Catalysts for Transformative Learning in the Making of Scientist-Environmentalists: A Consideration of the Lives of Aldo Leopold, Rachel Carson, and David Suzuki1

Pierre Walter
University of British Columbia

Catalysts for Transformative Learning in the Making of Scientist-Environmentalists: A Consideration of the Lives of Aldo Leopold, Rachel Carson, and David Suzuki[1]

Pierre Walter
University of British Columbia

Keywords: environmental education, transformative learning

Abstract: This is a study of the role of transformative learning in the lives of three well-known scientist-environmentalists. It identifies catalysts for transformative learning in their life transitions from positivist-scientists to scientist-environmentalists. The paper concludes that transformative learning was not only an individual process, but also that each scientist helped provoke a collective process of transformative learning and social change.

Introduction

The study took an historical multiple case study approach (Merriam, 1998) to investigate the process of transformative learning in the lives of three scientist-environmentalists: Aldo Leopold, Rachel Carson, and David Suzuki. Secondary data found in auto-biographical and biographical writings for each of the three scientists, their voluminous published writings, web-based media, and radio and television documentation (in the case of Carson and Suzuki) comprise the database for the study. The data for each case was analyzed against theoretical understandings transformative learning provided by Mezirow (2009) and many others.

Reflecting the historical contexts of their lives, the three scientists move from an ecological consciousness in the 1940s (Leopold), to the environmental consciousness of the 1960s (Carson), and on to environmental activism of the 1980s and the present-day (Suzuki). Aldo Leopold (1887-1948), worked as one of the first "scientific foresters" in the U.S.. He eventually questioned and revised the foundational principles of his discipline, and was largely responsible for founding the fields of wildlife conservation and restoration ecology. The "land ethic" which Leopold elaborated in *A Sand County Almanac* (1949) provoked a fundamental rethinking of environmentalism and environmental ethics, presaging a shift from homocentric to biocentric understandings of nature; that is, to an ecological consciousness. Rachel Carson (1907-1964), a marine biologist with the U.S. Bureau of Fisheries, most famously published *Silent Spring* (1962), a ringing indictment of the danger of pesticides widely credited with helping to initiate the North American environmental movement. In *Silent Spring*, Carson promoted an environmental consciousness encompassing a critique of corporate power and abuse of citizen rights. David Suzuki (1936-) first worked as a geneticist, but as a result of several instances of transformative learning, devoted his life to public environmental education and activism, with broad impact on the environmental movement in Canada and beyond.

Aldo Leopold and the Development of an Ecological Consciousness

Aldo Leopold, born in 1887 to an upper middle class family with a home along the Mississippi River in Burlington, Iowa, spent much of his childhood roaming the river's winding sloughs and marshes, bird watching and tromping through the prairies and forests above the bluffs, or hunting with his father (Newton, 2006; Meine, 1988). After taking a degree in Forestry

from Yale Forest School in 1909, Leopold went to work as an assistant forester for the U.S. Forest Service in Arizona. In the early 1920s, he was instrumental in the campaign to preserve wilderness areas in the National Forest system, including 547,000 acres of the Gila National Forest in New Mexico, which was designated as the nation's first Wilderness Area in 1926 (Nash, 2001; Meine, 1988). In 1924, Leopold was recruited to work at the University of Wisconsin, becoming the first professor of Game Management, and then in 1936, head of the newly created Department of Wildlife Management. He taught there until his death in 1948.

It was during his years as a forester in the 1910s and 1920s that Leopold first began to question the prevailing Progressive Era's utilitarian ideology of "scientific forestry" and "scientific game management." Rather than taking forest and wildlife primarily as consumable or harvestable "crops," Leopold began to play with the idea of an environmental ethic centred on the value of wilderness in its own right. As Leopold tells the story, his own awakening to this new ecological consciousness came during his tenure as a forester and game manager in the Apache National Forest in New Mexico. Out on a timber inspection tour, he and his crew of men stumbled across a family of wolves, which they quickly blasted away with their rifles, following standard culling practices of the time (Meine, 1988). However, following the killing of the wolves, Leopold began to question his personal beliefs, and subsequently, the premises of the professional practices of game management which guided his career. In the essay "Thinking Like a Mountain," Leopold (1949, p. 130) described the pivotal personal experience which caused him to re-evaluate his fundamental beliefs about wildlife:

> In those days we had never heard of passing up a chance to kill a wolf. In a second we were pumping lead into the pack….When our rifles were empty, the old wolf was down, and a pup was dragging a leg into impassable slide-rocks … We reached the old wolf in time to see a fierce green light dying in her eyes. I realized then, and have known ever since, that there was something new to me in those eyes—something known only to her and the mountain. I was young then, and full of trigger-itch: I thought that because fewer wolves meant more deer, that no wolves would mean a hunters' paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view.

From the 1920s to the 1940s, in hundreds of reports, scientific papers, essays, policy statements, popular articles and editorials, as a forester, founding member of the Wilderness Society and public intellectual (Meine, 2002), Leopold developed the ideas sparked that day by his sudden understanding of the "fierce green light." His reaction to the killing of wolves was a deeply emotional one: as Leopold (1949) reflected back on the experience some 25 years after it had occurred, he realized it had been an epiphany which helped shift his life's work towards a more biocentric understanding of land and wildlife. He came to believe that wolves and mountains had intrinsic value beyond their utility as game and forest "crops;" and that wilderness might be a necessary cultural counterpoint to the excesses of urban, industrial society: nature acted as a reservoir for human cultural replenishment (Gottlieb, 2005).

Leopold challenged prevailing scientific orthodoxies about animals as game crops, and wilderness as economic commodity, transforming notions of both for generations of environmentalists to come. Sparked in part by a wolf's death, he critically re-assessed his own assumptions about the management of game, forest and land, and came to see himself and other humans as an integral part of nature, with a moral imperative to preserve it. In this process of

transformative learning, he constructed entirely new fields of wildlife conservation and restoration ecology, and from his forester roots, reinvented himself as a teacher, naturalist and scientist-environmentalist. In coming to his personal ecological consciousness, he also stimulated the shift to a collective ecological consciousness among other scientists and in society at large.

Rachel Carson and the Emergence of an Environmental Consciousness

Rachel Carson was born in 1907 into a struggling farm family outside of Springdale, Pennsylvania along the Allegheny River. Her childhood was a mix of rural poverty, her mother's rich knowledge of writing, music and literature, and the wonders of the natural world around them (Lytle, 2007; Lear, 1997). From an early age, Carson spent hours roaming and exploring the woods, marshes and hills around the farm: the land was wild and rich, full of animals, birds, flowers, insects and plants. In 1925, Carson won a scholarship to study English and then biology, and graduated with her B.A. in 1928. She then undertook graduate study in zoology at John Hopkins University, where she focused her research on fish biology. She completed her M.A. in 1932, then worked as a teaching and research assistant in marine biology. In 1935, she was hired as an aquatic biologist at the U.S. Bureau of Fisheries, where she remained until 1952.

A pivotal, culminating moment in a subsequent decision to shift her attention from marine ecology to the dangers of pesticides came in the 1950s, when Carson received a poignant personal letter from a woman named Olga Owen Huckins. In the letter, Huckins described the effects of DDT spraying in a large bird sanctuary she had created around her home (quoted in Williams, 2007, pp. 135-36): "The 'harmless' shower bath killed seven of our lovely songbirds outright. We picked up three dead bodies the next morning by the door. They were birds that had lived next to us, trusted us, and built their nests in our trees year after year. . . All of these birds died horribly and in the same way. Their bills were gaping open, and their splayed claws were drawn up to their breasts in agony." As Carson (1962, p. ix) tells us in *Silent Spring*, "In a letter written in January 1958, Olga Owen Huckins told me of her own bitter experience of a small world made lifeless, and so brought my attention sharply back to a problem with which I had long been concerned. I realized then that I must write this book."

Carson's personal struggle with breast cancer, and her insistence as a scientist that sufficient, incontrovertible data be amassed to substantiate each claim she made, meant that four more years were to pass before *Silent Spring* was published. When *Silent Spring* finally did come out, it was "nothing less than an attempt to create a new environmental consciousness" (Gottlieb, 2005, p. 125). In this, it largely succeeded: "The publication of *Silent Spring* in 1962 and the ensuing controversy that made it an epochal event in the history of environmentalism can…be seen as helping launch a new decade of rebellion and protest" (Ibid., p. 121); *Silent Spring* "delivered a galvanic jolt to public consciousness and, as a result, infused the environmental movement with new substance and meaning" (Wilson, 2007, p. 27). In short, Carson's book, and the controversy surrounding it, effectively transformed public environmental consciousness and provoked action for change. The opening "fable" of her book illustrates the disorienting dilemma at the heart of this social transformation (Carson, 1962, pp. 1-3):

> There once was a town in the heart of America where all life seemed to live in harmony with its surroundings…Then a strange blight crept over the area and everything began to change. Some evil spell had settled on the community: mysterious maladies swept over the flocks of chickens; cattle and sheep sickened and died.…There was a strange stillness. The birds, for example—where had they

> gone? Many people spoke of them, puzzled and disturbed…The few birds seen anywhere were moribund: they trembled violently and could not fly. It was a spring without voices. On the mornings that had once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices there was now no sound; only silence lay over the fields and woods and marsh…

With this powerful opening to *Silent Spring*, Carson then proceeds to systematically illuminate the dangers of pesticide use to birds, animals, humans and the natural environment and indict the chemical industry and its scientist supporters, challenging the "paradigm of scientific progress that defined post-war American culture" in the process (Lytle, 2007, p. 166).

Like Aldo Leopold, Rachel Carson was a scientist who turned environmentalist and public educator through a process of transformative learning. In Carson's case, however, she did not identify a single discrete experience as a catalyst for change, but rather experienced a gradual, incremental shift in the focus of her environmental consciousness. Although she identified Olga Huckins' letter as a turning point, she had in fact been deliberating on the issue for some time before this (Lear, 1997). In researching and writing *Silent Spring* over the course of roughly a decade, she built her understanding of the dangers of pesticides and the complicity of the petrochemical industry in their dissemination step-by-step, systematically gathering evidence to support her argument. She searched relentlessly for new sources, poured over all available documentation, meticulously checked and rechecked her findings, and slowly developed her knowledge of pesticide poisoning and of possible solutions to the problem. In this respect, her personal transformation from scientist into environmentalist might best be characterized as the culmination of a long process of assimilative learning, in which the "integrating circumstance" (Schugurensky, 2002) was the disturbing letter from Huckins. For North American society as whole, however, the transformation was dramatic and abrupt, and involved nothing less than the beginning of a movement for socio-environmental change.

David Suzuki and Environmental Activism

David Suzuki, born in Vancouver, British Columbia in 1936, spent many contented hours as a child exploring the wild outdoors, hiking, camping and fishing, like Leopold and Carson before him. However, in 1942, following the bombing of Pearl Harbor, Suzuki's freedom to roam came to a sudden end: his family's Vancouver home and possessions were confiscated by the BC government, their civil rights suspended, and Suzuki, his two sisters and mother were deported to an internment camp in the BC interior. He was seven years old.

Being incarcerated by the government was the first of three disorienting dilemmas Suzuki describes as catalysts for change in his life. The second was his intellectual confrontation with Eugenics and the questioning of his identity as a geneticist; the third a disturbing encounter with a clear-cut BC forest (Suzuki, 2006, 2002, 1987; Davis, 1998). The experience of being jailed in an internment camp, as Suzuki reflected back upon it, was pivotal in the development of his self-identity and his consciousness of race and bigotry in Canadian society. All in all, some 22,000 Canadians of Japanese descent were incarcerated at the time, along with 113,000 Japanese Americans in the U.S. (Suzuki, 2006, p. 18; 1987, p. 113). As he reflected back on the racism levied against him, Suzuki explained how the experience alienated him from white Canadian Society: "Pearl Harbor led to a total shift in the way that I perceived myself. Although I was a third generation Canadian, my country had said that I was an enemy and not to be trusted; that I had no rights along with my parents…" (interview in Davis, 1998). As a result, "All my life as

an adult, my drive to do well has been motivated by the desire to demonstrate to my fellow Canadians that my family and I had not deserved to be treated as we were" (Suzuki, 2006, p. 16).

Suzuki's drive to do well—his "psychic burden," as he termed it—propelled him first to Amherst College, where he became enthralled with genetics, his "mouth hanging open in astonishment at the beauty of the insights and the elegance of mathematical precision absent from most other areas of biology" (Suzuki, 1987, p. 131). From Amherst, he went on to the University of Chicago, where he received a Ph.D. in genetics in 1961, specializing in the study of cell division in the common fruit fly. He was then hired at Oak Ridge Laboratories in Tennessee. In travelling through the Deep South in the early 1960s, he experienced the degrading effects of racial segregation and bigotry firsthand. As a result, Suzuki (1987, p. 167) tells us, "I was consumed with bitterness and anger at the racism apparent all around me. I finally decided that I had to leave the United States altogether and return to Canada." He then moved to the University of Alberta for a year, and ultimately landed as a genetics professor at the University of British Columbia (UBC). He remained at UBC for over a decade, building and running a prestigious genetics research lab, and passing along his passion for science and genetics to his students.

It was at UBC, when one of his students questioned him about the role of genetics in underpinning Eugenics and Nazism, that Suzuki experienced a second disorienting dilemma, turning him away from academia and towards a new career in televised public science education:

> I discovered that the kind of reasoning that had been used to lock up the "Japs" when the war broke out was being fuelled by geneticists…There were two great passions in my life at the time: one was genetics and the other had been civil rights. The civil rights had come through my experience being incarcerated as a Japanese Canadian during the Second World War….for many, many months I was absolutely paralyzed. I just couldn't bring myself to continue to do any research…I came out of that period of paralysis by saying one of the responsibilities was to speak out as openly and honestly and (in) as informed a matter (as possible) about the implications…(interview in Davis, 1998).

Suzuki then left the university for a career as a broadcaster and public science educator, a shift which further opened his eyes to the complicity of science in a range of social problems. In an essay entitled "Catching an Epiphany," Suzuki recounts a third pivotal experience which changed his view of nature and engendered in him a deep sense of responsibility for environmental preservation (Suzuki, 2002). As he tells the story, one day in 1964, he took his two children out fishing along a logging road in the mountains near Vancouver, only to encounter the stark devastation of a large clear-cut blocking their path. Struggling and sweating under the hot sun, Suzuki and his kids finally make it to the shade of the remaining forest. Entering "the dark, cool cathedral of trees was an absolute shock, Suzuki recalled, like stepping from a hot city street into an air-conditioned building" (Ibid., pp. 223-224):

> I was dumbstruck…In those few minutes that my children and I had entered into the forest temple, I had recognized the terrible hubris of the human economy. To transform this matrix of life forms, soil, water, and air into a war zone where soil, air, water, and life were so degraded was a travesty of stewardship and responsibility to future generations. I didn't articulate it that way at the time. I only knew in a profoundly visceral way that industrial logging was not right, that the magnificent forest we had entered was an entity far beyond our

> comprehension and was worthy of our respect and veneration…that encounter with an ancient forest on the edge of a clear-cut was my moment of enlightenment.

In short, much in the same way as Aldo Leopold and his dying wolf, and to some extent Rachel Carson and the letter from Olga Owen Huckins, for David Suzuki, the experience of the death of an "ancient forest" was a disorienting dilemma; it was a pivotal existential experience in developing his later environmental consciousness and activism. In characterising his transformation from scientist to environmental activist, Suzuki (in Mowat, 1990, pp. 173-74), like Carson, saw this process as incremental and assimilative rather than abrupt: "…my sense of injustice at what human beings were doing to the living world didn't suddenly happen. It was a gradual understanding that science is fundamentally flawed because scientists focus on parts of nature and study these in isolation from the rest." "Once I left the lab, I could see the enormous social consequences of science, its tight linkage with profit motives of private industry, its terrible dependence on military support…Once involved, I couldn't go back" (Suzuki 1987, p. 233). As a result, Suzuki turned his life to public environmental education through television broadcasting, writing and environmental activism. He is currently long-running host of CBC's *The Nature of Things*, a prolific author and popular public media pundit on environmental issues, head of an influential environmental think-tank and advocacy organization, and speaker at public meetings, community actions and environmental protests; in short, Suzuki is an influential leader in the present-day environmental movement.

Conclusion

It is clear that all three scientists were rational, analytical thinkers, who to a great extent moved through some variation of Mezirow's (2009) phases of learning in the transformative process. As the most obvious example, in each of three transformative life epochs detailed by Suzuki, he identifies a disorienting dilemma (incarceration, Eugenics, a clear-cut forest), questions his assumptions (about race, genetics, forestry), explores new roles (scientist, popular science educator, environmentalist), gains competence in the new field, and shifts his career and identity. Carson's transformative learning, as a meticulous scientific researcher, follows a similar linear pattern of thinking; albeit with an "integrating circumstance" (dead birds and a poignant letter) as a culminating catalyst for action (publishing *Silent Spring*). Leopold is again a profoundly rational thinker who, like Suzuki, experiences an epiphany, gradually comes to question the basic beliefs of the profession to which he belongs, proposes alternatives to them, and works to enact these alternatives in his life, ultimately shifting his career from scientific forester to environmental educator. In addition to their individual life journeys, it is evident that all three scientist-environmentalists also promoted a collective, societal process of transformative learning around key environmental issues of the day: Aldo Leopold helped to create an ecological consciousness in the 1940s, Rachel Carson sparked the environmental consciousness in the 1960s, and David Suzuki has continued to educate and advocate a rethinking of environmentalism from the 1980s to the present-day.

Endnote: 1. References available from the author on request.