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GROWING UP TO BECOME A WETLAND ECOLOGIST: CHANCE, CHOICE, OR DESTINY?

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He told of his adventures as he had never yet recalled them. He now, as it were, saw a new meaning in all that he had gone through. Leo Tolstoy, *War and Peace*

Doug Wilcox has asked each of us something deeply personal. To explain how and why we became wetland ecologists, we have to be willing to write about topics that normally do not appear in our published work -- to explore how chance, choice, and destiny influence our lives.

Early life influences

My earliest memories are from post-war France, where I lived in a trailer park on Royal Canadian Air Force base Grostenquin. Then we moved to Edmonton, Alberta. Those of you who own my book *The World's Largest Wetlands* (Fraser and Keddy 2005) will see that this city lies south of the vast Mackenzie Valley peatland. We lived in a new subdivision that had been bulldozed into a peatland. I could walk to a wetland to catch frogs.

In grade 1, I was tested and found to be rather clever, which created a dilemma—a dilemma being a choice with no positive option. I was gravely informed of these options: complete two grades each year or stay with my class. If I did two grades a year, I would be robbed of a normal social life. However, if I stayed with my class, I would be bored and likely become a trouble maker. So, I chose the first option. Hence, at a young age, I was taken out of my social milieu and taught to focus on a separate path.

Life in Manitoba: early scientific lessons

Dad was next transferred to Manitoba (to the Aspen Parkland Ecoregion, although, alas, there was no one to tell me so). The USA feared a bomber or missile attack from the Soviet Union over the north pole, and air bases such as the one in Portage La Prairie provided part of the protective network. I recall walking home under the clear blue prairie sky at minus 20 C, wondering if a missile track would signal the end of my world.

I was eight. During school recess, I could look down into the basement window wells at salamanders, each one staring out of its own burrow (these were probably barred tiger salamanders). My parents thought it remarkable that I could see painted turtles sitting on logs when our car was driving along a prairie highway. Dad built me a set of cages, and I caught and kept different kinds of frogs. Alas, there was no one to give me a book on herpetology, or ecology, perhaps making me little more than a zookeeper.

On another occasion, I caught field mice. I thereby learned an important lesson on carrying capacity: if there are too many mice in one cage, they eat one another. That is no minor lesson, since many current politicians believe that we can take refugees into our cities by the millions without negative consequencesand that we can allow the Earth's population to keep growing exponentially. Actually, there are limits how many animals can be confined within a given space.

The social situation was difficult. A map of bully density in North America might have a special region delineated just for Portage La Prairie. I wish to make it clear that I was not a sissy, as my father feared. Rather, I disliked fighting and thought that you should not get into a fight unless you have at least a chance of winning. I keep forgetting this lesson. For example, when I was a graduate student at Dalhousie University (ca. 1974), I led a campaign to stop the Wreck Cove Hydroelectric Project. This was going to flood a beautiful peatland in the southern part of Cape Breton Highlands National Park. I put a lot of time into this unsuccessful battle. Sometimes you have to do it anyway.

In grade 7, I read how some Canadians were going onto the ice floes and clubbing baby seals to death (more or less, sometimes less) before skinning them. That seemed like a bad thing. I boldly collected signatures on a petition, asking the federal government to stop the seal hunt. Yes, I thought that a petition or two might actually change history. I now know that it often takes rather more. John Muir succeeded in protecting Yellowstone but not Hetch Hetchy Valley, which was flooded to provide water for San Francisco ca. 1913. Canada still has the seal hunt.

I learned another important science lesson in Portage La Prairie, one that could save wetland ecologists a lot of time, and government agencies considerable money. The lesson came from a truck stop along the TransCanada highway near our house. First, the story, then the lesson. One Saturday morning, two of us took a

notebook, and for each parked truck, we recorded the colour, license number, place of origin, and manufacturer. To this day, I recall the intoxication of filling our notebook with raw data. I was trying to tell my mother how cleverly we had spent our morning, when I experienced insight: the information was meaningless. It was just a list of truck stuff. I felt deflated, but I had learned a vital lesson. Consider ecology in general, and wetland ecology in particular: one often sees colleagues similarly afflicted by 'data intoxication.' The thrill of travelling in helicopters and airboats sometimes seems to overwhelm rational thought.

Getting back to the prairies, here is another formative event. I joined the Boy Scouts. The scouts taught us how to tie knots, but, alas, there was still no one who could name local birds or trees. I climbed in the ranks high enough to attend a regional jamboree. One event is seared into my memory. Some of my tent mates caught a beautiful leopard frog and brought it to show me. Then they threw it alive in the fire and cheered and laughed as it died. This outraged me so much that I went directly to the top scout leader responsible for the camp to demand that something be done. I recall him staring at me like I was from another planet. "A what? A frog? Get out of here. I have far more important things to worry about."

Alas, I keep running into people like this ignorant scout master. Such people are a real obstacle to protecting wetlands and to running a sensible society altogether.

Life on the Mississippi

In 1966, my father was transferred to Ottawa, and we eventually moved into a new bungalow on the edge of a floodplain. The trees and the river and the ducks and the frogs were a doorway to bliss. Snapping turtles were digging nests in newly-created lawns, and people wanted the nests removed. I began collecting eggs, hatching them under a light bulb. What an adventure! One year, I released about a hundred hatchlings. This led to several science fair exhibits on the ecology of turtles. I spent many happy hours spent exploring that river in a plywood 'canoe' that my father built. I wrote a weekly newspaper column on environmental issues in *The Carleton Place Canadian*. Apparently, even then, I believed that public education mattered.

University years

I skipped the last year of high school and entered the science program at York University in Toronto, autumn 1970. The emphasis was on physics and chemistry. After all, we were told, molecular biology is where you work for Nobel Prizes. I wish there had been someone like Doug Wilcox to teach me about redox potential in wetlands.

Determined to get summer employment as a biologist, I mailed resumés widely. One resumé arrived on the desk of Dan Strickland, the chief park naturalist in Algonquin Provincial Park. I was hired. The other naturalists were brimming with talent and knowledge. What a treat to live in a staff house with them! Why, you could learn more over breakfast than at a university lecture.

Now to squeeze in mention of two scientists whose writing influenced me. Frank Preston wrote a paper on large scale patterns in the abundance of species, *The Canonical Distribution of Commonness and Rarity* (Preston 1962). Frank Rigler wrote an important paper about how species-oriented biology has its limitations: *Recognition of the possible: an advantage of empiricism in ecology* (Rigler 1982). His point: there are just too many species. More daunting still, there are n (n-1) possible interactions among them. Hence, ecologists have to seek general principles that transcend species. Their work led me to write about assembly rules for ecological communities (Keddy 1992) and a book (Weiher and Keddy 1999). All the same, balance is necessary. Yes, we need general principles in ecology, but every biologist must know the local flora and fauna.

Getting back to York and the topic of chance and choice, I chose to visit the University of Toronto for a lecture on slime molds. At dinner, I chose to chat with a charming young woman. We later married. She has even read this manuscript – except for this paragraph, which I inserted later.

Near the end of the undergraduate York years (1970-1974), there was another choice. Employment or graduate school? Destiny spoke, with a full scholarship for graduate school. Robert MacArthur had died, but there was a prominent Canadian mathematical ecologist working at Dalhousie University. I was warned well in advance that this professor had a reputation for being difficult. That was an understatement. Ater my first day at Dalhousie, a senior student took me aside and exclaimed "Get out of here while you can!" Good advice, but I had already rented an apartment and liked the biology of Nova Scotia. There is no space to tell stories, such as how other professors sometimes hid in the stair wells if they saw her coming, or how she showered her students with insults. OK, one story: one of my best friends there was a Vietnam veteran, a dedicated student, and a fine human being.

He quit. He wrote the university president to say that he had served in the American military and had been to Vietnam, but he had never been treated with the disrespect he experienced from her.

My graduate research dealt with the population biology of sand dune plants, mostly *Cakile edentula*. However, all the while, I was influenced by external forces -- messages from reality, if you wish. Two examples: Pickup trucks were tearing up the dunes, reminding me of the world beyond pure science. On weekends Cathy and I discovered the floristically diverse lakes and rivers in southwestern Nova Scotia. There were enormous numbers of species, nicely sorted by gradients of water depth and wave exposure. It was obvious that wetlands were more important than single species of sand dune plants.

Later, I returned to study these 'coastal plain' wetlands. Some of the areas I documented are now protected (e.g., the Wilson's Lake Conservation Lands). Some of the individual species I documented are now on our endangered species lists (e.g. *Sabatia kennedyana*, *Coreopsis rosea*).

So, by 1978, age 25, I had made a conscious decision to focus on wetlands. Apparently Doug's question has been answered. Actually, becoming a wetland ecologist is a long-term proposition. I will next explain how I became a professor of wetland ecology and then an independent scholar living in the forest.

Development and metamorphosis

My first position as a professor was at the University of Guelph. There, I taught a huge introductory botany course and thereby learned a good deal about gametophytes, life cycles, and plant anatomy. My research was mostly carried out several hours north in Muskoka (e.g., Axe Lake, Matchedash Lake) or in Nova Scotia (e.g., Gilfillan Lake, Wilsons Lake). Our campus had an annoying religious cult, devotees of Dow Chemical, whose mantra was 'spray and pray.' They regularly ranted about Rachel Carson, even though she was already dead. This did not seem to bother other faculty, but the attitude disgusted me. It was also difficult to go camping on weekends, as the landscape was mostly cornfields and urban sprawl.

Consequently, in 1978 we moved to the University of Ottawa. Many of my wetland papers date from the Ottawa era. Cathy and I had already bought 100 acres of forest and wetland nearby, including a large heronry. Over time, we bought considerably more adjoining acreage, nearly a square mile. I live there now.

Illness strikes

The situation in Ottawa seemed bright: I was a full professor, with significant grant support, working in a nationally respected university, teaching ecology, and publishing many papers a year. However, everything changed when I became seriously ill in the late 1980s. Eventually, I spent nearly a year in bed—with doctors puzzled and all tests coming back negative. I was losing consciousness and mobility. Some days, I could only crawl around the house. Often, I slept on the floor beside the second floor toilet for reasons I don't wish to describe. Severe headaches and nausea would last for days on end. Other days were better, so I would clean up and visit the campus to see my students. Alas, my chairman and my dean were both of the opinion that I was just a malingerer. They believed it was their assigned duty to set me straight, even if it meant moving my classrooms to distant buildings across winter snow drifts or refusing a well-earned sabbatical. People can be cruel.

After nearly two years on antibiotics, there was only partial recovery. In those bleak days, I began writing *Wetland Ecology*, a few sentences each day, in bed. It seemed necessary to go forward somehow. Still, there were choices to make. Here are three: I sued my insurance company, completed *Wetland Ecology*, and decided to leave the University of Ottawa. However, these choices were in a sense choiceless. A choiceless choice is one where it may appear you have many options, but only one is bearable.

Ok, so what about this illness? A plausible explanation was offered by a medical microbiologist: somewhere over many years of wading in wetlands with insect bites and cuts and scratches, a species of free-living bacterium or amoeba had entered my central nervous system and started eating. There are no reliable tests for such microorganisms. The cause might go all the way back to high school and my days on the river. Carleton Place, just upstream, had no sewage treatment plant then, so who knows what lurked in that water?

From the jamboree to the president's office

In 1999, I took the leap to an endowed chair in the United States, where, I was assured, I would not be judged by the hours I spent in the office nor by the time spent drinking coffee with colleagues, but simply by my scientific output. This offered a rare and inspiring opportunity to make a positive difference in the lives of students and in the future of coastal wetlands. I arrived full of enthusiasm. We were in a poor region (Tangipahoa Parish,

Louisiana), and the university was a beacon of hope for students. I could empathize with those students because of my years in Portage La Prairie. The university was well-situated to become a powerhouse for coastal restoration, having a fine field station (an old mansion) in the Manchac Swamp.

There is no space here to describe my research in Louisiana, such as the "Turtle Cove Experimental Marsh," set up at the field station to explore how key factors affected wetland composition and elevation. However, there are two published overviews to this wetland research (Keddy et al 2007, 2009). Alas, vital money from EPA, which should have maintained this project was diverted to trivial faculty projects that had little or nothing to do with coastal restoration. It was obscene. True direct quote from a departmental meeting: "This is just pork and I want my cut." Hurricane Katrina finally ended the experiment, with the added indignity of a refrigerator deposited in a treatment plot. (My house survived the flooding from Hurricane Katrina but took multiple hits from fallen trees and could, for some time, be reached only by canoe.)

The next university president had few apparent interests beyond football and golf. Instead of inspiring young people to get an education and better their lives, he diverted time and scarce resources into sports. He also built himself an ugly mansion on campus, even though he already had the use of a fine historic house. Instead of inspiring students, he encouraged them to attend tail-gating parties. Gandhi would have wept. Jesus too. That same president also began to shut down my endowment funds. Yes, although nearly forty years had passed, I was back dealing with another inept leader, just like that prairie scout master.

I considered a lawsuit for breach of contract, but my lawyer in Baton Rouge explained that SLU had nearly limitless state funds at their disposal. It went downhill from there. My health worsened. I used the last endowment funds to self-publish a guide to the natural environment of Louisiana, a parting gift for students and ecotourism (Keddy 2008). Then I left. Abruptly.

Conclusion

Getting back to Doug's question of how I became a wetland scientist, it seems that I started young and encountered some obstacles but was also stubborn enough to persist. I have now become an independent scholar, surrounded by forest and wetland. The property is protected 'in perpetuity' by a land trust (mmlt.ca/keddy-nature-sanctuary). I have lived in the forest longer than Thoreau and am gaining on St. Francis of Assisi. I continue working on wetlands (e.g., Keddy 2017a) and on ecology as a whole (Keddy 2017b).

Probably every contributor to this book could have done something else with their life and quite possibly earned more money doing so. However, the world is full of wild creatures who cannot speak for themselves. If we don't rise to the occasion and choose to speak on their behalf, how could we live with ourselves?

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Figure 1. Me, with my mother and father, on a holiday in England, mid 1950s. Mom was born on a farm in England. During Nazi air raids, she had to stay at her post as a telephone operator while the bombs fell. Dad was born on a farm in Nova Scotia, and ran away to the city. When the war erupted, he enlisted, and repaired bombers that flew raids into Germany. Had Hitler not started the Second World War, it is unlikely my parents would have met.
Figure 2. Moving to an island in the Mississippi River in 1967 was a defining point in my life. A self-assigned duty was rescuing nests laid by wild turtles in the lawns around new subdivisions. Science fair exhibits on turtle ecology allowed me to travel, and opened the door to early entry to university. I thank the many turtles who helped me during these formative years.
Figure 3. Three summers in Algonquin Park were a remarkable opportunity. Here I am at the Sunday Creek bog boardwalk, with Karen Grant, who married one of my park roommates. In those days I dressed mostly in denim, but did not own a motorbike. I thank all the fine Algonquin naturalists who shared their knowledge and enthusiasm. One of them, Howard Coneybeare, kindly did the colour painting that graces the cover of *Wetland Ecology*.
Figure 4. Here I am with a handsome sawgrass plant in coastal Louisiana. These wetlands were filled with wild creatures including ibis, amphiumas, turtles and alligators. Our field station was an old mansion in the Manchac Swamp. I lived on the edge of a bayou on the north side of this swamp. There was never spare time to attend football games, or play golf, but New Orleans was a fine historic city. As for Mardis Gras, after you have seen a few floats, and collected a few beads, and nursed a few hang-overs, you realize an important truth: the Louisiana swamps are actually far more entertaining.

Figure 1

Figure 2

Figure 3

Figure 4