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Three Bets

Sandra Steingraber '81 writes about the inescapable links between our environmental and personal health.

Essay by Sandra Steingraber '81

*Ecologist and author Sandra Steingraber '81 is an internationally recognized authority on environmental links to cancer and human health. Raised in Pekin, Ill., Steingraber was diagnosed and successfully treated for bladder cancer while attending IWU as a biology major. After receiving a doctorate in biology and a master's degree in English, she published the highly acclaimed book, *Living Downstream: An Ecologist's Personal Investigation of Cancer and the Environment*, in 1997.*

In the following essay — first published in Orion magazine in 2009 and excerpted here — Steingraber places her scientific insights in the context of her experiences as a cancer survivor and the mother of two children.



Frequently asked to speak at colleges, universities and health conferences, Steingraber, above, intends her lectures and books to help bridge the gap between scientific findings and public knowledge. (Photo by Benjamin Gervais / The PPC)

THIRTY YEARS AGO, between my sophomore and junior years of college, I was diagnosed with bladder cancer. Those are amazing words to write: *Thirty years ago I had cancer*. I could not have imagined, while lying in my hospital bed, exhaling anesthesia, that someday I could write, *Thirty years ago I had cancer*.

Last fall, on a sunny afternoon, the phone rang. It was the nurse in my urologist's office, calling to say that the pathologist had found, in the urine collected from my last cystoscopic checkup, abnormal cell clusters.

I provided a second urine sample for further testing and a third sample was sent out for genetic analysis. Ten days later, I got another call. The results were normal.

So am I fine or not fine? I don't know. Much of my adult life has been one of watchful waiting. *Watchful* means vigilance, screening tests, blood work, second opinions. *Waiting* means you lay plans and carry on within the confines of ambiguity. And sometimes you jump when the phone rings on a sunny afternoon.

Thirty years ago I had cancer.

After I left the hospital, I went back to the university and resumed my life as a biology major. It didn't take me long to learn that bladder cancer is considered a quintessential environmental cancer, meaning that we have more evidence for a link between toxic chemical exposures and bladder cancer risk than for almost any other kind of cancer. I also discovered that just because, through careful scientific study, we learn that a chemical causes cancer doesn't mean that we ban it from the marketplace.

I also learned that, in spite of all this evidence, the words *carcinogen* and *environment* rarely came up in conversations I had with my various health-care providers, who were interested instead in my family medical history. I was happy enough to provide it. My mother was diagnosed with breast cancer at age 44. I have uncles with colon cancer, prostate cancer, stromal cancer. My aunt died of the same kind of bladder cancer — transitional cell carcinoma — that I had.

But here's the punch line to my family story: I am adopted. So I began to ask hard questions about the presumption that what runs in families must necessarily run in genes. I began to ask, what else do families have in common? And when I looked at the literature on cancer among adult adoptees, I learned that, in fact, the chance of an adopted person dying of cancer is closely related to whether or not her adoptive parents had died of cancer and far less related to whether or not her biological parents had met such a fate.

So 30 years ago, as a college undergraduate, I made a bet. I bet that my cancer diagnosis had something to do with the environment in which I lived as a child. And I think I was right about this.

As I learned years later, while researching my book *Living Downstream*, the county where I grew up, along the east bluff of the Illinois River, has statistically elevated cancer rates. Three dozen different industries line the river valley there, and farmers practice chemically intensive agriculture along its floodplains. Hazardous waste is imported from as far away as New Jersey, and the drinking-water wells contain traces of both farm chemicals and industrial chemicals, including those with demonstrable links to ... bladder cancer.

TWENTY YEARS AGO, when I was a graduate student in biology at the University of Michigan, I made another bet. I was working as an opinion writer at the student newspaper there. My editor and I laid bets as to which system would collapse first — economy or ecology. I said ecology. I think I was wrong. I think we were both wrong. They seem to be crumbling simultaneously.

Let's compare our twin "eco" systems. Our economy and our ecology are both complex, globalized systems whose interconnections are little understood until something goes wrong. In both systems, eroding diversity creates fragility, as when financial systems merge and collapse, as when farming systems become monocultures and thereby vulnerable to catastrophic pest outbreaks. In the economic world, panic and fear drive investment decisions that lead to more panic and fear. In the ecological world, greenhouse gases raise temperatures that melt permafrost. Melted permafrost rots and releases more greenhouse gases.

But for one of our failing eco-systems, the economy, we became immediately engaged in drastic and unprecedented measures to rescue it — even though no one seemed to understand it very well. And for our other eco-system ... well, it's still widely considered too depressing and overwhelming to talk about in much detail.

Imagine that the mainstream media were as interested in the thoughts of the president's ecological team as they are in the opinions of his economic team. Imagine if, in primetime interview after interview, these public servants provided us regular environmental analysis. Imagine that all Americans find out, whether they want to or not, that atmospheric loading of carbon dioxide is acidifying the ocean in ways that, if unchecked, will drop pH to the point where calcium carbonate goes into solution, and that will spell the end of anything with a shell — from clams and oysters to coral reefs.

Suppose that ecological pundits discussed every night on cable TV the ongoing disappearance of bees, bats and other pollinators and the possibly dire consequences for our food supply. Suppose we received daily reports on the status of our aquifers. Suppose legislators and citizens both agreed that if we don't take immediate action to bail out our ecological system, something truly terrible will happen. Our ecology will tank.

The fact that nothing close to this is happening is the difference between economy and ecology, both of which share an etymology: eco, from the Greek oikos, meaning "household."



This fall, Steingraber (right) attended the dedication of the Environmental Studies Collections at The Ames Library's Tate Archives. Her papers are part of the collection. (Photo by Marc Featherly)

TEN YEARS AGO, I gave birth to a child. After 20 years as a solitary adult ecologist, I became a habitat, an inland ocean with a marine mammal swimming around inside of me. My daughter's name is Faith. She is planning a career as a marine biologist and wants to write her first book on the octopus. My son Elijah is 7. He wishes to be the president, a farmer, or a member of the Beatles. He figures there are two job openings there already.

Since becoming a mother, I've made another bet. I am betting that, in between my own adult life and my children's, an environmental human rights movement will arise. First, it will take up the task of rescuing and repairing our ecological system, upon which all human life depends. At the same time, it will also work to divorce our economy from its dependency on chemical toxicants that are known to trespass inside our bodies, without our consent.

Our current environmental regulatory apparatus does not require rigorous testing of chemicals as a precondition for marketing them. It also makes it very difficult to ban chemicals once they are in commerce. Of the 80,000 synthetic chemicals allowed into the market, exactly five have been outlawed under the Toxics Substances Control Act since 1976. Our current environmental regulatory apparatus allows economic benefits to be balanced against human health risks. It fails to take into account the fact that we are all exposed, to use Rachel Carson's words, to a changing kaleidoscope of chemicals over our lifetimes and not just one chemical at a time. In umbilical cord blood alone, 287 different chemicals have been identified, including pesticides, stain removers, wood preservatives, mercury, and flame retardants. Benzo[a]pyrene (an ingredient in tobacco smoke, diesel exhaust, and soot) can damage eggs in the ovaries. Exposure to pesticides in men can reduce sperm count. Thus, our environmental policies may be eroding our fertility. And if a pregnancy is achieved, exposure to certain chemicals raises the risk that it will be lost through miscarriage, or what we in the scientific community call spontaneous abortion.

And here is where I am interested in engaging the pro-life community in dialogue, because whether you see this problem as a violation of women's reproductive rights or whether you see this problem as a violation of fetal sanctity, maybe we can all agree, pro-life and pro-choice, that any chemical with the power to extinguish human pregnancy has no rightful place in our economy.

Some chemicals, such as PCBs, have the power to shorten human gestation and so raise the risk for premature birth, which is the leading cause of disability in this country. Other chemicals raise the risk for pediatric cancers, which are rising in incidence more rapidly than cancers among adults.

Some chemicals can raise the risk for early puberty in girls, which in turn raises the risk for breast cancer in adulthood. In short, chemical toxicants can sabotage the story of child development and so make urgent the need for restructuring our chemicals policy along the principles of precaution and green design. And at the other end of the lifespan, evidence links environmental exposures to neurotoxicants to increased risks of dementia in old age.

So I am betting that chemical reform will be a cornerstone of this new environmental human rights movement that I see getting underway. I am betting that my children — and the generation of children they are a part of — will, by the time they are my age, consider it unthinkable to

allow cancer-causing chemicals, reproductive toxicants and brain-destroying poisons to freely circulate in our economy. They will find it unthinkable to assume an attitude of silence and willful ignorance about our ecology.

In the same way, I look back on the life of Rachel Carson — my mentor in all this, who died when I was 5 years old — and find it unthinkable that she could not speak about her own cancer diagnosis, even while dying, as I have written about my diagnosis here. Thirty years of feminism lies between my life as an adult scientist and Rachel Carson's. That human rights movement has ended the silence around the personal experience of cancer so that I have never had to fear, as did Carson, that my status as a cancer survivor will be used to impeach my science.

And in the same way, I look back on the life of Abraham Lincoln, whose portrait hangs in every schoolroom in Illinois, and marvel that our economy was once dependent on slave labor. Unthinkable. I believe our grandchildren will look back on us and marvel that our economy was once dependent on chemicals that were killing the planet and killing ourselves.

Now I am willing to concede the point that this environmental human rights movement that I am betting on is less an evidence-based prediction than a mother's fervent hope that my children will never have to fear that the phone ringing on a sunny afternoon will bring bad news from the pathology lab. I'm willing to admit that this bet is a wish that my children will grow up in a world with a functioning Gulf Stream, and some ice caps and a few coral reefs. And some octopi for my daughter to write her first book about. And some honeybees to help my son the farmer grow apples. It's a wish that his polar bear Halloween costume not outlast the species. Wishful or not, I am determined to win this bet because my children's lives are inextricably bound to the abiding ecology of this planet, which is worth everything I could possibly wager. An environmental human rights movement is the vision under which I labor, from which I am not free to desist, and which may, if we all work together, become a self-fulfilling prophecy.

May it be so.