

I grew up in a relatively rural area of Maine where my closest friend lived about ten miles away. So growing up I spent a lot of time playing in the woods with the family dog as my only company. Keeping myself entertained in such scenarios required a surplus of imagination. Things I had been exposed to in my 'downtime' inspired many of the adventures my dog and I went on. One such exposure arose from the first book in a series of books called The Boxcar Children by Gertrude Chandler Warner. These books revolved around a family of four orphan children who were forced to fend for themselves out in the wilderness. Throughout the course of the book they make beds out of pine needles, pick wild berries, make a broom out of tree branches, find old cups in the dump, and make a swimming hole in the brook near their boxcar. All of the aforementioned activities were very applicable to the woods behind my house. I have very fond and distinct memories of making pine needle beds and trying in vain to dam up a tiny brook to make my own swimming hole. There was something about having to fend for myself out in the 'wilderness' that I found quite appealing. In hindsight it seems that what I related to the most was the children's use of their natural resources. I believe that my mimicry in this regard gave me a greater appreciation for simply being outdoors. Although the environment in which I grew up certainly fostered being outside and developing a relationship with nature, I also believe that books like The Boxcar Children helped to further encourage this relationship.

My love of the outdoors and nature as a whole has remained a constant throughout my life. However, I eventually reached an age where going outside and playing in the woods lost some of its original appeal. I was no longer content with simply being outside and letting my imagination entertain me – I always felt the need to be doing something, even if that something was nothing more than sitting on the porch reading a book. Parenthetically, it was the union between reading and sitting outside that rekindled a long stagnant desire to read. Partly due to an

unfortunate fifth grade experience in which I learned I didn't have to read in order to complete an assignment, I lost all interest in reading until my junior year of high school. That summer I wanted to be outside, but I couldn't think of anything to entertain me, so I picked up a book and decided to read, for pleasure, with no external motivation, for the first time in four or five years. Since then my reading habits are much improved, but sitting outside in the sunshine is still my favorite venue. One such book I specifically recall reading outside is Amazonia by James Rollins. Amazonia is a sci-fi novel that takes place in the Amazon rain forest, and as soon as I started reading I was transported right into the jungle, though it likely helped that I was reading in direct sunlight. In addition to this being one of my all time favorite books, I also found Amazonia to be exceptionally engaging because even though it is a science fiction novel, the actual science described is remarkably accurate. A few months prior to reading this book I had attended a week-long short course in functional genomics at MDIBL and I was very excited about research at that time. Thus this book appealed heavily to me as a scientist. Amazonia was not only engaging as a result of a believable scientific and action filled plot, but it also addressed with some moral quandaries that arise when dealing with tensions between science and nature. For example, one plotline of the novel is based on a prion disease that doesn't affect those living in the rainforest but is horribly detrimental to outsiders. As non-native humans began to invade the Amazon rainforest and attempted to capitalize on its resources, this mysterious disease began to affect those that invaded the region and was starting to spread to their respective homelands, thus putting the planet on the cusp of an epidemic. In this story, had we as humans left nature alone and not tried to manipulate it to our advantage we could have avoided potential disaster.

One of the most profound self-discoveries I have made over the course of my college career is that I tend to be more questioning of the applications of science than many of my peers. Specifically, I have become increasingly wary of the pharmaceutical companies and the more I learn, the more my interest in biomedical research has waned. A lot of biomedical research is conducted with the ultimate goal of developing a pharmaceutical and often times I think the moral capacity of pharmaceutical companies ought to be suspect. My general inclination to be suspicious of industry is partially a result of my upbringing. There was a time in my childhood during which my father decided to boycott Wal-Mart. At the time I doubt I had any personal convictions one way or the other, but my dad was opposed to big corporations so I followed suit since, as I've been told, dads are always right. This event, coupled with my subsequent reading of 1984 by George Orwell has helped develop my current convictions. Although the dystopian state of the planet in Orwell's novel is an exaggeration on anything that is likely to happen, the book did give me pause. The extreme manipulation of the people of Oceania by the government seemed only a few steps from the realm of possibilities, and the more I considered the actions of this fictitious government, the more possible they seemed. Allow me to make myself clear; I do not think that we are living in an Orwellian dystopia. I do, however, think that there are certain organizations that exist in society today that have enough power to get away with serious injustices, and in hindsight, books like 1984 are largely to thank (or blame) for my suspicions.

Chronologically, I read 1984 before I began examining my desire to participate in a biomedical field. At that point in my life I hadn't thought much about pharmaceutical companies and my chosen field. It really wasn't until we read Sir Francis Bacon in Honors that I truly started questioning my unwavering faith in scientific practices. Bacon introduces a sort of "new science" in *The Great Instauration* through which we study nature to try and control and

manipulate it for our own benefit. As a scientist, I recognize that this is, in fact, what science is mostly about today. At least in the biomedical branch of biochemistry, there is very little that we study simply for the sake of gaining a better understanding of what it is and/or how it works. We don't study a specific protein simply to understand the protein; we study that protein so we can use it as a target for a pharmaceutical, for example. Our goal is to understand natural phenomena and then employ that knowledge to our benefit. So while I realize that manipulating and controlling nature is a large part of my chosen field, I have a deeply rooted moral opposition to this sort of idea. And herein lies one of the largest academic struggles I've had to face in my collegiate experience.

In an effort to prevent things from becoming too serious, I would like to take a short respite from the retelling of my brief identity crisis and take a moment to engage in something more light-hearted. I am at my most comfortable when I'm in an environment in which I can crack jokes. My mother informs me that I learned sarcasm at an unfortunately young age, and a lot of my humor stems from that. I have no dreams of becoming a comedian (I'm not that funny), but I do think that even in the most serious of situations, a few (tastefully placed) wisecracks can do a lot of good. Therefore, for this interlude I turn to the delightfully amusing book Lamb: The Gospel According to Biff, Christ's Childhood Pal by Christopher Moore. I think the title speaks for itself, but in case it doesn't, the story begins with our narrator Biff meeting a young Joshua (Biff's modern translation of Jesus) resurrecting dead lizards in his mouth. Biff's gospel continues from there, filling in all the missing details on his pal's pre-messiah life. The bulk of Lamb consists of Joshua trying to figure out how to be a messiah, with Biff offering comedic relief and sarcasm to help his friend along. The story is cleverly written so that it's funny, but

comes with enough depth that I developed an emotional attachment to the characters. But what really appeals to me about this book is that Moore took a subject a number of people take very seriously and made it funny in a way that, in my opinion, doesn't disgrace the message of the Bible (though a devout Christian might disagree on that point). It's important to me to interrupt things in life that are serious or stressful with a bit of fun. I know that personally when I'm stressed if I can find something funny to start laughing about my stress dissolves and the source of that stress seems far less daunting.

And now, refreshed, I shall return to that which has caused me some minor stress over the past few years. One of my greatest ethical oppositions to Bacon's "new science" is that I don't believe we understand enough about nature to be able to manipulate and control it without facing significant consequences. As I have progressed through the predetermined curriculum of a biochemistry major, I have learned one very important piece of information – we, as scientists, don't know much. In his essay *The Land Ethic*, Aldo Leopold phrases this tidbit as follows "The ordinary citizen today assumes that science knows what makes the [biotic] community clock tick; the scientist is equally sure that he does not." (from *A Sand County Almanac*). As soon as I read that statement, I knew I was going to appreciate what Leopold had to say. *The Land Ethic* is an essay written in the late 1940s on the human relationship with the land that epitomizes my views on our interaction with the natural world. Nature as a whole is exceedingly complex – even something as small as a cell is filled with numerous interconnected signaling pathways that we have only begun to understand. Leopold speaks on a much larger scale, but the overall point is the same. He explains these relationships through the idea of a "land pyramid" containing numerous food webs that are all interconnected to one another. Ultimately, Leopold argues that

as a result of this high degree of connectivity, a change at any level of the pyramid will affect all the other tiers. Therefore all tiers, whether biotic or abiotic, are equally important. When we tromp through nature with blind abandon, manipulating the biome to suit our desires, we are undoubtedly affecting much more than the intended target. This is especially applicable to those involved in biomedical research. When focusing at the level of a protein it can be difficult to extrapolate that knowledge out into the larger context of a whole cell, organ, or organism. As I have gained a greater understanding of biochemistry as a science, I have grown less confident in the ability of science to solve the problems of the world. There are some points where you need to take risks, but I have no idea where to draw that kind of a line.

At a very basic level I believe my dissatisfaction with science, or at least the biomedical sciences, stemmed from my previous relationship with nature. I've always been interested in science but I had never stopped to consider the morals behind research. I had just assumed sacrifice is necessary 'in the name of science'. However, because I grew up with a sense of responsibility towards the natural world, reading about Bacon's 'new science' made me question what it meant to do something 'in the name of science'. In the end, Bacon was relatively shattering to my beliefs. As I began to mentally work through this conundrum, I found myself being drawn towards the agricultural world. Historically, agriculture has been a sort of unification between human scientific, technological development and the environment in which we live. Some sort of harmony between science and nature was a soothing idea and so I began to seek out more information on the topic. One of the first books I read was Michael Pollan's The Omnivore's Dilemma. In this book, Pollan explores the American food system from its most industrialized (conventional factory farms) to its most natural (hunting and gathering) in a

stepwise fashion. His book was able to both horrify me and give me hope within the span of a few hundred pages. The section on conventional factory farming and confined animal feeding operations (CAFOs) gave a perfect example of how our continued domination of the natural world through our scientific and technological advances has transformed something that was once an entirely natural act – a cow eating – into something mechanized and almost entirely unnatural. In contrast to this, Pollan's discussion of small-scale local farming seemed like more of a harmony between nature and our technology. I found this notion to be quite appealing and I began to feel more hopeful that I could possibly find a way to do science in a way that is more harmonious with nature.

My interest in agricultural sustainability and this sort of balance between technology and nature has remained strong to date. Coincidentally, after I left for college, my parents compensated for my absence by replacing me with farm animals. I say this in jest, but in actuality my departure for college coincided suspiciously well with the arrival of horses, cows and chickens. My parents by no means run a self-sufficient farm, but they frequently eat homegrown beef, eggs, and vegetables. As I continued my inquest into the realm of agriculture I happened across The Dirty Life by Kristin Kimball. This memoir tells the story of a New York City journalist turned rural community supported agriculture (CSA) farmer. What really intrigued me about this memoir was the fact that woven into the narrative of Kimball's life was a subtle critique on the way most American's look at food. Kimball talks about the meals her and her husband, Mark, would cook using whatever vegetables or meat they happened to have ready at the time. The way she describes her relationship with food should have been enough to give any modern American pause. How frequently do we, as Americans fully prepare a meal from scratch, let alone from ingredients that were just pulled from the earth? And even for those of us who do cook from

scratch, how many can say they know where that food originated? What did that chicken look like before it was nicely cut up in consumer-friendly slices? These are questions that most of us, most of the time, cannot answer. And there is a very large part of me that is seriously disturbed by that fact. Kimball's memoir represents the sort of direction I would like to head towards. I don't foresee running my own farm in the future, but eating local food grown by people I know has become something very important to me.

As a scientist with a great respect for nature, it seems quite appropriate that I find some solace with Rachel Carson. In Silent Spring she perhaps best describes my inner conflict between science and nature. Carson herself was a scientist, yet in Silent Spring she speaks out against the indiscriminate use of our environmentally damaging scientific technological-fixes. Although I most definitely identified with Carson's views and arguments presented throughout the text, it was not the content of this book that has had the largest impact on my perspective. As I continued to consider the text, I realized the part of Silent Spring that has had the most profound effect on me was the way Rachel Carson was able to present a scientific argument in a way that is approachable to the general population. Personally I wish the scientific community operated more in this fashion. In general, major scientific findings are published in journals that most people are completely unaware of and are written in a language completely foreign to the general population. Yet nearly every single one of these people who have no means of understanding these studies is exposed to the resulting technological developments. It is in this way that our society is somewhat like the Island of Bensalem described by Sir Francis Bacon in *The New Atlantis*. In this society, there is no religion, but there are 'wise men' who run the society unquestioned. These wise men are scientists who provide the people of Bensalem with all the



technology they need. The technology keeps the people placated so they do not question the power of the wise men. At some level I find this alarming. Putting people in a position where they are unwilling and/or unable to question authority sets up a situation in which people in command can abuse their power. It further worries me that this is what our society is currently leaning towards – it has hints of the Orwellian dystopia of which I am wary.

Another reason why Rachel Carson's writing style is so appealing to me is that I have a real passion for creative writing. I have participated in high school and college creative writing classes and have thoroughly enjoyed my experiences. It was in my collegiate creative writing class that I was exposed to the book The Triggering Town, a series of essays written by Richard Hugo on creative writing. One of the most profound points Hugo makes is that when writing creatively, one must not become too attached to the initial subject of their work. Sometimes it is best to keep your mind open to all the possibilities that may lie before you. When writing creatively, it is important not to have preconceived notions about your subject – it prevents you from seeing a full range of possibilities. This piece of advice was quite striking to me because the best story I have ever written (in my opinion) was a result of letting my mind wander away from the familiar. But what's really striking about this advice is that it can apply to things outside the field of creative writing. Hugo uses Sir Alexander Fleming, the man who discovered penicillin, as an example of what can happen when you allow yourself to be open to all possibilities. He proposes the question "*But what if the British government had told him to find a cure for gonorrhea? He might have worried so much he would not have noticed the mold.*" (pg 7). The preconceived notions we carry can blind us to all the possibilities that may lie before us, whether they are a scientific discovery, a new career path, or a brilliant short story.

I think it's safe to say that my perspectives have changed significantly during my time at the university. Therefore I think it is noteworthy that my taste in music has been relatively constant over the past four years. Most people who know me are aware that my favorite band, bar none, is The Decemberists. I have nearly every Decemberists song written in my music library and listen to them on an almost daily basis (literally). Sometimes even I have to admit that my love for this band is rather extreme, but if I am still capable of listening to them for hours on end even after listening to them almost every single day for three years (again, literally), there must be something significant keeping me engaged in their music. The Decemberists have had a remarkably profound influence on my life for being "just a band". They are directly responsible for me making the time investment necessary to learn to play the guitar, and they appeal to my interest in creative writing. These two reasons are why I chose *Picaresque* as a representative Decemberists album. The first song I was able to play from start to finish on the guitar was "We Both Go Down Together" (Track 2), followed closely by "The Mariner's Revenge Song" (Track 10). In addition, *Picaresque* is the album that in my opinion contains some of the most literary lyrics their lead singer, Colin Meloy, has ever written. One of the best aspects of listening to The Decemberists is Colin Meloy's ability to write full-fledged narratives within the confines of a song.

My interest in creative writing couples nicely with my love of The Decemberists. I was never a big fan of poetry – it just didn't do much for me. But, when I thought about song lyrics as poetry, Colin Meloy's lyrics in particular, I became more open-minded. I have always had trouble with the idea of analyzing poems for some deep, hidden metaphor. Why do poems have to be about something else? As I've come to find, they don't. What I now enjoy about poetry is

not the metaphors, but the way the sounds of language can be strung together to create something unique. Robert Frost, one of my favorite poets, does this in the poem, *Gathering Leaves*. I read this poem as nothing more than Frost talking about raking leaves, but there's much more to the poem than just the subject. Frost uses a gentle rhyme scheme that provides the poem with a very continuous, almost monotonous rhythm. As someone who spent many a day facing the vast sea of autumnal debris scattered across the lawn, I would say this monotonous rhythm is meant to represent the monotony of raking leaves – the continuous motion, repeated for a seemingly infinite span of time. I find it amazing that the sound of words, within the greater context of gathering leaves, can create the illusion of raking. The art of writing is something that fascinates me and is an area in which I aspire to improve.

It is ideas such as these that have made me realize I do not fit into the traditional mold of a scientist. Though I have had my reservations, I do enjoy basic research. Figuring out a piece of the great puzzle that is our natural world, no matter how small that piece may be, creates a feeling that I cannot describe. However, my passions are not tied to the field of biomedical research. Though I find the material interesting, some of the end results lead to an industry with which I would rather not be associated. I am still tied to my field of study, but I would like to take my background and apply it to sustainable agriculture or a related field. Additionally, my interests in the humanities have led me to consider the option of interdisciplinary work in my future. On the whole, the exposure to differing worldviews I have received over the past four years has led me to reconsider my own beliefs, and I feel that I have come out the other side far more confident in and content with my convictions. I am unsure where my future lies, but I am now comfortable with my ability to make a decision I will be happy with when the time comes.