiful thing besides us. That it's more complex and more beautiful than any video game. That hearts beat, and bones break, and cells divide, all without our notice, without our permission. And it happens in the systems that gave us life and thought and the ability to augment ourselves. Nature is culture's mother, and while it's okay to let culture annoy her, it's not alright to let it ignore and destroy her.

Chapter 5: And what we Gained

One last interesting thing happened when I was seven. A software company was created that would become a large influence in my life, and on the lives of similarly wired kids. Will Wright, who had discovered that building cities was more entertaining than bombing them while writing a war simulation game met Jeff Braun at 'arguably the world's most important pizza party.' The two combined forces and started a company that would create some of the worlds I grew up in.

That's not exactly true: we would create the worlds together. The company was called Maxis, and *SimCity* was their first killer game. The idea wasn't to accomplish goals set by the game, it was to create your own goals within the games construct, and then do your best to fulfill them. I made a lot of towns. Some where my citizens were happy and healthy. Some where the coffers overflowed and streets lay in disrepair. Some that were fully self-sustained at population 500. Some that packed 500,000 people into a map the size of a sardine can. *SimCity* was a virtual playground. Some rules were set, but you could play the game any way you wanted to.

The Sim paradigm flourished.

For kicks, I just went and played the original version. Maxis re-wrote it in Javascript and made it available for free online. Up at the top there's an advertisement ticker, hocking the latest version, *SimCity 4*. Every once in a while, the ticker says "You're playing your daddy's *SimCity*." Yikes. Anyhow, it's as I remembered, though the Javascript version is more limited. I sorta drove my city into a hole, concentrated the industry too much and didn't provide enough mass transportation. People started moving away and I didn't have enough money to fix the town. I abandoned that new city, clicked the little red x, and made it go away.

Sim games cover every aspect of life. From *SimEarth* to *SimLife* to, simply, *The Sims*, which we've probably all heard about as it is the most popular computer game franchise in history. In *The Sims* the gamer lives the life of his character, keeps it happy, clean and healthy. His character moves through the world freely, and the player is able to live different lives through them. Yeah, I know it's weird. I never played it, so I can't say

too much about it.

And then there's Maxis' new idea. Will Wright, is creating a new game called *Spore*. The player begins as a microscopic organism in a *PacMan*-like environment. As the organism eats and breeds, it is able to evolve better methods of locomotion, ingestion and defense. Eventually, it becomes a vertebrate, and then the vertebrate becomes sentient. The player then controls a tribe, then a town, then a city, then the whole planet, then the whole solar system, then, eventually, the galaxy.

The most peculiar part of all this is that none of it is designed at Maxis. The player starts with a glob of goo and creates the entire world. Everything is under your control. Using aspects of your character, algorithms determine how the creature will walk, dance, mate, fight and die. By paying attention to your actions, the computer develops the emotional characteristics of your people. Are they inquisitive, lazy, war-like, or party-animals? After understanding your character's niche in the world, the *Spore* engine reaches out to the virtual world and fills in your ecosystem with creatures created by other players. The buildings are created by the player, or the player can choose buildings that other players have created. The look of your creature, the size of its head, how many legs it has, the shape of its spine, the kind of mouth, feet, and grasper (hands) it has are all up to you.

You can take over the galaxy by force, or you can take over the galaxy by seeming like a really amazing species/civilization with amazing ideas that other entities want to be peaceful with and a part of.

I'm not just telling you this because I have a Maxis fetish. The Sim games have

eaten a good deal of my life away, but I would do it again. The personal computer certainly changes the way we live and think, but it can change it in positive ways. By living in my own Sim universes, I created a way to understand the world that I believe to be healthy and powerful. Certainly, the Maxis worldview is heavily influenced by culture, but what choice does it have? If my world-view weren't influenced by culture, how could I live in this world? Just because those worlds, and the *Spore* world, are artificial doesn't mean they don't help us understand and live well in the world.

In Will's own words:

> One of my goals for this whole thing has been to give somebody an awe-inspiring global view of reality, almost like a drug-induced epiphany with a computer. The kind of, "Oh, man, what if we were a molecule inside of a galaxy?" type thing. Can we transfer that experience -- that, I don't want to say drug-induced, but I guess it is, or a lmost theological meaning-of-life-type experience -- into an interactive computer game?

There we have it, back to the sixties, back to the drugs. Modern times are more structured for young people than ever before. Standardized tests, packed-in extra-curriculars, a general uneasiness from parents about letting kids out of their sight. The options here for kids are limited, and letting them sit down and create their own world is certainly not a harmful thing to let them do. They will understand better how to approach and solve environmental problems. As Wright says in an essay he wrote for *Wired Magazine* "the fact that they are learning in a totally new way - means they'll treat the world as a place for creation, not consumption." And, even though it may seem sad that they don't get to create in traditional ways, with wood, and tools and all those things that have environmental costs, if our choices are either to let one billion children have free

range of the environment, or put them in a room where they can do no damage, what should we choose?

Why not let them pound away at an interface that creates entire worlds but uses about as much electricity as two incandescent light bulbs? They'll be creating things that exist and yet don't exist...things made from nothing and are nothing, except that they're something extremely powerful. Wright is quick to point out the positive aspects of gaming. We can grow up creating, learning to solve multiple problems efficiently, creating communities, and feeling good about ourselves.

In Everything Bad is Good for You Steven Johnson chronicles the large-scale disparagement of new media but how it has, generally, led to smarter more culturally effective people. He identifies what he calls "The Sleeper Curve," which is the silent but continual increase in the average intelligence of Americans. If television really rots your brains, why doesn't anyone seem to have brain-rot? We certainly watch plenty of television. And it's not unusual to hear intellectuals screaming, terrified, that no one ever reads anymore. And that television is a waste of our precious time. But just a couple centuries ago, those who spent all their time reading novels were considered flighty and foolish.

I can't help but agree that television in excess has a negative influence on people, especially if it is poor quality television. But, nowadays, T.V. shows are complex institutions with multiple plot layers, and hundreds of interactions between dozens of characters. The most popular television shows are the ones that puzzle and surprise. Just like the most popular books. But, unlike books, television is actually getting more

challenging, more complicated.

I found a home in television and books, but mostly, it was the computer that captivated me. It was more complex than either television or books because it was filled with real people presenting real opportunities for financial gain and personal growth. The computer is an active medium. I use it to create things; I don't simply enjoy what others have created. And that ability to create, just as Will Wright said, actually decreases the amount that I am interested in consuming.

By the time I'd gotten to college I was totally out of the environmental scene. I came into that school intent on becoming a biochemist, just like my favorite character in the Mars trilogy. In my off hours, I spent a lot of time in a part of the internet called IRC (internet Relay Chat), which was one of the first chat mediums. IRC must not be too important to this story, because it was born when I was eight, not when I was seven. Nonetheless, I lived on an IRC server for maybe one tenth of my sophomore year. What did I do? Well, I didn't just chat, I'll tell you that. IRC was also one of the first peer-to-peer file sharing networks ever created. It was far more complex, both socially and technically, than Napster, and it was filled with far more valuable jewels.

So, you might have guessed by now that what I was doing was kinda illegal. I've decided to tell you anyway, in the hopes that the statute of limitations will wear out before this is published. In those years I lived online I created more than just friendships, I created (and distributed) a valued product that no one else in the world, including multi-national media companies, was able to provide.

The team was composed of Indi, the programmer from Alberta, DataStrm, the quiet bilingual Japanese guy, Elladine, resident Hawaiian hottie, Serun, the depressed but hardworking goth boy; DarkGildon, the Athiest Jew, and me, BrokenGolfClub, a half-assed biochemist from Florida. Our Mission, aside from making each other laugh and keeping lamers from hitting on Elladine, was to convert 'raw' (untranslated), just-released, episodes of Japanese cartoons into a subtitled product Americans could understand. We did it for fun, for posterity, for the love of Anime, and (mostly) just because we could.

Elladine led the group after deposing the former leader, Skates, who, everyone agreed, treated us all a bit too much like his minions. DataStrm translated the episodes, I translated Data's translations into English, Indi and Serun actually applied the subtitles using some open-source computer programs, and then Dark Gildon and I 'distributed' the files (which means that we set up servers that allowed people to download the files from wherever they were.) In order to serve at the fastest speeds possible, I installed two ethernet cards in my computer and plugged into two jacks, thus ensuring myself twice the bandwidth allotted to each individual student. One morning I received a phone call from the school's IT administrator. Over the night, roughly 95% of the school's bandwidth had been flowing into my room. We're talking multiple T1 lines that I was hogging in order to transmit full-length, high-quality television shows to thousands of people across the world. Their combined downloads added up to over four megabytes per second. Unheard of speeds!

A power trip, yes, but also a remarkable accomplishment. I was entertaining tens

of thousands of people. The anime that my group released has been, by now, viewed millions of times. We did that work having never met one another. The power! We didn't have to drive anywhere, we didn't have to make anything, all that we consumed were electrons. The value that we added to those programs was a product entirely of computers and individuals. Nothing was harmed in the process and we were able to do it really very easily. At the same time we became friends. These people were smart and funny, and I had no idea what they looked like. To this day, I only know one real name. I really wish I didn't know it, but I do. Serun's name was Jeff Corey. But I can't tell that story right now.

Last chapter, I mentioned my window. If I turn my head ninety degrees to the right, there is a piece of glass. Behind that piece of glass is the entire world. It is there, in all five senses, in high resolution, more infinitely complex than any computer game. But that's not where I look. I look straight ahead, at another piece of glass. It's smaller than my window, it stimulates, at most, two senses and it has a resolution roughly one fifteenth of what I perceive out my window. And behind it, there is considerably less information – after all, outside my window, there's everything. But I don't even go out there. I stay in here, at the interface.

Why do I do it? Because, from here, I can get at more faster. I have access to the digitized world, and that's no small world. Not only do I have access to it, I have instant access. Access to information I didn't even know I wanted. I recognize that knowledge is not equivalent to wisdom, and the simple access to knowledge is even further separated

from the ability to make wise decisions. But having that access, alone, cannot hinder our quest to make good decisions. Without moving I can do more than find out how to play my favorite *They Might Be Giants* song, I can do more than look up congressional voting records. I can watch old episodes of *Perfect Strangers* and I can search the full texts of the main sources of this book. I can search the entire text of Technopoly, What the Doormouse Said, Last Child in the Woods, as well as The Green Revolution. That's four of the five books I currently have on my desk. Why are they on my desk! If I can't remember where that piece about the kid who thought the world's largest natural bridge wasn't as perfect as it looked in the brochure, then I can just search the entire text of Last Child in the Woods for the word 'perfect'. I don't have to remember the name of the natural bridge, or even what section of the book it was in. I just search, and it's there; I can read the whole story, instantly.

I may be naïve, but I think that the younger generation will know more about the world. Not just the virtual world, but the actual world. And that knowledge, if they ever find the time to think about it, will lead them to an understanding and appreciation of the environmental crisis. I'm not the only one who sees this future. A few years ago a guy named Graham Hill started up a little blog called TreeHugger. It's now one of the top 100 blogs in the world and, as Graham put it when I talked with him last week, "that's competing with sex and gadgets and left wing politics." TreeHugger is one of the biggest names in online environmentalism. When I asked Graham if people need to be connected to nature to protect nature he, at first, seemed surprised that that was even a question and said "You can understand your impact but not care about it. I think there has to be an

emotional aspect."

But then, as we continued to talk about the future of our world, Graham saw deeper into the problem than I had. "Kids growing up today," he paused, thinking, "they're going to leave their computers. There is a global news network now and they're going to be very conscious of huge environmental fuck-ups....[they] will be more conscious of the contrast between nature and computers. They will experience amazing outdoor nature and potentially also major disasters. It may be more obvious to them than it is to us."

The coming generations will not enjoy the same quantity of outdoor nature as previous generations. And, as a result, they may not feel the passion that has resulted in effective, though often localized, environmental protection in the past. But they will know nature, and they will know its beauty and understand its power. My ridiculously rational mind is telling me that understanding might be almost as powerful as love. And understanding mixed with love, well that's the most powerful force we have. That's when culture and nature mix. The wired generation is more likely to cultivate a system-wide understanding of the environment, but their opportunities for a true, loving relationship will be limited. Graham and I, however, are not ready to discount the possibility that we may, somehow, cultivate both.

My own love of nature cannot be separated from my experiences as a young person. So I cannot vouch for the power of understanding without love. But nowadays, I'm a rational environmentalist. I am less interested in localized actions protecting the places I love, and more interested in the effects of politics, ideologies and economies on

the environment. I worry more about dams in China than clear-cuts here in Montana. And I act on my fears here, at my desk, not in the field ground-truthing or lobbying at City Hall.

When I was young, maybe thirteen, I asked my dad if it was possible to have a job outdoors. He probably laughed, having had several miserable outdoor jobs throughout his life. But he took me seriously and told me about the myriad scientists that worked in the field for the Nature Conservancy. I remember specifically my father taking me to visit a friend of his who worked on a wildlife preserve studying plant and animal populations. We drove around in a Range Rover through swampy Florida forests. Back at the office, I was much more impressed with their GIS software and gigabyte zip disks than I had been with working outside. So much for that dream.

Nonetheless, I cannot stay away from nature for long. Almost daily, this summer, I've visited about a hundred very specific plants. These plants live on 225 square feet of fertile earth that I freed of encroaching dandelions and yard grass, dug-out, tilled, fertilized and planted with beans, cabbage, broccoli, peppers, onions, garlic, carrots, tomatoes, peas, chard and lettuce.

I've watched these little guys poke their leafy heads up out of the ground, the beans wearing their seed casings on their heads like hats. I put my sweat in the earth, and from it sprang life. That life will feed my family, my friends and myself. It's a deep tradition of humans. We know it's deep because it's on the natural side of the ecotone. We all participate in the apparatus of agriculture daily, but usually just at the very last step. I find that my garden is a kind of home. I impose my culture on this wild earth, I

obey its rules, and it allows my use. My hands feel at home in the soil, among the gargantuan worms and half-composted egg shells. My garden plops me down on a different side of the ecotone, a bit of culture in nature, not the other way around.

When it comes to natural experiences, my town offers more than this. The U.S. Government has rules about the lands it owns. The basic rules are set when lands are designated. The Bureau of Land Management sets aside lands mostly for cows. National Forests are mostly for harvesting trees, while National Parks exist largely for tourists. In the early sixties, as the world was changing its shape, a new designation was created, that of Wilderness. This is land owned by our government on which the creations of man are severely limited. This is land where "man himself is a visitor who does not remain," and "where wildlife and its habitat would be kept in as primitive a condition as possible." A place where the only culture is the culture inside of visitors. The Rattlesnake Wilderness Area lies on the edge of my town, within a day's walk north and east of where I now sit.

These places expose my life, they strip me bare. The contrast is sharp and I question more than my ideas. Every day in wilderness brings me further out of the forest of technology until I can see for miles into nature. My own nature as well as the nature that always exists below our notice. I don't go to these places to be "reminded of what it is I'm protecting," as my colleagues often observe. Though, certainly, their effects strengthen my desire to ensure that these places continue to exist. But I'm not seeking a spur to make me work harder upon my return to the real world. I'm seeking a different definition of the real world. Wilderness skins off the tough layers of routine and assumption. The place is sharply different but undeniably desirable. But, ultimately, I

don't go to the wilderness to see nature. I go there to understand myself, to strengthen my grasp of the ecotone and to remember that there are other ways to live.

When I return I am shocked and scared and overwhelmed. But this world was created to bring startling ability to my immobile body and its fluttering fingertips. It's where I belong now.

The box can't be closed once it's opened, but we can control the power that emerged. The environmental movement has begun to understand this, and is now, finally, using the internet to reach out to people who are concerned about environmental issues. Sad as it may seem, I used to hear, somewhat frequently, from various environmental voices, that people online are not the target audience of environmental organizations. They use computers, so they must not be interested in the movement. This opinion has, of course, changed in the last five years, as everyone has become a person online, but the mere assumption angers me.

Why assume that, since I do not spend my days leaning on trees, munching organic apples and doing Yoga, that I somehow don't care about the most important problems my species faces? The people who aren't very interested are the most important part of the environmental movement. But when the movement brings these ideas to them, and allows them to realize that they are affected, that's when the movement has the most strength. There are a lot of people online waiting to be a part of that power.

If you hadn't figured it out, that's actually what I do for a living. It's weird, I know, to find out this late in the game, what my actual occupation is, but I told you at the

start, I don't like traditional introductions. I get environmental organizations online. I get them noticed, I get them money, I get them members, and I draw all of that support from a virtual world. All of it flowing from people who live at least part of their lives in a placeless place.

One week into my position with the Alaska Wilderness League, I created a MySpace profile for the Arctic National Wildlife Refuge. I assume we know about the Refuge, 20 million acres, oil under the north part...big fight...etc. Within two weeks the Refuge had hundreds of MySpace friends, in a month it had thousands, in two months, tens of thousands. The internet is a social institution. It's where the cultures of the next generation are forming. In a staff meeting, I told the Wilderness League about my success with MySpace. One of my coworkers looked at me blankly and said "MySpace, isn't that where the pedophiles hang out?" Another person at the table agreed. I was dumb, I knew what I wanted to say, but I didn't want to seem like a dick at my first ever staff meeting. MySpace has had it's share of pedophiles, sure, but it has them because the entire generation of people younger than me are there. MySpace gets more page views than Google. Over fifty million registered users log on an average of seven times per month. All my coworkers had heard was that it's where the pedophiles hang out. Well...I hate to put this so bluntly, but we need to hang out in the same places as the pedophiles, because that's where the trusting, kind-hearted, naïve, optimistic generation hangs out. If the young aren't spending time in nature anymore, we need to bring the environmental movement to them. Given the right circumstances, they will care.

And it's not just the young either. The internet makes every demographic more

politically and socially active. Wired Americans are more likely to be widely informed on political issues and they are more likely to actively seek facts, rather than passively accept them. I know from experience that people reading web pages will immediately leave any site that does not seem objective. Any attempts to market to someone online in anything other than a completely forthright way will be met with frustration and anger. People who use the internet regularly also generally have a wider circle of friends, and are more likely than nonusers to contact those people by phone, meet them in person, and receive help from one of those friends when they need it.

These people, who live large parts of their lives online, are not unnatural. They can feel the blood running in their arteries. As long as we don't start messing around inside our genes, we'll always see nature and know it is there looking back at us in the mirror as well as just outside the window. They might lose some connection to nature or the overall quality of the connection might decrease, but they still know it, just like the average twenty-something watching the sixties on TV knew it. We need to bring that to the internet, – not the sixties, that can only happen once – but the understanding that we have the power to screw this world and screw ourselves. Once we understand the possibility, there's no reason why we have to do it. People in American have a great deal of faith in themselves. Whenever gas prices rise, we lament, but we also praise the every-day ideas and innovations that are alleviating the problem. As we accept that the world might be heading someplace we don't want it to go, we will fix it. We have that power.

Bringing the environmental movement to the internet, I believe, fits remarkably

well into the dreams I had as a young person. When I looked into Kim Stanley Robinson's Mars, I prayed that someday I would find a lifeless wilderness to bring environmental virtues to. I had powerful dreams back then, and a geeked-out ego to boot. Well, this is where I ended up instead. In a lifeless world that is, in its way, wild. And here I am, bringing environmentalism to the people of that world. Not to save that world, but to remind them: this new world is based on another, you are based on another. You're more than cultural, you're more than natural. And that is the only reason you are unique and powerful. The personal computer doesn't change that, the internet doesn't change that. We're the same people, with the same genes and the same nature. We draw our power from an ecotone, not from a technology and not from nature. Reminding people of that fact is what makes both movements strong, and every time we remember that fact, we will become stronger. Every time we plunge in and withdraw unscathed, every time we share our bodies between the two worlds, we will become stronger.

Chapter 6: EcoGeeks

I'm going to tell you a secret, and really, you're not allowed to talk about it. I just got off the phone with Bradley Berman. He's a small fish, like me, in the world of the environmental movement and also in the world of the internet. But in a smaller world, the world of the environmental internet, he's up there with the big wigs. I met him because, six months ago, I was vying for a domain name. You do not want to know what that entails. It's a cutthroat business, picking up expired domain names. Imagine vicious computer programs lunging at servers trying to pick up the expiring names so they can be

plagued with advertisements until they're sold at a huge profit.

Six months ago I played my hand in that game for a domain name I needed as much as I've ever need anything virtual. I lost. The domain was picked up by one of those scavenging computer programs and stored with some big name domain company. They paid six dollars for it. I sent them an email and they quoted me a price of $2,500. A price I could not pay. I told them it was a good cause, and that I could pay $500. They told me to shove off.

A month later, I saw the domain name had changed status. Someone had bought it. I did a quick check to discover that Bradley Berman of New York was the new owner, promptly Googled him, discovered that he operated HybridCars.com, a long-time site devoted to, well...y'know. I felt tremendously relieved. Often these good domain names will become perpetual pages selling Viagra and porn and never live up to their dramatic potential. So I emailed Bradley Berman, and gave him my ideas, all of them, because, if he had the domain, I wasn't going to need them anymore.

The domain name was EcoGeek.com. I had recently discovered that I was not alone in my reaching between these two modern movements. I owe a friend from a journalism class for giving me the idea for the name. And I owe Jon Weber for giving me the impetus to create a plan and marketing strategy for an online magazine for techy enviro's. I loved that name and believe that the success of the magazine relies on it, so I needed the domain. When I lost the domain, I gave up on the magazine. But after I sent my proposal, design, and strategy to Bradley Berman, he was straight up excited.

He knew he needed the domain but he didn't know what for. He had a sketch, at

best, of the site and needed some good ideas. Today he called me, we talked for two hours and we created EcoGeek: a magazine for people who know how much power lies here at the modern intersection between nature and culture. We have to embrace technology while protecting nature; more and more people are realizing it. Bradley Berman and I realized it on opposite sides of the country at the exact same time. We reached for the domain name because we both knew that eco-geeks are the future.

This isn't my first venture into online publishing. Last year, at this time, I was editing Wild Thoughts Magazine, a dedicated effort to bring nature writing online. The unfortunate truth is that I don't really like nature writing, and neither does the next generation. If it's not funny, pithy, or immediately important, the wired soul has more important things to be doing. Wild Thoughts ventured forth nonetheless (and continues, in a form.) I would like for it to survive, but I'd rather not be the editor. Let me know if you're interested in the position.

EcoGeek, on the other hand, flows from the lesson I learned by analyzing the movements that sprang from the sixties. This stuff has to be relevant, quick, and important. EcoGeek can do that.

The euphemism "surfing the net" has been around for about as long as the net. It caught on because it's true. When I browse, it can be an engrossing experience. I can learn a thousand things an hour. This is not a place for environmental literature, it's a place for a new kind of writing that you can experience, depending on your tastes, at DailyKos, Gawker, Fleshbot, or Treehugger. It's a style of writing that I love and am

greatly influenced by. It's a style that promotes and is promoted by surfing. We all do it, we know what it's like.

Quite unintentionally, Richard Louv, the author of Last Child in the Woods wrote a bit about surfing that I find to be somewhat revealing.

"It is dependable, always there, but at the same time offering mystery and danger... I do not surf, but I understand the attachment that surfers have ... and once this attachment is made, it is never lost."

You will correctly assume that my ellipses occur in the places where Louv indicates that he is talking about surfing the ocean, not the net, but I find the metaphor too appealing not to share it. "Once this attachment is made it is never lost..." "Offering mystery and danger..." That is the internet. We weren't built for the ocean or the internet, but we've learned how to surf both. We've learned how to exist comfortably in either, but that doesn't mean there is no danger. There is always danger existing where we don't truly belong. People surf, but they also drown.

Two years ago I got an instant message from Elladine. She told me that Serun, who always said he hated life, loved drugs, and couldn't get girls to notice him, had intentionally overdosed on sleeping pills and Ritalin. He once told me that he always knew he'd kill himself some day. I took him seriously, told him not to do it, and said we'd miss him. The funny thing is, I actually do.

The blank feeling of loss, the confusion, the grief, the empty unfillable space – all came across the wires without dilution. He wasn't the most fun guy in the group, but he worked hard, thought hard, and was the only person ever interested in asking bigger

questions than, "When's the new episode of Kodocha gonna be released?" I told him that the world we all live in is inhuman and unnatural, and it's normal to feel out of place, because we all are. Our minds and our bodies weren't built for lives of fast cars, 40 hour work weeks, and high-school dictatorships. He replied by observing that everyone else seemed to manage all right. It didn't even matter if everyone else did feel the same way; Serun knew he wasn't built for this world, so he left.

I still believe what I told him. Our bodies and minds evolved as Sub-Saharan hunters-scavengers, but somehow we've become post-industrial techno-capitalists. The layers of cultural constructions are miles deep, and it is difficult to believe that any person could actually find comfort in such a strange and complex culture. But I have. I can swing through internet portals like a monkey through a tree. My mind finds juicy bits of online opportunity in an infinite field of worthless crap as sure as an owl's talons strike flesh in the darkest part of night. We didn't evolve to live in a techno-capitalist world, but, as cultural beings, we create our world to suit us. We created keyboards, automobiles, stock exchanges, books and surfboards to be compatible with our psychological and physiological needs. So I shouldn't be too surprised that I can function and even thrive in this techno-culture.

But not everyone thrives. Serun didn't. Is that what human evolution has become – a Cultural Selection: survival of the ones who can deal with this weird wired world without killing themselves before they can procreate? As distasteful as it sounds, it's no more graphic than Darwin's "war of nature." But still, he was *Serun* – a guy whose real name I never knew until he died, but who was my friend, and who lived on the internet

just as I did, and worked hard on the same projects as me, and who said really nice things sometimes, which meant a lot, because he was usually just an ass. I can't say if modern techno-life led to his depression. I'll never know if he could have been a contented hunter-gatherer.

But Serun's death didn't stop me from using the internet. I'm on less for social purposes now, but probably more than I ever was back then. Now I have bills to pay, and several businesses that I run online. The internet makes me money, though it doesn't necessarily make me happy. Sometimes, though, it does.

I have a cousin, a second cousin I think, my mom's cousin, Charles Goodrich, who is a writer, among many other things. I didn't know he existed until about a year ago. But he's a wonderful writer. Somehow, I think we share a sense of humor, as well as a sense of balance. His life has been dedicated to a more concrete study than mine, and his book, *The Practice of Home*, reflects that study. Charles built his house. He didn't actually know anything about building that house when he started. He just found a place, got some books, and started building. He still lives there, and I hope to visit him soon.

Charles set out to become his own general contractor, to learn every bit of what it takes to make a house, to understand everything from hinges to circuits, so that he could convert his land into his place. Through my entire life, I've been on a very different path from Charles. Somehow, they led us both to a common passion acted out in similar, yet quite dissimilar, ways.

While Charles' land is a fertile plot in South Corvallis, Oregon, my land doesn't actually exist. That place by the river becomes a place on a server. And, somehow, without ever even standing up, I set out to become my own general contractor. I didn't know anything about the internet when I staked my first claim. But I learned. I read books, I talked to experts, I fudged my way through. And now, I am the online equivalent of a general contractor.

Using my sweat and brains I can hammer out a home for myself in this unnatural world. I can lay down a foundation using programming languages and open-source databases. I can build up the structure with HTML code. I can decorate with Photoshop and Fireworks. I know which databases are best for what purposes, when I can use someone else's system, and when I need to build my own. I know the limitations of HTML and how to work around them. I can follow directions in how-to books, or I can try it out and hope. As Charles says in his introduction, "Home, it turns out, is an entirely experimental process, sometimes scientific and sometimes slapstick." I can tell friends and colleagues my address, and they can visit. We can talk about what has happened this week in the world, or on the net. It is a kind of living. They can listen to my stories and laugh out loud when the punch lines hit. It is a new place, and I am tied to it as surely as Charles is tied to the house that he built every inch of.

We've had the same experience building different kinds of houses in different kinds of worlds. Charles took nature and introduced his culture. I took culture and introduced my nature. We're both thriving in the ecotone, just on opposite sides. Anyone who might deride Charles for backward thinking, or me for being a techno-wonk pushing

too hard into the future, simply doesn't understand. There is no power in one or the other.

Some who are dedicated to the personal computer and the internet might want very badly to create a place that is purely culture. It might, in fact, be their drive. The most radical want to put sockets in our brains, or even download our consciousness into a super computer so that we can become immortal.

Some who are dedicated to the environment would like to break down the distinctions between man and nature. They want humanity to realize that it is in no way separate from nature. They see a world where we live in harmony with nature and create a utopia in which we do no harm. The most radical of them think fondly back to prehistoric man, who was a part of natural systems, and had no significant power over the earth.

At their most radical, one wants us to be purely cultural, and one wants us to be purely natural. Opposite views. I live comfortably in the world of the online personal computer and the world of the environmental movement. I can do it because I know that we are not merely natural or cultural, we are both. We are amazing because we are both.

The saddest part about writing this book is that I don't get to say anything inflammatory or revolutionary. I don't get to order you to shut Pandora's box, or passionately prod you into embracing a life-changing technology. All I get to say is: Yes, everyone is right. Yes, computers are bringing us an amazing new world. Yes, the explosion of personal computing is having negative affects on both the environment and on our relationship with the environment. Yes, some environmentalists are wacko Luddites. Yes, we must save some places for nature. Yes, a human's world is and always

will be anthropocentric.

I just agree, agree, agree. Who wants to read a book like that, where all the sides are right and nothing gets disparaged or heralded outright. Well, hopefully, you wanted to read it, because you're almost done. But also because it is true, and it's beautiful.

But it's also dangerous. Houses in tension, remember. The ecotone is a marvelous place to live, as long as you never move too far from the forest or too far from the plain. The danger, to me, seems faint, but on the horizon. I can conceive of a future in which we lose sight of nature. But I don't believe we could do it for long. Our minds would rebel in a purely cultural world and nature would still be there, waiting to take us back.

But simply because the world of pure culture grows stronger does not mean that the world of pure nature has been weakened. In fact, the opposite seems to have happened. The tumult the sixties brought strengthened our relationship with nature and culture. This didn't happen because culture and nature became stronger and more pure. It happened because environmentalism integrated nature with culture and the personal computer integrated culture with nature.

Because of that integration, our daily habits, activities, and abilities have changed dramatically. That integration has brought us a greater power than our species has ever known. To continue this integration is in our interest. The world has to understand the wealth of power that the ecotone provides. Both sides are beautiful and ridiculously complex. But only through an integration of each with the other, and by fueling ourselves with an understanding and appreciation of both do we reach our full potential.

That we can do this is the most remarkable of our abilities. In that ability is the power to better ourselves, and the power to save ourselves. The ecotone is a place of innovation, diversity, opportunity and abundance. We are alone in our ability to walk so easily between these habitats. We are so lucky.

Chapter 1 Bibliographic Notes

It's good to begin at the beginning. Namely with my own birth, a story which may or may not be true, but my mom swears by it.

Information on the oddity of human child birth due to our need for big heads and bipedalism come from *Human Birth: An Evolutionary Perspective* by Wenda R Trevathan. The entire text of which is available at the Questia online library.

It's hard to put a word in about the Nature Nurture debate. We know something, but not a great deal. The information I used here was gleaned from Wikipedia, and some interviews on NPR's *The Talk of the Nation*. I'm certainly no expert, but I'm also not trying to say anything revolutionary here.

There are a lot of different definitions for Ecotone. The one I use here is a specifically ecological one found at Wikipedia. A friend of mine points to another definition: "An abrupt or relatively rapid change in an environmental complex-gradient is termed an ecotone; this term is also used for a rapid change in a coenocline or ecoline." From HG Gauch. So the word ecotone does have a broader definition that is both biotic and abiotic. But I'm keepin' it simple.

All the rest of that information about ecotones comes from my terrestrial ecology class with Matthias Rillig. The text book, Principles of Terrestrial Ecosystem Ecology, notably, was accidentally posted publicly on a website by its author F. Stuart Chapin. Which was nice.

I read up on Sensory Integration Dysfunction a bit here. It's been a while since I thought about that part of my life, and how uncomfortable it was. I spent some time at "Kid Power" http://www.kid-power.org/sid.html but the best resource I found, and was really pleased to explore, was Sensory Integrative Dysfunction in Young Children by Linda C. Stephens. http://www.tsbvi.edu/Outreach/seehear/fall97/sensory.htm

Chapter 2 Bibliographic Notes

A note on this chapter title. The Matrix was a movie, you might have heard of it. In online culture, the Matrix is generally considered a place of pure virtual reality. Meatspace is a term that originates from early cyberpunk fiction. It's a kinda derogatory term for the place where our meat (bodies) still exists.

The story of Grace Hopper's moth is all around everywhere. There's a lot of talk about it being the origin of the phrase "computer bug" but that actually comes from the word bogey, as in bogey man. But nonetheless, the facts remain. And are chronicled fairly completely here: http://www.waterholes.com/~dennette/1996/hopper/bug.htm. Regular biographical information on Grace Hopper comes from Wikipedia, and the more in depth stuff was found in a Yale biography:

http://www.cs.yale.edu/homes/tap/Files/hopper-story.html

Vannevar Bush's article on the Memex was entitled *As We May Think* and was published in *Life Magazine* on September 10th, 1945.

A really huge amount of what I did here comes almost entirely out of John Markoff's ridiculously interesting book What the Doormouse Said. The book chronicles a bunch of Silicon Valley and personal computing history and its relationship with the counter-culture of the 60's. I owe Markoff a huge debt on this one.

The stat about Steve Jobs being the 140th richest man in the world comes from *Forbes* online.

Information about the early environmental movement is either just kicking around in my head and corroborated online, or it was found in The Green Revolution by Kirkpatrick Sale. There's also a really great environmental history timeline at http://www.radford.edu/~wkovarik/envhist/ written by William Kovarik.

All of my Engelbart stuff comes from Markoff. I'd love to find more on him, but I really don't think there's a better place to go than to Markoff, who wrote all of What the Doormouse Said because of a single dinner he had with Doug Engelbart.

Chapter 3 Bibliographic Notes
Santa Clara County has an information packed website that was really useful in writing this section.

Joel Michaelsen's brief overview of *California's Geologic History* was also very helpful in my digging deep.

I was also tremendously assisted throughout this section by Aaron Sachs' 1999 article in *World Watch Magazine* entitled *Virtual Ecology*. It was, in fact, an environmental history of Silicon Valley.

A bunch of great information about the Santa Clara Valley's trends in water use was found in the paper *Subsidence due to Groundwater Extraction in the Santa Clara Valley, California* by Aubrey Weese.

Most of the information concerning the Santa Clara Valley's pre-european people was gathered from *An Unvanished Story* located online at http://www.cr.nps.gov/seac/sfprehis.htm

The rest of the story was pieced together from Wikipedia (http://en.wikipedia.org/wiki/Ohlone) and the Santa Clara Country webpage.

That John Muir quote was in From the Yosemite.

Various bits about the History of Silicon Valley were gleaned from a Wikipedia article and from the stories of John Markoff in What the Doormouse Said.

Chapter 4 Bibliographic Notes
Claudia Wallis wrote the March 27th 2006 cover story *The Multitasking Generation* in *TIME*, which explores kids and their augmented lifestyles.

Pat Cadigan wrote Synners, the book I found in my professor's house.

Ideas about the sins of the augmented mind germinated in The Spell of the Sensuous by David Abram, a book inspired by the singularly remarkable idea that written language allowed us to abandon our attachment from place and conquer nature without regret.

Ideas about losing wisdom by gaining knowledge (and access to knowledge) came to life when I read Neil Postman's Technopoly.

And, of course, Richard Louv's Last Child in the Woods informed my thinking on the negative affects of technology greatly. Though they never really appear in any particular place.

Chapter 5 Bibliographic Notes
Maxis history comes from the Maxis History section of Maxis.com.

You can, and probably should, watch a video in which Will Wright introduces *Spore* to a crowd of extremely excited Geeks. It's at Google Video here:
http://video.google.com/videoplay?docid=8372603330420559198&q=spore

Will Wright talks about *Spore* at *Wired Magazine*:
http://www.wired.com/news/e3/0,2879,67581,00.html

Will Wright talks about gaming's effects on the future:
http://www.wired.com/wired/archive/14.04/wright.html

Everything Bad is Good For You by Steven Johnson was also an excellent resource when exploring how new media are increasing the intelligence of young people.

The Pew Internet and American Life Project has some great stats on what people use the internet for and how it affects their lives. That's where all of these pulled-out-of-the-air sounding statistics come from. http://www.pewinternet.org/